ADEQUACY STUDY: DRAFT FINAL REPORT

Prepared for

Maryland State Department of Education

Submitted by

APA Consulting

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In 2002, the Maryland General Assembly enacted Chapter 288, the Bridge to Excellence in Public Schools Act. The Act established new primary state education aid formulas based on adequacy cost studies. These adequacy cost studies – conducted in 2000 and 2001 under the purview of the Commission on Education Finance, Equity, and Excellence – employed the professional judgment and successful schools methods and other education finance analytical tools. State funding to implement the Bridge to Excellence Act was phased in over six years, reaching full implementation in fiscal year 2008. Chapter 288 requires that a follow-up study of the adequacy of education funding in the State be undertaken approximately 10 years after the enactment of the Bridge to Excellence in Public Schools Act. The study must include, at a minimum, (1) adequacy cost studies that identify (a) a base funding level for students without special needs and (b) per pupil weights for students with special needs, where weights can be applied to the base funding level, and (2) an analysis of the effects of concentrations of poverty on adequacy targets. The adequacy cost study will be based on Maryland's College and Career-Ready Standards (MCCRS) adopted by the State Board of Education. The adequacy cost study will include two years of results from new state assessments aligned with the standards. These assessments are scheduled to be administered beginning in the 2014-2015 school year.

There are several additional components mandated to be included in the study. These components include evaluations of (1) the impact of school size, (2) the Supplemental Grants program, (3) the use of Free and Reduced-Price Meals eligibility as the proxy for identifying economic disadvantage, (4) the federal Community Eligibility Provision in Maryland, (5) prekindergarten services and the funding of such services, (6) equity and the current wealth calculation, and (7) the impact of increasing and decreasing enrollments on local school systems. The study must also include an update of the Maryland Geographic Cost of Education Index.

APA Consulting, in partnership with Picus Odden & Associates and the Maryland Equity Project at the University of Maryland, will submit a final report to the State no later than October 31, 2016.

This report describes the evidence-based model, one of the three approaches used for estimating adequacy for the study of adequacy funding for education in the State of Maryland. The final report on the study on adequate base funding amounts and weights for special needs will include a copy of this report, as required under Section 3.2.1 of the Request for Proposals (R00R4402342).

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Executive Summary

The Draft Adequacy Report presents the findings of Augenblick, Palaich and Associates' (APA) adequacy analysis for the State of Maryland. The APA study team's estimate of the cost of an adequate education in Maryland used three approaches for estimating adequacy, the results of which were crafted into a single adequacy recommendation for the State. The study team also developed recommendations for a new funding formula incorporating its adequacy recommendation and a model to analyze the impacts of the proposed school funding formula on the State and on individual school districts.

This report is the culmination of two years of work by the study team to estimate the cost of an adequate education in Maryland and to conduct a number of related analyses required in the State's Request for Proposals (RFP). A final version of this adequacy report incorporating feedback from state and local stakeholders will be submitted by APA at the end of November 2016.

State Context

There are 879,601 students in grades prekindergarten through 12 enrolled in 24 school districts in the State of Maryland.[1] Sixty-one percent of all students are racial or ethnic minorities. The proportion of students receiving specialized services includes 44.6 percent who are low-income as measured by eligibility for the federal free and reduced-price lunch program, 7.9 percent who receive limited English proficiency services, and 11.3 percent who receive special education services.

Of the State's 24 school districts, 23 are county-based and the remaining district serves Baltimore City. There is a wide range in district enrollment, ranging from 2,029 students in Kent County to 156,380 in Montgomery County. Six districts enroll more than 50,000 students and three districts enroll more than 100,000 students. All of the districts are fiscally dependent, meaning that they do not have to raise their own tax revenues but rely on local appropriations from the county or city in which they are located.

In 2010, Maryland adopted new Common Core-based State standards, the Maryland College and Career-Ready Standards, and began administering the Partnership for Assessment of Readiness for College and Careers (PARCC) assessments statewide in the 2014-15 school year.

In fiscal year 2015, Maryland spent more than $5.1 billion on its major state education aid programs,[2] while local jurisdictions contributed another $5.7 billion in local appropriations for education, totaling $10.8 billion in State and local support for prekindergarten through grade 12 education.

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[1] Enrollment and demographic information are taken from the 2016 Maryland State Report Card found at: http://reportcard.msde.maryland.gov/Entity.aspx?WDATA=State

[2] The foundation, compensatory education, limited English proficiency, and special education program; student transportation; guaranteed tax base; net taxable income grants; supplemental grants; and declining enrollment grants.

Study Context

APA carried out a similar adequacy study for the State in 2000 and 2001 under the direction of the Commission on Education Finance, Equity, and Excellence, also known as the Thornton Commission. The 2002 legislation resulting from that study, the Bridge to Excellence in Public Schools Act, significantly increased state support for education and established the school finance formulas that are still used to allocate resources to county boards of education and the Baltimore City Public Schools today. The state aid distributed through these formulas are primarily based on differences in student enrollment, student need, and local wealth. The 2002 Act also required a follow up study of the adequacy of education funding in the State to be undertaken approximately 10 years after its enactment.

Current School Finance System

The new school funding formula established by the Bridge to Excellence in Public Schools Act retained the foundation-style funding formula previously used by the State, but set a level of funding based on adequacy. Foundation formulas set a minimum per student amount of funding, known as the foundation amount, which is multiplied by the count of eligible students to generate a total foundation program funding amount. The foundation amount set by the Act was based on the adequacy recommendations from the Thornton Commission study. The adequacy of the foundation amount was to be maintained by adjusting it for inflation annually. However, recent State budget shortfalls have curtailed the inflationary increases. In fiscal year 2015 the foundation level was set at $6,860 per student. In addition to an inflation adjustment, the Act also called for the development of a Maryland-specific geographic cost of education index (GCEI) for adjusting the foundation total program amount to account for regional cost differences. The GCEI adopted by the State in 2005 takes into account regional cost differences in professional district salaries, non-professional district salaries, energy, and other instructional costs. As implemented, the index is truncated at 1.0, or the statewide average cost, which provides additional funding for districts in high-cost regions but does not make corresponding reductions for districts in low-cost regions. The additional funding generated by the GCEI consists entirely of state aid.

Like other foundation funding formulas, Maryland's formula attempts to reduce the amount of disparities in education funding due to differences in local wealth through "wealth equalization." To accomplish wealth equalization, Maryland's foundation formula specifies a uniform local contribution rate that is multiplied by a jurisdiction's local wealth to determine its local share of total program. Jurisdictions with less local wealth generate a smaller local share and receive a larger share of total program funding in aid provided by the State. Conversely, jurisdictions with greater wealth generate a larger local share and receive a smaller share of state aid. The local contribution rate is designed so that, on average across all local jurisdictions, state aid comprises half of the total program funding amount. The measure of local wealth that the local contribution rate is applied to consists of the real and personal property assessable value in the jurisdiction plus its total net taxable income (NTI).

Maryland uses a similar formula for calculating total program funding for three state aid programs used to support students with special needs: 1) the compensatory education program for serving at risk students, 2) the limited English proficiency (LEP) program,[3] and 3) the special education program. The per student program funding amount for these three programs is determined by multiplying the per student foundation amount by a weight to account for the additional costs of educating these students. The program amounts for these three funding programs are also wealth equalized to account for differences in local wealth. Unlike the foundation program, local jurisdictions are not required to appropriate a local share for these three programs.

Table 1 shows the student count, special needs program weights, and per pupil amounts for the foundation, compensatory education, LEP, and special education funding formulas. The state share of the three special needs programs is also shown, since that is the only required amount of funding.

Table 1
FY 2015 Formula Components

Program	Student Count	Weight	Per Pupil Total Program Amount	Per Pupil State Share Amount
Foundation	FTE* Enrollment Grades K-12	N/A	$6,860	N/A
Compensatory Education	Eligible for Federal Free and Reduced Price Lunch	0.97	$6,654	$3,327
Limited English Proficient	Eligible for Program Services	0.99	$6,791	$3,396
Special Education	Eligible for Program Services	0.74	$5,076	$2,538

*Full-Time Equivalent

A minimum amount of state aid is also guaranteed for each of these programs. The minimum state aid guarantee for the foundation program is 15 percent of total program funding. The minimum state aid guarantee for each of the three special needs programs is 40 percent of the state share of funding.

Maryland's funding system includes several other major funding programs, each of which is listed below:

- **Guaranteed tax base (GTB)**: the GTB provides a financial incentive for jurisdictions with less than 80 percent of the statewide average local wealth per pupil to increase their local education appropriation. These jurisdictions may receive up to 20 percent of the per pupil foundation amount in additional state aid;

- **net taxable income education grants**: when the federal government changed the federal income tax extension filing deadline from August to October, the State conformed to this schedule for state income tax purposes. Beginning in fiscal year 2014, the State began

[3] Limited English proficiency (LEP) students are also commonly referred to as English language learners (ELL). Maryland's funding system refers to these students as LEP students. For the sake of consistency in this report, they will be referred to as LEP students throughout.

calculating state aid using both the September and November net taxable income totals for local jurisdictions. The State then uses the NTI which produces the largest state aid amount. If the November NTI-based aid amount is larger, districts receive the difference in additional state aid. This increase in state aid was to be phased-in over a five-year period;

- **grants to counties with declining enrollment**: assists smaller districts with declining enrollment by providing a state grant equal to 50 percent of the decrease in state education aid from the prior year. Only two districts meet the grant program's eligibility criteria;

- **supplemental grants**: beginning in fiscal year 2009 supplemental grants were paid to ensure that all districts received at least a one percent annual increase in state funding following a freeze of the per pupil foundation in fiscal years 2009 and 2010. The grant amounts paid to nine districts were frozen beginning in fiscal 2011; and

- **student transportation**: state aid for student transportation is based on a district's prior year grant with adjustments for inflation and increases in enrollment. Districts are guaranteed a minimum annual increase of one percent.

New Adequacy and Related Studies

In March 2014, the Maryland State Department of Education (MSDE) issued an RFP for the follow-up adequacy study required by the Bridge to Excellence in Public Schools Act. The study was to include, at a minimum, adequacy cost studies that identified a base funding level for students without special needs, per pupil weights for students with special needs to be applied to the base funding level, and an analysis of the effects of concentrations of poverty on adequacy targets. The adequacy cost study was to be based on the requirements of the Maryland College and Career-Ready Standards adopted by the State Board of Education.

Augenblick, Palaich and Associates (APA), in partnership with Picus, Odden and Associates (POA) and the Maryland Equity Project (MEP) at the University of Maryland, was selected to conduct the study. The RFP required the consultants to undertake a broad analysis including the following tasks:

- Conduct an adequacy study using at least two approaches;
- calibrate the study to identify the funding required to implement the Maryland College and Career-Ready Standards;
- identify a per pupil base level of funding and per pupil weights for students with special needs, such as economically disadvantaged students eligible for the federal free and reduced-price lunch program (FRPM), students with limited English proficiency (LEP) and students eligible for special education services;
- analyze the effects of concentrations of poverty on the adequacy estimates;

- identify gaps in growth and achievement among student groups and make recommendations of programs that might address these gaps;
- find possible relationships between student performance and funding deficits;
- assess the impact of quality prekindergarten on school readiness as a factor in the adequacy estimates;
- make recommendations on any other factors to be included as part of the adequacy study; and
- conduct a review of adequacy studies carried out in other states and report on best practices and recommendations for the Maryland study.

Approaches to Adequacy

The concept of adequacy as it relates to education funding grew out of the standards-based reform movement. As states implemented specific learning standards and performance expectations for what students should know – along with consequences for districts and schools failing to meet these expectations (and, eventually, federal expectations imposed through No Child Left Behind and continued by the Every Student Succeeds Act) – the focus of school finance shifted to an examination of the resources necessary to provide districts, schools, and students with reasonable opportunities to achieve state standards. Over the past two decades, researchers have developed four approaches to creating estimates for the level of funding necessary to provide all students with the opportunity to receive an adequate education. APA and its partners employed the first three approaches to estimate adequacy in Maryland:

1. The **evidence-based (EB)** approach was developed by Picus, Odden, and Associates. The EB approach assumes that information from research can be used to define the resource needs of a prototypical school or district to ensure that the school or district can meet state standards. The approach not only estimates resource levels, but also specifies the programs and strategies by which such resources could be used efficiently. The costs are then estimated using a model of prototypical schools and a district central office. The EB approach conducts case studies of existing high performing schools in the State and convenes multiple panels of state educators to review the EB model to ensure that it is consistent with the State's context. The EB approach is used to identify a base cost figure and adjustments for special needs students. In Maryland, the study team conducted case studies of 12 high-performing schools and convened four educator panels across the State.

2. The **professional judgment (PJ)** approach was first used in Wyoming in the mid-1990s and has since become one of the most widely used adequacy approaches. The PJ approach begins with evidence-based research but relies on and defers to the experience and expertise of educators in the State to identify the resources needed to ensure that all districts, schools, and students can meet state standards and requirements. Resources include school-level personnel, non-personnel costs, additional supports and services, technology, and district-level resources. The costs of these resources are then estimated via a cost model based on schools and district central offices representative of school and district sizes in the State. The PJ approach identifies

both a base cost and adjustments for special needs students. Nine panels of Maryland educators were convened, ranging from school-level to state-level perspectives, to develop the PJ model.

3. The **successful schools/school district (SSD)** approach was developed by APA. The SSD approach determines an adequate per pupil base cost amount by using the actual expenditure levels of schools or school districts that are currently outperforming other schools on state performance objectives. This approach assumes that every school and school district, in order to be successful, needs the same level of base funding that is available to the most successful schools and districts. However, the SSD approach does not necessarily indicate what it would take for a school and its students to meet all state requirements. The SSD approach is only able look at the base spending amount for a student with no additional needs, due to limitations on collecting special need student expenditure data. Finally, the SSD approach does not provide the study team with detailed information on the types of programs or interventions being employed by the schools. SSD studies are typically conducted at the district-level, but because Maryland has only 24 districts, this study examined school-level expenditures. Seventy-two schools representing 10 districts were selected for the study.

4. The fourth approach, the **cost function or statistical (CF)** approach, is an econometric method that estimates the level of funding needed to achieve a given level of student achievement as measured on assessments while controlling for student and district characteristics. The cost function approach was not used because it consists of a district level statistical model that requires a much larger number of districts than the 24 districts in Maryland to produce reliable results. Also, due to its complexity and use of econometric modeling techniques, the approach has proven difficult to explain in situations other than academic forums.

Table 2 summarizes the three approaches APA used for developing its adequacy estimates for Maryland.

Table 2
Summary of Three Approaches to Adequacy Used by APA

	Evidence-Based	Professional Judgment	Successful Schools/Districts
Benchmark of Success	Ensuring students can meet all State standards	Ensuring students can meet all state standards	Currently outperforming other Maryland schools
Data Source	Best practice research, reviewed by Maryland educators; when conflict arises in resource recommendations, the EB approach defers to the research	Expertise of Maryland educators serving on PJ panels; uses research as a starting point but defers to educators when conflict arises in resource recommendations	2014-15 expenditure data from selected successful schools

	Evidence-Based	Professional Judgment	Successful Schools/Districts
Available Data Points			
Base	Yes	Yes	Yes
Student Adjustments (Weights)	Yes	Yes	No

Reconciling Adequacy Approaches

The different perspectives of the three approaches used by the study team to estimate an adequate education in Maryland led to differing results. Table 3 shows the estimated base cost and weights for students with special needs for each of the three approaches and compares them to current funding.

Table 3
Base and Weights by Different Study Approach

	2014-15 Maryland	Evidence-Based	Professional Judgment	Successful Schools
Base Cost	$6,860	$10,551	$11,607	$8,700
Weights				
Compensatory Education (At risk)	0.97	0.30	0.36	N/A
Limited English Proficient	0.99	0.38	0.61	N/A
Special Education	0.74	0.70	1.18	N/A
Prekindergarten		0.40	0.26	

The study team felt that the best benchmark of success for developing a single adequacy figure in Maryland was to identify the resources needed not just to outperform other districts today, but to reach the higher benchmark of ensuring all students have the opportunity to achieve all state standards. Therefore, the study team recommends that an adequacy base cost figure be derived from the EB and PJ approaches. While the study team does not believe the SSD figure fully represents the cost of adequacy, it does present an important reference point for phasing in a new funding system, if necessary.

The EB and PJ approaches produced relatively similar base cost figures: the EB base is $10,514 and the PJ base is $11,607. However, larger differences existed in the weights for special needs students. In reviewing the EB and PJ resource models, the study team identified five important resource areas driving the differences in the estimates generated by the two approaches:

- Elementary school teacher-to-student ratios;
- Middle school teacher preparation time;
- School administration staffing, specifically assistant principals;
- School level student support services; and
- Inclusion of CTE resources in the models.

The study team reviewed the resource differences and made a recommendation in each area to create an adjusted model for each approach. It is important to note that the study team was not attempting to create a specific model for implementation, but instead was reconciling the largest resource differences in order to create a single cost estimate. The study team also examined differences in the resources included in each model for determining special needs weights, particularly for the LEP and special education weights, which differed the most, and used professional judgment panel and school case study information to determine new, blended weights.

This analysis resulted in a single estimate of an adequate per pupil base cost and weights. These figures were further adjusted to account for federal education funds and a net base cost and weights were calculated. Table 4 presents the study team's final estimate of an adequate base cost and weights.

Table 4
Final Adequacy Base and Weights

	Final Estimates
Base Cost	$10,880
Weights	
Compensatory Education	0.35
Limited English Proficient	0.35
Special Education	0.91
Prekindergarten	0.29

These estimates represent a significant shift from the current funding model used in Maryland. The per pupil base cost presented here is much higher than the current Maryland base of $6,860 for fiscal year 2015 and includes a significantly higher level of supports and services for all students, which was a recurring theme voiced by the PJ panels in discussions of specific resources. Conversely, the estimated weights for students with special needs are considerably lower than current weights, with the exception of the weight for special education. This change is a result of the much higher base cost and the expectation that a higher level of services will be provided through the base cost allocation. Both the EB and PJ approaches, and thus the resulting blended base figure, represent an important shift toward allocating more resources through the base cost to provide a higher level of services to all students regardless of need.

Recommendations

The study team considers the recommended formula in two parts. The first part is the calculation of district adequacy targets. This includes determining: (1) the student counts that are used, (2) the base amount of funding per pupil, (3) the adjustments for special needs students (including special education, compensatory education, and LEP students), and (4) any adjustment for regional cost of living differences. The calculation of an adequacy target is done outside any considerations of state and local responsibilities to pay for the adequacy target.

The second part of the formula revision focuses on the state and local shares for paying for the adequacy target. Recommendations include: (5) how to measure each district's capacity to pay for the adequacy target, and (6) if any minimum state aid guarantees should be included and whether local jurisdictions should be required to appropriate the local share of special needs programs. Combining the adequacy targets with the calculation of funding sources allows the study team to compare the current funding system to the recommended system.

Calculating District Adequacy Targets

To calculate a districts total adequacy target, regardless of the state or local share, student counts are multiplied by the base cost and special needs adjustments and then adjusted for regional cost differences. The decisions for each of these key components of calculating adequacy targets are described below.

Student Counts

The study team recommends changes to current student count methods for: (1) addressing declining enrollments for general education formulas, (2) counting low-income students for compensatory total program, and (3) including prekindergarten students in the State's full-time equivalent enrollment counts to provide universal prekindergarten services.

1. **Declining Enrollment.** The study team recommends including a declining enrollment calculation when calculating total enrollment for each district. The proposed methodology would use three years of enrollment information in the calculation of the total enrollment figure, allowing districts to absorb the loss of funding related to the loss of students over time. A district would receive the greater of two counts: the prior year's enrollment count or the average of the three prior years' counts. The calculation ensures that districts with growing enrollments receive funding based on the most recent enrollment count.
2. **Counting Low-Income Students.** The issue of how to best count low-income students was raised as a result of the growing use of the Community Eligibility Provision (CEP) included in the 2010 Healthy, Hunger-Free Kids Act (HHFKA), which allows eligible,[4] participating schools to serve free meals to all of its students. In a move to reduce reporting burdens on schools, the law prohibits participating schools from collecting application forms for the federal free and reduced-price lunch program during the four-year CEP eligibility period, which results in incomplete district and state-wide FRPM counts. The study team recommends continued use of free- and reduced-price lunch eligibility to identify students for compensatory education funding, but also recommends the use of a state-developed alternative form for collecting free- and reduced-price lunch eligibility information.
3. **Counting Prekindergarten Students.** Maryland currently provides funding for prekindergarten students who meet specific qualifying criteria related to the income of the child's family. The study team recommends a goal of providing high-quality prekindergarten for up to 80 percent of

[4] Schools are eligible for CEP if 40 percent or more of its students have been identified as being vulnerable to hunger during the spring of the prior school year. Among the factors that may be used to identify children are homelessness, placement in foster care, participation in Head Start, migrant status, and living in households receiving services from the SNAP, FDPIR, or TANF programs.

four-year old students. The recommended program is six-and-a-half hours long in a public or private setting that has earned an EXCELS rating of level 5, and is nationally accredited or is a public school program. To be included in the enrollment count used for state foundation funding, prekindergarten programs would be required to meet one of these quality criteria.

Base Cost

The study team recommends adopting a new per pupil base cost of $10,880. The difference between the recommended base cost ($10,880) and the current base cost ($6,860) is substantial and represents a greater focus on providing resources at the base level to all students (instead of through adjustments tied to student need) than in the previous adequacy work done for the Thornton Commission. Schools and districts are being asked to make meaningful progress in getting all students to meet high standards every year and require resources to provide the supports and services to do so. Further, since 2002, there are additional requirements for schools and districts, such educator evaluations that require additional resources to accomplish.

The new adequacy recommendation with a higher base and smaller weights is also more consistent with the findings of other recent adequacy studies as presented in the previously released report entitled *A Comprehensive Review of State Adequacy Studies Since 2003* (September 2014).

Weights

Student adjustments, or weights, are designed to provide the additional resources these students need above the base cost to ensure they can meet state standards. The study team recommends the following student need adjustments for special education, compensatory education, LEP, and prekindergarten students as shown in Table 5:

Table 5
Weights

Student Category	Weight
Compensatory Education	0.35
Limited English Proficient	0.35
Special Education	0.91
Prekindergarten	0.29

The recommended compensatory education and LEP weights, both 0.35, are lower than the current weights. This is reflective of the shift to providing additional resources in the base instead of through adjustments tied to student need as discussed above. Further, both weights are recommended to be linear, regardless of the concentration of these students. The study team concludes that at this time the evidence is not compelling to justify non-linear funding mechanisms,[5] even though the challenges that

[5] Under a non-linear weighting approach, a higher weight would be applied to districts (or schools) with higher concentrations of students in poverty. Under this approach, districts with higher concentrations of students in poverty would receive more funding per eligible student than districts with lower concentrations. Under a linear weighting approach, all students receive the same weighting (and amount of additional funding) regardless of poverty concentrations.

high-poverty schools face are readily observed. Neither the research literature nor the results from the PJ and EB studies indicate a need for a non-linear approach. The study team also proposes to continue to use a single weight, 0.91, for special education students. This weight is higher than the current weight of 0.74, but is in line with recommendations made in recent adequacy studies for other states. Finally, the study team proposes a prekindergarten weight of 0.29.

Though some of the proposed weights may be lower than current weights, there are two reasons why the proposed lower weights do not necessarily mean special needs students would receive fewer resources. First, the new weights are applied to a higher recommended base. Second, the current weights may not be fully funded at present, as only the state share of funding for the current weights is guaranteed. The study team recommends that the weights from this study be fully funded.

Regional Cost Adjustment

Regional cost adjustments are applied to funding targets to account for geographical differences in the costs faced by districts across the state. Maryland currently uses the Geographic Cost of Education Index (GCEI) to adjust the foundation total program for regional cost differences. The current GCEI is also truncated at 1.0, so only jurisdictions with higher than average costs are impacted. The study team is recommending using an alternative method, the comparable wage index (CWI), to adjust for regional cost differences. Specifically, the study recommends using a rolling three-year average of the CWI to minimize year-to-year variation and produce more stable funding patterns. The study team further recommends all formula funds (foundation, compensatory education, LEP, and special education) be adjusted by the CWI. The study team also recommends that adjustments be made for districts with CWI figures above and below the statewide average, which would result in funding increases for regions with higher than average costs and decreases for regions with lower than average regional costs. Finally, the study team recommends the CWI adjusted total funding figures be used as the basis for calculating state and local share, meaning the costs of the CWI adjustment would be borne by the state and local jurisdictions.

Determining State and Local Funding

Equalized state funding systems determine state and local funding based on the wealth of each district, the required levy, any additional adjustments such as minimum aid guarantees or guaranteed tax bases, and the ability of districts to raise dollars above the foundation formula. This section examines each of the study team's recommendations for these components.

Local Wealth

The study team examined three issues related to determining the local wealth of districts: 1) the choice of using September or November Net Taxable Income (NTI), whichever provided the largest amount of state aid, when determining local wealth, and 2) the method for combining local, assessed property values and NTI.

The study team provided recommendations on the issues of NTI and the method used for combining assessed property values and NTI but did not make a specific recommendation related to tax increment financing.

1. **Net Taxable Income.** Currently, MSDE calculates each funding formula impacted by local wealth using both the September and November NTI. Districts receive the calculation that results in the largest amount of state aid. The study team believes that the November NTI provides the more accurate measure of NTI, and hence the fiscal capacity of each district, because it includes a larger proportion of a county's income tax returns – including those filed closer to the extension deadline of October 15. Thus, the study team recommends using only the November NTI data for determining local wealth.

2. **Combining Assessed Property Values and NTI.** Currently, Maryland includes both property and income wealth in its measurement of a district's local wealth. The study team recommends continuing to include both of these components but recommends an alternative approach to combining them into a single local wealth figure. Instead of using the current additive approach for combining property and income wealth, in which a county's assessed property value and NTI are added together, the study team recommends using a multiplicative approach. Using this approach, each county's assessed property wealth is adjusted by multiplying by the ratio of the county's NTI to the state average NTI. This method gives NTI a greater weight in the overall wealth calculation than is the case using the current method.

Minimum State Aid Guarantees and Local Shares of Special Needs Programs

Maryland's current funding programs provide minimum state funding guarantees for the foundation and special needs state aid programs. District are guaranteed to receive at least 15 percent of foundation total program cost as state aid and at least 40 percent of special needs total program cost (compensatory education, LEP, and special education) as state aid. Further, districts are not required to provide a local share for any of these special needs total program formulas. The study team makes two recommendations concerning these issues. First, the minimum state aid guarantees should be eliminated for foundation and special needs funding programs. Eliminating the state aid minimums will free-up State funding dollars which could be used to provide additional support to those districts with lower local wealth and higher needs. Second, the study team recommends that all districts should be required to appropriate the full local share for all of the special needs funding programs. This change would both improve equity and ensure that districts are receiving the full funding amount identified by the adequacy study.

Other State Funding Programs and Tax Increment Financing

There are several issues that the study team explored but about which the team did not provide specific recommendations. These consist of transportation aid, the Guaranteed Tax Base (GTB) state aid program, and Tax Increment Financing. In all three cases, the study team determined there were insufficient research findings in the literature or examples of best practices from other states to support making a recommendation.

However, the research team recognizes that these issues should be explored and recommends that the State continue to study these issues and develop recommendations in the future.

Transportation Aid

Transportation aid provides funding for the transportation of general education and disabled students to and from school. The formula begins with a base amount equal to a district's prior year grant and is then adjusted for inflation and enrollment growth. The study team's recommendations would potentially impact the amount of transportation aid in two ways. First, the recommendation to use the greater of the prior year's FTE enrollment or the average of the three prior years' FTE enrollment will result in higher enrollments in declining enrollment districts, thus providing more aid for these districts and increasing State costs. Second, a determination must be made whether prekindergarten students will be transported via district transportation services, and if so, if prekindergarten counts be included in the enrollment counts used to adjust districts' base grant amount. It should be noted that the research team recommended that the transportation aid formula should be thoroughly studied to determine if an updated formula is warranted (Hartman and Schoch, 2015).

Guaranteed Tax Base

The current GTB program was established to incentivize districts with less than 80 percent of the statewide average per pupil wealth to provide a larger local education appropriation. The GTB provides additional state aid for these districts based on two factors: 1) the amount of their local education appropriation in excess of their local foundation share; and 2) the ratio of their wealth per pupil to 80 percent of the statewide average wealth per pupil. Under the current system, the GTB program is an important incentive for jurisdictions to provide a local appropriation for the special needs funding programs. Also, given the current low base funding amount, it aids lower wealth jurisdictions to provide an additional local appropriation to supplement their foundation total program funding. However, under the study team's recommendation that all jurisdictions provide a full local share of the special needs total program amounts, and with a new, adequate base funding amount, the State should examine whether the GTB should be continued in its present form and purpose.

Tax Increment Financing

Tax increment financing (TIF) is an economic development tool that uses the growth in property values in a designated area to pay for some of the costs of redevelopment, such as the principle and interest of municipal bonds issued to pay for new infrastructure. Because the tax assessments on these properties are used for other purposes, they are not available to support the general operations of local jurisdictions. In Maryland, the growth in property values in designated TIF areas are included in the calculation of property wealth for counties and the City of Baltimore, but these jurisdictions are not able to use the local tax revenues generated by these properties for education funding purposes. In several counties and the City of Baltimore, this results in either a loss of education funding or higher tax assessments on other properties. The study team's analysis of the calculation of local wealth studied this issue and presented an example of how another state has dealt with this issue. However, the study team does not offer a specific recommendation but instead suggests that the State continue to study this issue.

Total Cost of the Recommendations

The study team's adequacy recommendations would result in a significant additional investment in education by the State and some local jurisdictions. The recommendations would also result in some redistribution of resources across districts, even though all districts would experience an increase in funding.

The total State share for major state aid programs, excluding transportation, would increase from $4.9 billion to $6.8 billion - an increase of $1.9 billion or 39 percent - over current fiscal year 2015 state aid.[6] It is impossible to make an apples to apples comparison of current and proposed local shares, since local jurisdictions are not currently required to provide a local share for the special needs aid programs and many jurisdictions make additional local appropriations beyond what would be required to fund the local share of all of the major aid programs. However, a comparison of the proposed local share for the foundation and special needs programs to the current fiscal year 2015 total local appropriation provides a reasonable estimate of the local impact of these recommendations. Using this comparison, the local share would increase from $5.7 billion to $6.4 billion, an increase of $710.5 million or 12 percent.

Together, again estimating the local share using the local share for all major state aid program as the proposed local appropriation and the actual current total local appropriation, total funding for all major state aid programs, excluding transportation, would increase from $10.6 billion currently to $13.2 billion, an increase of $2.6 billion or 25 percent.

Summary of Previously Released Reports

The adequacy recommendations detailed above were informed by 13 studies conducted prior to this draft final report. This section briefly describes the reports produced for each of these studies. The reports range from research summaries to final impact analyses and provide detailed research methodologies, findings, and recommendations. Specifically, three of the reports focus on school size and two center on enrollment trends and prekindergarten. The remaining studies involve aspects of school finance equity, such as concentrations of poverty and the geographic cost of education. PDFs of the full reports are available on the Maryland State Department of Education's website at the links provided.

A Comprehensive Review of State Adequacy Studies Since 2003 **(September 2014)**
The purpose of this review is to provide Maryland policy makers with information on how the studies were conducted, what the estimated adequate funding levels are, and where definitive information exists, the policy impact the studies had in their own states.

http://archives.marylandpublicschools.org/adequacystudy/docs/AdequacyReviewReport_rev_091214.pdf

[6] Fiscal year 2015 is the latest year for which all of the data necessary for making these estimates were available.

***Summary of School Size Report* (September 2014)**

This report is the first of three required school size reports. The report identifies three factors: whether local Maryland school systems currently have policies regarding the size of schools including high schools, middle schools, elementary schools, and alternative schools, including the role of the public in determining the policy; other states' policies and best practices regarding school size; and an initial summary of the research regarding school size and the educational issues affected by school size.

http://archives.marylandpublicschools.org/adequacystudy/docs/SchoolSizeReport_rev_091114.pdf

***Proposed Methodology for Establishing Adequate Funding Levels in the State of Maryland* (December 2014)**

This report describes the approach the research team and its partners take to estimate a per student base funding level and per student weights for those students with special needs such as an impoverished background, LEP, and cognitive or physical disabilities. The report describes the study team's approach as presented in its proposed methodology to the MSDE, input on that approach received since work began on the study, and the study team's proposed changes to its approach.

http://archives.marylandpublicschools.org/adequacystudy/docs/ProposedMethodsEstablishingAdequatyFundingLevelsMD.pdf

***Preliminary Report on the Impact of School Size* (January 2015)**

The second of three required school size reports, this *Preliminary Report on the Impact of School Size* serves four purposes: extends the findings from the literature review on the impacts of smaller schools on student achievement, efficiency, and school climate contained in the first report; identifies models for establishing smaller schools as presented in the literature; describes currently available state programs for supporting school facility construction in Maryland; and outlines the remaining analyses to be presented in the final school size report.

http://archives.marylandpublicschools.org/adequacystudy/docs/PreliminaryImpactofSchoolSize.pdf

***Adequacy Cost Study: An Interim Report on Methodology and Progress* (July 2015)**

The *Adequacy Cost Study* provides a comprehensive progress report on the adequacy study components found in Section 3.2.1 of the state's RFP. The report begins with an overview of the adequacy study requirements outlined in the RFP, followed by an outline of the research team's specific approach to determining adequacy. The report then gives a description of the work required for each of the adequacy study's components, a description of the work already underway or completed, a description of the work still to be started, and a timeline for the completion of the work.

http://archives.marylandpublicschools.org/adequacystudy/docs/InterimAdequacyStudyReport-071015Final.pdf

***Evaluation of the Use of Free and Reduced-Price Meal Eligibility as a Proxy for Identifying Economically Disadvantaged Students: Alternative Measures and Recommendations* (July 2015)**
This evaluation describes the approach the research team and its partners took to evaluate the use of free and reduced-price meal eligibility as a proxy for identifying economically disadvantaged students, including the consideration of alternative measures of economic disadvantages, for calculating compensatory aid. More specifically, it describes the indicators of economic disadvantage currently being used by state school funding formulas across the nation, including how states are addressing the changes in the collection of family income data as a result of the Community Eligibility Provision (CEP) of the Healthy, Hunger-Free Kids Act of 2010, and it simulates the effects on school district shares of state counts of economically disadvantaged students for nine different proxies. The report concludes with a discussion of the tradeoffs associated with each model.

http://archives.marylandpublicschools.org/adequacystudy/docs/EvaluationFRPMEligibilityProxyEconomicDisadvantage.pdf

***Final School Size Study Report: Impact of Smaller Schools* (July 2015)**
Following the first two reports on the impacts of school size, this third and final report presents the analyses and findings from the first two school size reports along with the concluding analyses and findings of the school size study. This report examines the impacts of school size on student achievement and school operating costs; examines the relationship between school size and school climate; examines the relationship between school size and extracurricular participation; presents a review of factors influencing school size; proposes alternative methods for creating smaller learning environments; and discusses the potential impact of smaller school guidelines on Maryland's school construction funding programs. Finally, this report presents the research team's recommendations regarding school size.

http://archives.marylandpublicschools.org/adequacystudy/docs/SchoolSizeReport071615.pdf

***Final Report of the Study of Increasing and Declining Enrollment in Maryland Public Schools* (November 2015)**
This report presents the findings of the study on increasing and decreasing enrollment. The scope of the study includes analysis of enrollment trends and their relationship to local school system characteristics, and transportation and operational costs. Transportation was singled out for additional study to evaluate the transportation costs in conjunction with the numbers and types of students served, operating characteristics, and state funding.

http://archives.marylandpublicschools.org/adequacystudy/docs/MDEnrollmentReport-Rev111615.pdf

Geographic Cost of Education Adjustment for Maryland **(November 2015)**
Geographic Cost of Education Adjustment for Maryland evaluates the current Maryland Geographic Cost of Education Index (GCEI) and makes recommendations for possible revisions. This review provides information on the benefits and costs of different methods that could be used to estimate geographic costs and recommends that Maryland adopt the comparable wage index method to replace its current GCEI. The objective of this review is to give policy makers the information necessary to determine the best approach for Maryland.

http://archives.marylandpublicschools.org/adequacystudy/docs/APA-POA-GCEI-Report-Rev-11232015.pdf

Analysis of School Finance Equity and Local Wealth Measures in Maryland **(December 2015)**
This examination provides an analysis of the school finance equity in Maryland's current school funding formulas and offers further analysis of alternative wealth measures for distribution of state aid to local school districts.

http://archives.marylandpublicschools.org/adequacystudy/docs/APA-POA-MarylandWealthEquityReport-Rev121115.pdf

The Effects of Concentrations of Poverty on School Performance and School Resource Needs: A Literature Review **(December 2015)**
This literature review addresses the effects of concentrations of poverty on the research team's adequacy recommendations. This report provides a review of the relevant literature related to the effects of poverty on both student- and school-level academic outcomes. This report also discusses whether there is evidence to support providing additional per student funding to districts with higher concentrations of poverty.

http://archives.marylandpublicschools.org/adequacystudy/docs/ConcentratedPovertyLitReviewFinalDraft-071015.pdf

A Comprehensive Analysis of Prekindergarten in Maryland **(January 2016)**
As a comprehensive analysis of Maryland's prekindergarten system, this document provides six components: a detailed literature review on prekindergarten; an analysis of current prekindergarten capacity, enrollment, and quality distribution in Maryland; an analysis of current prekindergarten funding in Maryland; a comparative analysis of prekindergarten in Maryland and prekindergarten in 11 other states and the District of Columbia; a cost-benefit analysis of universal prekindergarten in Maryland; and a set of recommendations for Maryland as it continues to develop its prekindergarten programs.

http://archives.marylandpublicschools.org/adequacystudy/docs/MDPreKComprehensiveAnalysis011316.pdf

***A Comparable Wage Index for Maryland* (July 2016)**
This report briefly reviews the rationale for adjusting for variations in educational costs by geographic locations using a geographic cost of education index. It then estimates a comparable wage index (CWI) for Maryland based on the recommendation made in the earlier *Geographic Cost of Education Adjustment for Maryland* report.

http://archives.marylandpublicschools.org/adequacystudy/docs/APAPOAGCEIFinalReport070716.pdf

I. Introduction

This draft final report presents the findings of the study team's adequacy analysis for the State of Maryland. Like the original adequacy study conducted for the Commission on Education Finance, Equity and Excellence (Thornton Commission) in 2000 and 2001, this study also made use of multiple approaches to estimating adequacy. Then, through an analysis of the differences in the results of the multiple approaches, the study crafted a single adequacy recommendation for the State. The study team also developed recommendations for a new funding formula incorporating its adequacy recommendation and a model to analyze the impacts of its proposed school funding formula on the State and on individual school districts.

This report is the culmination of two years of work by the study team to estimate the cost of an adequate education in Maryland and to conduct a number of related analyses required in the State's Request for Proposals (RFP). These studies are summarized later in this report. A final version of this adequacy report incorporating feedback from state and local stakeholders will be submitted by the study team at the end of November 2016.

State Context

There are 879,601 students in grades prekindergarten through 12 enrolled in 24 school districts in the State of Maryland.[7] Sixty-one percent of all students are racial or ethnic minorities. The proportion of students receiving specialized services includes 44.6 percent who are low-income as measured by eligibility for the federal free and reduced-price lunch program, 7.9 percent who receive limited English proficiency (LEP)[8] services, and 11.3 percent who receive special education services.

Of the State's 24 school districts, 23 are county-based and the remaining district serves Baltimore City. There is a wide range in district enrollment, ranging from 2,029 students in Kent County to 156,380 in Montgomery County. Six districts enroll more than 50,000 students and three districts enroll more than 100,000 students. All of the districts are fiscally dependent, meaning that they do not have raise their own tax aid but rely on local appropriations from the county of city in which they are located.

Maryland adopted new Common Core-based state standards, the Maryland College and Career-Ready Standards, effective for the 2012-2013 school year and began administering the Partnership for Assessment of Readiness for College and Careers (PARCC) assessments statewide in the 2014-15 school year.

[7] Enrollment and demographic information are taken from the 2016 Maryland State Report Card found at: http://reportcard.msde.maryland.gov/Entity.aspx?WDATA=State

[8] Limited English proficiency (LEP) students are also commonly referred to as English language learners (ELL). Maryland's funding system refers to these students as LEP students. For the sake of consistency in this report, they will be referred to as LEP students throughout.

In fiscal year 2015 Maryland spent more than $5.1 billion on its major state education aid programs,[9] while local jurisdictions contributed another $5.7 billion in local appropriations for education, totaling $10.8 billion in state and local support for prekindergarten through grade 12 education.

Study Context

APA carried out a similar adequacy study for the State in 2000 and 2001 under the direction of the Commission on Education Finance, Equity, and Excellence, also known as the Thornton Commission. The 2002 legislation resulting from that study, the Bridge to Excellence in Public Schools Act, significantly increased state support for education and established the school finance formulas that are still used to allocate resources to county boards of education and the Baltimore City Public Schools today. The state aid distributed through these formulas are primarily based on differences in student enrollment, student need, and local wealth. The 2002 Act also required a follow up study of the adequacy of education funding in the State to be undertaken approximately 10 years after its enactment.

Current School Finance System

The new school funding formula established by the Bridge to Excellence in Public Schools Act retained the foundation style funding formula previously used by the State, but set a level of funding based on adequacy. Foundation formulas set a minimum per student amount of funding, known as the foundation amount, which is multiplied by the count of eligible students to generate a total foundation program funding amount. The foundation amount set by the Act was based on the adequacy recommendations from the Thornton Commission study. The adequacy of the foundation amount was to be maintained by adjusting it for inflation annually. However, recent state budget shortfalls have curtailed the inflationary increases. In fiscal year 2015 the foundation level was set at $6,860 per student. In addition to an inflation adjustment the Act also called for the development of a Maryland-specific geographic cost of education index (GCEI) for adjusting the foundation total program amount to account for regional cost differences. The GCEI adopted by the State in 2005 takes into account regional cost differences in professional district salaries, non-professional district salaries, energy, and other instructional costs. As implemented the index is truncated at 1.0, or the statewide average cost, which provides additional funding for districts in high-cost regions but does not make corresponding reductions for districts in low-cost regions. The additional funding generated by the GCEI consists entirely of state aid.

Like other foundation funding formulas, Maryland's formula also attempts to reduce the amount of disparities in education funding due to differences in local wealth through "wealth equalization." To accomplish wealth equalization, Maryland's foundation formula specifies a uniform local contribution rate that is multiplied by a jurisdiction's local wealth to determine its local share of total program. Jurisdictions with less local wealth, or local appropriation raising capacity, generate a smaller local share and receive a larger share of total program funding in aid provided by the State. Conversely, jurisdictions

[9] The foundation, compensatory education, limited English proficiency, and special education program; student transportation; guaranteed tax base; net taxable income grants; supplemental grants; and declining enrollment grants.

with greater wealth generate a larger local share and receive a smaller share of state aid. The local contribution rate is designed so that, on average across all local jurisdictions, state aid comprises half of the total program funding amount. The measure of local wealth that the local contribution rate is applied to consists of the real and personal property assessable value in the jurisdiction plus its total net taxable income (NTI).

Maryland uses a similar formula for calculating total program funding for three state aid programs used to support students with special needs: 1) the compensatory education program for serving at risk students, 2) the limited English proficiency (LEP) program, and 3) the special education program. The per student program funding amount for these three programs is determined by multiplying the per student foundation amount by a weight to account for the additional costs of educating these students. The program amounts for these three funding programs are also wealth equalized to account for differences in local wealth. Unlike the foundation program, local jurisdictions are not required to appropriate a local share for these three programs.

Table 1.1 shows the student count, special needs program weights, and per pupil amounts for the foundation, compensatory education, LEP, and special education funding formulas. The state share of the three special needs programs is also shown, since that is the only required amount of funding.

Table 1.1
FY 2015 Formula Components

Program	Student Count	Weight	Per Pupil Total Program Amount	Per Pupil State Share Amount
Foundation	FTE* Enrollment Grades K-12	N/A	$6,860	N/A
Compensatory Education	Eligible for Federal Free and Reduced Price Lunch	0.97	$6,654	$3,327
Limited English Proficient	Eligible for Program Services	0.99	$6,791	$3,396
Special Education	Eligible for Program Services	0.74	$5,076	$2,538

*Full-Time Equivalent

A minimum amount of state aid is also guaranteed for each of these programs. The minimum state aid guarantee for the foundation program is 15 percent of total program. The minimum state aid guarantee for each of the three special needs programs is 40 percent of the state share of funding.

Maryland's funding system includes several other major funding programs, each of which is listed below:

1. Guaranteed tax base (GTB). The GTB provides a financial incentive for jurisdictions with less than 80 percent of the statewide average local wealth per pupil to increase their local education appropriation. These jurisdictions may receive up to 20 percent of the per pupil foundation amount in additional state aid.

2. Net taxable income education grants. When the federal government changed the federal income tax extension filing deadline from August to October, the State conformed to this schedule for state income tax purposes. Beginning in fiscal year 2014, the State began calculating state aid using both the September and November net taxable income totals for local jurisdictions. The State then uses the NTI which produces the largest state aid amount. If the November NTI-based aid amount is larger, districts receive the difference in additional state aid. This increase in state aid was to be phased-in over a five year period.

3. Grants to counties with declining enrollment. Assists smaller districts with declining enrollment by providing a state grant equal to 50 percent of the decrease in state education aid from the prior year. Only two districts meet the grant program's eligibility criteria.

4. Supplemental grants. Beginning in fiscal year 2009 supplemental grants were paid to ensure that all districts received at least a one percent annual increase in state funding following a freeze of the per pupil foundation in fiscal years 2009 and 2010. The grant amounts paid to nine districts were frozen beginning in fiscal 2011.

5. Student transportation. State aid for student transportation is based on a district's prior year grant with adjustments for inflation and increases in enrollment. Districts are guaranteed a minimum annual increase of one percent.

Approaches to Adequacy

The concept of adequacy as it relates to education funding grew out of the standards-based reform movement (Hamilton, Stecher, & Yuan, 2009). As states implemented specific learning standards and performance expectations for what students should know – along with consequences for districts and schools failing to meet these expectations (and, eventually, federal expectations imposed through No Child Left Behind and continued by the Every Student Succeeds Act) – the focus of school finance shifted to an examination of the resources necessary to provide districts, schools, and students with reasonable opportunities to achieve state standards. Over the past two decades, researchers have developed four approaches to creating estimates for the level of funding necessary to provide all students with the opportunity to receive an adequate education. The study team did not look at transportation, food services and capital when utilizing any of the approaches. The study team believes that transportation is not best funded at a per pupil level. Food services should be self-sustainable through various funding streams.

The first three approaches were used by the research team to estimate adequacy in Maryland:

1. The **evidence-based (EB)** approach was developed by Picus, Odden and Associates. The EB approach assumes that information from research can be used to define the resource needs of a prototypical school or district to ensure that the school or district can meet state standards. The approach not only estimates resource levels, but also specifies the programs and strategies by which such resources could be used efficiently. The approach is used to identify a base cost figure and adjustments for special needs students.

2. The **professional judgment (PJ)** approach was first used in Wyoming in the mid-1990s and has been one of the most widely used adequacy approaches since then. The PJ approach relies on the experience and expertise of educators in the state to identify the resources needed to ensure that all districts, schools, and students can meet state standards and requirements. Resources include school-level personnel, non-personnel costs, additional supports and services, technology, and district-level resources. The approach identifies both a base cost and adjustments for special needs students.

3. The **successful schools/school district (SSD)** approach was developed by APA. The SSD approach determines an adequate per pupil base cost amount by using the actual expenditure levels of schools or school districts that are currently meeting or exceeding state performance objectives. This approach assumes that every school and school district, in order to be successful, needs the same level of base funding that is available to the most successful schools and districts. The approach does not identify adjustments for special needs students.

4. The fourth approach, the **cost function or statistical (CF)** approach, is an econometric method that estimates the level of funding needed to achieve a given level of student achievement as measured on assessments while controlling for student and district characteristics. The cost function approach was not used because it consists of a district level statistical model that requires a much larger number of districts than the 24 in Maryland to produce reliable results. Also, due to its complexity and use of econometric modeling techniques, the approach has proven difficult to explain in situations other than academic forums.

New Adequacy and Related Studies

In March 2014, the Maryland State Department of Education (MSDE) issued an RFP for the follow up adequacy study required by the Bridge to Excellence in Public Schools Act. The study was to include, at a minimum, adequacy cost studies that identified a base funding level for students without special needs, per pupil weights for students with special needs to be applied to the base funding level, and an analysis of the effects of concentrations of poverty on adequacy targets. The adequacy cost study was to be based on the requirements of the Maryland College and Career-Ready Standards adopted by the State Board of Education.

Augenblick, Palaich and Associates (APA), in partnership with Picus, Odden and Associates (POA) and the Maryland Equity Project (MEP) at the University of Maryland, was selected to conduct the study. The RFP required the consultants to undertake a broad analysis including the following tasks:

- Conduct an adequacy study using at least two approaches;
- calibrate the study to identify the funding required to implement the Maryland College and Career-Ready Standards;
- identify a per pupil base level of funding and per pupil weights for students with special needs, such as economically disadvantaged students eligible for the federal free and reduced-price lunch program (FRPM), students with limited English proficiency (LEP) and students eligible for special education services;
- analyze the effects of concentrations of poverty on the adequacy estimates;
- identify gaps in growth and achievement among student groups and make recommendations of programs that might address these gaps;
- find possible relationships between student performance and funding deficits;
- assess the impact of quality prekindergarten on school readiness as a factor in the adequacy estimates;
- make recommendations on any other factors to be included as part of the adequacy study; and
- conduct a review of adequacy studies carried out in other states and report on best practices and recommendations for the Maryland study.

Previously Released Reports

The follow-up adequacy study has been underway since July 2014. Per the requirements of the State's RFP, in addition to estimating new adequacy amounts for base funding and weights for students with special needs, APA's research team also undertook a number of related studies. These studies consisted of:

- A study of the equity of the current school funding system and an evaluation of the method used for determining local wealth;
- a study of optimum school sizes and the factors that drive school size;
- an analysis of alternatives to using federal free and reduced-price lunch counts for determining compensatory aid;
- a study of the impact of changes in enrollment on school district finances;
- an evaluation of the state's Geographical Cost of Education Index; and
- an evaluation of the Supplemental Grants program.

Over the course of this study, the APA study team has worked closely with staff from the Maryland State Department of Education and its partners from the Maryland Department of Budget and Management and the Department of Legislative Services of the State Assembly. The study has also been assisted by an advisory group representing education stakeholders.

To date, the following reports have been released presenting the results and recommendations of the various studies required by the RFP:

1. *A Comprehensive Review of State Adequacy Studies Since 2003* (September 2014).
2. *Summary of School Size Report* (September 2014).
3. *Proposed Methodology for Establishing Adequate Funding Levels in the State of Maryland* (December 2014).
4. *Preliminary Report on the Impact of School Size* (January 2015).
5. *Adequacy Cost Study: An Interim Report on Methodology and Progress* (July 2015).
6. *Evaluation of the Use of Free- and Reduced-Price Meal Eligibility as a Proxy for Identifying Economically Disadvantaged Students: Alternative Measures and Recommendations* (July 2015).
7. *Final School Size Study Report: Impact of Smaller Schools* (July 2015).
8. *Final Report of the Study of Increasing and Declining Enrollment in Maryland Public Schools* (November 2015).
9. *Geographic Cost of Education Adjustment for Maryland* (November 2015).
10. *Analysis of School Finance Equity and Local Wealth Measures in Maryland* (December 2015).
11. *The Effects of Concentrations of Poverty on School Performance and School Resource Needs: A Literature Review* (December 2015).
12. *A Comprehensive Analysis of Prekindergarten in Maryland* (January 2016).
13. *A Comparable Wage Index for Maryland* (July 2016).

PDFs of these reports may be found on the Maryland State Department of Education's website. The links to these reports are presented in Appendix B. A brief summary of each report is also presented in Chapter V.

Structure of this Report

This report presents both the findings from the adequacy studies undertaken by the study team and makes recommendations for a new funding formula based upon the entirety of work completed. The structure of the remainder of this report is described below.

Approaches to Adequacy

Chapter II through Chapter IV describe the three approaches to estimating an adequate level of education funding for Maryland used by the study team. These consist of: the EB approach, described in Chapter II; the PJ approach, described in Chapter III; and the SSD approach, described in Chapter IV.

Reconciling Approaches to Adequacy

Chapter V details how the study team combined the results of the three approaches to adequacy into a single set of adequacy recommendations, including a base cost and set of weights for specific student groups, including prekindergarten, special education, limited English proficient, and compensatory education students.

Formula Recommendations and Implementation

Chapter VI presents the study team's full recommendation for a new funding system for the State of Maryland based upon the final adequacy results and the previous studies. It presents a detailed funding formula and an estimate of the results, including district-by-district comparisons with current funding, a comparison to the adequacy study completed in 2002. It also provides considerations for phase-in of adequacy over time.

Additional Studies

Finally, Chapter VII of the report presents the finding of five additional studies required by the RFP including:

1. The impact of concentrations of poverty on the study's adequacy estimates.
2. Determine if a relationship exists between school district spending and performance on state assessments.
3. Whether gaps in growth and achievement among student groups exits and provide recommendations of programs that might address these gaps.
4. The impact of quality prekindergarten on school readiness as a factor in the adequacy estimates.
5. Whether the Supplemental Grant program is still necessary within the context of the new adequacy recommendations.

II. Evidenced-Based Approach to Adequacy

The evidence-based (EB) approach to measuring adequacy begins with educational research on student learning and school organization to define the resource needs that would allow a prototypical school or district to meet state standards. The EB approach is unique in that it is derived from research and best practices that identify programs and strategies that increase student learning. Further, the formulas and ratios for school resources originally developed from the research have also been reviewed by dozens of educator panels in multiple states over the past decade and adjusted to meet both the specific state standards and evolving best practices. The EB approach relies on two major types of research:

1. Reviews of research on the student achievement effects of each of the model's individual major elements, with a focus more recently on randomized controlled trials – the gold standard of evidence on "what works."

2. Studies of schools and districts that have dramatically improved student performance over a four- to six-year period on state tests.

The EB approach then incorporates these effective practices and strategies into a core EB school improvement model describing the resources needed at the school and district central office levels to help students meet rigorous state standards. This core EB school improvement model is then reviewed by panels of state educators to ensure the recommendations are consistent with both the resources needed to meet the state's specific standards and requirements and with the state's educational context.

More details on the research base (including the full bibliography), the components of the EB approach, and the study process that were used to estimate a new base spending level, along with per pupil weights for compensatory education students, LEP students, and special education students, are available in the full EB report in Appendix A.

The School Improvement Model

The EB approach, also referred to as the core EB model, is a research-based school improvement model shown to boost student achievement. The EB approach not only identifies a base level of staff, dollar resources, and extra resources for students struggling to meet standards, but also outlines how resources can be used to boost student performance. The EB model is structured around 10 improvement strategies. Research suggests district adoption of these strategies leads to significant improvement in academic achievement for all students and substantial reduction in student achievement gaps linked to demographic variables. The 10 school improvement strategies underpinning the approach are:

1. Analyze student data to become deeply knowledgeable about performance issues and to understand the nature of the achievement gap.

2. Set higher goals. These goals may include educating 95 percent of the students in the school to proficiency or higher on state assessments, ensuring that a significant portion of students reach advanced levels of achievement, and making significant progress in closing achievement gaps linked to demographics.

3. Review evidence on good instruction and effective curricula.

4. Invest heavily in teacher training, including intensive summer institutes and longer teacher contract years.

5. Support students at risk of academic failure by providing some combination of tutoring and other supplemental interventions in one-to-one, one-to-three, or one-to-five tutor-student ratio formats, via the response to intervention (RTI) process. Support for students at risk of academic failure also includes extended day, summer school, and formal English language development for LEP students.

6. Create smaller classes in early elementary grades, often lowering class sizes to 15 for students in kindergarten through grade three.

7. Restructure the school day to provide more effective ways to deliver instruction.

8. Provide strong leadership support to the principal and to teacher leaders around data-based decision-making and improvements to the instructional program.

9. Foster professional school cultures characterized by ongoing discussions of good instruction and by teachers taking responsibility for, and responsiveness to, student performance.

10. Bring external professional knowledge into the school. For example, hire experts to provide training; adopt new, research-based curricula; discuss research on good instruction; and work with regional education service agencies, as well as with the state department of education.

Prototypical School District and Schools

The EB approach develops its estimate for an adequate level of funding by identifying the specific resources needed at the school and district central office levels, and then aggregating these costs to a statewide estimate. To do this, the EB model identifies the types of staff and non-staff resources required for a set of prototypical elementary, middle, and high schools, as well as a district's central office. The EB model uses prototypical district and school sizes from the research literature and the specific state context.[10] The model can then extrapolate the necessary resources for larger districts and schools from these prototypes by increasing staff and non-staff resources proportionally to the increase in enrollment.

[10] In other states, the EB model has used prototypical district and school sizes suggested by a review of the research literature. These include a district with an enrollment of 3,900 students, elementary and middle schools of 450 students, and high schools of 600 students.

Due to the large size of the majority of districts in Maryland and the recommendation of Maryland educators who participated in a review of the EB model, the study team used district and school prototypes representative of Maryland's districts. The prototypes used in Maryland consist of a district size of 12,000 students, elementary school size of 450 students, middle school size of 720 students, and high school size of 1,200 students. The larger prototypical school sizes used in this study however, generally remain within the parameters of research on the most effective school sizes. Adjustments to the core EB model to reflect these larger sizes in Maryland are included in the following recommendations.

Developing an EB School Improvement Model for Maryland

The review of an EB school improvement model suited for Maryland consisted of four steps.

1. The study team prepared a detailed EB report for Maryland, available in Appendix A.

2. In four EB professional judgment (EBPJ) panels, education professionals from across Maryland reviewed the core EB model and provided feedback on necessary changes to ensure adequacy in the State of Maryland. The EB recommendations, summarized below, include changes to the EB model recommended by the four panels.

3. Through case studies of 12 high-performing schools, the study team identified the strategies currently used in successful and, when possible, improving, schools in Maryland. The case studies provided information on multiple aspects of the improvement strategies in each of these schools and collected details about specific school resources, including class size, number of electives, and amount of pupil support resources.

4. The study team revised and modified the core EB model based on the EBPJ panels and case study schools.

Reviewing the Core EB Model

Once the core EB model was created, based on findings from the research literature, the study team revised it to reflect Maryland's specific state standards and context. This review consisted of three steps.

1. The state's education requirements and standards were reviewed to determine whether they required changes in the core EB formulas.

2. Education professionals from across Maryland reviewed the core EB model. Specifically, the study team created four EBPJ panels to review the EB model's components and provide feedback on any changes necessary to ensure adequacy in the State of Maryland. The EB recommendations summarized above include suggested changes from the four panels.

3. The study team identified the strategies currently used in successful and, when possible, improving schools in Maryland, by conducting day-long case studies in 12 schools. The case

studies provided information on multiple aspects of the improvement strategies in each of these schools and collected details about specific school resources, including class size, number of electives, and amount of pupil support resources.

The core model was then modified based on what was learned from the input of the EBPJ panels and case study schools.

EB Professional Judgment Panels

In June 2015, the study team convened four EBPJ panels across the State to review the EB core model from a Maryland perspective. The purpose of these panels was threefold:

- To share the elements of the EB model with panel members;
- to ask the panel members to reflect on those elements; and
- to provide the research team with Maryland-specific insights on how each of the elements will operate within the State.

Based on the feedback from these EBPJ panels, the EB model was adjusted to reflect Maryland's unique circumstances.

For each panel, nearly half of the participants were teachers. The study team sought to identify teachers who are recognized as being among the best in their schools. Where possible, teacher participants were selected from a list of master teachers previously vetted by MSDE. Other panel participants consisted of school board members, district and school administrators, and instructional coaches recommended by their districts. Appendix C contains details on the number and types of participants serving on each of the four panels.

The four EBPJ panel meetings included one panel meeting on the Eastern Shore, one in western Maryland, one in northern Maryland, and one in southern Maryland. Table 2.1, below, provides the dates and regions of the panels.

Table 2.1
EBPJ Panel Dates

Date	Region
June 23, 2015	Eastern Shore
	Western Maryland
June 24, 2015	Northern Maryland
	Southern Maryland

Panelists were not compensated for their participation, though meals were provided and some expenses, like mileage and parking fees, were reimbursed.

At each meeting, members of the research team described the overall EB approach and the school improvement model that is the basis of the EB conceptual model. Next, members of the research team presented each component of the model to the panel. The research team next sought input as to whether the identified resources are sufficient to meet the needs of school districts in the area. The research team also asked for recommendations (and the rationale behind those recommendations) for alternative approaches. These alternative approaches were reviewed, and if supported by research evidence, incorporated in the EB model.

EB Model Resources

Table 2.2 shows the resources recommended by the EB model based on Maryland specific input from the EBPJ panels and case study schools. The EB model presents the research-based staff and non-staff resource recommendations for the following areas:

- **Staffing for core programs**, which include full-day prekindergarten, full-day kindergarten, core teachers, elective/specialist teachers, instructional facilitators/coaches, core tutors, core guidance counselors, core nurses (the latter three constituting recent changes and additions to the EB model), substitute teachers, supervisory aides, librarians, principals/assistant principals, and school secretaries;
- **dollar per student resources** including gifted and talented, professional development, computers and other technology, instructional materials and supplies, short cycle assessments, and extra duty/student activities;
- **central office functions** including maintenance and operations, and central administration; and
- **resources for students at risk of academic failure** including tutors, additional pupil support, extended day, summer school, LEP programs, alternative schools, and special education.

The design of the EB model reflects the Response to Intervention RTI model, a three-tier approach to meeting student needs. Tier 1 refers to core instruction for all students. At the Tier 1 level, the research behind the EB model suggests making core instruction as effective as possible with modest class sizes, provisions for collaborative time, and robust professional development resources. Effective core instruction is the foundation on which all other educational strategies depend. Tier 2 services are provided to struggling students (generally indicated by FRPM pupil counts) to help them meet standards without being given an individualized education program (IEP) and moved into special education. The EB model's current Tier 2 resources include one core tutor for every prototypical school and additional resources triggered by FRPM and LEP student counts providing funding for tutoring, extended day, summer school, additional pupil support and LEP services. Tier 3 includes all special education services.

For the core EB model, at risk students is the non-duplicated count of FRPM and LEP students, which includes both all FRPM students and all non-FRPM LEP students. LEP students includes all LEP students, whether or not they are eligible for FRPM.

Table 2.2
Summary of Current Evidence-Based Model Recommendations

Evidence-Based Model Element	Current Evidence-Based Formula Ratio or Dollar Per Pupil Figure
Staff Resources For Core Programs	
1a. Full-day prekindergarten	Each three and four-year-old prekindergarten student is staffed at a class size of one teacher and one aide for every 15 students
1b. Full-day kindergarten	Full-day kindergarten program; each kindergarten student counts as 1.0 pupil in the funding system
2. Core elementary class sizes/core teachers	Kindergarten through grade three: 15 Grades four through five: 25
3. Secondary class sizes/ teachers	Grades six through 12: 25 (plus one additional teacher per 600 students in high schools to support smaller advanced level courses)
4. Elective teachers	Elementary Schools: 20 percent of core elementary teachers Middle Schools: 20 percent of core middle school teachers High Schools: 33⅓ percent of core high school teachers
5. Instructional Coaches	One instructional coach position for every 200 students
6. Core Tutors	One tutor position for every 450 elementary and middle school students and for every 600 high school students (additional tutors are enabled through the at risk pupil count in Element 22)
7. Substitute Teachers	Five percent of core and elective teachers, instructional coaches, tutors (and teacher positions for additional tutoring, extended day, summer school, LEP, and special education programs)
8. Core Guidance Counselors and Nurses	One guidance counselor for every 450 grade K–5 students One guidance counselor for every 250 grade 6–12 students One nurse for every 750 K–12 students (Additional student support resources are provided on the basis of at risk student counts in Element 23)
9. Supervisory Aides	One supervisory aide for every 225 elementary and middle school students, one supervisory aide for every 200 high school students
10. Library Media Specialists	One library media specialist position for every 450 elementary and middle school students, and for every 600 high school students
11. Principal/Assistant Principal	One principal for the 450-student prototypical elementary school One principal and one assistant principal for the 720-student prototypical middle school One principal and three assistant principals for the 1,200-student prototypical high school
12. School Site Secretarial Staff	One secretary position for every 225 elementary and middle school students, and for every 200 high school students

Evidence-Based Model Element	Current Evidence-Based Formula Ratio or Dollar Per Pupil Figure
Dollar Per Student Resources	
13. Gifted and Talented	$40 per pupil
14. Professional Development (PD)	10 days of student-free time for training built into teacher contract year $125 per pupil for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$190 per pupil for instructional and library materials
16. Short Cycle/Interim Assessments	$25 per pupil for short cycle, interim and formative assessments
17. Computer Technology and Equipment[11]	$250 per pupil for school computer and technology equipment
18. Career Technical Education (CTE) Equipment	$10,000 per CTE teacher for specialized equipment
19. Extra Duty Funds and Student Activities	$250 per student for co-curricular activities including sports and clubs for grades K–12 (funding not provided for prekindergarten)
Central Office Functions	
20. Maintenance and Operations	Separate computations for custodians, maintenance workers and groundskeepers, including $305 per pupil for miscellaneous supplies
21. Central Office Staffing	Using a 12,000 student prototypical district, a dollar per student figure for the Central office based on the number of full-time equivalent (FTE) positions generated and the salary and benefit levels for those positions; it also includes $300 per pupil for miscellaneous items such as Board support, insurance, legal services, etc. Specific resource allocations for district central office staff are provided below in Table 2.2.
Resources for Special Needs Students	
22. Tutors	One tutor position for every 125 at risk students (in addition to the core tutor positions in each prototypical school [Element 6]); these positions are provided additional days for PD (Element 14) and substitute days (Element 7)
23. Additional Pupil Support	One pupil support position for every 125 at risk students; these positions are provided additional days for PD (Element 14)
24. Extended Day	One teacher position for every 30 at risk students or 3⅓ full-time equivalent (FTE) teacher positions per 100 such students; position paid at the rate of 25 percent of annual salary—enough to pay a teacher for a two-hour extended day program, five days per week. (This formula equates to one teacher position for every 120 at risk students)

[11] Infusing technology into the school curriculum has associated costs for computer hardware, networking equipment, software, training, and personnel associated with maintain and repairing these machines. The total cost is made up of 1) Direct costs- hardware, software, and labor cost for repairing and maintaining the machine and 2) Indirect costs- time spent in training classes, casual learning, trainers, self-support, and down time costs.

Evidence-Based Model Element	Current Evidence-Based Formula Ratio or Dollar Per Pupil Figure
25. Summer School	One teacher position for every 30 at risk students or 3⅓ FTE per 100 such students; position paid at the rate of 25 percent of annual salary—enough to pay a teacher for a six- to eight-week four-hour per day summer school program and include adequate time for planning and grading. (This formula equates to one teacher position for every 120 at risk students)
26. LEP Students	One teacher position for every 100 identified LEP students (This provision is in addition to all the resources triggered by the at risk student count, which includes all LEP students)
27. Alternative Schools	One assistant principal position plus one teacher position for every seven alternative learning education (ALE) students
28. Special Education	One teacher position for every 150 students in the school One aide position for every 150 students in the school Deduction of federal Title VI, Part B funds Full state funding for students with severe disabilities, minus the cost of the basic education program for all non-public placements

Detailed discussions of the research base for each recommendation in this table are in Appendix A.

Table 2.3 summarizes these staffing proposals, organized into departments into which a central office could be organized, and provides additional detail on the staffing resources allocated to a prototypical school district with 12,000 students. For districts with fewer or more students, the staff recommendations would be prorated accordingly.

Table 2.3
Evidence-Based Central Office Staffing for District with 12,000 Students

Office and Position	EB PJ Panel Modified Modified Evidence-Based Model Administrator	 Classified
Superintendent's Office		
Superintendent	1	
Secretary/Receptionist		1
Clerk		1
Curriculum and Instruction/Ed Services		
Assistant Superintendent	1	
Director of Elementary and Secondary	1	
Director of LEP	1	
Director of Assessment and Accountability	1	
Clerk		2
Secretary		4
Instructional Technology and Technology Network and Support		
Director	1	
Assistant Director	1	
Network Supervisor	1	
Systems Supervisor	1	
Technician	10	

Office and Position	EB PJ Panel Modified Modified Evidence-Based Model Administrator	 Classified
Secretary		2
Clerk		2
Human Resources/Personnel		
Assistant Superintendent	1	
Director	1	
Credential Specialist		1
Personnel Technician		2
Secretary		2
Special Education		
Assistant Superintendent	1	
Director	1	
Program Specialists	4	
Secretary		2
Clerk		2
Business Office		
Assistant Superintendent	1	
Director of Fiscal Services	1	
Accounting Technician		3
Risk Manager	1	
Benefit Technician		1
Director of Purchasing	1	
Buyers		2
Payroll Supervisor	1	
Payroll/purchasing Clerks		2
Records Technician		1
Warehouse Manager	1	
Warehouse Workers		2
Director Maintenance and 0perations (M and O)	1	
Assistant M and O Director	1	
Supervisor M and O	2	
Clerk		3
Secretary		5
Student Services		
Director	1	
Coordinator Health Services	1	
Secretary		1
Clerk		1
Coordinator Health Services	1	
Secretary		1
Clerk		
Total Central Office Staffing (12,000 Students)	**40**	**43**

Changes Made to the EB Model Based on the EBPJ Panel Review

The case studies and the EBPJ panels informed changes that needed to be made to the EB model to fit the needs of Maryland's students. Specifically, the EBPJ panel recommendations fell into three categories:

1. Areas where the panelists recommended changes with a sound research basis or modifications necessary to meet state requirements. These changes have been incorporated into the EB model.

2. Areas where panelists recommended changes or identified potential concerns with the EB model, but were not changed in the EB model.

3. Areas where panelists were in general agreement with the EB model recommendations.

The study team's response to the recommendations made in categories 1 and 2 are described below, identifying the EB model elements from Table 2.4 in each section.

Areas Where the Evidence-Based Model Was Changed

There were four areas where EBPJ panel recommendations suggested strong evidence for modifying the original EB model. These include (1) prototypical school sizes, (2) additional teacher positions at the prototypical size high school to allow for smaller advanced classes, (3) changes to the description of LEP resources, and (4) adjustments to the central office staffing recommendations to address concerns about district size and services for special education students. Each area is described below.

Prototypical School Sizes

The EBPJ panels suggested that the prototypical middle and high schools were much smaller than most schools in the State. As a result, the study team changed the sizes to 720 students for the prototypical middle school and 1,200 students for high school. These sizes are still generally within the parameters research suggests for effective middle and high schools.

Core High School Teachers (Element 3)

The number of core high school teachers is important to providing smaller class sizes. Participants at the EBPJ meetings generally supported the EB class size recommendations and stated that the class size of 25 was generally lower than most districts are now able to provide. However, the panelists expressed concerns about schools' capacities to offer smaller sizes for advanced classes and a diversity of CTE courses, including advanced CTE courses. This was a particular concern for high school math. A new state requirement mandates all high school students take four years of math. For students who take algebra in junior high, it is likely that by the end of grade 11 they will have taken the standard high school math curriculum and pre-calculus and there will be a need to offer more advanced classes, most of which are likely to have relatively low enrollments.

To accommodate this need in high schools, the study team assumed about 10 percent of juniors and seniors would require these advanced, smaller classes. This would amount to 60 students in a prototypical school of 1,200 students (300 per grades nine through 12). Adding two teachers would allow these 60 students to enroll in ten advanced classes as small as six students. Since most of these advanced classes could be larger than six, there is room for these students to take multiple advanced classes and maintain their small sizes. Moreover, since these students are not enrolled in other regular courses when they are in the advanced classes, there is some additional flexibility of class size in the non-advanced courses. Two additional teachers in the prototypical high school of 1,200 students would be sufficient for high schools to provide advanced courses in line with state advanced math requirements.

Therefore, for a prototypical high school of 1,200 students, the Maryland EB model includes two additional core teachers to provide resources to offer these smaller advanced classes. In addition, since this core teacher would also generate elective teacher resources, there would be another 33⅓ percent FTE elective teacher in the school. The study team's model adds one advanced course teacher for every 600 students in high schools.

Limited English Proficient Students (Element 26)

As part of the strategies for helping students at risk of academic failure, panelists expressed concern about the EB model's approach for serving LEP students. Many panelists were confused about the EB model's definition of at risk students, which is the non-duplicated count of FRPM and LEP students. This led panelists to report that the resources for LEP students of one teacher per 100 LEP students were too low, generally not realizing that the inclusion of LEP students in the at risk student count also provides them with tutoring, extended day, summer school, and additional support resources.

At the recommendation of one of the panelists, the study team modified the manner in which the EB model provides extra help resources to make more explicit the level of resources provided to LEP students.[12] The amount of these resources remains the same in the model. For example, in a district with 75 LEP students, 40 of whom are FRPM eligible, and 100 FRPM students, 40 LEP and 60 non-LEP. The 75 LEP students would receive all of the extra help services provided through the EB model plus one LEP teacher for every 100 LEP students. The remaining 60 FRPM students would receive all of the extra help services but not the LEP staffing.

In conclusion, the EB model has been modified to make the distinction between the LEP (FRPM and non-FRPM) and FRPM students more transparent so that the resources directed toward each group are clearer.

Central Office (Element 21)

There was a modest amount of discussion of the central office function at the EBPJ panels. The main concern expressed was the small size of the 3,900-student EB prototype district used to develop central office resources. In response, the study team independently contracted with a group of three former

[12] The at risk count is now non-LEP FRPM students and the LEP count now includes all LEP students (FRPM and non-FRPM). As a result, LEP students in the EB model now receive all of the at risk services for teacher tutors, pupil support, extended day and summer school, as well as the one additional teacher per 100 LEP students. The remaining FRPM students receive all of the at risk resources, but not the additional LEP teaching support. This change only affects the description of how extra help resources are provided to FRPM and LEP students.

school superintendents with experience in varying size districts from a range of states. These superintendents provided central office staffing configurations at a range of district sizes and pointed out that above 12,000 students, central office staff can be prorated up uniformly.

Table 2.2 above summarizes the central office staffing for the 12,000-student district. The study team used this model to estimate the per pupil central office costs included in the EB base program cost estimate.

Areas Where EBPJ Panels' Recommended Changes Were Not Included in the Adjusted Evidence-Based Model

There are seven elements of the EB model where the EBJP panels offered important suggestions. The study team describes those recommendations here, but has not modified the core EB model to reflect these changes for reasons that are discussed below. It is the theory of action of the EB approach unless there is evidence supporting the recommendation the recommendation is not modified. The seven elements are:

- Prekindergarten;
- core elementary teachers;
- elective teachers;
- guidance counselors and nurses;
- principals and assistant principals;
- special education; and
- alternative schools.

Prekindergarten (Element 1a)

The EB model resources prekindergarten programs as full day programs for three- and four-year-old children with one teacher and one aide for every 15 teachers, along with many of the other resources in the model. The EBPJ panels supported this recommendation but offered two suggestions:

1. Several panelists noted there are students who enroll in kindergarten with major behavioral and social issues that could be ameliorated if they had attended a prekindergarten program the year prior. This suggestion does not change the EB model recommendations, but does offer another argument in favor of prekindergarten programs.

2. A number of panelists wondered whether current schools had the space for such an expanded prekindergarten program, and suggested that perhaps a capital construction allocation could accompany implementation of this expansion of prekindergarten. They pointed to the capital funding efforts that followed the phase-in of the Thornton Commission recommendation to expand kindergarten from half to full day as an example of what might be needed. This is a critical concern, but capital construction is not a direct component of the EB model. Prior to undertaking a large capital construction program, the State would want to consider what school space is currently available and alternative prekindergarten school locations.

In the case of prekindergarten, the discussions centered around expansion and access to prekindergarten. These suggestions reflected the real needs of children and schools in Maryland, but do not offer specific changes that could be made to the current EB model, and therefore, the changes were not incorporated.

Core Elementary Teachers (Element 2)

The EB model provides core elementary teachers at a ratio of 15 students per teacher in prekindergarten through grade three and 25 students per teacher in grades four through five. This is an average of 17.3 students per core teacher. The EBPJ panels supported this recommendation, although a small number of panelists argued that kindergarten classes needed an aide. This view was not represented across panels or even a consensus in the panel where it was discussed so the change was not made to the model. Panelists also asked if there is sufficient classroom space to meet these class size ratios and discussed the issues of capital construction as described in the similar discussion about prekindergarten capital expansion (Element 1a above).

Elective Teachers (Element 4)

The EB model provides elective teachers to prototypical schools at a rate of 20 percent of elementary and middle school core teachers and 33⅓ percent of core high school teachers. The issue of elective teachers speaks to a number of important issues: (1) elective courses (i.e. art, music, and physical education, which are part of the EB model); (2) the school schedule; and (3) a schedule that allows sufficient time for collaborative team training and planning. In high schools, this allocation allows a block schedule with four 90-minute blocks each day, so teachers teach during three blocks and have 90 minutes, or 25 percent, of each day for individual and collaborative planning. This planning period also could be organized as two 45-minute periods.

Panelists felt that the model for elementary and middle school teachers was insufficient for both individual planning and collaborative team work (although this allocation was more than the three weekly time blocks of student-free time currently provided to most elementary teachers). Panelists offered two potential suggestions:

1. The model should provide 33⅓ percent electives for both elementary and middle schools, the same as for high school.

2. Alternatively, middle schools should be organized into a seven-period schedule with teachers providing instruction for five periods, requiring elective teachers to be 40 percent of core teachers.

Both suggestions would increase model costs or reduce core instructional minutes, so the study team deferred to available research and did not include either in the model.

Guidance Counselors and Nurses (Element 8)

The EB model provides for one guidance counselor for every 450 kindergarten through grade five students and one for every 250 grade six through 12 students, as well as one nurse for every 750 students. The EBPJ panels supported this recommendation, although a number of panelists suggested that each school should have a full-time nurse or nurse assistant to administer student medications and address other health issues that arise during the school day. The panelists' concern related to what happens if a child becomes sick or is hurt while the nurse is at another location. As available research does not support this recommendation, the study team did not change the model in this area.

Principals and Assistant Principals (Element 11)

The EB model provides one principal for the 450-student elementary school, one principal and one assistant principal for the 720-student middle school, and one principal and three assistant principals for the 1,200-student prototypical high school.

The EBPJ panels strongly recommended that all prototypical-sized elementary and middle schools have an additional assistant principal. Panelists argued:

- Current Maryland practice calls for more administrators in schools than the EB model provides;
- there has been a substantial burden on school site administrators due to the multiple observations required by the new teacher evaluations as well as the time required to work and consult with teachers on student learning objectives that are part of the new teacher evaluation systems;
- the need to coordinate testing (some panelists argued for testing coordinators for this work at each school); and
- administrative demands of coordinating IEP development and paperwork.

These arguments led to recommendations that a prototypical high school would need two assistant principals and that high schools in high-poverty areas may need even more school site administrators.

While the study team did not incorporate the full recommendation, as available research did not provide sufficient evidence to do so, it did modify the assistant principal allocation to reflect the larger prototypical middle and high schools. Specifically, the Maryland EB model includes one principal and one assistant principal for the prototypical 720-student middle school and one principal and three assistant principals for the prototypical 1,200-student high school.

Alternative Schools (Element 27)

Generally, EBPJ panelists felt that the EB model staffing provision of the equivalent of one assistant principal and one full-time teacher or educational professional for every seven students in an alternative school would work well for typical alternative schools with between 35 and 75 students. This was particularly true if alternative school students were defined as children with multiple behavioral and emotional issues, including substance abuse.

However, further discussion by the EBPJ panels led to concerns about additional student needs and several suggestions for enhancing the resources available to alternative schools.

Although the study team does not offer a recommendation to enhance resources for alternative schools, given available research, the team reports the findings from the EBPJ panels for consideration by Maryland policy makers:

- One district argued that some students in alternative schools required more intensive assistance as they had been convicted of serious felonies and violent crimes and were dangerous to other students;
- another district argued that many alternative schools might be needed to serve different regions of larger school districts and that each school would need a principal, an assistant principal, several counselors, and perhaps mental health professionals;
- some panelists suggested that alternative schools should be provided for middle schools as well, and a few even argued for alternative elementary schools, especially for children who currently enter kindergarten without the benefit of a prekindergarten program. Several panels raised the issue of students in kindergarten, who had not had a schooling experience before enrolling, might need intensive emotional and behavioral attention for the first quarter of the year, and that a prekindergarten program would alleviate this need;
- representatives from several districts suggested creating a categorical program for a Welcome Center for new immigrants, particularly new immigrants from backgrounds that could include refugee camps and no previous schooling experience; and
- finally, one individual cautioned about separating alternative school sites from regular high schools, arguing that if alternative school students were primarily minorities, further separation risked civil right violations.

Special Education (Element 28)

The EB model provides one teacher position and one aide position for every 150 students in a school (total students, not special education students). In addition, it suggests funding should be net of federal Title VI-B funding and that the State should fully fund the costs of programs for students with severe disabilities.

The EBPJ panel discussions about special education were closely linked to the discussion of strategies for students at risk of academic failure. The research behind the EB model shows that as more preventative resources are provided for Tier 2 interventions (tutoring, extended day, summer, and extra pupil support), the need for special education services is reduced. As a result, the EB model puts more resources into these Tier 2 strategies and less into special education.

A number of panelists observed that the EB allocation of one teacher and one aide for every 150 students would result in fewer special educators than are currently employed in Maryland schools. While the EB model provides extra resources for assistance than are currently provided, including additional Tier 2 resources to reduce the need for special education, panelists had difficulty conceptualizing this shift. This led to concerns among some panelists that the census-based special education model is insufficient to meet special education demands and expectations. Others seemed to feel that the allocation in the EB model would be sufficient.

Several principals suggested that if their school received the extra help resources *and* the special education resources identified in the model, they would hire teachers with special education certification to fill some of the extra help positions and organize around student needs. As a result, they felt the overall allocation of teacher resources to the school site was sufficient.

Some of the EBPJ panelists, as well as some of the people interviewed for the case studies, asserted that effective use of more preventative Tier 2 programs, along with early intervention supports embedded in the EB model (prekindergarten, smaller kindergarten through grade three classes, multiple Tier 2 interventions including tutoring), had reduced the need for special education in their schools. This perspective aligns with the theory of action embedded in the EB model and drives the logic behind resource allocation in the model. This leads the study team to reaffirm its recommendation of one teacher and one aide for every 150 students.

The EBPJ panels supported the concept of full state funding of programs for students with severe and profound disabilities and argued it would be important for the State to develop rules and regulations to identify these students and programs. Therefore, the EB model includes a weight for students with mild and moderate disabilities, and assumes the state will fully fund students with severe disabilities.

The one other special education issue that emerged from the EBPJ panels was the need for “related services” including occupational therapy, physical therapy, speech/language, hearing, emotional support for children experiencing trauma, and mental health services. The study team’s updated central office model accommodates support for staff to meet these needs.

Case Studies of Improving Schools

Between October 2014 and March 2015, the study team together with the Maryland Equity Project (MEP), conducted 12 case studies of high-performing and improving schools in Maryland. The studies investigated the programs and strategies effective in raising the achievement levels of all students, especially students from poverty, minority, and non-English speaking backgrounds. One goal of the case studies was to see if the school improvement strategies in Maryland differed from the EB model and required changes or augmentation of the model.

The twelve case study schools were selected on the basis of their performance on Maryland state assessments. For elementary and middle schools, performance data were taken from Maryland State Assessment (MSA). For high schools, achievement data were taken from Maryland High School Assessment (HSA) tests. The primary metric used was the percentage of students who scored proficient or advanced in each school.

These assessment data were used to select schools in four performance categories:

1. **High Performing**: these are schools with a very high percentage of students achieving at the proficient or advanced levels. Specifically, to be selected in this category at least 90 percent of all students in a school had to achieve proficient or better over a six-year period.

2. **High Growth**: schools selected in this category had to achieve at least 50 percent growth over the six-year period. That is, the percentage of students scoring proficient or advanced on the test had to increase by at least 50 percent between the first year and the sixth (for example from 50 percent to 75 percent). These schools were also required to have at least 60 percent of all students achieving proficient or above in the most recent year of data used.

3. **Reducing the Poverty Gap**: selected schools were successful in significantly reducing the achievement gap between low-income students – those identified as FRPM eligible – and all students in the school.[13] The research team used a benchmark of a two standard deviation decrease in the achievement gap (approximately 14 percentage points) over six years. These schools were also required to have at least 60 percent of all students achieving proficient or above in the most recent year of data used.

4. **High Growth for Student Groups**: schools in this category were selected on the basis of how well they had improved achievement for ethnic/minority, FRPM, LEP, and special education students. The specific criteria for selecting these schools were at least 50 percent growth for at least two of the subgroups. These schools were also required to have at least 60 percent of all students achieving proficient or above in the most recent year of data used.

Table 2.5 provides a summary of the 12 schools' demographic characteristics. The percentage of students eligible for FRPM ranged from 40 to 85 percent, with seven schools having a rate above 50 percent. The minority percentage (non-white) ranged from three to 97 percent, with nine schools above 50 percent and six schools above 80 percent. The percentage of LEP students ranged from 10 to 32 percent, with four schools having fewer than five LEP students. Special education rates ranged from six to 18 percent for 11 of the schools. One school with several programs for students with disabilities had a rate of 32 percent. It is important to note that more than half of the Case Study schools are smaller than the prototype schools described in the EB approach.

[13] Because the available data were not at the student level, the study team could not make comparisons between FRPM and non-FRPM students.

Table 2.5
Characteristics of Case Study Schools

School (County)	Enrollment	FRPM	LEP	Minority	Special Education	Performance Category
Chillum Elementary (Prince George's)	274	85%	32%	97%	6%	High-Growth
Parkland Middle (Montgomery)	883	52%	10%	87%	10%	High-Growth
Somerset Intermediate (Somerset)	409	76%	<=5	56%	18%	High-Growth
Bel Air Elementary (Allegany)	216	48%	<=5	3%	16.7%	High-Performing
Chadwick Elementary (Baltimore County)	548	81%	21%	98%	9%	High-Performing
North Hagerstown High (Washington)	1,280	49%	<=5	41%	10%	High-Performing
James H. Harrison Elementary (Prince George's)	330	70%	16%	94%	32%	High-Growth for Student Groups
Patterson Park Public Charter [14] (Baltimore City)	670	80%	18%	87%	12%	High-Growth for Student Groups
Wiley H. Bates Middle (Anne Arundel)	800	46%	10%	53%	9%	High-Growth for Student Groups
Fairmont Heights High (Prince George's)	837	65%	<=5	97%	16%	High-Growth for Student Groups
North Frederick Elementary (Frederick)	590	47%	14%	41%	6%	Reducing the Poverty Gap
Redland Middle (Montgomery)	545	40%	11%	67%	11%	Reducing the Poverty Gap

The school site visits consisted of multiple interviews with individual school administrators and teachers or with small teacher focus groups. An interview with the principal was typically scheduled during the first 90 minutes of each visit. This was followed by interviews with lead teachers; classroom teachers emphasizing math, reading/English/language arts/writing, and science; instructional coaches; and other key staff providing instruction in special education, Tier 2 interventions, and LEP. Teacher interviews were conducted during their student-free periods. The actual types and numbers of teachers interviewed and the length of interviews varied by school and each school's schedule.

[14] Serves PK-8 grade span

Following each site visit, the case researchers drafted a case study report summarizing the information learned from the document review and site interviews. Case study write-ups included common information:

- School demographics;
- school achievement data;
- school staffing;
- curriculum and instructional program, focusing on reading, mathematics, and if possible science, and including organization of teachers into collaborative groups (if done by the school), use of instructional coaches, and nature of data-based decision making;
- interventions for students struggling to achieve to standards;
- short cycle assessments;
- PD; and
- school culture.

Cross Case Analysis

The study team then conducted a cross case analysis, designed to identify common themes and findings across the 12 school sites. Each case study provides Maryland educators with information about successful strategies schools are using to boost student performance, reduce gaps in performance between and among various subgroups of students, and to maintain high performance levels. The focus of the cross case analysis is on the resource needs in support of implementing the following strategies in these 12 schools:

- Staffing and class size;
- collaborative learning teams;
- interim, short-cycle assessments;
- extra help for students at risk of academic failure; and
- alignment with the elements of the EB model.

Case Study Findings

The case study findings emphasized strategies that impacted student performance in the core subjects of reading/English/language arts and mathematics, and in a few cases, science. Thus, the cases did not address other potentially important outcomes, the causes of those outcomes, or the resources and specific staffing needs associated with those outcomes. This cross-case analysis summarizes many of the strategies involved in producing results for the core subjects listed.

Nearly all schools had specific goals focused on improving student performance in reading and math. Several schools specifically had goals to reduce achievement gaps linked to student demographics. The goals helped schools set their priorities for time and resources, and provided guidance for where the schools' staff should focus their efforts.

Most schools were in the process of adopting new instructional materials in both reading and mathematics, largely due to the shift to the MCCRS. Furthermore, many schools had previously modified their curriculum and instructional programs as part of their overall strategies that resulted in the performance successes made over the past several years. However, there were no commonalities in terms of the specific curriculum and instructional programs adopted, except for a greater focus on phonemic awareness, phonics, vocabulary, and fluency in the elementary reading programs. Every school was aligning its current curriculum program to new county school system guidelines, including using many new formative assessments provided by its county education offices.

There also were movements to clarify a more common approach to instructional practice. This resulted both from actions in teacher collaborative groups, where instructional strategies and interventions were discussed and assessed, and in the broader ongoing activities of the faculties to identify what pedagogical practices worked in their schools.

The schools had strong instructional leadership, provided by principals as well as teacher leaders. Teachers coordinated grade-level collaborative teams, and in a few instances school-wide curriculum teams, and were involved in school-wide teams that developed individual education programs for students with disabilities.

School cultures were characterized by school-wide and individual accountability. Administrators and teachers in the case study schools viewed their success in terms of the impact of their strategies on student academic achievement. If high levels of achievement were maintained, overall levels of achievement improved notably, or achievement gaps were diminishing, the administrators and faculties concluded it was largely due to their instructional efforts. If achievement did not produce these results, the attitude was to go back to the drawing boards and revise their instructional approaches.

Given the sample size, it was not possible to determine if the specific improvement strategies used across schools differed for purposes of maintaining high levels of performance, producing large gains in performance, or reducing achievement gaps linked to poverty or minority status. A review of all cases does not seem to indicate that such differences existed. All schools had goals focused on (1) improving their curriculum and instructional programs; (2) identifying the most effective instructional practices; (3) organizing teachers into collaborative work teams that used student data to plan instruction and interventions; (4) providing a variety of extra help services to students struggling to learn to standards; (5) engaging both administrators and teachers in instructional leadership; and (6) creating a cohesive and collaborative culture in which school staff took responsibility for the results of their actions on student achievement. Research also confirms the effectiveness of these common strategies.

Most schools took teacher quality very seriously. Indeed, when asked how the schools had produced their impressive results, several principals (and teachers) immediately said, “teacher talent.” These schools often partnered with local teacher training institutions and/or tried to hire only individuals who had student taught or otherwise had worked in the school in some capacity so their skills and work habits, and degree to which they fit into the school culture, were known.

In general, the improvement strategies in these schools were similar to those embedded in the EB model. The schools had goals focused on improving student performance in reading and math, and often also goals to reduce achievement gaps. To accomplish those goals, the schools:

- Revised their curriculum and instructional approaches, often adopting new instructional materials;
- created common approaches to effective instructional practice;
- organized teachers into collaborative work groups that met multiple times during the week;
- engaged teachers in ongoing data-based decision making;
- provided multiple interventions, including tutoring and other push-in and pull-out strategies, extended day academic help and summer school programming; and
- created collaborative school cultures in which faculties took responsibility for the student achievement outcomes of the school.

Most schools also sought to recruit and retain high-quality teacher talent, often hiring only individuals who had worked in the school in some capacity before being hired into a permanent teacher role.

The schools had class sizes that were in the range of the EB model, somewhat above the EB model at the elementary level and close to the EB model in secondary schools. All schools had a mix of core and elective teachers, so were able to offer a full liberal-arts curriculum program that was being revised to reflect MCCRS. The schools' extra help strategies for providing additional instructional and student support for students at risk of academic failure seemed to be in the range of resources provided by the EB model as well, including the EB model's extended day and summer school provisions.

Evidence-Based Approach Total Base Cost and Weights

Using all the evidence-based research, EBPJ panel discussions, and case studies, the study team determined a per pupil base amount and weights for students with special needs using school-level cost figures for each grade configuration along with the distribution of students at each grade level. The study team then added district-level costs to develop total base costs and weights for each identified student population.

For personnel salaries used to create these cost estimates, the study team used MSDE data on statewide average salaries for different personnel categories and available data on statewide benefit amounts and rates, supplemented by data collected from districts. See Appendix C for more detail on salaries and benefits used.

As shown in Table 2.6, below, the per student base cost is $10,514. The prekindergarten weight is 0.40. The weights for the other student populations were: 0.29 for at risk, 0.37 for LEP, and 0.70 for students with mild and moderate disabilities.[15]

[15] Under the EB model, the cost of students with more severe disabilities is assumed to be funded by the State. The 0.70 weight does not cover the costs for these students.

Table 2.6
EB Total Base Cost and Additional Weights

Base	**$10,514**
Weights	
Prekindergarten	0.40
At Risk	0.29
LEP	0.37
Special Education Weight (Applied Just to Students with Mild and Moderate Disabilities)*	0.70
***Note that the evidence-based special education weight presented is only for mild and moderate special education students.**	

III. Professional Judgment Approach to Adequacy

The **professional judgment** (PJ) approach relies on the experience and expertise of educators in the State to identify the resources needed to ensure that all districts, schools, and students can meet state standards and requirements. Resources include school-level personnel, non-personnel costs, additional supports and services, technology, and district-level resources. These resources are first identified for students with no identified special needs (which allows for the calculation of a base cost) and then separately for special needs students, presented as weights.

The PJ approach is distinct from the successful school district (SSD) approach and similar to the evidence-based (EB) approach. Like the EB approach, the PJ approach is able to identify of resources for special needs students and is also able to address future standards and performance expectations, a benchmark for academic success that is higher than the benchmark for the SSD approach.

Creating Representative Schools and a Representative District

The PJ approach estimates the costs of adequacy by developing representative schools and one or more representative districts. Representative schools are designed using statewide average characteristics to represent schools across the State. This includes identifying both averages for school sizes and grade configurations as well as identifying average demographics for at risk, LEP, and special education students. For the PJ panels, the term at risk was used to refer to students that struggle academically using FRPM eligibly as a proxy.

In Maryland, average school and district sizes (in rounded figures) are 450 students for elementary schools, 720 for middle schools, and 1,200 for high schools, with an average district size of over 30,000. Statewide, the average demographics are 44 percent of students qualify for FRPM, seven percent are LEP students, and 12 percent are special education students. For the purposes of this study in Maryland, the study team also identified the relationship between resources and student need concentration levels for at risk and LEP populations. For the at risk population, three concentration levels (25 percent, 50 percent, and 75 percent) were examined. For the LEP population, two higher concentration levels (20 percent and 60 percent) were considered in addition to the statewide average of 7 percent. For special education, the study team disaggregated the 12 percent statewide average into three categories of need: (1) mild (eight percent), (2) moderate (three percent), and (3) severe (one percent).

The study team created the representative schools and one representative district this way so they would closely resemble actual schools and districts, on average, in the State. This allowed PJ panelists to comfortably estimate what resources are needed, since the representative schools and district looked familiar. At the same time, the approach developed per-student figures that can be applied in each unique district and school in Maryland based on real enrollment figures and demographics.

Table 3.1 identifies the representative schools and representative district for Maryland, including demographics.

Table 3.1
PJ Representative Schools and District

	Prekindergarten Program	Elementary School	Middle School	High School	District
Enrollment	60	450	720	1,200	30,000
Special Need Populations					
At risk, 25% Concentration		113	180	300	7,500
At risk, 50% Concentration		225	360	600	15,000
At risk, 75% Concentration		338	540	900	22,500
LEP, 7% Concentration		32	50	84	2,100
LEP, 20% Concentration		90	144	240	6,000
LEP, 60% Concentration		270	432	720	18,000
Special Education- Mild (8%)		36	58	96	2,400
Special Education- Moderate (3%)		14	22	36	900
Special Education- Severe (1%)		5	7	12	300

Professional Judgment Panel Design

Based on the study team's experience using the PJ approach in other states, the study team felt that it was best to use multiple levels of PJ panels because: (1) multiple panels allow for the separation of school-level resources (which include teachers, supplies, materials, and professional development) from district-level resources (which include facility maintenance and operation, insurance, and school board activities); and (2) the study team believes strongly in having each panel's work reviewed by another panel for the consensus approach to be effective.

The PJ panel structure in Maryland was designed as follows:

1. School-level panels: the study team first held four school-level panels based on grade-level (prekindergarten, elementary, middle, and high school). Each of these panels focused first on the resources needed to serve students with no special needs; then, they identified the additional resources needed to serve at students.

2. Special needs panels: next, two special needs panels (one for special education and one for LEP) were held to review the work of the previous panels that identified the resources for the base and for at risk students and then identified the additional resources needed to serve special education and LEP students.

3. District panel: the next panel was a district-level panel that reviewed the work of the previous school-level and special needs panels and then identified the needed district-level resources.

4. Chief Financial Officers (CFO) panel: the study team also held a panel specifically with CFOs to review all non-personnel costs, both at the school and district level, identified by previous panels.

5. Statewide panel: the study team held a final, statewide panel to review the work of all previous panels to attempt to resolve any remaining inconsistencies that arose across panels.

Panels each had between six and eight participants, including a combination of classroom teachers, principals, personnel who provide services to students with special needs, superintendents, technology specialists, and school business officials. Districts were asked to nominate educators in these key positions whom they believed would be best able to help the study team identify the resources needed to ensure student success. Where possible, teacher participants were selected from a list of master teachers previously vetted by MSDE. In total, over 65 panelists participated in nine PJ panels. A list of panel members is provided in Appendix C to this report.

Panels were held from October 2015 to January 2016 in Baltimore at MSDE's offices. Table 3.2 provides the dates of these meetings.

Table 3.2
PJ Panel Dates

Date	Panel
October 13-14, 2015	Elementary School Panel; Middle School Panel
October 15-16, 2016	Prekindergarten Panel; High School Panel
October 28, 2015	Special Education Panel
October 29, 2015	LEP Panel
November 17-18, 2015	District-level Panel
January 12, 2016	CFO Panel
January 14, 2016	Statewide Review Panel

Panelists were not compensated for their participation, though meals were provided and some expenses, like mileage and parking fees, were reimbursed.

Summarizing Maryland State Standards and Requirements

Prior to the commencement of any PJ panel discussions, all panelists first reviewed a specific set of background materials and instructions prepared by the study team. Panelists were instructed that their task was to identify the resources needed to meet all Maryland standards and requirements, which included MCCRS and graduation requirements, as well as additional requirements for schools and districts around assessment, accountability, and educator evaluation. The study team prepared a brief summary document of these standards and requirements, which was reviewed by MSDE. This document was then shared with panelists (Appendix C). The document was not meant to be exhaustive, as all panel participants were experienced educators in Maryland; instead, it was meant to highlight key expectations and recently revised expectations, like the forthcoming change to the compulsory education age requirement (raising to 18 for the 2017-18 school year) and the requirement of an additional high school mathematics course (that started with freshman in 2014-15). Panelists were instructed to use the summary document, in conjunction with their knowledge of other critical education policies and practices in Maryland, to guide their allocations of resources needed to increase the number of Maryland students meeting or exceeding standards. The instructions and background information used at the PJ panels can be found in Appendix C.

Using Best Practice Research and Professional Association Recommendations as a Starting Point for PJ Panels

The study team provided the PJ panels with some starting point figures from a review of best practice research and with any staffing recommendations that were available from educator professional associations. These figures were used to prompt discussion. Panelists were in no way constrained by these recommended figures, instead they could adjust the figures as they saw fit to best suit Maryland and add in additional necessary staffing positions that were not addressed in the starting point figures.

The following tables summarize the starting point figures that were shared with the panelists based upon the team's research review and recommendations from professional associations, as available. Note that where "Rec." is indicated, the research or professional associations indicated that such a resource should be in place, but a specific resource level was not identified.

Table 3.3
Research-Based and Professional Association Starting Point Personnel Figures
Elementary School of 450 Students

Personnel Position	Research-Based Recommendations	Professional Association Recommendations
Instructional Staff		
Classroom Teachers	22.5-26.0	26.0
Specials Teachers (art, music, PE, world language, etc.)	Rec.	Rec.
Instructional Facilitators (Coaches)	2.3	
Interventionists	1.0	
Librarians/Media Specialists	1.0	1.0
Technology Specialists		
Instructional Aides		
Pupil Support Staff		
Counselors	1.8	1.8
Nurses	1.0	0.6
Psychologists		0.6
Social Workers		1.1
Family Liaisons		
Administrative Staff		
Principal	1.0	1.0
Assistant Principals		1.0
Clerical	2.0	

Personnel Position	Research-Based Recommendations	Professional Association Recommendations
Other Staff		
IT Technicians		1.8
Duty Aides	Rec.	

The study team's research review produced a range of class sizes that were shown to positively impact student success, from 15-20 in kindergarten through grade three and from 20-25 in grades four and five. The National Education Association recommended class sizes of 15:1 in kindergarten through grade three, then small class sizes in higher grades but not a specific figure. The study team therefore used 25:1 for grade four and five to create a comparison starting point figure. Other specials teachers were also recommended but not at a specific resource level. Other key recommendations out of both the research and professional association recommendations were related to counselors (both the research and the American School Counselor Association recommended staffing at 250:1), librarians (both sources recommending one per school), nurses (research recommending one per school and the National Association of School Nurses recommending staffing at 750:1 for the general student population), and principals (one per school). The research review also recommended instructional coaches, technology specialists, teacher tutors/interventionists, clerical staff, and duty aides. Additional professional association recommendations were 500:1 to 700:1 for psychologists based upon school need (National Association of School Psychologists), 400:1 for social workers (School Social Work Association), the addition of an assistant principal (one per school at the elementary and middle school level, one or more at the high school level, as recommended by the National Association of Elementary School Principals and National Association of Secondary School Principals), and 250:1 staffing for IT positions (International Society for Technology in Education, NETS Standards).

Table 3.4
Research-Based and Professional Association Starting Point Personnel Figures
Middle School of 720 Students

Personnel Position	Research-Based Recommendations	Professional Association Recommendations
Instructional Staff		
Teachers	41.1	
Instructional Facilitators (Coaches)	3.6	
Interventionists	1.0	
Librarians/Media Specialists	1.0	1.0
Technology Specialists		
Instructional Aides		
Pupil Support Staff		
Counselors	2.9	2.9
Nurses	1.0	1.0
Psychologists		1.0
Social Workers		1.8
Family Liaisons		
Administrative Staff		
Principal	1.0	1.0
Assistant Principals		1.0
Clerical	2.0	
Other Staff		
IT Technicians		2.9
Duty Aides		

The research review recommended class sizes of 25:1 on a block schedule, with teachers teaching three out of four blocks. As noted, there was not a specific class size recommendation from the professional associations, so a specific figure was not included as a starting point. All other staffing positions used similar ratios as the elementary recommendations.

Table 3.5
Research-Based and Professional Association Starting Point Personnel Figures
High School of 1,200 Students

Personnel Position	Research-Based Recommendations	Professional Association Recommendations
Instructional Staff		
Teachers	64.0	
Instructional Facilitators (Coaches)	6.0	
Interventionists	1.0	
Librarians/Media Specialists	1.0	1.0
Technology Specialists		
Instructional Aides		
Pupil Support Staff		
Counselors	4.8	4.8
Nurses	1.0	1.7
Psychologists		1.7
Social Workers		3.0
Family Liaisons		
Administrative Staff		
Principal	1.0	1.0
Assistant Principals		1+
Clerical	2.0	
Other Staff		
IT Technicians		4.8
Duty Aides		

The research review recommended the same class sizes (25:1) and schedule (four period block) as the middle school level for the high school level. As noted, there was not a specific class size recommendation from the professional associations, so a specific figure was not included as a starting point. All other staffing positions used similar ratios as the elementary recommendations.

The study team also provided starting point figures from the research review for non-personnel costs as shown in Table 3.6.

Table 3.6
Evidence-Based Starting Figures for School-Level Non-Personnel Costs

Cost Category	Research-based Starting Figures		
	Elementary School	Middle School	High School
Professional Development	10 days per teacher; $100 per student	10 days per teacher; $100 per student	10 days per teacher; $100 per student
Supplies and Materials	$165 per student	$165 per student	$200 per student
Student Activities	$250 per student	$250 per student	$250 per student

It is important to note that the study team's research review did not identify resources beyond the school-level items listed above (e.g. district-level resources).

Professional Judgment Panel Procedures

Once panelists were provided with instructions and background information to guide their efforts (as described previously), PJ panels convened and followed a specific procedure. At least two study team members attended each panel meeting to facilitate the discussion and to take notes about the level of resources needed as well as the rationales behind participant decisions. Panelists were frequently reminded that they should be identifying the resources needed to meet state standards in the most efficient way possible without sacrificing quality.

Each panel discussed the following school-level resource needs:

1. Personnel, including classroom teachers, other teachers, psychologists, counselors, librarians, teacher aides, administrators, nurses, etc.

2. Other personnel costs, including the use of substitute teachers and time for professional development.

3. Non-personnel costs, such as supplies, materials and equipment costs (including textbook replacement and consumables), plus the costs of offering extracurricular activities.

4. Non-traditional programs and services, including before and after-school programs, prekindergarten, and summer school programs.

5. Technology, including hardware, software, and licensing fees.

District-level panels also addressed the following district-level resource needs:

1. Personnel, including central office administrators, special programs directors and coordinators, and support staff.

2. Non-personnel costs, such as maintenance and operation, insurance, safety and security, adoption of textbooks, assessment, contract services, and out-of-district placements.

PJ panels first identified the above resources for students with no special needs, and then addressed the additional resources needed to serve special needs students (at risk, special education, and LEP). Keeping these costs separate allowed for the creation of a base cost and additional special needs weights (discussed in greater detail later in this report).

As described in the previous section, the study team provided PJ panelists with starting point figures - in a limited number of personnel categories - from both the study team's research review as well as recommendations from professional associations. These figures were used to prompt discussion. Panelists were in no way constrained by these recommended figures or limited to these personnel categories; instead they could identify resources as they saw fit to meet Maryland standards.

For each panel, the figures the study team recorded represent general consensus among members. At the time of the meetings, no participant (either panel member or study team member) had a precise idea of the costs of resources being identified. (The study team's costing of resources took place at a later date.) This is not to say that panel members were unaware that higher levels of resources would produce higher base cost figures or weights. However, without specific price information and knowledge of how other panels were proceeding, it would have been impossible for any individual or panel to suggest resource levels that would lead to specific base cost figures or weights, much less to costs that were relatively higher or lower than others.

Professional Judgment Resources Identified

While panels varied in the resources they identified as necessary for an adequate education, several key recommendations were common across panels:

- Small class sizes, with student-to-teacher ratios of 15:1 in kindergarten through grade three and 20:1 in grades four and five;
- significant time for teacher planning, collaboration, and imbedded professional development with instructional coaches. At each level this was essentially teachers teaching 70-75 percent of the day with the remaining time available for the listed activities. Given the amount of time available within the school day for professional development, the panels did not indicate a need for any additional professional development days;
- a high level of student support (counselors, social workers, behavior specialists, and pupil personnel workers-PPWs) available for all students;
- sufficient administrative support in the form of assistant principals to allow for required staff evaluations to be done well;
- before and after-school programs and school-level summer school for at risk students, particularly at the elementary level;
- technology-rich learning environments, including 1:1 student devices, and associated IT support;

- sufficient staff to serve special education and LEP students;
- prekindergarten for all four-year-olds.

It should be noted that the resources PJ panels identified here are examples of how funds might be used to organize programs and services in representative situations. Further, there were separate panels for each school level, so approaches may vary in how they identified resources, but subsequent review panels felt the differences were appropriate. The study team cannot emphasize strongly enough that the resources identified are not the only ways to organize programs and services to meet state standards. Instead, the purpose of the exercise is to estimate the overall level of resources and therefore the cost of adequacy – not to determine the best way to organize schools and districts.

School-Level Personnel

PJ panels discussed and recommended staffing, including:

- **Instructional staff,** including teachers, instructional aides, instructional coaches, interventionists, librarian/media specialists, and technology specialists;
- **pupil support staff,** including counselors, nurses, pupil personnel workers (PPWS), social workers, behavior specialists, and alterative to suspension instructors;
- **administrative staff,** including principals, assistant principals, bookkeepers, and clerical/secretarial staff; and
- **other staff members,** including school resource officers, testing/data coordinators, and media aides.

Tables 3.7A through 3.7D first identify the school or program size, and the panel-recommended average class size. The tables then identify the personnel on a FTE basis needed to serve all students, regardless of need, at the prekindergarten, elementary, middle, and high school settings (base education). Subsequent tables identify the additional personnel needed to serve special needs students.

As noted previously, separate panels at each level identified these resources and as a result, specific resources and approaches may vary from level to level. As these resources are not intended to be prescriptive, subsequent review panels allowed for variation as long as they felt the differences were reasonable.

Table 3.7A

Prekindergarten Program Personnel as Recommended by Maryland PJ Panels, Base Education

Program Configuration and Size	60 four-year-olds
Recommended Average Class Size	15:2 (one teacher and one instructional aide)
Instructional Staff	
Teachers	4.0
Specials Teachers	0.5
Instructional Facilitators (Coaches)	1.0
Instructional Aides	4.0
Pupil Support Staff	
Counselors	0.2
Psychologists	0.1
Speech Therapist	0.2
Behavior Specialists	0.2
Family Liaisons	0.25
Administrative Staff	
Clerical	0.1
Other Staff	
Duty Aides	0.25

Resources for the prekindergarten program were identified with the assumption that it would be a school-based program in an existing elementary school. The program was designed to serve all four-year- olds. Panelists recommended an average class size of 15:2, with one teacher and one instructional aide for every 15 students. Additional specials teacher staffing was identified to allow for teacher planning and collocation time, as well as instructional coaches to provide embedded professional development for prekindergarten teachers. Meaningful pupil support was also recommended.

Table 3.7B

Elementary School Personnel as Recommended by Maryland PJ Panels, Base Education

School Configuration and Size	K-5, 450 students
Recommended Average Class Size	Grades K-3: 15:1 Grades 4-5: 20:1
Instructional Staff	
Teachers	27.5
Specials Teachers	4.0
Instructional Facilitators (Coaches)	3.0
Librarians/Media Specialists	1.0
Technology Specialists	1.0
Media Aides	1.0
Instructional Aides	2.5

School Configuration and Size	K-5, 450 students
Pupil Support Staff	
Counselors	1.8
Nurses	1.0
Psychologists	0.2
Social Workers	0.2
PPWs	0.2
Behavior Specialists	0.4
Alternative to Suspension Instructor	1.0
Administrative Staff	
Principal	1.0
Assistant Principals	2.0
Bookkeeper	1.0
Clerical	2.0
Other Staff	
IT Technicians	1.0
Substitutes	1.0
Test/Data Coordinator	1.0

For the average elementary school of 450 students, the panelists recommended an average class size of 15:1 in kindergarten through grade three and 20:1 for grades four and five, for a total of 27.5 classroom teachers. Panelists also identified four other specials teachers to teach subjects like art, music, physical education, and world language, and to allow for sufficient planning and collaboration time for classroom teachers. The panelists also felt that the librarian/media specialist and technology specialist (whose primary role is to provide coaching to teachers on incorporating technology in the classroom) could also provide additional instruction and release time. Other key staffing included a high level of pupil support across a variety of positions (the local school site to determine the specific pupil support positions that would be the best fit for their school), IT staff for the 1:1 student devices recommended, assistant principals to handle required educator evaluations, and a full-time substitute teacher to provide continuity of instruction.

Table 3.7C
Middle School Personnel as Recommended by Maryland PJ Panels, Base Education

School Configuration and Size	Grades 6-8, 720 students
Recommended Average Class Size	25:1
Schedule	Five period day (modified block); teachers teaching three and a half periods
Instructional Staff	
Teachers	41.1
Instructional Facilitators (Coaches)	4.0

School Configuration and Size	Grades 6-8, 720 students
Interventionists	1.0
Librarians/Media Specialists	1.0
Media Aides	1.0
Technology Specialists	1.0
Pupil Support Staff	
Counselors	2.9
Nurses	1.0
Psychologists	0.5
Social Workers	1.0
PPWs	0.5
Behavior Specialists	1.0
Alternative to Suspension Instructors	1.0
Administrative Staff	
Principal	1.0
Assistant Principals	3.0
Bookkeeper	1.0
Clerical	3.0
Other Staff	
IT Technicians	1.5
School Resource Officer	1.0
Test/Data Coordinator	1.0
Substitute	1.0

For the average middle school of 720 students, panelists felt that 25:1 was an appropriate average class size. Panelists also based their staffing of middle school grades on a five-period modified block day (blocks of varying lengths), with teachers teaching on average of three and a half classes a day (perhaps varying by day or semester) to allow an average of 30 percent of the day for planning, collaboration, and embedded professional development. This resulted in a total of 41.1 teachers; at the secondary level no distinction is made between classroom or specials teachers and is instead presented as a total teachers figure. As was the case at the elementary level, panelists also identified significant pupil support services needed for all students and administrators to address evaluations.

Table 3.7D
High School Personnel, as Recommended by Maryland PJ Panels, Base Education

School Configuration and Size	Grades 9-12, 1,200 students
Recommended Average Class Size	25:1
Schedule	eight period day; teachers teaching five and a half periods
Instructional Staff	
Teachers	41.1
Instructional Facilitators (Coaches)	4.0

School Configuration and Size	Grades 9-12, 1,200 students
Interventionists	1.0
Librarians/Media Specialists	1.0
Media Aides	1.0
Technology Specialists	1.0
Pupil Support Staff	
Counselors	2.9
Nurses	1.0
Psychologists	0.5
Social Workers	1.0
PPWs	0.5
Behavior Specialists	1.0
In School Suspension Instructors	1.0
Alternative to Suspension Instructors	1.0
Administrative Staff	
Principal	1.0
Assistant Principals	4.0
Athletic/Activities Director	1.0
Bookkeeper	1.0
Clerical	5.0
Other Staff	
IT Technicians	2.0
School Resource Officer	1.0
Test/Data Coordinator	1.0

For the average high school of 1,200 students, panelists kept the same average class size of 25:1 that they used for the middle schools, then recommended an eight period day (or a four block day) to allow for a wide range of courses to be offered so that students could meet all graduation requirements. Teachers would teach five and a half periods on average, or about 70 percent of the day, to again allow for meaningful collaboration and embedded professional development. The panelists also identified additional pupil support staff, administrators to manage evaluations, and other staff.

Tables 3.8A through 3.8C identify the resources needed to serve at risk, LEP, and special education students. It is important to note that these tables identify certain positions as school-level personnel, even though some school districts may house these positions centrally; additional personnel not shown here are also identified at the district-level (Tables 3.13A-C).

As shown in Table 3.8A, below, resources identified for at risk students are above and beyond the resources identified in the base. Further, the resources identified were distinct for each concentration level and should not be considered cumulatively, i.e. a school with a 50 percent concentration level of at risk students would only receive the resources in the 50 percent column, and not the resources identified in the other columns (the columns are either/or).

Panelists identified the need for additional teaching staff to reduce class sizes, interventionists to work directly with students, instructional coaches to provide professional development to teachers, further pupil support staff – including site-based, community coordinators to work with local agencies to offer services as identified by the elementary panel – and some additional administrative support. The specific additional resources varied by concentration level, with fewer resources being needed at the 25 percent concentration level, and significantly increasing once the 50 percent concentration level, viewed as a tipping point, was reached.

Table 3.8A

Additional Personnel Needed to Serve At Risk Students Identified by Maryland PJ Panels

Elementary School			
Concentration	25%	50%	75%
# of At-Risk Students	113 students	225 students	338 students
Instructional Staff			
Teachers		2.5	2.5
Specials Teachers		0.5	0.5
Interventionists	2.0	4.0	6.0
Instructional Aides	2.5	2.5	5
Pupil Support Staff			
Health Aides		1.0	1.0
Psychologists	0.2	0.8	0.8
Social Workers	0.2	0.2	0.2
Family Liaisons	1.0		
School Based Site/Service Coordinator		1.0	2.0
Administrative Staff			
Assistant Principals			0.5
Middle School			
Concentration	25%	50%	75%
# of At-Risk Students	180 students	360 students	540 students
Instructional Staff			
Teachers	2.5	5.0	10.0
Instructional Facilitators (Coaches)		1.0	1.0
Interventionists		2.0	2.0
Pupil Support Staff			
Health Aides		1.0	1.0
Psychologists	0.25	0.5	0.75
Social Workers	0.5	1.0	1.5
PPWs		0.5	0.5
Family Liaisons		1.0	1.0
Alternative to Suspension Instructor		1.0	1.0
Administrative Staff			
Dean		1.0	1.0
Clerical		0.25	0.5
Other Staff			
Substitute		1.0	1.0
High School			
Concentration	25%	50%	75%
# of At-Risk Students	300 students	600 students	900 students
Instructional Staff			
Teachers	5.82	11.6	17.5
Instructional Facilitators (Coaches)		2.0	2.0
Pupil Support Staff			
Psychologists		1.0	1.0
Social Workers	0.25	0.5	1.0
PPWs	0.5	1.0	2.0
Family Liaisons		1.0	1.0
In School Suspension Instructors			1.0
Administrative Staff			
Dean		1.0	1.0

Table 3.8B
Additional Personnel Needed to Serve LEP Students Identified by Maryland PJ Panels

Elementary School			
Concentration	7%	20%	60%
# of ELL Students	32 students	90 students	270 students
Instructional Staff			
Teachers	2.0	6.0	11.0
Instructional Facilitators (Coaches)	0.2	0.5	1.0
Pupil Support Staff			
Family Liaisons	0.2	0.5	1.0
Administrative Staff			
ELL Coordinators	0.5	1.0	1.5
Middle School			
Concentration	7%	20%	60%
# of At-Risk Students	50 students	144 students	432 students
Instructional Staff			
Teachers	3.5	9.0	15.0
Instructional Facilitators (Coaches)	0.2	0.5	1.0
Interventionists	0.5	1.0	2.0
Instructional Aides	1.0	2.0	5.0
Pupil Support Staff			
Family Liaisons	0.5	1.0	2.0
Administrative Staff			
ELL Coordinators	0.5	1.0	1.5
High School			
Concentration	7%	20%	60%
# of At-Risk Students	84 students	240 students	720 students
Instructional Staff			
Teachers	4.0	9.0	20.0
Instructional Facilitators (Coaches)	0.3	0.8	1.5
Interventionists	2.0	4.0	4.0
Instructional Aides	5.0	5.0	5.0
Pupil Support Staff			
Family Liaisons	0.5	1.0	2.0
Administrative Staff			
ELL Coordinators	0.5	1.0	1.5

Panelists identified a well-resourced service model for LEP students, including instructional support, coaching, pupil support, and coordination. Panelists felt that it was hardest to serve students in lower concentration settings, therefore staff-to-student ratios were lowest at the 7 percent concentration level, and increased as the higher concentration levels, representing the economies of scale that could be experienced by serving a larger population of LEP students.

Table 3.8C
Additional Personnel Needed to Serve Special Education Students Identified by Maryland PJ Panels

Elementary School			
Concentration	Mild (8%)	Moderate (3%)	Severe (1%)
# of At-Risk Students	36 students	14 students	5 students
Instructional Staff			
Teachers	1.0	1.0	1.0
Instructional Aides	1.0	1.0	1.0
Pupil Support Staff			
Speech Pathologist	0.7	0.1	0.2
Other Therapists		0.1	0.2
Behavior Specialists	0.1	0.05	0.05
Administrative Staff			
IEP Coordinator	0.2	0.1	0.1
Middle School			
Concentration	Mild (8%)	Moderate (3%)	Severe (1%)
# of At-Risk Students	58 students	22 students	7 students
Instructional Staff			
Teachers	3.00	2.00	1.5
Instructional Aides	2.0	2.0	2.0
Pupil Support Staff			
Speech Pathologists	0.15	0.10	0.25
Other Therapists	-	0.05	0.15
Psychologists	0.15	0.1	0.1
Social Workers	0.3	0.1	0.1
Administrative Staff			
IEP Coordinators	0.3	0.15	0.15
High School			
Concentration	Mild (8%)	Moderate (3%)	Severe (1%)
# of At-Risk Students	96 students	36 students	12 students
Instructional Staff			
Teachers	5.00	3.00	3.00
Instructional Aides	3.00	3.00	3.00
Pupil Support Staff			
Speech Pathologists		0.05	0.05
Other Therapists	-	0.05	0.10
Job Coaches (Para)		1.0	1.0
Behavior Specialists	0.30	0.10	0.10
Administrative Staff			
IEP Coordinators	1.00	0.50	0.50
Transition Coordinators	0.33	0.33	0.33

For special education students with mild disabilities, panelists indicated at the elementary level that student need in this category would primarily be for speech services. The proportion of students with identified speech needs greatly decreases in secondary grades; so special education students with mild disabilities in higher grades predominately represent learning disabilities. Staffing reflects this shift in need by grade-level, with a teacher caseload ratio of 36:1 and a high level of speech therapist support in elementary school, then a lower teacher case load of about 20:1 in middle and high school, with little to no speech support. Additionally, panelists recommended IEP coordination at all grades, some behavior interventions and other pupil support in secondary grades, and transition support at the high school level.

For special education students with moderate disabilities, panelists felt there should be a teacher ratio, or caseload, of 11:1 to 14:1, with an instructional aide paired with each teacher. Panelists also identified a need for support from therapists/other pupil support staff and IEP coordination, as well as job coaches and transitions coordinators for high school students.

For special education students with severe disabilities, panelists felt there should be a teacher ratio, or caseload, of about 5:1, with at least one instructional aide per teacher. Support from speech therapists, other therapists, behavior specialists, and other pupil support staff was also identified, as was IEP coordinators, job coaches and transitions coordinators.

Other support positions needed to serve special education students (such as specialized therapists) were identified at the district level.

School-Level Non-Personnel Costs

Aside from personnel needs, Table 3.9 shows additional school-level non-personnel costs identified.

Table 3.9
School-Level Non-Personnel Costs Identified by Maryland PJ Panels

	Base Education	At Risk	LEP
Professional Development	$75/ student		
Supplies, Materials, and Equipment	Elem (incl. PreK): $100/student; Middle and HS: $115/student	Middle and HS: $20/at risk student	$20/LEP student
Textbooks	$25/student		
Assessment	$5/student		
Student Activities	Elem (incl. PreK): $20/student; Middle: $40/student; HS: $250/student	Elem and Middle: $20/at risk student; HS: $50/at risk student	Elem and Middle: $20/at risk student; HS: $50/at risk student
Library Materials	$12/student		
Teacher Stipends	Middle: $15,000 total HS: $30,000 total		
Positive Behavior Interventions and Supports	Middle: $1,000 total HS: $1,000 total		
CTE Supplies, Materials and Equipment	HS: $20/student		

Note: all special education non-personnel costs were accounted for at the district level.

Non-personnel cost figures were developed for instructional supplies, materials, equipment, textbooks, assessment, student activities (field trips, sports, extracurricular activities, etc.) professional development, assessment, library materials, positive behavior intervention, and supports (PBIS), and teacher stipends at the secondary level. At the high school level, panelists also identified an amount for CTE supplies, materials and equipment; this amount in addition to available staffing would allow for CTE programming at each high school. A separate CTE center, or centralized program, was also identified at the district level.

These figures were reviewed by both the CFO panel and then by the statewide panel, considering both what is currently spent and if the resources available in these areas were sufficient. To develop the final estimates, panelists on the statewide panel reviewed the various approaches previous panels had taken, and considered existing data on what districts currently spend. Supplies, materials, and equipment and student activities are two areas that panelists felt increased in cost in later grades.

One item shown separately is professional development, shown as a per student figure to cover professional development costs like materials, hired trainers, or conference fees. Panelists did not feel the need for additional days for professional development beyond what is already in current teaching contracts. Instead, panelists emphasized the need for ongoing professional development coaching and peer collaboration embedded in the regular school day. This was reflected in teaching staffing at each grade-level that would allow teachers to have about 30 percent of the day on average to allow for these activities separate from instructional time.

All figures for additional supplies, materials, and equipment, as well as student activities, for at risk and LEP students are in addition to base figures, and are only applied to the students in those categories.

School-Level Additional Programs

Tables 3.10A through 3.10C indicate other programs – such as a before and after-school programs, summer schools and bridge programs – the panels felt were needed to ensure that schools could meet Maryland state standards and requirements. Programs are shown as elementary, middle, and high school programs; many of these programs are designed with the belief that investments that are made early will alleviate the need for some services later on.

It is important to note that, while the study did not include transportation, panelists felt that additional transportation (e.g. a second bus pickup for students in an after-school program) was necessary for things like before and after-school programs and summer school to be possible.

Table 3.10A
Elementary Additional Programs Identified by Maryland PJ Panels

	Before or After-School *Before 50 Percent At Risk Concentration Level is Reached*	**Before or After-School** *Once 50 Percent At Risk Concentration Level is Reached*	**Summer School**
Type of Student Served	At risk	At risk	At risk
Percentage of Identified Populations Served	100%	100%	100%
Program Specifics (length of program, length of day)	Eight hours per week	12 hours per week	144 hours
Personnel			
Teachers	15:1 ratio	15:1 ratio	15:1 ratio
Nurses	0.5	1.0	0.5
PPWs	0.2		0.2
Social Workers		0.2	0.4
Behavior Specialists	0.4		
Coordinator	1.0	1.0	1.0
Other Costs			
Supplies, Materials and Equipment	$30/student	$50/student	$30/student
Technology Licensing		$10/student	
Student Activities	$20/student	$20/student	$20/student
Snacks	$60/ student	$60/ student	$16/ student

Panelists identified the need for before and after-school programs and summer school for 100 percent of at risk students. For schools with lower concentrations of at risk students (below 50 percent), the panelists recommended an eight hour per week program (first program column), and once the concentration of at risk students reached the 50 percent level, considered a tipping point, this program would change to 12 hours per week (second program column). Other changes once the 12 hour-a-week program would replace the eight hour-a-week program at the higher concentration levels were to have a social worker instead of a PPW, and have a nurse available full-time before and after-school, and additional dollars available for supplies, materials, equipment and technology licensing.

Table 3.10B
Middle School Additional Programs Identified by Maryland PJ Panels

	Before or After-School	Summer School	Bridge
Type of Student Served	At risk, LEP	At risk, LEP	All
Percentage of Identified Populations Served	25%	10%	(100 students served)
Program Specifics (length of program, length of day)	two hours per day, four days a week	four hours a day, four days per week, four weeks	four hours a day, four days per week, two weeks
Personnel			
Teachers	10:1 ratio	10:1 ratio	10:1 ratio
Coordinator	1.0	1.0	1.0
Other Costs			
Supplies, Materials and Equipment	$20/student	$10/student	$30/student
Student Activities		$12/student	
Snacks	$60/ student	$8/ student	$4/ student

At the middle school level, panelists identified the need for before and after-school programs and summer school for a reduced percentage of students compared to the intensive program built at the elementary level, 25 percent of students for before and after-school and 10 percent of these students for summer school. The middle school panel's recommendations also differed by specifically targeting LEP students in addition to at risk students for these programs. Panelists also said there should be a bridge program for entering students.

Table 3.10 C
High School Additional Programs Identified by Maryland PJ Panels

	Before or After-School	Bridge
Type of Student Served	All	All
Percentage of Identified Populations Served		(300 students served)
Program Specifics (length of program, length of day)	Two hours per day, four days a week	Four hours a day, four days per week, two weeks
Personnel		
Teachers	2.0	12.0
Coordinator		1.0
Other Costs		
Supplies, Materials and Equipment	$20/student	$30/student
Snacks	$60/ student	$4/ student

For high school students, panelists indicated that there should be before or after-school instructional support available for all students, as well as a bridge program for entering students.

School-Level Technology Hardware

Tables 3.11A through 3.11D show the technology needs of each school. Panelists called for an array of technology to be available in classrooms, computer labs (fixed or mobile), media centers, and to be available for teachers and administrative staff. Of particular note, panelists recommended one-to-one mobile devices (tablets, netbooks, or similar) for students, beginning in kindergarten. Computer labs were still included given the need for high-powered machines or dedicated spaces for certain programs and classes.

Table 3.11A

Prekindergarten Program Technology Hardware Identified by Maryland PJ Panels

Hardware Item	# of Units Needed
Faculty	
Laptops	1 per teacher
Classroom	
Printers	1 per classroom
Visual Presentation System	1 per classroom
Document Camera	1 per classroom
Wireless Access Point	1 per classroom
Other	
Student Devices	40 total

Table 3.11B

Elementary School Technology Hardware Identified by Maryland PJ Panels

Hardware Item	# of Units Needed
Administration/Main Office	
Computers	1 per office staff member
Laptops	1 per administrator
Mobile Device	1 per administrator
Printers	1 per administrator
Copier/Printer	1 total
Printers	1 total
Other Computers	10 total
Faculty	
Laptops	1 per teacher
Classroom	
Printers	6 total
Visual Presentation System	1 per classroom
Document Camera	1 per classroom
Wireless Access Point	1 per classroom

Hardware Item	# of Units Needed
Computer Lab(s)- Mobile (2)	
Laptops	20 per mobile lab
Media Center	
Computers	20 total
Other	
Student Devices	1 per student
Headphones	1 per student
Protective Cases	1 per student
LCD TV (digital signage)	2 total

Table 3.11C

Middle School Technology Hardware Identified by Maryland PJ Panels

Hardware Item	# of Units Needed
Administration/Main Office	
Computers	1 per office staff member
Laptops	1 per administrator
Mobile Device	1 per administrator
Copier/Printer	4 total
Faculty	
Laptops	1 per professional
Mobile Device	1 per professional
Classroom	
Computers	2 per classroom
Printers	1 per every 5 teachers
Visual Presentation System	1 per classroom
Document Camera	1 per classroom
Wireless Access Point	1 per classroom
Computer Lab(s)- Fixed (1)	
Computers	30 per fixed lab
Printers	1 per fixed lab
Visual Presentation System	1 per fixed lab
Document Camera	1 per fixed lab
Computer Lab(s)- Mobile (2)	
Laptops	30 per fixed lab

Hardware Item	# of Units Needed
Media Center	
Computers	30 total
Printers	1 total
Visual Presentation System	1 total
Document Camera	1 total
Other	
Student Devices	1 per student
Headphones	1 per student
Protective Cases	1 per student
LCD TV (digital signage)	2 total

Table 3.11D

High School Technology Hardware Identified by Maryland PJ Panels

Hardware Item	# of Units Needed
Administration/Main Office	
Computers	1 per office staff member
Laptops	1 per administrator
Mobile Device	1 per administrator
Printers	2 total
Copier/Printer	5 total
Cell Phone	1 per administrator
Faculty	
Laptops	1 per professional
Mobile Device	1 per professional
Classroom	
Computers	2 per classroom
Visual Presentation System	1 per classroom
Document Camera	1 per classroom
Wireless Access Point	1 per classroom
Computer Lab(s)- Fixed (2)	
Computers	30 per fixed lab
Printers	1 per fixed lab
Visual Presentation System	1 per fixed lab
Computer Lab(s)- Mobile (4)	
Laptops	30 per mobile lab
Media Center	
Computers	10 total
Printers	1 total

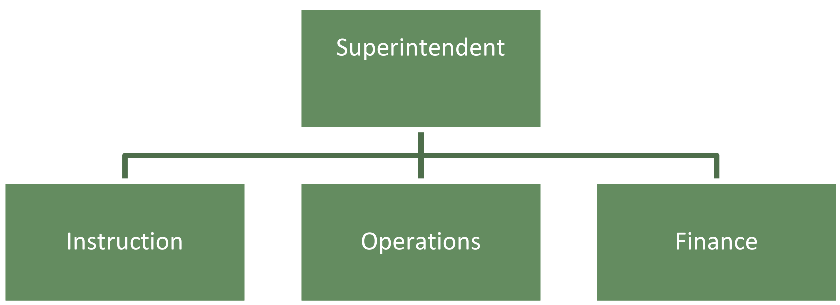
Hardware Item	# of Units Needed
Other	
Student Devices	1 per student
Computers	3 total
LCD TV (digital signage)	2 total

District-Level Resources

Panelists also identified the resources needed at the district level to support schools. Table 3.12A shows the personnel resources needed for all students (base education).

It is important to note that different districts often use different position titles or levels of personnel to fulfill the same functions or roles. For example, one district may have a CFO, while in another district that same function might be filled by a Business Manager or a Director. Therefore, the panelists first discussed the functions that would need to be fulfilled, shown in Figure 3.1.

Figure 3.1
District Functions



Instructional
Tech/IT
Student Services
Curriculum
Data, Research and Accountability
School Admin.
Athletics/Activities
Student Behavior
Digital Learning
Minority Achievement
Student Health
CTE

Food Service
Transportation
Facilities
Legal
Human Resources/ Benefits
Capital Planning
Construction
Security
Public Relations
Warehouse

Purchasing
Budgeting
Accounting
Payroll
Accounts Receivable
Accounts Payable
Grants
Internal Audit
Insurance

Panelists then identified the number of personnel needed to fulfill these functions in broad personnel categories as shown in Table 3.12A.

Table 3.12A
District Personnel Resources, Base Education Identified by Maryland PJ Panels

Personnel	FTE
Superintendent	1.0
Assistant/Associate Superintendent	3.0
Executive Director	3.0
Director	14.0
Supervisor	25.0
Coordinator	30.0
Manager	1.0
Secretary/Clerk	64.0
IT Technician	4.0
Nurse	5.0
Specialist	
Other Professional	43.0
Attorney (Systems and Board)	1.0
Teachers	20.0
Database Admin/Programmer	9.0

Panelists also addressed the district-level costs incurred to support schools. Such costs include building maintenance and operation (M and O), district-level technology licensing and hardware, insurance, legal fees, finance and data system fees, and contracted services. The cost of having a CTE center, or centralized program, is also identified; this cost is above and beyond the school-level costs identified that allowed for CTE programming at each high school. A separate CTE center, or centralized program, was also identified at the district level. As noted previously, transportation and capital were not addressed through the PJ approach.

Costs were identified by the CFO and statewide panels, primarily based upon existing district expenditure figures. Some cost areas were already identified at the school-level, so are not included at the district-level (even if often purchased district-wide, such as textbooks) to avoid double counting.

Table 3.12B identifies the additional non-personnel costs at the district-level for base education, shown both as total figures for the 30,000 district and as per student figures.

Table 3.12B
District Non-Personnel Costs, Base Education Identified by Maryland PJ Panels

Cost Area	Total	Per Student
Contracted Services	$300,000	$10 per student
Maintenance and Operations	$37,500,000	$1,250 per student
Security	In M and O	
Textbooks	School-level	
Supplies and Materials	School-level	
Professional Development	School-level	
Risk Management	$330,000	$11 per student
Legal	$180,000	$6 per student
Graduation	$60,000	$2 per student
School Board/Audit/MABE	$120,000	$4 per student
Assessment/Data	$300,000	$10 per student
Technology Licensing/ Data	$1,500,000	$50 per student
Tech Hardware, incl. servers	$100,000	$3 per student
Telecommunications	$270,000	$9 per student
Tuition Reimbursement	$1,200,000	$40 per student
Unemployment Insurance	$150,000	$5 per student
Finance Systems (HR/Payroll), Office Supplies, Reimbursements, etc.	$1,080,000	$36 per student
Substitutes	$2,875,000	$96 per student
CTE Center Program	$2,250,000	$75 per student

Tables 3.13A through 3.13C show the additional district-level resources needed to serve at risk, LEP, and special education students.

Table 3.13A
Additional District Resources to Serve At Risk Students Identified by Maryland PJ Panels

Personnel	
Coordinator	3.0
Secretary/Clerk	1.0
Other Costs	
Alternative School	$1,870,000

Panelists identified the need for district-level coordination and clerical support for at risk students, as well as resources to support an alternative school in the district.

Table 3.13B
Additional District Resources to Serve LEP Students Identified by Maryland PJ Panels

Personnel	
Coordinator	3.0
Secretary/Clerk	1.0
Interpreter/Translator	1.0
Other Costs	
Contracted Services	$100,000
Work-based Language Program	$100,000

Panelists identified the need for district-level coordination and clerical support for LEP students, as well as interpretation/translation support. Additional amounts for contracted services and a work-based language program were identified. The work-based language program was intended for older, newcomer students at the high school-level to support targeted language acquisition in a compressed time period.

Table 3.13C
Additional District Resources to Serve Special Education Students Identified by Maryland PJ Panels

Personnel	
Assistant/Associate Superintendent	
Director	1.0
Supervisor	5.0
Coordinator	7.0
Secretary/Clerk	8.0
Additional Therapists/Specialists	3.0
Teacher	1.0
Other Costs	
Contracted Services	$1,250,000
Legal	$120,000
Non-public Placement	$5,281,459
Supplies and Materials (incl. Adaptive Technology)	$400,000
Extended School Year (ESY)	$589,000

Panelists also identified additional personnel and related costs for special education students, regardless of level (so not disaggregated by special education students with mild, moderate, or severe disabilities). These resources included district-level leadership, coordination, and clerical support. Non-personnel cost areas included contracted services; legal services; non-public placement for the highest need students; supplies, materials and equipment, including adaptive technology; and extended school year (ESY) services for students whose IEP indicates it is necessary.

Developing Cost Estimates

Once the panels completed their work, the study team undertook the process of costing-out the resources identified above. The primary prices needed to complete this costing-out were the salaries and benefits of personnel and the prices assigned to different kinds of technology hardware. See Appendix C for more detail on salaries and benefits used.

For personnel salaries, the study team used MSDE data on statewide average salaries for different personnel categories and available data on statewide benefit amounts and rates, supplemented by data collected from districts. In determining technology costs, the study team assumed equipment would be replaced every four years for the majority of hardware items. The study team surveyed district CFOs on average costs for each hardware item. See Appendix C for more detail on technology prices used.

School-Level and District-Level Costs

Table 3.14A, shown below, lists the base costs for each representative school, disaggregated into costs for personnel, professional development, non-personnel, technology, and other programs after applying the resource prices noted above.

Table 3.14A
School-Level Base Costs Identified by Maryland PJ Panels

	Elementary School	Middle School	High School
School-level Costs, Base	**$10,513**	**$8,838**	**$8,442**
Personnel Costs	$9,911	$8,141	$7,427
Professional Development	$75	$75	$75
Non-Personnel Costs	$262	$319	$553
Technology	$266	$246	$243
Other Programs	$0	$56	$143

School-level base costs range from $8,442 to $10,513. This reflects the panelists' sentiment that providing intensive service at the elementary level will have the greatest impact and reduce the need for significant interventions at the secondary level.

Table 3.14B shows the total school-level cost per prekindergarten student.

Table 3.14B
Prekindergarten Program School-level Cost Identified by Maryland PJ Panels

	Prekindergarten Program
School-level Costs	**$12,524**
Personnel Costs	$12,167
Professional Development	$75
Non-Personnel Costs	$137
Technology	$145
Other Programs	$0

As shown, the school-level cost per prekindergarten student is $12,524 (this figure is a total figure, not to be added to the base costs in Table 3.14A).

Table 3.14C then shows the additional costs above and beyond the base for identified special needs students, including at risk, LEP, and special education students.

Table 3.14C
School-Level Costs for Special Needs Students Identified by Maryland PJ Panels

Additional School-level Costs Identified	Elementary School	Middle School	High School
At risk			
25% Concentration	$5,320	$2,028	$1,985
50% Concentration	$6,472	$3,887	$2,732
75% Concentration	$4,130	$3,685	$2,627
LEP			
7% Concentration	$7,486	$9,835	$9,874
20% Concentration	$7,356	$8,187	$6,435
60% Concentration	$4,436	$5,020	$3,703
Special Education			
Mild	$6,140	$7,361	$7,228
Moderate	$11,499	$13,601	$14,391
Severe	$36,096	$40,199	$43,591

The figures shown above would be in addition to the base amounts in Table 3.14C. For at risk, identified resources and subsequent per student amounts were highest in elementary school reflecting the panelists strong feelings that early intervention was essential to serving these students. Additionally, the panelists' view that the 50 percent concentration level was a tipping point was also reflected that student amounts were highest at that level, declining somewhat at the 75 percent level. Note the standout figure, 50 percent concentration at the elementary level, is largely driven by intensive, 12 hour-a-week after-school program they created to serve all at risk students to be implemented once that tipping point was reached. Next, looking at identified costs to serve LEP students, per student figures were highest at the 7 percent concentration level, and lowest at the 60 percent concentration level reflecting the economies of scale associated with serving a larger population. Approaches to serving these students varied at the three school levels, reflected in varying costs identified. Costs for special education increased with need level, reflecting the higher level of support and service required. Costs were similar across school levels, increasing at the secondary level to allow for needed transition and job coaching.

It is important to be careful in drawing conclusions based on school-level costs, since such costs exclude district-level costs and it is the combination of school and district costs that reflect the true, total costs of providing services.

Table 3.15 presents the district-level cost figures for the base, as well as the additional amounts for special needs students.

Table 3.15
District-Level Costs Identified by Maryland PJ Panels

District-level Costs, Base	$2,121
At risk	$291
LEP	$273
Special Education	$2,745

The additional district-level base cost was $2,121. The cost of providing the additional supports and services needed at the district-level for special needs students was $291 for at risk students, $273 for LEP students, and $2,745 for special education students. Additional district-level resources were not identified for prekindergarten students. (These students would just receive the district-level base cost.)

Professional Judgment Total Base Costs and Weights

The study team then calculated a single, weighted school-level base cost figure. To do this, the study team used school-level cost figures for each grade configuration (Table 3.14A), along with the distribution of students at each grade-level. The study team took this same approach to create an average figure for each concentration level of at risk and LEP, and a weighted average figure for the three categories of special education (mild, moderate, and severe disabilities). The study team then added district-level costs from Table 3.15 to develop total base costs and weights for each identified student population. These figures are shown in Table 3.16.

Table 3.16

Professional Judgment Total Base Cost and Additional Weights

Base	**$11,607**
Weights	
Prekindergarten	0.26
At risk	
25% Concentration	0.33
50% Concentration	0.43
75% Concentration	0.33
Average	0.36
LEP	
7% Concentration	0.78
20% Concentration	0.65
60% Concentration	0.40
Average	0.61
Special Education	
Mild	0.82
Moderate	1.35
Severe	3.62
Average (Weighted)	1.18

As table 3.16 shows the per student base cost was $11,607. The prekindergarten weight was 0.26. Average weights for the other student populations were 0.36 for at risk, 0.61 for LEP, and 1.18 for special education (weighted by the proportion of special education students in each category to produce a single weight[16]).

[16] Based upon eight percent of students in the mild category (67 percent of special education students), 3 percent of students being in the moderate category (25 percent of special education students), and one percent of students in the severe category (eight percent of special education students). *(0.82 x 0.67)+(1.35 x 0.25)+(3.62 x 0.08)= 1.18*

IV. Successful Schools/School District (SSD) Approach to Adequacy

The **successful schools/school district** (SSD) approach is the third method used to assess the adequacy of Maryland's school finance system. To determine an adequate per pupil base cost amount, this approach makes use of the actual expenditures in the functional areas of administration, instruction, and operations of schools that are currently meeting or exceeding state performance objectives. School performance is most often measured by school-wide performance on state assessments. In Maryland the study team looked at both absolute performance on state assessments and growth in performance over time. This approach assumes that every school and school district should have the same level of base funding that is available to the most successful schools and districts. This approach provides an empirical method for determining an adequate per pupil base or foundation amount of funding, but it does not provide a means of determining what additional funding is needed for services and programs for students with special needs (e.g. at risk, LEP, and students with disabilities) and for districts with special circumstances. That is because in most cases the highest performing schools also tend to have lower concentrations of students with special needs. The research team used its PJ or EB analyses to estimate what these additional funding levels should be. The SSD approach is typically conducted at the district level. However, in Maryland, where there are relatively few school districts, the approach was applied at the school level.

The steps to conducting an SSD analysis are: 1) identify high performing schools and schools that are dramatically improving; 2) analyze school spending levels (excluding spending targeted for student need-based programs such as compensatory education, special education, or LEP); and 3) determine a per pupil base spending amount from the school expenditure analysis. Each of these steps is described in more detail below.

Identifying High-Performing Schools

Using the specific performance criteria described below, the study team selected 111 high-performing schools in the first round of school selections for this study. These schools were initially selected using assessment results from the MSA and HSA as the measure of performance. The study team selected schools that were high-performing both in terms of absolute achievement, meaning the percentage of all students at or above proficiency, and those that experienced high levels of growth in achievement over time. The study team also sought to select a mix of elementary, middle, and high schools. One school from this initial group was eventually dropped from the list because it had such a high percentage of low-income students that it was impossible to distinguish base instructional services from services targeted to at risk students. In essence, the school's entire program was designed to serve disadvantaged students. This left 110 schools for the school expenditure analysis.

As noted, MSA and HSA results were used to measure school performance for the initial selection of schools in January of 2016. However, the RFP required using two years of results from the new Partnership for Assessment of Readiness for College and Careers (PARCC) assessments (the assessments most aligned with the state's College and Career-Ready Standards) when making adequacy estimates. This means that two years of PARCC results need to be used for the selection of successful schools. Thus, when the results of the first statewide administration of the PARCC test became available in February 2016, the relative performance of the selected schools was re-evaluated using these 2014-15 PARCC scores. Schools that experienced a significant drop-off in performance on the PARCC assessments were removed from the list and the cost analyses rerun. The group of successful schools was reduced by 38 schools to a total of 72 schools. This process is explained in more detail below. The results of the 2015-16 PARCC test administration were not available at the time this report was prepared and will be included for the final adequacy report due the end of November 2016.

Assessment Data

The annual MSA and HSA assessment data used for selecting the initial set of schools were provided by MSDE. These assessment datasets consisted of school level records that aggregated student performance data by grade, subject, race/ethnicity, and special needs status (FRPM eligibility, LEP, and special education). The assessment data provided for each category of students included the total number of students in the group taking the test and the number of students scoring at the basic, proficient, and advanced levels. These raw data were then aggregated to a single performance score for each school representing all students in all grades and all subjects.

The subjects included in the assessment data for elementary and middle schools were reading and mathematics in grades three through eight, and science in grades five and eight. For high schools, the subjects included were English, algebra, and biology.

The most recent administrations of the MSA and HSA assessments were not used in the school selection process due to concerns that the assessments were not well aligned with the state's new College and Career-Ready Standards adopted in 2012. Because the new PARCC assessments were not available for statewide administration until 2014-15, the State continued to use the MSA for grades three through eight and the HSA for grades nine through twelve until the PARCC assessments became available in the 2014-15 school year. Following the implementation of the new standards, average performance on the MSA fell by about five to seven percentage points in 2012-13 and 2013-14. The impact on average performance on the HSA was less significant. Because of the misalignment between the new standards and the old assessments, MSDE testing staff felt that MSA assessment scores after 2011-12 and HSA scores after 2012-13 were not a valid measure of school performance. As a result, the study's school selections were based on assessment data for the six-year period 2006-07 through 2011-12 for the MSA, and 2007-08 through 2012-13 for the HSA. These are the most recent assessment periods for which both standards and assessments were best aligned.

While the study team shared MSDE's concern with the alignment of standards and assessments, there were also concerns about selecting schools on the basis of nearly three-year-old performance data.

Together with MSDE staff, a revised approach to the assessment data selection process was developed as follows:

- For the MSA, the initial selection of elementary and middle schools was carried out using the 2006-07 through 2011-12 assessment data;

- for the HSA, the initial selection of high schools was carried out using assessment data for the years 2007-08 to 2012-13;

- the difference between the 2011-12 to 2013-14 scores of the schools selected through the initial analysis of MSA data were compared to the mean change in scores for all elementary and middle schools. Selected schools with a falloff of more than one standard deviation were removed from the school list. A similar comparison was not conducted for the HSA because 2013-14 test results were not available at the time; and

- when 2014-15 PARCC data became available, selected schools that performed significantly worse on PARCC relative to other schools than they did on the MSA/HSA were removed from the list of high performing schools. A second round of evaluation using 2015-16 PARCC results will occur when these data become available.

When PARCC assessment data became available in February of 2016, the results of the 2014-15 assessments were aggregated to a single total school score (all students/all grades/all subjects) using the same method that was used for the MSA and HSA. Performance levels on the PARCC were equated to those of the MSA and HSA using the recommendations of the Maryland Assessment Research Center.[17] Using this approach, the performance of students scoring at PARCC Level 3 or higher were considered to be equivalent to students scoring proficient or above on the MSA and HSA.

The change in schools' performance from the MSA/HSA to PARCC was determined by analyzing whether a school selected as a successful school performed significantly worse on PARCC than the average school in its school level (elementary, middle, or high). To do this, each school's performance on the pervious state tests was compared to its PARCC performance by converting its average overall score on the MSA/HSA and on the PARCC to z-scores.[18] Converting both scores to z-scores allows the two scores to be compared despite the difference is score scales between the assessments. The difference between the two z-scores was then calculated for each school and compared to the mean difference in z-scores for all schools at that level (e.g. an elementary school was compared to the mean of all elementary schools). If the school's difference between its z-scores on the two assessments was more than one half of a

[17] See *Investigating the Concordance Relationship between the HSA Cut Scores and the PARCC Cut Scores*, a report to MSDE by the Maryland Assessment Research Center.

[18] A z-score is a method for standardizing items that have different scales. A z-score is a measure of how many standard deviations above or below a population or sample mean a score is. Z-scores are calculated by subtracting the mean value of all items in a sample or population from the value of a single item and then dividing by the standard deviation.

standard deviation lower than the mean for all schools at its level, the school was dropped from the successful schools selection. This approach for comparing how much a school's performance changed as it moved from one assessment to the other was used because the research team felt that it placed somewhat less weight on the limited number of available PARCC data points than alternative approaches.

A total of 38 schools were dropped from the successful schools list based on their 2014-15 PARCC scores, leaving 72 successful schools eligible for the cost analysis. When the 2015-16 PARCC data become available the schools' mean MSA/HSA scores will be compared to the average of the 2014-15 and 2015-16 PARCC scores and the list of schools will again be revised using the same approach as described above. Table 4.1 below compares the characteristics of then initial 111 schools to all schools in the State. Table 4.2 compares the school characteristics of the revised school selections based on the 2014-15 PARCC (72 schools) to the initial school selection.

Selection Criteria

To identify the first round of high-performing schools for the study, the research team used the following selection criteria:

1. High-Performing Schools (Absolute Achievement). The criterion used for selecting high-performing elementary and high schools was that at least 95 percent of all students scored proficient or above for each of the six years from 2007-2012 (2008-2013 for high schools). The criterion for middle schools was at least 90 percent of all students scoring proficient or above for each of the six years from 2007-2012.

2. High-Growth Schools (Improving Achievement). The selection criterion used for elementary, middle, and high schools was growth in the proportion of students scoring proficient or above on assessments of at least 40 percentage points from 2006-2012 (2008-2013 for high schools), with a minimum of 80 percent of students achieving at proficient or above in 2012 (2013 for high schools). The minimum overall percentage of 80 percent of students achieving at least proficiency was used to select out schools that may have experienced a high level of growth but continued to have low absolute achievement.

In the past, SSD studies often only used the High-Performing or Absolute Achievement selection criterion. However, using only high absolute performance for selecting schools will typically exclude schools that are making significant improvement in their students' achievement. These schools may not currently meet the absolute standard, but seem to be on track to do so over time. Further, these schools also tend to have larger numbers of low-income, LEP, or other special need students, and are useful to include in the SSD analysis because of their demonstrated ability to improve student performance over time. By using both the absolute and growth criteria, the resulting SSD analysis becomes more robust and benefits from using two different definitions of success.

The initial group of 111 schools consisted of 99 High-Performing schools and 12 High-Growth schools. The group included 65 elementary schools, 29 middle schools, and 17 high schools. The schools selected represent 16 different school districts. Table 4.1, below, compares the schools initially selected for the successful schools study with all schools in the State. The schools selected as successful schools tend to be somewhat larger and enroll fewer students with special needs than the average for all schools in the State. The fact that the selected schools, on average, have lower concentrations of special needs students is not surprising given that schools with higher numbers of special needs students tend to perform less well in terms of absolute performance (but not necessarily in terms of growth). This is why the SSD approach is used only to estimate an adequacy level of per student base funding and not additional spending via weights for special needs students.

Table 4.1
Initial Successful Schools Selection

Performance Category	Elementary Schools	Middle Schools	High Schools	Total Schools
Selected Schools				
Schools by Level	65	29	17	111
Percent by Level	59%	26%	15%	100%
High-Performing	57	25	17	99
High-Growth	8	4	0	12
Average Enrollment	540	804	1,571	636
Average FRPM	18%	15%	9%	14%
Average LEP	8%	2%	1%	4%
Average Special Education	9%	8%	7%	8%
All Schools In Maryland				
Schools by Level	867	227	252	1,346
Percent by Level	64%	17%	19%	100%
Average Enrollment	498	729	1,116	637
Average FRPM	52%	40%	38%	46%
Average LEP	11%	5%	4%	8%
Average Special Education	11%	11%	10%	11%

Table 4.2
Comparison of Revised and Initial Successful Schools Selections

Performance Category	Elementary Schools	Middle Schools	High Schools	Total Schools
Selected Schools – Initial Selection				
Schools by Level	65	29	17	111
Percent by Level	59%	26%	15%	100%
High-Performing	57	25	17	99
High-Growth	8	4	0	12
Average Enrollment	540	804	1,571	636
Average FRPM	18%	15%	9%	14%
Average LEP	8%	2%	1%	4%
Average Special Education	9%	8%	7%	8%
Selected Schools – Revised for 2014-15 PARCC				
Schools by Level	46	19	7	72
Percent by Level	64%	26%	10%	100%
Average Enrollment	557	731	1,693	700
Average FRPM	21%	19%	6%	17%
Average LEP	9%	3%	1%	5%
Average Special Education	8%	8%	7%	8%

Incorporating the first statewide administration of PARCC assessments in 2014-15 as part of the school selection criteria resulted in eliminating 38 schools from the successful schools selection. Nineteen of these schools were elementary schools, 10 middle schools, and 10 high schools. The number of districts represented decreased from 16 to 10. The resulting selection consisted of 46 elementary schools, 19 middle schools, and seven high schools. As the table above shows, the overall selection of successful schools using PARCC data has somewhat larger average enrollment (except for middle schools) but remains very similar in terms of the concentration of students with special needs.

Table 4.3 presents the final list of 72 schools selected for the SSD expenditure analysis.

Table 4.3
Revised List of Successful Schools Included in Cost Analysis (72 Schools)

District Number	District Name	School Number	School Name
High-Performing Schools			
02	Anne Arundel	2052	Arnold Elementary
02	Anne Arundel	2092	Cape St. Claire Elementary
02	Anne Arundel	3082	Crofton Woods Elementary
02	Anne Arundel	4122	Davidsonville Elementary
02	Anne Arundel	2102	Folger McKinsey Elementary
02	Anne Arundel	2152	Jones Elementary
02	Anne Arundel	2372	Windsor Farm Elementary
02	Anne Arundel	2243	Magothy River Middle

District Number	District Name	School Number	School Name
02	Anne Arundel	2413	Severn River Middle
02	Anne Arundel	2013	Severna Park High
03	Baltimore County	0916	Cromwell Valley Elementary Technology
03	Baltimore County	1104	Kingsville Elementary
03	Baltimore County	0803	Lutherville Laboratory
03	Baltimore County	0811	Pinewood Elementary
03	Baltimore County	0907	Rodgers Forge Elementary
03	Baltimore County	0701	Seventh District Elementary
03	Baltimore County	0905	Stoneleigh Elementary
03	Baltimore County	0310	Summit Park Elementary
03	Baltimore County	0805	Timonium Elementary
03	Baltimore County	0772	Hereford High
04	Calvert	0312	Mount Harmony Elementary
04	Calvert	0315	Northern Middle
04	Calvert	0216	Plum Point Middle
06	Carroll	0406	Mechanicsville Elementary
06	Carroll	0509	Piney Ridge Elementary
06	Carroll	1306	Mount Airy Middle
06	Carroll	0508	Oklahoma Road Middle
06	Carroll	0504	Sykesville Middle
10	Frederick	1604	Myersville Elementary
10	Frederick	0311	Middletown Middle
10	Frederick	0714	Windsor Knolls Middle
13	Howard	0406	Bushy Park Elementary
13	Howard	0606	Hammond Elementary
13	Howard	0208	Northfield Elementary
13	Howard	0523	Pointers Run Elementary
13	Howard	0306	Triadelphia Ridge Elementary
13	Howard	0215	Waverly Elementary
13	Howard	0213	Worthington Elementary
13	Howard	0521	Clarksville Middle
13	Howard	0405	Glenwood Middle
13	Howard	0526	Lime Kiln Middle
13	Howard	0509	Atholton High
13	Howard	0404	Glenelg High
13	Howard	0203	Howard High
15	Montgomery	0420	Bannockburn Elementary
15	Montgomery	0226	Beverly Farms Elementary
15	Montgomery	0410	Bradley Hills Elementary
15	Montgomery	0511	Cashell Elementary
15	Montgomery	0351	Darnestown Elementary

District Number	District Name	School Number	School Name
15	Montgomery	0209	Lakewood Elementary
15	Montgomery	0601	Potomac Elementary
15	Montgomery	0405	Somerset Elementary
15	Montgomery	0408	Westbrook Elementary
15	Montgomery	0422	Wyngate Elementary
15	Montgomery	0413	North Bethesda Middle
15	Montgomery	0412	Westland Middle
15	Montgomery	0234	Thomas S. Wootton High
15	Montgomery	0427	Walt Whitman High
23	Worcester	1001	Ocean City Elementary
23	Worcester	0312	Showell Elementary
23	Worcester	0308	Stephen Decatur Middle
High Growth Schools			
05	Caroline	0802	Colonel Richardson Middle School
10	Frederick	0204	Lincoln Elementary
15	Montgomery	0333	Benjamin Banneker Middle
15	Montgomery	0812	Parkland Middle
16	Prince George's	1709	Chillum Elementary
16	Prince George's	1725	Cool Spring Elementary
16	Prince George's	1214	Glassmanor Elementary
16	Prince George's	1408	Glenn Dale Elementary
16	Prince George's	1712	Lewisdale Elementary
16	Prince George's	2007	Woodridge Elementary
19	Somerset	1303	Somerset 6/7 Intermediate School

Collection and Analysis of School Level Expenditure Data

Once the high-performing schools were identified, the research team worked to collect expenditure data on the selected schools. Because MSDE only collects spending data at the district-level, rather than at the school-level, the research team developed a school expenditure data collection tool similar to the one used in APA's earlier study for the Thornton Commission. This Microsoft Excel-based school expenditure data collection workbook was sent to each district from which a school was selected. In districts with more than one school selected, a data collection workbook was issued for each selected school. The data collection tools and detailed instructions were emailed to the districts' chief financial officers in early February 2016 and completed data collection tools were returned in early March.

The data collection tool is designed to gather general data on schools and districts and on five specific functional expenditure areas. These consist of:

1. General information: this section of the tool collects information on a school's grade span and enrollment, district enrollment, and teacher characteristics at the school and district levels.

2. District administration: this area collects information on central office staffing levels and on expenditures for district administration, including general, centralized and business support services, and instructional program administration and supervision. These data will be used to determine overall district administration costs, which can then be allocated to schools on a per pupil basis.

3. School administration: this area collects information on staffing and cost data for the office of the principal, including principals and assistant principals; clerical staff; and office supplies, equipment and contracted services.[19]

4. School instruction: this section gathers data on the costs of a school's instructional programs. These data include the number of staff and associated costs for instructional and instructional support staff, textbooks and other instructional materials and equipment.

5. Other school costs: this section of the tool is used to collect all other school-based costs such as operations and maintenance, student personnel and health services, and community services.

The MSDE staff provided an initial vetting of the draft data collection tool. Following this review, the research team met with district budget administrators in October 2015 to obtain direct feedback from the administrators who would be completing the data collection tool. The research team explored whether the use of technology, such as a web-based survey tool, would facilitate the collection of data from the large number of schools included in the study, but the district budget administrators who reviewed the tool felt that the Excel workbooks would be easier to use.[20] Of the 111 data collection tools sent out to districts, 110 were returned (the one exception being the very high needs school that was withdrawn from the study.

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[19] Maryland's *Financial Reporting Manual for Maryland Public Schools* defines the central office functions included under District Administration as follows:
General Support Services: Activities concerned with establishing and administering policy for district operations, including the Board of Education and the office of the superintendent.
Centralized Support Services: Activities that support each of the other instructional and supporting services programs, including planning, research, development, and evaluation services.
Business Support Services: Activities concerned with paying, transporting, exchanging, and maintaining goods and services for the district, including budget, financial accounting, payroll, and internal auditing.
Instructional Administration and Supervision: Activities that support instruction and assist instructional staff in planning, developing, and evaluating the process of providing learning experiences for students.
[20] The text of the data collection tool instructions and expenditure tool worksheets sent to district budget administrators are shown in Appendix D.

Determining a Per Pupil Base Cost

After the school-level expenditure data had been collected, the research team compiled the data in a Microsoft Excel database for analysis. Because the SSD approach is used only for determining an adequate per pupil base cost, spending on programs for students with special needs are specifically excluded from the analysis. To facilitate comparability of data across districts and schools, the categorization of expenditure data is standardized across the participating schools and a weighted average base cost per pupil[21] is calculated for each school level – elementary, middle, and high. From these, a single base cost per pupil was derived that is weighted by the distribution of students across the three levels of schooling.

Data Verification

To ensure the accuracy of the expenditure data reported on the data collection tool, the research team compared the data reported in the data collection tool to each school's district expenditures looking for inconsistencies between the school and district-reported expenditure data. Enrollment and staffing counts were also compared to data provided by MSDE school-level reports. In cases where a school's reported data differed significantly from the comparison data, the research team contacted the district to verify or correct the data.

Application of Efficiency Screens

The final step in the school selection process was a check on the fiscal efficiency of each selected school. For this study, a relative measure of efficiency was used, that is, schools with spending significantly higher or lower than the average for all of the selected schools were eliminated from the cost analysis for the area or areas where they were outside the norm. The purpose of the efficiency screen is to avoid biasing the base cost estimate by removing schools that are either very inefficient or unusually efficient in the use of their resources. Efficiency screens were applied separately to:

- the school's per pupil costs, both personnel and non-personnel, for instruction;
- the school's per pupil costs, both personnel and non-personnel, for administration; and
- the school's per pupil costs, both personnel and non-personnel, for operations and maintenance functions.

Only the expenditures from the functional areas for which a school was within the acceptable efficiency range (instruction, administration, or operations and maintenance) were included in the spending analysis. For example, a school whose expenditures for administration and operations and maintenance were outside of the acceptable efficiency range would only have its expenditures for instruction

[21] The purpose of calculating a weighted average per pupil base cost is to prevent outlier schools, such as a very small school with high per pupil spending, from unduly influencing the average base cost. The weighted average per pupil base cost is calculated by multiplying school enrollment by the base cost for each school included in the study, summing the result, and then dividing this by the total enrollment of all schools in the study.

included in the expenditure analysis. A school whose expenditures in all three functional areas were with the acceptable efficiency range would be included in all three areas of the analysis.

The acceptable efficiency range for each area was set at 1.5 standard deviations above to 2.0 standard deviations below the mean for all selected schools; schools above or below this efficiency range in each expenditure area were excluded from the analysis for that expenditure area. This efficiency range was established based on analyses of school expenditures in several states and are intended to exclude only extreme outliers. In excluding these schools – thus excluding schools whose level of efficiency is well outside the norm of other schools – the research team avoided bias in its creation of a per pupil base cost estimate.

A total of 27 schools out of the original 111 did not meet the criteria for one or more of the efficiency measures. Only one school failed to meet the criteria for two of the measures and no schools failed to meet the criteria for all three measures. The following number of schools were outside the acceptable efficiency range in each area: 10 schools for instructional expenditures, nine schools for administration expenditures, and eight schools for per pupil operations and maintenance expenditures. One school was outside the acceptable efficiency range for both instruction and administration expenditures. As a result, the expenditures for these schools were removed from the spending analysis for the relevant functional area.

Successful Schools/School District Approach Base Cost Estimates

Using expenditure data from the original 110 schools, adjusted for efficiency, resulted in a per student base figure of $8,700. This base figure number is the estimate of the average spending per student for the regular education program provided to all students in a school along with per student allocations of central office administrative support in the areas of general support services, business support services, centralized support services, and instructional administration and supervision. The estimate excluded spending for all programs targeted to students with special needs such as compensatory education (including the state's compensatory education grants and federal Title I funding), LEP, and special education. Table 4.4 illustrates per student expenditures for the initial group of 110 schools by school-level disaggregated by the three major functional areas of administration (both the allocated portion of district administration and school administration), instruction, and other expenditures. For this set of schools, the highest average per student spending is at the high school-level and the lowest in elementary schools. Administration and other school expenditures accounts for 16 percent of total spending each, while school instruction accounts for 68 percent.

Table 4.4
Successful Schools Expenditures Per Pupil (110 Schools)

Performance Category	Elementary Schools	Middle Schools	High Schools	Total Schools
Administration (District and School)	$1,402	$1,375	$1,396	$1,405
School Instruction	$5,782	$5,886	$6,179	$5,915
Other School Expenditures	$1,343	$1,375	$1,413	$1,380
Total Expenditures	**$8,527**	**$8,552**	**$8,988**	**$8,700**

There was no change in the per student base cost estimate after recalculating the base using the 72 schools remaining after accounting for performance on the 2014-15 PARCC. The base cost still rounded to $8,700 per student. This base cost may change when the 2015-16 PARCC results are incorporated into the school selection criteria.

Table 4.5 shows the breakout of spending in the final group of 72 schools by functional area. The expenditures by functional area are very similar to those of the 110 schools with the exception of high schools, from which the most schools were dropped when performance on PARCC was included. The remaining high schools are higher spending overall than the larger group of high schools among the 110 schools, but the smaller number of schools had little impact on the overall base cost estimate. School instruction still comprises the largest share of per pupil spending across all schools, totaling 69 percent of total spending. Total administration (both district central office and school) accounts for 16 percent of total spending, and other school expenditures for 15 percent. Per student spending in all three of the functional areas is greatest in high schools. Elementary schools had the lowest per pupil expenditures for instruction which middle schools spent the least per pupil for total administration and other school expenditures.

Table 4.5
Successful Schools Expenditures Per Pupil (72 Schools)

Performance Category	Elementary Schools	Middle Schools	High Schools	Total Schools
Administration (District and School)	$1,407	$1,375	$1,472	$1,405
School Instruction	$5,815	$6,010	$6,623	$5,950
Other School Expenditures	$1,340	$1,298	$1,488	$1,345
Total Expenditures	**$8,561**	**$8,683**	**$9,584**	**$8,700**

V. Reconciling Adequacy Approaches

This chapter of the report examines how the study team used the results of the three approaches – evidence-based (EB), professional judgment (PJ), and successful school districts (SSD) – to identify a single adequacy recommendation that includes a base cost figure and adjustments for special needs students, including special education, LEP, and compensatory education (at risk) students, as well as an adjustment for prekindergarten students. Each of the three approaches uses a different method to examining adequacy, as fully described in the previous chapters, and provides independent data points.

Table 5.1 briefly summarizes the three adequacy approaches:

Table 5.1
Summary of Three Approaches to Adequacy

	Evidence-Based	Professional Judgment	Successful Schools/Districts
Benchmark of Success	Ensuring students can meet all State standards	Ensuring students can meet all state standards	Currently outperforming other Maryland schools
Data Source	Best practice research, reviewed by Maryland educators; when conflict arises in resource recommendations, the EB approach defers to the research	Expertise of Maryland educators serving on PJ panels; uses research as a starting point but defers to educators when conflict arises in resource recommendations	2014-15 expenditure data from selected successful schools
Available Data Points			
Base	Yes	Yes	Yes
Student Adjustments (Weights)	Yes	Yes	No

In brief review, the EB approach examines available best practice research to create a base adequacy model and then convenes a series of panels with educators to ensure that students can meet all state-specific standards with the resources identified by research. The approach defers to the available research when conflicts arise between the research and the panels. The EB approach identifies base spending as well as additional weights for students with special needs.

Similar to the EB approach, the PJ approach identifies the resources needed to meet all state standards. It also begins with evidence-based research but relies on and defers to the experience of the state's educators to finalize the model based on the resources their professional experiences and judgments suggest are needed to ensure student success. The PJ approach also identifies both a base cost and special needs adjustments.

In contrast, the SSD approach examines the spending of schools currently outperforming other schools in the State. As such, it is a good representation of the resources needed to perform well in comparison to other schools, but not necessarily what it would take for a school and its students to meet all state requirements. The SSD approach is only able to look at the base spending amount for a student with no additional needs, due to limitations on collecting special need student expenditure data. Finally, the SSD approach does not provide the study team with detailed information on the types of programs or interventions being employed by the schools.

Developing a Blended Base Cost Figure

Table 5.2 shows the resulting base figure from the three approaches and compares them to the 2014-15 base used in Maryland's funding system.

Table 5.2
Base from Each Study Approach, Compared to 2014-15 Maryland Base

	2014-15 Maryland	Successful Schools/Districts	Evidence-Based	Professional Judgment
Base Cost	$6,860	$8,700	$10,551	$11,607

As shown, the base cost figures identified by the three approaches are all higher than the state's current 2014-15 base cost figure of $6,860. The three figures vary from a low of $8,700 for the SSD approach to a high $11,607 for the PJ approach.

The analysis utilized all three approaches to allow the study team to understand the differences in base costs associated with meeting each of the three benchmarks of success described in Table 5.1. In some other states, the results for the SSD and PJ approaches have been similar. In Maryland, the three base cost data points show larger variation between the SSD results and the EB and PJ results. To identify a single base cost figure from the three approaches, the study team first needed to identify the benchmark of success to be used.

The study team felt that the best benchmark of success to develop a single adequacy figure in Maryland would be to identify what it would take not just to outperform other schools today, but to reach the higher benchmark of being able to ensure all students can achieve all current state standards. During the duration of the study PARCC data was released for two school years, and the results of on the tests statewide and for the SSD schools reinforced the differences between current success and meeting all state standards. Therefore, the study team recommends that a final adequacy base cost figure be derived from the EB and PJ approaches.

While the study team does not believe the SSD figure fully represents the cost of adequacy in Maryland, it does present an important reference point for the work. It shows the base resources necessary for schools to reach a higher level of achievement than current performance, and therefore the study team believes that the SSD figure could be used during the phasing in of a new funding system.

The study team needed to then determine how to reconcile the base cost figures from the EB and PJ approaches. As noted in Table 5.2 and detailed in Chapters II and III, the two approaches produced relatively similar base cost figures – the EB base is $10,514 and the PJ base is $11,607. The study team then undertook an analysis of the resources identified by each approach to reconcile the key differences that produced these differing figures to come up with a final, blended adequacy base figure.

Addressing Key Resource Differences between EB and PJ Approaches

In its review of the EB and PJ resource models, the study team identified five important areas of resource differences between the two approaches:

1. Elementary school teacher-to-student ratios
2. Middle school teacher preparation time
3. School administration staffing, specifically assistant principals
4. School level student support services
5. Inclusion of CTE resources in the models

The study team reviewed the resource differences, and made a recommendation in each area to create an adjusted model for each approach. It is important to note that the study team was not attempting to create a specific model for implementation, but instead was reconciling the largest resource differences in order to create a single cost estimate. Table 5.3 provides more detail on these differences.

Table 5.3
Key Resource Differences in Base across the EB and PJ Approaches

	Evidenced-Based	Professional Judgment	Blended Model Recommendation
Elementary School Teacher Ratios (grades four and five)	25:1	20:1	25:1
Middle School Planning and Collaboration Time	25%	30%	25%
School Administrator Positions - Assistant Principals (AP)	E/S- 0 AP per 450 students M/S- 1 AP per 720 students H/S- 3 AP per 1,200 students	E/S- 2 AP per 450 students M/S- 3 AP per 720 students H/S- 4 AP per 1,200 students	E/S- 1 AP per 450 students M/S- 2 AP per 720 students H/S- 3 AP per 1,200 students
School Level Student Support Positions	2.0	3.8	3.0
CTE	Not included in Base	Included in Base	Included in Base

Elementary School Teacher Ratios

Both models had the same classroom teacher to student ratios in kindergarten through grade three, but differed in grades four and five. Given that teacher staffing is the largest cost driver in both models, the study team addressed this difference first. The EB identifies a student teacher ratio of 25:1 while the PJ identifies a ratio of 20:1 in grade four and five. The team deferred to the available best practice research and used the 25:1 ratio in grades four and five since additional teaching staff are added on top of the base once student need is taken into consideration.

Middle School Planning and Collaboration Time

The second difference was the amount of time allocated for planning, collaboration, and professional development for middle school teachers during the school day, represented as a percentage of the day. The PJ participants identified a modified block schedule that provided this time, with teachers teaching in classrooms 70 percent of the day. The EB approach had a four 90-minute period block schedule where a teacher would teach for three blocks and have one block as preparation time, resulting in teachers teaching 75 percent of the day. Given that common planning and professional development time are key components of any successful school, as was stressed repeatedly by panelists in both approaches, the study team felt that meaningful time during the day to allow for these activities was needed to meet state standards. The study team recommends the slightly more conservative estimate from the EB approach with teachers teaching 75 percent of the day and 25 percent of the day set aside for planning and collaboration activities. This still represents a significant portion of the day, but is more in line with the teaching percentages at the elementary and high school levels in both the PJ and EB models.

School Administrator Positions

The third difference was the number of school administrators, specifically assistant principals. The PJ and EBPJ panels both mentioned the need for additional administrative time to ensure proper evaluation of teaching staff and to provide time for instructional leadership. The two models, however, differed in how this feedback was used. The PJ approach deferred to the experience of educators, with panels identifying the need for two assistant principals per 450 students in elementary schools, three assistant principals per 720 students in middle schools, and four assistant principals per 1,200 students in high schools. The EB approach deferred to the available research (which is limited regarding the impact of additional administrative staff) and retained its original recommendation of no assistant principals per 450 students in elementary schools, one assistant principals per 720 students in middle schools, and three assistant principals per 1,200 students in high schools. The study team felt that while the research may not suggest the need for additional assistant principals at all levels, given the state's requirements around educator evaluations and panelists' strong opinions about the importance of the positions, each model was adjusted to include one assistant principal in the elementary school, two assistant principals in the middle school, and three assistant principals in the high school.

Student Support Services Positions

The next key area of difference was school-level student support services – positions such as nurses, counselors, social workers, and psychologists – at the elementary-level. Both the EBPJ and PJ panelists identified a significant need for student support resources, even at the base level. The actual number of staff recommended varied between the two approaches, with the PJ approach recommending 3.8 student support staff positions and the EB model instead recommending 2.0 student support staff positions. The study team settled on three student support staff positions at the elementary-level as a compromise between PJ and EB recommendations to adequately meet student needs; this would allow for one nurse and two counselors, or a different configuration of the positions that would work best for a school site (such as a social worker instead of one of the counselors).

CTE Expenditures

Finally, the PJ study included CTE expenditures in the base while the EB study kept CTE as a separate per student amount. The study team decided that given that CTE is not a separate component of the current funding system, these resources should be a part of the base and adjusted the EB model accordingly.

Adjustments in these key resource areas reduced the difference between the EB and PJ base figures to less than $100, so the study team did not further reconcile smaller resource differences. By blending the resulting figures from the two approaches the study team produced a final adequacy base of $10,970. The study team feels this amount appropriately reflects the best estimate of the level of resources needed for students to meet state standards.

Developing Weights

Once the single blended adequacy base figure was developed, the study team next needed to identify a single set of weights. As mentioned earlier, the SSD approach only provides an estimate for base expenditures and is not designed to determine weights for special needs students, so the study team relied on the results of the EB and PJ approaches. Table 5.4 presents the weights from the two approaches, using the blended base of $10,970; these weights will vary from those presented in Chapters II and III since a new base figure is used. Weights were calculated for the three categories of special needs students (compensatory education, special education and LEP) as well as for prekindergarten students. PJ weights shown are the average figures across concentration levels, or need categories.

Table 5.4
Weights Determined by the EB and PJ Approaches, Using the Blended Model Base

	Compensatory Education Weight	Special Education Weight*	LEP Weight	Prekindergarten Weight
Evidence-Based	0.29	0.70	0.37	0.36
Professional Judgment, (Average)	0.39[22]	1.25[23]	0.64[24]	0.33

**Note that the Evidence-Based special education weight presented is only for mild and moderate special education students, while the PJ weight includes mild, moderate and severe special education students.*

[22] Average weight from three concentration levels: 2 percent Concentration: 0.35; 50 percent Concentration: 0.46; and 75 percent Concentration: 0.36
[23] Combined weight weighted by the proportion of special education students in each category: Mild: 0.87; Moderate: 1.43; Severe: 3.86
[24] Average weight from three concentration levels: 7 percent Concentration: 0.83; 20 percent Concentration: 0.69; and 60 percent Concentration: 0.42

For all but the prekindergarten weight, the weights derived from the PJ approach were higher than those from the EB approach. As noted, the weights for special education are not perfectly comparable figures, a difference that will be subsequently addressed. In most instances, the study team did not try to reconcile specific resources when determining weights as approaches to serving students with special needs varied widely between EB and PJ. Instead the team compared the resulting weights (calculated against the blended base), reviewed panel recommendations, case study information, and data on student performance to determine a blended weight, then benchmarked the weight against weights from other adequacy studies conducted nationally since Maryland's prior study.

Compensatory Education

The results from the EB and PJ approaches were similar, with an EB weight of 0.29 and an averaged PJ weight across the three concentration levels of 0.39. The EB weight did not include the resources for an alternative school (instead the resources for an alternative school were kept as a separate categorical) while the PJ weight did; if these resources were instead included the EB weight would be 0.31.

Given the results of the study team's analysis of student assessment performance in Maryland, coupled with panel discussions that often emphasized the significant instructional and support resources needed to serve these students, the study team felt that the PJ panel weight was a better estimate of the additional resources required to provide compensatory education students with the services they need to meet state standards. Therefore, the study team decided on a rounded 0.40 weight for compensatory education students.

This weight is within the range of weights seen in other adequacy studies since 2002, which ranged from 0.24 to 0.75, as shown in Table 5.5.

Table 5.5
Weights from Other State Adequacy Studies

State	Year	At Risk Weight
Colorado	2003	0.26- 0.56 (based on district size)
Colorado	2006	0.26- 0.56 (based on district size)
Colorado	2011	0.35
Colorado	2013	0.35
Connecticut	2005	0.28-0.62 (based on concentration)
D.C.	2013	0.37
Kentucky	2004	0.49-0.59
Minnesota	2006	0.75
Montana	2007	0.27-0.50 (based on district size)
Nevada	2006	0.29-0.35 (based on district size)
Pennsylvania	2007	0.43
South Dakota	2006	0.24-0.72 (based on district size)
Tennessee	2004	0.25

Special Education

The PJ study recommended a higher weight of 1.25 than the EB study's weight of 0.70. This is primarily because the EB study assumes high cost special education student services were to be fully paid for by the State, which results in their exclusion from the approach's 0.70 weight. Alternatively, the PJ study includes these students in the calculation of its 1.25 weight. If the EB model included the high-cost special education students, then the resulting weight would be higher. Using the 3.86 weight for severe special education students from the PJ approach, and the same weighting based upon the proportion of students in each need category as was done to create the average PJ weight, an EB weight that includes these higher cost students would be 0.96. Averaging the EB and PJ weight produces a weight of 1.11. Knowing that meaningful achievement gaps exist for these students, the study team recommends a rounded weight of 1.10 for special education students, including mild, moderate, and severe categories.

This figure is also in line with the average special education weights from the study team's national adequacy study review as shown in Table 5.6.

Table 5.6
Special Education Weights from Other State Adequacy Studies

State	Year	Special Education Weight
Colorado	2003	1.15
Colorado	2006	1.15
Colorado	2011	0.93 for mild; 1.93 for moderate; 5.2 for severe
Colorado	2013	0.93 for mild; 1.93 for moderate; 5.2 for severe
Connecticut	2005	0.987 for mild; 1.540 for moderate; 4.182 for severe
D.C.	2013	Level 1: .88; Level 2: 1.08; Level 3: 1.77; Level 4: 3.13
Kentucky	2004	1.23
Minnesota	2006	1.0
Montana	2007	0.77 for mild; 1.32 for moderate; 2.93 for severe
Nevada	2006	0.88 for mild; 1.28 for moderate; 2.52 for severe
Pennsylvania	2007	1.3
South Dakota	2006	0.94 for mild, 1.86 for moderate; 4.21 for severe
Tennessee	2004	0.5 for mild; 1 for moderate; 3.45 for severe

LEP

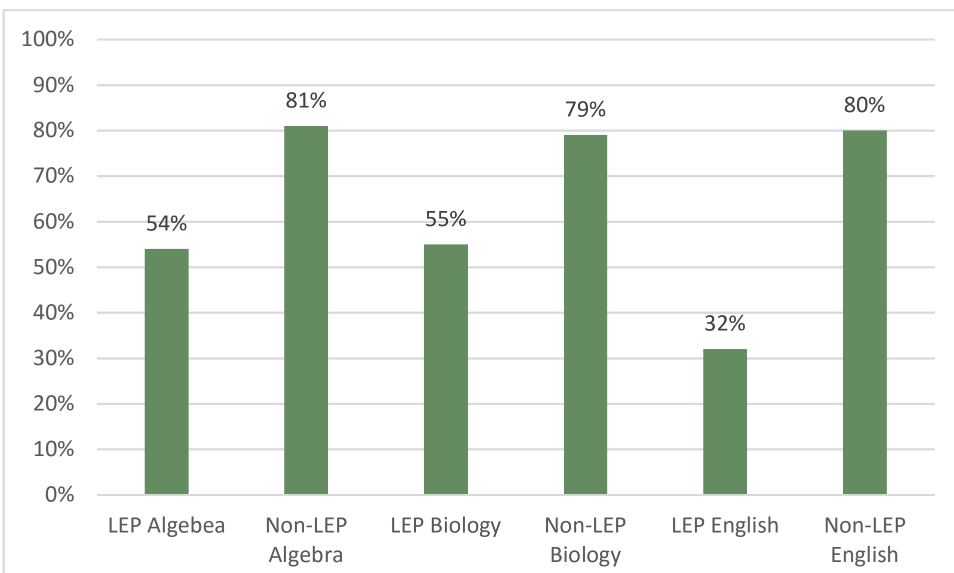
The weights for LEP from the EB and the PJ approaches are very different. The EB weight is 0.37 – with 0.07 to address language services and 0.30 to provide support services. The EB model also uses a non-duplicated count, that is, LEP students who are also eligible for the compensatory education weight only receive the LEP weight. The PJ model identifies an average weight of 0.61 to address both the instructional and support service needs of LEP students. The PJ model also applies the compensatory weight to LEP students who meet the income criteria, meaning a student who is low-income and identified as a LEP would receive both the compensatory education and the LEP weight.

To determine the appropriate blended weight, the study team first looked deeper into the resource allocations in the two models. The study team determined that support services needed for LEP students, as identified in the two approaches, were very similar to the services needed for compensatory education students, and in fact many of LEP students qualify for both programs. Therefore, the study team believes a weight of 0.40 would be appropriate to meet the support service needs for the LEP population outside of the specific language needs.

Next, looking specifically at the resources provided in each model to address student instructional needs, the study team found that the two models had very disparate recommendations, with the EB model recommending an LEP student-to-staff ratio of 100:1, and the PJ model recommending about 15:1. The case studies indicated that staff-to-student ratio from the PJ approach was a lower ratio than what is currently being utilized in successful schools, while the EB ratio was much higher.

The study team's analysis of student assessment performance indicates that there are significant achievement gaps for LEP students, even higher than that of other student populations; LEP students on the Maryland High School assessment score on average 24 percentage points below their non-LEP peers in biology, 48 percentage points below in English, and 27 percentage points in algebra.

Figure 5.1
Achievement Gaps for LEP Students



Based on this information, the study team determined that an adequate level of funding for language services would need to be closer to the estimates from the PJ approach to better address these persistent performance gaps. Therefore, the study team recommends a 0.40 weight to address the language needs of LEP students.

Students who are both LEP and eligible for compensatory education would also receive the compensatory education weight of 0.40 for necessary support services, for a combined weight of 0.80.

This weight is within the range of LEP weights available from other states' adequacy studies nationally as shown in Table 5.7.

Table 5.7
LEP Weights from Other State Adequacy Studies

State	Year	LEP Weight
Colorado	2013	0.47-0.56 (based on district size)
Connecticut	2005	0.76
D.C.	2013	0.60
Maryland	2001	1.0
Minnesota	2006	0.90
Montana	2007	0.50-0.82 (based on district size)
Nevada	2006	0.47-1.21 (based on district size)
Pennsylvania	2007	0.75
South Dakota	2006	.39-1.18 (based on district size)
Tennessee	2004	0.60-0.90 (based on district size)

Prekindergarten

Lastly, the study team recommends a weight of 0.35 for prekindergarten students. The EB and the PJ weights using the blended base cost were similar with an EB weight of 0.36 and a PJ weight of 0.33. Each weight represents the greater resource needs associated with serving prekindergarten students, primarily due to the staffing requirements mandated by regulations. Both models recommend one teacher and one instructional aide per 15 students, which is more significant classroom staffing than at any other grade-level (15:1 Kindergarten to grade three or 25:1 grade four through grade 12 without an aide). Although the EB model recommends providing prekindergarten services for both three and four-year-olds, the return on investment analysis from the study team's prekindergarten study and PJ work led to a final recommendation of providing a program only for four-year-olds at this time. The EB weight is a per student weight and the reduction in students served does not change the EB prekindergarten weight.

All compensatory education and special education-eligible prekindergarten students would receive the compensatory education weight and the special education weight in addition to this prekindergarten weight. Based upon feedback from the PJ panels, the study team believes applying the LEP weight to prekindergarten students would be unnecessary as all students at this age are engaged in language acquisition.

Adjusting for Federal Funds

The above base and weights establish the amounts of resources needed per student from combined federal, state, and local funding sources. The federal government provides Maryland with financial resources for special education students, LEP students, economically disadvantaged students, early childhood services, teacher development, and other programs and services. The study team calculated the portion of the base and weights that the State and districts would be responsible to fund net of these federally support dollars. The base amount funded net of federal funds is lowered from $10,970 to $10,880. The special education, LEP, compensatory education, and prekindergarten weights become 0.91, 0.35, 0.35, and 0.29, respectively.

Table 5.8
Final Adequacy Base and Weights after Adjusting for Federal Funds

	Blended Model	Final Adjusted
Base Cost	$10,970	$10,880
Weights		
Compensatory Education	0.40	0.35
LEP	0.40	0.35
Special Education	1.10	0.91
Prekindergarten	0.35	0.29

These final adjusted adequacy figures will be used in the remainder of the report.

VI. Formula Recommendations and Implementation

Utilizing the information gathered during the past two years of the study, the study team developed recommendations for a revised school funding formula for the State of Maryland. This chapter will be structured as follows:

1. **Summary of previously released reports**: the first section of this chapter will summarize the 13 reports produced to date for this study.

2. **Recommendations:** the second section of this chapter will detail the decisions made in creating the final formula recommendations. For each decision, the study team will discuss both the information from the current study used to inform the decision and address differences from Maryland's current funding approach.

3. Comparison to current funding: the third section of this chapter will examine the district and state-level impacts of the recommended formula. This included examining differences in total funding, funding per student, and state and local shares.

4. Comparison to prior adequacy study results: the fourth section of this chapter will compare adequacy cost estimates from the current study to the prior study for context.

5. Considerations for phase in: The final section of this chapter examines approaches to phasing in the adequacy recommendations.

Summary of Previously Released Reports

The adequacy recommendation detailed below was informed by 13 studies conducted prior to this final report. This section briefly describes the reports produced for each of these studies. The reports range from research summaries to final impact analyses, and provide detailed research methodologies, findings, and recommendations. Specifically, three of the reports focus on school size and two center on enrollment trends and prekindergarten. The remaining studies involve aspects of school finance equity, such as concentrations of poverty and the geographic cost of education. PDFs of the full reports are available on the Maryland State Department of Education's website. The links to these reports and suggested citations for each can be found in Appendix B.

Below is a summary of each report in chronological order:

A Comprehensive Review of State Adequacy Studies Since 2003 **(September 2014)**
The purpose of this review is to provide Maryland policy makers with information on how the studies were conducted, what the estimated adequate funding-levels are, and where definitive information exists, the policy impact the studies had in their own states.

***Summary of School Size Report* (September 2014)**
This report is the first of three required school size reports. The report identifies three factors: whether local Maryland school systems currently have policies regarding the size of schools including high schools, middle schools, elementary schools, and alternative schools, including the role of the public in determining the policy; other states' policies and best practices regarding school size; and an initial summary of the research regarding school size and the educational issues affected by school size.

***Proposed Methodology for Establishing Adequate Funding Levels in the State of Maryland* (December 2014)**
This report describes the approach the research team and its partners take to estimate a per student base funding level and per student weights for those students with special needs such as an impoverished background, LEP, and cognitive or physical disabilities. The report describes the study team's approach as presented in its proposed methodology to the MSDE, input on that approach received since work began on the study, and the study team's proposed changes to its approach.

***Preliminary Report on the Impact of School Size* (January 2015)**
The second of three required school size reports, this *Preliminary Report on the Impact of School Size* serves four purposes: extend the findings from the literature review on the impacts of smaller schools on student achievement, efficiency, and school climate contained in the first report; identify models for establishing smaller schools as presented in the literature; describe currently available state programs for supporting school facility construction in Maryland; and, outline the remaining analyses to be presented in the final school size report.

***Adequacy Cost Study: An Interim Report on Methodology and Progress* (July 2015)**
The *Adequacy Cost Study* provides a comprehensive progress report on the adequacy study components found in Section 3.2.1 of the state's RFP. The report begins with an overview of the adequacy study requirements outlined in the RFP, followed by an outline of the research team's specific approach to determining adequacy. The report then gives a description of the work required for each of the adequacy study's components, a description of the work already underway or completed, a description of the work still to be started, and a timeline for the completion of the work.

***Evaluation of the Use of Free and Reduced-Price Meal Eligibility as a Proxy for Identifying Economically Disadvantaged Students: Alternative Measures and Recommendations* (July 2015)**
This evaluation describes the approach the research team and its partners took to evaluate the use of free and reduced-price meal (FRPM) eligibility as a proxy for identifying economically disadvantaged students, including the consideration of alternative measures of economic disadvantages, for calculating compensatory aid. More specifically, it describes the indicators of economic disadvantage currently being used by state school funding formulas across the nation, including how states are addressing the changes in the collection of family income data as a result of the Community Eligibility Provision (CEP) of the Healthy, Hunger-Free Kids Act of 2010, and it simulates the effects on school district shares of state counts of economically disadvantaged students for nine different proxies. The report concludes with a discussion of the tradeoffs associated with each model.

***Final School Size Study Report: Impact of Smaller Schools* (July 2015)**
Following the first two reports on the impacts of school size, this third and final report presents the analyses and findings from the first two school size reports along with the concluding analyses and findings of the school size study. This report examines the impacts of school size on student achievement and school operating costs; examines the relationship between school size and school climate; examines the relationship between school size and extracurricular participation; presents a review of factors influencing school size; proposes alternative methods for creating smaller learning environments; and discusses the potential impact of smaller school guidelines on Maryland's school construction funding programs. Finally, this report presents the research team's recommendations regarding school size.

***Final Report of the Study of Increasing and Declining Enrollment in Maryland Public Schools* (November 2015)**
This report presents the findings of the study on increasing and decreasing enrollment. The scope of the study includes analysis of enrollment trends and their relationship to local school system characteristics, and transportation and operational costs. Transportation was singled out for additional study to evaluate the transportation costs in conjunction with the numbers and types of students served, operating characteristics, and state funding.

***Geographic Cost of Education Adjustment for Maryland* (November 2015)**
Geographic Cost of Education Adjustment for Maryland evaluates the current Maryland Geographic Cost of Education Index (GCEI) and makes recommendations for possible revisions. This review provides information on the benefits and costs of different methods that could be used to estimate geographic costs and recommends that Maryland adopt the comparable wage index method to replace its current GCEI. The objective of this review is to give policy makers the information necessary to determine the best approach for Maryland.

***Analysis of School Finance Equity and Local Wealth Measures in Maryland* (December 2015)**
This examination provides an analysis of the school finance equity in Maryland's current school funding formulas and offers further analysis of alternative wealth measures for distribution of state aid to local school districts.

***The Effects of Concentrations of Poverty on School Performance and School Resource Needs: A Literature Review* (December 2015)**
This literature review addresses the effects of concentrations of poverty on the research team's adequacy recommendations. This report provides a review of the relevant literature related to the effects of poverty on both student- and school-level academic outcomes. This report also discusses whether there is evidence to support providing additional per student funding to districts with higher concentrations of poverty.

A Comprehensive Analysis of Prekindergarten in Maryland **(January 2016)**
As a comprehensive analysis of Maryland's prekindergarten system, this document provides six components: a detailed literature review on prekindergarten; an analysis of current prekindergarten capacity, enrollment, and quality distribution in Maryland; an analysis of current prekindergarten funding in Maryland; a comparative analysis of prekindergarten in Maryland and prekindergarten in 11 other states and the District of Columbia; a cost-benefit analysis of universal prekindergarten in Maryland; and a set of recommendations for Maryland as it continues to develop its prekindergarten programs.

A Comparable Wage Index for Maryland **(July 2016)**
This report briefly reviews the rationale for adjusting for variations in educational costs by geographic locations using a geographic cost of education index. It then estimates a comparable wage index (CWI) for Maryland based on the recommendation made in the earlier *Geographic Cost of Education Adjustment for Maryland* report.

Recommendations

The study teams' recommendations result in a significant increase in the state's investment in prekindergarten through grade 12 education. However, they also change the way in which funding is allocated through the funding formulas and the distribution of state and local shares across districts. Although implementing these recommendations will present some challenges, the recommendations reflect the professional judgment of educators across the State, the findings of a wide range of research literature, and are consistent with the results of numerous adequacy studies conducted across the country over the past decade. The study team believes these changes are necessary for Maryland's students to significantly increase their performance on the new state standards and assessments. In the first year of statewide administration of the PARCC assessments, an average of 57 percent of students met or exceeded proficiency in math and 65 percent of students met or exceeded proficiency in reading. The changes to the formula recommended here are geared towards increasing the number of students meeting these new, higher standards. Other factors also drive the need for these changes, such as the increased costs of the state's new educator evaluation system, the need for more extensive student supports for all students, and improved funding equity.

The study team thinks of the recommended formula in two parts. The first part is the calculation of district adequacy targets. This includes determining: (1) the student counts that are used, (2) the base amount of funding per pupil, (3) the adjustments for special needs students (including special education, compensatory education, and LEP students), and (4) any adjustment for regional cost of living differences. The calculation of an adequacy target is done outside any considerations of the state and local responsibilities to pay for the adequacy target.

The second part of the formula revision focuses on the state and local shares for paying for the adequacy target. Recommendations include: (5) how to measure each district's capacity to pay for the adequacy target, and (6) if any minimum state aid guarantees should be included and whether local jurisdictions should be required to appropriate the local share of special needs programs. Combining the adequacy targets with the calculation of funding sources allows the study team to compare the current funding system to the recommended system.

Calculating District Adequacy Targets

To calculate a districts total adequacy target, regardless of the state or local share, student counts are multiplied by the base cost and special needs adjustments and then adjusted for regional cost differences. The decisions for each of these key components of calculating adequacy targets are described below.

Student Counts

The study team recommends changes to current student count methods for: (1) addressing declining enrollments for general education formulas, (2) counting low-income students for compensatory total program, and (3) including prekindergarten students in the state's full-time equivalent enrollment counts to provide universal prekindergarten services.

The study team recommends retaining the same general student count methods used for the current formulas, including total FTE enrollment, compensatory education students, LEP students, special education students, and prekindergarten students. Our recommendations for addressing declining enrollment, counting compensatory education students, and counting prekindergarten students are presented below.

Declining Enrollment

The study team recommends including a declining enrollment calculation when calculating total enrollment for each district. Currently, total enrollment is based on the September 30 FTE enrollment count for the prior school year. The November 2015 *Final Report of the Study of Increasing and Declining Enrollment in Maryland schools* discusses the reasoning for a declining enrollment adjustment. Generally speaking, as a district loses enrollment, it can't necessarily reduce costs in a linear fashion to the loss of students. The proposed methodology would use three years of enrollment information in the calculation of the total enrollment figure, allowing districts to absorb the loss of funding related to the loss of students over time. A district would receive the greater of two counts – the prior year's enrollment count or the average of the three prior years' counts. The calculation ensures that districts with growing enrollments receive funding based on the most recent enrollment count. Table E.2 in Appendix E shows the effect on enrollment numbers and funding by using the greater of a single year or a three-year rolling average or just implementing a single year count. The recommended method increases student enrollment in 10 of the 24 districts. Also, the recommended enrollment results in higher total funding by $11,468,202 compared to just using a single year enrollment count.

Counting Low-Income Students

The issue of how to best count low-income students was raised as a result of the growing use of the Community Eligibility Provision (CEP) included in the 2010 Healthy, Hunger-Free Kids Act (HHFKA), which allows eligible,[25] participating schools to serve free meals to all of its students. In a move to reduce reporting burdens on schools, the law prohibits participating schools from collecting application forms for the federal free and reduced-price lunch program during the four-year CEP eligibility period, which results in incomplete district and statewide FRPM counts.

In July 2015 the study team released the report entitled *Evaluation of the Use of Free- and Reduced-Price Meal Eligibility as a Proxy for Identifying Economically Disadvantaged Students: Alternative Measures and Recommendations*. The report examined the various options for identifying students for compensatory education funding. It attempted to identify the best count for compensatory education generally and with a focus on the potential impact of CEP program, which would suspend FRPM counts in eligible schools for up to four years. The implication of CEP is that students no longer need to complete the federal form required to qualify for FRPM in these schools, creating an undercount of FRPM students and, in turn, an undercount of low-income students.

The report discusses the impact of this provision on student counts. Two alternatives were examined in the report. One was to continue to use FRPM eligibility to identify students for compensatory education funding, but use an alternative state-developed form for collecting FRPM eligibility information. The second approach relies on direct certification of students eligible for programs such as the Supplemental Nutritional Assistance Program (SNAP), Transitional Assistance for Needy Families (TANF), or Medicaid using existing administrative data from state and local social services agencies.[26] However, the statewide direct certification count is much lower than the current FRPM count, about 56 percent of the FRPM count, and would result in significantly less compensatory education funding. An adjustment factor could be applied to the direct certification count to generate a statewide eligibility count comparable to the current FRPM count, but counts at the district level would still vary greatly from current counts. Due to this redistribution in the compensatory education eligibility counts, any implementation of direct certification should be phased-in over time. The study team recommends using the first alternative, in which the State creates an alternative form for collecting FRPL eligibility information because this approach will continue to provide a comprehensive count while minimizing the redistribution of counts across districts.

Counting Prekindergarten Students

Maryland currently provides funding for prekindergarten students who meet specific qualifying criteria related to the income of the child's family. In the January 2016 report entitled *A Comprehensive Analysis of Prekindergarten in Maryland,* the study team identified the need to expand the coverage and the quality of prekindergarten services in the state to ensure students would be prepared to meet the MCCRS. The report recommends a goal of providing high-quality prekindergarten for up to 80 percent of

[25] Schools are eligible for CEP if 40 percent or more of its students have been identified as being vulnerable to hunger during the spring of the prior school year. Among the factors that may be used to identify children are homelessness, placement in foster care, participation in Head Start, migrant status, and living in households receiving services from the SNAP, FDPIR, or TANF programs.

[26] The recommendation suggests including eligibility for Medicaid or the Children's Health Insurance Program among the criteria used for determining eligibility if the direct certification method is chosen.

eligible four-year-old students. Eighty percent participation is considered the "full" participation level, assuming that about 20 percent of the families of four-year-olds will choose not participate even if the program is available to them. To be eligible for state funding, prekindergarten students must be enrolled in a "quality" program, which is defined as a program that is six and a half hours long and located in a public or private setting that: 1) has earned an EXCELS[27] rating of level 5, 2) has earned state or national accreditation (for example, accreditation through the National Association for the Education of Young Children), or 3) is a public school program which must, at a minimum, meet EXCELS level 4 standards.

In September 2013, the total public prekindergarten enrollment reported by local school districts was 29,724. After adjusting the school district figures to convert half-day programs to their full-day equivalent, the number of full day public program spaces available in the State is 26,631. In addition, most, though not all, districts have private EXCELS Level 5 and accredited programs within their boundaries. This adds 1,607 EXCELS Level 5 full-time slots and 4,413 accredited full-time slots that are eligible for funding. This approach would recognize 32,651 prekindergarten slots as being eligible for funding through the foundation formula, which is the funding method recommended by the study team. This represents an increase of 2,927 eligible prekindergarten students in the State from the September 2013 enrollment count, or approximately 60 percent of all four-year-olds. In the modeling below, the study team uses the 32,651 count of "high-quality" slots for use in the foundation formula. This count is expected to grow over time as more Level 5 slots become available.[28]

Base Cost

The base cost figure of a formula should be designed to represent the resources a student with no special needs in a district with no special circumstances needs to meet state standards. The base cost includes resources for instructional, administrative, and other costs associated with meeting student needs. Maryland's standards and requirements have changed over time and the base cost needs to keep up with these changes to ensure all students, schools, and districts have the resources needed to meet the new standards. As was mentioned in Chapters II-IV, the study team identified three base cost figures from the various adequacy approaches. The base cost figures from the evidence-based approach (EB) and professional judgment approach (PJ) were determined to best estimate the resources needed for all students to meet the MCCRS. The three adequacy study approaches were reconciled in Chapter V to create a final base cost recommendation based upon blending the EB and PJ approaches. This new base cost, once federal dollars were considered, was $10,880. For comparison, the current base cost used for the 2014-15 foundation program was $6,860.

[27] Maryland uses a Quality Rating and Improvement System (QRIS) called EXCELS to accredit prekindergarten providers.

[28] The rate at which existing slots for prekindergarten students are converted to EXCELS Level 5 or its equivalent is limited by the number of prekindergarten programs that earn and move to EXCELS Level 5. To meet the goal of 80 percent of Maryland four-year-olds being served in a Level 5 program, the objective would be to have the capacity to serve approximately 60,300 four-year-olds in high quality programs. This figure is approximately 27,650 higher than the 32,651 slots that are available today. The study team included the 32,651 figure in the recommendation estimate. The study team elected to use the lower count in recognition that it will take several more years before the number of "high-quality" EXCELS Level 5 slots become available to accommodate 80 percent of four-year-olds.

This difference between the recommended base cost ($10,880) and the current base cost ($6,860) is substantial, and represents a greater focus on providing resources at the base level to all students (instead of through adjustments tied to student need) than in the previous adequacy work done for the Thornton Commission, from which the current base figure is derived. The professional judgment panelists and the extensive research reviews of the EB and PJ approaches strongly argued for a larger base amount for several reasons. First, the new College and Career-Ready State standards and other state requirements are more rigorous than those in place at the time of the first study. Stronger accountability systems at both the state and federal levels also place higher stakes on adequately supporting students to meet these standards. The professional judgment panelists and research literature also indicated that most, if not all, students are coming to school with greater needs, requiring more support services even if they have not been formally identified as at risk, LEP, or special education. Further, since 2002 there are additional requirements for schools and districts, such educator evaluations that require additional resources to accomplish.

The study team's adequacy recommendation featuring a higher base and smaller weights is also more consistent with the findings of other recent adequacy studies as presented in the previously released report entitled *A Comprehensive Review of State Adequacy Studies Since 2003* (September 2014).

Weights

Student adjustments, or weights, are designed to provide the additional resources these students need above the base cost to ensure they can meet state standards. The study team is recommending the following student need adjustments for special education, compensatory education, LEP, and prekindergarten students:

Table 6.1
Recommended Weights

Student Category	Weight
Compensatory Education	0.35
LEP	0.35
Special Education	0.91
Prekindergarten	0.29

The recommended compensatory education and LEP weights, both 0.35, are lower than the current weights. This is reflective of the shift to providing additional resources in the base instead of through adjustments tied to student need as discussed above. These weights were set at the level needed to raise sufficient funding when applied to the higher base to fund the additional staff and non-staff resources identified in the PJ and EB studies as necessary to adequately serve these students. The lower weights also reflect that all students, including students at risk of academic failure and students with limited English proficiency, will receive a higher level of services through the general education program due to the higher base amount. Further, both weights are recommended to be linear, that is, the weights remain constant regardless of the concentration of these students. In this final chapter of this report addressing additional studies, a discussion on funding for higher concentrations of low-income students is included. This section goes into detail on the research related to funding for concentrations of poverty and the basis for the study team's recommendation of funding compensatory education on a linear basis. It builds on the December 2015 report *The Effects of Concentrations of Poverty on School Performance and School Resource Needs: A Literature Review*. The study team recommends that regardless of a district's percentage of compensatory education students, all eligible students receive the 0.35 weight. Districts with higher concentrations would receive more funding overall, but not more on a per student basis.

The study team concludes that at this time the evidence is not compelling to justify non-linear funding mechanisms,[29] even though the challenges that high-poverty schools face are readily observed. Neither the research literature nor the results from the PJ and EB studies indicate a need for a non-linear approach. The research team believes that given the level of funding recommended by this study, Maryland's schools would have the necessary resources for services to meet state standards, such as the supplemental strategies highlighted in the *Concentrations of Poverty* report and those highlighted in the EB and PJ approach sections of this report such prekindergarten, summer school, afterschool programs, arts education, and the coordination of wrap-around services through the use of school-based community liaisons to address the needs of these students.

Second, the study team recommends that the State continue to use a single weight for special education students. The recommended weight is 0.91, which is higher than the current weight of 0.74. The proposed weight both reflects the level of services identified by the PJ and EB studies and is in-line with recommendations made in recent adequacy studies for other states as presented in the *A Comprehensive Review of State Adequacy Studies Since 2003* report.[30]

Finally, the study team proposes a prekindergarten weight of 0.29 to fund quality prekindergarten programs for four-year-olds. The 0.29 weighting is needed to pay for the additional costs of high quality programs. The primary cost drivers are related to staff, including higher total compensation packages required to attract and retain early childhood education certified teachers and credentialed program administrators, a small instructor to student ratio of one certified teacher and assistant (or two certified teachers) per 15 students, a 6.5 hour program day, planning time and ongoing professional development for staff, and time to conduct routine child screenings and assessments.

At a participation rate of 80 percent of all four-year-olds, the study team estimated a total cost of $439.6 million with state aid accounting for 51 percent of total costs on average and local appropriations accounting for the remaining 49 percent of costs. Contributions from families based on their income is an option for offsetting part of these costs. However, the study team estimated that the

[29] Under a non-linear weighting approach, a higher weight would be applied to districts (or schools) with higher concentrations of students in poverty. Under this approach districts with higher concentrations of students in poverty would receive more funding per eligible student than districts with lower concentrations. Under a linear weighting approach, all students receive the same weighting (and amount of additional funding) regardless of poverty concentrations.

[30] See Aportela, A., Picus, L., Odden, A. & Fermanich, M. (2014). *A Comprehensive Review of State Adequacy Studies Since 2003*. Denver, CO: Augenblick, Palaich & Associates.

State would accrue a return on investment of $5.54 for each dollar spent through reduced special education and remedial program spending in grades kindergarten through 12 and lower criminal justice and child welfare system costs.[31]

Though the recommended weights may be lower than the current weights in some cases, it does not necessarily mean special needs students would receive fewer resources for two reasons. One reason is that the weights are applied to a higher recommended base. Another reason is that current weights may not be fully funded at present, as only the state share of funding for these weights is guaranteed. The study team recommends that the recommended weights from this study be fully funded. A detailed comparison of per student amounts generated under both current and recommended bases and weights will be provided later in this chapter.

One final recommendation regarding weights, the study team recommends a student receive all weights for which they are eligible, with the exception of LEP weights for prekindergarten students. As described in Chapter V, the study team believes applying the LEP weight to prekindergarten students would be unnecessary as all students at this age are engaged in language acquisition.

Regional Cost Adjustment

Regional cost adjustments are applied to funding targets to account for geographical differences in the costs faced by districts across the State. Two reports were produced examining regional cost adjustments for the Maryland school funding model. In November 2015, the *Geographic Cost of Education Adjustment for Maryland* report examined the current approach used by the State, the GCEI, and the alternative approaches available for adjusting for regional cost differences. The report recommended switching from the GCEI to a Comparable Wage Index (CWI) approach for regional cost adjustments to better account for the differences in costs faced by districts in Maryland. The June 2016 report *A Comparable Wage Index for Maryland* calculated the CWI figure for each school district in the State.

As a result, the study team is recommending using the CWI figure to adjust for regional cost differences. The study team recommends all formula funds be adjusted by the CWI, which is a further change from the current funding system. Currently, only foundation funding is adjusted by the GCEI. However, regional differences in costs impact all program areas, not only programs supported by foundation funding. Additionally, the study team also recommends that adjustments be made for districts with CWI figures above and below the statewide average. Currently, adjustments are made only for those districts with GCEI figures above the state average, providing for additional funding for districts in regions with higher than average costs. By not applying GCEI figures below the state average, funding for districts in lower cost regions is not reduced, resulting in a financial advantage for these districts in the competition for attracting and retaining qualify staff. Finally, the study team recommends that the CWI adjustment be applied prior to determining the state and local shares. Currently, the GCEI adjustment is made after the local share has been calculated and the entire cost of the GCEI adjustment is included in state

[31] For more information on prekindergarten costs and return on investment, see Workman, S., Palaich, R., & Wool, S. (2016, January). *A Comprehensive Analysis of Prekindergarten in Maryland*. Denver, CO: APA Consulting.

foundation aid. However, under this recommendation the full range of the CWI will be applied (both above and below the state average), therefore local jurisdictions should share in any savings as well as extra costs resulting from the application of the CWI. Applying the CWI prior to the calculation of state and local shares may also make the cost of the adjustment less susceptible to budget cuts if the State faces a budget deficit. Table E.1a in Appendix E shows the effect on the total program amount (without the guaranteed tax base (GTB) and transportation) with a regional adjustment using CWI compared to no regional adjustment. Table E.1b shows the State and local shares of the cost of the CWI. Total funding in 12 of the 24 districts would be lower with the adjustment, with the largest decrease being 19 percent. However, 11 districts would have an increase in funding using the CWI, with the largest increase being 17 percent. The use of the CWI as a regional adjustment to all formula funds would increase funding by $974.3 million compared to using no regional adjustment.

Determining State and Local Funding

Equalized state funding systems determine state and local funding based on the wealth of each district, the required local share, any additional adjustments such as minimum aid guarantees or guaranteed tax bases, and the ability of districts to raise dollars above the foundation formula. This section examines each of the study team's recommendations for these components.

Local Wealth

The study team examined three issues related to determining the local wealth of districts: 1) the choice of using September or November Net Taxable Income (NTI), whichever provided the largest amount of state aid, when determining local wealth; 2) the method for combining local, assessed property values and NTI; and 3) whether all or a portion of the tax increment of tax increment financing (TIF) districts should be exempted from the local property wealth portion of a district's wealth for school aid formula purposes. All three of these issues are presented in more detail in the December 2015 report *Analysis of School Finance Equity and Local Wealth Measures in Maryland.* The study team provided recommendation on the issues of NTI and the method used for combining assessed property values and NTI but did not make a specific recommendation related to tax increment financing.

<u>Net Taxable Income</u>

Currently, MSDE calculates each funding formula impacted by local wealth using both the September and November NTI. Districts receive the calculation that results in the largest amount of state aid. The study team believes that the November NTI provides the more accurate measure of NTI, and hence the fiscal capacity of each district, because it includes a larger proportion of a county's income tax returns – including those filed closer to the extension deadline of October 15. Thus, the study team recommends using only the November NTI data for determining local wealth.

<u>Combining Assessed Property Values and NTI</u>

Currently, Maryland includes both property and income wealth in its measurement of a district's local wealth. The study team recommends continuing to include both of these components but recommends an alternative approach to combining them into a single local wealth figure. Instead of using the current additive approach for combining property and income wealth, in which a county's assessed property value and NTI are added together, the study team recommends using a multiplicative approach. Using this approach, each county's assessed property wealth is adjusted by multiplying by the ratio of the county's NTI to the state average NTI. In essence, under this approach, assessed property wealth is adjusted by an income index to account for differences in jurisdictions' NTI. This method gives NTI a greater weight in the overall wealth calculation than is the case using the current method.

Moving to the multiplicative approach helps to increase the equity of the State's school finance system by placing greater emphasis on the ability of a local jurisdiction's residents to pay for the local share of funding formulas. One of the basic tenets of a fair taxation system is the ability to afford the tax (Institute on Taxation and Economic Policy, 2011, Oates & Schwab, 2004). Under the current additive approach, the real and personal property assessable value comprises between 60 percent and 90 percent of total local wealth. However, possessing high assessable property wealth does not necessarily mean a jurisdiction also has high taxable incomes. In Maryland there is only a moderate correlation between the two (0.58). Studies also show that the property tax is regressive, with low-income families paying 3.6 percent of income in property taxes compared to 0.7 percent of income for high-income families (ITEP, 2015). The ability to pay property taxes may also change over time, for example seniors may find it difficult to pay the property taxes on their home once retired and living on a fixed income (Oates & Schwab, 2004). Some states, including Maryland, have attempted to address this by providing some property tax relief through an income-based circuit breaker (Lyons, Farkas, & Johnson, 2007). The multiplicative approach also improves the fiscal neutrality of Maryland's school finance system when student need is taken into consideration (e.g. weighted student counts are used to calculate per pupil total program and local wealth).

Table 6.2 compares measures of two important equity concepts for the proposed formula if wealth is determined using the multiplicative approach or if it is determined using the additive approach. The first, fiscal neutrality, is a measure of the relationship between local wealth and education funding. Ideally, there should be little or no relationship between how wealthy a community is and the amount of money available to fund its schools. The second concept is equity, or how much variation in spending exists across local jurisdictions. An equitable school finance system should show minimal variation except for spending differences driven by student need.[32]

Each of the equity statistics is calculated using two different student counts to examine two different ways of looking at equity. The first, labeled "Unweighted Enrollment" uses the September 30th enrollment counts. The equity statistics using this count provide a measure of horizontal equity, or how equitable the finance system is without taking student need into account. The second, labeled "Weighted Enrollment" uses the enrollment counts adjusted by the proposed weights for special need

[32] Fiscal neutrality is measured by the correlation coefficient, a statistical measure of the relationship between per student local wealth and per student funding. The correlation coefficient may range from -1.0 (a perfect negative relationship) to 1.0 (a perfect positive relationship). Equity is measured by the coefficient of variation, a statistic that measures the amount of variation around the average for a set of values. The coefficient of variation typically ranges from 0.0 (no variation) to 1.0 (very high variation). An equitable school finance system should show minimal variation except for spending differences driven by student need.

students. These statistics provide a measure of vertical equity, or how equitable the system is when accounting for differences in student need.

The table also includes benchmarks, or the generally accepted maximum value for each equity measure. The benchmark for fiscal neutrality should be no more than 0.50. This represents a moderate or lower positive relationship. The benchmark for equity should not exceed 0.10, a fairly low level of variation.

Table 6.2
Equity Statistics for Multiplicative and Additive Approaches to Combining Assessed Property Value and NTI

	Benchmark	Multiplicative	Additive
Fiscal Neutrality			
Unweighted Enrollment	0.50	(0.32)	(0.20)
Weighted Enrollment	0.50	(0.19)	0.02
Equity			
Unweighted Enrollment	0.10	0.10	0.09
Weighted Enrollment	0.10	0.10	0.10

The table shows that for all measures both the multiplicative and additive approaches meet or exceed all benchmarks. There is essentially no difference in the equity measure whether using unweighted or weighted enrollment counts. But, the measure for fiscal neutrality, which would be expected to be impacted the most by a change in the way wealth is calculated, improves using the multiplicative approach, especially when taking student need into account by using weighted student counts.

Table E.3 in Appendix E compares the recommended formula using the multiplicative approach to the recommended formula using the additive approach. The multiplicative approach results in the State providing a larger share of total funding in 19 of the 24 districts. Only one district would have an increase in local contribution of more than 30 percent if the multiplicative approach was used instead of the additive. The study team believes this recommendation will result in improved equity for the school finance system and improve the system's ability to take taxpayers' ability to pay into account when determining the distribution of state and local shares of state aid programs.

Minimum State Aid Guarantees and Local Shares of Special Needs Programs

Maryland's current funding programs provide minimum state funding guarantees in two ways. First, each district is guaranteed to receive at least 15 percent of its total foundation total program as state aid. Under the minimum foundation aid guarantee, a district with high local wealth may generate the full foundation total program through its local share, but still receive at least 15 percent of the foundation total program in state aid, thus generating additional funding for the district or enabling the jurisdiction to reduce its local share in other program areas.

The second way in which state aid is guaranteed is by guaranteeing that all districts receive at least 40 percent of their special needs total program (compensatory education, LEP, and special education) as state aid. Further, districts are not required to provide a local share for any of these special needs program formulas. Again, under this minimum state aid guarantee, wealthier districts may reduce their local share amounts due to the guaranteed state aid, thereby increasing the cost of the program to the state and reducing or even eliminating any local effort. Further, providing the state aid minimums to wealthier districts and not requiring local shares of the special needs programs may be contributing to inequities identified in the formula in the study team's earlier school funding equity analysis.[33]

The study team makes two recommendations concerning these issues. First, the minimum state aid guarantees should be eliminated for foundation and special needs funding programs. Eliminating the state aid minimums will free-up state funding dollars which could be used to provide additional support to those districts with lower local wealth and higher needs. Second, the study team recommends that all districts should be required to appropriate the full local share for all of the special needs funding programs. This change would both improve equity and ensure that districts are receiving the full funding amount identified by the adequacy study.

Under the study team's recommendation, a required local share would be calculated for each special needs (compensatory education, LEP, and special education) program using the same method as the foundation calculation. A total program amount, adjusted by the CWI, would be determined; an equalized local share determined; and a state share equaling the difference between the total program amount and the local share. The local share is equalized using the same method used for calculating the foundation local share, that is, by determining a statewide local contribution rate assuming the state average state and local shares are equal to 50 percent each.[34] The study team recognizes that this approach differs from the current method of equalization used with the special needs programs, but it elected to use the foundation program's method for two reasons. First, the study team's rationale for requiring a full local share for the special needs funding programs is to ensure that the full adequacy level of funding is provided to all students in every district – both students with and without special needs. The study team could find no rationale for calculating the local shares of these programs differently, either in terms of whether or not a local jurisdiction appropriates a local share or how that local share is equalized. Second, by making the calculations for the foundation and special needs programs the same, the State could potentially streamline the formula by calculating the total program and state and local shares all within the foundation formula by using weighted student counts, i.e. taking the FTE enrollment count, calculating a weighted count by adjusting for the student need weights, and then multiplying by the foundation amount. A single local contribution rate could then be used to determine the state and local shares.

Other State Funding Programs and Tax Increment Financing

There are several issues that the study team explored but have not provided specific recommendations. These consist of transportation aid, the Guaranteed Tax Base (GTB) state aid program, and Tax Increment Financing. In all three cases the study team determined there were insufficient research

[33] See Glenn, W. J., Griffith, M., Picus, L.O., & Odden, A. (2015). *Analysis of School Finance Equity and Local Wealth Measures in Maryland*. Denver, CO: APA Consulting.

[34] The formula for determining the local contribution rate is: (total program X 0.50)/Total statewide local wealth.

findings in the literature or examples of best practices from other states to support making a recommendation. However, the research team recognizes that these issues should be explored and recommends that the State continue to study these issues and develop recommendations in the future.

Transportation Aid

Transportation aid provides funding for the transportation of general education and disabled students to and from school. The current formula begins with a base amount equal to a district's prior year grant and is then adjusted for inflation and enrollment growth. The study team's recommendations would potentially impact the amount of transportation aid in two ways. First, the study team's recommendation to use the greater of the prior year's FTE enrollment or the average of the three prior years' FTE enrollment will result in higher enrollments in declining enrollment districts, thus providing more aid for these districts and increasing state costs. Second, the State must determine whether prekindergarten students will be transported via district transportation services, and if so, should prekindergarten counts be included in the enrollment counts used to adjust districts' base grant amount. It should be noted that the research team recommended that the transportation aid formula should be thoroughly studied to determine if an updated formula is warranted.[35]

Guaranteed Tax Base

The current GTB program was established to incentivize districts with less than 80 percent of the statewide average per pupil wealth to provide a larger local education appropriation. The GTB provides additional state aid for these districts based on two factors: 1) the amount of their local education appropriation in excess of their local foundation share; and 2) the ratio of their wealth per pupil to 80 percent of the statewide average wealth per pupil. Under the current system the GTB program is an important incentive for jurisdictions to provide a local appropriation for the special needs funding programs. Also, given the current low base-funding amount, it aids lower wealth jurisdictions to provide an additional local appropriation to supplement their foundation total program funding. However, under the study team's recommendation that all jurisdictions provide a full local share of the special needs total program amounts, and with a new, adequate base funding amount, the State should examine whether the GTB should be continued in its present form and purpose.

Tax Increment Financing

Tax increment financing (TIF) is an economic development tool that uses the growth in property values in a designated area to pay for some of the costs of redevelopment, for example the principle and interest of municipal bonds issued to pay for new infrastructure. Because the tax assessments on these properties are used for other purposes they are not available to support the general operations of local jurisdictions. In Maryland, the growth in property values in designated TIF areas are included in the calculation of property wealth for counties and the City of Baltimore, but these jurisdictions are not able to use the local tax revenues generated by these properties for education funding purposes. In several counties and the City of Baltimore this results in either a loss of education funding or higher tax

[35] See Hartman, W. & Schoch, R. (2015). *Final Report of the Study of Increasing and Declining Enrollment in Maryland Public Schools*. Denver, CO: APA Consulting.

assessments on other properties. The study team's analysis of the calculation of local wealth examined this issue and presented an example of how another state has dealt with this issue. [36] However, the study team does not offer a specific recommendation but instead suggests that the State continue to study this issue.

Comparison to Current Funding System

This section compares the results of the proposed school finance formula with the current formula. The study team's adequacy recommendations would result in a significant additional investment in education by the State and some local jurisdictions. The recommendations would also result in some redistribution of resources across districts, even though all districts would experience an increase in funding. The comparisons presented in this section include the changes in total program, state and local share.

All data used for these comparisons, such as student enrollment; special needs student counts; local wealth; and current total program, state share, and local shares are based on FY 2015 numbers. All of the parameters for the proposed model parameters (e.g. base amount, weights for students with special needs, local wealth calculation, etc.) reflect the model as described earlier in this chapter. These parameters are summarized in Table 6.3. All of the proposed amounts – total program, state share, and local share – are CWI adjusted. Comparisons do not include the estimated impact on transportation funding or the GTB program. An estimate of the change in transportation funding was not included because the RFP does not include an analysis of transportation funding.[37] No estimate for the GTB program was included because the study team could not identify any research or best practices to support a particular formula design. Therefore, the study team recommends further study of both of these issues with state policy makers during implementation of the new state funding system.

[36] See Glenn, W. J., Griffith, M., Picus, L.O., & Odden, A. (2015). *Analysis of School Finance Equity and Local Wealth Measures in Maryland*. Denver, CO: APA Consulting.

[37] The final report of the study teams' analysis of the impact of increasing and declining enrollment includes a recommendation for reviewing and updating the State's transportation formula. See Hartman, W. & Schoch, R. (2015). *Final Report of the Study of Increasing and Declining Enrollment in Maryland Public Schools*. Denver, CO: Augenblick, Palaich & Associates.

Table 6.3
Settings for Proposed Funding System Model

Funding System Component	Setting
Base Amount	$10,880
Weights	
Compensatory Education	0.35
LEP	0.35
Special Education	0.91
Prekindergarten	0.29
Type of Enrollment Count	Greater of the prior year's count or a three-year rolling average, includes prekindergarten
Compensatory Total Program Count	Alternative Form FRPM count, includes prekindergarten
Special Needs Total Program	Adjusted for regional cost differences
Minimum Aid Guarantees	None
Local Share	Required for all special needs programs Amount of local share limited to no more than the Total Program amount
Regional Cost Adjustment	CWI
Wealth Calculations	Multiplicative with no limits

It is difficult to make a direct comparison between current local appropriations and the proposed local share for a number reasons. First, districts are not currently required to fully appropriate local funds identified for special needs students through the special education, LEP, and at risk funding streams. The proposed system requires full local appropriation for these funding streams. This means that though the expected local share for each special needs funding stream could be identified for the proposed system, there are not data available to compare for the current funding system by specials needs population.

Second, the study team cannot predict how districts would react to the proposed requirements for local funding. Currently, many districts have local appropriations above the current systems full expected total program, for both state and local share. A comparison can be made to these local appropriations and the proposed systems local share requirement. The study team cannot predict if districts would continue to fund above the proposed total adequacy target in the future.

Given the limitations discussed above, this analysis presents the following comparisons of the proposed and current funding systems:

- The aggregated total program amounts for the foundation and special needs programs (compensatory education, LEP, and special education);
- the aggregated state share amounts for the foundation and special needs programs, and the aggregated proposed required local share for these programs and the current total local appropriation;

- the per pupil aggregated total program amounts for the foundation and special needs programs;
- the total program and state and local shares for the foundation program; and
- the total program and state shares for each of the compensatory education, LEP, and special education funding programs.

The total of the proposed and current total program amounts for the foundation, compensatory education, LEP, and special education programs is presented in Table 6.4 below. Statewide, these total program amounts would increase by $4.2 billion or 46 percent over the current system. While all districts experience an increase in total program, the changes from district to district range widely - from 12 percent in Allegany County to 68 percent in Howard County. The primary factor influencing this range of increases across districts is the move from a formula with a relatively low base amount and very high weights for special needs students to one with a higher base amount and smaller weights. The districts with the smallest change in total program (Allegany, Caroline, and Dorchester) are among those with higher concentrations of special needs students. The smaller increases for these higher need districts stems from the fact that the current formula was designed to target a very high level of resources to special needs students while the base amount has failed to keep up with the State's move to higher standards and the increase in instructional and support services required for the average student to succeed

Table 6.4
Comparison of Proposed and Current Total Program for Foundation and Special Needs State Aid Programs

	Total Program			
Local Unit	Proposed	Current[1]	Change	Percent Change
Allegany	$106,193,944	$94,815,130	$11,378,830	12%
Anne Arundel	$1,161,936,991	$744,748,750	$417,191,800	56%
Baltimore City	$1,449,109,710	$1,087,111,876	$362,000,839	33%
Baltimore	$1,636,358,800	$1,139,119,927	$497,242,904	44%
Calvert	$225,294,976	$141,462,171	$83,832,930	59%
Caroline	$73,873,587	$60,515,928	$13,357,939	22%
Carroll	$338,196,159	$226,980,162	$111,216,198	49%
Cecil	$220,398,254	$156,851,870	$63,546,529	41%
Charles	$370,978,635	$245,565,085	$125,413,822	51%
Dorchester	$63,156,163	$53,259,526	$9,896,752	19%
Frederick	$560,038,906	$370,378,888	$189,661,745	51%
Garrett	$45,089,530	$39,836,600	$5,252,933	13%
Harford	$550,008,571	$355,544,632	$194,464,296	55%
Howard	$766,474,431	$457,192,741	$309,283,786	68%
Kent	$28,665,436	$22,072,746	$6,592,755	30%

Total Program				
Local Unit	Proposed	Current[1]	Change	Percent Change
Montgomery	$2,467,169,557	$1,561,774,295	$905,415,727	58%
Prince George's	$2,110,671,451	$1,494,286,701	$616,402,518	41%
Queen Anne's	$95,172,967	$70,014,330	$25,158,796	36%
St. Mary's	$252,865,758	$160,869,281	$91,996,666	57%
Somerset	$43,559,075	$34,643,988	$8,915,173	26%
Talbot	$58,485,958	$44,918,318	$13,567,907	30%
Washington	$300,346,598	$235,047,773	$65,299,202	28%
Wicomico	$203,312,762	$162,730,744	$40,582,620	25%
Worcester	$89,045,641	$66,228,114	$22,817,664	34%
Total State	**$13,216,403,859**	**$9,025,969,576**	**$4,190,490,330**	**46%**

[1]Current total program represents the program amount determined by the state aid formula. The actual funding received by a jurisdiction may differ depending on the amount of local share it elects to appropriate. These amounts exclude additional funding provided through the Net Taxable Income Adjustment grants.

Table 6.5a compares the proposed state and local shares for the foundation, compensatory education, LEP, and special education programs, to the current state share for these programs and jurisdictions' total local appropriation. Comparing the proposed required local share to the current local appropriation is not a perfect "apples-to-apples" comparison because the proposed local shares do not include an estimate of any additional local appropriation a jurisdiction may choose to raise. However, it does provide an indication of how jurisdictions' local shares may change under the proposed system.

The results shown in Table 6.5a also show a wide range of changes across districts in state and local share. This is a result of several features of the proposed system, including the new method for calculating local wealth, the elimination of minimum state aid amounts, and the requirement that all jurisdictions raise the full local share of the three special needs programs. These changes, in addition to increases in total program amounts, lead to large increases in state aid, in the range of 80 percent or more, in Calvert, Charles, Harford, and St. Mary's counties. Three counties, Kent, Talbot, and, Worcester lose all of their state aid due to the recommendation for required local shares and changes in the local wealth calculation.

Local wealth changes and requiring full local shares for the three special needs funding programs results in an increase in the local share in several counties, including Anne Arundel (36 percent), Baltimore (13 percent), Garrett (2 percent), Kent (67 percent), Montgomery (53 percent), Queen Anne's (23 percent), Talbot (66 percent), and Worcester (15 percent). These compare to a statewide average increase of 12 percent. Several other counties are already raising local appropriations well in excess of the proposed required local shares, including Allegany County, Baltimore City, Calvert County, Cecil County, Charles County, Prince George's County, Somerset County, and Washington County.

Table 6.5b compares the total of the proposed state and local shares for the foundation, compensatory education, LEP, and special education programs, to the total of the current state share for these programs and jurisdictions' total local appropriation. Again, this is not a perfect apples-to-apples comparison because the proposed local shares do not include any additional local appropriation jurisdictions may elect to contribute. This comparison shows that total state shares plus local appropriations statewide would increase by 25 percent. Potentially, this increase could be larger if jurisdictions make additional local appropriations above the proposed required local share. The difference between proposed and current range from increases of 30 percent or greater in Cecil, Harford, Prince George's, and St. Mary's counties. Worcester County is the only jurisdiction that would experience a decrease.

Table 6.5a

Comparison of Proposed and Current State Shares, Proposed Required Local Share, and Current Total Local Appropriation for Major State Aid Programs, *Fiscal Year 2015*

	Total State Share				Total Local Share			
Local Unit	Proposed[1]	Current[2]	Change	Percent Change	Proposed Total Required Local Share[3]	Current Total Local Appropriation	Change	Percent Change
Allegany	$84,760,301	$69,402,465	$15,357,836	22%	$21,433,643	$29,418,144	(7,984,500.75)	(27%)
Anne Arundel	$338,187,597	$298,243,340	$39,944,257	13%	$823,749,394	$603,483,300	220,266,093.99	36%
Baltimore City	$1,255,260,400	$868,410,977	$386,849,423	45%	$193,849,309	$254,684,808	(60,835,498.55)	(24%)
Baltimore	$805,808,718	$543,936,097	$261,872,621	48%	$830,550,082	$738,074,687	92,475,394.95	13%
Calvert	$132,316,345	$74,239,921	$58,076,424	78%	$92,978,632	$115,808,239	(22,829,607.48)	(20%)
Caroline	$62,256,061	$44,843,482	$17,412,579	39%	$11,617,526	$13,437,485	(1,819,959.22)	(14%)
Carroll	$182,371,694	$120,768,400	$61,603,294	51%	$155,824,465	$171,037,000	(15,212,534.83)	(9%)
Cecil	$160,424,468	$93,494,559	$66,929,909	72%	$59,973,786	$75,523,845	(15,550,059.27)	(21%)
Charles	$263,859,425	$148,176,358	$115,683,067	78%	$107,119,210	$161,921,600	(54,802,390.03)	(34%)
Dorchester	$48,221,525	$33,872,151	$14,349,374	42%	$14,934,638	$18,531,907	(3,597,268.88)	(19%)
Frederick	$358,044,072	$214,292,242	$143,751,830	67%	$201,994,834	$233,493,582	(31,498,747.80)	(13%)
Garrett	$17,831,996	$16,372,428	$1,459,568	9%	$27,257,534	$26,690,979	566,554.86	2%
Harford	$329,614,473	$183,761,510	$145,852,963	79%	$220,394,097	$223,667,302	(3,273,204.88)	(1%)
Howard	$284,723,521	$200,955,246	$83,768,275	42%	$481,750,910	$530,439,861	(48,688,951.23)	(9%)
Kent	$0	$7,038,633	($7,038,633)	(100%)	$28,665,436	$17,191,672	11,473,764.03	67%
Montgomery	$210,685,890	$564,924,312	($354,238,422)	(63%)	$2,256,483,667	$1,476,855,309	779,628,357.88	53%
Prince George's	$1,616,734,015	$938,783,546	$677,950,469	72%	$493,937,436	$630,218,800	(136,281,364.30)	(22%)
Queen Anne's	$31,948,463	$29,340,617	$2,607,846	9%	$63,224,504	$51,228,247	11,996,257.03	23%
St. Mary's	$162,528,290	$89,393,070	$73,135,220	82%	$90,337,468	$93,910,979	(3,573,511.01)	(4%)
Somerset	$37,756,339	$25,425,381	$12,330,958	48%	$5,802,736	$9,646,844	(3,844,107.78)	(40%)
Talbot	$0	$10,595,400	($10,595,400)	(100%)	$58,485,958	$35,338,852	23,147,105.59	66%

Washington	$228,453,419	$155,626,289	$72,827,130	47%	$71,893,179	$94,845,452	(22,952,272.54)	(24%)
Wicomico	$170,557,795	$121,959,193	$48,598,602	40%	$32,754,966	$40,396,119	(7,641,152.52)	(19%)
Worcester	$0	$15,774,211	($15,774,211)	(100%)	$89,045,641	$77,675,762	11,369,878.80	15%
Total State	**$6,782,344,808**	**$4,869,629,829**	**$1,912,714,978**	**39%**	**$6,434,059,051**	**$5,723,520,775**	**$710,538,276**	**12%**

[1]Proposed state share is the amount for the foundation, compensatory education, LEP, and special education programs.

[2]Current state share includes all major state aid programs except student transportation.

[3]Proposed total required local share includes local share for foundation, compensatory education, LEP, and special education programs.

Table 6.5b
Comparison of Proposed State and Local Shares and the Sum of
Current State Share for Major State Aid Programs and Current Total Local Appropriations
Fiscal Year 2015

Local Unit	Proposed State and Local Shares	Current State Share and Total Local Appropriations	Change	Percent Change
Allegany	$106,193,944	$98,820,609	$7,373,335	7%
Anne Arundel	$1,161,936,991	$901,726,640	$260,210,351	29%
Baltimore City	$1,449,109,710	$1,123,095,785	$326,013,925	29%
Baltimore	$1,636,358,800	$1,282,010,784	$354,348,016	28%
Calvert	$225,294,976	$190,048,160	$35,246,817	19%
Caroline	$73,873,587	$58,280,967	$15,592,619	27%
Carroll	$338,196,159	$291,805,400	$46,390,759	16%
Cecil	$220,398,254	$169,018,404	$51,379,850	30%
Charles	$370,978,635	$310,097,958	$60,880,677	20%
Dorchester	$63,156,163	$52,404,058	$10,752,105	21%
Frederick	$560,038,906	$447,785,824	$112,253,082	25%
Garrett	$45,089,530	$43,063,407	$2,026,123	5%
Harford	$550,008,571	$407,428,812	$142,579,759	35%
Howard	$766,474,431	$731,395,107	$35,079,324	5%
Kent	$28,665,436	$24,230,305	$4,435,131	18%
Montgomery	$2,467,169,557	$2,041,779,621	$425,389,936	21%
Prince George's	$2,110,671,451	$1,569,002,346	$541,669,105	35%
Queen Anne's	$95,172,967	$80,568,864	$14,604,103	18%
St. Mary's	$252,865,758	$183,304,049	$69,561,709	38%
Somerset	$43,559,075	$35,072,225	$8,486,851	24%
Talbot	$58,485,958	$45,934,252	$12,551,706	27%
Washington	$300,346,598	$250,471,741	$49,874,857	20%
Wicomico	$203,312,762	$162,355,312	$40,957,449	25%
Worcester	$89,045,641	$93,449,973	($4,404,332)	(5%)
Total State	**$13,216,403,859**	**$10,593,150,604**	**$2,623,253,255**	**25%**

Table 6.6 below shows the change in per pupil total program for the four funding programs. Statewide, the average per pupil increase is $4,425 or 41 percent. Again, while all districts receive an increase, there is a significant range – from 5 percent in Allegany County to 63 percent in Howard County. Only two counties (Allegany and Garrett) receive an increase of less than 10 percent while six counties (Anne Arundel, Calvert, Harford, Howard, Montgomery, and St. Mary’s) receive an increase of 50 percent or greater.

Table 6.6
Comparison of Proposed and Current Total Program for Foundation and Special Needs State Aid Programs Per Student, *Fiscal Year 2015*

Total Program				
Local Unit	**Proposed**	**Current[1]**	**Change**	**Percent Change**
Allegany	$12,000	$11,405	$595	5%
Anne Arundel	$14,789	$9,776	$5,013	51%
Baltimore City	$17,165	$13,700	$3,466	25%
Baltimore	$15,115	$10,915	$4,199	38%
Calvert	$13,873	$8,940	$4,933	55%
Caroline	$13,339	$11,560	$1,780	15%
Carroll	$12,801	$8,747	$4,054	46%
Cecil	$14,003	$10,388	$3,616	35%
Charles	$14,049	$9,621	$4,428	46%
Dorchester	$13,395	$11,822	$1,572	13%
Frederick	$13,757	$9,383	$4,374	47%
Garrett	$11,434	$10,523	$910	9%
Harford	$14,477	$9,595	$4,882	51%
Howard	$14,397	$8,855	$5,542	63%
Kent	$13,327	$11,064	$2,263	20%
Montgomery	$16,197	$10,591	$5,606	53%
Prince George's	$16,959	$12,527	$4,432	35%
Queen Anne's	$12,313	$9,371	$2,942	31%
St. Mary's	$14,269	$9,524	$4,745	50%
Somerset	$14,588	$12,704	$1,884	15%
Talbot	$12,650	$10,450	$2,200	21%
Washington	$13,261	$10,714	$2,547	24%
Wicomico	$13,765	$11,682	$2,082	18%
Worcester	$13,239	$10,598	$2,641	25%
Total State	**$15,241**	**$10,816**	**$4,425**	**41%**

[1]Current total program represents the program amount determined by the state aid formula. The actual funding received by a jurisdiction may differ depending on the amount of local share it elects to appropriate. These amounts exclude additional funding provided through the Net Taxable Income Adjustment grants.

Tables 6.7 through 6.11 show the total program, state share, and local share, for the foundation program; and total program and state share for the compensatory education, LEP, and special education programs. As is consistent with the move to a higher base amount, the foundation total program increases by $4.5 billion, or 76 percent statewide under the proposed system. Similarly, given the proposed system's shift to lower weights, the proposed total program for compensatory education decreases by $852.6 million, or 36 percent and LEP total program decreases by $141.2 million, or 37 percent. Special education, which has a higher weight under the proposed system (0.91 compared to 0.74 currently) increases by $577.8 million, or 111 percent. As described above, the recommended changes in the way local wealth is calculated, the elimination of minimum state aid amounts, and imposition of required local shares lead to significant changes in the state share across counties for all four programs.

Table 6.7
Comparison of Proposed and Current Foundation Total Program, *Fiscal Year 2015*

Total Program				
Local Unit	**Proposed**	**Current[1]**	**Change**	**Percent Change**
Allegany	$80,030,248	$57,030,610	$22,999,638	40%
Anne Arundel	$956,378,725	$532,008,490	$424,370,235	80%
Baltimore City	$996,155,844	$567,217,618	$428,938,226	76%
Baltimore	$1,267,569,114	$721,621,318	$545,947,796	76%
Calvert	$193,539,839	$110,823,490	$82,716,349	75%
Caroline	$56,496,337	$35,912,100	$20,584,237	57%
Carroll	$288,893,313	$180,498,804	$108,394,509	60%
Cecil	$173,412,439	$103,586,000	$69,826,439	67%
Charles	$308,093,992	$178,594,784	$129,499,208	73%
Dorchester	$47,960,734	$30,904,300	$17,056,434	55%
Frederick	$467,811,601	$277,273,078	$190,538,523	69%
Garrett	$36,052,703	$25,968,530	$10,084,173	39%
Harford	$448,260,424	$254,197,300	$194,063,124	76%
Howard	$660,843,619	$359,492,786	$301,350,833	84%
Kent	$22,256,851	$13,822,557	$8,434,294	61%
Montgomery	$1,950,252,010	$1,045,985,130	$904,266,880	86%
Prince George's	$1,547,189,187	$857,542,710	$689,646,477	80%
Queen Anne's	$78,602,152	$51,818,289	$26,783,863	52%
St. Mary's	$210,868,076	$116,098,849	$94,769,227	82%
Somerset	$31,339,889	$18,707,220	$12,632,669	68%
Talbot	$47,376,778	$29,487,710	$17,889,068	61%
Washington	$237,971,479	$150,503,255	$87,468,224	58%
Wicomico	$153,767,157	$95,556,370	$58,210,787	61%
Worcester	$70,277,559	$42,868,140	$27,409,419	64%
Total State	**$10,331,400,071**	**$5,857,519,438**	**$4,473,880,632**	**76%**

[1]Current amounts include the adjustment for GCEI but exclude additional funding provided through the Net Taxable Income Adjustment grants.

Table 6.8
Comparison of Proposed and Current Foundation State and Local Shares, *Fiscal Year 2015*

	Total State Share				Total Local Share			
Local Unit	**Proposed**	**Current[1]**	**Dollar Change**	**Change**	**Proposed**	**Current**	**Dollar Change**	**Change**
Allegany	$63,005,569	$39,322,383	$23,683,186	60%	$17,024,679	$17,708,227	($683,548)	(4%)
Anne Arundel	$312,445,304	$208,420,839	$104,024,465	50%	$643,933,421	$323,587,651	$320,345,770	99%
Baltimore City	$844,621,834	$410,660,390	$433,961,444	106%	$151,534,010	$156,557,228	($5,023,218)	(3%)
Baltimore	$618,319,525	$363,429,623	$254,889,902	70%	$649,249,589	$358,191,695	$291,057,894	81%
Calvert	$119,925,434	$58,932,041	$60,993,393	103%	$73,614,405	$51,891,449	$21,722,956	42%
Caroline	$47,414,797	$25,115,561	$22,299,236	89%	$9,081,540	$10,796,539	($1,714,999)	(16%)
Carroll	$165,298,372	$97,191,118	$68,107,254	70%	$123,594,941	$83,307,686	$40,287,255	48%
Cecil	$126,104,957	$62,872,334	$63,232,623	101%	$47,307,482	$40,713,666	$6,593,816	16%
Charles	$223,682,886	$108,473,587	$115,209,299	106%	$84,411,106	$70,121,197	$14,289,909	20%
Dorchester	$36,286,173	$19,242,908	$17,043,265	89%	$11,674,561	$11,661,392	$13,169	0%
Frederick	$309,910,150	$162,311,117	$147,599,033	91%	$157,901,451	$114,961,961	$42,939,490	37%
Garrett	$14,359,473	$8,885,474	$5,473,999	62%	$21,693,230	$17,083,056	$4,610,174	27%
Harford	$273,958,856	$135,734,462	$138,224,394	102%	$174,301,568	$118,462,838	$55,838,730	47%
Howard	$272,574,368	$158,918,877	$113,655,491	72%	$388,269,251	$200,573,909	$187,695,342	94%
Kent	$0	$2,551,449	($2,551,449)	(100%)	$22,256,851	$11,271,108	$10,985,743	97%
Montgomery	$149,422,769	$344,851,008	($195,428,239)	(57%)	$1,800,829,241	$701,134,122	$1,099,695,119	157%
Prince George's	$1,161,073,185	$533,848,244	$627,224,941	117%	$386,116,002	$323,694,466	$62,421,536	19%
Queen Anne's	$28,219,832	$21,548,679	$6,671,153	31%	$50,382,320	$30,269,610	$20,112,710	66%
St. Mary's	$139,565,742	$63,976,011	$75,589,731	118%	$71,302,334	$52,122,838	$19,179,496	37%
Somerset	$26,803,830	$12,974,047	$13,829,783	107%	$4,536,059	$5,733,173	($1,197,114)	(21%)
Talbot	$0	$4,423,157	($4,423,157)	(100%)	$47,376,778	$32,014,349	$15,362,429	48%
Washington	$181,771,837	$97,450,724	$84,321,113	87%	$56,199,642	$53,052,531	$3,147,111	6%
Wicomico	$128,162,261	$67,564,743	$60,597,518	90%	$25,604,896	$27,991,627	($2,386,731)	(9%)
Worcester	$0	$6,430,221	($6,430,221)	(100%)	$70,277,559	$49,507,162	$20,770,397	42%
Total State	**$5,242,927,155**	**$3,015,128,997**	**$2,227,798,158**	**74%**	**$5,088,472,916**	**$2,862,409,480**	**$2,226,063,436**	**78%**

[1]Current amounts include the adjustments for GCEI and minimum state aid but exclude additional funding provided through the NTI Adjustment grants.

Table 6.9

Comparison of Compensatory Education Total Program and State Share, *Fiscal Year 2015*

	Total Program				Total State Share			
Local Unit	Proposed	Current[1]	Dollar Change	Change	Proposed	Current	Dollar Change	Change
Allegany	$15,250,085	$30,808,020	($15,557,935)	(50%)	$12,703,182	$20,723,718	(8,020,536)	(39%)
Anne Arundel	$103,422,355	$157,706,454	($54,284,099)	(34%)	$7,089,518	$63,082,582	(55,993,064)	(89%)
Baltimore City	$292,919,180	$451,247,664	($158,328,484)	(35%)	$270,249,598	$327,714,001	(57,464,403)	(18%)
Baltimore	$206,072,778	$325,387,254	($119,314,476)	(37%)	$108,944,638	$135,832,813	(26,888,175)	(20%)
Calvert	$15,633,408	$24,653,070	($9,019,662)	(37%)	$4,620,648	$10,770,908	(6,150,260)	(57%)
Caroline	$11,028,738	$19,722,456	($8,693,718)	(44%)	$9,670,134	$13,702,149	(4,032,015)	(29%)
Carroll	$18,316,215	$31,872,660	($13,556,445)	(43%)	$0	$14,224,610	(14,224,610)	(100%)
Cecil	$24,601,950	$41,088,450	($16,486,500)	(40%)	$17,524,721	$21,834,914	(4,310,193)	(20%)
Charles	$34,717,021	$55,467,744	($20,750,723)	(37%)	$22,089,067	$28,928,798	(6,839,731)	(24%)
Dorchester	$10,678,849	$19,289,946	($8,611,097)	(45%)	$8,932,327	$10,677,511	(1,745,184)	(16%)
Frederick	$40,942,734	$66,134,106	($25,191,372)	(38%)	$17,320,579	$32,534,923	(15,214,344)	(47%)
Garrett	$5,679,172	$11,731,002	($6,051,830)	(52%)	$2,433,851	$4,692,401	(2,258,550)	(48%)
Harford	$46,023,217	$72,994,380	($26,971,163)	(37%)	$19,947,595	$32,715,145	(12,767,550)	(39%)
Howard	$43,144,258	$64,543,800	($21,399,542)	(33%)	$0	$25,817,520	(25,817,520)	(100%)
Kent	$3,794,944	$6,620,730	($2,825,786)	(43%)	$0	$2,648,292	(2,648,292)	(100%)
Montgomery	$222,184,836	$321,547,896	($99,363,060)	(31%)	$0	$128,619,158	(128,619,158)	(100%)
Prince George's	$325,590,457	$482,002,452	($156,411,995)	(32%)	$267,827,265	$254,495,324	13,331,941	5%
Queen Anne's	$6,919,034	$12,629,292	($5,710,258)	(45%)	$0	$5,051,717	(5,051,717)	(100%)
St. Mary's	$22,717,847	$34,926,846	($12,208,999)	(35%)	$12,050,974	$16,216,711	(4,165,737)	(26%)
Somerset	$7,718,442	$13,068,456	($5,350,014)	(41%)	$7,039,844	$8,906,534	(1,866,690)	(21%)
Talbot	$6,643,224	$11,657,808	($5,014,584)	(43%)	$0	$4,663,123	(4,663,123)	(100%)

	Total Program				Total State Share			
Local Unit	Proposed	Current[1]	Dollar Change	Change	Proposed	Current	Dollar Change	Change
Washington	$39,985,115	$70,725,366	($30,740,251)	(43%)	$31,577,614	$41,906,935	(10,329,321)	(25%)
Wicomico	$31,000,118	$54,156,906	($23,156,788)	(43%)	$27,169,610	$38,615,082	(11,445,472)	(30%)
Worcester	$10,609,405	$18,251,922	($7,642,517)	(42%)	$0	$7,300,769	(7,300,769)	(100%)
Total State	**$1,545,593,383**	**$2,398,234,680**	**($852,641,297)**	**(36%)**	**$847,191,167**	**$1,251,675,638**	**($404,484,471)**	**(32%)**

[1]Current total program represents the program amount determined by the state aid formula. The actual funding received by a jurisdiction may differ depending on the amount of local share it elects to appropriate. These amounts exclude additional funding provided through the Net Taxable Income Adjustment grants.

Table 6.10
Comparison of Limited English Proficient Total Program and State Share, *Fiscal Year 2015*

	Total Program				Total State Share			
Local Unit	Proposed	Current[1]	Dollar Change	Change	Proposed	Current	Dollar Change	Change
Allegany	$49,413	$108,672	($59,243)	(55%)	$0	$85,434	($85,434)	(100%)
Anne Arundel	$15,029,913	$24,172,728	($9,139,256)	(38%)	$107,561	$9,669,091	($9,561,530)	(99%)
Baltimore City	$12,198,281	$20,409,960	($8,208,674)	(40%)	$8,686,669	$17,323,418	($8,636,749)	(50%)
Baltimore	$16,347,801	$27,378,552	($11,026,720)	(40%)	$1,302,254	$13,357,527	($12,055,273)	(90%)
Calvert	$513,604	$849,000	($335,271)	(39%)	$0	$433,512	($433,512)	(100%)
Caroline	$984,140	$1,901,760	($917,340)	(48%)	$773,686	$1,544,169	($770,483)	(50%)
Carroll	$753,927	$1,365,192	($611,064)	(45%)	$0	$712,078	($712,078)	(100%)
Cecil	$552,160	$984,840	($432,535)	(44%)	$0	$611,658	($611,658)	(100%)
Charles	$1,092,744	$1,847,424	($754,408)	(41%)	$0	$1,126,076	($1,126,076)	(100%)
Dorchester	$404,200	$781,080	($376,765)	(48%)	$133,657	$505,296	($371,639)	(74%)
Frederick	$6,885,508	$11,729,784	($4,842,549)	(41%)	$3,226,339	$6,744,127	($3,517,788)	(52%)
Garrett	$9,265	$20,376	($11,108)	(55%)	$0	$8,150	($8,150)	(100%)
Harford	$1,458,696	$2,424,744	($965,691)	(40%)	$0	$1,270,097	($1,270,097)	(100%)
Howard	$9,027,153	$14,236,032	($5,206,783)	(37%)	$29,499	$6,136,505	($6,107,006)	(100%)
Kent	$228,461	$441,480	($212,954)	(48%)	$0	$176,592	($176,592)	(100%)
Montgomery	$90,867,220	$138,998,280	($48,110,595)	(35%)	$49,135,254	$55,599,312	($6,464,058)	(12%)
Prince George's	$76,388,754	$120,680,256	($44,273,734)	(37%)	$67,440,999	$74,469,456	($7,028,457)	(9%)
Queen Anne's	$558,851	$1,079,928	($520,918)	(48%)	$0	$446,378	($446,378)	(100%)
St. Mary's	$776,569	$1,283,688	($506,930)	(39%)	$0	$696,586	($696,586)	(100%)
Somerset	$308,166	$584,112	($275,860)	(47%)	$203,049	$465,256	($262,207)	(56%)
Talbot	$938,447	$1,813,464	($874,750)	(48%)	$0	$725,386	($725,386)	(100%)

	Total Program				Total State Share			
Local Unit	Proposed	Current[1]	Dollar Change	Change	Proposed	Current	Dollar Change	Change
Washington	$1,373,885	$2,560,584	($1,186,322)	(46%)	$71,528	$1,773,214	($1,701,686)	(96%)
Wicomico	$2,157,163	$4,088,784	($1,931,019)	(47%)	$1,563,802	$3,407,287	($1,843,485)	(54%)
Worcester	$490,916	$930,504	($439,451)	(47%)	$0	$372,202	($372,202)	(100%)
Total State	**$239,395,236**	**$380,671,224**	**($141,219,941)**	**(37%)**	**$132,674,297**	**$197,658,807**	**($64,984,510)**	**(33%)**

[1]Current total program represents the program amount determined by the state aid formula. The actual funding received by a jurisdiction may differ depending on the amount of local share it elects to appropriate. These amounts exclude additional funding provided through the Net Taxable Income Adjustment grants.

Table 6.11
Comparison of Special Education Total Program and State Share, *Fiscal Year 2015*

	Total Program				Total State Share			
Local Unit	Proposed	Current[1]	Dollar Change	Change	Proposed	Current	Dollar Change	Change
Allegany	$10,864,199	$6,867,828	$3,996,371	58%	$9,051,550	$4,918,639	$4,132,911	84%
Anne Arundel	$87,105,998	$40,267,908	$46,838,090	116%	$18,545,214	$16,107,163	$2,438,051	15%
Baltimore City	$147,836,405	$71,099,532	$76,736,873	108%	$131,702,299	$54,975,400	$76,726,899	140%
Baltimore	$146,369,107	$70,459,956	$75,909,151	108%	$77,242,301	$31,316,134	$45,926,167	147%
Calvert	$15,608,125	$7,416,036	$8,192,089	110%	$7,770,262	$3,449,648	$4,320,614	125%
Caroline	$5,364,372	$2,979,612	$2,384,760	80%	$4,397,443	$2,203,987	$2,193,456	100%
Carroll	$30,232,704	$15,735,600	$14,497,104	92%	$17,073,321	$7,476,993	$9,596,328	128%
Cecil	$21,831,705	$11,192,580	$10,639,125	95%	$16,794,790	$6,332,622	$10,462,168	165%
Charles	$27,074,879	$13,156,992	$13,917,887	106%	$18,087,472	$7,305,806	$10,781,666	148%
Dorchester	$4,112,380	$2,284,200	$1,828,180	80%	$2,869,368	$1,346,154	$1,523,214	113%
Frederick	$44,399,064	$21,740,508	$22,658,556	104%	$27,587,004	$11,387,164	$16,199,840	142%
Garrett	$3,348,389	$2,116,692	$1,231,697	58%	$1,038,671	$846,677	$191,994	23%
Harford	$54,266,232	$25,928,208	$28,338,024	109%	$35,708,022	$12,372,389	$23,335,633	189%
Howard	$53,459,400	$24,232,824	$29,226,576	121%	$12,119,654	$9,693,130	$2,426,524	25%
Kent	$2,385,181	$1,324,836	$1,060,345	80%	$0	$529,934	($529,934)	(100%)
Montgomery	$203,865,491	$89,637,084	$114,228,407	127%	$12,127,867	$35,854,834	($23,726,967)	(66%)
Prince George's	$161,503,053	$73,338,048	$88,165,005	120%	$120,392,567	$41,226,980	$79,165,587	192%
Queen Anne's	$9,092,930	$5,050,620	$4,042,310	80%	$3,728,631	$2,020,248	$1,708,383	85%
St. Mary's	$18,503,266	$8,791,632	$9,711,634	110%	$10,911,575	$4,346,048	$6,565,527	151%
Somerset	$4,192,578	$2,284,200	$1,908,378	84%	$3,709,616	$1,657,449	$2,052,167	124%
Talbot	$3,527,508	$1,959,336	$1,568,172	80%	$0	$783,734	($783,734)	(100%)

	Total Program				Total State Share			
Local Unit	Proposed	Current[1]	Dollar Change	Change	Proposed	Current	Dollar Change	Change
Washington	$21,016,120	$11,258,568	$9,757,552	87%	$15,032,440	$7,102,570	$7,929,870	112%
Wicomico	$16,388,323	$8,928,684	$7,459,639	84%	$13,662,123	$6,778,166	$6,883,957	102%
Worcester	$7,667,760	$4,177,548	$3,490,212	84%	$0	$1,671,019	($1,671,019)	(100%)
Total State	**$1,100,015,169**	**$522,229,032**	**$577,786,137**	**111%**	**$559,552,190**	**$271,702,888**	**$287,849,302**	**106%**

[1]Current total program represents the program amount determined by the state aid formula. The actual funding received by a jurisdiction may differ depending on the amount of local share it elects to appropriate. These amounts exclude additional funding provided through the Net Taxable Income Adjustment grants.

Comparison to Prior Adequacy Study

The preceding section identifies the total cost of the study team's adequacy proposal compared to current funding levels. Since Maryland conducted a prior adequacy study, the study team has the unique opportunity to be able to compare the total adequacy recommendation not just to current funding, but to the estimates from the earlier work conducted on behalf of the Thornton Commission.

It is important to note what this comparison represents and what it does not represent. The comparison offered here simply examines the total adequacy need level(s) identified in the original work to that of the current study. Comparisons are only of the identified adequacy amounts and do not take into account the actual implementation of the original work. They are meant to examine what the results of the original work would be if adjusted to 2014-15 dollars. To make the base cost figures comparable, the original study figures were adjusted for inflation. The study team used a 1.40 factor to adjust the 2002 report figures to 2014-15 dollars based on the Bureau of Labor Statistics Consumer Price Index for Washington-Baltimore, DC-MD-VA-WV[38]. Total figures used in this section will vary from those in the previous section as the computations are made at the state level and are not district specific.

As noted previously, the results of the current and original studies differ in the way resources are allocated between the general education program provided to all students (base) and the resources for students with special needs (weights). The first adequacy study resulted in a system with a lower base amount (based upon the study's SSD results) and higher weights compared to the final adequacy recommendations in this report, which included a higher base and lower weights. This section will not investigate the specific resources that drive these differences, but will instead examine the changes in the total cost of adequacy between the estimates generated fourteen years apart.

The original study used the SSD and PJ approaches to determining adequacy, both of which have been used in the current study. The current work also has included a third approach to determining adequacy: the EB approach. With that in mind, the study team compared the prior study's SSD results to the current SSD results and the prior study's PJ results to the current study's final adequacy recommendations, the blended results of the EB and PJ approaches. For both the original and current study results, the pre-federal fund adjustment figures will be used as the study team feels this is the most direct comparison of the full cost of adequacy from each study. For comparison purposes, weights for the current SSD approach were calculated by dividing the SSD base into the total resources identified for each special needs category through the blended approach.

Table 6.12 below shows the results from this comparison. Again, these figures are the estimates prior to any adjustments for federal funding and are limited to costs generated from applying the base costs and weights to current student counts, so differ from full recommended system estimates in the prior section.

[38] http://www.bls.gov/regions/mid-atlantic/data/consumerpriceindexhistorical_washingtondc_table.htm

Table 6.12
Base Costs and Weights for Original and Current Adequacy Studies*

	Original SSD	Current SSD	Original PJ	Current Recommended**
Base Cost	$5,969	$8,700	$6,612	$10,970
Base Cost Adjusted for Inflation	$8,362	$8,700	$9,263	$10,970
Compensatory Education Weight	1.10	0.50	1.10	0.40
LEP Weight	1.00	0.50	1.00	0.40
Special Education Weight	1.17	1.39	1.17	1.10

*All base costs and weights are the amounts prior to the adjustments for federal funding.
**The current recommendation is a blended figure from PJ and EB results.

As shown in Table 6.12 when adjusted for inflation, the original SSD base cost figure is only about $350 below the SSD base cost figure from the current study. The original PJ base cost figure is more than $1,700 below the current study's recommended base cost figure, representing the shift towards more resources at the base level for all students. The weights for the original SSD and PJ studies are much higher than those produced by the current study, with the original compensatory and LEP weights being at least double that of the current weights. Special education weights are more similar between the original studies and current studies.

While the base and weights from the two studies varied, it is also important to consider the overall total costs. Therefore, the study team calculated total cost figures utilizing the inflation adjusted bases and the 2014-15 FTE, compensatory education, LEP, and special education student counts for Maryland. The student counts do not include the increased prekindergarten enrollment discussed in the recommendation section to create a more straightforward comparison. The figures are also prior to any adjustments for regional cost differences such as the GCEI or the CWI that are included as part of the full system comparison in the preceding section.

Table 6.13 shows the total adequacy cost estimates from the prior adequacy study compared to the current.

Table 6.13
Total Adequacy Cost Estimates for Original and Current Adequacy Studies (in Millions)

	Original SSD	Current SSD	Original PJ	Current Recommended*
Total Adequacy Cost Estimate	$11,974.3	$10,454.6	$13,264.2	$12,380.1

*The current recommendation is a blended figure from PJ and EB results.

Overall, the comparison shows that though the results differ between the original and current studies in where resources are focused, low base and high weights versus high base and lower weights, the overall scale of adequacy need is within a comparable range across all four estimates when adjusted for inflation. The original PJ figures provide the highest total adequacy estimate and the current SSD identifies the lowest total adequacy estimate. Using the original SSD figures and then adjusted annually for inflation from 2002, the target adequacy cost estimate from the prior study in today's dollars would be very similar to the current recommended total cost of adequacy, about $400 million apart.[39]

Considerations for Phase-In

Given the difference in the study team's recommended adequacy figures from the current system, both in terms of overall cost and the structural shift to a higher base with lower weights, the study team recommends the state implement a multi-year phase-in. It is up to state policy makers to determine the length of time for the phase-in, which will determine much about the specifics of how the base and weight figures will be applied each year. Due to the significance of the changes, the study team offers three key considerations for how to structure any possible phase.

1. **The study team believes that the recommended structure for a new formula is the right approach for Maryland to meet its educational goals for students.**

The study team understands that the change from a current system that uses a lower base and a higher set of weights to one with a much higher base and a set of lower weights is a significant change and might seem radical to those familiar with the current formula. The shift to a system that targets more funds through the per student base amount reflects the resources Maryland educators identified as needed for all students. This includes providing some of supports and services currently targeted to special needs populations to all students. It also reflects the resources identified by the research literature underpinning the EB model and the recommendations of adequacy research from around country over the past decade, as presented in the previously released report, *A Comprehensive Review of State Adequacy Studies Since 2003* (September 2014).

The new formula recommended by the study team creates a higher per student base funding amount that parallels both (1) the higher state standards required of all students since the current formula was developed and (2) the goal of improving upon the current performance level of all students. Overall, students in Maryland are not meeting or exceeding 100 percent proficiency on the HSA, MSA, or PARCC. On average across all schools and all subjects, 73 percent of students were proficient on the MSA. On the HSA, the average across all schools and all subjects was 79 percent of students meeting or exceeding proficiency. The first year of PARCC assessments had much lower results with an average of 57 percent of students meeting or exceeding proficiency in math and 65 percent of students meeting or exceeding proficiency in reading. The changes to the formula recommended here are geared towards increasing the number of students meeting these educational goals. Further, while the recommended structure represents a shift in the way dollars will be distributed, it does not mean that the overall dollars are necessarily lower for special needs students, as shown in Table 6.14.

[39] It is interesting to note that the results of the current PJ approach (prior to blending with the EB approach to create the final adequacy study recommendation) would be nearly identical to the original PJ, about $100 million lower at $13,152.1 million.

Table 6.14
Comparison of Recommended Per Pupil Funding and Current Per Pupil Total Funding by Special Needs Categories

Student Need Category	Proposed Adequacy Target	Current System Target	Difference
Compensatory Education	$14,688	$13,514	$1,174
LEP	$14,688	$13,651	$1,037
Special Education	$20,781	$11,936	$8,844

When looking at each weight independently, the proposed per student adequacy targets are higher than the current system targets even though the weights are lower.[40]

Additionally, the recommended changes in the distribution of state and local district shares aim to improve the equity of the system. These changes include eliminating minimum guarantees for the foundation program and funding of special needs students and using a different approach to measuring local wealth. The equity of the system is significantly enhanced by ensuring the total program amounts for all of formulas targeting special needs students are fully funded.

2. Any new state dollars should first go towards the funding for students with special needs.

As the study team's analysis documented, there are significant achievement gaps between general education and special needs and the State would benefit from prioritizing the needs of these students. While the study team overall recommends more dollars for students at risk of academic failure, the shift to providing increased support services for all students as opposed to the current system's more targeted approach to special needs students, results in lower weights and creates a particular issue when phasing in the recommended formula. Simplified approaches to phasing in the changes, such as specifying an annual overall percentage increase in funding over a period of years or adopting the recommended weights but a lower base amount, could leave current special needs students with less total targeted funding then they currently have. For example, the current funding system identifies the need of a LEP student at $13,651, calculated on a base cost of $6,860 and a LEP weight .99. These weights are designed to ensure that the language acquisition supports needed for a LEP student are available. If the State used a phase-in approach that targeted 70 percent of the recommendation in a given year, the formula would identify need for LEP students at $10,282, 70 percent of the adequacy target of $14,688 for LEP students. The targeted funding for a LEP student would be nearly $2,400 less than the current system target, jeopardizing the supports needed for the student. Similarly, if the phase in approach was to take the recommended weights and apply them to a lower base, like the current system's base of $6,860, a student could also receive less funding than current. Using our example of a LEP student, applying the recommended 0.35 weight would result in a per student amount of $9,261, or $4,390 less than the current system's target.

[40] This comparison is only of single weight categories and does not reflect differences when a student is eligible for more than one weight; when such a comparison is done, the resulting per student dollar amount is higher for all student combinations except for students that are eligible for both the LEP and compensatory education weights.

Therefore, the study team believes phasing-in should instead be done in a manner to ensure sustained levels of targeted funding for special needs students. Table 6.15 shows the weights needed to ensure that special needs students receive the recommended adequacy amounts presented in this study while ensuring that they never receive less than the current target amount. The approach would allow the State to phase-in various base amounts, ranging from the current system's base to the recommended adequacy base from this study, while still ensuring that students with the highest need can receive the supports and services necessary to address the meaningful achievement gaps that exist for these groups of students.

Table 6.15
Weights Needed to Generate Total Adequacy Target per Student with Various Base Cost Figures

Adjustment(s) for which student is eligible	Total per Student Recommended	Base Amount				
		$6,860	$8,000	$9,000	$10,000	$10,880
Compensatory Education	$14,688	1.14	0.84	0.63	0.47	0.35
LEP	$14,688	1.14	0.84	0.63	0.47	0.35
Special Education	$20,781	2.03	1.60	1.31	1.08	0.91

3. **No district should receive less funding than it currently receives, in total, in the initial stages of phase-in.**

The study team believes that the combination of state and local funding should ensure that every district receives at least a small increase in funding every year during the phase-in, when adjusted for student enrollment and demographic changes. Any phase-in can have unintended consequences and districts should not be negatively impacted during this period.

In order to ensure that districts do not receive a decrease in per student funding during phase-in, the State could guarantee an increased total program amount (excluding federal funding) for the phase-in period. It is, however, imperative that this funding is not permanent. The funding could be calculated by comparing a district's current year per student total program for all major state aid programs to the current year's projected total per student total program. A transitional hold harmless state aid amount could be determined for district's whose annual increase in total program is below a targeted threshold.

VII. Additional Studies

This chapter presents the finding of five additional studies required by the RFP including:

1. The impact of concentrations of poverty on the study's adequacy estimates.
2. Determine if a relationship exists between school district spending and performance on state assessments.
3. Whether gaps in growth and achievement among student groups exits and provide recommendations of programs that might address these gaps.
4. The impact of quality prekindergarten on school readiness as a factor in the adequacy estimates.
5. Whether the Supplemental Grant program is still necessary within the context of the new adequacy recommendations.

Concentrations of Poverty

The correlation between a student's socioeconomic economic status (SES) and academic achievement has been well-documented since the publication of the *Coleman Report* by the U.S. Department of Education in 1966. Subsequent studies have consistently observed the report's original findings: a school's demographics strongly correlate to its level of student achievement. Schools with a high percentage of low-income students – or schools with a concentration of poverty – require additional services and resources to support student achievement. Because this correlation between economic composition and student achievement is so accepted, federal and state education budgets and aid distribution formulas reflect the need for resources to address effects of poverty.

Indeed, Maryland's current funding formula accounts for this relationship by including a weight to provide additional funding for schools serving low-income families (Wool et al. 2015). While the reality that low-income students benefit from additional services is not controversial, a debate has emerged surrounding how a higher concentration of poverty should be reflected in funding allocations. Maryland's adjustment, like those in the vast majority of state funding formulas, relies on a linear funding adjustment, meaning that additional funding per low-income pupil remains constant regardless of the district's concentration of poverty. Non-linear adjustments, in contrast, provide more funding per low-income student as a district's concentration of low-income students increases. The question then becomes what type of funding formula, linear or non-linear, most adequately supports both student achievement and efficiency in resource allocation.

To answer this question, the research team performed a literature review, focusing on the micro- and macro-level impact of high concentrations of poverty. The research team also detailed strategies that have been adopted in some schools to mitigate the negative effects of concentrated poverty. Based on the literature review – particularly its lack of significant evidence supporting non-linear formulas, the research team recommends that the structure of the Maryland funding formula's low-income student weight remain the same. In other words, Maryland should continue its linear funding formula weight, rather than adjust it in an exponential fashion as the concentration of poverty increases. This report presents the literature review on concentrations of poverty and common school-based strategies, including those implemented in Baltimore City Community Schools, to justify the research team's recommendation.

Measuring Poverty

In order to understand the literature surrounding concentrations of poverty, it is first important to define how poverty is measured. Common practice in education research involves using a student's Free and Reduced-Price Meals (FRPM) status as a proxy for that student's status as low-income, in poverty, and/or at risk. Using FRPM as a reliable measure has limitations, especially since FRPM eligibility is much more lenient than other poverty classifications. Not all families are included because the count depends on the voluntary reporting of eligible families, and once counted, families are treated similarly regardless of the unique circumstances they might face. In a longitudinal study on students who qualify for subsidized school meals in Michigan, data show that the duration a student lives in poverty affects academic outcomes. The data suggests that, "there is a negative, linear relationship between grades spent in economic disadvantage and 8th grade test scores" and that "years eligible for subsidized meals can therefore be used as a reasonable proxy for income" (Michelmore & Dynarski, 2016). This report suggests expanding FRPM data analysis to include years in poverty, not just present status. Current research in Maryland also documents the limitations of using FRPM as a measure of poverty. Schwartz (Schwartz, 2010, p. 7) states that the discrepancies between Montgomery County's own criteria[41] for disadvantage and FRPM eligibility as a proxy for disadvantage "suggest the shortcoming of FRPM eligibility] as a single indicator of school need." Nevertheless, FRPM has provided a readily available measure of low-income status that is consistent across districts and states" (Wool et. al., 2015). Despite the limitations of this methodology, FRPM, as Schwartz states, still represents the most accessible way to collect data on student poverty.

The research team also completed a study, *Alternative Indicators of Low-income Students*, to analyze potential measures of poverty in Maryland. To analyze the consequences of using different indicators of low-income status for state funding, the research team simulates nine different indicator alternatives that include FRPM-based counts or various alternative indicators. The report recommends the continued use of free and reduced-price meals count. As a second choice, the report recommends using direct certification with a new State developed eligibility form for identifying economically disadvantaged students (Croninger et. al., 2015). The research team's study, therefore, supports Schwartz's claim that FRPM still represents the most reliable measure of poverty, especially for its precedence and familiarity.

[41] In 2000, Montgomery County Schools identified the neediest elementary schools using multiple measures, including poverty and neighborhood location, to create a "red zone" of schools that were targeted with additional funding

Summary of Concentrations of Poverty Literature Review

A plethora of research exists documenting the effect of high-poverty neighborhoods on family and child development. Understanding the macro-level impact of concentrations of poverty in neighborhoods ultimately contributes to understanding the micro-level effect of concentrated poverty on individual schools and students.

In 1990, Lynn and McGeary conducted a seminal study on “ghetto poverty” and the difference between neighborhoods with poverty rates above and below 40 percent. The researchers found that high-poverty neighborhoods “...experienced higher rates of unemployment than the poor living in areas with less severe poverty; they were also more dependent on welfare and more likely to live in single-parent households” (Lynn & McGeary, 1990, p. 2). More recent studies corroborate these initial findings, and also focus more on the behavioral effects of living in a high-poverty neighborhood. Atkinson and Kintrea (2001), examining whether it is worse to be low-income in a poor versus mixed neighborhood, “compared deprived and mixed neighborhoods along the dimensions of daily life, barriers to choice of neighborhood location, social networks, stigma and reputation, employment, and health” (Atkinson & Kintrea, 2001, p. 2294-2295). Their results show that area or neighborhood can compound the negative effects of poverty (Wool et al, 2016). At the neighborhood level, concentrated poverty has an observed negative effect on nearly all aspects of life. These negative macro-level correlations funnel down to affect child and adolescent development.

Researchers argue that areas with high concentrations of poverty lack the systemic support structures that affluent neighborhoods have to encourage success. Sampson et al. observe that “concentrated disadvantage” is correlated with a much lower incidence of “shared child control,” or the shared expectations and collaborative efforts of neighborhoods to supervise children’s well-being (Sampson et al., 1999, p. 633). As such, structural factors in disadvantaged neighborhoods can create barriers and lower shared expectations for children (Wool et al, 2016). Similarly, Reijnevald et al. conclude that higher concentrations of poverty lead to higher rates of psychosocial problems in children, as high-poverty neighborhoods can catalyze these issues. They cite the “lack of institutional resources in deprived areas such as health- and day care; child-parent relationships in which the parents transfer their own economic, social and health difficulties and resulting psychological problems to the child; and a lack of norms and collective efficacy in these areas that shape child behavior” as primary causes for observed psychosocial problems (Reijneveld et al., 2004, p. 22; see also, Levanthal & Brooks-Gunn, 2000). These negative societal patterns found in high-poverty neighborhoods raise the question: what is the effect of a high poverty concentration on schools and student learning?

Because schools reflect the attributes of the communities they serve, it follows that systemic issues related to high poverty concentrations would manifest within schools. Indeed, according to Jargowski (2013), poverty levels may intensify in schools due to the combination of exclusionary district boundaries, zoning practices and the drawing of school attendance boundaries that concentrate poor families in certain neighborhood schools and spur the movement of wealthy families away from low-income schools.

Researchers consistently observe that poverty negatively affects students in multiple ways, especially regarding language gaps, summer learning loss, attendance, and motivation (Boon, 2007; Carey, 2013; Hernandez, 2011). Because of these barriers to achievement, students from low-income backgrounds often underperform. While some literature presents this relationship between concentrated poverty in schools and achievement as a linear relationship, other literature describes non-linear leaps in challenges when schools reach a certain "critical mass" of poverty (Wool et al, 2016). An *amicus* brief from the NAACP Legal Defense and Educational Fund, Inc. and the New York Civil Liberties Union, prepared for *Paynter v. State* (Poverty & Race Research Action Council, 2015) marks a critical mass of poverty at 25 percent. Their research shows that when poverty levels increase to 25 percent or greater, then 56 percent of poor and 36.9 percent of non-poor students underperform, compared to only 27.6 percent and 11 percent respectively for schools with less than seven percent poverty (Kennedy et al., 1986; Brief Amicus Curiae, 2001, p. 24). The problems that low-income students face become school-wide problems when poverty concentrates, thus leading to absence of positive peer influence, lack of parental involvement, and a depreciated quality of school resources such as teachers and curricula.

While the research clearly supports increased funding for low-income students, it is not conclusive as to whether increased funding should be linear or non-linear. Indeed, the research does not establish a definitive relationship between increased challenges and the resources needed to help. Further, panels of Maryland educators were asked directly about the need for a nonlinear approach to funding the compensatory education program in both the EB and PJ studies, but there was no consensus for such a change.[42] What is clear, however, is that school-based and wrap-around supports can effectively address and minimize challenges associated with low-income schools. Therefore, the research team suggests that Maryland maintain its linear student weighting formula – which provides significant increased funding to low-income schools. For example, in fiscal year 2015 Maryland's compensatory education funding formula provided an additional $6,654 per FRPM-eligible student[43]. In a school of 500 students with 50 percent of students eligible for FRPM, this totals nearly $1.7 million in additional funding. The research team also suggests that those schools continue to implement strategies proven to increase achievement in schools with high concentrations of poverty.

Suggested Educational Strategies

To combat the negative effects of highly concentrated poverty in schools, the research team suggests that Maryland support, or continue to support, research based strategies shown to be effective in combating the effects of concentrated poverty and reducing the achievement gap between economically disadvantaged and more advantaged students. Four of these strategies should be part of the state's strategy - prekindergarten, summer school, afterschool programs, and finally, well-qualified community schools coordinators that connect schools to local supporting resources.

[42] Participants in the school-level PJ panels were specifically asked to consider the resources needed to serve schools with concentrations of 25 percent, 50 percent, and 75 percent economically disadvantaged students.
[43] This is the total state and local amount. However, local county school boards are not required to raise their full appropriation. They may also raise more than the assumed local share.

As outlined in the research team's *A Comprehensive Analysis on Prekindergarten in Maryland* (2015) and this report's section on universal prekindergarten and school readiness, prekindergarten has positive effects on school readiness that can translate to a student's future. Yoshiba et al. posit that, "high-quality early childhood education programs are among the most cost-effective educational interventions and are likely to be profitable investments for society as a whole" (2013, p. 13). Specifically, for a year spent in prekindergarten, children get an average gain of "about a third of a year of additional learning across language, reading, and math skills," though gains have been shown to be as high as one full year of additional learning in math and reading (Yoshikawa et al., 2013, p. 1). Because research shows that prekindergarten programs encourage holistic student success and higher outcomes, it follows that enacting prekindergarten programs in high-poverty areas can help mitigate the negative effects of concentrations of poverty. Additionally, because the return on investment of prekindergarten is so significant, implementing these programs could also minimize the need for both linear and non-linear adjustments to funding for high-poverty schools.

Similarly, summer school programs help combat observed summer learning loss among low-income students. Initiating a year-round instructional calendar or providing additional summer programs both represent effective ways to minimize this gap. A number of studies have found that summer school programs increase reading achievement for low-income or at risk students (Chaplin & Capizzano, 2006; Zvoch & Stevens, 2012; Kim & Quinn, 2013; Schacter & Jo, 2005; Borman & Dowling, 2006; Shapiro et al., 1986; Borman et al., 2009). As with prekindergarten programs, proactively offering summer school programs can help to alleviate issues that low-income students face, especially regarding school readiness and academic underperformance.

The justification for after-school programs is similar, as these programs, like prekindergarten and summer school, enhance school readiness and academic performance. A number of evaluations of state-level after-school programs have found that students in these programs have improved academic performance. Baltimore City Public Schools' Out of School Time (OST) programs yielded (1) higher rates of school attendance, generally; (2) higher rates of school attendance following the critical transitions from grade five to grade six and from grade eight to grade nine; (3) higher rates of grade-level advancement; (4) higher numbers of credits earned in high school; and (5) fewer rates of chronic absence (Olson et al, 2013, p. v). After-school programs, therefore, work in conjunction with other school-based supports to raise student achievement levels and well-being.

Research also suggests that schools with highly concentrated poverty implement wrap-around services and hire dedicated community coordinators. Wrap-around or integrated student supports (ISS) services "focus on the non-academic factors that influence educational outcomes" (Moore, 2014, p. 5). Potential wrap-around services include programs in health, mental health, extended nutrition (e.g. dinner or meals during school vacations), and restorative justice (Wool et al., 2016). Additionally, the Community Schools model suggests hiring at least one full-time community schools coordinator, whose serves as a liaison between school and home. Thus, while other educational strategies aim to increase academic performance, these programs seek to promote holistic well-being and school-to-family contact. Although schools, by nature of the community model, house these wrap-around programs, funding allocations do not necessarily come exclusively from education budgets. Instead, schools and districts form community partnerships with public and private sources to fund the resources needed for wrap-around services.

Summary

Research on the adverse relationship between low-income backgrounds and student and school success is clear and ubiquitous. Researchers have begun to look more closely, now, at how higher concentrations of poverty might affect student outcomes. As a result, policymakers face the question of whether high poverty concentrations merit non-linear adjustments – increased funding with higher poverty concentrations – or whether linear adjustments – using a consistent weight per low-income student – should remain. The research team concludes, at this time, the evidence does not justify a non-linear funding mechanisms, even though the challenges that high-poverty schools face are readily observed. Instead, the research team recommends that Maryland maintain its linear funding formula, which already allocates more funding to low-income students and schools, and combine these efforts with other educational strategies. These strategies include prekindergarten, summer school, after-school programs, and the coordination of wrap-around services through the use of school-based community liaisons. With this multi-faceted approach, the research team believes that Maryland schools will have the resources needed to effectively tackle the challenges associated with poverty and schooling.

Proficiency Gaps

Elementary and Middle School

The RFP asked the contractor to identify gaps in growth and achievement among student groups disaggregated by race and income and make recommendations on specific programs to address the gaps in growth or achievement. The study team analyzed the average percentages of students proficient in math, reading, and science for each grade in elementary and middle school in Maryland, broken down by race and subgroup – Limited English Proficient (LEP)[44], students who qualify for Free and Reduced-Price Meals (FRPM), and special education – to see where achievement gaps exist. The study team used Maryland School Assessment (MSA) data to look at elementary and middle schools for school years 2010 to 2012. To get the deepest understanding of the achievement gaps, APA looked at achievement gaps at the school and grade-levels. Students identified as LEP were compared to students who were non-LEP. Non-LEP were determined by taking the total number of students tested and subtracting the number of students who were classified as LEP from the total. The same was done with the students who scored proficient. Table 7.1 shows an example of the LEP for a sample district. The study team then divided the number of proficient non-LEP students by the number of non-LEP student who took the test. The same steps were done for FRPM and special education sub groups as well.

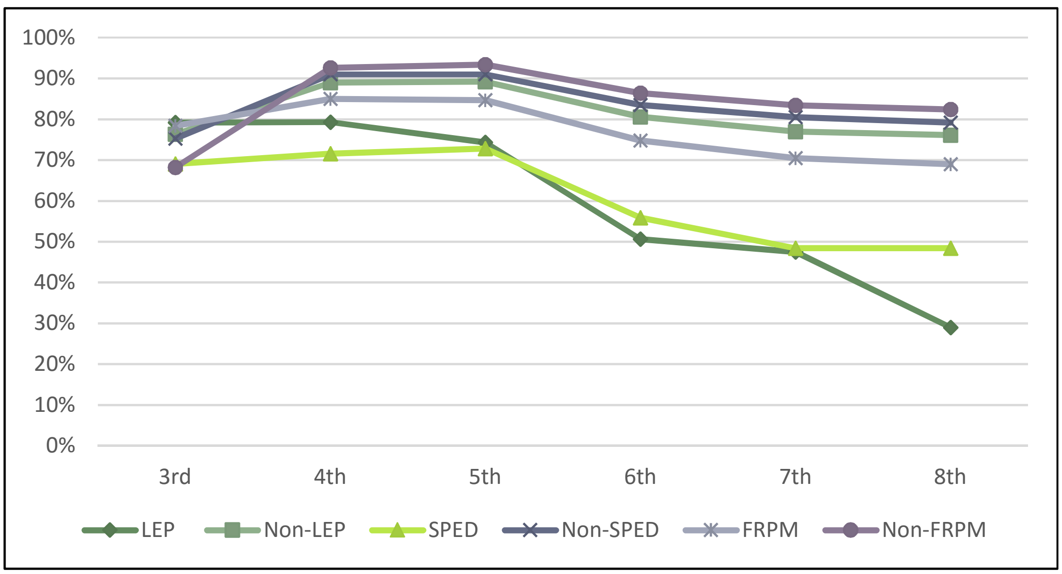
[44] LEP students have been referred to as LEP students throughout this report. The student populations are the same but as Maryland assessment results use the LEP category this report and the following report will use the LEP title.

Table 7.1
LEP Proficiency Gaps for a Sample District

Calculation of Non-LEP Students							
	All Students Tested	All LEP Students Tested	Non-LEP Students Tested	All Students Proficient	All LEP Students Proficient	Non-LEP Students Proficient	% Non-LEP Students Proficient
District A	100	25	75	80	20	60	80%

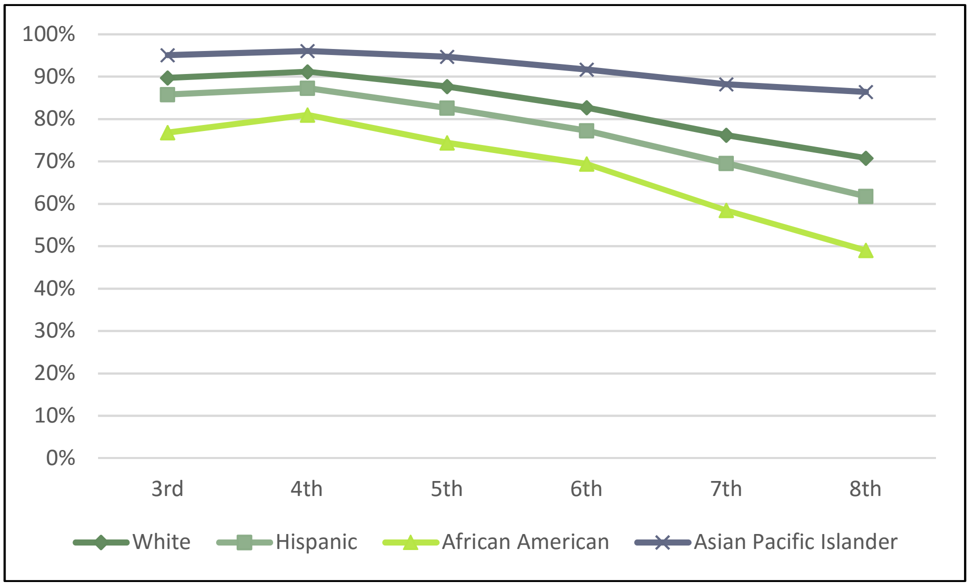
Across all grades the average percentage of students who qualify as FRPM and special education in 2012 were 44 percent and 11 percent. However, in 2012 there are only two percent of LEP students in eighth grade and ten percent in grade three. This trend was expected because students should begin to move out of the LEP program by grade eight. Forty percent of the students in elementary and middle schools in Maryland identify as African American, 36 percent as white, five percent Asian or Pacific Islander, and 15 percent Hispanic.

Figure 7.1
Average Percentage of Students Proficient in Reading by Subgroup and Grade



In 2012, the percentage of LEP students who are proficient in reading is highest in grade three at 79 percent and while only 29 percent of LEP students are proficient in grade eight (see Figure 7.1). The gap between LEP and non-LEP students increased from three percentage points in grade three to 47 points in grade eight while the gap between special education students and non-special education students remained constant across the grades at 30 percentage points. In grade three there was a higher percentage of FRPM students proficient in reading than non-FRPM students. However, the gap between FRPM and non-FRPM is reversed in all other grades ranging from five percentage points to 11 percentage points. These gaps and lack of overall proficiency, especially in the earlier grades are concerning for the overall performance of Maryland students.

Figure 7.2
Average Percentage of Students Proficient in Reading by Race and Grade



The achievement gaps in reading exist between races as well. African American students achieved 22 percentage points below their white peers in grade eight. The achievement gap is smaller in third grade, with African American students 13 percentage points below their white peers. Across all grades Asian or Pacific/ Islander students have a higher rate of proficiency than other races. In 2012, grade three Hispanic students performed on average nine percentage points below their Asian or Pacific/Islander peers; however, grade eight Hispanic students performed on average 24 percentage points below their Asian or Pacific/ Islander peers. Larger gaps between races exist in the later grades.

Figure 7.3
Average Percentage of Students Proficient in Math by Subgroup and Grade

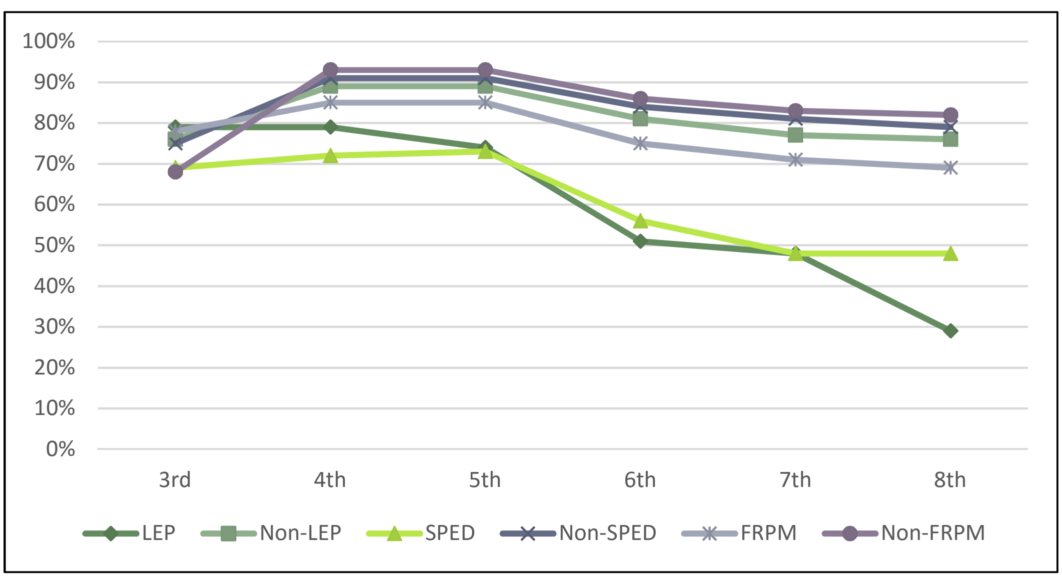
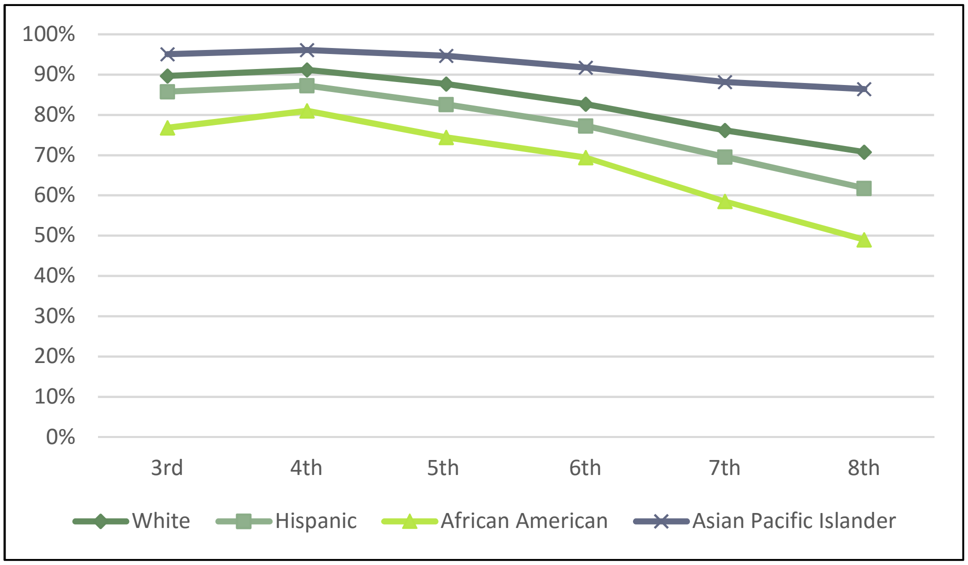


Figure 7.4
Average Percentage of Students Proficient in Math by Race and Grade



The math achievement gaps amongst elementary and middle schools are similar to the reading gaps in 2012. There was a lower rate of students proficient in math in the later grades than in the earlier grades. Eighty-one percent of students who qualify for FRPM were proficient in math on average in grade three and only 53 percent were proficient in math on average in grade eight. The gap between special education students and non-special education students across grades on average was 26 percentage points, between FRPM and non-FRPM was 12 percentage points, and between LEP and non-LEP was 15 percentage points. The gaps became much more prominent in the later grades. Students who identify as Asian or Pacific/Islander were most likely to be proficient in math, where 95 percent of these students in grade three and 86 percent of these students in grade eight achieved proficiency. African American students were least likely to be proficient in math with 77 percent of students in grade three were proficient and 49 percent of students in grade eight were proficient.

High School

Similar to the elementary and middle school analysis, the study team looked at the achievement gaps amongst subgroups and race for high schools in Maryland. The research team used data from Maryland High School Assessment (HSA) for school years 2011 to 2013 to analyze achievement gaps. Unlike the elementary and middle school analysis, the study team did not evaluate the scores at the grade-level; instead, the team just looked at algebra, English subject areas. Forty-six percent of the tested students identified as white, 35 percent as African American, nine percent as Hispanic, six percent as Asian or Pacific/Islander, and three percent as "other." One percent of the population was classified as LEP, eight percent as special education and 32 percent as FRPM-eligible.

Figure 7.5
Average Percentage of High School Students Proficient in Algebra by Subgroup

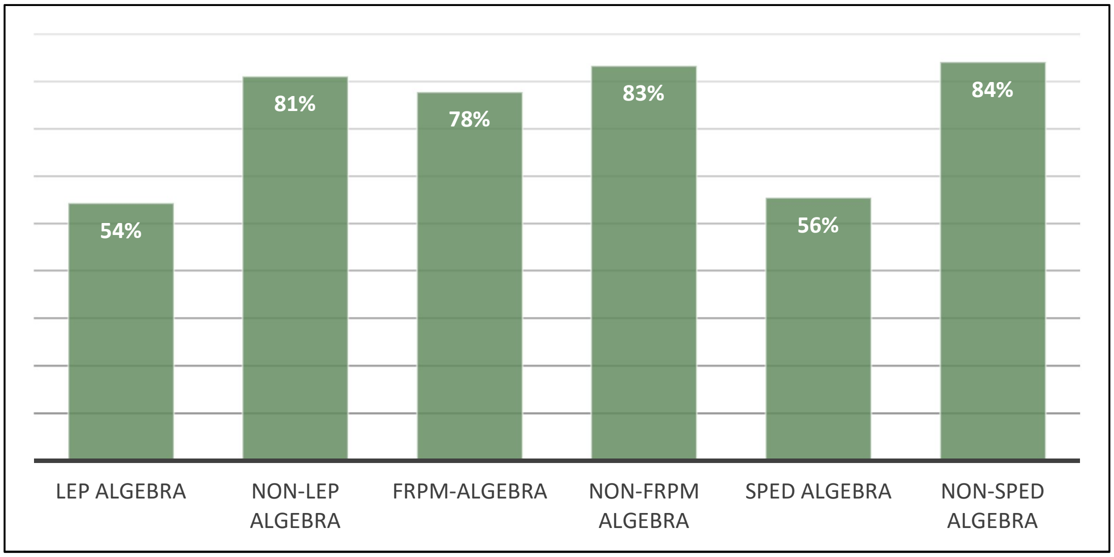
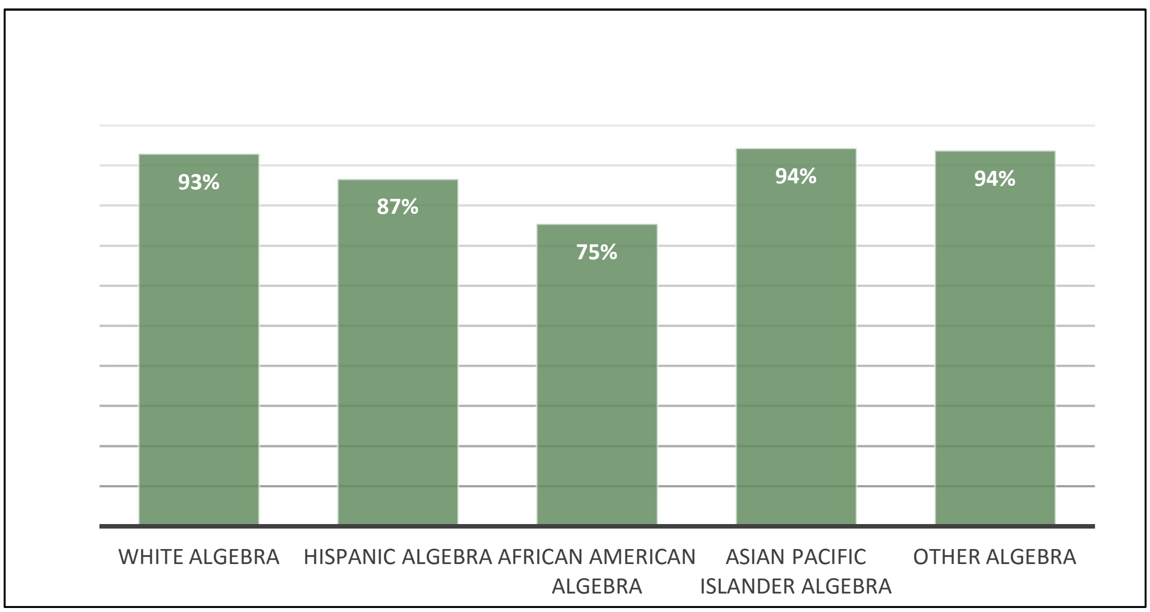


Figure 7.6
Average Percentage of High School Students Proficient in Algebra by Race



The students from the white, Asian or Pacific/Islander students, and “other” categories had the highest percent of students proficient in high school algebra with 93 percent, 94 percent, and 94 percent of students proficient respectively (Figure 7.6) The percentage of African American students proficient in algebra are 19 percentage points below their white peers. Similarly, Hispanic students were below their peers by seven percentage points.

The gaps among different subgroups in high school math were similar to the ones the study group observed in elementary and middle schools. The largest achievement gaps in 2013 were between special education and non-special education students with 28 percentage points and 27 percentage points between LEP and non-LEP. The FRPM gap was smaller than that of the elementary and middle school level with only a five percentage point difference (Figure 7.5).

Figure 7.7
Average Percentage of High School Students Proficient in English by Race

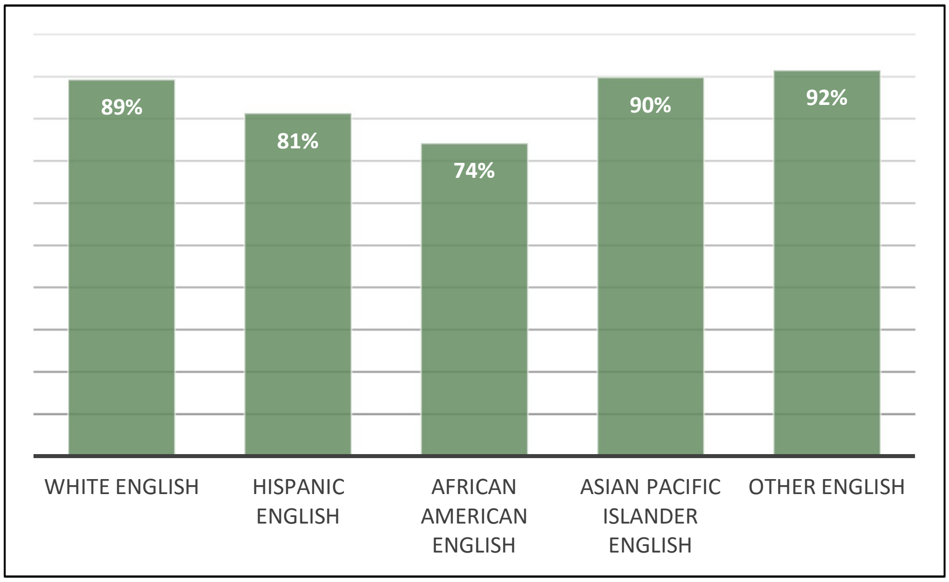
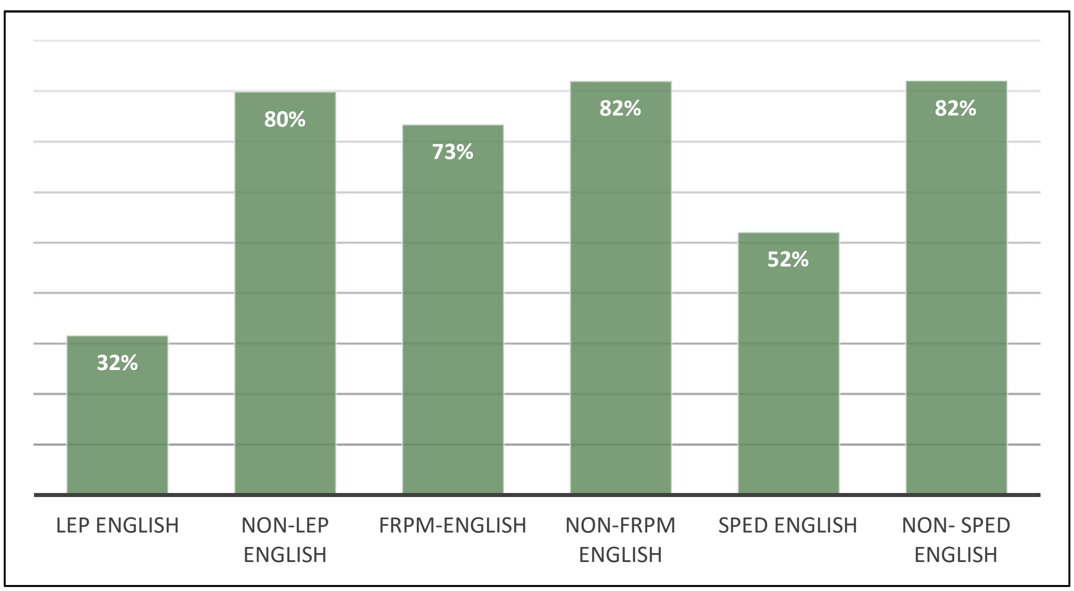


Figure 7.8
Average Percentage of High School Students Proficient in English by Subgroup



In Figure 7.7 the achievement gap between Asian or Pacific/Islander students and African American student was 16 percentage points in English, while the gap between white and Asian Pacific/Islander students is only one percentage point. Also, there was a low percentage of LEP students proficient in English, 32 percent, at the high school level in 2013. The achievement gap between LEP students and non-LEP students was 48 percentage points, which is significant compared to the gap between FRPM and non-FRPM students which was 10 percentage points. The gap between special education and non-special education is a 30 percentage point difference. The overall percentage of Maryland students proficient in high school algebra and English is less than 95 percent and the gaps by race and subgroup are large. There is a need for increased performance in Maryland.

Recommendations

The proficiency gaps amongst Maryland students are evident across racial and high-needs categories. The study team through the PJ and EB studies has recommended various programs that will help with closing the achievement gaps. The recommendations include smaller early elementary class size, effective teachers and instruction with an emphasis on teacher development, interventions for struggling student, and high quality prekindergarten programs.

High quality prekindergarten is a way to improve and minimize achievement gaps early. A year spent in prekindergarten results in an average gain of “about a third of a year of additional learning across language, reading, and math skills” (Yoshikawa et al., 2013, p. 1). A study of prekindergarten in Chicago found that students who attended the Chicago Child-parent Center (CPC) program had 29 percent higher graduation, 41 percent lower rates of enrollment in special education, 33 percent lower rates of juvenile detention, and 51 percent lower rates of child maltreatment (Rice University Center for Education, 2012). These are all valuable outcomes to help promote students’ success and achievement later in school.

Smaller elementary class sizes in grades kindergarten to grade three also increase student achievement. The Tennessee STAR study found that students in small classes achieved a higher proficiency level of 0.25 standard deviations than those in regular classes. The impact was larger for students of low-income and minority students, about 0.5 standard deviations (Finn, 2002; Grissmer 1999; Krueger 2002). Similarly, the Wisconsin pilot project found that when class sizes in grades kindergarten to grade three were reduced to 15-to-1 in high poverty schools that students achieved higher reading, math, and language arts scores (Molnar, Smith, Zahorik, Palmer, Halbch, & Ehrle, 1999). These are two important studies that emphasize the positive effect of smaller class sizes in early elementary classes especially on low-income and minority students.

Effective teachers with access to quality professional development also influence student achievement (Rowan, Correnti, & Miller, 2002). Effective professional development produces changes in teachers’ classroom-based instructional practices that can be linked to improvements in student learning.

According to case studies of the current Maryland adequacy study, these six features of effective professional development raise student achievement (Odden & Picus, 2015):

- Activity-based;
- close to 200 hours of professional development a year;
- emphasis on collective participation of teachers in the same school, department, or grade;
- content-focused;
- opportunities of active learning; and
- coherence with performance standards, teacher evaluations, and district and school goals.

Lastly, interventions for struggling students are key to advancing student achievement. These interventions consist of one-on-one or small group tutoring and extra learning time. The most effective extra help strategy to enable struggling students to meet career-ready standards involves individual one-to-one tutoring provided by a licensed teacher (Shanahan, 1998; Wasik & Slavin, 1993). A study found that high school students from low-income and minority backgrounds who received individualized tutoring and counseling improved in math by 0.65 standard deviations and 0.48 standard deviations in reading (Cook, et al., 2014). Extended learning time specifically extended day interventions have positive results on students learning. In a study at Boston schools with a seven-and-a-half-hour school day, researchers found a 13 percent increase in the percent of students who passed the basic skill sets over three years (Adelman, Haslam, & Pringle, 1996). Both of these interventions address the populations where Maryland has the greatest disparities.

The PJ, EB, and resulting recommendations all point to additional programs and interventions to assist in minimizing the achievement gaps.

Correlating Funding and Performance

One of the analyses required under the Maryland Request for Proposal (RFP) is to correlate the deficits in student performance with deficits in education funding. This analysis used data on district expenditures, as well as student demographics and assessment results, by district, for the state of Maryland for the years 2012-2015. These data were provided by the MSDE. The assessment data included the proportion of students in a district who scored proficient or advanced on the High School Assessment (HSA), Maryland School Assessment (MSA), and Partnership for Assessment of Readiness for College and Careers (PARCC) assessments. PARCC data was available only for 2015, while MSA and HSA data were available for 2012-2015. Assessment data used for this analysis differs from those used in previous analyses so that data from the PARCC, the assessment currently used by the State, could be included. The expenditure data included district spending as reported by districts in their annual school financial reports and categorized according to the financial accounting structure specified in the *Financial Reporting Manual for Maryland Public Schools*.[45] This analysis examined total district instructional expenditures per pupil and total district current expenditures per pupil.

[45] Maryland State Department of Education. (2009). *Financial Reporting Manual for Maryland Public Schools*. Baltimore, MD: Author.

The team completed a number of linear regressions to analyze the relationship between district spending and each individual performance outcome. Each regression had the proportion of students in a district who were proficient or advanced on each individual assessment – HSA, MSA, or PARCC. Each regression also included a panel of demographic information for the districts: the proportions of students who were in special education, who were Free and Reduced-Price Meal (FRPM) eligible, who were Limited English Proficient (LEP), who were black, who were Latino, or who were white. The regression also included the total district enrollment size and the year the assessment was administered. In addition to those covariates, each regression included a measure of spending. For each assessment, the study team examined both the district total instructional expenditures and the total district current expenditures, both adjusted to per pupil figures.

Analysis

Table 7.2 reports the coefficient for the spending variables in each of the regressions, controlling for the demographic characteristics of the districts.[46]

Table 7.2
Correlation Between Total Per Pupil Expenditures and Performance

Assessment Outcome	Expenditure Variable	Coefficient
HSA	Total expenditures per pupil	0.00
MSA	Total expenditures per pupil	0.000009*
PARCC	Total expenditures per pupil	0.00003*

The study team first looked at the correlation between total expenditures per pupil and performance. None of the coefficients for spending were significant at the 0.05 level[47] in any of the regressions. The coefficients marked with an asterisk were significant at the 0.10 level. There appears to be some relationship between total district per pupil expenditures and student performance on the MSA and PARCC, but not on the HSA. This means that every additional one thousand dollars of per pupil total spending is associated with an increase of about one percent in the proportion of districts' students proficient on the MSA. Every additional one thousand dollars of per pupil total spending is associated with an increase of about 2.6 percent in the proportion of districts' students proficient on PARCC.

[46] Coefficients smaller than 0.0000001 have been rounded to zero.
[47] This refers to a significance level, a statistical measure of how likely the result is correct, in this case whether there is a relationship between expenditures and student performance. A significance level of 0.05 means that there is a 95 percent chance that the finding is correct – a very high standard. A significance of 0.10 means that there is a 90 percent chance.

Table 7.3
Correlation between Instructional Expenditures and Performance

Assessment Outcome	Expenditure Variable	Coefficient
HSA	Instructional expenditures per pupil	0.00
MSA	Instructional expenditures per pupil	0.00001
PARCC	Instructional expenditures per pupil	0.00003

Since there was no meaningful correlation between total spending and performance at a highly significant level, the study team analyzed the correlation between instructional spending and performance. As Table 7.3 shows, none of the coefficients for instructional spending were significant at the 0.05 level in any of the regressions. Although the coefficients are not significant, the direction and size of the relationship is roughly the same as with total spending. Every additional one thousand dollars of per pupil total spending is associated with an increase of about one percent in the proportion of districts' students proficient on the MSA. Additionally, every additional one thousand dollars of per pupil total spending is associated with an increase of about three percent in the proportion of districts' students proficient on PARCC.

Implications

Until recently, studies of the relationship between school spending and student performance have found, at best, a weak correlation between funding and student achievement (Hanushek, 1986; 1989). However, two recent studies from the National Bureau of Economic Research (NBER) found both statistically and practically significant positive relationships between higher spending and student outcomes. The first study (Jackson, Johnson & Persico, 2014), which examined the impact of statewide, often court-ordered, school finance reforms between 1967 and 2010 found that a 20 percent annual increase in funding for low-income children led to an average of nearly one additional year of schooling completed, 25 percent higher individual earnings, and a 20 percentage point drop in the incidence of adult poverty. These increases were strong enough to eliminate at least two-thirds or more of the gaps in these adult incomes between persons raised in economically disadvantaged families and those raised in more affluent families.

The second NBER study of states implementing adequacy reforms since 1990 (Lafortune, Rothstein & Whitmore Schanzenbach, 2016) found a significant reduction in the achievement gaps on the National Assessment of Educational Progress (NAEP) between districts with poor funding prior to the reforms and wealthy districts. The researchers found that:

> The (local) average effect of an extra $1,000 in per pupil annual spending is to raise student test scores ten years later by 0.18 standard deviations. This is roughly twice as large as the effect implied by the annual additional spending in the Project STAR class size experiment (which, translated into these terms, corresponds to an approximately 0.085 standard deviation effect per $1,000 per pupil). It implies that marginal increases in school resources in low-income,

> poorly resourced school districts are cost effective from a social perspective, even when the only benefits considered are those operating through subsequent earnings (pp. 6-7).

In Maryland, an analysis conducted by MGT of America evaluated the state's education system after the implementation of the Bridge to Excellence Act based on the findings of the Thornton Commission. MGT found that achievement gaps were closed by 51 percent in reading and 49 percent in math for elementary schools, and by 36 percent in reading and 39 percent in math for middle schools (MGT of America, 2008). They also found that a $1,000 increase in spending leads to proficiency gap closure of four percent at the elementary school level and eight percent at the middle school level. MGT cites that a reason for these successes in linking funding and achievement are due to how the resources were used. The programs that consistently produced positive results spent dollars on the following: recruiting and retaining high quality teachers, continuing high quality professional development, and providing instructional tools for students. It is possible the current analysis of the relationship between spending and performance is mixed because state funding has not kept pace with the adequacy targets and inflation since implementation of the Bridge to Excellence Act in 2002.

These findings suggest that greater investments in education can have significant effects on student, school, and district performances. One possible explanation of these more recent positive results found by NBER and MGT is that in this era of high-stakes accountability districts and schools are making more effective use of the resources. Increasingly, research indicates that while the amount of resources going to schools is important, the capacity to make effective use of these resources may be just as important (Cohen, 2002; Grubb, 2009).

This thinking is consistent with the logic behind the school and district resourcing models used in the PJ and EB approaches to determining adequacy for this study. New money received by districts and schools spent on strategies and programs which are unlikely to result in increased student achievement is likely to blunt the positive impact of additional spending on student outcomes. The list of resources, strategies and programs that would result in increased student achievement (such as those identified in the PJ and EB studies) is a much more promising investment.

Prekindergarten and School Readiness

Introduction

Catalyzed by an increased national interest in early childhood education and positive research findings, the federal and state governments have championed the inclusion of prekindergarten programs. Indeed, 40 states and D.C. currently offer state-funded prekindergarten programs, targeted toward three- and four-year-old children. Specifically, Maryland has moved to expand access to prekindergarten setting with the 2014 Prekindergarten Expansion Act and $15-million Preschool Expansion Grant as foundational steps in this process (Maryland Federal Preschool Expansion Grant Application, 2014). Additionally, in 2014, Maryland introduced Ready for Kindergarten (R4K), which measures learning and identifies needs for prekindergarten-age children (Readiness Matters, 2016). These efforts reveal

Maryland's continued investment in prekindergarten programs, particularly considering their potential to support school readiness.

The following prekindergarten literature summary, synthesized from the research team's *A Comprehensive Analysis of* Prekindergarten in Maryland, supports Maryland's move towards prekindergarten expansion. The research team also recommends that Maryland provide increased investment to support high-quality childcare centers and family homes, as the return on investment (ROI) justifies the expense. This document will not only outline this recommendation, but it will also share different funding models that would cover its cost.

Summary of Literature Review

Published research overwhelmingly favors prekindergarten programs, citing both their short- and long-term benefits. While the academic benefits of prekindergarten standout – especially the positive correlation with school readiness – evidence of other holistic benefits, such as social and emotional competence, also exist. Indeed, Yoshikawa et al. (2013, p. 13) assert that, "high-quality early childhood education programs are among the most cost-effective educational interventions, and are likely to be profitable investments for society as a whole." Providing quality prekindergarten programs, therefore, contributes to a state's general welfare.

In terms of academics, quality prekindergarten programs build the skills children need to be school-ready. For every year spent in prekindergarten, children get an average gain of, "about a third of a year of additional learning across language, reading, and math skills," though gains can be as high as a full year of additional learning in math and reading (Yoshikawa et al. 2013, p. 1). Maryland's R4K assessment results corroborate this assertion, showing significant increases in school-readiness for children who attend prekindergarten programs. The initiative's 2015-16 A Kindergarten Readiness Assessment (KRA), which measures school-readiness behaviors, finds that 44 percent of children enrolled in a public prekindergarten program demonstrate school-readiness, compared to 29 percent of children enrolled in home or informal care settings (Readiness Matters, 2016). Additionally, the KRA asserts that those who attend public prekindergarten outperform their peers at the same income level – 44 percent to 33 percent. As a result, in Maryland, prekindergarten programs are already yielding school-readiness and narrowing the achievement gap.

Other landmark research on prekindergarten effectiveness, especially a study published in *JAMA* in 2014, corroborates the positive correlation between prekindergarten and school-readiness that exists in Maryland. Using the readiness standards outlined in Teaching Strategies GOLD (TS GOLD), this 2014 study focuses on more holistic domains of school-readiness, such as socio-emotional and cognitive development, in addition to literacy and math. Researchers found that, "a full-day preschool intervention was associated with increased school readiness skills in four of six domains, attendance, and reduced chronic absences compared with a part-day program" (Reynolds et al., 2014). While this study focused on comparing full- and half-day programs, these findings still effectively demonstrate the positive link between prekindergarten programs and school-readiness skills and behaviors.

Beyond academic gains, children who attend prekindergarten programs are more likely to be contributing members of society. Studies show that children with higher school-readiness levels are healthier, less likely to become involved in the criminal justice system, and are more likely to stay in school (Readiness Matters, 2016, p. 1). As a result, these students also typically attain higher levels of education and earn higher wages later in life. The effect of prekindergarten on school readiness, therefore, has lasting positive implications. Accordingly, access to universal prekindergarten programs represents a worthy and profitable goal.

Additionally, students with greater school readiness may positively impact kindergarten through grade 12 funding in the future. For example, research shows that these students require smaller investments in compensatory and special education, while also increasing base costs if prekindergarten programs yield fewer dropouts and higher graduation rates. Findings from the Chicago Child-Parent Center Program (CPC) and the High Scope Perry Preschool Project (the Perry Project) corroborate this assertion. For the CPC program, "participants had 29 percent higher high school graduation rates, 41 percent lower rates of enrollment in special education, 33 percent lower rates of juvenile detention, 42 percent lower rates of 'violent offense' arrests, and 51 percent lower rates of child maltreatment" (Rice University Center for Education, 2012, para. 4). Data from the Perry Project also suggests that greater school readiness affects kindergarten through grade 12 future funding. Following up with students at age 27, data reveals that compared to non-participants, Perry Project participants had finished, on average, one more year of school than non-participants; had spent, on average, 1.3 fewer years in special education; had higher graduation rates (65 percent compared to 45 percent); and had half as many teenage pregnancies (Coalition for Evidence-Based Policy, 2015b). Data from both programs, therefore, suggest that prekindergarten programs can save school systems money in the future, as students who attend these programs demonstrate school readiness skills that can mitigate the need for special services. These skills can also encourage higher graduation rates, thus allowing prekindergarten students to become positive contributors to society.

For a state to truly reap the benefits of universal prekindergarten, however, programs must be considered high quality. As cited in the research team's original report, high-quality programs yield higher benefits because of desirable factors, including but not limited to (1) smaller class sizes, (2) smaller student-to-teacher ratios (and, as a result, warmer and more responsive teacher-student interactions), (3) higher teacher qualifications and credentials, (4) higher teacher and staff pay, and (5) greater professional support for teachers and staff (Yoshikawa et al., 2013, 6). This research implies that effective prekindergarten services should include these determinants of high quality programs, or the positive effects of prekindergarten will be significantly diminished. For Maryland, therefore, it is important that the state commits not just to universal prekindergarten coverage, but also to supporting the highest quality programs.

Recommendation

Currently, Maryland uses a Quality Rating and Improvement System (QRIS) called EXCELS to accredit prekindergarten providers. Given the importance of quality prekindergarten programs, the research team defines "high quality" as a public or private program that earns an EXCELS Level 5 rating. According to the original report's "Estimated Capacity, Cost, and Benefit of Current Prekindergarten System" table, Maryland has the current capacity for 32,651 children to attend prekindergarten at a Level 5 or accredited child care, family home, or public program (Workman et al. 2016, p. 62). However, the research team also asserts that 27,713 additional high-quality slots are needed to meet the goal of 80 percent enrollment, which is considered universal, in high-quality programs. To account for this difference between supply and demand, the research team recommends that Maryland provide increased investment to support high-quality childcare centers and family homes, as the return on investment (ROI) justifies the expense.

To realize the goal of 80 percent enrollment in high quality kindergarten, the cost to the state would be $675 million. Compared to the current system, this universal high-quality prekindergarten scenario costs an additional $141 million. Although the state would have to pay the initial $675 million investment, the benefits will total over $3.7 billion, with an ROI of $5.54 for every dollar invested, a 27 percent increase over the current system ROI (Workman et al. 2016, p. 78). The study team believes that the increased ROI justifies the increased investment in quality prekindergarten.

To fund this endeavor, the study team suggests the possibility for shared investment. In the state-local share model, the costs of expanding to universal prekindergarten would be shared between state and local school districts. Benefits of this model include 1) ease of administration and budgeting, 2) quality-level based funding for providers, 3) aligned funding allocations to Maryland's current school finance system, 4) single-system funding for public and private providers, and 5) shared support for prekindergarten expansion (Workman et al. 2016, p. 85). The second model proposes that costs are shared between the State and local school districts, as well as participating families based on means testing. The benefits of this system align with the benefits of the state-share model. They also include families that are financially able being able to contribute based on their ability to pay, resulting in free services for families below 300 percent of the federal poverty level. Additionally, this model includes participating families as stakeholders, beyond just the State and local school districts (Workman et al. 2016, p. 86).

Conclusion

The State of Maryland has already shown a commitment to prekindergarten programs, supported by positive research findings on the relationship between prekindergarten and school readiness. Indeed, students who attend prekindergarten tend to be more prepared for school, show positive socio-emotional and behavioral skills, have higher attendance, and require fewer services, such as special education and criminal justice, throughout their lives. As such, students who attend prekindergarten both save money and contribute to society, representing a significant return on investment. Universal prekindergarten, therefore, is a valuable investment. Although Maryland has programs in place to encourage expanded prekindergarten access, there is a gap between the current number of high quality prekindergarten slots and the number needed to reach 80 percent enrollment at high-quality programs. For Maryland to close this gap and achieve universal prekindergarten enrollment, it would need to invest $675 million. However, this investment would yield a ROI of $5.54 for every dollar invested. The study team also recommends this investment be shared across stakeholders, to both share the cost and maximize stakeholder engagement.

Supplemental Grants

In 2007, the Maryland General Assembly authorized the Supplemental Grant program for school districts to "mitigate the effect of the freeze in the per pupil foundation amount for fiscal 2009 and 2010, ensuring at least a 1 percent annual increase in state funding for each local school system based on a formula established in the law" (Department of Legislative Services, 2014, p. 80). The grant program exists to ensure that all school systems receive at least a minimal amount of increase in state education aid. After its enactment in 2007, the Supplemental Grant program was amended twice. First, in 2009 the grant amounts were reduced for fiscal years 2011 and beyond to correct for a miscalculation of state aid in 2009 and 2010. Then, in 2013, a provision was enacted mandating that no grants may be less than zero, eliminating the negative grant amounts that were being charged to Carroll and Harford Counties. Between 2009 and 2015, accounting for the reductions described above, the State of Maryland spent $310,528,888 in total on the supplemental grants program.Table 7.4 below, details Maryland's spending on supplemental grants between 2009 and 2015, organized by school district and year.

Table 7.4: Observed Supplemental Grant Allocations, by District, by Year

	2009	2010	2011	2012	2013	2014	2015	Totals
Allegany	-	$443,985	$10,348	$10,348	$10,348	$10,348	$10,348	**$495,725**
Anne Arundel	-	-	-	-	-	-	-	-
Baltimore City	$25,076,647	$18,310,933	$18,310,933	$18,310,933	$18,310,933	$18,310,933	$18,310,933	**$134,942,245**
Baltimore County	-	-	-	-	-	-	-	-
Calvert	-	-	-	-	-	-	-	-
Caroline	-	$1,326,173	$966, 820	$966, 820	$966, 820	$966, 820	$966, 820	**$6,161,273**
Carroll	-	$502,149	($117,565)	($117,565)	($117,565)	-	-	**$149,454**
Cecil	-	$520,250	$49,060	$49,060	$49,060	$49,060	$49,060	**$765,550**
Charles	-	-	-	-	-	-	-	-
Dorchester	-	$1,662,399	$1,321,515	$1,321,515	$1,321,515	$1,321,515	$1,321,515	**$8,269,974**
Frederick	-	-	-	-	-	-	-	-
Garrett	$514,217	$1,201,160	$1,201,160	$1,201,160	$1,201,160	$1,201,160	$1,201,160	**$7,721,177**
Harford	-	$971,599	($6,102)	($6,102)	($6,102)	-	-	**$953,293**
Howard	-	-	-	-	-	-	-	-
Kent	$482,608	$1,003,414	$1,003,414	$1,003,414	$1,003,414	$1,003,414	$1,003,414	**$6,503,092**
Montgomery	-	-	-	-	-	-	-	-
Prince George's	-	$20,574,031	$20,505,652	$20,505,652	$20,505,652	$20,505,652	$20,505,652	**$123,102,291**
Queen Anne's	-	-	-	-	-	-	-	-
St. Mary's	-	$4,683,265	$3,251,181	$3,251,181	$3,251,181	$3,251,181	$3,251,181	**$20,939,170**
Somerset	$525,644	-	-	-	-	-	-	**$525,644**
Talbot	-	-	-	-	-	-	-	-
Washington	-	-	-	-	-	-	-	-
Wicomico	-	-	-	-	-	-	-	-
Worcester	-	-	-	-	-	-	-	-
Statewide Total	**$26,599,116**	**$51,200,358**	**$46,496,416**	**$46,496,416**	**$46,496,416**	**$46,620,083**	**$46,620,083**	**$310,528,888**

Source: Data provided by the Maryland State Department of Education.

Recommendation

The research team's *A Comprehensive Review of State Adequacy Studies Since 2003* (2014) reviewed 39 adequacy studies, including two previous studies completed for Maryland in 2001. This initial review aimed to set a foundation of best practices for the current comprehensive adequacy study. Supplemental grants or hold harmless provisions played a negligible role in the studies reviewed.

For the current adequacy study the research team used three approaches to estimating adequacy: the successful schools/districts (SSD) approach, which analyzes spending in districts that are currently meeting state standards; the professional judgment (PJ) approach, which relies on professionals to specify the resources needed for a representative district and schools to meet state standards; and the evidence-based (EB) approach, which relies on research findings to design a prototypical district and schools to estimate an adequacy amount. The immediate use of the results from the PJ and EB studies (or their combination) would eliminate the need for the Supplemental Grants program altogether. Consideration of a phase-in approach to implementing the study's recommendation would likely require the retention of a hold harmless program to help certain districts make the transition before the recommended base cost and new weights were completely phased-in.

As a result, the study team concludes that the Supplemental Grant program in its current form is no longer needed. Further, a hold harmless program may be needed during a phase in of this report's recommendation. The size and nature of that program should be developed once the phase-in parameters are set. Once the recommendations are fully implemented, the hold harmless program should also be eliminated.

Adequacy Study: Draft Final Report

Appendices

Contents

Appendix A

Using the Evidence-Based Approach to Identify a Base Spending Level and Pupil Weights for the Maryland School Funding System

Using the Evidence-Based Approach to Identify a Base Spending Level and Pupil Weights for the Maryland School Funding System

Prepared for

Maryland State Department of Education

By

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Picus Odden and Associates

Submitted by

APA Consulting

September 30, 2016

In 2002, the Maryland General Assembly enacted Chapter 288, the Bridge to Excellence in Public Schools Act. The Act established new primary state education aid formulas based on adequacy cost studies. These adequacy cost studies – conducted in 2000 and 2001 under the purview of the Commission on Education Finance, Equity, and Excellence – employed the professional judgment and successful schools methods and other education finance analytical tools. State funding to implement the Bridge to Excellence Act was phased in over six years, reaching full implementation in fiscal year 2008. Chapter 288 requires that a follow-up study of the adequacy of education funding in the State be undertaken approximately 10 years after the enactment of the Bridge to Excellence in Public Schools Act. The study must include, at a minimum, (1) adequacy cost studies that identify (a) a base funding level for students without special needs and (b) per pupil weights for students with special needs, where weights can be applied to the base funding level, and (2) an analysis of the effects of concentrations of poverty on adequacy targets. The adequacy cost study will be based on Maryland's College and Career-Ready Standards (MCCRS) adopted by the State Board of Education. The adequacy cost study will include two years of results from new state assessments aligned with the standards. These assessments are scheduled to be administered beginning in the 2014-2015 school year.

There are several additional components mandated to be included in the study. These components include evaluations of (1) the impact of school size, (2) the Supplemental Grants program, (3) the use of Free and Reduced-Price Meals eligibility as the proxy for identifying economic disadvantage, (4) the federal Community Eligibility Provision in Maryland, (5) prekindergarten services and the funding of such services, (6) equity and the current wealth calculation, and (7) the impact of increasing and decreasing enrollments on local school systems. The study must also include an update of the Maryland Geographic Cost of Education Index.

APA Consulting, in partnership with Picus Odden and Associates and the Maryland Equity Project at the University of Maryland, will submit a final report to the State no later than October 31, 2016.

This report describes the evidence-based model, one of the three approaches used for estimating adequacy for the study of adequacy funding for education in the State of Maryland. The final report on the study on adequate base funding amounts and weights for special needs will include a copy of this report, as required under Section 3.2.1 of the Request for Proposals (R00R4402342).

Suggested Citation: Odden, A. O. and Picus, L. O. (2016). *Using the Evidence-Based Approach to Identify a Base Spending Level and Pupil Weights for the Maryland School Funding System*. Denver, CO: APA Consulting.

Chapter 1: The Maryland Evidence-Based School Finance Adequacy Study

One of the critical questions facing school finance today is this: How much does it cost to provide the resources needed to implement education programs that will ensure all students have an opportunity to meet their state's proficiency standards and be prepared for college and/or careers? This document, prepared as part of the Maryland School Finance Adequacy Study, uses the evidence-based (EB) model (Odden & Picus, 2014) to provide the State with a base funding amount and student weights estimates for such a system.

Following this introductory chapter, Chapter 2 provides a brief description of the EB model and the school improvement model that supports it. Chapter 3 offers a detailed description of the EB model, describing the personnel resources needed for regular education programs, along with estimated dollar per pupil resources needed for instructional materials, technology, and other support services. In addition, Chapter 3 describes the additional resources needed for students who are struggling to meet grade-level standards and offers estimates of the resources needed at the central office to provide for maintenance and operations. Transportation and food services are not included in this model.

Education professionals from across Maryland have reviewed this analysis. Specifically, the study team invited four EB professional judgment (EBPJ) panels to review the EB model's components and provide feedback on its adequacy. The panels were asked to recommend any changes necessary to ensure adequacy in the State of Maryland. Their recommendations and potential cost implications of those changes are described in Chapter 4.

The study team also sought to identify the strategies that successful and, when possible, improving schools employ in Maryland. To that end, the study team conducted day-long case studies in 12 schools. The case studies provided information on multiple aspects of improvement strategies in each of these schools and collected details about specific school resources, including class size, number of electives, and amount of pupil support resources. The detailed case study write-ups are included in the appendix to this report, and a cross-site analysis is provided in Chapter 5.

To estimate a per pupil foundation amount, the study team developed an Excel-based model that takes all the report's recommendations and calculates a base per pupil figure, together with weights for poverty students, LEP students, and students with mild and moderate disabilities. Chapter 6 includes these figures.

Chapter 2: The School Improvement Model

The intent of Maryland's school funding model is to identify the costs of providing a basket of educational goods and services that allows each school and school district to provide all students an equal opportunity to meet the state's student performance standards. Although a direct linkage between funding and student performance does not exist, the intent of this adequacy study is to identify a base per pupil spending level and weights for students from economically disadvantaged or Limited English Proficient (LEP) backgrounds and/or with disabilities. This adequacy study aims to provide all students with robust opportunities to meet State College and Career-Ready Standards

(CCRS). Regardless of whether high school graduates go on to college or enter the workforce, today's global, knowledge-based economy requires a similar set of skills and expertise of each graduate.

No matter what course of studies a high school student completes – college prep or career tech – all Maryland students are expected to achieve to CCRS. This includes children from low-income homes, students of color, LEP students, and students with disabilities. Since the 2001 Thornton Commission,[1] Maryland's policy makers have sought to provide adequate funding to meet this goal and continue to work to ensure the funding model meets the needs of all students. The current study is designed to update the core elements of the state's school funding formula – base foundation expenditure per pupil level and extra pupil weights for low-income students, LEP students, and students with disabilities – to ensure they are adequate to meeting today's CCRS.

Before presenting the EB analysis that will be used as one of three approaches for recalibrating these key elements of the Maryland funding model, this chapter provides a description of the school improvement model that undergirds the EB model. The expectation is that funds provided through the school funding formula will be used to boost student achievement and close achievement gaps. This chapter contains a more explicit and detailed description of the school improvement model embedded in the EB approach to adequate school funding. The concept is to link the level of funding with its effective use. The EB model not only identifies a base level of staff and dollar resources, and extra resources for students struggling to meet standards, but also outlines how resources can be used to boost student performance.

The School Improvement Model Embedded in the Evidence-Based Approach

The EB model, used to estimate an adequate spending level for schools, has been designed to allow districts and schools to provide every child with an equal opportunity to meet state performance standards, which are currently the Common Core and CCRS. The EB model is unique because it is derived from research and best practices that identify programs and strategies that increase student learning. Further, the formulas and ratios for school resources, which have been developed from that research, have been reviewed by dozens of educator panels in multiple states over the past decade and adjusted to meet both the specific state standards and evolving best practices. The model relies on two major types of research:

1. Reviews of research on the student achievement effects of each of the model's individual major elements, with a focus more recently on randomized controlled trials – the gold standard of evidence on "what works."

[1] Commission on Education Finance, Equity, and Excellence. (2002). *Commission on Education Finance, Equity, and Excellence: Final Report*. Annapolis, MD: State of Maryland, Department of Legislative Services.

2. Studies of schools and districts that have dramatically improved student performance over a four- to six-year period – sometimes labeled "a doubling of student performance" on state tests.

An Overview of the Evidence-Based School Improvement Model

As a result of the study team's research and work in other states, the EB approach has become more explicit in identifying the components of a school improvement model. It also better articulates how all the elements in the funding model are linked at the school level to strategies that, when implemented, produce notable improvements in student achievement (Odden & Picus, 2014).

Improving and high-performing schools have clear and specific student achievement goals, including goals to reduce achievement gaps linked to poverty and minority status. The goals are nearly always specified in terms of performance on state assessments.

Compared to traditional schools where teachers work in isolated classrooms, improving schools organize instruction differently. Regardless of the context – urban, suburban, or rural or high-income or low-income – improving and high-performing schools organize teachers into collaborative teams: grade-level teams in elementary schools and subject or course teams in secondary schools. With the guidance and support of instructional coaches, the teacher teams work with student data (usually short cycle or formative assessment) to:

- Plan and develop standards-based curriculum units;
- teach those units simultaneously;
- debrief on how successful the units were; and
- make changes when student performance does not meet expectations.

This collaborative teamwork makes instruction "public" over time by identifying a set of instructional strategies that work in the teachers' school. Over time, all teachers are expected to use the instructional strategies that have been demonstrated to improve student learning and achievement.

Improving and high-performing schools also provide an array of "extra help" programs for students struggling to achieve to standards. This is critical because the number of students at risk of academic failure is likely to increase as more rigorous curriculum programs are implemented to prepare all students for college and careers. Individual tutoring, small group tutoring, after-school academic help, and summer school programs focused on reading and mathematics for younger students and courses needed for high school graduation for older students. These programs represent the array of "extra help" strategies the improving schools deploy. The idea is to "hold standards" constant and vary instructional time.

These schools exhibit dense leadership. Teachers lead by coordinating collaborative teams and through instructional coaching. Principals lead by structuring the school to foster instructional improvement. The district leads by ensuring that schools have the resources to deploy the strategies outlined above, focusing on aggressive student performance goals, improving instructional practice, and taking responsibility for student achievement results.

High-performing and improving schools seek out top talent. They know the challenges in preparing students for the competitive and knowledge-based global economy are difficult and require smart and capable teachers and administrators to effectively educate all students.

The study team has continued to enhance the details of the school improvement strategy embedded in the EB funding model. The study team has summarized its findings in a recent textbook (Odden & Picus, 2014) and several books profiling schools and districts that have moved the student achievement needle (Odden & Archibald, 2009; Odden, 2009; Odden, 2012). The team has also studied dramatically improving schools in Vermont and Maine as part of school finance studies recently completed in both states. The team found the theory of improvement embodied in the EB model was reflected in nearly all these successful schools (Picus, Odden, et al., 2011; Picus, Odden, et al., 2013). In addition, other researchers and analysts have found similar features in schools that significantly improve student performance and reduce achievement gaps (Blankstein, 2010, 2011; Chenoweth, 2007, 2009). The study team has developed similar case descriptions of improving schools in Maryland as part of this study.

In a recent book, Greg Duncan and Richard Murnane (2014) reached similar conclusions on how schools boost student learning. They note that for all students to have a chance at success in the emerging global economy they will need high-quality preschool programs followed by effective elementary and secondary schools. The key features needed in each school include: (1) leadership focused on improving instructional practice, (2) in-school organization of teachers into teams that over time create a set of effective instructional practices and deploy them systematically in all classrooms, (3) a culture of assistance (e.g. instructional coaches, ongoing professional development (PD)) and accountability (e.g. adults taking responsibility for the impact of their school actions on student performance), and (4) an array of extra help strategies to extend learning time for any student who needs more time to achieve to standards.

Although study details of improving and high-performing schools vary, and authors highlight somewhat different elements of the process, the overall findings are more similar than different. These key findings suggest all schools can improve if they have adequate resources, which is a goal of the current adequacy studies. The key to dramatic improvement in student learning is for schools and districts to effectively deploy those adequate resources.

The 10 Strategies in the Evidence-Based School Improvement Model

For clarity, the elements of the school improvement strategy embedded in the EB funding model are organized into 10 areas. In general, findings indicate that schools and districts that produce large gains in student performance follow 10 similar strategies (Odden, 2009; Odden & Picus, 2014) that are supported by the resources included in the EB model. The 10 strategies are listed below:

1. Analyze student data to become deeply knowledgeable about performance issues and to understand the nature of the achievement gap. The test score analysis usually first includes review of state test results and then analysis of formative/short cycle (e.g. Renaissance Learning STAR Enterprise) and benchmark assessments (e.g. NWEA MAP). These analyses help tailor

instruction to student needs; monitor progress of students with an Individual Education Plan (IEP) to determine whether interventions are working; and, follow the progress of students, classrooms, and schools over the course of the academic year. Improving schools are "performance data-hungry."

2. Set higher goals, such as aiming to educate at least 95 percent of the students in the school to proficiency or higher on state reading and math tests; attain advanced achievement levels for a significant portion of the school's students; increase the number of high school students taking and passing Advanced Placement (AP) classes; and make significant progress in closing the achievement gap. These goals tend to be numerically explicit and far beyond just producing "improvement" or "making adequate yearly progress (AYP)." Further, because the goals are ambitious, they help the school produce large gains in student performance, even when not fully attained.
3. Review evidence on good instruction and effective curriculum. Successful schools throw out the old curriculum, replace it with a different and more rigorous curriculum, and create their specific view of what good instructional practice is needed to deliver that curriculum. Changing curriculum is necessary for schools implementing more rigorous CCRS, and such new curriculum requires changes in instructional practice. Successful schools also want all teachers to learn and implement new instructional strategies in their classrooms, so they also seek to make good instructional practice systemic to the school and not idiosyncratic to a teacher's individual classroom.
4. Invest heavily in teacher training that includes intensive summer institutes and longer teacher work years, provide resources for trainers, and fund instructional coaches in all schools. Time is provided during the regular school day for teacher collaboration focused on improving instruction. Nearly all improving schools have found resources to fund instructional coaches to work with school-based teacher data teams, model effective instructional practices, observe teachers, and give helpful, direct feedback. This focus has intensified now that schools are delivering a more rigorous curriculum focused on educating all students to college and career proficiency levels. In addition, staff PD is viewed as an ongoing activity, not a "once and done."
5. Provide extra help for students at risk of academic failure and, with a combination of state and federal Title I funds, provide some combination of tutoring in a 1 to 1, 1 to 3, or 1 to 5 tutor to student format. In some cases, this includes extended days, summer school, and English language development for all LEP students. These Tier 2 interventions in the Response to Intervention (RTI) approach to helping students at risk of academic failure achieve to standards were absolutely critical. For many students, one dose of even high-quality instruction is not enough. Many students need a combination of extra help services to achieve to their potential. No school producing large gains in student learning ignored these extra help strategies altogether or argued that small classes or prekindergarten were substitutes.
6. Restructure the school day to provide more effective ways to deliver instruction. This can include multi-age classrooms in elementary schools and block schedules and double periods of mathematics and reading in secondary schools. Schools also "protect" instructional time for core subjects, especially reading and mathematics. Further, most improving schools today

organize teachers into collaborative teams – grade-level teams in elementary schools and subject/course teams in secondary schools. These teams meet during the regular school day, often daily, and collaboratively develop curriculum units, lesson plans to teach them, and common assessments to measure student learning. Further, teams debrief on the impact of each collaboratively developed unit, reviewing student learning overall and across individual classrooms.

7. Provide strong leadership and support for data-based decision-making and improving the instructional program, usually through the superintendent, principal, and teacher leaders. Instructional leadership is "dense" and "distributed" in successful schools; leadership derives from the teachers coordinating collaborative teacher teams, from instructional coaches, the principal, and district leaders. Both teachers and administrators provide an array of complementary instructional leadership.
8. Create professional school cultures characterized by ongoing discussion of good instruction and teachers taking responsibility for the student performance results of their actions. Over time, the collaborative teams that deliver instruction produce a school culture characterized by: (1) high expectations of performance on the part of both students and teachers, (2) a systemic and school-wide approach to effective instruction, (3) a belief that instruction is public and good instructional practices are expected to be implemented by each individual teacher, and (4) an expectation that the adults in the school are responsible for the achievement gains made (or not made) by students. Professionals in these schools accept responsibility for student achievement results.
9. Bring external professional knowledge into the school (e.g. hiring experts to provide training, adopting research-based new curricula, discussing research on good instruction, and working with regional education service agencies as well as the state department of education). Successful schools do not attain their goals by "pulling themselves up by their own boot straps." They aggressively seek outside knowledge, find similar schools that produce results and benchmark their practices to them, and operate in ways that typify other professions.
10. Recruit and retain the best talent. Many improving schools today consciously seek to recruit and retain the best talent, from effective principal leaders to knowledgeable, committed, and effective teachers. They seek individuals who are mission-driven to boost student learning, who are willing to work in a collaborative environment where all teachers are expected to acquire and deliver the school's view of effective instructional practice, and who are focused on accountability.

In sum, the schools that have boosted student performance deployed strategies that are strongly aligned with those embedded in the EB model. Further, in the study team's adequacy and recalibration work in many other states, including Maine, North Dakota, Washington, Wisconsin, and Wyoming, the study team found that most educators shared this view of how schools can increase student performance. These practices bolster the study team's claim that if funds are provided and used to implement these effective strategies, significant student performance gains follow.

Finally, as noted above, the study team conducted school case studies in Maryland to determine whether school improvement in the State is similar to or different from this model.

Chapter 3: Using the Evidence-Based Model to Identify a Base Spending Level and Pupil Weights

This chapter describes the components of the EB model used to build a foundation for estimating a new base spending level, along with pupil weights for at risk students, LEP students, and students with disabilities. The five parts of this chapter include the following:

- Staffing for core programs, which include full-day prekindergarten, full-day kindergarten, core teachers, elective/specialist teachers, instructional facilitators/coaches, core tutors, core guidance counselors, core nurses (the latter three constituting changes and additions to the EB model), substitute teachers, supervisory aides, librarians, principals/assistant principals, and school secretaries;
- dollar per student resources including gifted and talented, PD, computers and other technology, instructional materials and supplies, and extra duty/student activities;
- central functions including maintenance and operations, central administration, and transportation;
- resources for students at risk of academic failure including tutors, extended day, summer school, LEP programs, alternative schools, and special education; and
- staff compensation.

In each section, the study team provides an analysis of each element in the EB funding model in the context of current research.

Prototypical School District and Schools

The EB model develops its estimate for an adequate level of funding by identifying the specific resources needed at the school and district central office levels, and then aggregating these costs to a statewide estimate. To do this, the EB model identifies the types of staff and non-staff resources required for a set of prototypical elementary, middle, and high schools as well as a district's central office. In other states, the EB model has used prototypical district and school sizes suggested by a review of the research literature. These prototypical sizes include a district with an enrollment of 3,900 students, elementary and middle schools of 450 students, and high schools of 600 students. The assumption is that the necessary resources for larger districts and schools can be extrapolated from these prototypes by increasing staff and non-staff resources proportionally to increased enrollment.

Due to the large size of the majority of districts in Maryland and the recommendation of Maryland educators who participated in a review of the EB model, the study team increased the size of the district and school prototypes to make them more representative of Maryland's districts. The prototypes used in Maryland consist of a district size of 12,000 students, elementary school size of 450 students, middle school size of 720 students, and high school size of 1,200 students. The following EB model recommendations are based on the original 3,900-student district size and corresponding school sizes. The changes to these recommendations resulting from using the larger district and school sizes recommended by Maryland educators are discussed in Chapter 4: EB Professional Judgment Panels.

Table 3.1 below provides a summary of all the recommendations suggested by the EB model. Chapter 6 shows how these recommendations are combined into a new base per pupil figure and three different pupil weights.

TABLE 3.1:
SUMMARY OF CURRENT EVIDENCE-BASED MODEL RECOMMENDATIONS

Evidence-Based Model Element	Current Evidence-Based Formula Ratio or Dollar per Pupil Figure
STAFF RESOURCES FOR CORE PROGRAMS	
1a. Full-day prekindergarten	Each prekindergarten student is staffed at a class size of one teacher and one aide for every 15 students
1b. Full-day kindergarten	Full-day kindergarten program; each kindergarten student counts as 1.0 pupil in the funding system
2. Core elementary class sizes/core teachers	Kindergarten through grade three: 15 Grades four through five: 25
3. Secondary class sizes/ teachers	Grades six through twelve: 25 (plus one additional teacher per 600 students in high schools to support smaller advanced level courses)
4. Elective teachers	Elementary Schools: 20% of core elementary teachers Middle Schools: 20% of core middle school teachers High Schools: 33 ⅓% of core high school teachers
5. Instructional Coaches	One instructional coach position for every 200 students
6. Core Tutors	One tutor position for every 450 elementary and middle school students and for every 600 high school students (additional tutors are enabled through the at risk pupil count in Element 22)
7. Substitute Teachers	Five percent of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, LEP, and special education programs)
8. Core Guidance Counselors and Nurses	Kindergarten through grade five: One guidance counselor for every 450 students Grades six through twelve: One guidance counselor for every 250 students Kindergarten to grade twelve: One nurse for every 750 students (Additional student support resources are provided on the basis of at risk student counts in Element 23)
9. Supervisory Aides	One supervisory aide for every 225 elementary and middle school students One supervisory aide for every 200 high school students
10. Library Media Specialists	One library media specialist position for every 450 elementary and middle school students, and for every 600 high school students

Evidence-Based Model Element	Current Evidence-Based Formula Ratio or Dollar per Pupil Figure
11. Principal/Assistant Principal	One principal for the 450-student prototypical elementary school One principal for the 450-student prototypical middle school One principal and one assistant principal for the 600-student prototypical high school
12. School Site Secretarial Staff	One secretary position for every 225 elementary and middle school students, and for every 200 high school students
DOLLAR PER STUDENT RESOURCES	
13. Gifted and Talented	$40 per pupil inflated annually
14. Professional Development (PD)	10 days of student-free time for training built into teacher contract year $125 per pupil for trainers, inflated annually (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$190 per pupil for instructional and library materials
16. Short Cycle/Interim Assessments	$25 per pupil for short cycle, interim and formative assessments
17. Computer Technology and Equipment	$250 per pupil for school computer and technology equipment
18. Career Technical Education (CTE) Equipment	$10,000 per CTE teacher for specialized equipment
19. Extra Duty Funds and Student Activities	$250 per student for co-curricular activities including sports and clubs for grades K–12 (funding not provided for prekindergarten)
CENTRAL OFFICE FUNCTIONS	
20. Maintenance and Operations	Separate computations for custodians, maintenance workers, and groundskeepers
21. Central Office Staffing	A dollar per student figure for the Central office based on the number of full-time equivalent (FTE) positions generated and the salary and benefit levels for those positions; it also includes $300 per pupil for miscellaneous items such as Board support, insurance, legal services, etc.
RESOURCES FOR students at risk of academic failure	
22. Tutors	One tutor position for every 125 at risk students (in addition to the one core tutor position in each prototypical school); these positions are provided additional days for PD (Element 14) and substitute days (Element 7)
23. Additional Pupil Support	One pupil support position for every 125 at risk students; these positions are provided additional days for PD (Element 14)

Evidence-Based Model Element	Current Evidence-Based Formula Ratio or Dollar per Pupil Figure
24. Extended Day	One teacher position for every 30 at risk students or 3 ⅓ FTE per 100 such students; position paid at the rate of 25% of annual salary—enough to pay a teacher for a two-hour extended day program, five days per week (This formula equates to one teacher position for every 120 at risk students)
25. Summer School	One teacher position for every 30 at risk students or 3 ⅓ FTE per 100 such students; position paid at the rate of 25% of annual salary — enough to pay a teacher for a six- to eight-week, four-hour per day summer school program and include adequate time for planning and grading. (This formula equates to one teacher position for every 120 at risk students)
26. LEP Students	One teacher position for every 100 identified LEP students (This provision is in addition to all the resources triggered by the at risk student count, which includes all LEP students)
27. Alternative Schools	One assistant principal position and one teacher position for every seven alternative learning education (ALE) students
28. Special Education	One teacher position for every 150 students in the school One aide position for every 150 students in the school Deduction of federal Title VI, Part B funds Full state funding for students with severe disabilities, minus the cost of the basic education program for all non-public placements
29. Staff Compensation	Average of previous year For benefits: Retirement or pension costs: Certified staff: 4.56% Classified staff: 8.17% Health Insurance: $8,537 per employee Social Security and Medicare: 7.65% Workers' Compensation (certified): 0.55% Workers' Compensation (classified): 2.18% Unemployment Insurance: 2.8%

Response to Intervention

Before proceeding, the study team notes that the design of the EB model, which includes core and elective teachers for all children and provides additional resources for students at risk of academic failure, reflects the Response to Intervention (RTI) model. RTI is a three-tier approach to meet student needs. Tier 1 refers to core instruction for all students. The EB model seeks to make core instruction as effective as possible with its modest class sizes, provisions for collaborative time, and robust PD resources. Effective core instruction is the foundation on which all other educational strategies depend to effectively add value. Tier 1 usually includes some differentiated instruction in the regular classroom.

After Tier 1 instruction, Tier 2 services are provided to students still struggling to achieve to standards before they are given an IEP and are labeled as a student with a disability. The EB model's current Tier 2 resources include one core tutor for every prototypical school and additional resources triggered by at risk student counts that provide funding for tutoring, extended day, summer school, and additional pupil support. Tier 3 includes all special education services.

Pupil Counts

In addition, the EB model typically recommends that states use an average daily membership (ADM) pupil count for the funding formula, which is similar to Maryland's use of the September 30 membership count. The EB approach recommends states use the greater of the previous year's ADM count or the previous three years' average. This approach recognizes the cost implications of both growing and declining enrollments. These pupil counts impact the formula for resource distribution, not the EB model's approach to determining the base per pupil number for the formula.

However, the current EB definition of at risk students is broader than only including students eligible for Free and Reduced-Price Meals (FRPM). Currently, the EB method defines at risk students as the unduplicated count of LEP students as well as FRPM-eligible students in grades in kindergarten to grade 12.[2] The intent of this augmented definition is to ensure all LEP students, whether or not they are also FRPM students, and all FRPM students trigger resources under the at risk pupil count and are counted only once for these resources.

Prototypical Schools and Districts

A key component of the EB model is the use of prototypical schools and districts to indicate the general level of resources in schools and districts, and to serve as a heuristic to calculate the base per pupil amount, and then the student weights. The EB model identifies resources for prototypical elementary, middle, and high schools, as well as a prototypical district. The model needs to use specific sizes for the prototypes to indicate the relative level of resources in the schools. Although the study's modeling is based on these prototypes, this does not imply Maryland should adopt new policies on school or district size based on the sizes used in the study. For the study team's school size recommendations, see the team's school size study final report.[3]

School sizes differ substantially within and across all states. No state has a specific policy on school size, though some, including New Jersey and Wyoming, use prototypical school sizes to develop and/or

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[2] The study team is aware of the potential difficulties in obtaining a count of FRPM-eligible students due to changes in how districts may provide meals to students, such as the Community Eligibility Program (CEP). In this report, reference to FRPM students includes any changes the State may adopt to identify a more accurate count of such students.

[3] Humann, C., Palaich, R., Fermanich, M., and Griffin, S. (2015). Final School Size Study Report: Impact of Smaller Schools. Denver, CO: APA Consulting.

operate their funding formula. A number of other states include “ideal” size configurations for different levels of schools in their facility guidelines – a process that clearly creates incentives for specific school sizes.

Much of the research on school size addresses the question of whether large schools – those significantly over 1,000 students – are more efficient and effective than smaller school units (schools of 300 to 500), and whether cost savings and performance improvements can be identified by consolidating small schools or districts into larger entities. The research generally shows that school units of roughly 400 to 600 elementary students and between 500 and 1,000 secondary students may be as efficient as large schools while providing the necessary learning conditions for improving student outcomes, particularly for low-income and at risk students (Lee & Smith, 1997; Raywid, 1997, 1998; Ready & Lee, 2004).

Moreover, the research on small- and large-scale diseconomies, which should consider both costs and outcomes, generally does not provide solid evidence for a consolidation policy. In an earlier literature review, Fox (1981) concluded little research had analyzed output in combination with input and size variables. Ten years later, Monk (1990) assessed the meager extant research on costs and outcomes and concluded there was little support for either school or district consolidation.

In more recent reviews of scale economies and diseconomies and potential cost savings from consolidation, Andrews, Duncombe, & Yinger (2002) and Duncombe and Yinger (2007, 2010) found that the optimum size for elementary schools was in the 300- to 500-student range and for high schools was in the 600- to 900-range. Both findings suggest that the very large urban districts and schools across the U.S. and Maryland are larger than the optimum size – and perhaps need to be downsized – and the potential cost savings from consolidation of small districts and schools are realistically scant. In sum, the research suggests elementary school units be in the range of 400 to 500 students and secondary school units be in the range of 500 to 1,000 students.

The EB approach starts by identifying resources for prototypical elementary, middle, and high schools with enrollments of 450, 450, and 600, respectively. It uses this approach and these prototypes to indicate the relative level of resources in schools, as well as to calculate a base per pupil cost. These prototypical school sizes reflect research on the most effective school sizes, although in reality few schools are exactly the size of the prototypes. However, because many schools in Maryland are larger than these prototypical school sizes, prototypical sizes of 450, 720, and 1,200 were used to determine a new base per pupil figure. Where actual school sizes are larger than those recommended here, the study team suggests that larger school buildings organize their students into smaller “schools within school” units inside the larger building.

Further, as discussed in Element 21 below, the EB model begins with a prototypical district size of 3,900, which comprises four 450-student elementary schools, two 450-student middle schools, and two 600-student high schools. This configuration is used to estimate a district-level cost per student. Several states have used the micro-EB formulas and ratios to estimate a base per pupil cost estimate for their foundational school finance formula structure. States using this approach include Arkansas, New Jersey, and North Dakota. Maryland used a similar strategy by using the professional judgment (PJ) approach to identify the base per pupil figure for the Thornton Commission. Although actual school sizes vary in each of those states, the prototypes provide good estimates of a base cost per pupil in the context of each of those states. The study team's Wisconsin study (Odden et al., 2007) estimated a base per pupil cost using prototypical schools and a prototypical district, then compared that to a district-specific figure created by adapting the ratios and formulas to every school and district size. In Wisconsin, the study team found that the difference between the two methods was about $50 per pupil, a small amount in a base spending level of approximately $10,000 per pupil. The EB prototypes should not be construed to imply Maryland replace all school sites with smaller or larger buildings or break school districts into smaller units. The prototypes are used as heuristics to determine the estimated base cost per student. Based on the four EBPJ panels' recommendations and the district's size analysis undertaken as part of the PJ adequacy approach, the study team expects to adjust the size of prototypical districts to more closely reflect the larger district sizes found in Maryland.

The EB model also makes adjustments for districts and schools with enrollments much smaller than the prototypes. These adjustments begin at about 1,000 students and provide additional resources per pupil on a sliding scale until enrollment reaches 97 or fewer students. All Maryland districts are larger than these figures, so the EB model's small district adjustments are not needed in Maryland.

Staffing for Core Programs

This section covers full-day kindergarten, core teachers, elective/specialist teachers, instructional facilitators/coaches, core tutors, core guidance counselors, core nurses (the latter three being changes and additions to the EB model), substitute teachers, supervisory aides, librarians, principals/assistant principals, and school secretaries.

1a. Prekindergarten

The table below shows the resources the EB model provides for full-day prekindergarten. Currently, Maryland provides prekindergarten services to four-year-olds from families with incomes up to 185 percent of the federal poverty level under the 2002 Bridge to Excellence in Public Schools Act, while the 2014 Prekindergarten Expansion Act provides additional slots for four-year-olds from families with incomes up to 300 percent of the federal poverty level.

Current Evidence-Based Recommendation
Each prekindergarten student is staffed at a class size of one teacher and one aide for every 15 students

Analysis and Evidence

There is growing evidence that a high-quality prekindergarten program is an effective way to help all children succeed in school (Kauerz, 2006). Such programs are best paired with well-resourced elementary schools, which can continue the performance catch-up that prekindergarten programs are designed to initiate. In addition, there is a growing recognition that integrating prekindergarten programs with the traditional public school system, particularly between kindergarten and grade three, could strengthen the effect of both prekindergarten programs and grades one to three. This prekindergarten analysis will estimate the structure of a high-quality program for three- and/or four-year-olds integrated with high-quality kindergarten through grade three programs.

Much of the research on the effectiveness of prekindergarten through grade three programs has focused on the prekindergarten component, with less research on the advantages of integrated programs that continue from prekindergarten to grade three. Thus, the prekindergarten research is addressed first. Drawing from a number of major studies that found long-term positive effects of prekindergarten programs on student learning, Reynolds and Temple (2008) constructed five possible pathways through which early childhood education programs produced their impacts, including:

- A cognitive advantage pathway leading to enhanced literacy, language, and numeracy skills and better school readiness (see Conger (2008) for evidence on early learning impacts on English language skills acquisition for LEP students);
- a family support pathway describing benefits from greater parental involvement in education and enhanced parenting skills (see Kalil & Crosnoe, 2008);
- a school support pathway for high-quality education programs beyond prekindergarten to strengthen the learning advantages of early childhood education programs (a pathway allowed by an overall adequate funding system);
- a social adjustment pathway suggesting benefits from increased classroom and peer social skills and positive teacher-child relationships; and
- a motivational pathway advocating early education programs provide benefits to achievement motivation and commitment to school.

Whatever the pathway, most researchers find that "high-quality" prekindergarten, particularly for students from lower income backgrounds, significantly affects future student academic achievement as well as other desired social and community outcomes (Barnett, 2008, 2010, 2011a, 2011b; Camilli et al., 2010; Pianta et al., 2012; Reynolds et al., 2001, 2011; Reynolds and Temple, 2006, 2008; Schweinhart et al., 2005).[4] These longitudinal studies show that students from lower income backgrounds who experience a high-quality, full-day prekindergarten program perform better in learning basic skills in elementary school, score higher on academic goals in middle and high school, attend college at a greater rate, and earn higher incomes and engage in less socially-undesirable behavior as adults.

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[4]A more extensive literature review, a comprehensive assessment of current prekindergarten capacity in Maryland, a return on investment analysis, and the study team's recommendations for prekindergarten programs in Maryland may be found in Workman, S., Palaich, R., & Wool, S. (2016). *A Comprehensive Analysis of Prekindergarten in Maryland*. Denver, CO: APA Consulting.

Lynch (2007), Heckman (2011), and a recent report from the Education Commission of the States (Workman, Griffith, & Atchison, 2014) identify specific positive impacts and multiple benefits of prekindergarten programs for children who participate in "high-quality" prekindergarten programs. Such children:

- Require less special education;
- are less likely to repeat a grade;
- are less likely to need child welfare services;
- enroll in K–12 education better prepared, which results in lower spending at that level;
- are less likely to engage in criminal activity as juveniles and adults;
- are less likely to need social welfare support services as adults;
- generally have higher incomes when they enter the labor force ;
- pay higher taxes as a result of their higher incomes; and
- are likely to have employer-provided health insurance.

The consistently recurring theme in all analyses is the multiple benefits and long-term savings of high-quality prekindergarten programs. While typically a high-quality program is defined by the individuals employed to run the program and their commitment to their job, as well as a comprehensive array of services beyond just the "school" component, it is possible to identify the resource levels needed to support such high-quality programs.

Russo (2007) identified effective prekindergarten through grade three program components, including:

- Voluntary, full-day prekindergarten available to all three- and four-year-olds;
- full-day kindergarten that builds on prekindergarten experiences and is available to all children, which is supported by the current funding system;
- standards, curriculum, instruction, and assessments aligned within and across grades from prekindergarten through grade three, which can be accomplished with new curriculum standards;
- curriculum focused on emotional development, social skills, and self-discipline, as well as reading and mathematics;
- early education lead teachers qualified to teach any grade level from prekindergarten through grade three and compensated based on public elementary school teacher salaries; and
- families and teachers who work together to ensure the success of all children.

More recently, the National Institute for Early Education Research (NIEER) has established 10 quality benchmarks to identify program quality. Its 10 prekindergarten high-quality program standards are similar to the above and include:[5]

1. Comprehensive learning standards.
2. Teachers with a bachelor degree.
3. Teachers with specialized training in early childhood.
4. Assistant teachers with a Child Development Associate credential or the equivalent.
5. Teacher in-service training of at least 15 hours per year.
6. Maximum class sizes of 20 or less.
7. Staff-to-child ratios of 1 to 10 or better.
8. Vision, hearing, and health screening and referral and support services.
9. At least one meal per day provided.
10. Site visits to ensure program quality.

Nearly all of the longitudinal studies of prekindergarten programs have relied on data from three prekindergarten programs that meet the above standards: High-Scope Perry Preschool Program, Carolina Abecedarian Project, and Chicago Child-Parent Center Program. These results reinforce the finding that the most robust impacts of prekindergarten programs are found in studies of high-quality programs.

In sum, high-quality prekindergarten offered for a full day and taught by fully certified and trained teachers using a rigorous but appropriate early childhood curriculum can provide initial effects of 0.9 standard deviation that fall to 0.45 in later primary years. By themselves, prekindergarten programs can reduce by half achievement gaps linked to race and income. Effects of prekindergarten programs can be enhanced if followed by high-quality education programming in the elementary grades, particularly kindergarten through grade three.

Furthermore, there is increasing recognition that all students have access to prekindergarten. Research shows that this strategy produces significant gains for middle-income children and greater gains for low-income students (Barnett, Brown, & Shore, 2004). A prominent economist also supports this position (Greeley, 2014; Heckman, 2011).

Impact of Statewide Prekindergarten Programs

Researchers analyzed the success of more universal statewide prekindergarten initiatives. A 2003 study of state-funded prekindergarten programs in six states – California, Georgia, Illinois, Kentucky, New York, and Ohio – found that children from lower income families start catching up to their middle income peers when they attend a prekindergarten program (Jacobson, 2003). There is evidence that statewide universal programs in Georgia (Henry et al., 2006) and Oklahoma (Gormley, Jr. et al., 2005)

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[5] See http://nieer.org/yearbook/compare/ for a detailed description of the NIEER quality standards.

have improved the performance of students who participated in those programs. In addition, a 2007 study showed that prekindergarten programs in New Jersey's urban districts had not only significant short-term cognitive and social impacts, but also long-term, positive impacts on students who enrolled, closing the achievement gap by 40 percent in grade two for a two-year prekindergarten program (Frede, Jung, Barnett et al., 2007).

Fiscal Returns to Preschool

Generally, estimates of the long-term financial benefits of prekindergarten programs are reported as returns on investment. Reynolds and Temple (2008) reported that in addition to benefits on child well-being and student achievement, high-quality prekindergarten programs for low-income children at risk for underachievement produced economic returns ranging from \$4 to \$10 per dollar invested. Others make similar arguments (e.g. Heckman et al., 2010). Indeed, several studies conclude there is a return over time of \$8 to \$10 for every \$1 invested in high-quality prekindergarten programs (Barnett, 2007; Barnett & Masse, 2007; Karoly et al., 1998; Reynolds et al., 2011; Zigler, Gilliam, & Jones, 2006; and Gormley, 2007).

In a more detailed analysis, Lynch (2007) found that voluntary, high-quality, publicly funded prekindergarten programs targeted to the poorest 25 percent of three-and four-year-olds generate substantial benefits that eclipse the costs of the programs in six years. By 2050, Lynch estimated the annual benefits of these prekindergarten programs would exceed the program costs in that year by a ratio of 12.1 to one. He estimated the costs of a high-quality half-day program for these children at \$6,300 (2006 dollars) for each of the two million children enrolled. He further estimated if individual states mainly funded those programs instead of the federal government, then by 2050 all 50 states would realize net benefits in tax revenues from the programs in four to 29 years.

Further, Lynch (2007) estimated if a voluntary, high-quality, publicly funded universal half-day prekindergarten program for three-and four-year-olds was established, budgetary savings would surpass costs in about nine years and, by 2050, benefits would exceed costs by an 8.2:1 ratio. He assumed these prekindergarten programs would cost about \$6,300 per student and would enroll approximately seven million children when fully phased in. University of Chicago economist Heckman (2015) goes beyond these assertions and argues investments in early childhood education potentially reduce deficits and improve the overall economy.

The Case for Integrated Prekindergarten through Grade Three Programs

The discussion above considered prekindergarten programs, but said little about prekindergarten through grade three programs or their benefits. While there is growing evidence that integrating prekindergarten programs with primary grades can lead to increased educational benefits, there has been less research in this field.

Takanishi and Kauerz (2008) argue that the prekindergarten through grade three years are the cornerstone of any educational system. They point out the importance of quality for integrated prekindergarten through grade three programs in providing strong foundations for lifelong learning, educational excellence, and competitiveness in the marketplace. Bogard (2003) suggests that variability in prekindergarten experiences is a strong predictor of children's outcomes, and the link is stronger for low-income children. Bogard suggests a prekindergarten through grade three approach to early childhood education will help "level the playing field" by supporting better teacher preparation and qualifications, as well as establishing sequential learning experiences from prekindergarten through grade three.

One of the challenges in thinking about prekindergarten through grade three programs is the need to coordinate traditional education programs in kindergarten through grade with prekindergarten programs. This takes on a number of dimensions. First, even if the prekindergarten programs are in the same school, the need to coordinate education programs (curriculum, PD, teacher collaboration, school facilities) becomes more complex with the addition of more staff, more students, and more grade levels to integrate into the program. Second, many prekindergarten programs are offered by providers other than the public school system – frequently at sites other than the local school. This further complicates the coordination efforts.

Finally, this is further complicated by prekindergarten programs remaining voluntary for the foreseeable future. Thus, some children will continue to come to kindergarten without the benefit of prekindergarten programs, and other children, who have had access to prekindergarten programs, will bring those benefits to the first years of formal schooling. In addition, prekindergarten through grade three program success depends on the educational program quality in kindergarten through grade three, which varies across schools, school districts, and states. This study addresses that issue by using an EB model to estimate the resources needed for a high-quality program in all prekindergarten through grade three classrooms.

Those who advocate for prekindergarten through grade three programs also support many of the components of success for high-quality prekindergarten programs. These include full-day programs with low pupil/teacher ratios staffed by highly qualified teachers and aides, along with support for articulating curriculum, providing PD, fostering teacher collaboration, and helping children with special educational needs.

In earlier research, Picus, Odden, and Goetz (2009), as part of an overall effort to cost out prekindergarten through grade three programs in all states, developed case studies of several integrated prekindergarten programs. The case studied showed programs were provided in regular elementary school settings and often organized schools into prekindergarten and grade one, grade two and three, and grade four and five collegial teacher teams; provided prekindergarten teachers with the same pupil-free time as the grade-level elementary teachers so they could collaboratively plan during the regular school day; integrated the prekindergarten and grade one curriculum; and generally augmented a kindergarten through grade five elementary school with an additional one to three prekindergarten classrooms. Most of the prekindergarten classrooms staffed one teacher and one aide for every 15 to 20 students.

In addition, and as recommended by the NIEER standards, such programs had classroom teachers fully certified as early childhood educators and paid on the same salary schedule as the other teachers in the school and school system (see also Camilli et al., 2010; Whitebrook, 2004).

The Evidence-Based Method to Providing Prekindergarten Integrated Program

The EB method has been used to identify costs for integrated prekindergarten programs in three recent studies. The first was the major study Picus Odden & Associates (POA) conducted for The Fund for Child Development, which developed estimated costs for providing such programs in all states in the country using various assumptions of eligibility and participation (Picus, Odden & Goetz, 2009). The second was a study conducted in 2011 as part of an adequacy study for the State of Texas (Picus, Odden, Goetz, & Aportela, 2012). The third was an analysis conducted for Maine as part of a 2013 recalibration of its adequacy-oriented school funding system (Picus et al., 2013).

In these three studies, the EB elementary school model was used to develop a per prekindergarten pupil cost for a high-quality prekindergarten program. The per pupil cost figure was derived from a prototypical prekindergarten program of 150 students, which included 10 classrooms of 15 students each with the staffing and program elements identified in Table 3.2. These elements draw from the elements and ratios that the EB model provides for regular elementary schools. The major difference is that for all prekindergarten classes, the EB model provides one FTE teacher position and one FTE instructional aide position for every 15 prekindergarten students.

The prototypical prekindergarten school functions and includes resources similarly to the regular EB elementary school model with the exception that in the model described here, the school has only prekindergarten classrooms. The EB prekindergarten teachers trigger elective teachers and substitutes just as in a regular elementary school. Pupils also trigger instructional coaches, pupil support, secretaries, and all the per pupil dollar amounts – technology, instructional materials, PD, assessments – as for a regular elementary school. The model includes an assistant principal position to provide a prekindergarten program coordinator, and also includes central office costs such as central administration and operation and maintenance. Further, the model includes putting prekindergarten teachers on the same salary schedule as teachers of other grades, as a way to ensure high-quality staff in the programs (Camilli et al., 2010; Whitebrook, 2004).

Table 3.2 summarizes the program elements of the EB prototypical prekindergarten program.

TABLE 3.2

ELEMENTS FOR AN EVIDENCE-BASED PROTOTYPICAL PREKINDERGARTEN PROGRAM

	Prekindergarten Prototype
Pupils	**150**
Personnel Resources	
Core Teachers	10.00
Elective Teachers	2.00
Instructional Facilitators	0.75
Pupil Support (e.g. Counselors, Family Outreach, Nurse)	1.50
Supervisory Aides	0.75
Instructional Aides	10.00
Substitute Teachers	0.64
Program Coordinator (in lieu of Principal/AP)	1.00
School Secretary	1.00
Dollar per Pupil Resources	
PD Resources	150
Technology/Equipment	150
Instructional Materials	150
Assessments	150

The data in the table can be used to identify a separate per prekindergarten pupil cost for the program.

On the other hand, Maryland's primary prekindergarten program is incorporated into the base foundation expenditure per pupil figure. The most straightforward way to follow this approach would be to simply add the prekindergarten student count to the prototypical elementary school, staff those classrooms at one teacher and one aide position for every 15 students, and let all of the other formulas work as currently designed. Such an approach would trigger all the resources in the model portrayed in Table 3.2 and would seamlessly integrate prekindergarten support into the state's funding model. If prekindergarten students were also at risk of underachievement, then they would trigger the resources for summer school and afterschool programs, thus allowing for more of a year-round, full-service prekindergarten program.

1b. Full-Day Kindergarten

The table below shows that the EB model provides for full-day kindergarten. Since 2007-08, Maryland has supported full-day kindergarten for all five-year-olds.

Current Evidence-Based Recommendation
Full-day kindergarten program: Each kindergarten student counts as 1.0 pupil in the funding system

Analysis and Evidence

Research shows that full-day kindergarten, particularly for students from low-income backgrounds, has significant positive effects on student learning in the early elementary grades (Gullo, 2000; Slavin, Karweit & Wasik, 1994). Fusaro's (1997) meta-analysis of 23 studies comparing the achievement effect of full-day kindergarten to half-day kindergarten programs found an average effect size of +0.77,[6] which is substantial. Children participating in full-day kindergarten programs do better learning the basic skills of reading, writing, and mathematics in the primary grades than children who receive only a half-day program or no kindergarten at all (see also Lee, Burkam, Ready, Honigman, & Meisels, 2006).

In 2003, using nationally representative, longitudinal data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS–K), Denton, West & Walston (2003) showed that children who attended full-day kindergarten had a greater ability to demonstrate reading knowledge and skill than their peers in half-day programs, across the range of family backgrounds. Cooper et al.'s (2010) comprehensive meta-analysis reached similar conclusions, finding the average effect size of students in full-day versus half-day kindergarten to be +0.25. Moreover, a randomized controlled trial, the gold standard of education research, found the effect of full-day versus half-day kindergarten to be about +0.75 standard deviation (Elicker & Mathur, 1997). As a result of this research, funding full-day kindergarten for five-year-olds, as well as for four-year-olds, is an increasingly common practice among the states (Kauerz, 2005).

Since research suggests that children from all backgrounds can benefit from full-day kindergarten programs, the EB model supports a full-day program for all students by counting such students as 1.0 in the state aid formula.

2. Elementary Core Teachers/Class Size

In staffing schools and classrooms, the most expensive decision superintendents and principals make is that of class size. Core teachers are defined as grade-level classroom teachers in elementary schools. In middle and high schools, core teachers are those who teach core subjects such as mathematics, science, language arts, social studies, and world language.

Current Evidence-Based Recommendation
Grades kindergarten through grade three: 15 Grades four and five: 25

[6] Effect size is the amount of a standard deviation in higher performance that the program produces for students who participate in the program versus students who do not. An effect size of 1.0 indicates that the average student's performance would move from the 50th to the 83rd percentile. The research field generally recognizes effect sizes greater than 0.25 as significant and greater than 0.50 as substantial.

Analysis and Evidence

The gold standard of educational research is randomized controlled trials, which provide scientific evidence on the impact of a certain treatment (Mosteller, 1995). Thus, the primary evidence on the impact of small classes today is the Tennessee STAR study, which was a large-scale, randomized controlled experiment of class sizes of approximately 15 compared to a control group of classes with approximately 24 students in kindergarten through grade three (Finn & Achilles, 1999; Word et al., 1990). The study found that students in the small classes achieved at a significantly higher level (effect size of about 0.25 standard deviation) than those in regular class sizes, and the impacts were even larger (effect size of about 0.50) for low-income and minority students (Finn, 2002; Grissmer, 1999; Krueger, 2002). The same research also showed that a regular class of 24 to 25 with a teacher and an instructional aide *did not* produce a discernible positive impact on student achievement, a finding that undercuts proposals and widespread practices that place instructional aides in elementary classrooms (Gerber, Finn, Achilles, & Boyd-Zaharias, 2001).

Subsequent research showed the positive impacts of the small classes in the Tennessee study persisted into the middle and high school years, and the years beyond high school (Finn, Gerger, Achilles, & Zaharias, 2001; Konstantopulos & Chung, 2009; Krueger, 2002; Mishel & Rothstein, 2002; Nye, Hedges, & Konstantopulos, 2001a, 2001b). Longitudinal research on class size reduction also found that the lasting benefits of small classes include a reduction in the achievement gap in reading and mathematics in later grades (Krueger & Whitmore, 2001).

Although some argue that the impact of the small class sizes is derived primarily from just kindergarten and grade one, Konstantopoulos and Chung (2009) found that the longer students were in small classes, i.e. in kindergarten through grade three, the greater the impact on grade four through eighth achievement. They concluded that the full treatment – small classes in the first four grades – had the greatest short- and long-term impacts.

Though differences in analytical methods and conclusions characterize some of the debate over class size (see Hanushek, 2002; Krueger, 2002), the EB model reflects those concluding class size makes a difference for class sizes of approximately 15 students with one teacher (and not class sizes of 30 with an aide or two teachers) and only for kindergarten through grade three.

Finally, as funds for schools become scarcer, it is legitimate to raise the issue of the cost of small classes versus the benefits. Whitehurst and Chingos (2010) argue that though the Tennessee STAR study supports the efficacy of small classes, there is other research today that has produced more ambiguous conclusions. However, they also note that this other research includes class size reductions in grades above kindergarten through grade three and “natural experiments” rather than randomized controlled trials. Most importantly, they also conclude that while the costs of small classes are high, the benefits, particularly the long-term benefits, outweigh the costs and small class sizes in kindergarten through grade three “pay their way.”

The study team consistently recommends that states fund all other elements of the EB model before putting funds into the class size recommendations displayed above. The study team has made this recommendation because research shows many other components of the EB model are more cost effective in terms of improving student performance, particularly for improving the performance of students at risk of academic failure.

3. Secondary Core Teachers/Class Size

In middle and high schools, core teachers are those who teach core subjects such as mathematics, science, language arts, social studies, and world language. AP classes in these subjects are considered core classes. However, because Maryland policy requires students to take four years of math, regardless of what classes were taken in middle school, there is a need for additional teacher resources to provide for very small, highly advanced classes. This need sometimes arises in other subjects as well. Consequently, the EB model for Maryland provides one additional teachers for each prototypical high school, which provides enough resources to offer up to five of these very small classes.

Current Evidence-Based Recommendation
Grade six through twelve: 25 (plus one additional teacher in prototypical high schools for advanced classes)

Analysis and Evidence

There is less research evidence on the most effective class size in grade four through 12 than there is on effective class size in kindergarten through grade three. As a result, in developing the EB model, the study team sought evidence on the most appropriate secondary class size from typical and best practices to identify the most appropriate class size for these grades. The national average class size in middle and high schools is roughly 25, and nearly all comprehensive school reform models were developed on the basis of a class size of 25 (Odden, 1997a; Stringfield, Ross, & Smith, 1996), a conclusion on class size reached by the dozens of experts who created these whole-school design models. Although many professional judgment (PJ) panels[7] in many states have recommended secondary class sizes of 20, none cited research or best practices to support that proposal.

Citing more recent studies, Whitehurst and Chingos (2010) argue that there might be a modest linear relationship in improving student performance when class size drops from between 25 and 30 students to 15. The study team's view of the evidence and impact is that the gains identified are modest at best, and insufficient to alter the EB class size formulas. Both the elementary and secondary EB class size

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[7] The professional judgment approach, another widely recognized method for estimating education adequacy, makes use of the recommendations of panels of expert PK-12 practitioners for estimating adequate education funding.

recommendations are within the general parameters of actual class sizes in Maryland (Maryland State Department of Education, 2013).

4. Elective/Specialist Teachers

In addition to core classroom teachers, the EB model provides additional elective/specialist teachers to support core teachers. This allows schools to offer a full liberal arts curriculum – core and electives – as well as time during the school day for teachers to collaborate on instructional planning, participate in PD activities, and otherwise plan for classroom instruction. Generally, non-core or elective teachers, also called specialist teachers, offer courses in subjects such as music, band, art, physical education (PE), health, and career-technical education (CTE).

Current Evidence-Based Recommendation
Elementary Schools: 20% of core elementary teachers Middle Schools: 20% of core middle school teachers High Schools: 33⅓% of core high school teachers

Analysis and Evidence

In addition to the core subjects addressed above, schools need to provide a solid, well-rounded curriculum including art, music, library skills, and physical education. Teachers also need some time during the regular school day to work collaboratively and engage in job-embedded PD. Providing every teacher one period a day for collaborative planning and focused PD requires an additional 20 percent allocation for elective teachers. Using this elective staff allocation, every teacher – core and elective – would teach five of six periods during the day and have one period for planning, preparation, and collaborative work. One of the most important elements of effective collaborative work is team-focused, data-based decision-making using student data to improve instructional practices, now shown to be effective by a recent randomized controlled trial (Carlson, Borman, & Robinson, 2011).

The 20 percent additional staff is adequate for elementary and middle schools, but the EB method developed a different argument for high schools. If the goal is to have more high school students take a core set of rigorous academic courses and learn the course material at a high level of thinking and problem solving, cognitive research findings suggest that use of longer class periods, such as a block schedule, is a better way to organize the instructional time of a high school. (Bransford, Brown, & Cocking, 1999; Donovan & Bransford, 2005a, 2005b, 2005c). Typical block scheduling for high schools includes four 90-minute blocks where teachers provide instruction for three of those 90-minute blocks and have one block (90 minutes) for planning, preparation, and collaboration each day. This schedule requires elective teachers at a rate of 33⅓ percent of the number of core teachers. This block schedule would operate with students taking four courses each semester while attending the same classes each day or with students taking eight courses each semester while attending different classes every other day. Such a schedule could also accommodate a few "skinny" blocks (45-minute periods) for some classes. Each of these specific ways of structuring a block schedule would require an additional 33⅓ percent of the number of core teachers to serve as elective teachers to provide the regular teacher with a “block” for planning, preparation, and collaboration each day.

This staffing recommendation for high schools would be sufficient for high schools to provide all students with a rigorous set of courses throughout grade nine through twelve and the 21 credits required for high school graduation in Maryland, as well as be college ready for any university in the country.

The study team explicitly notes that the elective teacher recommendation described above does not provide sufficient resources, at the same class sizes, for either middle schools or high schools to offer a seven-period day and require teachers to instruct for only five of those periods. The EB model does not resource schools at that level for two primary reasons. First, the EB model formulates recommendations on strategies and resources that help to improve student performance in the core subjects of reading/English/language arts, mathematics, science, history/geography, and world language, in part by providing nearly an hour of instruction in each of these subjects daily. Restructuring the day to add a seventh period is usually accomplished by reducing the minutes of instruction in core subjects and thus is not a strategy likely to boost performance in those subjects, regardless of the arguments about the motivational aspects of elective classes. Second, increasing the provision of specialist and elective teachers to 40 percent in both middle and high schools is more costly. Therefore, a recommendation of 40 percent specialists and elective teachers in secondary schools would result in added costs and a potential decrease in instructional effectiveness for the core subjects, something not aligned with the framework for the EB approach to adequacy.

The above formulas for core and elective teachers are premised on the class size ratios specified: 15 for kindergarten through grade three and 25 for grade four through six. The formulas assume the elective class sizes are the same, and therefore produce a total of 31.2 teacher positions for a 450-student prototypical elementary school, 21.6 teacher positions for a 450-student prototypical middle school, and 32 for a prototypical 600-student high school. These class size and core and specialist teacher ratios can then be converted to a teacher-staffing ratio, a term used in other states. The teacher-student ratio would be 14.42 for the prototypical elementary school, 20.83 for the prototypical middle school, and 18.75 for the prototypical high school. These teacher-staffing ratios are for *teaching* staff only. The EB model includes other staff, such as instructional coaches, guidance counselors, and nurses, which represent additional staff for each school.

5. Instructional Facilitators/Coaches

Coaches, or instructional facilitators, coordinate the instructional program, but most importantly provide the critical ongoing instructional coaching and mentoring that the PD literature shows is necessary for teachers to improve their instructional practice (Cornett & Knight, 2008; Crow, 2011; Garet, Porter, Desimone, Birman, & Yoon, 2001; Joyce & Calhoun, 1996; Joyce & Showers, 2002). This means that they spend the bulk of their time with teachers modeling lessons, giving feedback to teachers, working with teacher collaborative teams, and generally helping to improve the instructional program. The few instructional coaches who also function as school technology coordinators provide the technological expertise to fix small problems with the computer system, install software, connect computer equipment so it can be used for both instructional and management purposes, and provide PD to embed computer technologies into a school's curriculum. This report expands on the rationale for these individuals in the section on PD (Element 16), but includes them here as they represent teacher positions.

Current Evidence-Based Recommendation
1.0 FTE instructional coach position for every 200 students

Analysis and Evidence

Only a few states (Arkansas, New Jersey, Wyoming, and, to a modest degree, North Dakota) explicitly provide resources for school- and classroom-based instructional coaches, yet instructional coaches are key to making PD work (see Element 16 below). Most comprehensive school designs (see Odden, 1997; Stringfield, Ross, & Smith, 1996) and EB studies conducted in other states (Arizona, Arkansas, Kentucky, Maine, North Dakota, Texas, Washington, Wisconsin) call for school-based instructional facilitators or instructional coaches (sometimes called mentors, site coaches, curriculum specialists, or lead teachers).

Early research found strong effect sizes (1.25 to 2.71) for coaches as part of PD (Joyce & Calhoun, 1996; Joyce & Showers, 2002). A 2010 evaluation of a Florida program that provided reading coaches for middle schools found positive impacts on student performance in reading (Lockwood, McCombs & Marsh, 2010). A related study found that coaches provided as part of a data-based decision-making initiative also improved both teachers' instructional practice and students' achievement (Marsh, McCombs, & Martorell, 2010).

More importantly, a recent randomized controlled trial of coaching (Pianta, Allen, & King, 2011) found significant positive impacts in the form of student achievement gains across four subject areas – mathematics, science, history, and language arts. This gold standard of research provides further support to this element as an effective strategy to boost student learning.

In terms of numbers of coaches, several comprehensive school designs suggest that although one instructional coach might be sufficient for the first year of implementation of a school-wide program, in a school with about 500 students, additional instructional coaches are needed in subsequent years. Moreover, several technology-heavy school designs recommend a full-time facilitator who spends at least half time as the site's technology expert. Thus, drawing from all programs, the study team concludes that 1.0 FTE instructional coach/technology coordinator is needed for every 200 students in a school. This resourcing strategy works for elementary as well as middle and high schools.

Although instructional coaching positions are identified as FTE positions, schools could divide the responsibilities across several individual teachers. For example, the 3.0 FTE positions in a 600-student high school could be structured with six half-time teachers and instructional coaches. In this example, each teacher/coach would work 50 percent time as a coach – perhaps in one curriculum area such as reading, math, science, social studies, or technology – and 50 percent time as a classroom teacher or tutor.

This level of staffing for coaches, combined with the additional elements of PD discussed below, focus on making Tier 1 instruction (in the RTI frame) as effective as possible, providing a solid foundation of high-quality instruction for everyone, including students who struggle to learn to proficiency.

6. Core Tutors/Tier 2 Intervention

The most powerful and effective approach for helping students struggling to meet state standards is individual one-to-one or small group (one-to-three or one-to-five) tutoring provided by licensed teachers (Shanahan, 1998; Wasik & Slavin, 1993). In earlier reports, the EB model allocated tutors to schools based on the number of at risk students. Reports since then recognize that all schools, even with those without at risk students, have some students at risk of academic failure and need some minimum Tier 2 resources. Thus, the EB model has been modified so that each prototypical school receives at least one tutor regardless of the number of at risk students. Consequently, this report identifies the tutor resources a school receives under the current EB model within the Core Staffing section and discusses the need for more tutors in Element 22 below.

Current Evidence-Based Recommendation
1.0 FTE tutor position in each prototypical school (Additional tutors are enabled through the at risk pupil count in Element 22)

Analysis and Evidence

Students who must work harder and need more assistance to achieve to proficiency levels especially benefit from preventative tutoring (Cohen, Kulik, & Kulik, 1982). Tutoring program effect sizes vary by the components of the approach used, e.g. the tutoring program's nature and structure. Effect sizes of tutoring programs on student learning reported in meta-analyses range from 0.4 to 2.5 (Cohen, Kulik, & Kulik, 1982; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993) with an average of about 0.75 (Wasik & Slavin, 1993).

The impact of tutoring programs depends on how they are staffed and organized, the tutoring program's link to the core program, and tutoring intensity. Researchers (Cohen, Kulik & Kulik, 1982; Farkas, 1998; Shanahan, 1998; Wasik & Slavin, 1993) and experts on tutoring practices (Gordon, 2009) found greater effects when tutoring includes:

- Using professional teachers as tutors;
- initially providing one-to-one tutoring to students;
- using tutors trained in specific tutoring strategies;
- closely aligning tutoring to the regular curriculum and specific learning challenges, with appropriate content-specific scaffolding and modeling;

- allowing sufficient time for tutoring; and
- highly structuring programming, both substantively and organizationally.

Several specific structural features are associated with effective one-to-one tutoring programs:

- First, each tutor would tutor one student every 20 minutes, or three students per hour. This would allow one tutor position to tutor 18 students a day. (Since tutoring is an intensive activity, individual teachers may spend only half their time tutoring, but a 1.0 FTE tutoring position would allow 18 students per day to receive one-to-one tutoring). Four positions would allow 72 students to receive individual tutoring daily in the prototypical elementary and middle schools.
- second, most students do not require tutoring all year long. Tutoring programs generally assess students quarterly and change tutoring arrangements. With modest changes such as these, nearly half the student body of a 400-student school unit could receive individual tutoring during the year.
- third, not all students who are from low-income backgrounds require individual tutoring, so core tutors and a portion of the at risk tutor allocation could be used for students in the school who may not be from a lower income family but have a learning issue that could be remedied by tutoring. This also is part of the rationale for including one tutor in each prototypical school, regardless of the number of at risk students.

Though this discussion focuses on *individual* tutoring, schools could also deploy these resources for small group tutoring. In a detailed review of the evidence on how to structure a variety of early intervention supports to prevent reading failure, Torgeson (2004) shows how one-to-one tutoring, one-to-three tutoring, and one-to-five small group sessions (all Tier 2 interventions) can be combined for different students to enhance their chances of learning to read successfully.

One-to-one tutoring would be reserved for the students with the most severe reading difficulties, such as scoring at or below the 20^{th} or 25^{th} percentiles on a norm-referenced test or below basic level on state achievement tests. Intensive instruction for groups of three to five students would be provided for students above those levels but below the proficiency level.

It is important to note that the instruction for all student groups needing extra help needs to be more explicit and sequenced than that for other students. Young children with weakness in knowledge of letters, letter sound relationships, and phonemic awareness need explicit and systematic instruction to help them first decode, then learn to read and comprehend. As Torgeson (2004:12) states:

> Explicit instruction is instruction that does not leave anything to chance and does not make assumptions about skills and knowledge that children will acquire on their own. For example, explicit instruction requires teachers to directly make connections between letters in print and the sounds of words, and it requires that these relationships be taught in a comprehensive fashion. Evidence for this is found in a recent study of preventive instruction given to a group of high at risk children in kindergarten, first grade and second grade […..] only the most [phonemically] explicit intervention produced a reliable increase in the growth of word-reading ability … schools must be

> prepared to provide very explicit and systematic instruction in beginning word-reading skills to some of their students if they expect virtually all children to acquire work-reading skills at grade-level by the third grade …. Further, explicit instruction also requires that the meanings of words be directly taught and be explicitly practiced so that they are accessible when children are reading text…. Finally, it requires not only direct practice to build fluency…. but also careful, sequential instruction and practice in the use of comprehension strategies to help construct meaning.

Torgeson (2004) goes on to state that meta-analyses consistently show the positive effects of reducing reading group size (Elbaum, Vaughn, Hughes & Moody, 1999) and identifies experiments with both one-to-three and one-to-five teacher-student groupings. Though one-to-one tutoring works with 20 minutes of tutoring per student, a one-to-three or one-to-five grouping requires a longer instructional time for the small group – up to 45 minutes. The two latter groupings, with 45 minutes of instruction, reduced the rate of reading failure to a miniscule percentage.

For example, if the recommended numbers of tutors are used for such small groups, one FTE reading position could teach 30 students a day in the one-to-three setting with 30 minutes of instruction per group and more than 30 students a day in the one-to-five setting with 45 minutes of instruction per group. Four FTE tutoring positions could then provide this type of intensive instruction for up to 120 students daily. In short, though the EB model emphasizes one-to-one tutoring, and some students need one-to-one tutoring, other small group practices (which characterize the bulk of Tier 2 interventions) can also work, with the length of instruction for the small group increasing as the size of the group increases.

Though Torgeson (2004) states that similar interventions can work with middle and high school students, the effect is often smaller, as it is much more difficult to undo the lasting damage of not learning to read, particularly when students with severe reading deficiencies enter middle and high schools. However, a new randomized control study (Cook et al., 2014), discussed below, found similarly positive impacts of a tutoring program for adolescents in high poverty schools *if* it was combined with counseling. This is possible with the EB model as it includes such additional non-academic pupil support resources (see Element 23 discussion).

Two recent randomized controlled trials of the effectiveness of tutoring for students at risk of academic failure strengthen the above rationale for tutors. These trials also support the study team's logic for providing a minimum level of tutor support in all schools and additional tutors for schools with more need. At the elementary level, using a randomized controlled trial, May et al. (2013) assessed the impact of tutors in a Reading Recovery program. In the third year of a five-year evaluation, they found that Reading Recovery tutoring had an effect size of 0.68 on overall reading scores relative to the population of students eligible for such services in the specific study and a 0.47 effective size relative to the national population of grade one struggling readers. The effects were similarly large for reading words and reading comprehensive sub-scales.

For students in high schools, Cook et al. (2014) reported on a randomized controlled trial of a two-pronged intervention that provided disadvantaged youth with tutoring *and* counseling. They found that intensive individualized academic extra help (tutoring) combined with non-academic support seeking to teach grade nine and 10 youth social-cognitive skills based on the principles of cognitive behavioral therapy (CBT) led to improved math and reading performance. The study sample consisted mainly of students from low-income and minority backgrounds, which generally pose the toughest challenges. The effect size for math was 0.65 and for reading was 0.48. The combined program also appeared to increase high school graduation by 14 percentage points (a 40-percent hike). The authors concluded that this intervention seemed to yield larger gains in adolescent outcomes per dollar spent than many other intervention strategies.

These studies are highlighted for several reasons. First, they represent new, randomized controlled trials (the gold standard of research) supporting the efficacy of tutoring. Second, they show that tutoring can work not only for elementary, but also for high school students (most of the tutoring research addresses only elementary-aged students). Third, they demonstrate that tutoring can work even in the most challenging educational environments. Fourth, they bolster the EB argument below that extra-help resources in schools triggered by poverty/at risk status should also include some non-academic, counseling resources such as tutoring combined with counseling.

In earlier adequacy study reports, the study team recommended that at risk student counts determine tutor positions. The recommended ratio was one position for every 100 at risk students with a minimum of one for each prototypical school. As a result, a school without any at risk students would receive the minimum of one tutor position for students at risk of academic failure, and a school with 100 at risk students would receive the same tutoring or Tier 2 intervention resources, although it may have more need for such additional resources. Today, educators and policy makers across the country not only argue that schools with few low-income students still have students who struggle to learn to proficiency, but also that the number of such students will likely increase with the more rigorous CCRS. The study team agreed with those arguments and modified the EB recommendations for tutoring resources.

The revised EB model provides one tutor/Tier 2 intervention position in each prototypical school. In conjunction with that change, the EB model adjusts the ratio for additional tutor positions to one position for every 125 at risk students. The additional support beyond the first tutor per prototypical school is discussed again in Section 22, students at risk of academic failure below.

The new EB recommendation for tutor/Tier 2 intervention positions is more generous than the previous recommendation of one per 100 at risk students with a minimum of one for each prototypical school. In the above example, under the previous recommendation a prototypical school with no at risk students would receive one position, as would a prototypical school with 100 at risk students. The revised EB recommendation would provide 1.0 position to the school with no at risk students, but would provide 1.0 core tutor position for a school with 100 at risk students plus an additional 0.8 (100/125) position for the 100 at risk students for a total of 1.8 positions.

7. Substitute Teachers

Schools need some level of substitute teacher allocations to cover classrooms when teachers are sick short term, absent for other reasons, or on long-term sick or pregnancy leave. In many other states, substitute funds are budgeted at a rate of about 10 days for all teachers. The current EB model approach of providing funding equal to five percent of the cost of teacher salaries approximates that 10-day figure.

Current Evidence-Based Recommendation
Five percent of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, LEP, and special education)

Analysis and Evidence

Five percent of a teacher work year equals approximately 10 days, so this provision provides up to 10 days of substitute teacher resources for each teacher. This approach does not mean that each teacher is provided 10 substitute days a year; it means the district receives a "pot of money" approximately equal to 10 substitute days per year for all teachers to cover classrooms when teachers are sick short term, absent for other reasons, or on long-term sick or pregnancy leave. This allocation is not for 10 days above what is currently provided; it simply is an amount of money for substitute teachers estimated at 10 days for each teacher on average. These substitute funds are not meant to provide for student-free days for PD. The PD recommendations are fully developed in a separate section below (Element 16).

8. Core Guidance Counselors and Nurses

The previous EB model provided student or pupil support resources without specifying guidance counselor or nurse positions. During the past five years that approach has been changed to provide guidance counselor and nurse positions in the core program and to provide additional pupil support positions (e.g. social workers and family liaison persons) based on at risk student counts as described in Element 23 below. Thus, core student support services now specify guidance counselor and nurse positions.

Current Evidence-Based Recommendation
1.0 FTE guidance counselor for every 450 kindergarten through grade five students 1.0 FTE guidance counselor for every 250 students, grades six through twelve 1.0 FTE nurse for every 750 K–12 students (Additional student support resources are provided on the basis of at risk student counts in Element 23)

Analysis and Evidence

For guidance counselors, the EB model uses the standards from the American School Counselor Association (ASCA). Those standards recommend one counselor for every 250 secondary (middle and high school) students. This produces 1.8 pupil support positions for a 450-student prototypical middle school and 2.4 pupil support positions for a 600-student prototypical high school.

Today, many states require guidance counselors in elementary schools as well. Moreover, even in states that do not require counselors at the elementary level, a growing number of elementary schools have begun to employ these personnel. Consequently, the EB model has been modified in recent years to include a minimum of one guidance counselor for a prototypical elementary school. The EB model provides additional pupil support personnel to schools based on at risk student counts as described in Element 23 below.

These recommendations align with Maryland standards on guidance counselors. The Code of Maryland Regulations (COMAR) 13A.05.05.02 mandates a planned, systematic program of counseling, consulting, appraisal, information, and placement services for students in prekindergarten through grade 12. The program must be designed to address three goal areas: (1) personal and academic growth, (2) educational and career decision making, and (3) social/emotional growth and interpersonal relations. *However, COMAR does not mandate a ratio of students to counselors*. Generally, elementary schools have one certified school counselor and middle and high schools have two to five certified school counselors, depending on the size of the school.

The physical and medical needs of students also have changed dramatically over the past several years. Many students need medications during the school day; often school staff are required to administer such medications. Other students have additional medical or physical needs, and trends in several states show these needs have grown over the past decade. Thus, the EB model has been enhanced to provide nurses as core positions. Drawing from the staffing standard of the National Association of School Nurses, the EB model now provides core school nurses at the rate of 1.0 FTE nurse position for every 750 students.

This approach also is in line with Maryland requirements. As the MSDE's website notes:

> Since 1991, the Code of Maryland Regulations COMAR 13A.05.05.05 - 15 has mandated health coverage in schools by a school health services professional. The school health services professional is defined in COMAR as a physician, certified nurse practitioner, or registered nurse, with experience and or training in working with children or school health programs. Local school systems, with the assistance of local health departments, are responsible for providing school health services to all public schools. *The regulations do not specify a ratio of school nurse to student* (emphasis added).

Local jurisdictions in Maryland meet the mandate in a variety of ways. Some have a registered nurse in every school; others employ licensed practical nurses or registered nurses in each school. In some schools, trained unlicensed health staff are working under the supervision of a registered nurse who may be responsible for one to three schools. Either local school systems or local health departments manage school health services programs. School nurses work with students, families, health care providers, and school staff to support student success.

9. Supervisory Aides

Supervisory aides are non-certified individuals who provide needed services and supervision necessary to a school such as lunch duty, hallways, and external door monitoring, and helping elementary students get on and off buses. Supervisory aides do not provide assistance to teachers inside or outside the classroom nor instruction of any kind to students.

Current Evidence-Based Recommendation
One supervisory aide for every 225 elementary and middle school students; and one supervisory aide for every 200 high school students

Analysis and Evidence

Elementary, middle, and high schools require staff for responsibilities that include lunch duty, before and after-school playground supervision, sometimes bus duty, and other responsibilities that do not require a licensed teacher. Covering these duties generally requires an allocation of supervisory aides at about the rate of 2.0 FTE aide positions for a school of 450 students.

However, research does not support the use of instructional aides for improving student performance. As noted in Element 2, the Tennessee STAR study (which produced solid evidence through field-based randomized controlled trials that small classes work in elementary schools) produced evidence that instructional aides in a regular-sized classroom do not add instructional value, i.e. do not positively impact student achievement (Gerber, Finn, Achilles, & Boyd-Zaharias, 2001).

At the same time, districts may want to consider a possible use of instructional aides, as supported by research. Two studies have shown how instructional aides could be used to tutor students. Farkas (1998) has shown that if aides are selected according to clear and rigorous literacy criteria, are trained in a specific reading tutoring program, provide individual tutoring to students in reading, and are supervised, then they can have a significant impact on student reading attainment. Some districts have used Farkas-type tutors for students struggling in reading in the upper elementary grades. Another study by Miller (2003) showed that such aides could also have an impact on reading achievement if used to provide individual tutoring to students at risk of academic failure in grade one.

Neither study supports the typical use of instructional aides as general teacher helpers. Evidence shows that instructional aides can have an impact, but only if they are selected according to educational criteria, trained in a specific tutoring program, deployed to provide tutoring to students at risk of academic failure, and closely supervised.

10. Library Media Specialists

Most schools have a library, and staff resources must be sufficient to operate it and incorporate appropriate technologies into the library system.

Current Evidence-Based Recommendation
One library media specialist position for every 450 elementary and middle school students, and for every 600 high school students

Analysis and Evidence

There is scant research on the impact of school librarians on student achievement. In 2003, six states conducted studies of the impacts of librarians on student achievement: Florida, Minnesota, Michigan, Missouri, New Mexico, and North Carolina. In 2012, Colorado also conducted a statewide study using data from 2005–11. The general finding is, regardless of family income, children with access to endorsed librarians working full time perform better on state reading assessments (Rodney, Lance, & Hamilton-Rennell, 2003; Lance & Hofschire, 2012). The Michigan study found that regardless of whether the librarian was endorsed, student achievement was better for low-income children, but higher achievement was associated with having an endorsed librarian rather than an unendorsed librarian (Rodney, Lance, & Hamilton-Rennell, 2003). Each state examined the issue differently, but library staffing and the number of operating hours were generally associated with higher academic outcomes. The EB model recommendation for library staff is derived from best practices in other states, state statutes, and the referenced research.

This recommendation aligns with standards for library programs for Maryland schools.

11. Principals and Assistant Principals

Every school unit needs a principal. There is no research evidence on the performance of schools with or without a principal. All comprehensive school designs and all prototypical school designs from all PJ studies around the country include a principal for every school unit.

Current Evidence-Based Recommendation
10 FTE principal for the 450-student prototypical elementary school 1.0 FTE principal for the 450-student prototypical middle school 1.0 FTE principal and 1.0 FTE assistant principal for the 600-student prototypical high school

Analysis and Evidence

Few, if any, comprehensive school designs for 500 students include assistant principal positions. Very few school systems around the country provide assistant principals to schools with 500 or fewer students. The EB model recommends that instead of one school with a large number of students, school buildings with large numbers of students be subdivided into multiple school units within the building, with each unit having a principal. This implies that one principal would be required for each school unit.

The EB model provides one assistant principal for the prototypical high school, largely for discipline and athletics.

12. School Site Secretarial Staff

Every school site needs secretarial support to provide clerical and administrative support to administrators and teachers, answer phones, greet parents when they visit the school, and help with paperwork.

Current Evidence-Based Recommendation
One secretary position for every 225 elementary and middle school students, and for every 200 high school students

Analysis and Evidence

The secretarial ratios included in the EB model generally are derived from common practices across the country. There is no research on the impact of clerical staff on student outcomes, yet it is impossible to have a school operate without adequate clerical staff support.

Dollar per Student Resources

This section addresses areas that are resourced by dollar per student amounts, including gifted and talented, PD, computers and other technology, instructional materials and supplies, and extra duty/student activities.

13. Gifted and Talented Students

A complete analysis of educational adequacy should consider the needs of gifted and talented students, most of which perform above state proficiency standards. This is important for all states whose citizens desire improved performance for students at all levels of achievement.

Current Evidence-Based Recommendation
$40 per ADM inflated annually

Analysis and Evidence

Research shows that developing the potential of gifted and talented students requires:

- Effort to discover the hidden talent of low-income and/or culturally diverse students;
- curriculum materials designed specifically to meet the needs of talented learners;
- acceleration of the curriculum; and
- special training in how teachers can work effectively with talented learners.

Discovering Hidden Talents in Low-Income and/or Culturally Diverse High Ability Learners

Research studies on the use of performance assessments, non-verbal measures, open-ended tasks, extended try-out and transitional periods, and inclusive definitions and policies show that these produce increased and more equitable identification practices for culturally diverse and/or low-income high ability learners. Access to specialized services for talented learners in the elementary years is especially important for increased achievement among vulnerable students. For example, culturally diverse high ability learners who participated in three or more years of specialized elementary and/or middle school programming had higher achievement at high school graduation, as well as other measures of school achievement, than a comparable group of high ability students who did not participate (Struck, 2003).

Access to Curriculum

Overall, research shows that curriculum programs specifically designed for talented learners produce greater learning than regular academic programs. Increased complexity of the curricular material is a key factor (Robinson & Clinkenbeard, 1998). Large-scale curriculum projects in science and mathematics in the 1960s, such as the Biological Sciences Curriculum Study (BCSC), the Physical Science Study Committee (PSSC), and the Chemical Bond Approach (CBA), benefited academically talented learners (Gallagher, 2002). Further, curriculum projects in the 1990s designed to increase the achievement of talented learners in core content areas such as language arts, science, and social studies produced academic gains in persuasive writing and literary analysis (VanTassel-Baska, Johnson, Hughes & Boyce, 1996; VanTassell-Baska, Zuo, Avery, & Little, 2002), scientific understanding of variables (VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998), and problem generation and social studies content acquisition (Gallagher & Stepien, 1996; Gallagher, Stepien, & Rosenthal, 1992).

Access to Acceleration

Because academically talented students learn quickly, one effective option for serving them is accelerated curriculum. Many educators and members of the general public believe acceleration always means skipping a grade. However, there are at least 17 different types of acceleration ranging from curriculum compacting (which reduces the amount of time students spend on material) to subject matter acceleration (going to a higher grade-level for one class) to high school course options like AP or concurrent credit (Southern, Jones, & Stanley, 1993). In some cases, acceleration means *content* acceleration, which brings more complex material to the student at his or her current grade-level. In other cases, acceleration means *student* acceleration, which brings the student to the material by shifting placement. Reviews of the research on different forms of acceleration have been conducted across several decades and consistently report the positive effects of acceleration on student achievement (Gallagher, 1996; Kulik & Kulik, 1984; Southern, Jones, & Stanley, 1993), including that of AP classes (Bleske-Rechek, Lubinski, & Benbow, 2004). Multiple studies also report participant satisfaction with acceleration and benign effects on social and psychological development.

Access to Trained Teachers

Research and teacher reports indicate that general classroom teachers make very few, if any, modifications for academically talented learners (Archambault et al., 1993), even though talented students have mastered 40 to 50 percent of the elementary curriculum before the school year begins. In contrast, teachers who receive appropriate training are more likely to provide classroom instruction that meets the needs of talented learners. Students report differences among teachers who have had such training, and independent observers in the classroom document the benefit of this training as well (Hansen & Feldhusen, 1994). Curriculum and instructional adaptation requires the support of a specially trained coach at the building level, which could be embedded in the instructional coaches recommended above (Reis & Purcell, 1993). Overall, learning outcomes for high-ability learners are increased when they have access to programs whose staff have specialized training in working with high-ability learners. This could be accomplished with the PD resources recommended below.

Overall, research on gifted programs indicates that the effects on student achievement vary by the strategy of the intervention. Enriched classes for gifted and talented students produce effect sizes of about +0.40 and accelerated classes for gifted and talented students produce somewhat larger effect sizes of +0.90 (Gallagher, 1996; Kulik & Kulik, 1984; Kulik & Kulik, 1992).

Practice Implications

At the elementary and middle school levels, the study team's understanding of the research on best practices is to place gifted students in special classes comprising all gifted students and accelerate their instruction, because such students can learn much more in a given time period than other students. When the pullout and acceleration approach is not possible, an alternative is to have these students skip grades to expose them to accelerated instruction. Research shows that neither of these practices systemically produces social adjustment problems. Many gifted students get bored and restless in classrooms that do not have accelerated instruction. Moreover, both of these strategies have little or no cost except for scheduling and training of teachers, resources that are provided for by PD (Element 14).

The primary approach to serving gifted students in high schools is to enroll them in advanced courses, such as AP and International Baccalaureate (IB), to participate in dual enrollment in postsecondary institutions or to have them take courses through distance learning mechanisms.

The study team confirmed its understanding of best practices for the gifted and talented with directors of three gifted and talented research centers in the United States: Dr. Elissa Brown, Director of the Center for Gifted Education, College of William & Mary; Dr. Joseph Renzulli, The National Research Center on the Gifted and Talented at the University of Connecticut; and Dr. Ann Robinson, Director of the Center for Gifted Education at the University of Arkansas at Little Rock.

The University of Connecticut center agreed with these conclusions and has developed a very powerful Internet-based platform – Renzulli Learning, which could provide an array of programs and services for gifted and talented students. This system takes students through a 25- to 30-minute detailed assessment of their interests and abilities, producing an individual profile for the student. The student is then directed, via a search engine, to 14 different Internet data systems including interactive websites and simulations that provide a wide range of opportunities to engage the student's interests. Renzulli stated that such an approach was undoubtedly the future for the very bright student and could be supported by a grant of $30 per student in a district. Field (2007) found that after 16 weeks, students given access to an Internet-based program, such as Renzulli Learning, to read, research, investigate, and produce materials significantly improved their overall achievement in reading comprehension, reading fluency, and social studies.

Since this research, Renzulli Learning was sold to Compass Learning, an educational organization with technology-based applications used around the country. Compass Learning has renamed the Renzulli Learning program GoQuest. According to the company's website,[8] a student's first experience with Renzulli Learning is with the Renzulli Profiler, a detailed online questionnaire that allows the Renzulli software to generate a personal profile of each student's top interests, learning styles, and expression styles, making it easier for teachers to get to know their students and effectively differentiate instruction. Once students and teachers generate a profile, they can use it to guide their exploration of the 40,000 online educational resources in the Renzulli database. Students can engage in self-directed learning by exploring safe, fully vetted resources specifically matched to their individual profiles. Further, teachers can browse the database of resources to find activities that align to specific objectives, skills, and state and Common Core curriculum standards.

On July 20, 2015, the study team spoke with Troy Duffield, a Compass Learning lead consultant who works with various states. He described the attributes of Renzulli Learning and other products provided by Compass Learning. In that conversation, the study team confirmed a new pricing structure for Renzulli Learning. The cost today is $40 per student for up to 125 students in a school, at which point the cost is $5,000 for a school and all students have full access to the program. If a figure of $40 per pupil were included in the EB model, all districts would be able to afford this gifted program.

14. Intensive Professional Development

PD includes a number of important components. This section describes the specific dollar resource recommendations the EB model provides for PD. In addition to the resources listed here, PD includes the instructional coaches described in Element 7 and the collaborative planning time provided by the provisions for elective or specialist teachers in Element 4. Those staff positions are critical to an adequate PD program along with the resources identified in this section.

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[8] http://www.renzullilearning.com/whatisrenzullilearning.aspx

Current Evidence-Based Recommendation
10 days of student-free time for training built into teacher contract year $125 per ADM for trainers inflated annually (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])

Analysis and Evidence

Effective teachers are the most influential factor in student learning (Rowan, Correnti, & Miller, 2002; Wright, Horn, & Sanders, 1997) and more systemic deployment of effective instruction is key to improving student learning and reducing achievement gaps (Odden, 2011a; Raudenbusch, 2009). All school faculties need ongoing PD. Improving teacher effectiveness through high-quality PD is arguably one of the most important strategies.

An ongoing, comprehensive, and systemic PD strategy is the way in which all resources recommended in this report are transformed into high-quality, Tier 1 instruction that increases student learning. Though the key focus of PD is better instruction in the core subjects of mathematics, reading/language arts, writing, history, and science, the PD resources in the EB model are adequate to address the instructional needs for gifted and talented, special education, LEP students; to embed technology into the curriculum; and to provide elective teachers. Finally, all beginning teachers need intensive PD – first in classroom management, organization, and student discipline, then in instruction. Finally, the most effective way to "induct" and "mentor" new teachers is to have them work in functional collaborative teacher teams, discussed above for Elements 4 and 5.

Fortunately, there is recent and substantial research on effective PD and its costs (e.g. Crow, 2011; Odden, 2011b). Effective PD is defined as PD that produces change in teachers' classroom-based instructional practice that can be linked to improvements in student learning. The practices and principles that researchers and PD organizations use to characterize "high-quality" or "effective" PD draw upon a series of empirical research studies that linked program strategies to changes in teachers' instructional practice and subsequent increases in student achievement. These studies, combined with recent reports from Learning Forward (the national organization focused on PD (see Crow, 2011), identified six structural features of effective PD:

1. The *form* of the activity, i.e. organizing the activity as a study group, teacher network, mentoring collaborative, committee, or curriculum development group. The above research suggests that effective PD should be school-based, job-embedded, and curriculum-focused rather than a one-day workshop.
2. The *duration* of the activity, including the total number of contact hours expected for participants to spend in the activity, as well as the span of time the activity takes place. The above research has shown the importance of continuous, ongoing, long-term PD that totals a substantial number of hours each year: at least 100 hours and close to 200 hours.

3. The degree to which the activity emphasizes *collective participation* from teachers in the same school, department, or grade level. The above research suggests that effective PD be organized around groups of teachers from a school that over time includes the entire faculty.
4. The degree to which the activity is *content focused*, i.e. the degree to which the activity focuses on improving and deepening teachers' content knowledge and how students learn that content. The above research concludes that teachers need solid understanding of the content they teach, must be in tune with common student miscues or problems typically encountered while learning that content, and should have effective instructional strategies linking the two. The content focus today should emphasize content for college and career-ready curriculum standards.
5. The extent to which the activity offers opportunities for *active learning*, such as opportunities for teachers to become engaged in meaningful analysis of teaching and learning. For example, by scoring student work or developing, refining, and implementing a standards-based curriculum unit. The above research has shown that PD is most effective when it includes opportunities for teachers to work directly on incorporating the new techniques into their instructional practice with the help of instructional coaches (see also Joyce & Showers, 2002).
6. The degree to which the activity promotes *coherence* in teachers' PD by aligning PD to other key parts of the education system, such as student content and performance standards, teacher evaluation, school and district goals, and development of a professional community. The above research supports tying PD to a comprehensive, inter-related change process focused on improving student learning.

Form, duration, and active learning together imply that effective PD includes some initial learning (e.g. a two-week, 10-day summer training institute) as well as considerable longer term work in which teachers incorporate the new methodologies into their actual classroom practice, with guidance provided by instructional coaches. Active learning implies some degree of collaborative work and coaching during regular school hours to help the teacher incorporate new strategies into his/her normal instructional practices. It should be clear that the greater the duration of the initial training as well as coaching, the more time is required of teachers as well as PD trainers and coaches.

Content focus means that effective PD focuses largely on subject matter knowledge, how students learn that subject, and the actual curriculum used to teach the content. Today, this means a curriculum program to ensure students are college and career-ready when they graduate from high school. Collective participation implies that PD includes groups of and, at some point, all teachers in a school who then work together to implement the new strategies, engage in data-based decision making (Carlson, Borman, & Robinson, 2011), and build a professional community.

Coherence suggests that the PD is more effective when the signals from the policy environment (federal, state, district, and school) reinforce rather than contradict one another or send multiple, confusing messages. Coherence also implies that PD opportunities should be given as part of implementation of new curriculum and instructional approaches, e.g. the adoption of the Common Core curriculum. There is little support in this research for the development of individually oriented PD plans. The research implies a much more systemic approach.

Each of these six structural features has cost implications. Form, duration, collective participation, and active learning require various amounts of both teacher and trainer/coach/mentor time, during the regular school day and year and, depending on the specific strategies, outside of the regular day and year. This time costs money. Further, all PD strategies require some amount of administration, materials and supplies, and miscellaneous financial support for travel and fees. Both the above programmatic features and the specifics of their cost implications are helpful to describe the resource needs of specific PD programs.

From this research on the features of effective PD, the EB model includes the following for a systemic, ongoing, comprehensive PD program:

- Ten days of student-free time for training via an extension of the teacher work year; and
- funds for training at the rate of $125 per student.

These resources are in addition to:

- Instructional coaches (Element 5); and
- collaborative work with teachers in their schools during planning and collaborative time periods (Elements 4).

These resources and PD elements are fully aligned with Maryland's PD standards.

15. Instructional Materials

The need for up-to-date instructional materials is paramount. Newer materials contain more accurate information and incorporate the most contemporary pedagogical approaches. New curriculum materials are critical today as school systems shift to more rigorous CCRS. To ensure that materials are current, 20 states have instituted adoption cycles in which they specify or recommend texts that are aligned to state learning standards (Ravitch, 2004). Up-to-date instructional materials are expensive, but vital to the learning process. Researchers estimate that classroom textbooks and textbook content drive up to 90 percent of activities (Ravitch, 2004). Adoption cycles with state funding attached allow districts to upgrade their texts on an ongoing basis instead of allowing these expenditures to be postponed indefinitely.

Current Evidence-Based Recommendation
$190 per pupil for instructional and library materials

Analysis and Evidence

The type and cost of textbooks and other instructional materials differ across elementary, middle school, and high school levels. Textbooks are more complex and thus more expensive at the upper grades, whereas elementary grades use more workbooks, worksheets, and other consumables than the upper grades. Both elementary and upper grades require extensive pedagogical aides such as math manipulatives and science supplies that help teachers to demonstrate or present concepts using different pedagogical approaches. As school budgets for instructional supplies have tightened in the past, consumables and pedagogical aides have typically been the first items to be cut, as teachers have been forced to manage without these supplies or to purchase materials out of their own pockets.

The price of textbooks ranges widely. In reviewing the price of adopted materials from a variety of sources, the top end of the high school price band is significant at $120 per book. Though the cost of textbooks has remained relatively constant over the past several years, many textbook companies have begun to offer electronic versions of their textbooks. Many of these electronic versions are offered in a time-bound contract somewhat similar to library resource contracts for content databases. Although the common hope has been that electronic textbooks would be priced at significantly lower levels than the paper-based texts, thus far that has not been the case. Most electronically based materials from standard publishers are the same price or are only marginally discounted by 10 to 20 percent. Moreover, many publishers offer to sell the paper-based texts with the electronic version for a 20 percent to 30 percent premium; that electronic version is also time-bound. Further, until schools have reached a one-to-one student-to-computer ratio, it is not practical to rely on an exclusively electronic-based textbook.

A total average figure of $135 per student provides sufficient funds for adequate instructional materials and texts for most non-severe special education students. Modifications for severe special education cases would need to be funded from special education funds.

Adoption Cycle

While Maryland does not have a formal textbook adoption cycle, the EB model for instructional materials is developed based on a six-year adoption cycle. The six-year adoption cycle fits nicely with the typical secondary schedule of six content courses (see Table 3.3). It also comes close to matching the content areas covered at the elementary level.

TABLE 3.3

POTENTIAL SECONDARY SIX-YEAR ADOPTION CYCLE

Year	2014	2015	2016	2017	2018	2019
Content Area	Social Studies	Science Health PE	Fine Arts	English Language Arts	Foreign Language	Mathematics

In some years, at the elementary level there are subject areas that pertain more to the secondary levels. In these years, the funds for instructional materials provide the opportunity for purchasing not only additional supplementary texts but also consumables/pedagogical aides (see Table 3.4).

TABLE 3.4
POTENTIAL ELEMENTARY SIX-YEAR ADOPTION CYCLE

Year	2014	2015	2016	2017	2018	2019
Content Area	Language Arts	Mathematics	Social Studies	Science/ Health	PE, Visual and Performing Arts	Supplements, Consumables, Manipulatives

Library Funds

The National Center for Educational Statistics (NCES) reports that the average national per student expenditure for library materials in the 2010-11 school year was $16 (excluding library salaries) (NCES, 2013). Over 90 percent of the $16 was spent on book titles and only 10 percent on other resources such as subscription databases. This is a change from the 40 percent that was spent on book titles and 60 percent on other resources in 2005 reported by Michie and Holton (2005), demonstrating a possible shift back to printed materials. Though there seems to have been a reallocation of library materials between printed materials and other resources such as electronic databases, the amount per student has remained unchanged for many years despite inflationary factors. The NCES figures are based on self-reported responses to NCES surveys.

Over the last 10 years, libraries have purchased subscriptions or used electronic databases such as online catalogs, the Internet, reference and bibliography databases, general article and news databases, college and career databases, academic subject databases, and full electronic textbooks. In 2002, 25 percent of school libraries across the nation had no subscriptions, 44 percent had one to three subscriptions to electronic databases, 14 percent had four to seven subscriptions, and 17 percent had subscriptions to seven or more. Usually larger high schools subscribed to the most services (Scott, 2004). Based on the reallocation of spending back to book titles, the move to electronic databases appears to have slowed and/or even decreased. This could be due to various factors such as the rise in free services and online resources such as the Khan Academy and Wikipedia.

Electronic database services vary in price and scope and usually are charged to school districts on an annual per student basis. Depending on the content of these databases, costs can range from $1 to $5 per database per year per student.

Inflating these numbers to adequately meet the needs of school libraries, the EB model includes funding of $25 per student to pay for library texts and electronic services. This figure modestly exceeds the national average, allowing librarians to strengthen print collections. At the same time, it allows schools to provide and experiment with the electronic database resources on which more and more students rely (Tenopir, 2003).

This brings the overall average total funding for instructional materials and library resources to $160 per pupil.

Move to Common Core

Maryland fully implemented the Common Core standards for the 2013-14 school year. Access to standards-aligned instructional resources for teachers and students is critical for the successful implementation of these standards. Because of the move to Common Core, the current EB recommendation is to add an additional $30 to the $160 for a total of $190 per pupil. These additional funds would allow districts in some cases to purchase textbooks with rights to the electronic copies and permit the purchase of supplementary materials that support Common Core learning goals.

16. Short Cycle/Interim Assessments

The need to monitor the progress of students with IEPs, benchmark students' progress over the year, and engage teachers in collaborative work using student data requires that faculties have access to short cycle, interim assessment data.

Current Evidence-Based Recommendation
$25 per pupil for short cycle, interim assessments

Analysis and Evidence

Data-based decision-making has become an important element in school reform over the past decade. It began with the seminal work of Black and William (1998) on how ongoing data on student performance could be used by teachers to frame and reform instructional practice, and continued with current best practice on how professional learning communities use student data to improve teaching and learning (DuFour et al., 2010; Steiny, 2009). The goal is to have teachers use data to inform their instructional practice, identify students who need interventions, and improve student performance (Boudett, City, & Murnane, 2007). As a result, data-based decision-making has become a central element of schools that are moving the student achievement needle (Odden, 2009, 2012).

Recent research on data-based decision-making has documented significant positive impacts on student learning. For example, Marsh, McCombs, and Martorell (2010) showed how data-driven decision-making in combination with instructional coaches produced improvements in teaching practice as well as student achievement. Further, a recent study of such efforts using the gold standard of research (a randomized controlled trial) showed that engaging in data-based decision-making using interim assessment data improved student achievement in both mathematics and reading (Carlson, Borman, & Robinson, 2011).

There is some confusion in terminology when referring to these assessment data. Generally, these student performance data are different from those provided by state accountability or summative testing, such as Maryland's end-of-year tests. The most generic term is "interim data," meaning assessment data collected in the interim between the annual administrations of state accountability tests, though some practitioners and writers refer to such data as "formative assessments." There are several kinds of such "interim" assessment data. Benchmark assessments, such as those provided by the

Northwest Evaluation System called MAP (www.nwea.org), are given two to three times a year, often at the beginning, middle, and end of the year. They provide "benchmark" information so teachers can see at the end of the semester how students are progressing in their learning. Sometimes these benchmark assessments are given only twice, once in the fall and once in late spring, and function as a pre- and post-test for the school year, even though some practitioners erroneously refer to tests used this way as "formative assessments." These test data cannot be used for progress monitoring in a RTI program of extra help for students at risk of academic failure.

A second type of assessment data are collected during shorter time cycles within every quarter, such as monthly, and are often referred to as a "short cycle" or "formative" assessment. These more "micro" student outcome data are meant to be used by teachers to plan instructional strategies before a curriculum unit is taught, track student performance for the two to three curriculum concepts that would normally be taught during a nine-week or so instructional period, and monitor progress of students with IEPs.

Examples of "short cycle" assessments include STAR Enterprise from Renaissance Learning (www.renaissance.com), an online, adaptive system that provides data in reading/literacy and mathematics for prekindergarten through grade 12. The basic package costs less than $10 per student per subject, takes students 20 to 30 minutes to complete, aligns to Common Core, can be augmented with PD activities, and can be given as often as the teacher wishes at no extra cost. Many Reading First schools as well as many schools the study team has studied (Odden & Archibald, 2009; Odden, 2009) use the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) assessments (http://dibels.uoregon.edu).

The Wireless Generation, now one of three parts of Amplify that was launched in July 2012 as an education division of News Corp, has created an assessment similar to DIBELS that can be used with a handheld, mobile electronic device. The company also offers a web service that provides PD for teachers on how to turn the results into specific instructional strategies, including video clips of how to teach certain reading skills. The cost is approximately $15 per student per year, plus approximately $200 per teacher for the device, and somewhat more for training, though the company usually uses a trainer-of-trainers approach.

Many districts have also developed their own benchmark tests mainly in core subject areas. Others use common unit or chapter tests to gauge interim student progress toward achieving standards. While these tests cannot be normed because of their localized origin, they can provide valuable information to site and district teachers and administrators to ensure students are learning and teachers have covered the subject standards required in district pacing guides.

Though some "interim" assessments are teacher created, it often is more efficient to start with commercially available packages, most of which are administered online and provide immediate results. Short cycle assessments provide the information a teacher needs to create a micro-map for how to teach specific curriculum units. Analyses of the state tests provide a good beginning for schools to redesign their overall educational program. Benchmark assessments give feedback on each semester of instruction and often help determine which students need interventions or extra help. Teachers also need additional short cycle assessment and other screening data to design the details of and daily lesson plans for each specific curriculum unit and be more effective in getting all students to learn the main objectives in each curriculum unit to the level of proficiency.

When teachers have the detailed data from these interim assessments, they are able to design instructional activities more precisely matched to the exact learning status of the students in their own classrooms and school. In this way, their instruction can be much more efficient because they know the goals and objectives they want students to learn, and they know exactly what their students do and do not know with respect to those goals and objectives. With these data, they can design instructional activities specifically to help the students in their classrooms learn the goals and objectives for the particular curriculum unit.

The costs of these powerful assessments are modest. The EB model provides $25 per student, which is more than sufficient for a school to purchase access to a system, as well as some specific technological equipment and related PD. The Renaissance Learning STAR assessments, and more recently the NWEA MAP system, can function as both interim and benchmark assessments, can be used to progress monitor students with IEPs, can include both math and reading for prekindergarten through grade 12, and can be purchased with this per pupil amount. Some districts have dropped Scantron, NWEA MAP, and AimsWeb assessments and replaced them with the STAR Enterprise system that provides all the information of the previous three at a lower overall cost.

17. Computers, Technology, and Equipment

Over time, schools need to embed technology in instructional programs and school management strategies. Today, more and more states require students not only to be technologically proficient but also to take some courses online to graduate from high school. Further, there are many online education options – from state-run virtual schools such as those in Florida and Wisconsin to private sector companies, such as K12 Inc. and Connections Academy, who run virtual charter schools. “Blended instruction” or “flipped classroom” models, such as Rocketship, have also emerged (Whitmire, 2014). These programs infuse technology and online teaching into regular schools, provide more one-to-one student assistance, and put the teacher into more of a coaching role (see Odden, 2012). Research also shows that these technology systems work very well for many students and can work very effectively in schools with high concentrations of lower income and minority students (Whitmire, 2014). Moreover, they can be less costly than traditional public schools (Battaglino, Haldeman, & Laurans, 2012; Odden, 2012).

Current Evidence-Based Recommendation
$250 per pupil for school computer and technology equipment

Analysis and Evidence

Infusing technology into the school curriculum has associated costs for computer hardware, networking equipment, software, training, and personnel associated with maintaining and repairing these machines.

The *total cost* of purchasing and embedding technology into the operation of schools identifies both the direct and indirect costs of technology and its successful implementation:

- *Direct costs* of technology include hardware, software, and labor costs for repairing and maintaining the machines; and
- *indirect costs* include costs of users supporting each other, time spent in training classes, casual learning, self-support, user application development, and downtime costs.

This Element (17) identifies only direct technology costs because the indirect costs, which are primarily training, are included in the overall PD resources (Element 14). Districts also need individuals to serve as technical support for technology embedded curriculum and management systems, though the bulk of that work can be covered by warranties purchased at the time computers are acquired.

In estimating the direct costs of purchasing, upgrading, and maintaining computer hardware, the software that helps these computers function and the networks on which they run, the EB approach recognizes the fact that today virtually no school is beginning at a baseline of zero. All schools have a variety of computers of varying ages, the large majority of which are connected to school networks and the Internet. Unlike the 1990s when expensive projects had to retrofit schools with data networks, the following cost estimates identify resources needed to maintain and enhance the technology base that exists in schools. Moreover, as should be clear, these are ongoing and not one-time costs.

Most school districts have technology plans, and each district and school situation is unique and should be described in its plan. These documents, if up-to-date, should be meaningful mechanisms used to allocate resources to the areas of most need within the school or district environment.

The study team refers readers to a more detailed analysis of the costs of equipping schools with ongoing technology materials (Odden, 2012) that was spearheaded by Scott Price, former Chief Financial Officer of the South Pasadena School District in California and current Chief Financial Officer for the Los Angeles County Public Schools, who serves as a consultant to POA on technology costs. The analysis estimated four categories of technology costs that totaled $250 per student. The amounts by category should be considered flexible, as districts and schools will need to allocate dollars to their highest priority technology needs outlined in state and district technology plans. The per student costs for each of the four subcategories are:

- Computer hardware: $71;
- operating systems, productivity, and non-instructional software: $72;
- network equipment, printers, and copiers: $55; and
- instructional software and additional classroom hardware: $52.

This per student figure would be sufficient for schools to purchase, upgrade, and maintain computers, servers, operating systems and productivity software, network equipment, student administrative system, and financial systems software, as well as other equipment such as copiers. Since the systems software packages vary dramatically in price, the figure would cover medium-priced student administrative and financial systems software packages.

The original analysis of the $250 per student figure, beginning in 2006 and reconfirmed in 2012 (Odden, 2012), allowed a school to have one computer for every two to three students. This ratio was sufficient to provide every teacher, the principal, and other key school level staff with a computer and have an actual ratio of about one computer for every three to four students in each classroom. Over the last few years, computer makers have developed alternative products, such as netbooks and Chromebooks that have a lower entry price point of about $350 per unit compared to the $700 to $800 cost for laptop or desktop computers. For school districts that value lowering the student-to-computer ratio, purchase of these devices provides an opportunity to significantly increase the number of student devices when replacing traditional units at the end of their life.

As the ratio of these new devices to traditional devices increases, there will be opportunity for districts to explore one-to-one student-to-computer ratios at key grade levels. As high stakes computerized testing is pushed further into the primary grade levels, it is essential that students are able to comfortably use computers to demonstrate their knowledge. If students have not had sufficient practice with computers in a testing environment, computerized testing can become a barrier to successfully measuring student achievement. If students cannot comfortably type, text responses become more of a test of “hunt and peck” skills than a reflection of a student’s ability to respond to a prompt.

Though Chromebooks use a different operating system than typically used in the educational environment, most instructional and interactive testing software is browser-based, making the instructional software agnostic regarding operating systems. Additional software is continually developed for these new platforms as they become more commonly used in the educational space. Chromebooks and other such platforms are still not appropriate for the school site or district administrative office functions.

Taking the factors above into consideration, and recognizing that the average cost of computer units can change if new, less expensive platforms are incorporated into the instructional setting, the EB model continues to recommend the $250 per student cost. This figure also permits districts to move closer to a one-to-one student-to-computer ratio.

In the past, the EB model has recommended that districts either incorporate maintenance costs in lease agreements or, if purchasing the equipment, buy 24-hour maintenance plans to eliminate the need for school or district staff to fix computers. For example, for a very modest amount, one can purchase a maintenance agreement from a number of computer manufacturers that guarantees computer repair on a next business day basis. In terms of educator concerns that it would be difficult for a manufacturer’s contractors to serve remote communities, the maintenance agreement makes meeting the service requirements the manufacturer's or contractor's responsibility and not the district's. Many of the private sector companies that offer such services often take a new or reconditioned computer with them, leave it, and take the broken computer to fix, which often turns out to be more cost effective than sending technicians to fix broken computers. On the other hand, when districts analyze the cost of warranty programs for Chromebooks or similar low-cost hardware, they may find that it is more practical to replace broken machines than to pay for extended warranties.

As the number of computers in schools increases, it becomes more impractical to hard-wire connections into classrooms or other instructional spaces. Wireless connectivity is the only solution to creating an instructional environment in which Internet access is available anywhere, anytime on campus. Depending on campus configuration, it is possible to serve a small group of wireless computers with just a few wireless access points. However, as the number of computers being simultaneously used increases, additional access points must be added.

The original $250 per pupil figure included modest funds to complete small on-campus infrastructure improvements. This remains the case in the EB recommendation for technology, which remains at $250 per pupil for site-based technology.

18. Career and Technical Education Teachers and Equipment/Materials

Vocational education, or its modern term, career and technical education (CTE), has experienced a shift in focus during the past decade. Traditional vocational education focused on practical, applied skills needed for wood and metalworking, welding, automobile mechanics, typing and other office assistance careers, as well as courses in home economics.

Today, many argue that vocational and technical education, or "voc-tec," should instead be "info-tech," "nano-tech," "bio-tech," and "health-tech." As the demand increases for jobs in the fields of information, technology, biology, and medicine, it makes sense to alter voc-tec programs so that they can teach students specific technical skills for use in emerging and/or fast-growing job markets. The American College Testing Company and many policy makers have concluded that the knowledge, skills, and competencies needed for college are quite similar to those needed for work in the higher-wage, growing jobs of the evolving economy, so all students need a solid academic high school program to be college and career-ready when they graduate from high school.

Current Evidence-Based Recommendation
$10,000 per CTE teacher for specialized equipment

Analysis and Evidence

A key question is whether new CTE programs require more resources. Many districts and states believe that new career-technical programs cost more than the regular program and even more than traditional vocational classes. However, in a review conducted for a Wisconsin school finance adequacy task force, a national expert on career-technical education (Phelps, 2006) concluded that the best of the new career-technical programs did not cost more, especially if the district and state made adequate provisions for PD (as teachers in these new programs needed training) and computer technologies (as computer technologies were heavily used). These conclusions were generally confirmed by the cost analysis the study team conducted of Project Lead the Way (PLTW), one of the most highly rated and allegedly "expensive" CTE programs in the country.

PLTW (www.pltw.org) is a nationally recognized exemplar for secondary CTE education. Often implemented jointly with local postsecondary educational institutions and employer advisory groups, these programs usually feature project- or problem-based learning experiences, career planning and guidance services, and technical and/or academic skills assessments. Through hands-on learning, the programs are designed to develop the science, technology, engineering, and mathematics (STEM) skills essential for achievement in the classroom and success in college or jobs not requiring a four-year college education. Today, PLTW is offered in more than 5,000 elementary, middle, and high schools in all 50 states and enrolls over 500,000 students.

The curriculum features rigorous, in-depth learning experiences delivered by certified teachers and administers end-of-course assessments. High-scoring students earn college credit recognized by more than 100 affiliated postsecondary institutions. Courses focus on engineering foundations (design, principles, and digital electronics) and specializations (such as architectural and civil engineering and bio-technical engineering) that provide students with career and college readiness competencies in engineering and science. Students need to take math through Algebra 2 to handle the courses in the program, which also meets many states' requirements for science and other mathematics classes.

The major cost areas for the program are in class size, PD, and computer technologies. Most programs recommend class sizes of 25, a figure equal to secondary class sizes provided by the EB Funding Model. The PD and most of the computer technology costs are covered through the PD and technology components of the EB model. However, a few of the PLTW concentration areas require a one-time purchase of expensive equipment, which can be covered by a $10,000 allocation per career-technical education teacher. To implement this recommendation, Maryland would need to specify standards for CTE courses, then collect the number of FTE CTE teachers for each school.

The core resources of class size and PD, together with the above additional equipment resources, are sufficient to fund the CTE programs that are typically included in Maryland schools (Maryland State Department of Education, 2012).

19. Extra Duty Funds/Student Activities

Elementary, middle, and high schools typically provide an array of non-credit producing after-school programs, from clubs and bands, to sports and enrichment activities. Teachers supervising or coaching these activities usually receive small stipends for these extra duties.

Current Evidence-Based Recommendation
$250 per student for co-curricular activities including sports and clubs for kindergarten through grade 12 (Funding not provided for prekindergarten)

Analysis and Evidence

Research shows, particularly at the secondary level, that students engaged in student activities tend to perform better academically than students not as involved (Feldman & Matjasko, 2005), although too much extracurricular activity can be a detriment to academic learning (Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004; Steinberg, 1996, 1997). Feldman and Matjasko (2005) found that participation in interscholastic (as compared to intramural) sports had a positive impact for both boys and girls on grades, postsecondary education aspirations, reducing drop-out rates, lowering alcohol and substance abuse, and attending more years of schooling. The effect was particularly strong for boys participating in interscholastic football and basketball. One reason for these impacts is that participation in interscholastic athletics placed students in new social groups that tended to have higher scholastic aspirations and those aspirations "rubbed off" on everyone. But, the effects differed by race and gender and were not as strong for black students.

During the past several years, the EB model has allocated between $200 and $300 per pupil for student activities, including inter-mural sports. These figures are in line with average amounts spent on such activities in many states. Currently, the EB model includes an overall figure of $250 per pupil.

Central Office Functions

In addition to school-based resources, education systems also need resources for district-level expenditures including operations and maintenance and the central office, as outlined below. The study does not address transportation.

20. Operations and Maintenance

The lack of a strong or consistent research base complicates computation of operations and maintenance costs. Many models allocate a percentage of current expenditures to operations and maintenance. The EB model uses formulas to compute the number of personnel needed *at the school level* for custodial, maintenance, and grounds work.

Current Evidence-Based Recommendation
Separate computations for custodians, maintenance workers, and groundskeepers as outlined in the analysis and evidence section below

Analysis and Evidence

Drawing on professional standards in the field as well as research, the EB method has conducted analyses of the cost basis for maintenance and operations (e.g., Picus & Odden, 2010; Picus & Seder, 2010). The discussion below summarizes the research on operations and maintenance, identifying the needs for custodians (school level), maintenance staff (district level), and groundskeepers (school and district level), as well as the costs of materials and supplies to support these activities.

Custodians: Custodians are responsible for the daily cleaning of classrooms and hallways as well as for routine furniture setups and takedowns. In addition, custodians often manage routine and simple repairs like minor faucet leaks and clean cafeterias/multipurpose rooms, lockers, and showers. Custodial workers' duties are time-sensitive, structured, and varied. Zureich (1998) estimates the time devoted to various custodial duties:

- Daily duties (sweep or vacuum classroom floors, empty trash cans and pencil sharpeners in each classroom, clean one sink with faucet, and ensure the security of rooms), which take approximately 12 minutes per classroom;
- weekly duties (dust reachable surfaces, dust chalk trays and clean doors, clean student desk tops, clean sink counters and spots on floors, and dust chalk/white boards and trays), each of which adds five minutes a day per classroom; and
- noncleaning services (approximately 145 minutes per day) provided by custodians include: opening school (checking for vandalism, safety and maintenance concerns), playground and field inspection, miscellaneous duties (teacher/site-manager requests, activity set-ups, repairing furniture and equipment, ordering and delivering supplies), and putting up the flag and PE equipment.

Nelli (2006) developed and updated a formula that takes into consideration these cleaning and noncleaning duties. The formula takes into account teachers, students, classrooms, and gross square feet (GSF) in the school. The formula is:

- One custodian for every 13 teachers, plus
- one custodian for every 325 students, plus
- one custodian for every 13 classrooms, plus
- one custodian for every 18,000 GSF, and
- this total divided by four.

The formula calculates the number of custodians needed at prototypical schools. The advantage of using all four factors is that it accommodates growth or decline in enrollment and continues to provide schools with adequate coverage for custodial services over time.

Maintenance Workers: Maintenance workers function at the district level, rather than at individual schools. Core tasks provided by maintenance workers include preventative maintenance, routine maintenance, and emergency response activities. Individual maintenance worker accomplishment associated with core tasks are: (1) HVAC systems, HVAC equipment, and kitchen equipment, (2) electrical systems and equipment, (3) plumbing systems and equipment, and (4) structural work, carpentry, and general maintenance/repairs of buildings and equipment (Zureich, 1998).

Zureich (1998) recommends a formula for maintenance worker FTEs incorporated into the funding model for instructional facilities as follows:

[(# of Buildings in District) × 1.1 + (GSF / 60,000 Sq. Ft.) ×

1.2 + (Enrollment / 1,000) × 1.3

+ General Fund Revenue/5,000,000) × 1.2] / 4

= Total Number of Maintenance Workers Needed

A review of state facility standards suggests that for prototypical schools of the sizes used in the EB model, approximate gross square footage should be 63,000 for elementary and middle schools and 110,000 for a high school. In addition, allowances are needed for central functions including a central office, warehousing, and maintenance and operations facilities. The study team estimates these three facilities would require an additional 25,000 GSF of space. Maintenance and custodial supplies are estimated at $1.00 per gross square foot, which for the prototypical district is 623,000 sq. ft.

The Florida Department of Education has released a new set of facilities guidelines that discuss custodial and maintenance personnel. The guidelines are similar to those developed for Maryland. Although they would potentially generate a few more staff positions in the largest districts, the changes tend to use the same approach to estimating personnel needs, and, when combined with the allocation and use data below, lead to a recommendation that recalibration is not needed at this time.

<u>*Grounds Maintenance*</u>: The typical goals of a school grounds maintenance program are generally to provide safe, attractive, and economical grounds maintenance (Mutter & Randolph, 1987). This is also a district level function. Although groundskeepers generally work in teams and visit schools on a less than daily schedule, the study team estimated groundskeeper resources based on the number of schools. Specifically, the study team estimated that an elementary school needs the equivalent of 0.25 FTE groundskeeper staff, middle school 0.5 FTE groundskeeper staff, and high school 1.5 FTE groundskeeper staff.

<u>*Utilities:*</u> It is necessary to add the per student costs of utilities and insurance to these totals. It is unlikely that a district has much control over these costs in the short term and thus each district can best estimate future costs using their current expenditures for utilities and insurance as a base. The utilities cost is estimated at $305 per student.

21. Central Office Staffing/Nonpersonnel Resources

All districts require central office staff to meet the overall management needs of the educational programs. In other states, the study team developed an EB staffing models using a prototypical district of approximately 3,900 students. The team also developed an approach for central office staffing for districts with fewer than 1,000 students, which does not apply in Maryland. For Maryland, the study team developed a model for resourcing the central office of a 12,000-student prototypical district, which is discussed in Chapter 4.

Current Evidence-Based Recommendation
The EB model computes a dollar per student figure for the central office based on the number of FTE positions generated and the salary and benefit levels for those positions. It also includes a$300 per pupil for miscellaneous items such as board support, insurance, legal services, etc.

Analysis and Evidence

POA has identified resources for these positions in other reports and the most recent version of the team's textbook (Odden & Picus, 2014; Picus & Odden, 2010), drawing on a variety of research studies and professional standards for best practices. Over the past several years, the study team has developed central office staffing recommendations in several states, including Maine, New Jersey, North Dakota, Washington, Wisconsin, and Texas. In all states, the study team began its analysis with the research of Elizabeth Swift (2007), who used PJ panels to determine staffing for a prototypical district. Swift's research addressed the issue of the appropriate staffing for a district of 3,500 students. Swift's work formed the basis of each state's analysis, although in three states (Washington, Wisconsin, and North Dakota) the study team also conducted EBPJ panels to review the basic recommendations that emerged from the research.

Through that work, the study team estimated the central office resources required for a district of 3,500 students. The initial studies provided for about eight professional staff (superintendent, assistant superintendent for curriculum, business manager, and directors of human resources, pupil services, technology, and special education) and nine clerical positions.

Although the research basis for staffing school district central offices is relatively limited, analysis of the Educational Research Service (ERS) staffing ratio report shows that, nationally, school districts with between 2,500 and 9,999 students employ an average of one central office professional/administrative staff member for every 440 students (Educational Research Services, 2009). This equates to about eight central office professionals (7.95) in a district of 3,500 students. The study team's research-based staffing formula of eight FTE professional staff matches the ERS estimate of eight FTE central office staff for a school district of 3,500 students nationally. Because the 3,500 student district size did not readily incorporate the EB model's prototypical schools – parameters for which are needed to estimate maintenance and operations costs – over the past few years the study team increased its prototypical district size to 3,900 students to include four 450-student elementary schools, two 450-student middle schools, and two 600-student high schools. This larger size also allowed us to add the testing and evaluation and central office computer staff, which districts have been arguing are needed today. Further, in recent analyses, the study team received a recommendation to add individuals who work with schools to provide the first-line technical help (installing computers and software, ensuring wireless systems operate, keeping printers operating, and providing related technical assistance to keep computers operating). The recommendation was one school computer technician for every 600 students working in school but operating from the central technology office, which adds 6.5 positions to the central office.

Moreover, the EB model has been short on central resources for special education and related services. In summer 2015, the study team asked a group of superintendents to design central office staff for several sizes of districts. For a 4,000 district office, they recommended two speech pathologists and two psychologists be added.

In addition to staffing, central offices need a dollar per student figure for such costs as insurance, purchased services, materials and supplies, equipment, association fees, elections, district-wide technology, communications, and other costs; that figure is approximately $350 per pupil.

Table 3.5 summarizes these staffing proposals organized into departments into which a central office could be organized. The table shows the staff in the previous EB central office as well as the staff in the newer 3,900-student central office that includes the additional positions discussed above. Larger districts would be provided the resources for a larger central office by prorating up the per-student cost of this 3,900-student central office and could have more differentiated staff with coordinators as well as a full-fledged legal counsel for large districts.

TABLE 3.5
EVIDENCE-BASED CENTRAL OFFICE STAFFING FOR DISTRICT WITH 3,900 STUDENTS

Office and Position	FTE Previous Evidence-Based Model		FTE Current Evidence-Based Model	
	Admin	Classified	Admin	Classified
Superintendent's Office				
Superintendent	1		1	
Secretary		1		2
Business Office				
Business Manager	1		1	
Director of Human Resources	1		1	
Accounting Clerk		1		2
Accounts Payable		1		2
Secretary		1		1
Curriculum and Support				
Assistant Supt. for Instruction	1		1	
Director of Pupil Services	1		1	
Speech Pathologist			2	
Psychologists			2	
Dir. of Assessment & Evaluation	1		1	
Secretary		3		3
Technology				
Director of Technology	1		1	
Network Supervisor (Hardware)		1		1
Systems Supervisor (Software)		0.3		1
Computer Technician		1		6.5
Secretary		1		2

Office and Position	FTE Previous Evidence-Based Model		FTE Current Evidence-Based Model	
	Admin	Classified	Admin	Classified
Operations and Maintenance				
Director of O&M	1		1	
Secretary		1		2
Total Central Office Staffing (3,900 Students)	8	10	10	22.5

The study team knows that school districts in Maryland are larger than the 3,900-student prototypical EB district. Thus, the team sought advice from the EBPJ panels that were asked to review the core EB analyses and report those results in the following chapter on EBPJ panel recommendations.

Resources for students at risk of academic failure

The core staffing section of this document contains positions for supporting teachers and students beyond the regular classroom core teacher. Those positions include elective or specialist teachers, tutors, and pupil support personnel. However, in many instances, additional support for students at risk of academic failure is also needed. The programs described in this section extend the learning time for students at risk of academic failure in focused ways. The key concept is to implement the maxim of standards-based education reform: keep standards high for all students, but vary the instructional time so all students can achieve to proficiency levels. The EB elements for extra help are also embedded in the “response to intervention” schema described at the beginning of this chapter.

The study team used two specific counts of pupils.

1. All LEP students, regardless of their FRPM eligibility.
2. All FRPM-eligible students who are not included in the LEP count.

In the discussion that follows, all resources for at risk students are provided for all LEP students (regardless of FRPM eligibility) and all non-LEP FRPM-eligible students. Additional resources are provided for LEP students in addition to the at risk resources.

The EB model provides substantial additional resources for students based on the at risk student counts including tutoring, extended da y, summer school, and pupil support. These resources for students struggling to achieve to academic standards should be viewed in concert with resources for students with identified disabilities. Districts sometimes over identify students for special education services as the “only way” to trigger more resources for some students at risk of academic failure. The study team’s goal in expanding resources for students at risk of academic failure triggered by at risk counts is to provide adequate resources for all students at risk of academic failure, with or without a diagnosed disability and to reduce over identification in special education.

This section includes discussion of seven categories of services: (1) tutoring, (2) additional pupil support, (3) extended day, (4) summer school, (5) programs for LEP students, (6) alternative schools, and (7) special education.

22. Tutors

The first strategy to help students at risk of academic failure is to provide additional support as described in Element 8 above. In addition to the one core tutor position provided to every prototypical school discussed above for Element 6, the EB model provides additional tutor positions at the rate of one for every 125 at risk students.

Current Evidence-Based Recommendation
1.0 FTE tutor position for every 125 at risk students (in addition to the 1.0 FTE tutor position in each prototypical school) These positions are provided additional days for PD (Element 14) and substitute days (Element 7) discussed above

Analysis and Evidence

The most powerful and effective extra help strategy to enable students at risk of academic failure to meet state College and Career-Ready Standards, including Common Core standards, is individual one-to-one tutoring provided by licensed teachers (Shanahan, 1998; Wasik & Slavin, 1993). Students who must work harder and need more assistance to achieve to proficiency levels especially benefit from preventative tutoring (Cohen, Kulik, & Kulik, 1982). Tutoring program effect sizes vary by the components of the approach used, e.g. the nature and structure of the tutoring program, but effect sizes on student learning reported in meta-analyses range from 0.4 to 2.5 (Cohen, Kulik & Kulik, 1982; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993) with an average of about 0.75 (Wasik & Slavin, 1993).

The impact of tutoring programs depends on staffing and organization, link to the core program, and tutoring intensity. Researchers (Cohen, Kulik, & Kulik, 1982; Farkas, 1998; Shanahan, 1998; Wasik & Slavin, 1993) and experts on tutoring practices (Gordon, 2009) have found greater effects when the tutoring includes:

- Using professional teachers as tutors;
- initially providing one-to-one tutoring to students;
- using tutors trained in specific tutoring strategies;
- closely aligning tutoring to the regular curriculum and specific learning challenges, with appropriate content-specific scaffolding and modeling;
- allowing sufficient time for tutoring; and
- highly structuring programming, both substantively and organizationally.

Several specific structural features of effective one-to-one tutoring programs include:

- First, each tutor would tutor one student every 20 minutes, or three students per hour. This would allow one tutor position to tutor 18 students a day. (Since tutoring is such an intensive activity, individual teachers might spend only half their time tutoring; but a 1.0 FTE tutoring position would allow 18 students per day to receive one-to-one tutoring.) Four positions would allow 72 students to receive individual tutoring daily in the prototypical elementary and middle schools.
- second, most students do not require tutoring all year long; tutoring programs generally assess students quarterly and change tutoring arrangements. With modest changes such as these, nearly half the student body of a 400-student school unit could receive individual tutoring during the year.
- third, not all students who are from a low-income background require individual tutoring, so a portion of the allocation could be used for students in the school who may not be from a lower income family but have a learning issue that could be remedied by tutoring. This also is part of the rationale for including one tutor in each prototypical school, regardless of the number of at risk students.

Though this discussion focuses on *individual* tutoring, schools could also deploy these resources for small group tutoring. In a detailed review of the evidence on how to structure a variety of early intervention supports to prevent reading failure, Torgeson (2004) shows how one-to-one tutoring, one-to-three tutoring, and one-to-five small group sessions (all Tier 2 interventions) can be combined for different students to enhance their chances of learning to read successfully.

One-to-one tutoring would be reserved for the students with the most severe reading difficulties, scoring at or below the 20th or 25th percentile on a norm-referenced test or below basic level on state achievement tests. Intensive instruction for groups of three to five students would then be provided for students above those levels but below the proficiency level.

It is important to note that the instruction for all student groups needing extra help needs to be more explicit and sequenced than that for other students. Young children with weakness in letter recognition, letter sound relationships, and phonemic awareness need explicit and systematic instruction to help them first decode and then learn to read and comprehend. As Torgeson (2004:12) states:

> Explicit instruction is instruction that does not leave anything to chance and does not make assumptions about skills and knowledge that children will acquire on their own. For example, explicit instruction requires teachers to directly make connections between letters in print and the sounds of words, and it requires that these relationships be taught in a comprehensive fashion. Evidence for this is found in a recent study of preventive instruction given to a group of highly at risk children in kindergarten, grade one and grade two […..] only the most [phonemically] explicit intervention produced a reliable increase in the growth of word-reading ability … schools must be prepared to provide very explicit and systematic instruction in beginning word-reading skills to some

> of their students if they expect virtually all children to acquire work-reading skills at grade-level by the grade three …. Further, explicit instruction also requires that the meanings of words be directly taught and be explicitly practiced so that they are accessible when children are reading text…. Finally, it requires not only direct practice to build fluency…. but also careful, sequential instruction and practice in the use of comprehension strategies to help construct meaning.

Torgeson (2004) goes on to state that meta-analyses consistently show the positive effects of reducing reading group size (Elbaum, Vaughn, Hughes & Moody, 1999) and identifies experiments with both one-to-three and one-to-five teacher-student groupings. Though one-to-one tutoring works with 20 minutes of tutoring per student, a one-to-three or one-to-five grouping requires a longer instructional time for the small group – up to 45 minutes. The two latter groupings, with 45 minutes of instruction, reduced the rate of reading failure to a miniscule percentage.

For example, if the recommended numbers of tutors are used for such small groups, one FTE reading position could teach 30 students a day in the one-to-three setting with 30 minutes of instruction per group and more than 30 students a day in the one-to-five setting with 45 minutes of instruction per group. Four FTE tutoring positions could then provide this type of intensive instruction for up to 120 students daily. In short, though the emphasis is on one-to-one tutoring, and some students do need one-to-one, other small group practices, which characterize the bulk of Tier 2 interventions, can also work, with the length of instruction for the small group increasing as the size of the group increases.

Though Torgeson (2004) states that similar interventions can work with middle and high school students, the effect is often smaller as it is much more difficult to undo the lasting damage of not learning to read once students with severe reading deficiencies enter middle and high schools. However, a new randomized control study (Cook et al., 2014) discussed below found similarly positive impacts of a tutoring program for adolescents in high poverty schools *if* it was combined with counseling. This is possible in the EB model as it includes such additional nonacademic pupil support resources (see Element 23 discussion).

The rationale outlined above is strengthened by two recent randomized controlled trials of the effectiveness of tutoring for students at risk of academic failure, which support the study team's logic for providing a minimum level of tutor support in all schools as well as additional tutors for schools with greater need. At the elementary level, using a randomized controlled trial, May et al. (2013) assessed the impact of tutors in a Reading Recovery program. In the third year of a five-year evaluation, they found that Reading Recovery tutoring had an effect size of 0.68 on overall reading scores relative to the population of students eligible for such services in the specific study and a 0.47 effective size relative to the national population of grade one struggling readers. The effects were similarly large for reading words and reading comprehensive sub-scales.

For students in high schools, Cook, et al. (2014) reported on a randomized controlled trial of a two-pronged intervention that provided disadvantaged youth with tutoring *and* counseling. They found that intensive individualized academic extra help – tutoring – combined with non-academic support seeking to teach grades nine and 10 youth social-cognitive skills based on the principles of cognitive behavioral therapy (CBT), led to improved math and reading performance. The study sample consisted mainly of students from low-income and minority backgrounds, who generally pose the toughest challenges. The effect size for math was 0.65 and for reading was 0.48. Also, the combined program appeared to increase high school graduation by 14 percentage points (a 40 percent hike). The authors concluded that this intervention seemed to yield larger gains in adolescent outcomes per dollar spent than many other intervention strategies.

These studies are highlighted for several reasons. First, they represent new, randomized controlled trials – the gold standard of research supporting the efficacy of tutoring. Second, they show that tutoring can work not only for elementary but also for high school students, whereas most of the tutoring research addresses only elementary-aged students. Third, they show that tutoring can work even in the most challenging educational environments. Fourth, they bolster the EB argument below that extra help resources in schools triggered by at risk status should also include some non-academic, counseling resources, as the treatment in the second study was tutoring combined with counseling.

In earlier adequacy reports and even in the recently published fifth edition of the study team's textbook (Odden & Picus, 2014), recommendations included tutor positions to be provided based on at risk student counts. The recommended ratio was one position for every 100 at risk students, with a minimum of one for each prototypical school. As a result, a school without any at risk students would receive the minimum of one tutor position for students at risk of academic failure, but a school with 100 at risk students would receive the same single tutor, even though it might have more need for tutor resources. Today, educators and policy makers across the country argue that schools with few low-income students still have students who struggle to learn to proficiency and more rigorous CCRS lead to greater numbers of students at risk of academic failure in the future. Those arguments are convincing and the study team has modified the EB recommendations for tutoring resources.

The revised EB model provides one tutor per Tier 2-intervention position in each prototypical school. In parallel with that change, the EB model adjusts the ratio for additional tutor positions to one position for every 125 at risk students. The new EB recommendation for tutor per Tier 2-intervention positions is more generous than the previous recommendation of one tutor per 100 at risk students with a minimum of one for each prototypical school. For example, under the old EB model, a prototypical school with no at risk students would receive one position, as would a prototypical school with 100 at risk students. The revised EB model calls for 1.0 FTE position at a school with no at risk students. For a school with 100 at risk students, the model provides 1.0 FTE tutor position plus an additional 0.8 FTE (100/125) position for the 100 at risk students, for a total of 1.8 FTE positions. Both the old and revised EB models would provide five positions for a school with 500 at risk students.

23. Additional Pupil Support

Core pupil support positions for guidance counselors and nurses are discussed above in core resources as Element 10. At risk students, however, generally have more non-academic needs that should be addressed by additional pupil support staff. Such staff could include more guidance counselors, as well as social workers, family liaison individuals, and psychologists. Thus, in addition to the core guidance counselor and nurse positions provided to every prototypical school discussed above for Element 10, the EB model provides additional pupil support position at the rate of one for every 125 at risk students.

Current Evidence-Based Recommendation
1.0 FTE pupil support position for every 125 at risk students These positions are provided additional days for PD (Element 14) discussed above

Analysis and Evidence

At risk students tend to have more non-academic issues for schools to address. This usually requires interactions with families and parents as well as more guidance counseling in school. The EB model addresses this by providing more staffing resources to meet these needs. Although there are many ways schools can provide outreach to parents or involve parents in school activities – from fundraisers to governance – research shows that school-sponsored programs that have an impact on achievement address what parents can do at home to help their children learn. For example, if the education system has clear content and performance standards, such as the new CCRS, programs that help parents and students understand both what needs to be learned and what constitutes acceptable standards for academic performance have been found to improve student outcomes. Parent outreach that explicitly and directly addresses what parents can do to help their children be successful in school and to understand the standards of performance that the school expects are the types of school-sponsored parent activities that produce discernible impacts on students' academic learning (Steinberg, 1997).

At the secondary school level, the goal of parent outreach programs is to have parents learn about what they should expect of their children in terms of academic performance. If a district or a state requires a minimum number of courses for graduation, such as Maryland's 21 credits, the school should make those requirements clear. If either average scores on end-of-course examinations or a cut-score on a comprehensive high school test are required for graduation, they too should be discussed. Secondary schools need to help parents understand how to more effectively assist their children in identifying an academic pathway through middle and high school, understand standards for acceptable performance, and be aware of the coursework necessary for college entrance. This is particularly important for parents of students in the middle or lower end of the achievement range, as often these students know very little of the requirements for transition from high school to postsecondary education (Kirst & Venezia, 2004).

At the elementary level, parental outreach and involvement programs should concentrate on what parents can do at home to help their children do academic work for school. Too often parent programs focus on fundraising through the parent-teacher organization, involvement in decision making through school site councils, or other non-academically focused activities at the school site. Although these school-sponsored parent activities may impact other goals, such as making parents feel more comfortable being at school or involving parents more in some school policies, they have little effect on student academic achievement. Parent actions that impact learning include: (1) reading to children at young ages, (2) discussing stories and their meanings, (3) engaging in open-ended conversations, (4) setting aside a place where homework can be done, and (5) ensuring that children complete homework assignments.

The resources in the EB funding model are adequate to create and deploy the ambitious and comprehensive parent involvement and outreach programs that are part of two comprehensive school designs: Success for All and Comer School Development Program. The Success for All program includes a family outreach coordinator, a nurse, a social worker, a guidance counselor, and an education diagnostician for a school with about 500 students. This group functions as a parent outreach team for the school, serves as case managers for students who need non-academic and social services, and usually includes a clothing strategy to ensure all students, especially in cold climates, have sufficient and adequate clothes and coats to attend school.

The Comer program was created on the premise of connecting schools more to their communities. Its parent-school team has a somewhat different composition and focuses on training parents to raise expectations for their children's learning, working with social service agencies, and working with the school's faculty to raise expectations for what students can learn. Sometimes the team co-locates on school site premises to provide a host of social services.

A program called Communities in Schools, which now operates in 26 states and the District of Columbia and is referenced by the resources provided by this model component, has been successful in raising school attendance rates, as students need to attend school to learn. The program adds a caseworker, often trained in social work, to a school's pupil support team to help match social services provided by non-educational agencies to students who need them.

24. Extended Day Programs

At both elementary and secondary school levels, some students at risk of academic failure are likely to benefit from after-school or extended day programs, even if they receive tutoring/Tier 2 interventions during the regular school day. Extended day programs provide academic support as well as a safe environment for children and adolescents to spend time after the school day ends during the regular school year.

Current Evidence-Based Recommendation
1.0 FTE teacher position for every 30 at risk students or 3 ⅓ FTE per 100 such students Position paid at the rate of 25 percent of annual salary—enough to pay a teacher for a two-hour extended day program, five days per week This formula equates to 1.0 FTE teacher position for every 120 at risk students

Analysis and Evidence

In a review of research, Vandell, Pierce and Dadisman (2005) found that well-designed and administered after-school programs yield numerous improvements in academic and behavioral outcomes (see also Fashola, 1998; Posner & Vandell, 1994). On the other hand, the evaluation of the 21st Century

Community Learning Centers (CCLC) program (James-Burdumy et al., 2005), though heavily debated, indicated that for elementary students, extended day programs did not appear to produce measurable academic improvement. Critics of this study (Vandell, Pierce & Dadisman, 2005) argued that the control groups had higher pre-existing achievement, which reduced the potential for finding program impact. They also argued that the small impacts identified had more to do with lack of full program implementation during the initial years than with the strength of the program.

Overall, studies have documented positive effects of extended day programs on the academic performance of students in select after-school programs (e.g., Takoata & Vandell, 2013; Vandell, 2014). However, the evidence is mixed because of research methods (few randomized trials), poor program quality, and imperfect implementation of the programs studied. Researchers have identified several structural and institutional supports necessary to make after-school programs effective:

- Staff qualifications and support (staff training in child or adolescent development, after-school programming, elementary or secondary education, and content areas offered in the program; staff expertise; staff stability/turnover; compensation; institutional supports);
- program/group size and configuration (enrollment size, ages served, group size, age groupings and child-staff ratio) and a program *culture of mastery;*
- consistent participation in a structured program;
- financial resources and budget (dedicated space and facilities that support skill development and mastery, equipment and materials to promote skill development and mastery, curricular resources in relevant content areas, and a location accessible to youth and families);
- program partnerships and connections (with schools to connect administrators, teachers, and programs; with larger networks of programs; with parents and community); and
- program sustainability strategies (institutional partners, networks, linkages, community linkages that support enhanced services, and long-term alliances to ensure long-term funding).

The resources recommended in the EB model could be used to provide students at risk of academic failure in all elementary grades and in secondary schools additional help during the school year, but before or after the normal school day. Because not all at risk students need or will attend an after-school program, the EB model assumes 50 percent of the eligible at risk students will attend the program – a need and participation figure identified by Kleiner, Nolin, and Chapman (2004). As a result, providing resources at a rate of 1.0 FTE teacher to 30 at risk students will result in class sizes of approximately 15 in extended day programs.

The State should monitor the degree to which the estimated 50 percent figure accurately estimates the numbers of students needing extended day programs. The study team also encourages Maryland to require districts to track the students participating in the programs, their pre- and post-program test scores, and the specific nature of the after-school program provided. This will develop a knowledge base of which after-school program structures have the most impact on student learning. The study team recognizes that how these extended day services are provided will vary across Maryland's school districts, and that any monitoring of the impacts of these resources should focus more on impacts on student performance than on the strategy for providing the services. The study team also found that most of the schools studied in other states with improved student performance had various combinations of before- and after-school extra help programs.

25. Summer School

Many students need extra instructional time to achieve to the state's high proficiency standards. Thus, summer school programs should be part of the set of programs available to provide students at risk of academic failure the additional time and help needed to achieve standards and earn academic promotion from grade to grade (Borman, 2001). Providing additional time to help all students master the same content is an initiative grounded in research (National Education Commission on Time and Learning, 1994). Summer school services are provided outside of the regular school year.

Current Evidence-Based Recommendation
1.0 FTE teacher position for every 30 at risk students or 3 ⅓ FTE per 100 such students Position paid at the rate of 25 percent of annual salary—enough to pay a teacher for a six-to-eight-week, four-hour-per-day summer school program and include adequate time for planning and grading This formula equates to 1.0 FTE teacher position for every 120 at risk students

Analysis and Evidence

Research dating to 1906 shows that students *on average* lose a little more than a month's worth of skill or knowledge over the summer break (Cooper, Nye, Charlton, Lindsay & Greathouse, 1996). Summer breaks have a larger deleterious impact on low-income children's reading and mathematics achievement. This loss can reach as much as one-third of the learning during a regular nine-month school year (Cooper et al., 1996). A longitudinal study by Alexander and Entwisle (1996) showed that these income-based summer learning differences *accumulate* over the elementary school years, such that low-income children's achievement scores – without summer school – fall further and further behind the scores of middle class students as they progress through school. There is emerging consensus that what happens (or does not happen) during the summer can significantly affect the achievement of students from low-income and at risk backgrounds and can help reduce (or increase) the low-income and minority achievement gaps in the United States.

Evidence on the effectiveness of summer programs in attaining these goals is mixed. Though past research linking student achievement to summer programs shows promise, several studies suffer from methodological shortcomings and low quality of the summer school programs (Borman & Boulay, 2004).

A meta-analysis of 93 summer school programs (Cooper, Charlton, Valentine & Muhlenbruck, 2000) found that the average student in summer programs outperformed about 56 percent to 60 percent of similar students not receiving the enrichment. However, the certainty of these conclusions is compromised because only a small number of studies (e.g., Borman, Rachuba, Hewes, Boulay & Kaplan, 2001) used random assignment and program quality varied substantially. More recent randomized controlled trial research of summer school reached more positive conclusions (Borman & Dowling, 2006;

Borman, Goetz & Dowling, 2009). Roberts (2000) found an effect size of 0.42 in reading achievement for a randomized sample of 325 students who participated in the Voyager summer school program.

Researchers (see McCombs et al., 2011) note several program components related to improved achievement effects for summer program attendees include:

- Early intervention during elementary school and a full six- to eight-week summer program;
- a clear focus on mathematics and reading achievement, or failed courses in high schools;
- small-group or individualized instruction;
- parent involvement and participation;
- careful scrutiny for treatment fidelity and good instruction in reading and mathematics; and
- monitoring student attendance.

Summer programs that include these elements hold promise for improving the achievement of at risk students and closing the achievement gap. Indeed, the most recent review of the effects of summer school programs reached this same conclusion (Kim & Quinn, 2013). Their meta-analysis of 41 school- and home-based summer school programs found that kindergarten through grade eight students who attended summer school programs with teacher-directed literacy lessons showed significant improvements in multiple areas including reading comprehension, with effects much larger for students from low-income backgrounds.

In sum, research generally suggests that summer school is needed and can be effective for at risk students. Studies suggest that the effects of summer school are largest for elementary students when the programs emphasize reading and mathematics and for high school students when programs focus on courses students failed during the school year. The more modest effects frequently found in middle school programs can be partially explained by the emphasis in many middle school summer school programs on adolescent development and self-efficacy, rather than academics.

Because summer school can produce powerful impacts, the EB model provides resources for summer school for classes of 15 students for 50 percent of all at risk students in kindergarten through grade 12, an estimate of the number of students still struggling to meet academic requirements (Capizzano, Adelman & Stagner, 2002). The model provides resources for a program of eight weeks in length and a six-hour day, which allows for four hours of instruction in core subjects. A six-hour day would also allow for two hours of non-academic activities. The formula would be one FTE position for every 30 at risk students or 3.33 per 100 such students. Because not all at risk students will need or will attend a summer school program, the EB model assumes 50 percent of the eligible at risk students will attend the program – a need and participation figure identified by Kleiner, Nolin, and Chapman (2004). Although a summer school term of six to eight weeks will have fewer hours than five day a week extended day programs, the EB resources this at the same rate to allow for teacher planning time for the summer school program – something that is less needed in extended day programs. Simplified, the EB summer school formula equates to 1.0 FTE teacher position for every 120 at risk students.

26. Limited English Proficient Students

Research, best practices, and experience show that LEP students need assistance to learn English, in addition to instruction in the regular content classes. This can include some combination of small classes, English as a Second Language (ESL) classes, PD for teachers to help them teach "sheltered" English classes, and "reception" centers for districts with large numbers of LEP students who arrive as new immigrants to the country and the school throughout the year.

LEP is a separate program from the at risk programs described above in the sections on tutors, extra pupil support, extended day and summer school. Funding is provided for all LEP students for these additional services regardless of FRPM status.

The total resources available to all LEP students (those FRPM eligible and those not) include one tutor position for every 125 LEP students, one pupil support position for every 125 LEP students, and any extended day and summer school teacher resources to which the LEP student count leads.

Current Evidence-Based Recommendation
1.0 FTE teacher position for every 100 identified LEP students This provision is in addition to all the resources triggered by the at risk student count, which includes all LEP students

Analysis and Evidence

Good LEP programs work, whether the approach is structured English immersion (Clark, 2009) or initial instruction in the native language, often called bilingual education. However, bilingual education is difficult to provide in most schools because students come from so many different language backgrounds. Nevertheless, bilingual programs have been studied intensively. A best-evidence synthesis of 17 studies of bilingual education (Slavin & Cheung, 2005) found that LEP students in bilingual programs outperformed their non-bilingual program peers. Using studies focused primarily on reading achievement, the authors found an effect size of +0.45 for LEP students. A more recent randomized controlled trial also produced strong positive effects for bilingual education programs (Slavin et al., 2011), but concluded that the language of instruction is less important than the approaches taken to teach reading.

Addressing that important issue in The Elementary School Journal, Gerstein (2006) concluded that LEP students can be taught to read in English if, as shown for monolingual students, the instruction covers phonemic awareness, decoding, fluency, vocabulary, and reading comprehension. Gerstein's studies also showed that LEP students benefit from instructional interventions initially designed for monolingual English speaking students, the resources for which are included above in the four at risk student triggered programs: tutoring, extended day, summer school, and additional pupil support.

Beyond the provision of additional teachers to provide ESL instruction to students or other types of extra help for LEP students; however, research shows that LEP students need a solid and rigorous core curriculum as the basis from which to provide any extra services (Gandara & Rumberger, 2008; Gandara, Rumberger, Maxwell-Jolly & Callahan, 2003).

This research suggests that LEP students need:

- Effective teachers – a core goal of all the staffing in this report. A recent study found that teachers who are effective with non-LEP students are also effective with LEP students, and vice versa. In addition, this study found that effective teachers who are fluent in the LEP student's native language are even more effective with those students (Loeb, Soland & Fox, 2014);
- adequate instructional materials (Element 15) and good school conditions;
- good assessments of LEP students so teachers know in detail their English language reading and other academic skills (Element 16);
- less segregation of LEP students;
- rigorous and effective curriculum and courses for all LEP students, including college and career-ready, and affirmative counseling of such students to take those courses; and
- PD for all teachers, focusing on sheltered English teaching skills (Element 14).

Hakuta (2011) supports these conclusions. Hakuta notes that English language learning takes time (one reason the EB model includes the above resources for every grade-level) and that "academic language" is critical to learning the new Common Core standards. The new standards require more explicit and coherent LEP instructional strategies and extra help services, if these are to be effective at ensuring that LEP students learn the subject matter English generally and academic English specifically, i.e. learn how to read content texts in English. While this instruction requires smaller regular classes, those are provided by the EB model, particularly at the early elementary level.

However, additional teaching staff are needed to provide ESL instruction during the regular school day, such as having LEP students take ESL in lieu of an elective course. Although the potential to eliminate some elective classes exists if there are large numbers of LEP students who need to be pulled out of individual classrooms, it is generally agreed that to fully staff a strong ESL program, each 100 LEP students should trigger one additional FTE teaching position. This makes it possible to provide additional instructional opportunities for LEP students to provide an additional dose of English instruction. The goal of this programming is to reinforce LEP student learning of academic content *and* English so at some point the students can continue their schooling in English only.

Research shows that it is the LEP students from lower income, and generally less educated backgrounds, who struggle most in school and need extra help to learn both academics and English. The EB model addresses this need by making sure that the ESL resources triggered by just LEP pupil counts are *in addition* to other Tier 2 intervention resources, including tutoring, additional pupil support, extended day and summer school resources as well as pupil support staff (Elements 22 to 25).

For example, a prototypical school with 125 at risk students and no LEP students would receive 1.0 FTE core teacher and pupil support staff, and in addition, approximately 1.0 FTE tutor position, 1.0 FTE extended day, 1.0 FTE summer school, and 1.0 FTE additional pupil support resources. However, if the

125 at risk children were all LEP students, the school would receive an *additional* 1.25 FTE teacher positions primarily to provide ESL instruction.

Given these realities, it is more appropriate to view the EB approach to extra resources for LEP students as including both resources for students from at risk backgrounds (unduplicated FRPM recipients and LEP) and ESL specific resources (Jimenez-Castellanos & Topper, 2012). That is a major reason why the EB model today augments the at risk student count to include the unduplicated count of students who are either FRPM recipients or LEP. This ensures that all LEP students trigger the extra resources for the Tier 2 interventions as well as the resources for ESL instruction.

27. Alternative Schools

Current Evidence-Based Recommendation
1.0 assistant principal position and one teacher position for every seven alternative education students

Analysis and Evidence

A small number of students have difficulty learning in the traditional school environment. The Alternative Learning Environment (ALE) students this report addresses are those who also have some combination of significant behavioral, social, and emotional issues, often also including alcohol or drug abuse. Such students often do much better in *small* "alternative learning environments." However, this rationale for ALE does not consider alternative schools for students who simply prefer a different approach to learning academics, such as project-based learning or more applied learning strategies used in new CTE programs such as computer-assisted engineering. The EB concept of alternative schools, which is also the State's concept, is for "troubled" youth who need counseling and therapy embedded in the school's instructional program.

The Institute for Education Sciences at the U.S. Department of Education published statistics on alternative schools and programs for the 2007-08 school year (Carver & Lewis, 2010). The study identified 558,300 students in 10,300 districts that administered alternative education schools and programs across the United States. Although the report did not provide data on the size of these schools or on staffing ratios, the data above suggest an average alternative school size of 54 students. Most of the programs served students in grades nine through 12. The main reasons students were enrolled in alternative programs, all of which meet the study team's initial definition of severe emotional and/or behavioral problems, included:

- Possession or use of firearms or other weapons;
- possession, distribution, or use of alcohol or drugs;
- arrest or involvement with the criminal justice system;
- physical attacks or fights;
- disruptive verbal behavior;
- chronic truancy;
- continual academic failure;

- pregnancy/teen parenthood; and
- mental health needs.

One of the major issues states face in creating funding programs for alternative schools is defining them. The study team's 2010 review of literature and state practice on alternative education provided little guidance for developing a clear definition of alternative education. More recently, and as part of implementing its compulsory attendance laws, Maryland commissioned a study to review state definitions of alternative education programs (see Porowski, O'Conner & Luo, 2014). Maryland needed a definition because attendance in an alternative education program was an exemption in its compulsory attendance law and the State did not have a clear definition of such programs. The study found great variation across the states in both defining and structuring alternative education programs. Because individual states or school districts define and determine the features of their alternative education programs, they tended to differ in key characteristics, such as target populations, setting, services, and structure.

A formal definition of an alternative education program would need to consider the target population (including both grade-levels served and types of students), program setting (within a public school or outside such a structure), program offerings (academic, behavioral, counseling, social skills, career counseling, etc.), and structure (how programs are scheduled, staff responsibilities, etc.). The Porowski, O'Conner & Luo (2014) study found wide variation across states (and districts) for all four elements.

The study team concluded that the 2006 Urban Institute (Aron, 2006) definition of alternative education closely follows the team's understanding of such programs, and this definition is aligned with the intent of such programs in Maryland:

> Alternative education refers to schools or programs that are set up by states, school districts, or other entities to serve young people who are not succeeding in a traditional public school environment. Alternative education programs offer students who are failing academically or may have learning disabilities, behavioral problems, or poor attendance an opportunity to achieve in a different setting and use different and innovative learning methods. While there are many different kinds of alternative schools and programs, they are often characterized by their flexible schedules, smaller teacher-student ratios, and modified curricula.

There is also the issue of standards for alternative education programs. Most states use definitions similar to that of the Urban Institute, but only one state, Indiana, has established standards for what an alternative education program might look like. The Indiana Department of Education's (2010) website states that:

> While each of Indiana's alternative education programs is unique, they share characteristics identified in the research as common to successful alternative schools:
>
> - Maximum teacher/student ratio of 1:15;
> - small student base;
> - clearly stated mission and discipline code;

- caring faculty with continual staff development;
- school staff having high expectations for student achievement;
- learning program specific to the student's expectations and learning style;
- flexible school schedule with community involvement and support; and
- total commitment to have each student be a success.

The study team concludes that these characteristics align with the EB view of alternative education programs.

From work in other states, the study team found that funding formulas for alternative schools differ substantially. In a few states, the typical staffing ratio for an alternative school is one administrative position for the school plus one teacher position for every seven to 10 students. Because alternative high schools are generally designed to serve students who are severely at risk, it is recommended they remain relatively small. Because of the small size of alternative schools, staff at these schools often must fill multiple roles. Many teachers in alternative schools provide many different services for students, including instruction, pupil support, and counseling services. This suggests that the staffing structure and organization for instruction in alternative high schools is usually quite different from that found in typical high schools.

Though the State could launch a process to more formally define alternative education programs as well as set standards for them, it might also want to adopt the above definition. It could also include a maximum size for any alternative education programs that would trigger alternative education funding. The EB model staffs alternative education programs with 1.0 FTE assistant principal position and 1.0 FTE teacher position for every seven alternative students and assumes the programs enroll fewer than 100 students.

28. Special Education

Providing appropriate education services for students with disabilities, while containing costs and avoiding over-identification of students, particularly minority students, presents several challenges (see Levenson, 2012). Many mild and moderate disabilities, often those associated with students learning to read, are correctable through strategic early intervention. This intervention includes effective core instruction as well as targeted Tier 2 intervention programs, particularly one-to-one tutoring (Elements 6 and 22). For those who require special programs as identified through an IEP, the EB model relies on a census-based funding formula that provides additional teaching and aid resources based on the *total* number of students in a school. As described below, these resources are expected to meet the instructional needs of children with mild and moderate disabilities. For children with severe disabilities, the EB model recommends that the State pay the entire cost of their programs, minus the cost of the basic education program for all non-public placements.

Current Evidence-Based Recommendation
1.0 FTE teacher position for every 150 students in the school 1.0 FTE aide position for every 150 students in the school Deduction of federal Title VIb funds Full state funding for students with severe disabilities, minus the cost of the basic education program for all non-public placements

Analysis and Evidence

In Frattura and Capper's (2007) book on the best approaches to serve students with disabilities, they conclude that both research and most leading educators recommend educating students in general education environments results in higher academic achievement and more positive social outcomes for students with and without disability labels, as well as being the most cost-effective way to educate students. Thus, they recommend that school leaders focus their efforts on preventing student underachievement and alter how students who struggle are educated. Doing so, they argue, will overcome the costly and low performance outcomes of multiple pullout programs. Further, fewer students will be inappropriately labeled with a disability and more students will be educated in heterogeneous learning environments, and thus yielding higher student achievement and more equitable distribution of achievement (Frattura & Capper, 2007).

The core principles of such a proactive approach to teaching students with disabilities are (1) education system needs to adapt to the student, (2) primary aim of teaching and learning is to prevent student failure, (3) aim of all educators is to build teacher capacity, (4) all services must be grounded in the school's core teaching and learning, and (5) students must be educated alongside their peers in integrated environments (Frattura & Capper, 2007).

Supporting this argument, research shows that many mild and moderate disabilities, particularly those associated with students learning to read, are correctable through intensive early intervention. For example, several studies (e.g., Borman & Hewes, 2003; Landry, 1999; Slavin, 1996) have documented that through a series of intensive instructional interventions (e.g. small classes, rigorous reading curriculum, one-to-one tutoring), nearly 75 percent of struggling readers identified in kindergarten and grade one can be brought up to grade-level without the need for placement in special education. Other studies have noted decreases in disability labeling of up to 50 percent with interventions of this type (see for example, Levenson, 2011; Madden, Slavin, Karweit, Dolan & Wasik, 1993; Slavin, 1996).

That is why the EB recommendations for extended learning opportunities (Elements 22, 24, and 25) are so important. They, along with core tutoring and pupil support services, are the series of service strategies that can be implemented before special education services are needed. This sounds like a common-sense approach that would be second nature to educators, but in many cases educators have been rooted in a "categorical culture" that must be corrected through PD and strong leadership from the district office and the site principal. Using a census approach to providing most of the extra resources for students with disabilities, an approach increasingly used across the country, works best for students with mild and moderate disabilities, but only if a functional, collaborative early intervention model (as outlined above) is also implemented.

This proactive approach to special education is evident in the Individuals with Disabilities Education Act (IDEA) of 2004, which changed the law about identifying children with specific learning disabilities. The reauthorized law states that schools will “not be required to take into consideration whether a child has a severe discrepancy between achievement and intellectual ability..." (Section 1414(b)). Instead, in the Commentary and Explanation to the proposed special education regulations, the U.S. Department of Education encourages states and school districts to abandon the IQ-achievement discrepancy model and adopt RTI models (also discussed above) based on recent research findings (Donovan & Cross, 2002; Lyon et al., 2001; President’s Commission on Excellence in Special Education, 2002; Stuebing et al., 2002). An RTI model, called a proactive approach within this report, identifies students who are not achieving at the same level and rate as their peers and provides appropriate interventions, the first ones of which should be part of the “regular” school program and not funded with special education resources (Mellard, 2004).

The core features of RTI, which is a critical part of the EB approach, include:

- High-quality classroom instruction;
- research-based instruction;
- classroom performance;
- universal screening;
- continuous progress monitoring;
- research-based interventions, that would include 1-1 tutoring;
- progress monitoring during interventions; and
- fidelity measures (Mellard, 2004).

Common attributes of RTI implementations are (1) a strong core instructional program for all students, (2) multiple tiers of increasingly intense student interventions, (3) implementation of a differentiated curriculum, (4) instruction delivered by staff other than the classroom teacher, (5) varied duration, frequency, and time of interventions, and (6) categorical or non-categorical placement decisions (Mellard, 2004). This proactive model fits seamlessly into the EB broader approach to helping all students at risk of academic failure through early interventions.

In many instances, this approach requires school-level staff to change their practice and cease functioning in “silos” that serve children primarily in “pullout” programs identified by funding source for the staff member providing the services (e.g. General Fund, Special Education, Title I). Instead, all staff would team closely with the regular classroom teacher to identify deficits and work together to correct them as quickly as possible.

For children with more severe disabilities, clustering them in specific schools to achieve economies of scale is generally the most effective strategy and provides the greatest opportunity to find ways to mainstream them (to the extent feasible) with regular education students. Students in these categories generally include severely emotionally disturbed (ED), severely mentally and/or physically handicapped, and children within the autism spectrum. The ED and autism populations have been increasing dramatically across the country, and it is likely that this trend will continue. To make the provision of services to these children cost-effective, it makes sense to explore clustering of services where possible and design cost parameters for clustered services in each category. In cases where students need to be served individually or in groups of two or three because of geographic isolation, it would be helpful to cost out service models for those configurations as well, but provide full state funding for those children. This strategy would reduce the likelihood of overwhelming the financial capacity of a small school district that happens to be the home of a child with a severe disability.

The census approach to funding core special education services can be accomplished by providing additional teacher resources at a fixed level – the EB recommendation now is 1.0 FTE teacher and 1.0 FTE aide for every 150 regular students. The census approach emerged across the country for several reasons:

- Continued rise in the number and percentage of “learning disabled” students and continued questioning by some of the validity of these numbers;
- underfunding of the costs of severely disabled students;
- over-labeling of low-income, minority, and LEP students into special education categories, which often leads to lower curriculum expectations and inappropriate instructional services; and
- reduction of paperwork.

Often, the census approach for the high incidence, lower cost students with disabilities is combined with a different strategy for the low-incidence, high-need students, whose costs are funded separately and totally by the State (with the exception of basic education funding), as these students are not found proportionately in all districts. This is the catastrophic funding for school districts that provide resources for special education students who require services exceeding some specified amount, such as $15,000 (after Medicaid, federal special education grants, and other available third-party funding is applied).

Today, diverse states such as Alabama, Arkansas, California, Montana, North Dakota, Pennsylvania, Massachusetts, and Vermont all use census-based special education funding systems. Moreover, all current and future increases in federal funding for disabled students are distributed on a census basis.

Staff Compensation

As is usually done in most adequacy studies, the EB approach, as well as the successful schools and PJ methods, to costing out the above recommendations is to use the average of the previous year’s staff salaries to put a salary “price” on each staff element of the funding model. Staff would include the major certified categories such as teacher, principal, superintendent, assistant superintendent, as well as the major classified categories such as secretary, custodian, maintenance worker, groundskeeper, and supervisory aide.

In some cases, adequacy studies explicitly include a market analysis of salaries; for example, comparing teacher salaries to salaries of workers in other occupations with similar skills and competencies to teaching. These market analyses are not part of the current study. Therefore, average salaries from the preceding year, 2014-15, will be used as the salary price to cost out the various elements of the model in the process of identifying both a new base per pupil figure and appropriate pupil weights.

However, benefits present a set of issues that need to be addressed in more detail. Benefits generally include:

- Retirement or pension costs;
- health insurance;
- social security and Medicare;
- workers' compensation; and
- unemployment insurance.

These are usually calculated as a percent of salary. For example, today social security and Medicare costs are 7.65 percent of salary, though social security contributions are capped at an annual salary of $118,500. To reflect this, the costing model includes 6.2 percent of salary for all salaries up to $118,500 and nothing above that. Medicare is computed as 1.45 percent of total salary.

The State generally sets retirement costs. In some cases, the State pays pension costs directly to the retirement fund, and that cost is not included in local district costs. Maryland has experienced recent changes regarding which level of government pays pension costs for school district employees. The study team developed the new base per pupil figure on an appropriate assumption about the percent of salaries that should be paid for pensions and the share of pension costs paid by local districts/counties, by the State, and by individuals. These costs were included in the compensation figure used to calculate the new per pupil amount. Though school districts are all contained within Maryland counties or Baltimore City, and the county or city technically pays pension costs, the rate is generally set by the State. In Maryland, the employer contribution rate is approximately 14.56 percent, and 10 percentage points of this total is paid directly by the State, leaving 4.56 percent as the district responsibility. In costing out the above recommendations, the district responsibility of 4.56 percent is used as the local cost for pensions for certified staff. A figure of 8.17 percent is used for pension costs for classified staff.

Health care insurance costs pose a more complex challenge. Costs of health care insurance often vary substantially across districts, which usually have different approaches to covering health care, including self-insurance. Rates often differ for individuals, couples, and families. Typically, the State does not explicitly state its fiscal responsibility for health insurance costs for school district employees, and typically unspecified amounts for such coverage are included in the base school funding formula. Moreover, many states' school funding formulas under-support actual health care insurance costs.

Health care costs need to be directly addressed in an adequacy study to ensure this part of the compensation is "adequately" reflected in any cost figure. In a recent study in North Dakota, the study team found that the State average cost for health insurance for all *state* employees was about $12,000.

Though the State had not explicitly adopted a policy of health care coverage for school district employees, the decision was made, with the assent of the legislative committee for which the study was conducted, to use the figure used for state employees as an “indirect” indicator of how the State would recognize health insurance costs in the school aid formula. This decision was bolstered by a previous state policy that allowed school districts to “opt into” the State health care program. Thus, in calculating a new per pupil figure for North Dakota, the $12,000 state figure was used for all staff categories. Wyoming also uses a state health insurance cost figure in its school aid formula.

The study team took the same approach in Maryland, and included the average cost the state health insurance program for state employees, of $8,537 in estimating the cost of health insurance for school districts.

Unemployment insurance is estimated by Maryland to be 2.8 percent of salary.

Workers compensation is estimated at 0.55 percent for certified employees and 0.0218 percent for classified employees, figures obtained from a study team survey of all district business officers.

Chapter 4: Evidence-Based Professional Judgment Panels

Introduction

As part of the study team's EB approach to estimating school finance adequacy, the study team conducted four evidence-based professional judgment (EBPJ) panels across Maryland. The purpose of these panels was to seek input from educational professionals on the content and elements of the EB model described in Chapter 3. At each panel meeting, the study team shared the elements of the EB model and then asked the panel members to reflect on those elements and provide the study team with a Maryland-specific reflection as to how each will operate in Maryland. Based on the feedback from these panels the study team noted several areas where adjustments to the EB model might be considered in estimating school finance adequacy using the EB model.

This chapter describes the outcomes of the four EBPJ panels the study team met with in June 2015. The findings from these panels were used to refine the EB model and adjust the model as appropriate. There were three overall outcomes from the EBPJ panels. In many instances, the panel members felt the recommendations in the EB model would work well in Maryland. In other instances, their recommendations led to changes in the study's EB model for Maryland. In a few cases, panelists expressed some concerns about the parameters of the model, but there is not a research-based alternative for the study's current EB recommendations. In those instances where the study team's interpretation of the research diverges from recommendations made at the EBPJ panels, the study team provides a detailed description of these differences. The study team has documented its rationale for recommendations and has provided sufficient information for state policy makers to determine which approach to fund. The simulation capacity of the Excel model will enable alternative recommendations to be modeled in real time and cost projections provided to policy makers as they review this report.

Professional Judgment Panels

The study team conducted four EBPJ panels on June 23 and 24. EBPJ panels were held across the State with the goal of including all regions of the State and ensuring representation from both urban and non-urban school district staff. The EBPJ panels were held in the following locations:

June 23

- Eastern Maryland (non-urban), Washington College in Chestertown, MD
- Western Maryland (non-urban), Allegany College of Maryland, Cumberland, MD

June 24

- Southern Maryland (urban), Prince George's Community College, Largo, MD
- Northern Maryland (urban), Harford Community College, Harford, MD

There were approximately 20 panelists at each EBPJ panel meeting. Panelists were nominated by education community stakeholders and school officials, vetted by the Maryland State Department of Education, and invited to attend the panel meetings. The study team specifically sought to include a range of school staff at each EBPJ session. The goal was that half of the members of each panel would be teachers from different types of schools (elementary, middle, and high school) as well as teachers with varying work assignments including core subjects/classrooms, elective classes, special education, LEP, and others. The study team wanted teachers with experience in developing curricula and programs to meet the new state standards, as that would make them particularly helpful in understanding the resource implications of programs to meet state standards. The study team also sought Maryland master teachers as well as lead teachers, mentor teachers, instructional coaches, National Board Certified Teachers, LEP teachers, special education teachers, and certificated personnel serving in the role of tutors.

In addition to teachers, the study team asked for participation from school site administrators at all school levels, along with a representative group of central office administrators including superintendents, assistant/associate/deputy superintendents, curriculum directors, special education directors, business managers, and school board members.

All EBPJ panel members were sent a copy of the draft EB report (Chapters 1, 2, and 3) several days before the meetings so they could attend the meetings prepared to discuss the details of the initial recommendations. EBPJ panels met for an entire day, starting at 9:00 a.m. and ending around 4:00 p.m. Each panel was supported by two POA staff members who presented the outline of the EB model and then sought input as to the implementation of the model's resources on Maryland schools and the allocation of those resources in ways that would improve student learning. The discussion at each EBPJ panel was summarized and combined into one overall summary that forms the basis of this chapter.

The balance of this chapter describes the discussion emanating from the EBPJ panels and is presented in the same order as the components of the EB model described in Chapter 3.

EBPJ Panel Recommendations

As indicated above, EBPJ panel recommendations fell into three categories:

1. Areas where the panelists recommended changes that have a sound research basis or need to be modified to meet state requirements and have been incorporated into the EB model.
2. Areas were panelists recommended changes or identified potential concerns with the EB model, but for now have not been changed in the EB model.
3. Areas where panelists were in general agreement with the EB model recommendations.

The study team considered each of these areas below, identifying the EB model elements from Chapter 3 in each section.

EBPJ Panel Recommendations

Areas Where the Evidence-Based Model Has Been Changed

There were three areas where EBPJ panel recommendations suggested strong evidence for modifying the EB model as originally presented to the panels. These include (1) prototypical school sizes, (2) addition of one additional teacher position at the prototypical size high school to provide for smaller advanced classes, (3) change in the way LEP resources are described, and (4) adjustments to the central office staffing recommendations to address concerns about district size and services for special education students. Each area is described below.

Prototypical School Sizes

The EBPJ panels suggested that the prototypical middle and high schools were much smaller than most schools in the State. As a result, the study team changed the sizes to 720 students for middle schools and 1,200 students for the prototypical high school. These sizes are still generally within the parameters research suggests for effective middle and high schools.

Element 3: Core High School Teachers (Advanced Courses)

Participants at the EBPJ meetings generally supported the EB class size recommendations and stated that, for the most part, the class size of 25 was lower than most districts are now able to provide. The one concern expressed by panelists was the issue of smaller classes for advanced AP classes and the ability to offer a diversity of CTE courses, including advanced CTE courses. This was a particular concern for high school math. A new state requirement mandates all high school students take four years of math. For students who take Algebra in junior high, it is likely that by the end of the grade 11 they will have taken the standard high school math curriculum and pre-calculus, and there will be a need to offer more advanced classes – most of which are likely to have relatively low enrollments. In addition, schools, particularly small schools that offer more than one CTE program often face the need to offer small classes as well.

To accommodate this very real need in high schools, the study team's approach is to assume that about 10 percent of juniors and seniors would require these advanced, smaller classes. In a prototypical school of 600 students (150 per grades nine through 12), this would amount to 30 students. If these 30 students were enrolled in advanced classes as small as six students, it would be possible to offer them instruction in five additional advanced classes with one additional teacher. Since most of these advanced classes could be larger than six, there is room for these students to take multiple advanced classes and maintain their small size. Moreover, since these students are not enrolled in other regular courses when they are in the advanced classes, there is some additional flexibility of class size in the non-advanced courses. One additional teacher in the prototypical high school of 600 students would be sufficient for high schools to provide advanced courses in line with state advanced math requirements.

Therefore, for a prototypical high school of 1,200 students, the Maryland EB model will include two additional core teacher to provide resources to offer these smaller advanced classes. In addition, since these core teachers would also generate elective teacher resources, there would be another 33⅓ percent FTE elective teacher per teacher in the school. The study team's model adds one advanced course teacher for every 600 students in high schools.

Element 26: LEP Students

As part of the strategies for helping students at risk of academic failure (discussed more below in the section on areas not requiring changes), panelists expressed concern about the EB model's approach for serving LEP students. Many panelists were confused about the EB model's definition of at risk students, which is the non-duplicated count of FRPM and students. Although the EB model generates substantial resources for all LEP students (FRPM or not) panelists initially stated that the resources for LEP students of one teacher per 100 LEP students were too low, generally not realizing that in the EB model LEP students are included in the at risk student count, which provides them with the tutoring, extended day, summer school, and additional support resources at risk students receive. Because the EB model's at risk count includes all LEP students, LEP students generate all of the at risk resources (teacher tutors, pupil support staff, extended day, and summer school) and generate an additional teacher for every 100 LEP students.

At the recommendation of one of the panelists, the study team modified the manner in which the EB model provides extra help resources. The change does not alter the level of resources provided to LEP and FRPM students, but makes more explicit the level of resources provided to LEP students. The at risk count is now non-LEP FRPM students and the LEP count now includes all LEP students (FRPM and non-FRPM). As a result, in the EB model, LEP students now receive all of the at risk services for teacher tutors, pupil support, extended day and summer school, as well as the one additional teacher per 100 LEP students. The remaining FRPM students receive all of the at risk resources, but not the additional LEP teaching support. This change only affects the description of how extra help resources are provided to FRPM and LEP students. The amount of these resources remains the same. This change simply makes more transparent the extensive resources available for LEP students. Several other issues were discussed and are outlined below, although they did not lead to changes in the recommended EB model.

For example, consider a district with 75 LEP students, 40 of whom are FRPM eligible. In addition, there is a total of 100 FRPM students, 40 LEP, and 60 non-LEP. The 75 LEP students would receive all of the extra-help services provided through the EB model, plus one LEP teacher for every 100 LEP students. The remaining 60 FRPM students would receive all of the extra help services, but not the LEP staffing.

There was considerable discussion of the most effective and efficient way to fully serve LEP students. Some districts and schools placed two teachers in LEP classrooms, one with the content expertise and one with ESL expertise, and lowered the class size to 20. That approach is very expensive. Other similar strategies were considered as well.

A LEP teacher in one panel suggested that best way to serve LEP students is for the core teacher to be an expert in sheltered English instruction. That way, the core teacher can teach the core subject in a way that allows LEP students to learn. The irony is that this approach is a no-cost approach but requires teachers of LEP students, who often exhibit multiple native languages in one classroom, to be certified in a core subject and also trained in sheltered English Instruction. This is the approach suggested by the EB model. For Maryland, however, this requires the education system – both universities and school districts – to begin training teachers in sheltered English instructional techniques. This might not happen immediately, but with the rising number of LEP students entering Maryland classrooms, there should be some urgency to fulfilling this need.

In conclusion, the EB model has been modified to make the distinction between the LEP (FRPM and non-FRPM) and FRPM students more transparent so that the resources directed toward each group are clearer.

Element 21: Central Office

There was a modest amount of discussion of the central office function at the EBPJ panels. The main concern expressed was the small size of the 3,900-student EB prototype district used to develop central office resources. As a result, the study team independently contracted with a group of three former school superintendents with experience in varying size districts from a range of states. They provided central office staffing configurations at a range of district sizes and pointed out that at more than 12,000 students, central office staff can be prorated up uniformly.

Table 4.1 provides the data for the staff in the 12,000-student district. The study team used this model to estimate the per pupil central office costs that were included in the estimate of EB costs for the base program.

TABLE 4.1

EVIDENCE-BASED CENTRAL OFFICE STAFFING FOR DISTRICT WITH 12,000 STUDENTS

Office and Position	EB PJ Panel Modified	
	Modified Evidence-Based Model	
	Admin	Classified
Superintendent's Office		
Superintendent	1	
Secretary/Receptionist		1
Clerk		1
Curriculum and Instruction/Ed Services		
Assistant Superintendent	1	
Director Elementary and Secondary	1	
Director EL	1	
Director of Assessment and Accountability	1	
Clerk		2
Secretary		4
Instructional Technology and Technology Network and Support		
Director	1	
Assistant Director	1	
Network Supervisor	1	
Systems Supervisor	1	
Technician	10	
Secretary		2
Clerk		2

Office and Position	EB PJ Panel Modified	
	Modified Evidence-Based Model	
	Admin	Classified
Human Resources/Personnel		
Assistant Superintendent	1	
Director	1	
Credential Specialist		1
Personnel Technician		2
Secretary		2
Special Education		
Assistant Superintendent	1	
Director	1	
Program Specialists	4	
Secretary		2
Clerk		2
Business Office		
Assistant Superintendent	1	
Director of Fiscal Services	1	
Accounting Technician		3
Risk Manager	1	
Benefit Technician		1
Director of Purchasing	1	
Buyers		2
Payroll Supervisor	1	
Payroll/purchasing Clerks		2
Records Technician		1
Warehouse Manager	1	
Warehouse Workers		2
Director Maintenance and 0perations (M&O)	1	
Assistant M & O Director	1	
Supervisor M & O	2	
Clerk		3
Secretary		5
Student Services		
Director	1	
Coordinator Health Services	1	
Secretary		1
Clerk		1
Coordinator Health Services	1	
Secretary		1
Clerk		
Total Central Office Staffing (12,000 Students)	40	43

Areas Where EBPJ Panels Recommended Changes Not Included in the Core Evidence-Based Model

There are seven elements of the EB model where the EBJP panels offered important suggestions. The study team describes those recommendations here, but has not modified the core EB model to reflect these changes, although in all cases, the Excel EB model can simulate the impact of these changes on the per pupil aid estimate generated by the simulation program. The seven elements are:

1. Prekindergarten.
2. Core elementary teachers.
3. Elective teachers.
4. Guidance counselors and nurses.
5. Principals and assistant principals.
6. Special Education.
7. Alternative schools.

Element 1a: Prekindergarten

The EB model resources prekindergarten programs as full-day programs for three- and four-year-old children, with one teacher and one aide for every 15 teachers, along with many of the other resources in the model. The EBPJ panels supported this recommendation. However, two suggestions emerged.

Several panelists noted there is a group of students that enroll in kindergarten with major behavioral and social issues that could be ameliorated if they had attended a prekindergarten program the year prior. This suggestion does not change the EB model recommendations, but it does offer another argument in favor of prekindergarten programs.

A number of panelists wondered whether current schools had the space for such an expanded prekindergarten program, and suggested that perhaps a capital construction allocation could accompany implementation of this expansion of prekindergarten. They pointed to the capital funding efforts that followed the phase-in of the Thornton Commission recommendation to expand kindergarten from half- to full-day as an example of what might be needed. This is a critical concern, but capital construction is not a direct component of the EB model. Prior to undertaking a large capital construction program, the State would want to consider what school space is currently available and potential alternative prekindergarten school locations.

Element 2a: Core Elementary Teachers

The EB model provides core elementary teachers at a ratio of 15 students per teacher in prekindergarten through grade three and 25 students per teacher in grades four through five (for grades six through 12 as well). This is an average of 17.3 students per core teacher. The EBPJ panels supported this recommendation, although a small number of panelists argued that kindergarten classes needed an aide – this was not universal across panels or in the panel where it was discussed.

Panelists also asked if there is sufficient classroom space to meet these class size ratios and discussed the issues of capital construction as described immediately above in Element 1a: Prekindergarten.

Element 3a. Elective Teachers

The EB model provides elective teachers to prototypical schools at a rate of 20 percent of elementary and middle school core teachers and 33⅓ percent of core high school teachers. This element ties together the issues of elective courses (i.e. art, music, and PE, which is part of the EB model), the school schedule, and sufficient time for teachers to engage in collaborative team planning and work.

The model provides for five 60-minute periods of student-free time for elementary and middle school teachers, and the panels stated that that was not sufficient for both individual planning and prep and collaborative teamwork (although this allocation was more than the three weekly time blocks of student-free time currently provided to most elementary teachers).

The high school elective allocation allows high schools to organize using a block schedule with four 90-minute blocks each day and allows for teachers to teach during three blocks and have 90 minutes each day for individual and collaborative planning (this time period also could be organized as two 45-minute periods).

The EBPJ panels also discussed ways to provide for sufficient time for collaborative teamwork for elementary and middle school teachers. One proposal that emerged was to provide 33⅓ percent electives for both elementary and middle schools, the same as for high schools. This would increase model costs.

Panelists described several middle schools organized into a seven-period schedule with teachers providing instruction for five periods. A schedule using this structure requires elective teachers to be 40 percent of core teachers. This would both reduce core instructional minutes and increase model costs.

EBPJ panelists did provide descriptions of creative ways some elementary and middle schools provide more student-free time for collaborative teamwork. One four-section elementary school combined elective classes into three sections, which produced an additional student-free period every third day. Another group of schools also increased class size for electives to carve out more student-free time for collaboration.

The consensus was that all teachers should be provided with 90 minutes of student-free time daily, which was viewed as sufficient for individual planning and preparation and for collaborative teamwork. Many panelists felt strongly that instructional minutes should be maximized, resulting in a preference for a six-period school day over both a seven-period day and even over a block schedule at the middle and high school levels.

One proposal that emerged from the EBPJ panels offers a solution that is both efficient and cost effective. In discussions, it was suggested that the teacher workday be extended by 30 minutes to a full seven hours, pay teachers more, and move all schools to a six-period schedule. The additional 30 minutes would merit a modest increase in teacher salary costs. Many panelists indicated teachers already worked a longer day to find time for collaboration with colleagues. This suggestion would make that time “official” and encourage all teachers to participate in important collaboration dialogues. In addition, this approach is more cost effective than increasing the number of elective teachers to 33⅓ percent at the elementary and middle school levels.

This suggestion would lead to teachers having 90 minutes a day for planning and collaboration, which could be organized to best meet the needs of each school. Examples of how the day could be organized included a 45-minute period for collaborative teamwork before students arrive for class each day. The rest of the day could be organized so that teachers had individual planning time at different periods of the day and enable schools to offer a 30-minute intervention/enrichment period, a structure that is commonly used today.

Element 8: Guidance Counselors and Nurses

The EB model provides for one guidance counselor for every 450 kindergarteners through grade five students and one for every 250 grades six through 12 students, as well as one nurse for every 750 students. The EBPJ panels supported this recommendation, although a number of panelists suggested that each school should have a full-time nurse or nurse assistant to administer student medications and address other health issues that arise during the school day. The panelists' concern related to what happens if a child becomes sick or is hurt while the nurse is at another location.

Element 11: Principals and Assistant Principals

The EB model provides one principal for every 450 students in elementary and middle schools, and one principal and one assistant principal for a 600-student prototypical high school.

The EBPJ panels strongly recommended that all prototypical-sized elementary and middle schools have an assistant principal using the following arguments:

- Current Maryland practice calls for more administrators in schools than the EB model provides;
- there has been a substantial burden on school site administrators due to the multiple observations required by the new teacher evaluations as well as the time required to work and consult with teachers on student learning objectives that are part of the new teacher evaluation systems;
- the need to coordinate testing (some panelists argued for testing coordinators for this work at each school); and
- administrative demands of coordinating IEP development and paperwork.

These arguments led to recommendations that a prototypical high school would need two assistant principals and that high schools in high poverty areas may need even more additional school site administration.

However, the study team did modify the assistant principal allocation to reflect the larger prototypical middle and high schools. Specifically, the Maryland EB model includes one principal and one assistant principal for the prototypical 720-student middle school, and one principal and three assistant principals for the prototypical 1,200-student high school.

Element 27: Alternative Schools

The EB model provides funding for the equivalent of one assistant principal and one full-time teacher or educational professional for every seven students in an alternative school. Generally, EBPJ panelists felt that for typical alternative schools with between 35 and 75 students, this formula would work well, particularly if alternative school students were defined as children with multiple behavioral and emotional issues, including concern over substance abuse.

However, further discussion by the EBPJ panels led to concerns about additional student needs and several suggestions for enhancing the resources available to alternative schools. Although the study team does not offer a recommendation to enhance resources to alternative schools, the team reports the findings from the EBPJ panels for consideration by state policy makers:

- One district argued that some students in alternative schools required more intensive assistance as they had been convicted of serious felonies and violent crimes and were dangerous to other students.
- another district argued that many alternative schools might be needed to serve different regions of larger school districts and that each school would need a principal, an assistant principal, several counselors, and perhaps mental health professionals.
- some panelists suggested that alternative schools should be provided for middle schools as well. A few even argued for alternative elementary schools especially for children who currently enter kindergarten without the benefit of a prekindergarten program. Several panels raised the issue of students in kindergarten who had not had a schooling experience before enrolling and might need intensive emotional and behavioral attention for the first quarter of the year. The same individuals conceded that a prekindergarten program would alleviate this need. The study team believes it is a state policy decision to determine the age brackets that qualify for enrollment in an alternative school.
- representatives from several districts suggested creating a categorical program for a Welcome Center for new immigrants, particularly new immigrants from backgrounds that could include refugee camps and no previous schooling experience. The study team supports that suggestion but recommends that it be funded outside the regular funding formula and be considered as part of the LEP program, not as alternative schools.
- finally, one individual cautioned about separating alternative school sites from regular high schools, arguing that if alternative school students were primarily minorities, further separation risked civil right violations.

Element 28: Special Education

The EB model provides one teacher position and one aide position for every 150 students in a school (this is total students, not special education students). In addition, it suggests funding should be net of federal Title VIb funding and that the State should fully fund the costs of programs for students with severe disabilities.

The EBPJ panel discussions about special education were closely linked to the discussion of strategies for students at risk of academic failure. The research behind the EB model shows that more preventative resources are provided for Tier 2 interventions – tutoring, extended day, summer, and extra pupil support – and those efforts should reduce the need for special education services. As a result, the EB model puts more resources into these Tier 2 strategies and less into special education under the theory that fewer children will need the more intense special education programs.

A number of panelists observed that the EB allocation of one teacher and one aide for every 150 students would result in fewer special educators than are currently employed in Maryland schools. Panelists had difficulty conceptualizing alternative ways of providing special education services if the resources for extra help in the EB model existed. This led to concerns among some panelists that the census-based special education model is insufficient to meet special education demands and expectations. Others seemed to feel that the allocation in the EB model would be sufficient.

Several principals suggested that if their school received the extra help resources and the special education resources identified in the model, they would hire teachers with special education certification to fill some of the extra help positions and organize around student needs. As a result, they felt the overall allocation of teacher resources to the school site was sufficient.

Some of the EBPJ panelists, as well as some of the people interviewed for the case studies, asserted that effective use of more preventative Tier 2 programs, along with early intervention supports embedded in the EB model (prekindergarten, smaller kindergarten through grade three classes, multiple Tier 2 interventions including tutoring), reduced the need for special education and actually had reduced incidences in their schools. This perspective aligns with the theory of action embedded in the EB model and drives the logic behind resource allocation in the model. This leads the study team to reaffirm its recommendation of one teacher and one aide for every 150 students.

The EBPJ panels supported the concept of full state funding of programs for students with severe and profound disabilities and argued it would be important for the State to develop rules and regulations to identify these students and programs.

The one other special education issue that emerged from the EBPJ panels was the need for "related services" including occupational therapy, physical therapy, speech/language, hearing, emotional support for children experiencing trauma, and mental health services. The study team's updated central office model accommodates support for staff to meet these needs.

Areas Where EBPJ Panels Agreed with the Evidence-Based Model Recommendations

For most of the elements of the EB model, the EBPJ panelists generally agreed the resource allocations were adequate for meeting state performance standards. Each of those elements is listed below with any comments from the panels included.

Element 1: Kindergarten. The panels supported the EB model recommendation of one teacher for 15 students.

Element 5: Instructional Coaches. Panels who indicated that the allocation of one coach for every 200 students was higher than is now provided in schools supported the EB model recommendation. There was agreement that coaches are critical to support collaborative time and PD to improve instructional practice. There was also considerable support to make funding of coaches a categorical program to dedicate the funds to coaching positions.

Element 6: Core Tutors. The EB model provides one core tutor for each prototypical school. The EBPJ panels supported this recommendation and pointed out there will be students in every school who are struggling with the new higher Common Core standards and this important extra help strategy is important to ensuring they meet the standards.

Element 7: Substitute Teachers. The recommendation that substitutes be provided at the rate of five percent of all core and elective teachers as well as for instructional coaches, tutors, special education, extended day, and summer school teachers was supported. CFOs attending the EBPJ panels indicated this would be sufficient.

Element 9: Supervisory Aides. The EBPJ panels broadly supported the recommendation for two supervisory aides in each prototypical elementary and middle school and three in a prototypical high school. The issue of school resource officers (SROs) was discussed. The majority of panelists said that in their districts the local police departments funded SROs and further support for such positions was not needed.

Element 10: Librarians. The panelists supported the recommendation of one library media specialist for each prototypical school and suggested the category needed to be renamed Library Media Specialists.

Element 12: School Site Secretarial Staff. The allocation of two secretarial positions at prototypical elementary and middle schools and three secretarial positions at prototypical high schools was generally supported. Some panelists indicated this was more staff than they had at schools in their districts, others said it was somewhat less.

Element 13: Gifted and Talented. The panels supported the recommendation of $30 per student. There was some discussion of the need for more teachers at higher grades to address the movement of some advanced classes to lower grades necessitating small highly advanced classes in the high school. This issue is addressed above in the discussion of core high school teachers. Due to research over the summer, the EB gifted and talented recommendation has been increased to $40 per student as the new price of the Renzulli Learning System, which has been sold to Compass Learning.

Element 14: Professional Development. EBPJ panels supported the PD recommendations in the EB model. These include $125 per student, which is in addition to longer teacher contracts for 10 student-free days of collaborative planning and training and the support for instructional coaches at the school level.

Elements 15, 16, and 17: Instructional Materials, Interim, Short Cycle Assessments, and Instructional Technology. The panelists were supportive of the EB model allocations of $190 per student for instructional materials, $30 per student for formative and short cycle assessments, and $250 per student for technology. Most of the CFOs on the panels indicated this was more than is currently expended in these three categories. Due to more research performed over the summer, the EB recommendation for short cycle assessments has been reduced to $25 per student to encourage schools to purchase one integrated, online battery of such assessments, rather than multiple additional assessment systems.

Element 18: Career and Technical Education. The EBPJ panels supported the recommendation of $10,000 per CTE teacher for advanced computer and technology equipment.

Element 19: Activity Funds and Extra Duty Pay. The panelists supported the recommendation of $250 per student. Most CFOs and high school principals said this would be sufficient for their sports and extracurricular programs, including teacher stipends, equipment, uniforms, etc., and would eliminate the need to "pay to play." This funding level also would provide for elementary school activities as well, supporting the sports programs, after-school STEM programs, and others at that level. Prekindergarten students are not eligible for student activity funding under the EB model.

Element 20: Maintenance and Operations. This topic was not discussed in detail, as the panelists did not feel they were knowledgeable in this area.

Elements 23, 24, 25, and 26: Strategies for students at risk of academic failure. Panelists were generally supportive of the recommendations for these services, but they had several suggestions that led to the changes proposed for the EB model to make resources for LEP and special education students more transparent.

Element 29: Compensation. There was support for, including realistic assumptions about, the cost of health insurance and state retirement programs used in the model.

Summary

This chapter summarized the reflections and discussion of four EBPJ meetings that took place in June 2015. There were 80 panelists in four locations located across the State. The panels consisted of educators, approximately half of which were teachers and the other half were school site administrators, special education and/or central office administrators, and school board members.

Overall, the panels offered a number of important and helpful suggestions. In three areas, core high school teachers, LEP teachers, and central office staff recommendations lead to changes in the EB model. Although the study team did not modify the EB model in response to suggestions in seven other areas, the capacity to do so through the simulation model being provided to the State will enable policy makers to understand the costs of alternative approaches to the EB model.

For most model elements, there was general agreement among EBPJ panelists that the EB model provides sufficient resources for Maryland school children to meet the state's proficiency standards.

Chapter 5: Case Studies of Improving Schools, Cross-Case Analysis

Introduction

Between October 2014 and March 2015, POA together with the Maryland Equity Project (MEP)[9] conducted 12 case studies of high performing and improving schools in Maryland. These case studies were intended to inform several adequacy study components about successful school improvement programs and strategies, and the staffing costs of these programs and strategies. The studies investigated the programs and strategies effective in raising the achievement levels of all students, especially students from poverty, minority, and non-English speaking backgrounds. One goal of the case studies was to see if the school improvement strategies in Maryland differed from the EB model and required changes or augmentation of the model. As this chapter shows, the cases showed that such changes are not warranted. Write-ups of the 12 individual case studies are provided in separate reports.

Selection of Case Study Schools

Case study schools were selected on the basis of their performance on Maryland state assessments. For elementary and middle schools, performance data were taken from state MSA tests. For high schools, achievement data were taken from state HSA tests. The primary metric used was the percentage of students who scored proficient or advanced in each school. This same metric was also used to select schools for the successful schools/districts adequacy study, although some modifications are being made to the criteria for the successful schools adequacy approach.

In the interest of selecting schools to represent a range of performance (e.g. status versus growth over time), the research team selected schools from the following four performance categories:

1. High Performing: These are schools with a very high percentage of students achieving at the proficient or advanced levels. Specifically, to be selected in this category at least 90 percent of all students in a school had to achieve proficient or better over a six-year period.
2. High Growth: Schools selected in this category had to achieve at least 50 percent growth over the six-year period. That is, the percentage of students scoring proficient or advanced on the test had to increase by at least 50 percent between the first year and the sixth (for example from 50 percent to 75 percent). These schools were also required to have at least 60 percent of all students achieving proficient or above in the most recent year of data used.
3. Reducing the Poverty Gap: In this category, the research team was interested in selecting schools that were successful in significantly reducing the achievement gap between low-income students – those identified as eligible as FRPM eligible – and all students in the school.[10] The research team used a benchmark of a two standard deviation decrease in the achievement gap

[9] The Maryland Equity Project, housed in the College of Education at the University of Maryland College Park is a partner in this study.
[10] The data was not disaggregated to the student level to allow for comparison between FRPM and non-FRPM students.

(approximately 14 percentage points) over six years. These schools were also required to have at least 60 percent of all students achieving proficient or above in the most recent year of data used.

4. High Growth for Student Groups. Schools in this category were selected on the basis of how well they had improved achievement for ethnic/minority, FRPM, LEP, and special education students. The specific criteria for selecting these schools were at least 50 percent growth for at least two of the subgroups. These schools were also required to have at least 60 percent of all students achieving proficient or above in the most recent year of data used.

The selection process used MSA assessment data from 2007 to 2012 and HSA assessment data from 2008 to 2013. More recent MSA data were not used because Maryland adopted its Common Core-based College and Career-Ready Standards, effective beginning in the 2013-14 school year. Because new assessments were not yet available, the State continued to use the MSA and HSA, though these assessments were not fully aligned with the new standards. This resulted in a decline in MSA and HSA scores across the State. For this reason, upon the recommendation of the MSDE, 2013 and 2014 MSA data were not included in the initial selection of elementary schools. Because there was less of an impact on HSA scores than the MSA scores, the research team was able to use the 2013 HSA data in the selection process for high schools. HSA data for 2014 were not available at the time the case study schools were selected.

As a check to assess whether schools that were high-performing through 2012 continued to perform at a high level, the research team applied one more performance criteria when selecting elementary and middle schools. The MSA scores for 2012 and 2014 were compared, and if the 2014 score decreased by more than one standard deviation, the school was eliminated from the sample.

Finally, the research team wanted to ensure that the selected schools were successful with all students. The research team analyzed schools' student demographics and selected schools with higher concentrations of FRPM-eligible students, LEP students, special education students, and ethnic/minority students. Though the research team did not use specific benchmarks across the board, which would have been especially challenging at the high school level, schools with at least 50 percent FRPM-eligible students, 50 percent ethnic/minority students, 10 percent LEP students, and 15 percent special education students were preferred.

Assessment Data

The MSDE provided the research team with school-level files of assessment scores, disaggregated by student groups (ethnic/minority, FRPM-eligible, LEP, and special education) for the years 2006-2012 (MSA) and 2008-2013 (HSA).

These files were also disaggregated by grade-level and subject. The MSA included scores for reading, math, and science. Depending on the grade, the HSA included scores for English, algebra, and biology. To simplify comparisons across schools, the research team calculated a set of composite scores for each school by aggregating all of the scores by grade and subject into a single all subjects/all grades score for each student group within each school. The final composite scores used to select schools consisted of a

FRPM composite, LEP composite, special education composite, and an aggregated all students composite.

School Selections

Twelve schools were selected, with approval from the MSDE, for inclusion in the case studies. The MSDE approved two of the 12 schools in October 2014 so that site visits could be used as part of the researcher training in the case study method described below. The MSDE approved the remaining 10 schools in December 2014, and the research team then contacted those schools to schedule site visits between January and March 2015. The goal was to include three schools in each of the four performance categories. However, one school in the Reducing the Poverty Gap category could not be scheduled. As a result, the final selection consists of two Reducing the Poverty Gap schools and four High-Growth for Student Groups schools (school assignments to each category appear in Table 5.1 below).

The 12 schools selected included the following:

1. Bel Air Elementary, Allegany County.
2. Chadwick Elementary, Baltimore County.
3. Chillum Elementary, Prince George's County.
4. Fairmont Heights High, Prince George's County.
5. James H. Harrison Elementary, Prince George's County.
6. North Frederick Elementary, Frederick County.
7. North Hagerstown High, Washington County.
8. Parkland Middle, Montgomery County.
9. Patterson Park Public Charter, Baltimore City.
10. Redland Middle, Montgomery County.
11. Somerset Intermediate, Somerset County.
12. Wiley H. Bates Middle, Anne Arundel County.

Table 5.1 provides a summary of each schools' demographic characteristics. The percentage of students eligible for FRPM ranged from 40 to 85 percent, with seven schools having a rate above 50 percent. The minority percentage (non-white) ranged from three to 97 percent, with nine schools above 50 percent and six schools above 80 percent. The percentage of LEP students ranged from 10 to 32 percent, with four schools having less than five LEP students. Special education rates ranged from six to 18 percent for 11 of the schools. One school with several programs for students with disabilities had a rate of 32 percent.

TABLE 5.1
CHARACTERISTICS OF CASE STUDY SCHOOLS

School (County)	Students	FRPM	LEP	Percent Minority	Special Education	Performance Category
Chillum Elementary (Prince George's)	274	85%	32%	97%	6%	High-Growth
Parkland Middle (Montgomery)	883	52%	10%	87%	10%	High-Growth
Somerset Intermediate (Somerset)	409	76%	<=5	56%	18%	High-Growth
Bel Air Elementary (Allegany)	216	48%	<=5	3%	16.7%	High-Performing
Chadwick Elementary (Baltimore County)	548	81%	21%	98%	9%	High-Performing
North Hagerstown High (Washington)	1,280	49%	<=5	41%	10%	High-Performing
James H. Harrison Elementary (Prince George's)	330	70%	16%	94%	32%	High-Growth for Student Groups
Patterson Park Public Charter (Baltimore City)	670	80%	18%	87%	12%	High-Growth for Student Groups
Wiley H. Bates Middle (Anne Arundel)	800	46%	10%	53%	9%	High-Growth for Student Groups
Fairmont Heights High (Prince George's)	837	65%	<=5	97%	16%	High-Growth for Student Groups
North Frederick Elementary (Frederick)	590	47%	14%	41%	6%	Reducing the Poverty Gap
Redland Middle (Montgomery)	545	40%	11%	67%	11%	Reducing the Poverty Gap

Case Study Training and Site Visits

On October 29, 2014, POA conducted a training session on the school case study methodology with the MEP staff and graduate students who were going to lead the site visits. The training focused on the link between the EB funding model elements, the components of the theory of school improvement embedded in the EB approach, and the key aspects of the protocol that structured the interviews and data collection in each of the case study schools.

In conjunction with the case study training, the first two site visits were completed on October 28, 2015. Both elementary schools were approved as site visit schools by the MSDE. Scheduling for the remaining 10 site visits occurred in January, with site visits taking place between January 2015 and March 2015. Some schools were visited twice or rescheduled because of inclement weather. Because one of the selected schools did not provide permission to conduct a visit, another site was selected and approved in late February 2015 and visited in March.

Before each case site visit, a request was sent to each school to provide documents for the case researchers to review before the site visit. To reduce the burden on school staff, only documents in an electronic form that could be sent via email were requested. These documents included site school improvement plan, descriptions of the curriculum and instructional approaches, daily and weekly bell schedules, a listing of all staff, and any other document the school thought would be useful as background for the case researchers. Materials on the schools' websites, when available, were also reviewed prior to the site visit. While the documents received from the schools varied, generally the materials helped the case researchers understand the context of the school and its overall curriculum and instructional approach before conducting the interviews.

The school site visits consisted of multiple interviews with individual school administrators and teachers or with small teacher focus groups. An interview with the principal was typically scheduled during the first 90 minutes of each visit. This was followed by interviews with lead teachers; classroom teachers emphasizing math, reading/English/language arts/writing, and science; instructional coaches; and, other key staff providing instruction in special education, Tier 2 interventions, and LEP. Teacher interviews were conducted during their student-free periods. The actual types and numbers of teachers interviewed and the length of interviews varied by school and each school's schedule.

Following each site visit, the case researchers drafted a case study report summarizing the information learned from the document review and site interviews. Case study write-ups followed a similar order:

- School demographics;
- school achievement data;
- school staffing;
- curriculum and instructional program, focusing on reading, mathematics, and if possible science, and including organization of teachers into collaborative groups (if done by the school), use of instructional coaches, and nature of data-based decision making;
- interventions for students struggling to achieve to standards;
- short cycle assessments;
- PD; and
- school culture.

Each case study report then underwent a rigorous internal review that followed the following process:

- Case study researchers produced an initial draft report;
- senior POA and MEP staff reviewed the initial draft;
- case study researchers revised the draft based on feedback and resubmitted it for review;
- a draft case study document was sent to the school principal for review and comment;
- staff revised the draft incorporating the principal's comments;
- the revised draft was reviewed internally; and
- a final draft submitted to APA for review, and then to the MSDE for final review.

Cross Case Analysis

The final step of the case study process is the cross case analysis, designed to identify common themes and findings across the 12 school sites. Although each case study provides Maryland educators with information about successful strategies schools are using to boost student performance, reduce gaps in performance between and among various subgroups of students, and/or to maintain high performance levels, the focus of this cross case analysis is on the resource needs of the strategies implemented by these 12 schools.

The remainder of the cross case analysis is organized into the following sections:

- Overall commonalities among the case study schools;
- staffing and class size;
- collaborative learning teams;
- interim, short-cycle assessments;
- extra help for students at risk of academic failure; and
- alignment with the elements of the EB model.

Overall Case School Commonalities

As should be clear from the way the schools were selected, the cases emphasized strategies that impacted student performance in reading/English/language arts and mathematics, and, in a few cases, science. Thus, the cases did not address other potentially important outcomes nor how they were produced. Further, many of the topics included in the case write-ups do not entail resources or specific staffing needs. This cross-case analysis, thus, first summarizes many of these latter strategies.

Nearly all schools had specific goals focused on improving student performance in reading and math. Several schools specifically had goals to reduce achievement gaps linked to student sociodemographics. The goals helped schools set their priorities for time and resources and provided guidance for how to expend energy.

Most schools were in the process of adopting new instructional materials in both reading and math, largely due to the shift to the Common Core-aligned Maryland's College and Career-Ready Standards. Furthermore, many schools had previously modified their curriculum and instructional programs as part of their overall strategies that resulted in the performance successes made over the past several years. On the other hand, there were no commonalities in terms of the specific curriculum and instructional programs adopted, except for a greater focus on phonemic awareness, phonics, vocabulary, and fluency in the elementary reading programs. Every school was aligning its current curriculum program to new county school system guidelines, including using many new formative assessments provided by its county education offices.

There also were movements to clarify a more common approach to instructional practice. This resulted both from actions in teacher collaborative groups, where instructional strategies and interventions were discussed and assessed, and in the broader ongoing activities of the faculties to identify what pedagogical practices worked in their schools.

The schools had a density of instructional leadership, provided by principals as well as teacher leaders. Teachers coordinated grade-level collaborative teams and in a few instances school-wide curriculum teams, and were involved in school-wide teams that developed individual education programs for students with disabilities.

School cultures were characterized by school-wide and individual accountability. Administrators and teachers in the case study schools viewed their success in terms of the impact of their strategies on student academic achievement. If high levels of achievement were maintained, if overall levels of achievement improved notably, and if achievement gaps diminished, the administrators and faculties concluded it was largely due to their instructional efforts. If achievement did not produce these results, the attitude was to go back to the drawing boards and revise their instructional approaches.

Given the sample size, it was not possible to determine if the specific improvement strategies for maintaining high levels of performance, for producing large gains in performance, or for reducing achievement gaps linked to poverty or minority status differed. But a review of all cases does not indicate that such differences existed. All schools had goals focused on a) improving their curriculum and instructional programs, b) identifying the most effective instructional practices, c) organizing teachers into collaborative work teams that used student data to plan instruction and interventions, d) providing a variety of extra help services to students struggling to learn to standards, e) engaging both administrators and teachers in instructional leadership, and f) creating a cohesive and collaborative culture in which school staff took responsibility for the results of their actions on student achievement.

Lastly, most schools took teacher quality very seriously. Indeed, when asked how the schools had produced their impressive results, several principals (and teachers) immediately said, “Teacher talent.” These schools often partnered with local teacher training institutions and/or tried to hire only individuals who had student taught or otherwise had worked in the school in some capacity so their skills and work habits, and degree to which they fit into the school culture, were known.

Staffing and Class Size

The largest component of school costs is teacher staffing. Teacher staffing is largely determined by the core class size and the number of electives offered by the school. The combination of these two figures reflects, in part, the school schedule and the opportunities for grade- or subject-alike teachers to be provided common planning time in order to engage in collaborate work. This section of the cross-case discusses these issues and their connections.

Table 5.2 provides the data on core class sizes and the number of elective teachers as a percentage of the number of core teachers. The table also includes data on the grade levels served, the number of students in the school, and the percent of FRPM students in the school. Core class sizes varied from a low of 19 (for an art integration magnet school in Anne Arundel County) to a high of 27 for a middle school in Montgomery County.

The five elementary schools serving prekindergarten to grade five had core class sizes that varied from 20 to 25. The one prekindergarten to grade eight school had core class sizes of 25. An interesting feature of these core class sizes is that teachers in many of the schools commented that the small class size was an important factor in the schools' successes, even though none of the core class sizes in these schools dipped below 20. It should also be noted that the largest class sizes among these six schools were in the schools with the highest percentage of FRPM students. By contrast, the EB model provides average elementary school class sizes of 17.3, which would reduce class sizes for all schools and also significantly reduce class sizes for the highest poverty schools.

TABLE 5.2
SCHOOL CORE CLASS SIZE AND ELECTIVES

School	Grades	Students	Percent FRPM	Core Class Size	Percent Elective Teachers
Bel Air	PreK-5	216	48	22	25
Chadwick	PreK-5	548	81	23	17
Chillum	PreK-5	274	85	25	11
North Frederick	PreK-5	590	47	22	25
James H. Harrison	Prek-5	220*	70	20	20
Patterson Park	PreK-8	670	80	25	22
Wiley H. Bates Performing Arts integration	6-8	800	46	19	34* 2 45 min planning
Parkland	6-8	883	52	26	38
Redland	6-8	545	40	27	38
Somerset	6-7	409	76	20	35
Fairmont Heights	9-12	837	65	25	43
North Hagerstown	9-12	1,280	49	24	28

*Harrison also has 110 additional students in county-wide special education programs located at the school with separate staffing.

The middle school core class sizes were 19 (for an art integration magnet school in Anne Arundel County), 20, 26, and 27, while the two high schools had core class sizes of 24 and 25. Except for the magnet school and the core class sizes of 20 in Somerset Intermediate, these class sizes are closer to the 25 provided by the EB model for secondary schools.

Elective teachers as a percent of core teachers ranged from 11 to 43 percent, but these figures are best analyzed by level of school – elementary versus secondary. Elective teachers as a percent of core teachers for the elementary (prekindergarten to grade five) schools ranged from 11 to 25 percent, with 22 percent for Patterson Park, which is a prekindergarten to grade eight school combining elementary and middle school levels. As noted in Chapter 3 of this report, a six-period schedule would require elective teachers at the rate of 20 percent of core teachers, assuming class sizes of core and elective classes were the same. This type of organization would then allow principals to schedule grade alike teachers with common planning time so they could engage in collaborate work. All of these six elementary schools adopted this strategy, but it was more of a challenge in Chillum with the smallest elective teacher allocation. Chadwick created time for teacher collaborative work with its less than 20 percent elective teacher allocation by sometimes having elective classes larger than core classes. The research team would argue that the 25 percent of elective teachers in North Frederick could be reduced to just 20 percent.

The elective teacher allocation for the middle and high schools requires more discussion. As noted in Chapter 3, a seven-period day with teachers providing instruction for five periods would require a 40-percent elective teacher allocation over core teachers. Two of the middle schools have 38 percent elective teachers and one of the high schools has 43 percent elective teachers. A block-schedule of four 90-minute blocks, in which teachers provide instruction for three blocks, requires a 33 ⅓ percent elective teacher allocation over core teachers. Two of the middle schools have approximately this percentage. Finally, a six period schedule requires only a 20-percent elective teacher allocation; North Hagerstown had moved to a six period schedule. As a result, its elective teacher allocation more reflects this schedule; however, at 28 percent it also indicates that it provides a somewhat higher percentage of electives (28 percent) and as a result elective classes are likely to be somewhat smaller than core class sizes.

The EB model provides a 20-percent elective teacher allocation for middle schools and a 33 ⅓-percent elective teacher allocation for high schools. These numbers are below what most of the case study middle schools have and different from the two high schools, one of which has a seven period schedule and the other a six period schedule.

All schools – elementary, intermediate, middle, and high – however, managed to carve out time for significant amounts of teacher collaborative work, a practice that research suggests is critical to each school's ability to boost student performance and reduce achievement gaps. North Hagerstown had recently reverted to a six-period schedule (from a block schedule used during the time of its performance gains) and would be able to restore the block schedule if it had the 33 ⅓-percent elective teacher allocation provided by the EB model.

Collaborative Learning Teams

As noted above, one of the key factors for all schools was the ability for multiple teacher teams to meet during the regular school day. There were multiple purposes for these team meetings. One focus was analyzing student assessment data to determine the appropriate interventions for students struggling to meet academic standards. A second and related activity was to monitor teachers who had been given assessments to determine whether the interventions were working. A third purpose was to plan instructional lessons for standards-based curriculum units that all teachers would teach simultaneously. And then after giving the same end-of-unit test, the teams would meet to discuss results.

For these collaborative activities to occur, teachers needed common, pupil-free time during the regular school day to meet. This time was only possible if the school had an appropriate mix of core and elective teachers, and if the principal organized all teachers in ways that the right teachers – grade alike and/or course/subject alike – had free time during the same period of the day so the team meetings could occur. As Table 5.2 indicates, all schools with the exception of Chillum and North Hagerstown had sufficient elective teachers to organize the school schedule so that teacher collaborative teams could meet multiple times during the week. The schools, moreover, adopted many different approaches for these team meetings. One school expanded the school day by 30 minutes to allow for both a 45-minute individual planning period and a 45-minute team collaborative period. The key was that all but two of the schools had a sufficient mix of core and elective teaches to allow for the scheduling of collaborative team time. Under the EB model, all schools would be provided a sufficient mix of core and elective teachers so that principals could create school schedules that provided ample time for collaborative teacher work teams to meet multiple times each week.

Interim, Short-Cycle Assessments

Each school case identified several different types of short cycle, interim assessments that schools and collaborative teacher teams used throughout the school year. Though each school used a different mix of such assessments, they needed the resources to acquire the combination that they ultimately used. Schools used many assessments beyond the State's accountability tests. The schools used benchmark assessments, usually given in the fall, January, and spring to monitor overall student performance during the year and progress toward achieving the desired proficiency levels. The schools also used various combinations of screener and diagnostic assessments, including DIBELS, the screener portions of the NWEA MAP assessments, and Renaissance Learning STAR Enterprise assessments. AIMSWEB was another assessment used by some schools. Nearly all schools used "formative" assessments that had been developed by their County education office as the systems transitioned to Maryland's new state standards.

The EB model provides a separate allocation for schools to purchase their chosen battery of short cycle, interim assessments. Without such assessments, the collaborative teacher teams would not have the information needed to plan effective instructional strategies and practices or to assess the effectiveness of those strategies.

Extra Help for Students at risk of Academic Failure

As each school case indicated, all schools had a range of extra help strategies for students struggling to meet proficiency standards. Most elementary schools had tutors to provide such extra help. These tutors were often called reading or math experts. Further, elementary schools had a mix of push-in as well as pull-out supports that included not only reading and math support experts, but also LEP and special education teachers. Several schools also offered extended day and summer school programming. Many elementary schools also had a 30-minute time block every day for interventions (and enrichment for students not needing interventions). Several elementary schools had specific computer-based programs that provided students with extra drills for math facts and reading fundamentals, including phonics as well as vocabulary. Finally, several elementary schools had bolstered pupil support systems related to the non-academic issues students face.

Most of the elementary schools studied also had a prekindergarten program. A number of the elementary schools claimed that early interventions, including prekindergarten programs, small class sizes (in the upper teens or low twenties) in the early elementary years, tutoring for students struggling in math and/or reading, and flexible student grouping combined to get more students performing at proficiency levels and reduced the percentage of students labeled with a disability and needing an IEP.

Secondary schools provided less individual tutoring, but most provided some tutoring. Secondary schools more often provided “second” periods of math or reading to help students struggling to meet standards. Some secondary schools offered semester length courses for students struggling in some core area, such as reading or mathematics. These are largely “no cost” strategies as the extra course or class substituted for an elective. In a few cases, though, these additional courses or classes had fewer numbers of students so did require additional resources.

Some high schools provided additional counseling to students at risk of academic failure, underscoring the need for additional pupil support staff, which the EB model provides. Many secondary schools also offered extended day academic extra support, which required additional resources. Finally, most secondary schools also had behavior programs which entailed some staff as well as professional development for teachers.

The cases were not designed to quantify the level of such extra support, but it seemed the EB model would provide a sufficient level of extra help staffing to financially support the mix and level of extra help services the case study schools provided, including the additional non-academic pupil supports that many schools – both elementary and secondary – provided.

Alignment with the Elements of the Evidence-Based Model

The case study schools’ strategies for improving student achievement and reducing the achievement gaps linked to poverty or minority status were highly aligned with the strategies embedded in the EB funding model. The research team did not find any schools whose strategies dramatically differed from the EB model nor did it find elements that would necessitate a change in the EB formulas or ratios. As noted earlier, there were differences across schools. For example, schools did not use the same reading or math curriculum materials, nor the same instructional materials in high schools. So, while there were consistencies in the overall strategies, there were also differences in the specifics of the various strategies as determined by local context and the county education systems of each individual school. The research team did not find any schools that used technology as a core of its improvement strategies. If it had however, the EB model's allocation for school-based computer technologies would likely be sufficient for such technology needs.

Summary

During the late fall and early winter, 12 schools were studied to identify their school improvement strategies, the degree to which those strategies were aligned with the strategies embedded in the EB model, as well as whether the school structures and strategies identified by the research team suggested a change in the formulas or ratios used in the EB model. Schools selected represented four categories of performance: high performance, high growth, reducing the poverty gap, and high growth for student sub-groups. The schools were selected from all regions of the State.

In general, the improvement strategies in these schools were parallel to those of the EB model. The schools had goals focused on improving student performance in reading and math, and often also goals to reduce achievement gaps. To accomplish those goals, the schools revised their curriculum and instructional approaches, often adopting new instructional materials; created common approaches to effective instructional practice; organized teachers into collaborative work groups that met multiple times during the week for team meetings; engaged teachers in ongoing data-based decision making; provided multiple interventions, including tutoring and other push-in and pullout strategies, extended day academic help, and summer school programming; and created collaborative school cultures in which faculties took responsibility for the student achievement outcomes of the school. Most schools also sought to recruit and retain high quality teacher talent, often hiring only individuals who had worked in the school in some capacity before being hired into a permanent teacher role.

The schools had class sizes that were in the range of the EB model, somewhat above the EB model at the elementary level and close to the EB model in secondary schools. All schools had a mix of core and elective teachers, so they were able to offer a full liberal-arts curriculum program that was being revised to reflect Maryland's College and Career-Ready Standards.

The schools' extra help strategies for providing additional instructional and student support for students at risk of academic failure seemed to be in the range of resources provided by the EB model, including the EB model's extended day and summer school provisions.

The research team did not find anything in the case study schools that suggested a major change was needed in any of the EB formulas or ratios.

Chapter 6: Calculating the Base and Pupil Weights

The EB base and its accompanying pupil weights were then calculated via an EXCEL-based model. Table 5.1 shows the salary data that were used:

TABLE 6.1

2014-15 AVERAGE SALARY BY POSITION

Position	Average Salary
School	
Principal	$118,906
Assistant Principal	$100,948
Teacher	$65,440
Instructional Coach	$81,131
Substitute Teacher	$65,440
Guidance Counselor	$72,415
Nurse	$56,842
Instructional/Supervisory Aide	$29,435
Library Media Specialist	$72,904
School Secretary/Clerical	$43,943
Custodian	$42,607
Maintenance Worker	$56,303
Grounds Maintenance	$42,607
Superintendent	$199,670
Business Manager	$125,820
Director--Personnel/HR	$125,820
Asst. Supt. of Instruction	$156,314
Director of Pupil Services	$125,820
Director of Assessment	$125,820
Director of Technology	$125,820
Director of O&M	$125,820
Secretary/Clerical	$43,943
Network/Systems Supervisor	$75,000
School Computer Technician	$45,000
Speech Pathologist	$74,608
Psychologist	$86,404

The model used the benefit rates provided in Chapter 3, in the section on compensation on pp. 71-72. With these figures, the EB base expenditure per pupil figure is $10,551, with weights of 0.30 for poverty students and 0.38 for LEP students. For all students with mild and moderate disabilities the weight is 0.70.

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(Those with an asterisk * refer to randomized controlled trials.)

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Appendix A

Glossary of Funding Model Elements

Model Element	Page Number	Definition
Core Teachers	21, 23	Core teachers are the grade-level classroom teachers in elementary schools and the core subject teachers in middle and high schools (e.g. mathematics, science, language arts, social studies and world language, including such subjects taught as Advanced Placement in high schools). Core teachers are provided at the rate of one for every 15 K–3 students and one for every 25 grade four to 12 students.
Elective Teachers	24	Elective teachers are all teachers for subject areas not included in the core, including such classes as art, music, physical education, health, and CTE, etc. However, some CTE classes can substitute for core math and science classes. Elective teachers are provided at the rate of 20% of core teachers for elementary and secondary and 33⅓% of core teachers for high schools.
Instructional Coaches	25	Instructional coaches (sometimes called mentors, site coaches, curriculum specialists, or lead teachers) coordinate the school-based instructional program, provide the critical ongoing instructional coaching and mentoring that the PD literature shows is necessary for teachers to improve their instructional practice, do model lessons, and work with teachers in collaborative teams using data to improve instruction.
Tutors	55	Tutors, or Tier 2 Interventionists, are licensed teachers who, during the regular school day, provide one-to-one or small group (no larger than five) tutoring to students struggling to meet proficiency in core subjects.
Extended day Programs	60	Extended day programs provide academic extra help to students outside the regular school day before and after-school.
Summer School	62	Summer school includes all programs provided during the summer months, i.e. outside the regular school year, largely focusing on academic deficiencies of students but includes a wider array of classes for high school students.
At Risk Students	11, 55	The unduplicated count of FRPM-eligible students and all LEP students. The resources triggered by at risk student counts would include all resources for tutors (Tier 2 Interventionists), summer school, extended day programming, and additional pupil support.

Model Element	Page Number	Definition
English Language Learner Services	64	LEP students are those who come from homes where English is not the native language and who perform at Levels 1, 2, and 3 in English; in addition to the at risk resources, the model provides resources to provide ESL or other extra help services for these students.
Special Education	68	Programs for all students with disabilities.
Alternative Schools	66	Alternative schools provide services, usually outside of the regular school environment, to students who have some combination of significant behavioral, social and emotional issues often including alcohol or drug addiction. These students are different from at risk students and require a different set of services.
Gifted and Talented	35	Gifted and talented students are those who perform in the very top levels of performance and can handle much more than a year of academic work in a regular school year.
Substitute Teachers	30	These are regular substitute teachers.
Student Support, Guidance Counselors, Nurses	31, 59	These include guidance counselors, social workers, psychologists, family outreach workers, nurses, etc. Guidance counselors and nurses are provided for all students, and additional student support staff are provided in the struggling student section.
Duty/Supervisory Aides	32	These are non-licensed individuals who help students get on and off buses, monitor the hallways, doors and playgrounds, and supervise the lunchroom.
Librarians	33	These are regular school librarians.
Principal, Assistant Principal	34	These are regular school principals and assistant principals.
Professional Development (PD)	38	PD includes all training programs for licensed staff in schools, including PD for implementing new curriculum programs, sheltered English instructional strategies for LEP students, gifted and talented, etc. It also includes assistance to teachers working in collaborative groups and ongoing coaching of teachers in their individual classrooms. Resources include instructional coaches, 10 pupil-free days for training, and $125 per pupil for trainers and other expenses.
School-Based Technology and Equipment	45	These include within school technology such as computers, servers, network equipment, copiers, printers, instructional software, security software, some curriculum management courseware, etc.
Instructional Materials	40	These include textbooks, consumable workbooks, laboratory equipment, library books and other relevant instructional materials.
Interim, Short Cycle Assessments	43	These include benchmark, progress monitoring, formative, diagnostic, and other assessments

Model Element	Page Number	Definition
		teachers need in addition to state accountability assessment data.
Student Activities	49	These include non-credit producing after-school programs, including clubs, bands, sports, and other such activities.
Central Office Administration	52	This is a per pupil amount developed for a prototypical school district of 3,900 students and includes all typical central office staff, such as superintendent, assistant superintendents, curriculum director, special education, business and HR functions, assessment and technology, and a director of operations/maintenance.
Operations and Maintenance	50	Covers functions such as custodial services, grounds maintenance and facilities maintenance, and minor repairs.

Appendix B

Previously Released Reports

Below is a list of suggested citations for previously released reports under the study. All the information (meeting information, reports, and supplemental materials) pertaining to the study can be found at http://archives.marylandpublicschools.org/adequacystudy/index.html.

Aportela, A., Picus, L., Odden, A. & Fermanich, M. (2014). *A Comprehensive Review of State Adequacy Studies Since 2003.* Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/AdequacyReviewReport_rev_091214.pdf

Humann, C. & Fermanich, M. (2014). *Summary of School Size Report.* Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/SchoolSizeReport_rev_091114.pdf

Fermanich, M., Picus, L. O. & Odden, A. (2014). *Proposed Methodology for Establishing Adequate Funding Levels in the State of Maryland*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/ProposedMethodsEstablishingAdequatyFundingLevelsMD.pdf

Humann, C. & Griffin, S. (2014). *Preliminary Report on the Impact of School Size*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/PreliminaryImpactofSchoolSize.pdf

Fermanich, M. L. & Picus, L. O. (2015). Adequacy Cost Study: *An Interim Report on Methodology and Progress.* Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/InterimAdequacyStudyReport-071015Final.pdf

Croninger, R. G., King Rice, J. & Checovish, L. (2015). *Evaluation of the Use of Free- and Reduced-Price Meal Eligibility as a Proxy for Identifying Economically Disadvantaged Students: Alternative Measures and Recommendations*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/EvaluationFRPMEligibilityProxyEconomicDisadvantage.pdf

Humann, C., Palaich, R., Fermanich, M. and Griffin, S. (2015). *Final School Size Study Report: Impact of Smaller Schools*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/SchoolSizeReport071615.pdf

Hartman, W. & Schoch, R. (2015). *Final Report of the Study of Increasing and Declining Enrollment in Maryland Public Schools*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/MDEnrollmentReport-Rev111615.pdf

Imazeki, J. (2015, November). *A Geographic Cost of Education Adjustment for Maryland*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/APA-POA-GCEI-Report-Rev-11232015.pdf

Glenn, W. J., Griffith, M., Picus, L.O., & Odden, A. (2015). *Analysis of School Finance Equity and Local Wealth Measures in Maryland*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/APA-POA-MarylandWealthEquityReport-Rev121115.pdf

Wool, S., Fermanich, M., & Reichardt, R. (2015, December). *The Effects of Concentrations of Poverty on School Performance and School Resource Needs: A Literature Review*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/ConcentratedPovertyLitReviewFinalDraft-071015.pdf

Workman, S., Palaich, R., & Wool, S. (2016, January). *A Comprehensive Analysis of Prekindergarten in Maryland*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/MDPreKComprehensiveAnalysis011316.pdf

Imazeki, J. (2016, June). *A Comparable Wage Index for Maryland*. Denver, CO: Augenblick, Palaich & Associates. Retrieved at: http://archives.marylandpublicschools.org/adequacystudy/docs/APAPOAGCEIFinalReport070716.pdf

Appendix C

Professional Judgment and Evidence-Based Panels

Table C.1
CHARACTERISTICS AND COUNTS OF MARYLAND PROFESSIONAL JUDGMENT PANEL PARTICIPANTS

Panel Type						Numbers of Participants by Role								
Panel Number	Level	School Type	Student Type	Time Needed (Days)	Location of Panel Meeting	Teacher/ Coordinator	Principal	District Superintent or Instructional Leader	Director of Special Ed, ELL, ECE or Student Services	Tech Specialist or Director	CFO or Business Manager	School Board Member	Representative of MSDE, the Division of Early Childhood Development (Office of Childcare)	**Total Participants per Panel**
1	School	Preschool	Regular, At-Risk	1.0	Balt.	2 Preschool Teachers/Coordinators	3 Elementary Principals	1	1 Director of Preschool /ECE		1		1	**9**
2	School	Elementary	Regular, At-Risk	1.5	Balt.	2 Elementary Teachers	3 Elementary Principals	1		1	1			**8**
3	School	Middle	Regular, At-Risk	1.5	Balt.	2 Middle School Teachers	3 Middle School Principals	1		1	1			**8**
4	School	High School	Regular, At-Risk	1.5	Balt.	2 High School Teachers	3 High School Principals	1		1	1			**8**
5	Special Need	Elementary, Middle, HS	ELL	1.0	Balt.	1 Elementary ELL Lead Teacher Coordinator 1 Middle School ELL Lead Teacher/Coordinator 1 High School ELL Lead Teacher/Coordinator	1 Elementary Principal, 1 Middle School Principal, 1 High School Principal	1	1 Director of ELL		1			**9**
6	Special Need	Elementary, Middle, HS	Special Education	1.0	Balt.	1 Elementary SpEd Lead Teacher/Coordinator 1 Middle School SpEd Lead Teacher/Coordinator 1 High School SpEd Lead Teacher/Coordinator	1 Elementary Principal, 1 Middle School Principal, 1 High School Principal	1	1 Director of Special Ed		1			**9**
7	District	All	All	2.0	Balt.	1	1 Elementary Principal, 1 Secondary Principal	3	1 Director of Student Services	1	1	1		**10**
8	CFO	All	All	1.0	Balt.						6			**6**
9	Statewide	All	All	1.0	Balt.	1	1 Elementary Principal, 1 Secondary Principal	3	1		2	1		**10**
TOTAL PARTICIPANTS						***16***	***22***	***12***	***5***	***4***	***15***	2	***1***	***77***

Table C.2
CHARACTERISTICS AND COUNTS OF MARYLAND EVIDENCE-BASED PROFESSIONAL JUDGMENT PANEL PARTICIPANTS

Panel Type						Numbers of Participants by Role									
Panel Number	Level	School Type	Student Type	Time Needed (Days)	Location of Panel Meeting	Teacher/ Coordinator	Principal	District Superintent or Instructional Leader	Director of Special Ed, ELL, ECE or Student Services	Director or Assistant Supt. of Curriculum	Tech Specialist or Director	CFO or Business Manager	School Board Member	**Total Participants per Panel**
1	Multiple	Multiple	All	1.5	North Bel Air	1 Elementary Teacher 1 Middle School Teacher 1 High School Teacher 1 Preschool Teacher 1 SpEd Teacher 1 ELL Teacher 1 Lead Teacher - for example teacher team leader 1 Instructional Coach 1 Tutor	1 Elementary Principal 1 Middle School Principal 1 High School Principal	1	2	1	1	1	1	**19**
2	Multiple	Multiple	All	1.5	South Largo	1 Elementary Teacher 1 Middle School Teacher 1 High School Teacher 1 Preschool Teacher 1 SpEd Teacher 1 ELL Teacher 1 Lead Teacher - for example teacher team leader 1 Instructional Coach 1 Tutor	1 Elementary Principal 1 Middle School Principal 1 High School Principal	1	2	1	1	1	1	**19**
3	Multiple	Multiple	All	1.5	East Chester-town	1 Elementary Teacher 1 Middle School Teacher 1 High School Teacher 1 Preschool Teacher 1 SpEd Teacher 1 ELL Teacher 1 Lead Teacher - for example teacher team leader 1 Instructional Coach 1 Tutor	1 Elementary Principal 1 Middle School Principal 1 High School Principal	1	2	1	1	1	1	**19**
4	Multiple	Multiple	All	1.5	West Cumber-land	1 Elementary Teacher 1 Middle School Teacher 1 High School Teacher 1 Preschool Teacher 1 SpEd Teacher 1 ELL Teacher 1 Lead Teacher - for example teacher team leader 1 Instructional Coach 1 Tutor	1 Elementary Principal 1 Middle School Principal 1 High School Principal	1	2	1	1	1	1	**19**
TOTAL PARTICIPANTS						***36***	***12***	***4***	***8***	***4***	***4***	***4***	***4***	***76***

Table C.3
PROFESSIONAL JUDGMENT PANEL PARTICIPANTS

Panel	LEA	Role	First Name	Last Name	Title
CFO	Frederick	CFO or Business Manager	Leslie	Pellegrino	Central Office
	Garrett	CFO or Business Manager	Larry	McKenzie	Director of Finance
	Prince George's	CFO or Business Manager	John	Pfister	Director of Budget and Management Services
	Queen Anne's	CFO or Business Manager	Robin	Landgraf	CFO, CO
	St. Mary's	CFO or Business Manager	Tammy	McCourt	Assistant Superintendent, Finance
	Carroll	CFO or Business Manager	Chris	Hartlove	Chief Financial Officer
District	Anne Arundel	Principal	Nuria	Williams	Principal, Crofton
	Frederick	District Superintendent or Instructional Leader	Kevin	Cuppett	Central Office
	Garrett	District Superintendent or Instructional Leader	Barbara	Baker	Assistant Superintendent of Educational Services
	Kent	Director of Student Services	Darlene	Spurrier	Supervisor of Student Services
	Washington	Tech Specialist or Director	Jim	Corns	Chief Operations Officer Instructional Technology
	Baltimore County	Teacher/Coordinator	Orly	Mondell	Teacher, New Town High School
	MABE	Board Member	William	Phalen	Board Member
	Carroll	CFO or Business Manager	Chris	Hartlove	Chief Financial Officer
	Howard	Principal	James	LeMon	Principal, Wilde Lake HS
ELL	Anne Arundel	Teacher/Coordinator	Cheryl	Menke	Teacher Specialist
	Frederick	Principal	Kathy	Swire	Myersville Elementary
	Montgomery	Teacher/Coordinator	Sonja	Bloetner	Secondary ESOL
	Washington	Principal	James	Aleshire	Principal, North Hagerstown High
	Dorchester	Director of ELL	Theresa	Connors	Supervisor of English/ELL

Panel	LEA	Role	First Name	Last Name	Title
	Cecil	Teacher/Coordinator	Enid	Lum	Teacher, ESOL multi-school-
	Harford	Principal	Larissa	Santos	Principal/Edgewood
Elementary	Calvert	Tech Specialist or Director	Jon	McClellan	Director of Instructional and Informational Technology
	Kent	Principal	Dawn	VanGrin	Principal of Galena Elementary
	Washington	District Superintendent or Instructional Leader	Peggy	Pugh	Associate Superintendent for Curriculum and Instruction
	Allegany	Teacher/Coordinator	Dana	Reinhardt	Third Grade Teacher - George's Creek Elementary School; 2014-15 Teacher of the Year
	Harford	CFO or Business Manager	Eric	Clark	Director of Budget
	Harford	Principal	Patty	Mason	Principal/Magnolia
	Howard	Principal	Maisha	Strong	Principal, Swansfield ES
	Baltimore City	Teacher/Coordinator	Katrina	Kickbush	Wolfe Street Academy
High School	Garrett	Tech Specialist or Director	Jeff	Gank	Director of Information Technology
	Prince George's	Teacher/Coordinator	Effie	Hillian	English Dept. Chair, Oxon Hill High School
	Somerset	Principal	Sidney	Hankerson	Principal (Washington H. S.)
	Baltimore County	Teacher/Coordinator	Sean	McComb	ELA, Patapsco High School and Center for the Arts
	Allegany	Principal	Stephanie	Wesolowski	Assistant Principal/Academic Dean - Mountain Ridge High School
	Cecil	District Superintendent or Instructional Leader	Carolyn	Teigland	Assoc. Supt for Education Services
	Howard	CFO or Business Manager	Beverly	Davis	Executive Director, Budget and Finance
Middle School	Anne Arundel	District Superintendent or Instructional Leader	Jolyn	Davis	Director, School Performance
	Baltimore City	Principal	Najib	Jammal	Principal, Lakeland Elem./Middle
	Caroline	CFO or Business Manager	Erin	Thornton	Comptroller
	Caroline	Teacher/Coordinator	Heather	Harper	Teacher, Colonel Richardson Middle School
	Montgomery	Principal	Monifa	McKnight	Ridgeview MS

Panel	LEA	Role	First Name	Last Name	Title
	Washington	Teacher/Coordinator	Jaime	Mason-Lego	2010 Teacher of the Year, Clear Spring Middle
	Allegany	Principal	Tessa	Fairall	Assistant Principal at Washington Middle School
	Howard	Tech Specialist or Director	Shelly	Barnett	Manager, Enterprise Systems
PreK	Baltimore City	Director of Early Childhood	Perry	Gergen	Director of Early Education
	Garrett	Principal	Candy	Maust	Route 40 Elementary
	Montgomery	Principal	Annette	Ffolkes	Roscoe Nix Elementary
	Washington	CFO or Business Manager	Eric	Sisler	Financial Budget Analyst
	Worcester	Tech Specialist or Director	Thomas	Mascara	Director, Technology
Special Education	Calvert	District Superintendent or Instructional Leader	Daniel	Curry	Superintendent of Schools
	Garrett	Teacher/Coordinator	Katie	Lauder	Accident
	Somerset	Teacher/Coordinator	Fern	Griffith	Special Ed. Teacher
	Worcester	Teacher/Coordinator	Jenifer	Heimer	Snow Hill Middle School
	Queen Anne's	Principal	Amy	Hudock	Principal, CMS
	Carroll	Principal	Craig	Dunkelberger	Principal, Piney Ridge Elem.
Statewide	Frederick	Principal	Jenny	Powell	Thurmont Middle
	Montgomery	District Superintendent or Instructional Leader	Maria	Navarro	Chief Academic Officer
	Wicomico	CFO or Business Manager	Bruce	Ford	Business Manager
	Queen Anne's	District Superintendent or Instructional Leader	Carol	Williamson	Superintendent
	St. Mary's	CFO or Business Manager	Tammy	McCourt	Assistant Superintendent, Finance
	MABE	Board Member	Christopher	Barclay	Board Member, Montgomery
	Carroll	Principal	Eric	King	Principal, Winters Mill HS
	Harford	District Superintendent or Instructional Leader	Barbara	Canavan	Superintendent
	Baltimore City	Teacher/Coordinator	Ryan	Kaiser	Teacher of the Year

Table C.4
EVIDENCE-BASED PROFESSIONAL JUDGMENT PANEL PARTICIPANTS

Panel	Role	District	First Name	Last Name
East	Elem.	Kent County	Tracy	Hodge
East	ELL	Prince George's County	Kristen	Ford
East	High	Dorchester County	Julie	Harp
East	Lead	Dorchester County	Natalie	Taylor
East	Middle	Wicomico County	Chad	Pavlekovich
East	Sped.	Anne Arundel County	Jenna	Freiberg
North	Elem.	Howard County	Maleeta	Kitchen
North	ELL	Montgomery County	Tamara	Henneman
North	High	Harford County	Amanda	Roberts
North	Lead	Harford County	Kelly	Mangum
North	Middle	Baltimore County	Barbara	Noppinger
North	Sped.	Prince George's County	Kelly	Moffett
South	Elem.	Charles County	Taniesha	Goulbourne
South	ELL	Montgomery County	Susan	Nerlinger
South	High	Calvert County	Jamie	Culp
South	Lead	Prince George's County	Timonious	Downing
South	Middle	Charles County	Joseph	Farrell
South	Sped.	Montgomery County	Shannon	Mitchell
West	Elem.	Washington County	Megan	Cornelius
West	ELL	Washington County	Nitzalis	Rivera
West	High	Carroll County	Jennifer	Wennell
West	Lead	Carroll County	Thomas	McHugh
West	Middle	Allegany County	Deborah	Jackson
West	Sped.	Frederick County	Pamela	Adams-Campbell
East	After-school or extended learning professional	Dorchester County Public Schools	Teat	Regina

Panel	Role	District	First Name	Last Name
East	CFO or Business Manager	Worcester County Public Schools	Tolbert	Vince
East	Director of sped, ELL, SS, or ECE	Anne Arundel County Public Schools	Pedrick	Bobbi
East	Director of sped, ELL, SS, or ECE	Anne Arundel County Public Schools	Reider	Kelli
East	Director or Assistant Supt. of Curriculum	Queen Anne's County Public Schools	Thomas	Anne
East	District Superintendent, Chief Academic Officer or other Instructional Leader	Somerset County Public Schools	Davis	Tom
East	Elementary School Principal	Queen Anne's County Public Schools	Carey	Michelle
East	High School Principal	Dorchester County Public Schools	Sorrells	Lynn
East	Instructional Coach	Somerset County Public Schools	Bevilacqua	Tony
East	Middle School Principal	Somerset County Public Schools	Marshall	Elizabeth
East	Prekindergarten Teacher	Worcester County Public Schools	Doherty	Lucy
East	School Board Member	Worcester County Public Schools	Rothermel	Bob
East	Tech Specialist or Director	Wicomico County Public Schools	Langan	Robert
North	After-school or extended learning professional	Baltimore City Public Schools	Starnes	Glenn
North	CFO or Business Manager	Carroll County Public Schools	Hartlove	Chris
North	Director of sped, ELL, SS, or ECE	Baltimore City Public Schools	Perkins-Cohen	Alison
North	Director of sped, ELL, SS, or ECE	Cecil County Public Schools	Farr	Sarah
North	Director or Assistant Supt. of Curriculum	Cecil County Public Schools	Teigland	Carolyn

Panel	Role	District	First Name	Last Name
North	District Superintendent, Chief Academic Officer or other Instructional Leader	Harford County Public Schools	Canavan	Barbara
North	Elementary School Principal	Baltimore County Public Schools	Easterly	Jerry (Dwight)
North	High School Principal	Cecil County Public Schools	Gellrich	Anne
North	Instructional Coach	Harford County Public Schools	Schisler	Erin
North	Middle School Principal	Harford County Public Schools	Mascari	Joe
North	Prekindergarten Teacher	Baltimore City Public Schools	Fleury	Jody
North	School Board Member	Harford County Public Schools	Reynolds	Nancy
North	Tech Specialist or Director	Baltimore City Public Schools	Ross	Bert
South	After-school or extended learning professional	Howard County Public Schools	Cifrese	Marty
South	CFO or Business Manager	Montgomery County Public Schools	Klausing	Tom
South	Director of sped, ELL, SS, or ECE	Howard County Public Schools	Davis	Lisa
South	Director of sped, ELL, SS, or ECE	Howard County Public Schools	Pattik	Judy
South	Director or Assistant Supt. of Curriculum	Montgomery County Public Schools	Hazel	Niki
South	District Superintendent, Chief Academic Officer or other Instructional Leader	Prince George's County Public Schools	Joseph	Shawn
South	Elementary School Principal	Howard County Public Schools	Larner	David
South	High School Principal	Baltimore County Public Schools	Lloyd	David
South	Instructional Coach	Anne Arundel County Public Schools	Gregory	Theresa

Panel	Role	District	First Name	Last Name
South	Middle School Principal	Howard County Public Schools	John	Shiney
South	Prekindergarten Teacher	Howard County Public Schools	Martinec	Dawn
South	School Board Member	Montgomery County Public Schools	Kauffman	Philip
South	Tech Specialist or Director	Howard County Public Schools	Barnett	Shelly
West	After-school or extended learning professional	Allegany County Public Schools	Roberts	Kate
West	CFO or Business Manager	Garrett County Public Schools	McKenzie	Larry
West	Director of sped, ELL, SS, or ECE	Baltimore County Public Schools	Rider	Rebecca
West	Director of sped, ELL, SS, or ECE	Frederick County Public Schools	Hartsock	Kathy
West	Director or Assistant Supt. of Curriculum	Frederick County Public Schools	Cuppett	Kevin
West	District Superintendent, Chief Academic Officer or other Instructional Leader	Garrett County Public Schools	Wilson	Janet
West	Elementary School Principal	Allegany County Public Schools	Eirich	Autumn
West	High School Principal	Garrett County Public Schools	Maddy	Jim
West	Instructional Coach	Carroll County Public Schools	Weaver	Jamie
West	Middle School Principal	Carroll County Public Schools	Carver	James
West	Prekindergarten Teacher	Baltimore County Public Schools	Capron	Susan
West	School Board Member	Allegany County Public Schools	Root	Edward
West	Tech Specialist or Director	Allegany County Public Schools	Grove	Nil

Appendix C.1 Participant Qualifications for Maryland's Professional Judgment and Evidence-Based Panels: District-Based Panel Participant Qualifications

Below is a list of suggested qualifications for nominating district-based educators to serve on professional judgment and evidence-based state, district and school level panels. This is a guideline to help the Maryland State Department of Education identify district-based educators who are effective in their positions and knowledgeable about resources necessary to educate all Maryland students to state standards. This is not intended to be an exhaustive or strict list of requirements for participation. Ultimately, it is up to the discretion of the Department to nominate those who it feels are most qualified to successfully fulfill the role of a district representative on the panels.

These are some suggested general guidelines when nominating participants:

- Participants should be experienced. Experience working in more than one school or district is desirable.
- Nominees should be recognized as being successful educators - those who have effectively contributed to the success of their students, schools, and districts.
- Participants should, in the aggregate, represent all regions of the State.
- Where possible, nominate administrators/educators possessing indicators of excellence such as past recognition as administrator or educator of the year (e.g. superintendent of the year, principal of the year, etc.), National Board for Teaching Standards certification, or active involvement or leadership in a professional association.

Below is a list of suggested qualifications for specific positions (or their equivalent):

- District Superintendent or Instructional Leader
  - 7 years of education experience
  - 3 years of district leadership experience

- School Board Member
  - 3 years serving on a school board

- Director or Assistant Superintendent of Curriculum
  - 7 years of education experience
  - 3 years of curriculum development experience

- Chief Financial Officer or Business Manager
  - 7 years of education experience
  - 3 years of school finance experience

- Director of Special Education, Limited English Proficient students, at risk programs, or Student Services
    - 7 years of education experience
    - 3 years of leadership in the specified field of special need

- Director of Prekindergarten or Early Childhood Education Programs
    - 7 years of education experience
    - 3 years of leadership in prekindergarten or early childhood education programs

- Technology Specialist or Director
    - 3 year minimum of experience working in a technology capacity in a school or district
    - Demonstrated knowledge of instructional technology needs for educational achievement

Appendix C.2 Participant Qualifications for Maryland's Professional Judgment and Evidence-Based Panels: School-Based Panel Participant Qualifications

Below is a list of suggested qualifications for nominating school-based educators to serve on professional judgment and evidence-based state, district and school level panels. This is a guideline to help district leaders identify educators who are effective in their positions and knowledgeable about resources necessary to educate all Maryland students to state standards. This is not intended to be an exhaustive or strict list of requirements for participation. Ultimately, it is up to the discretion of Maryland's education leaders to nominate educators who they feel are most qualified to successfully fulfill the role of school-based representatives on the panels.

These are some suggested general guidelines when nominating participants:

- Participants should be experienced. Experience working in more than one school or district is desirable.
- Nominees should be recognized as being successful educators - those who have effectively contributed to the success of their students and schools.
- Where possible, nominate educators possessing indicators of excellence, such as recognition as educator of the year (e.g. principal of the year, teacher of the year, etc.), National Board for Teaching Standards certification, or active involvement or leadership in a professional association.

Below is a list of suggested qualifications for specific positions:

- Teacher (Including general education teachers, prekindergarten teachers, LEP teachers, special education teachers, Title I teachers, etc.). Teachers are needed for all levels of schooling, e.g. elementary, middle and high school.
    - 5 years minimum of teaching experience, with at least 2 years in Maryland.
    - If the teacher being selected is for a specialized teaching position such as an LEP teacher or special education teacher, at least 1 year in the specialized role in addition to 4 years of general teaching experience.

- Teacher Leader/Coordinator (Including specialized teacher positions such as master teacher, teacher leader, prekindergarten program coordinator, LEP teacher leader/coordinator, special education lead teacher/coordinator, etc.). Teacher leaders/coordinators are needed for all levels of schooling, e.g. elementary, middle and high school.
    - 5 years minimum of teaching experience, with at least 2 years in Maryland.
    - If the teacher being selected is for a specialized position such as LEP or special education teacher leader or coordinator, at least 1 year in the specialized role in addition to 4 years of general teaching experience.

- Instructional Coach
    - 3 years minimum of instructional coaching experience
    - Possess a track record of increasing teacher quality

- Tutor
    - Should be a certificated teacher, not an aide or volunteer
    - 3 years minimum of tutoring experience
    - Possess a track record of increasing student performance

- Principal (Principals are needed for all levels of schooling, e.g. elementary, middle and high school).
    - 7 years of education experience
    - 3 years of experience in school level administrative leadership roles, including at least one year as principal
    - Highly qualified assistant principals may be substituted if they possess the same level of experience, e.g. 7 years of education experience, 3 years of experience in school level administrative leadership roles, and at least one year as an assistant principal

Appendix C.3 Professional Judgment and Evidence-Based Professional Judgment Panel Participant Nomination Memo

To: Maryland Education Leaders

From: Maryland State Department of Education on behalf of Augenblick, Palaich and Associates, Picus Odden and Associates and Maryland Equity Project

Date:

Re: Nominating Educators to Serve on Professional Judgment and Evidence-Based Panels

As you may be aware, the Maryland State Department of Education has contracted with Augenblick, Palaich, and Associates (APA), in partnership with Picus Odden and Associates (POA) and the Maryland Equity Project (MEP), to study the adequacy of school funding in the state of Maryland. Two of the approaches the research team will use for estimating adequacy are the professional judgment and evidence-based approaches. Both of these approaches involve inviting educators to participate in a series of panels where they will share their expertise and experiences to help the research team understand the resources needed to educate students to Maryland's academic standards.

To ensure the success of the panels, we need your help in identifying experienced educators from schools that have been successful in educating all students or with a track record of individual success in working with students. You will find an attached document describing the preferred guidelines and criteria for nominating educators to participate on these panels. Please provide the name, position, school, district, phone number, and email of the nominee.

Once we have received your nominations, we will contact the nominees directly. Most teachers and principals will be asked to serve on panels for identifying school-based resources. One set of these school panels, which focuses on for the evidence-based approach, will be managed by POA and will be held this summer during the week of June 22-26. A second set of school panels focused on the professional judgment approach will be managed by APA and be held in the fall of 2015 after the start of the school year. A small number of teachers and principals will be asked to serve on panels that look at resources from a district or state perspective. These panels will be held later in the fall and winter. The exact dates, locations, and other details are still to be determined. Most panels meet for one day, while several panels meet for up to two days. Lunch will be provided whenever a panel meets past noon. We understand the time of educators is valuable, and will do everything in our abilities to minimize conflicts with work duties of the nominees in this process. We do not anticipate any educator being asked to serve on more than one panel. Your district will be reimbursed for the cost of substitute teachers if they are needed to provide release time for participating teachers. A stipend will be paid to teachers serving on panels held in June.

Please feel free to contact the Maryland State Department of Education (should add designated contact here) if you have any questions. Thank you very much for your cooperation in this process! We look forward to working with you.

Appendix C.4 Review of Maryland Requirements for Schools and Districts

The following is a brief review of key requirements for schools and districts in Maryland. All language is derived directly from the following sources: the Maryland State Department of Education and the State Board of Education (through the MSDE website and the Maryland Report Card website), and the 2014 Legislative Handbook Series Volume IX: Education in Maryland.

Compulsory Education and Minimum Days/Hours of Instruction[11]

Maryland law requires all children between the ages of 5 and 16 who live in the state to attend school. Also, every child must attend kindergarten before entering the grade one. A child may be excused from going to kindergarten if he or she is in a full-time licensed child care center, a full-time registered family day care home, or is in a Head Start five-year-old program part time.

Under the new Age of Compulsory School Attendance law (Senate Bill 362, signed into law in 2012), the age for compulsory school attendance will rise to 17 in the 2015-2016 school year, and to 18 in the 2017-2018 school year.

Public schools must be open at least 180 days over a 10-month period and must provide at least 1,080 hours of instruction for elementary and middle schools and 1,170 hours for high schools.

Maryland College and Career Standards[12]

Schools across the State in 2013-14 have implemented Maryland's College and Career-Ready Standards. These standards incorporate the Common Core State standards. Maryland was one of the first states to adopt the standards in reading/English language arts and mathematics. The Maryland State Board of Education adopted the standards by unanimous vote in June 2010. The Next Generation Science Standards were also adopted in June 2013. These rigorous education standards establish a set of shared goals and expectations for what students should understand and be able to do in grades Kindergarten to grade 12 in order to be prepared for success in college and the workplace.

The Maryland State Department of Education had previously developed, and the State Board of Education had approved, a statewide curriculum or State standards that define what students should know and be able to do in the additional subject areas of fine arts, social studies, health, world languages, Limited English Proficient students, school library media, financial literacy, environmental education, technology education, and physical education. For some of these curricula the standards, indicators, and objectives are written grade-by-grade, while others are written in three grade bands consisting of grade three through grade five, grade six through grade eight, and grade nine through grade twelve.

[11] Legislative Handbook
[12] Maryland State Department of Education website and legislative handbook

Graduation Requirements[13]

As of 2005, to be awarded a diploma, a student shall be enrolled in a Maryland public school system and have earned a minimum of 21 credits that include the following:

Subject Area	**Specific Credit Requirements**
English	4 credits
Mathematics	3 credits 1 in algebra, 1 in geometry, 1 other area
Science	3 credits 1 in biology, 2 that must include lab experience in any or all of the following areas: earth science, life science, physical science
Social Studies	3 credits 1 in US History, 1 in World History, 1 in local, state, national government
Fine Arts	1 credit
Physical Education	½ credit
Health	½ credit
Technology Education	1 credit
Other	2 credits in World Language or 2 credits in American Sign Language or 2 credits in Advanced Technology Education and 3 credits in electives or 4 credits in a state-approved career and technology program and 1 credit of elective

[13] MSDE website

Additional Mathematics Course Requirement[14]

In addition to the Maryland College- and Career-Ready Standards, the College and Career Readiness and College Completion Act of 2013 established further requirements for mathematics. Beginning with the grade nine class of the 2014-2015 school year, each student is required to enroll in a mathematics course during each year that the student attends high school. It is the law's goal that all students achieve mathematics competency in at least Algebra II by the time they graduate. Regulations published by the State Board of Education identify mathematics courses that will satisfy the four-year requirement to include Algebra II, Pre-calculus, Discrete Mathematics, Linear Algebra, Probability and Statistics, AP Computer Science (or a computer science course that is not AP if the local school system determines that the course meets other specified requirements), and AP Calculus.

Service Learning Requirements[15]

Students must also meet service learning requirements that vary by district. To fit with Maryland's Seven Best Practices for Service Learning, a high quality service learning experience will:

1. Address a recognized need in the community
2. Achieve curricular objectives
3. Reflect throughout the service-learning experience
4. Develop student responsibility
5. Establish community partnerships
6. Plan ahead for service learning
7. Equip students with knowledge and skills needed for civic engagement

Assessments[16]

Partnership for Assessment of Readiness for College and Careers (PARCC) Assessments

Students in grades three through eight, and in English 10 and Algebra are to be assessed using the Partnership for Assessment of Readiness for College and Careers (PARCC) assessments. The new PARCC assessments are aligned to the Maryland College and Career-Ready Standards which were developed from the Common Core and were fully implemented during the 2013-14 school year. PARCC will provide comparability across states, and be able to assess and measure higher-order skills such as critical thinking, communications, and problem solving. The assessments are computer-based and include a mix of constructed response items, performance-based tasks, and computer-enhanced items. Paper-pencil PARCC state assessments will be available for at least three years during the transition to online testing, and will be available for special needs beyond the transition.

[14] Legislative Handbook
[15] MSDE website
[16] MSDE website

Science and Social Studies Assessments

The science Maryland School Assessment will continue to be given in grades five and eight until the Next Generation Science Assessment is developed. The Government High School Assessment will continue to be required for graduation, and the Biology High School Assessment will be replaced with the Next Generation Science Assessment when it is completed.

Alternate Maryland School Assessmen*t/ National Center and State Collaborative Assessment*

The Alternate Maryland School Assessment (Alt-MSA) and the National Center and State Collaborative (NCSC) Assessment are assessments in which students with the most significant cognitive disabilities participate if the IEP process has been determined they cannot participate in the MSA/PARCC assessments even with accommodations.

In compliance with state and federal law, MSDE has used the Alt-MSA to assess reading and math in grades three through eight and 10, and science in grades five, eight, and 10. Beginning with the 2015-2016 school year, the NCSC assessment will replace the Alt-MSA for reading and math.

The NCSC alternative assessment does not currently include a science component, so Maryland will continue to use the Alt-MSA for science only.

ACCESS for LEPs

The English Language Proficiency Assessment, ACCESS for LEPs, is administered to Limited English Proficient (LEPs) in grades Kindergarten through 12 annually. The assessment measures a student's English language proficiency in the areas of listening, speaking, reading, writing, comprehension, oral, and literacy. English Language Proficiency Assessment results are used by the State and the local education systems to report information related to the English language proficiency targets, referred to in the NCLB, Title III as Annual Measurable Achievement Objective (AMAO). AMAO I measures LEP students' progress in learning English; AMAO II measures the number of students who attain English proficiency during the school year.

Accountability[17]

Waivers from the Federal Elementary and Secondary Education Act[18]

The federal No Child Left Behind Act, the most recent reauthorization of the Elementary and Secondary Education Act of 1965, requires every state to meet certain annual benchmarks. A school that fails to meet the requirements of No Child Left Behind may be subject to strict penalties for noncompliance. Due to the strict penalties of No Child Left Behind, the U.S. Department of Education offered states an opportunity to apply for waivers from certain provisions of No Child Left Behind (flexibility waivers). In order to receive a flexibility waiver, states must outline their plans to improve educational outcomes for all students, close achievement gaps, increase equity, and

[17] Maryland Report Card website
[18] Legislative Handbook

improve the quality of instruction. A flexibility waiver applies to 10 No Child Left Behind requirements and up to 3 optional requirements that a state chooses.

Maryland received a flexibility waiver which allowed the State and its local education agencies to focus on implementing the Maryland College- and Career-Ready Standards; transition to the Partnership for Assessment of Readiness for College and Careers assessments; provide support, recognition, and intervention to all Maryland public schools; and develop a teacher and principal evaluation system that incorporates student growth, measured by assessments, as a major component.

Maryland's Accountability Program

Maryland's new Accountability Program is comprised of three components, (1) School Progress, (2) School Progress Index (SPI), and (3) Differentiated Recognition.

The new Maryland School Progress Index is based on high expectations and multiple measures that include student achievement data in English/Language Arts, Mathematics, and Science; growth data in English/Language Arts and Mathematics; gaps, based on the gap score between highest-achieving and lowest-achieving subgroups in mathematics, reading, science, cohort graduation and cohort dropout rates. Maryland's Progress Index will differentiate schools into one of five strands which determine the district and state support schools receive. The State affords top-performing schools greater flexibility while lower-performing schools receive progressively more prescriptive technical assistance, expectations, and monitoring.

The School Progress Index evaluates schools on a continuous scale based on the variables of Achievement, Growth, Gap Reduction, and College- and Career-Readiness. The indicators are specific to Elementary and Middle schools or High Schools. Each indicator is comprised of specific measures for Elementary and Middle schools or High Schools. SPI is compensatory so that a low value on one indicator can be balanced by a high value on another indicator. Each of the indicators comprising the Index are differentially weighted based on their importance in assessing overall school progress.

The Annual Measurable Objectives (AMOs) for each component of the Index are based on a trajectory toward the goal, the time by which each individual school is expected to reduce its percent of students that are non-proficient by half for Achievement, reduce its students not showing Growth by half, reduce the gap between the lowest and highest performing subgroups by half, and reduce the number of students that are not completing the goals for College- and Career-Readiness by half.

The School Progress Index results in a Strand classification of 1 (highest) to 5 (lowest) which in turn helps identify schools for intervention, supports, and recognition of schools achieving at high levels or making exceptional progress.

Requirements for Publically-funded Prekindergarten Programs[19]

The overall goal of the prekindergarten program is to provide learning experiences to help children develop and maintain school readiness skills necessary for successful school performance.

Local boards of education shall provide prekindergarten programs to accommodate all eligible 4-year-old children seeking enrollment in public school programs. Eligible children include all 4-year-old applicants who are from families with economically disadvantaged[20] backgrounds or who are homeless; if vacancies remain after compliance with this regulation a local school system may enroll 4-year-old applicants who are not from families with economically disadvantaged backgrounds but who represent a student population that exhibits a lack of school readiness. A program for three-year-old children may also be established for children that fit these same criteria. A qualified vendor will: (1) Maintain state or national early childhood program accreditation; (2) Have the capacity to meet the responsibilities identified in this regulation; (3) Be licensed to operate a child care center: and (4) Provide responses to Department requests for information and data related to the operation of the prekindergarten program.

Further, a local school system shall: (1) Develop and maintain a policy for determining the eligibility and selection of prekindergarten sites as well as the eligibility of 4-year-old students for prekindergarten programs consistent with the requirements of this chapter; (2) Develop criteria that establishes procedures to include children in the prekindergarten program who are not economically disadvantaged; (3) Operate the prekindergarten educational program 5 days per week for a minimum of 2.5 hours per day consistent with the school calendar approved by the local board; (4) Analyze the Department-approved kindergarten assessment system information to evaluate the effectiveness of the prekindergarten program, and make necessary adjustments to the prekindergarten instructional program; (5) Provide data in the Bridge to Excellence Master Plan needs assessment to indicate progress on prekindergarten program goals; (6) Provide staffing for each session of prekindergarten to include a teacher who possesses a current state professional certificate in early childhood education and a para-professional with a minimum of a high school diploma, or its equivalent, or a CDA; (7) Align each prekindergarten program with the Maryland Common Core State Curriculum; (8) Based on the September 30 enrollment count, maintain an average staff to student ratio of 1:10 with an average of 20 students per classroom; and (9) Provide responses to Department requests for information and data related to the operation of the prekindergarten program.

Education of Students with Disabilities[21]

Federal law requires states to provide a free appropriate public education to all students with disabilities through age 21 who are found to be in need of special education services. In order to

[19] State Board of Education via MSDE website
[20] Economically disadvantaged being 185 percent of poverty
[21] Legislative Handbook

meet the requirement, the education programs for disabled students must be designed to meet their individual needs and could include specially designed instruction in classrooms, at home, or in private or public settings. Examples of these services include speech, occupational, and physical therapy, psychological counseling, and medical diagnostic services that are necessary to a child's education. Teachers of students with disabilities are required to be trained in the instruction of disabled students. Services begin as soon as the child can benefit from them, regardless of whether the child is of school age.

Maryland High School Certificate[22]

This certificate is awarded to students with disabilities who do not meet the requirements for a diploma but who meet one of the following criteria:

1. The student is enrolled in a special education program for at least four years beyond Grade eight, or its age equivalent. The student is determined to have developed appropriate skills for the individual to enter the world of work, act responsibly as a citizen, and enjoy a fulfilling life by an Individualized Educational Program (IEP) Team, with agreement of the student's parents/guardians. The world of work includes, but is not limited to, gainful employment, work activity centers, supported employment, or sheltered workshops.
2. After being enrolled in a special education program for four years beyond Grade eight, or its age equivalent, the student reached age 21.

Teacher Certification[23]

The Maryland State Department of Education oversees the certification of teachers, principals, and other school personnel and evaluates and approves higher education programs that educate and prepare teachers and other certified school personnel, in collaboration with the Professional Standards and Teacher Education Board. In order to ensure teacher quality and that students are being taught by qualified, competent teachers, the Maryland State Department of Education is also responsible for state approval and national accreditation for all professional educator certification programs in Maryland's colleges and universities.

The federal No Child Left Behind Act requires that all teachers of core academic subjects be highly qualified. Core academic subjects include English, mathematics, reading or language arts, science, foreign languages, civics and government, economics, arts, history, and geography. To be highly qualified, a teacher must have at least a bachelor's degree, hold a license to teach in the State, have obtained full state certification, and have subject matter expertise. Schools are required by federal law to annually report on the number of non-highly qualified teachers.

[22] MSDE website
[23] Legislative Handbook

Teacher and Principal Evaluations[24]

Chapter 189 of 2010, the Education Reform Act, enhanced accountability measures for teachers and principals by requiring annual performance evaluations for non-tenured certificated teachers and principals that include student growth as a significant component. The law also added a third probationary year before teachers may receive tenure.

MSDE developed a statewide Teacher and Principal Evaluation (TPE) system. The state TPE system includes equally weighted measures of professional practices and student growth. Each district is responsible for evaluating its certified teachers and principals, using either the state system or a locally developed system that has been endorsed by both the State and local education agencies' collective bargaining units.

The State Board of Education regulations require that a District's teacher and principal evaluation system meet the minimum general standards set forth in the regulations. The general standards require at least two classroom observations (for teachers), claims and evidence that substantiate observed behavior, a professional development component, a mentoring component for ineffective-rated teachers and non-tenured teachers, and a measure of student growth that is a significant factor in the overall rating and is based on multiple measures. An evaluation must have a written report that is presented to the evaluated teacher or principal, a space for written comments by the evaluated teacher or principal, and a process for appealing a final rating and report.

The student growth component should count for 50 percent of an evaluation, may not be based solely on an existing or newly created exam, and must be based on multiple measures, such as aggregate class growth scores and student learning objectives and the school-wide performance index. However, student growth data based on or derived from state assessments may not be used to make personnel decisions until school year 2016-17.

The professional practice component should also count for 50 percent of an evaluation. For teachers, this component includes planning and preparation, classroom environment, instruction, and professional responsibility. For principals, the professional practice component should include the outcomes in the Maryland Instructional Leadership Framework, which is comprised of eight domains: (1) school vision; (2) school culture; (3) curriculum, instruction, and assessment; (4) observation/evaluation of teachers; (5) integration of appropriate assessments; (6) use of technology and data; (7) professional development; and (8) stakeholder engagement. The professional practice component also should include outcomes developed by the Interstate School Leaders and Licensure Consortium, including (1) school operations and budget; (2) effective communication; (3) influence on the school community; and (4) integrity, fairness, and ethics.

[24] Legislative Handbook and MSDE

Appendix C.5 Instructions to Maryland Professional Judgment Panel Members

Augenblick, Palaich and Associates

Denver, Colorado

[Panel Date]

The work you are doing today is part of an adequacy study being conducted in Maryland on behalf of the Maryland State Department of Education. It relies on your professional experience to identify the resources needed so that all students, schools, and districts can fulfill all state standards. Below you will find a number of instructions to help you in this process. It is important to remember that you are not being tasked to build your "Dream School." Instead, you are being asked to identify the resources needed to meet the specific standards and requirements that the State expects students, schools and districts to fulfill. You should allocate resources as efficiently as possible without sacrificing quality.You are a member of a panel that is being asked to design how programs and services will be delivered in representative school settings. These panels are being used to identify the resources that schools with a particular set of demographic characteristics should have in order to meet a specific set of "input" requirements and "output" objectives.

1. **[Description of prior panels held, example language here from final statewide panel]** Previously, four school-level professional judgment panels were convened to address: (1) elementary schools; (2) prekindergarten programs; (3) middle schools; and (4) high schools. Each panel discussed more than one representative school for that grade configuration of varying size, and addressed resources needed to serve all students ("base" resources) and at risk students. Two additional panels were then held to review the work of the school-level panels and address the resources needed for (1) special education students, and (2) English Language Proficient (LEP). A district-level panel was also held to review the work of all prior panels, and identify the district-level resources needed to support schools. Finally, a CFO panel was held earlier this week to specifically review non-personnel costs at the school and district level.

2. **[Short description of current panel, example language here from final statewide panel]** Today, you are serving on a statewide review panel to review the work of all prior panels and address any inconsistencies or outstanding issues.

3. The characteristics of each representative school(s) are identified, including: (1) grade span; (2) enrollment; and (3) the proportion of at risk students (based on those students eligible for free/reduced price lunch), LEP students, and special education students.

4. The "input" requirements and "outcome" objectives that need to be accomplished by the representative school(s) are those required by the State. These requirements or objectives can be described broadly as education opportunities, programs, services or as levels of education performance. You will be provided a short summary of state expectations and performance standards; it is not meant to be exhaustive of all requirements that the State requires schools and districts to fulfill, but instead should be considered a refresher or reminder.

5. In designing the representative school(s), we need you to provide some very specific information so that we can calculate the cost of the resources that are needed to fulfill the indicated requirements or objectives. The fact that we need that information should not constrain you in any way in designing the program of the representative school(s). Your job is to create a set of programs, curriculums, or services designed to serve students with particular needs in such a way that the indicated requirements/objectives can be fulfilled. Use your experience and expertise to organize personnel, supplies and materials, and technology in an efficient way you feel confident will produce the desired outcomes.

6. For this process, the following statements are true about the representative school(s) and the conditions in which they exist:

Teachers: You should assume that you can attract and retain qualified personnel and that you can employ people on a part-time basis if needed (based on tenths of a full-time equivalent person).

Facilities: You should assume that the representative school has sufficient space and the technology infrastructure to meet the requirements of the program you design.

Revenues: You should not be concerned about where revenues will come from to pay for the program you design. Do not worry about federal or state requirements that may be associated with certain types of funding. You should not think about whatever revenues might be available in the school or district in which you now work or about any of the revenue constraints that might exist on those revenues.

Programs: You may create new programs or services that do not presently exist that you believe address the challenges that arise in schools. You should assume that such programs or services are in place and that no additional time is needed for them to produce the results you expect of them. For example, if you create after-school programs or prekindergarten programs to serve some students, you should assume that such programs will achieve their intended results, possibly reducing the need for other programs or services that might have otherwise been needed.

Appendix C.6 Evidence-Based Professional Judgment Panel's Introduction to Evidence-Based Method

Using the Evidence-Based Method to identify a Base Spending level and Pupil Weights for the Maryland School Funding System

Professional Judgment Panel Meetings

Picus Odden & Associates

Improving the way public resources for education are translated into improved student learning

Today's Agenda

- Introductions
- The Evidence-Based (EB) Funding Model
- The Improvement Model in the EB Model
- Purpose of Professional Judgment Panels
- Discussion of EB Model Elements
- Questions & Answers

Introductions

Team Members

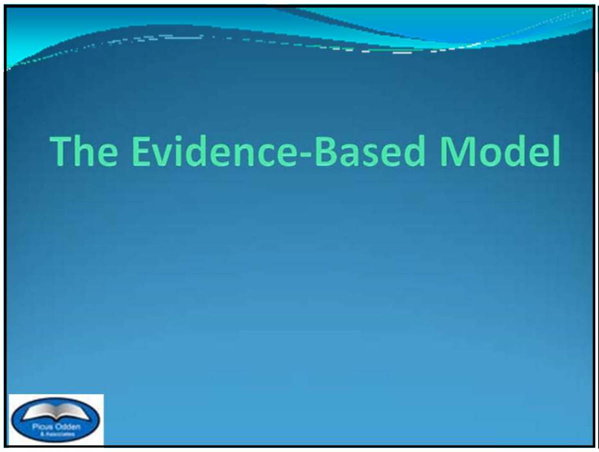
- Picus Odden and Associates
  - Lawrence O. Picus
  - Allan Odden
- Maryland Equity Project
  - Amaya Garcia
  - Rebecca Grove
  - Kathleen Hoyer
  - Gail Sunderman

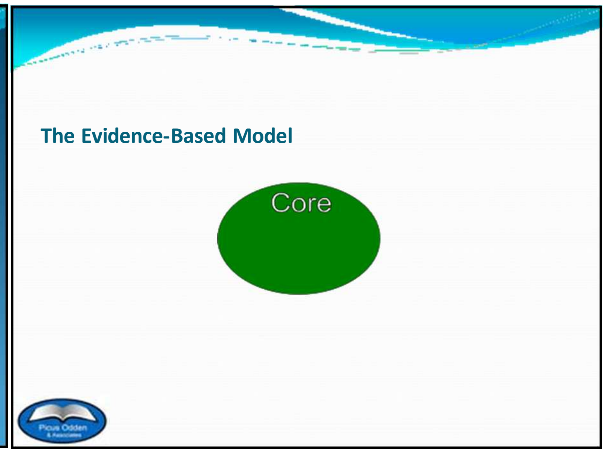
Mission Statement

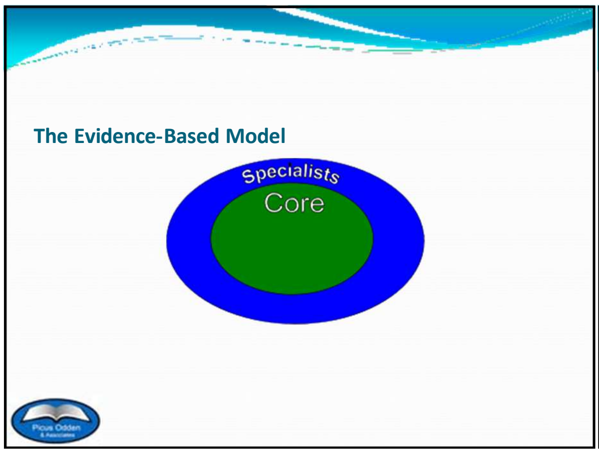
Picus Odden and Associates is an independent school finance consulting group whose mission is to work collaboratively with states and school districts to improve the way public resources for education are translated into improved student learning.

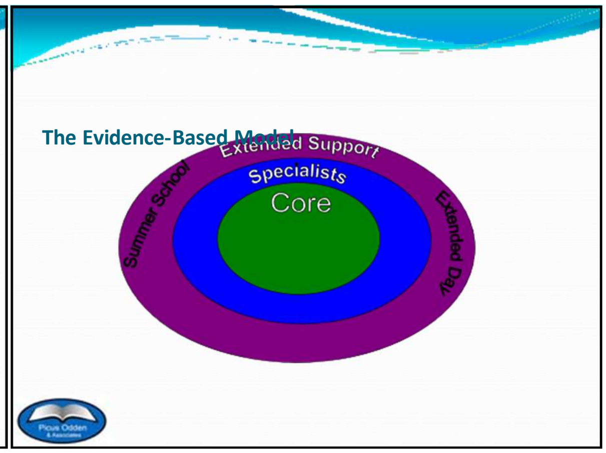
Overview of the Maryland School Funding Study

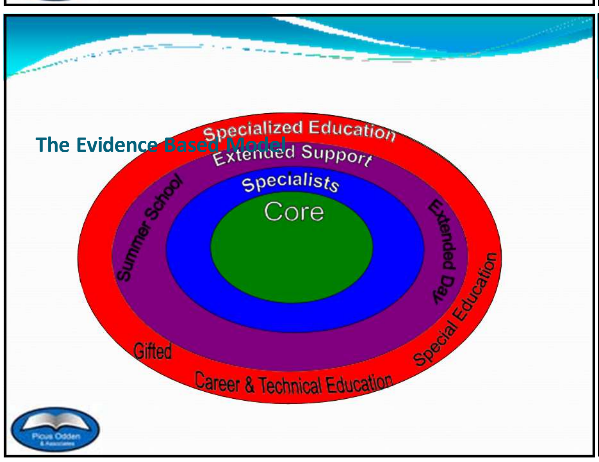
- Study Partnership with APA Consulting
- Three approaches to estimating adequacy
  - Professional Judgment
  - Successful Schools/Districts
  - Evidence-Based (Picus Odden & Assoc.)
    - Evidence-Based report
    - Professional Judgment panel
    - Case studies

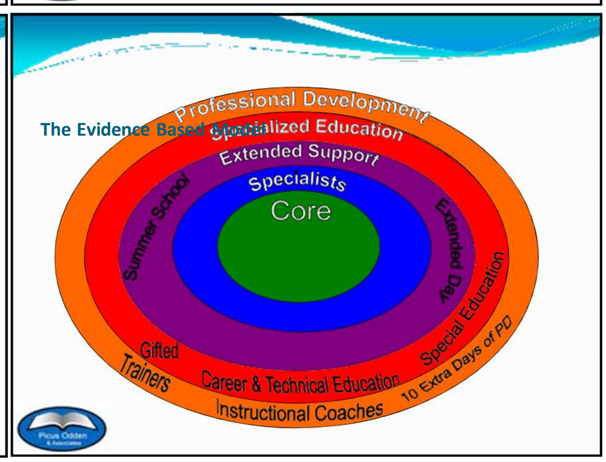

The Evidence-Based Model


The Evidence-Based Model
Core

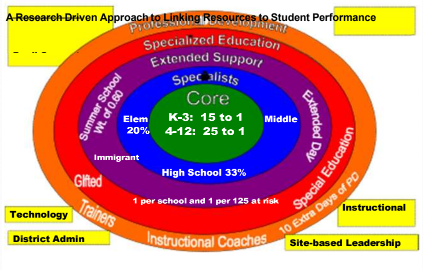

The Evidence-Based Model
Specialists
Core


The Evidence-Based Model
Extended Support
Summer School
Extended Day
Specialists
Core


The Evidence-Based Model
Specialized Education
Extended Support
Summer School
Extended Day
Specialists
Core
Gifted
Career & Technical Education
Special Education


The Evidence-Based Model
Professional Development
Specialized Education
Extended Support
Summer School
Extended Day
Specialists
Core
Gifted
Career & Technical Education
Special Education
Trainers
Instructional Coaches
10 Extra Days of PD

The Evidence-Based Model:



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The EB Improvement Model

Strategies to Boost Performance

1. Conduct needs assessment
2. Set high goals
3. Adopt a new curriculum and identify effective instructional practices
4. Commit to data-based decision making
5. Invest in on-going professional development, with instructional coaches

Strategies to Boost Performance

6. Focus class time more efficiently
7. Provide multiple and timely interventions for students at risk of academic failure
8. Create professional learning communities
9. Empower leaders to support instructional improvement
10. Take advantage of external expertise
11. Manage Talent

The Challenge

Scale up these strategies in all schools by effectively and efficiently using resources provided by an adequately-oriented state funding model

Note: the EB funding model provides all the resources

Elements of the EB Model

Staff Resources for Core Programs

Heuristic Use of Prototypical School Sizes

- 450 elementary school, 75 students per grade
- 450 middle school, 150 students per grade
- 600 high school, 150 students per grade
- All can be scaled up or down

1a. Pre-Kindergarten

- Full day prekindergarten program
- Staff at 1 teacher and 1 aide position for every 15 PreK students

1b. Kindergarten

- Full day kindergarten program
- Each kindergarten student counts as 1.0 pupil in the funding system.

2. Core Teachers (Elementary)

- Student/Teacher Ratio
  - 15:1 – Grades K-3
  - 25:1 – Grades 4-5

3. Core Teachers (Secondary)

- Student/Teacher Ratio
  - 25:1 – Grades 6-12

4. Elective Teachers

- Elementary – 20% of Core Teachers
- Middle – 20% of Core Teachers
- High School – 33% of Core Teachers

5. Instructional Coaches

- 1.0 FTE Instructional Coach position for every 200 students

6. Core Tutors

- One tutor position for each prototypical school

- Note: Additional tutors are provided through the at risk pupil count in element 22

7. Substitute Teachers

- 5 % of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school and LEP)

8. Core Guidance Counselors and Nurses

- 1 guidance counselor for every 450 K-5 students
- 1 guidance counselor for every 250 6-12 students
- 1 nurse for every 750 K-12 students

9. Supervisory Aides

- 2 for each prototypical 450-student elementary and middle school
- 3 for each prototypical 600-student high school

10. Librarians

- 1.0 librarian position for each prototypical school

11. Principal/Assistant Principal

- 1.0 principal for the 450-student prototypical elementary school
- 1.0 principal for the 450-student prototypical middle school
- 1.0 principal and 1.0 assistant principal for the 600-student prototypical high school

12. School Site Secretarial Staff

- 2.0 secretary positions for the 450-student prototypical elementary school
- 2.0 secretary positions for the 450-student prototypical middle school
- 3.0 secretary positions for the 600-student prototypical high school

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Elements of the EB Model

Dollar Per Student Resources

13. Gifted and Talented

- $30 per ADM, inflated annually

14. Professional Development

- 10 days of student-free time for training built into teacher contract year
- $125 per ADM for trainers inflated annually

This is in addition to instructional coaches

15. Instructional Materials

- $190 per pupil for instructional and library materials

16. Short Cycle/Interim Assessments

- $30 per pupil for short cycle, interim and formative assessments

17. Computer Technology and Equipment

- $250 per pupil for school computer and technology equipment

18. Career and Technical Education Equipment

- $10,000 per CTE teacher for specialized equipment

19. Extra Duty Funds and Student Activities

- $250 per student for co-curricular activities including sports and clubs

Elements of the EB Model

Central Office Staffing

20. Maintenance and Operations

- Separate computations for custodians, maintenance workers and groundskeepers

21. Central Office Staffing

- A dollar per student figure for the Central Office based on the number of FTE positions generated and the salary and benefit levels for those positions. It also includes a per pupil amount for miscellaneous items such as Board support, insurance, legal services, etc.

Elements of the EB Model

Resources for Struggling Students

22. Tutors

- One tutor position for every 125 at risk students (in addition to the one core tutor position in each prototypical school)

- These positions are provided additional days for professional development (Element 14) and substitute days (Element 7)

23. Additional Pupil Support

- One pupil support position for every 125 at-risk students

- These positions are provided additional days for professional development (Element 14)

24. Extended Day

- 1.0 teacher position for every 30 at-risk students or 3.33 FTE per 100 such students.
- Position paid at the rate of 25 percent of annual salary—enough to pay a teacher for a 2-hour extended-day program, 5 days per week.
- This formula equates to 1 teacher position for every 120 at-risk students

25. Summer School

- 1.0 teacher position for every 30 at-risk students or 3.33 FTE per 100 such students.
- Position paid at the rate of 25 percent of annual salary—enough to pay a teacher for a six to eight week 4 hour per day summer school program and include adequate time for planning and grading
- This formula equates to 1 teacher position for every 120 at-risk students.

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26. Limited English Proficient Students

- 1.0 teacher position for every 100 identified LEP students.
- This provision is in addition to all the resources triggered by the at-risk student count, which includes all LEP students.

27. Alternative Schools

- One assistant principal position and one teacher position for every 7 ALE students.
- Note: Resources also include other per-staff

28. Special Education

- 1 teacher position for every 150 students in the school
- 1 aide position for every 150 students in the school
- Deduction of Federal Title VIb funds

Elements of the EB Model

Staff C mpensation

Staff Compensation

- Average salary by major staff positions of previous year
- For benefits:
  - Percentage Benefits:
    - Retirement or pension costs
    - Social Security and Medicare
    - Worker's Compensation
    - Unemployment Insurance
  - Fixed Benefits:
    - Health Insurance

Questions & Answers

Next Steps

Contacts

- Lawrence O. Picus – lpicus@picusodden.com
- Allan Odden – arodden@picusodden.com

Appendix C.7 Ingredient Prices for Professional Judgment and Evidence-Based Models

Table C.1

2014-15 Average Salary by Position (Evidence-Based)

Position	Average Salary
School	
Principal	$118,906
Assistant Principal	$100,948
Teacher	$65,440
Instructional Coach	$81,131
Substitute Teacher	$65,440
Guidance Counselor	$72,415
Nurse	$56,842
Instructional/Supervisory Aide	$29,435
Library Media Specialist	$72,904
School Secretary/Clerical	$43,943
Maintenance and Operations	
Custodian	$42,607
Maintenance Worker	$56,303
Grounds Maintenance	$42,607
Central Office	
Superintendent	$199,670
Business Manager	$125,820
Director--Personnel/HR	$125,820
Asst. Supt. of Instruction	$156,314
Director of Pupil Services	$125,820
Director of Assessment	$125,820
Director of Technology	$125,820
Director of O&M	$125,820
Secretary/Clerical	$43,943
Network/Systems Supervisor	$75,000
School Computer Technician	$45,000
Speech Pathologist	$74,608
Psychologist	$86,404

Table C.2
2014-15 Average Salary by Position (Professional Judgment)

School-Level	
Position Title	**Salary**
Instructional Staff	
Teachers	$65,440
Instructional Facilitator (Coach)	$65,440
Teacher Tutor/ Interventionist	$65,440
Librarians/Media Specialists	$72,904
Media Aide	$32,677
Technology Specialists	$72,904
Instructional Aides	$29,435
LEP Staff	
LEP Coordinator	$65,440
Special Education Staff	
Speech Pathologist	$74,608
OT/PT Therapists	$79,367
IEP Coordinator	$65,440
Pupil Support Staff	
Counselors	$72,415
Nurses	$56,842
Health Aide	$27,783
Psychologists	$86,404
Social Worker	$80,815
Student/Pupil Support Worker	$95,564
Behavior Specialists	$75,836
Family Liaison	$43,943
Alternative/In School Suspension (Para)	$29,435
Transition Coordinator	$65,440
Job Coaches (Para)	$29,435
Administrative Staff	
Principal	$118,906
Assistant Principal	$100,948
Dean	$87,644
Athletic/Activities Director	$87,644
Bookkeeper	$43,943
Clerical/Data Entry	$43,943
Other Staff	
IT Technician	$53,667
Substitute	$65,440
Coordinator	$65,440

District-Level	
Position Title	**Salary**
Superintendent	$199,670
Assistant/Associate Superintendent	$156,314
Executive Director	$125,820
Director	$125,820
Supervisor	$105,039
Coordinator	$105,371
Manager	$105,371
Secretary/Clerk	$43,943
IT Technician	$53,667
Nurse	$56,842
Specialist	$75,836
Other Professional	$75,836
Attorney (Systems and Board)	$125,820
Database Admin/Programmer	$53,667
Therapist/Specialist	$70,551
Interpreter/Translator	$43,943

Table C.3
2014-15 Employee Benefit Costs (Evidence-Based and Professional Judgment)

Employee Benefit	Rate
Social Security	6.20% (Up to $118,500 of salary)
Medicare Insurance	1.45%
State Retirement (Certified)	4.560%
State Retirement (Classified)	8.170%
Workers Compensation (Certified)	0.550%
Workers Compensation (Classified)	2.18%
Unemployment Insurance	2.8%
Medical Insurance	$8,537

Table C.4

2014-15 Technology Prices (Professional Judgment)

	Cost per Unit	Replacement Cycle	Annual Price
Administration/Main Office			
Computers	$826	4	$207
Laptops	$1,124	4	$281
Mobile Device	$528	4	$132
Printers	$299	4	$75
Copier	$625	4	$156
Faculty			
Computers	$831	4	$208
Laptops	$1,124	4	$281
Mobile Device	$528	4	$132
Classroom			
Computers	$826	4	$207
Printers	$299	4	$75
Visual Presentation System	$1,948	4	$487
Document Camera	$450	4	$113
Wireless Access Point	$560	4	$140
Computer Lab(s)- Fixed			
Computers	$826	4	$207
Printers	$299	4	$75
Visual Presentation System	$1,948	4	$487
Computer Lab(s)- Mobile			
Laptops	$840	4	$210
Media Center			
Computers	$820	4	$205
Printers	$299	4	$75
Other			
Student Devices	$429	4	$107
Headphones	$19	4	$5
Protective Cases	$25	4	$6
LCD TV (Digital Signage)	$843	4	$211

Appendix D

Successful Schools Materials

Appendix D.1 Study of Adequacy Of Funding For Education In Maryland Instructions For School Expenditure Data Collection Tool

OVERVIEW:

We are asking you to complete the accompanying Data Collection Tool(s) as part of the adequacy study APA Consulting is conducting for the Maryland State Department of Education. This study was required by the Bridge to Excellence in Public Schools Act, which enacted the recommendations of the Thornton Commission, to make recommendations for updating the state's school finance formula. The results of this and two other approaches to estimating the cost of an adequate education will be used to recommend a new base per pupil funding amount and weights for students with special needs in fall 2016.

The purpose of this survey is to collect the amount of money the selected school spends to provide its basic education program, that is, the general education program provided for all students enrolled in the school. This amount should exclude spending for supplemental programs and services for students who are at risk, Limited English Proficient students, or have an Individualized Education Program (IEP) through the special education program. This spending information will be used to help estimate a new per pupil basic foundation amount.

Please complete a Data Collection Tool workbook for each school from your district selected for the successful schools study. Please note that if you are completing more than one Data Collection Tool (e.g. two or more schools from your district were selected for the study) you are only required to complete the district level sections in the General Information and District Administration tabs once. If you do not see a cell for entering a school expenditure related to the school's general education program, please describe the expenditure and enter the amount in either the Notes or Questions box found at the bottom of each program area tab or the Comments tab.

The following applies to all data you will enter in the Data Collection Tool:

- *All data should be for the 2014-15 school year*
- *All student and staff information should be as of September 30, 2014*
- *Please report actual expenditures for 2014-15, not budgeted*
- *Do not include any expenditures for Category 206 – special education*
- *Please list the source for all information provided (E.g. budget, district/state data reporting system, required state or federal reports, etc.)*

Please read the instructions carefully as you complete the Data Collection Tool. If you have any questions please contact:

Mark Fermanich

APA Consulting

mlf@apaconsulting.net

720-227-0101

Thank you for your help!

GENERAL INFORMATION (INFO) TAB:

We will begin by asking for information about the selected school (the name of the school is part of the Microsoft Excel workbook file name).

All Student Counts should be taken from your September 30th, 2014 enrollment count. Staff information should also be based on staff working in the school and district as of September 30th, 2014.

- In cell C5 please use the drop down menu to enter the lowest grade served by the school (for example, PK).
- In cell E5 please use the drop down menu to enter the highest grade served by the school (for example, grade six).

If the drop down menus are not compatible with your version of Microsoft Excel, please simply enter the lowest grade served in cell C5 and the highest grade served in cell E5.

- In cell B8 please enter the total number of FTE students enrolled in grades one through 12. We understand that most schools will not have this full grade span. We are requesting the count only of those students not in kindergarten or prekindergarten served by the school.
- In cell B9 please enter the total number of enrolled FTE full-day kindergarten students if any.
- In cell B10 please enter the total number of enrolled FTE half-day prekindergarten students if any.
- In cell B11 please enter the total number of enrolled FTE full-day prekindergarten students if any.

For the questions requesting information about teachers (cells B15, B17, B33, and B35), please include classroom, specialist (music, art, physical education, foreign language, etc.), Title I, special education, English language learner, long-term substitutes, and other certified staff with direct instructional responsibilities. Do not include other professional student support staff without instructional responsibilities such as media/librarians, guidance counselors, social workers, nurses, therapists, psychologists, etc.

- In cell B15 please enter the average years of experience of all teachers working in the identified school. When calculating the school's average years of experience, please enter the teachers' total teaching experience, not their years of experience working in this school or district.

- In cell B17 please enter the percent of teachers in the identified school who hold an APC or National Board of Professional Teaching Standards certification.

In the next section we request information about your entire district. ***If more than one school has been identified in your district and you have already provided this information you may skip this section.***

- In cell B22 please enter the total number of enrolled FTE half-day prekindergarten students if any.
- In cell B23 please enter the total number of enrolled FTE full-day prekindergarten students if any.
- In cell B24 please enter the total number of enrolled FTE full-day kindergarten students if any.
- In cell B25 please enter the total number of enrolled FTE elementary students in the district.
- In cell B26 please enter the total number of enrolled FTE middle school or junior high students in the district.
- In cell B27 please enter the total number of enrolled FTE high school students in the district.

- In cell B29 please enter the district's total operating expenditures for 2014-2015, this would include both restricted and unrestricted funds.

  This amount should consist of actual 2014-15 expenditures reported in the Current Expense fund *excluding* any expenditures for transportation, food service, adult education, district payments for retiree benefits, and non-Current Expense Fund capital expenditures. (The amount should include capital expenditures from the Current Expense Fund).

- In cell B33 please enter the average years of experience for all teachers in the district.

  Please follow the instructions for calculating the average years of experience for all teachers in the school listed above.

- In cell B35 please enter the percent of teachers in the district who hold an APC or National Board of Professional Teaching Standards certification.

DISTRICT ADMINISTRATION TAB:

If more than one school has been identified in your district and you have already provided this information you may skip this section.

All FTE and Personnel Costs data should be for staff working in the district as of September 30, 2014.

The first section addresses expenditures for General Support Services, identified in the Maryland *Financial Reporting Manual* with category code 20121. Please enter the full district cost for each area.

- In cell B9 please enter the total amount expended for salaries and wages for General Support Services.

- In cell C9 please enter the amount of employee fringe benefits reported in Fixed Charges (Category 212) that correspond to the salaries identified in cell B9, the salaries and wages for General Support Services. Fringe benefits should include the employer's share of FICA; Medicare; premiums for health insurance, life insurance, short- and/or long-term disability insurance, and workers' compensation insurance; and any other employee- related Fixed Charges. When reporting the employer's share of retirement contributions, please use 100% of the normal cost contributions for fiscal year 2017, assuming the teacher pension cost sharing as specified in the Budget Reconciliation Act of 2012 is fully phased in. The total for fringe benefits may be shown as an amount or as a percentage of total Salaries and Wages. Do not include any payments for retiree benefits.

- Cell D9 shows the total amount expended for salaries and wages and fringe benefits for General Support Services. Please enter this amount if the total does not calculate automatically.

The next section addresses expenditures for Business Support Services, identified in the Maryland *Financial Reporting Manual* with category code 20122.

- In cell B15 please enter the total amount expended for salaries and wages for Business Support Services.
- In cell C15 please enter the amount of employee fringe benefits reported in Fixed Charges (Category 212) that correspond to the salaries identified in cell B15, the salaries and wages for Business Support Services. Please see the instructions provided above for cell C9 for directions on how to calculate total fringe benefits.
- Cell D15 shows the total amount expended for salaries and wages and fringe benefits for Business Support Services. Please enter this amount if the total does not calculate automatically.

The next section addresses expenditures for Centralized Support Services, identified in the Maryland *Financial Reporting Manual* with category code 20123.

- In cell B21 please enter the total amount expended for salaries and wages for Centralized

Support Services.

- In cell C21 please enter the amount of employee fringe benefits reported in Fixed Charges (Category 212) that correspond to the salaries identified in cell B21, the salaries and wages for Centralized Support Services. Please see the instructions provided above for Cell C9 for directions on how to calculate total fringe benefits.

- Cell D21 shows the total amount expended for salaries and wages and fringe benefits for Centralized Support Services. Please enter this amount if the total does not calculate automatically.

The final section addresses costs associated with Instructional Administration and Supervision, identified in the Maryland *Financial Reporting Manual* with category code 20216. *Do not include any FTEs or expenditures for Instructional Administration and Supervision for special education programs (20616)*.

Please see the instructions provided above for Cell C9 for directions on how to calculate total fringe benefits for cells B29 through F29.

- In cells B27, C27, D27, E27, and F27 please enter the total Full Time Equivalent (FTE) of people working in each designated area under Instructional Administration and Supervision. For example, a person working full-time is 1.0 FTE. A person working 40 percent of the time is .4 FTE.

- In cells B28, C28, D28, E28, and F28 please enter the district's total expenditure for salaries and wages for each personnel category for Instructional Administration and Supervision. This amount should not include any expenditure for employee fringe benefits (employee-related Fixed Charges).

- In cells B29, C29, D29, E29, and F29 please enter the district's total expenditure for employee fringe benefits for each personnel category for Instructional Administration and Supervision. This amount comes from Fixed Charges (Category 212). Please see the instructions provided above for Cell C9 for directions on how to calculate total fringe benefits. Expenditures reported here should exclude employee fringe benefits.

- In cells B30, C30, D30, E30, and F30 please enter the total FTE of people in each personnel category that work exclusively with Limited English Proficient (LEP) students or administration of LEP programs, or their portion of time spent exclusively in this area related to Instructional Administration and Supervision. For example, if reporting partial time for a person enter .4 for someone who spends 40 percent of their time with the LEP program.

- In cells B31, C31, D31, E31, and F31 please enter the total FTE of people in each personnel category that work exclusively with at risk students or administration of at risk programs, or their portion of time spent exclusively in this area related to Instructional Administration and Supervision. For example, if reporting partial time for a person enter .4 for someone who spends 40 percent of their time working with at risk programs.

By staff working with at risk students we mean staff who are funded through Title I or the State's Compensatory Education formula who provide supplemental services to students who are low-income, at risk of academic failure, or have a record of disruptive behavior.

When entering teacher and other staff FTE, salary and wage expenditures, and fringe benefit expenditures for staff working with at risk students, if any of these staff are funded through Title I include only the Title I staff FTE and salary and benefit expenditures exceeding the school's federal comparability levels.

- In cell B37 please enter the total amount spent for Contractual Services (200) for programs 20121, 20122, 20123, and 20216.
- In cell C37 please enter the total amount spent for Supplies and Materials (300) for programs 20121, 20122, 20123, and 20216.
- In cell D37 please enter the total amount spent for Other Charges (400) for programs 20121, 20122, 20123, and 20216. Expenditures reported here should exclude employee fringe benefits.
- In cell E37 please enter the total amount spent for Equipment and Technology (554) for programs 20121, 20122, 20123, and 20216. Expenditures for Equipment and Technology should only include expenditures from the Current Expense Fund.

SCHOOL (MID-LEVEL) ADMINISTRATION TAB:

The questions in this tab only apply to expenditures for the Office of the Principal. Expenditures associated with this area are identified with category code 20215 in the Maryland *Financial Reporting Manual*. *Do not include any FTEs or expenditures of School Administration related to special education programs (Category 206)*.

All FTE and Personnel Costs data should be for staff working in the school as of September 30, 2014.

Please include as school expenditures, if possible, the proportional share of the cost of central office controlled school administration resources that are regularly assigned to this school. For example, if there is an administrator whose salary costs are assigned to the central office but who spends 25 percent of her time performing administrative tasks directly for the school (for example, an assessment coordinator who is assigned to multiple schools), include this person as a .25 FTE in the school.

- In cells B7 through I7 please enter the total FTE of people working in each designated position under the Office of the Principal. For example, a person working full-time is 1.0 FTE. A person working 40 percent of the time is .4 FTE.

  If the school's principal is also assigned teaching responsibilities for part of the day on an ongoing basis please allocate his or her FTE, salary and wage expenditure, and fringe benefits expenditure between the Principal position on the School Administration tab and the appropriate position category on the School Instruction tab.

- In cells B8 through I8 please enter the school's total expenditure for salaries and wages for each personnel category for the Office of the Principal. This amount should not include any expenditure for employee fringe benefits.

- In cells B9 through I9 please enter the school's total expenditure for employee benefits for each personnel category for the Office of the Principal. This amount comes from Fixed Charges (Category 212).

  Fringe benefits should include the employer's share of FICA; Medicare; premiums for health insurance, life insurance, short- and/or long-term disability insurance, and workers' compensation insurance; and any other employee-related Fixed Charges. When reporting the employer's share of retirement contributions, please use 100 percent of the normal cost contributions for fiscal year 2017, assuming the teacher pension cost sharing as specified in the Budget Reconciliation Act of 2012 is fully phased in. The total for fringe benefits may be shown as an amount or as a percentage of total Salaries and Wages. Do not include any payments for retiree benefits.
- In cells B10 through I10 please enter the total FTE of people for each personnel category that work exclusively with Limited English Proficient (LEP) students or administration of LEP programs, or the portion of time spent exclusively in this area under the Office of the Principal. For example, if reporting partial time for a person enter .4 for someone who spends 40 percent of their time with the LEP program.

- In cells B11 through I11 please enter the total FTE of people in each personnel category that work exclusively with at risk Students or administration of at risk programs, or the portion of time spent exclusively in this area under the Office of the Principal. For example, if reporting partial time for a person enter .4 for someone who spends 40 percent of their time working with at risk programs.

  By staff working with at risk students we mean staff who are funded through Title I or the State's Compensatory Education formula who provide supplemental services to students who are low-income, at risk of academic failure, or have a record of disruptive behavior.

  When entering teacher and other staff FTE, salary and wage expenditures, and fringe benefit expenditures for staff working with at risk Students, if any of these staff are funded through Title I include only the Title I staff FTE and salary and benefit expenditures exceeding the school's federal comparability levels.

- In cell B17 please enter the total amount spent for Contractual Services (200) for the Office of the Principal.

- In cell C17 please enter the total amount spent for Supplies and Materials (300) for the Office of the Principal.

- In cell D17 please enter the total amount spent for Other Charges (400) for the Office of the Principal. Expenditures reported here should exclude employee fringe benefits.

- In cell E17 please enter the total amount spent for Equipment and Technology (554) for the Office of the Principal. Expenditures for Equipment and Technology should only include expenditures from the Current Expense Fund.

SCHOOL INSTRUCTION TAB:

TO AVOID DOUBLE COUNTING ANY FUNDS; PLEASE MAKE SURE THE COSTS REPORTED HERE ARE UNIQUE TO THIS SECTION.

The first section addresses Instructional Salaries, identified in the Maryland *Financial Reporting Manual* as Category 203. We want to build this cost by personnel type so we can exclude those who work identifiable amounts of time with Limited English Proficient or at risk students. *Do not include any FTEs or expenditures of School Instruction related to special education programs (Category 206)*.

All FTE and Personnel Costs data should be for staff working in the school as of September 30, 2014.

Please include as school expenditures, if possible, the proportional share of the cost of central office controlled school instruction resources that are regularly assigned to this school. For example, if textbook purchases are assigned to the central office but you can identify the cost of textbooks purchased for this school in 2014-15, please report this expenditure as a school cost.

- In cells B6 through M6 please enter the total FTE of people working in each personnel category under Instructional Salaries. For example, a person working full-time is 1.0 FTE. A person working 40 percent of the time is .4 FTE.
- In cells B7 through M7 please enter the school's total expenditure for salaries and wages for each personnel category for Instructional Salaries. This amount should not include any expenditure for employee fringe benefits.
- In cells B8 through M8 please enter the school's total expenditure for employee fringe benefits for each personnel category for Instructional Salaries. This amount comes from Fixed Charges (Category 212).

  Fringe benefits should include the employer's share of FICA; Medicare; premiums for health insurance, life insurance, short- and/or long-term disability insurance, and workers' compensation insurance; and any other employee-related Fixed Charges. When reporting the employer's share of retirement contributions, please use 100 percent of the normal cost contributions for fiscal year 2017, assuming the teacher pension cost sharing as specified in the Budget Reconciliation Act of 2012 is fully phased in. The total for fringe benefits may be shown as an amount or as a percentage of total Salaries and Wages. Do not include any payments for retiree benefits.

- In cells B9 through M9 please enter the total FTE of people in the school in each designated area that work exclusively with Limited English Proficient (LEP) students or the portion of time spent exclusively in this area under Instructional Salaries. For example, if reporting partial time for a person enter .4 for someone who spends 40 percent of their time working with the LEP program.

- In cells B10 through M10 please enter the total FTE of people in the school in each designated area that work exclusively with at risk students or the portion of time spent exclusively in this area under Instructional Salaries. For example, if reporting partial time for a person enter .4 for someone who spends 40 percent of their time working with at risk programs.

  By staff working with at risk students we mean staff who are funded through Title I or the State's Compensatory Education formula who provide supplemental services to students who are low-income, at risk of academic failure, or have a record of disruptive behavior.

When entering teacher and other staff FTE, salary and wage expenditures, and fringe benefit expenditures for staff working with at risk Students, if any of these staff are funded through Title I include only the Title I staff FTE and salary and benefit expenditures exceeding the school's federal comparability levels.

- In cell B16 please enter the school's total expenditure for stipends to employees working extracurricular or cocurricular activities for Instructional Salaries.

By extracurricular or cocurricular activities we mean school-sponsored activities under the guidance of qualified adults designed to provide opportunities for students to participate on an individual basis, in small groups, or in large groups at school events, public events, or a combination of these for purposes such as motivation, enjoyment, and improvement of skills. Cocurricular activities normally supplement the regular instructional program and include such activities as band, chorus, choir, speech, debate, and school sponsored athletics. Participation usually is not required, and credit is not given (*Financial Reporting Manual for Maryland Public Schools*, 2009).

- In cell C16 please enter the school's total expenditure for substitutes for Instructional Salaries.

The next section addresses the costs associated with Instructional Textbooks/Supplies, identified in the Maryland *Financial Reporting Manual* as Category 204.

- In cell B22 please enter the amount attributable to the specific school if identifiable, if not please enter the district's total expenditure for Category 204 in cell B24. Only enter a districtwide amount if you are not able to break out an amount for the school.

The final section addresses all Other Instructional Costs, identified in the Maryland Financial Reporting Manual as Category 205. Please include any expenditures from the Current Expenses Fund for instructional equipment or technology (Object 554, Other Equipment) here.

- In cell B29 please enter the amount attributable to the specific school if identifiable, if not please enter the district's total expenditure for Category 205 in cell B31.

OTHER SCHOOL COSTS TAB:

The questions in this tab address all other operating costs of the school or district excluding food service (Category 213), transportation (Category 209), adult education (Category 20512), and special education (Category 206).

Please include as school expenditures, if possible, the proportional share of the cost of central office controlled resources that are regularly assigned to this school. For example, if there is a staff person whose salary costs are assigned to the central office but who spends 25 percent of her time performing tasks directly for the school, include this person as a .25 FTE in the school.

- In cell B6 please enter the total expenditure for salary and wage attributable to the specific school for Student Personnel Services, Category 207, if identifiable. If not, please enter the district's total expenditure for Category 207 in cell B19. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell B7 please enter the total expenditure for employee fringe benefits attributable to the salary and wage amount entered in cell B6 for the specific school for Student Personnel Services, Category 207, if identifiable. If not, please enter the district's total expenditure for Category 207 in cell B20. Only enter a districtwide amount if you are not able to break out an amount for the school.

  Fringe benefits should include the employer's share of FICA; Medicare; premiums for health insurance, life insurance, short- and/or long-term disability insurance, and workers' compensation insurance; and any other employee-related Fixed Charges. When reporting the employer's share of retirement contributions, please use 100 percent of the normal cost contributions for fiscal year 2017, assuming the teacher pension cost sharing as specified in the Budget Reconciliation Act of 2012 is fully phased in. The total for fringe benefits may be shown as an amount or as a percentage of total Salaries and Wages. Do not include any payments for retiree benefits.

- In cell C6 please enter the total expenditure for salary and wage attributable to the specific school for Student Health Services, Category 208, if identifiable. If not, please enter the district's total expenditure for Category 208 in cell C19. If there are outside sources that provide services for this area please enter the total amount they provide under Contractual Services in cell B11. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell C7 please enter the total expenditure for employee fringe benefits attributable to the salary and wage amount entered in cell C6 for the specific school for Student Health Services, Category 208, if identifiable. If not, please enter the district's total expenditure for Category 208 in cell C20. Please see the instructions provided above for Cell B7 for directions on how to calculate total fringe benefits. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell D6 please enter the total expenditure for salary and wage attributable to the specific school for Operation of Plant, Category 210, if identifiable. If not, please enter the district's total expenditure for Category 210 in cell D19. Only enter a districtwide amount if you are not able to break out an amount for the school.
- In cell D7 please enter the total expenditure for employee fringe benefits attributable to the salary and wage amount entered in cell D6 for the specific school for Operation of Plant, Category 210, if identifiable. If not, please enter the district's total expenditure for Category 210 in cell D20. Please see the instructions provided above for Cell B7 for directions on how to calculate total fringe benefits. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell E6 please enter the total expenditure for salary and wage attributable to the specific school for Maintenance of Plant, Category 211, if identifiable. If not, please enter the district's total expenditure for Category 211 in cell E19. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell E7 please enter the total expenditure for employee fringe benefits attributable to the salary and wage amount entered in cell E6 for the specific school for Maintenance of Plant, Category 211, if identifiable. If not, please enter the district's total expenditure for Category 211 in cell E20. Please see the instructions provided above for Cell B7 for directions on how to calculate total fringe benefits. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell F6 please enter the total expenditure for salary and wage attributable to the specific school for Community Services, Category 214, if identifiable. If not, please enter the district's total expenditure for Category 214 in cell F19. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell F7 please enter the total expenditure for employee fringe benefits attributable to the salary and wage amount entered in cell F6 for the specific school for Community Services, Category 214, if identifiable. If not, please enter the district's total expenditure for Category 214 in cell F20. Please see the instructions provided above for Cell B7 for directions on how to calculate total fringe benefits. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell B11 please enter the total amount for Contractual Services (Object 200) attributable to the specific school in Categories 207, 208, 210, 211, and 214, if identifiable. If not, please enter the district's total expenditures for Object 200 in these Categories in cell B24. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell C11 please enter the total amount for Supplies and Materials (Object 300) attributable to the specific school in Categories 207, 208, 210, 211, and 214, if identifiable. If not, please enter the district's total expenditures for Object 300 in these Categories in cell C24. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell D11 please enter the total amount for Fixed Charges (Category 212) or Other Charges (Object 400 for Categories 207, 208, 210, 211, and 214) from the Current Expense Fund that have not already been entered elsewhere in the Expenditure Tool and are attributable to the specific school. This amount should not include any expenditures related to personnel costs, such as employee fringe benefits. If an amount for this specific school cannot be determined, please enter the district's total expenditures for Fixed Charges (Category 212) or Other Charges (Object 400 for Categories 207, 208, 210, 211,

  and 214) in cell D24. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell E11 please enter the total amount for Equipment/Technology (Object 554) from the Current Expense Fund attributable to the specific school in Categories 207, 208, 210, 211, and 214, if identifiable. If not, please enter the district's total expenditures for Object 554 in these Categories in cell E24. Only enter a districtwide amount if you are not able to break out an amount for the school.

- In cell F11 please enter any other expenditures from the Current Expense Fund that have not already been entered elsewhere in the Expenditure Tool and are attributable to the specific school if identifiable. If not, please enter the district's total amount for these expenditures in cell

F24. Please note what these expenditures were for in the Notes or Questions not box at the bottom of the page. Only enter a districtwide amount if you are not able to break out an amount for the school.

THANK YOU FOR YOUR TIME!

Appendix D.2 Successful Schools Data Collection Tool Tabs

GENERAL INFORMATION PAGE (Data will be entered in columns B-E and rows 5-35. Please see instructions for more information)

School Information: (The questions in rows 5 - 17 refer to the identified school)

		Lowest Grade		**Highest Grade**	
Grade Span					- In cells C5 and E5 please select the lowest (C5) and highest (E5) grades served by the identified school
Number of Students (FTE):		All Student counts should be from the September 30th, 2014 enrollment count.			
- Grades 1-12		- In cell B8 please enter the total number of students enrolled in grades 1-12.			
- Full-day kindergarten		- In cell B9 please enter the total number of enrolled full-day kindergarten students if any.			
- Half-day prekindergarten		- In cell B10 please enter the total number of enrolled half-day prekindergarten students if any.			
- Full-day prekindergarten		- In cell B11 please enter the total number of enrolled full-day prekindergarten students if any.			
Teacher Characteristics:	Please see instructions for guidance on teachers to include here and throughout the report. Use teacher staffing counts as of September 30, 2014				
Average Years of Experience of All Teachers		- In cell B15 please enter the average experience of all teachers working in the identified school.			
% of Teachers with Advanced Professional Certificate (APC) or National Board of Professional Teaching Standards Certification		- In cell B17 please enter the percent of all teachers working in the identified school who hold an APC or NBPTS certification.			

District Info: **(If your district has more than one school identified and you have already provided this information, please skip this section)**

Number of Students (FTE):		All Student counts should be from the September 30th, 2014 enrollment counts.
- Half-day prekindergarten		- In cell B22 please enter the total number of enrolled half-day prekindergarten students if any.
- Full-day prekindergarten		- In cell B23 please enter the total number of enrolled full-day prekindergarten students if any.
- Full-day kindergarten		- In cell B24 please enter the total number of enrolled full-day kindergarten students if any.
- Elementary		- In cell B25 please enter the total number of enrolled elementary students in the district.
- Middle/Junior		- In cell B26 please enter the total number of enrolled middle school students in the district
- High School		- In cell B27 please enter the total number of enrolled high school students in the district.
Operating Expenditures:		- In cell B29 please enter the district's total operating expenditures for 2014-2015.
Teacher Characteristics:	Please see instructions for guidance on teachers to include here and throughout the report. Use teacher staffing counts as of September 30, 2014	
Average Years of Experience of All Teachers		- In cell B33 please enter the average years experience for all teachers in the district.
% of Teachers with Advanced Professional Certificate (APC) or National Board of Professional Teaching Standards Certification		- In cell B35 please enter the percent of all teachers working in the district who hold an APC or NBPTS certification.
Notes or Questions:		

DISTRICT ADMINISTRATION PAGE (Data should be entered in columns B-F and rows 9-37)
The number of FTE and Personnel Costs should be based on staff working in the district as of September 30, 2014.

(If your district has more than one identified school and you have already provided this information, please skip this section.)

General Support Services (20121)

	Salaries and Wages 100	Fringe Benefits (Fixed Charges)	Total
Total Personnel Costs			$0

Business Support Services (20122)

	Salaries and Wages 100	Fringe Benefits (Fixed Charges)	Total
Total Personnel Costs			$0

Centralized Support Services (20123)

	Salaries and Wages 100	Fringe Benefits (Fixed Charges)	Total
Total Personnel Costs			$0

Instructional Administration and Supervision (20216)

	Curriculum Specialist	Supervisors of Guidance & Psychological Services	Media/ Technology Specialist	Other Administrators/ Supervisors of Instruction	Clerical Staff in Area
# of FTE (as of September 30, 2014)					
Total Salary and Wage Expenditure					
Total Fringe Benefits Expenditure (Fixed Charges)					
# FTE who only work with English Language Learner Students					
# FTE who only work with At-Risk Students					

Non-Personnel Costs (For program accounts 20121, 20122, 20123, and 20216)

	Contractual Services Object 200)	Supplies/ Materials (Object 300)	Other Charges* (Object 400)	Equipment/ Technology (Object 554)	
Total District Cost					
	*Expenditures reported here for Other Charges (400) should exclude employee fringe benefits.				
Notes or Questions:					

SCHOOL (MID-LEVEL) ADMINISTRATION PAGE (Data should be entered in columns B-I and rows 7-17)

Office of Principal (20215)

	Principal	Assistant or Vice Principals	Other School-Level Administrators	Business Managers	Secretaries/Clerks	Student Personnel Workers Account 20215	Aides in Expenditure Account 20215	Other Staff in Expenditure Account 20215
# of FTE (as of September 30, 2014)								
Total Salary and Wage Expenditure								
Total Fringe Benefits Expenditure (Fixed Charges)								
# FTE who only work with English Language Learner Students								
# FTE who only work with At-Risk Students								

Non-Personnel Costs (20215)

	Contractual Services Object 200)	Supplies/ Materials (Object 300)	Other Charges* (Object 400)	Equipment/ Technology (Object 554)
Total School Cost				

*Expenditures reported here for Other Charges (400) should exclude employee fringe benefits.

Notes or Questions:

SCHOOL INSTRUCTION PAGE (Data should be entered in columns B-M and rows 6-31)

Instructional Salaries (Category 203)

	Teachers*	Long-Term Substitute Teachers	Coaches, mentor teachers, specialist teachers	Teacher Aids or Teaching Assistants	Librarians/ Media	Guidance Counselors	Social Workers	Therapists (OT/PT/Speech/Other	Psychologists	Itinerate Teachers	Other Para-professionals in Expenditure Account 203	Other Staff in Expenditure Account 203
# of FTE (as of September 30, 2014)												
Total Salary and Wage Expenditure												
Total Fringe Benefits Expenditure (Fixed Charges)												
# FTE who only work with English Language Learner Students												
# FTE who only work with At-Risk Students												

*Do not include long-term substitute teachers in this column

	Extracurricul	Substitutes
Total School Cost		

- In cell B16 please enter the school’s total expenditure for stipends to employees working extracurricular activities for Instructional Salari
- In cell C16 please enter the school’s total expenditure for substitutes for Instructional Salaries

Instructional Textbooks/Supplies (Category 204)

	Total School
Total School Cost	
OR	OR
Total Amount Spent by District for Category 204	

- In cell B22 please enter the amount attributable to the specific school if identifiable, if not please enter the district's total expenditure for Category 204 in cell B24.

Other Instructional Costs (Category 205)

Total School Cost	
OR	OR
Total Amount Spent by District for Category 205	

- In cell B29 please enter the amount attributable to the specific school if identifiable, if not please enter the district's total expenditure for Category 205 in cell B31.

Notes or Questions:

OTHER COSTS PAGE (Data should be entered in columns B-F and rows 6-24)					
	Student Personnel Services 207	Student Health Services 208	Operation of Plant 210	Maintenance of Plant 211	Community Services 214
Total School Cost					
Total Salary and Wage Expenditure					
Total Fringe Benefits Expenditure (Fixed Charges)					
Non-Personnel Costs	Contractual Services (Object 200)	Supplies/ Materials (Object 300)	Fixed/Other Charges* (Category 212/ Object 400)	Equipment/ Technology (Object 554)	Other Program Costs
Total School Cost					
	*Expenditures reported here for Fixed/Other Charges (Category 212/Object 400) should exclude employee fringe benefits.				
OR - IF NOT AVAILABLE BY SCHOOL, PLEASE ENTER TOTAL AMOUNT SPENT BY THE DISTRICT FOR EACH CATEGORY					
Total District Cost					
Total Salary and Wage Expenditure					
Total Fringe Benefits Expenditure (Fixed Charges)					
Non-Personnel Costs	Contractual Services (Object 200)	Supplies/ Materials (Object 300)	Fixed/Other Charges* (Category 212/ Object 400)	Equipment/ Technology (Object 554)	Other Program Costs
Total District Cost					
	*Expenditures reported here for Fixed/Other Charges (Category 212/Object 400) should exclude employee fringe benefits.				
Notes or Questions:					

COMMENTS PAGE (Enter any other comments, notes, concerns here)

Please enter other comments you may have below:

Appendix E

Impact of Changes in the Formula

Table E.1a
Impact of CWI on Total Program Amount*

District	Total Program Amount with CWI	Total Program Amount without CWI	Difference	% Difference
Allegany	106,193,944	130,941,978	(24,748,034)	-19%
Anne Arundel	1,161,936,991	1,047,733,987	114,203,005	11%
Baltimore City	1,449,109,710	1,359,389,971	89,719,738	7%
Baltimore	1,636,358,800	1,536,487,136	99,871,664	6%
Calvert	225,294,976	208,799,793	16,495,184	8%
Caroline	73,873,587	80,036,389	(6,162,802)	-8%
Carroll	338,196,159	343,346,354	(5,150,195)	-2%
Cecil	220,398,254	220,398,254	-	0%
Charles	370,978,635	351,638,517	19,340,118	5%
Dorchester	63,156,163	68,424,879	(5,268,716)	-8%
Frederick	560,038,906	534,898,669	25,140,237	5%
Garrett	45,089,530	55,597,447	(10,507,918)	-19%
Harford	550,008,571	512,589,534	37,419,036	7%
Howard	766,474,431	677,696,225	88,778,205	13%
Kent	28,665,436	31,056,810	(2,391,374)	-8%
Montgomery	2,467,169,557	2,115,925,864	351,243,693	17%
Prince George's	2,110,671,451	1,869,505,271	241,166,180	13%
Queen Anne's	95,172,967	103,112,640	(7,939,673)	-8%
St. Mary's	252,865,758	234,351,954	18,513,804	8%
Somerset	43,559,075	46,290,197	-2,731,122	-6%
Talbot	58,485,958	63,365,068	(4,879,110)	-8%
Washington	300,346,598	313,841,795	(13,495,197)	-4%
Wicomico	203,312,762	216,060,321	(12,747,559)	-6%
Worcester	89,045,641	94,628,736	(5,583,095)	-6%
Total	**13,216,403,859**	**12,216,117,789**	**1,000,286,070**	**8%**

*Excludes Transportation and GTB

Table E.1b
State and Local Shares of CWI Impact on Total Program Amount*

District	State Share of CWI Cost	Local Share of CWI Cost	Total CWI Cost
Allegany	(26,342,068)	1,594,034	(24,748,034)
Anne Arundel	51,856,540	62,346,465	114,203,005
Baltimore City	75,048,020	14,671,718	89,719,738
Baltimore	37,010,482	62,861,182	99,871,664
Calvert	9,515,213	6,979,971	16,495,184
Caroline	(7,042,088)	879,287	(6,162,802)
Carroll	(16,620,941)	11,470,745	(5,150,195)
Cecil	(4,461,435)	4,461,435	0
Charles	11,322,577	8,017,542	19,340,118
Dorchester	(6,399,061)	1,130,345	(5,268,716)
Frederick	9,852,015	15,288,222	25,140,237
Garrett	(12,551,586)	2,043,668	(10,507,918)
Harford	20,881,905	16,537,131	37,419,036
Howard	50,319,902	38,458,303	88,778,205
Kent	(392,391)	(1,998,984)	(2,391,374)
Montgomery	161,887,137	189,356,557	351,243,693
Prince George's	203,781,931	37,384,249	241,166,180
Queen Anne's	(12,026,275)	4,086,602	(7,939,673)
St. Mary's	11,732,625	6,781,180	18,513,804
Somerset	(3,170,309)	439,187	(2,731,122)
Talbot	0	(4,879,110)	(4,879,110)
Washington	($18,936,520)	5,441,323	(13,495,197)
Wicomico	(15,226,658)	2,479,099	(12,747,559)
Worcester	0	(5,583,095)	(5,583,095)
Total	520,039,015	480,247,056	1,000,286,070

* Excludes Transportation and GTB

Table E.2
Impact of Enrollment Count Changes

Districts	Student Count Greater of Single or Rolling Average w. Pre-k	Student Count Single Year w. Pre-K	Difference	Student Count Greater of Single or Rolling Average w. Pre-k	Student Count Single Year	Difference	% Difference
Allegany	9,069.94	9,004.94	65	$80,030,248	$79,456,709	$573,539	1%
Anne Arundel	79,262.81	79,262.81	-	$956,378,725	$956,378,725	-	0%
Baltimore City	85,889.72	85,889.72	-	$996,155,844	$996,155,844	-	0%
Baltimore	109,393.91	109,393.91	-	$1,267,569,114	$1,267,569,114	-	0%
Calvert	16,486.18	16,360.68	126	$193,539,839	$192,066,530	$1,473,310	1%
Caroline	5,625.87	5,625.87	-	$56,496,337	$56,496,337	-	0%
Carroll	26,957.05	26,554.80	402	$288,893,313	$284,582,481	$4,310,833	2%
Cecil	15,938.64	15,924.31	14	$173,412,439	$173,256,493	$155,946	0%
Charles	26,841.20	26,661.53	180	$308,093,992	$306,031,706	$2,062,287	1%
Dorchester	4,775.90	4,775.90	-	$47,960,734	$47,960,734	-	0%
Frederick	41,067.23	41,067.23	-	$467,811,601	$467,811,601	-	0%
Garrett	4,085.90	3,989.32	97	$36,052,703	$$35,200,483	$852,220	2%
Harford	38,397.40	38,263.73	134	$448,260,424	$446,699,967	$1,560,457	0%
Howard	53,704.07	53,704.07	-	$660,843,619	$660,843,619	-	0%
Kent	2,216.32	2,196.24	20	$22,256,851	$22,055,169	$201,682	1%
Montgomery	153,731.65	153,731.65	-	$1,950,252,010	$1,950,252,010	-	0%
Prince George's	125,956.50	125,956.50	-	$1,547,189,187	$1,547,189,187	-	0%
Queen Anne's	7,827.15	7,804.32	23	$78,602,152	$78,372,855	$229,297	0%
St. Mary's	17,962.24	17,962.24	-	$210,868,076	$210,868,076	-	0%
Somerset	3,061.11	3,061.11	-	$31,339,889	$31,339,889	-	0%
Talbot	4,717.75	4,717.75	-	$47,376,778	$47,376,778	-	0%

Districts	Student Count Greater of Single or Rolling Average w. Pre-k	Student Count Single Year w. Pre-K	Difference	Student Count Greater of Single or Rolling Average w. Pre-k	Student Count Single Year	Difference	% Difference
Washington	22,855.15	22,855.15	-	$237,971,479	$237,971,479	-	0%
Wicomico	15,019.14	15,014.39	4.75	$153,767,157	$153,718,526	$48,631	0%
Worcester	6,864.33	6,864.33	-	$70,277,559	$70,277,559	-	0%
Total	877,707.17	876,642.50	1,065.75	$10,331,400,071	$10,319,931,869	$11,468,202	

Table E.3

Differences between Multiplicative and Additive Report*

District	Additive State Share	Multiplicative State Share	Difference	% Difference	Additive Local Share	Multiplicative Local Share	Difference	%Difference
Allegany	67,470,603	84,760,301	17,289,698	26%	38,723,341	21,433,643	(17,289,698)	-45%
Anne Arundel	420,459,602	338,187,597	(82,272,005)	-20%	741,477,389	823,749,394	82,272,005	11%
Baltimore City	1,088,759,048	1,255,260,400	166,501,352	15%	360,350,661	193,849,309	(166,501,352)	-46%
Baltimore	794,951,043	805,808,718	10,857,675	1%	841,407,757	830,550,082	(10,857,675)	-1%
Calvert	110,284,633	132,316345	22,031,712	20%	115,010,344	92,978,632	(22,031,712)	-19%
Caroline	49,824,768	62,256,061	12,431,293	25%	24,048,819	11,617,526	(12,431,293)	-52%
Carroll	157,671,389	182,371,694	24,700,305	16%	180,524,770	155,824,465	(24,700,305)	-14%
Cecil	130,470,625	160,424,468	29,953,843	23%	89,927,629	59,973,786	(29,953,843)	-33%
Charles	215,912,112	263,859,425	47,947,313	22%	155,066,523	107,119,210	(47,947,313)	-31%
Dorchester	37,173,179	48,221,525	11,048,346	30%	25,982,984	14,934,638	(11,048,346)	-43%
Frederick	300,624,988	358,044,072	57,419,084	19%	259,413,918	201,994,834	(57,419,084)	-22%
Garrett	7,911,706	17,831,996	9,920,290	125%	37,177,824	27,257,534	(9,920,290)	-27%
Harford	287,515,134	329,614,473	42,099,339	15%	262,493,436	220,394,097	(42,099,339)	-16%
Howard	316,411,856	284,723,521	(31,688,335)	-10%	450,062,575	481,750,910	31,688,335	7%
Kent	2,711,254	0	(2,711,254)	-100%	25,594,182	28,665,436	2,711,254	10%
Montgomery	781,964,849	210,685,890	(571,278,959)	-73%	1,685,204,708	2,256,483,667	571,278,959	34%
Prince George's	1,385,585,044	1,616,734,015	231,148,971	17%	725,086,407	493,937,436	(231,148,971)	-32%
Queen Anne's	28,601,540	31,948,463	3,346,923	12%	66,571,427	63,224,504	(3,346,923)	-5%
St. Mary's	137,894,021	162,528,290	24,634,269	18%	114,971,737	90,337,468	(24,634,269)	-21%
Somerset	30,765,317	37,756,339	6,991,022	23%	12,793,758	5,802,736	(6,991,022)	-55%
Talbot	0	0	-	0%	58,485,958	58,485,958	-	0%

District	Additive State Share	Multiplicative State Share	Difference	% Difference	Additive Local Share	Multiplicative Local Share	Difference	%Difference
Washington	182,441,600	228,453,419	46,011,819	25%	117,904,998	71,893,179	(46,011,819)	-39%
Wicomico	140,514,364	170,557,795	30,043,431	21%	62,798,398	32,754,966	(30,043,432)	-48%
Worcester	0	0	-	0%	89,045,641	89,045,641	-	0%
Total	**6,675,918,675**	**6,782,344,808**	**106,426,133**		**6,540,485,184**	**6,434,059,051**	**(106,426,133)**	

*Excludes Transportation and GTB

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