Washington State Institute for Public Policy

Pre-K to 12 Education Benefit-Cost Results

The WSIPP benefit-cost analysis examines, on an apples-to-apples basis, the monetary value of programs or policies to determine whether the benefits from the program exceed its costs. WSIPP's research approach to identifying evidence-based programs and policies has three main steps. First, we determine "what works" (and what does not work) to improve outcomes using a statistical technique called meta-analysis. Second, we calculate whether the benefits of a program exceed its costs. Third, we estimate the risk of investing in a program by testing the sensitivity of our results. For more detail on our methods, see our Technical Documentation.

Current estimates replace old estimates. Numbers will change over time as a result of model inputs and monetization methods.

State and district early childhood education programs

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated December 2013.

Program Description: In this analysis, we include pre-kindergarten programs funded by states or school districts that are universal or that target low-income students. Comparison students could have received any other child care options available in the community, including care by family members, another preschool program, subsidized or unsubsidized child care, or Head Start.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$13,501	Benefit to cost ratio	$5.74
Participants	$19,721	Benefits minus costs	$34,398
Others	$10,142	Chance the program will produce	
Indirect	($1,707)	benefits greater than the costs	90 %
Total benefits	$41,657		
Net program cost	($7,259)		
Benefits minus cost	$34,398		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1]	Benefits to:				
	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$1,783	$3,913	$887	$6,583
Labor market earnings associated with high school graduation	$19,365	$8,794	$8,860	$0	$37,020
K-12 grade repetition	$0	$290	$0	$144	$434
K-12 special education	$0	$819	$0	$408	$1,227
Health care associated with educational attainment	($578)	$2,123	($2,303)	$1,057	$299
Costs of higher education	($1,003)	($1,186)	($328)	($591)	($3,108)
Subtotals	$17,784	$12,624	$10,142	$1,906	$42,456
From secondary participant					
Labor market earnings associated with employment	$1,936	$879	$0	$0	$2,815
Public assistance	$1	($3)	$0	($1)	($2)
Subtotals	$1,937	$877	$0	($1)	$2,812
Adjustment for deadweight cost of program	$0	$0	$0	($3,611)	($3,611)
Totals	$19,721	$13,501	$10,142	($1,707)	$41,657

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

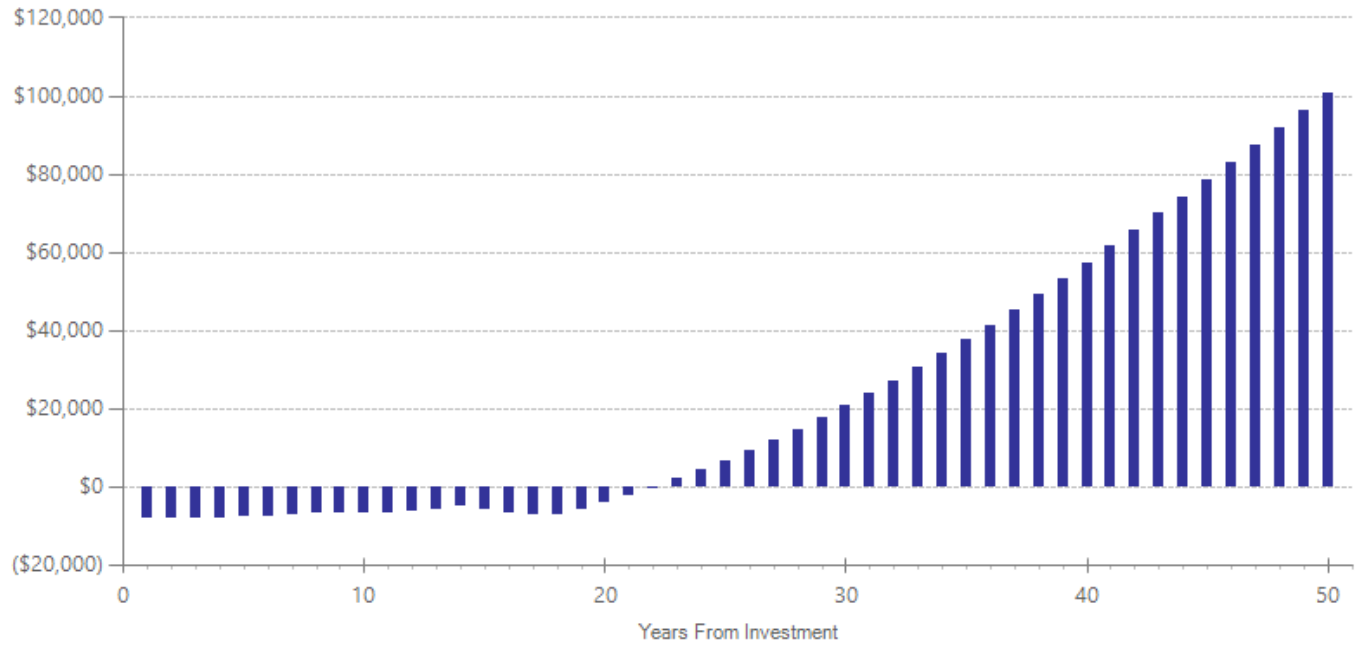
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$6,934	2012	Present value of net program costs (in 2016 dollars)	($7,259)
Comparison costs	$961	2012	Cost range (+ or -)	10 %

Our per-participant estimate reflects the total cost of Washington State's Early Childhood Education and Assistance Program (ECEAP), including administrative costs per slot plus the amount of state-subsidized child care subsidies distributed to kids in ECEAP (http://www.del.wa.gov/publications/partnerships/docs/ECEAP_HS_Profile_2012.pdf). Comparison group costs reflect the range of other options that low-income children in Washington might receive, including state-subsidized child care and Head Start. Comparison group costs were calculated by dividing the amount of state-subsidized child care subsidies distributed to ECEAP-eligible families who did not participate in ECEAP by the number of children (30,936). The number of eligible students includes all Head Start (HS) students; while HS eligibility is up to 130% of the federal poverty line (FPL), students under 100% FPL are given first priority (http://www.del.wa.gov/publications/partnerships/docs/ECEAP_HS_Profile_2012.pdf and personal communication with Nicole Rose, Department of Early Learning, Early Learning Management System on December 4, 2013).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
				First time ES is estimated			Second time ES is estimated				
				ES	SE	Age	ES	SE	Age	ES	p-value
Crime	Primary	1	902	-0.251	0.174	26	-0.251	0.174	36	-0.251	0.149
High school graduation	Primary	2	1184	0.231	0.091	21	0.231	0.091	21	0.231	0.011
K-12 grade repetition	Primary	4	2023	-0.351	0.068	12	-0.351	0.068	12	-0.351	0.001
K-12 special education	Primary	3	1670	-0.118	0.193	14	-0.118	0.193	14	-0.118	0.544
Test scores	Primary	17	10799	0.303	0.029	4	0.064	0.031	17	0.303	0.001
Earnings*	Secondary	1	5253	0.024	0.042	33	0.000	0.000	34	0.024	0.566
Employment	Secondary	1	5253	-0.003	0.017	33	0.000	0.000	34	-0.003	0.851
Public assistance	Secondary	1	5253	0.000	0.040	33	0.000	0.000	34	0.000	1.000

*The effect size for this outcome indicates percentage change, not a standardized mean difference effect size.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Barnett, W.S., Frede, E.C., Mobasher, H., & Mohr, P. (1988). The efficacy of public preschool programs and the relationship of program quality to efficacy. *Educational Evaluation and Policy Analysis, 10*(1), 37–49.

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Becoming a Man (BAM) with high-dosage tutoring

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated May 2015.

Program Description: Becoming a Man (BAM) is a high school behavioral program that offers non-academic intervention to disadvantaged and at-risk males through exposure to prosocial adults and skill training based on cognitive behavioral therapy. The program focuses on teaching character and social-emotional skills including considering another person's perspective, evaluating consequences ahead of time, and reducing automatic decision-making. Participants attend weekly one-hour group sessions offered during the school day. The program included in this analysis combines BAM with individualized math tutoring conducted for one hour each day in groups of two students.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$9,686
Participants	$20,031
Others	$8,139
Indirect	($2,122)
Total benefits	$35,735
Net program cost	($4,532)
Benefits minus cost	$31,203

Benefit to cost ratio	$7.89
Benefits minus costs	$31,203
Chance the program will produce benefits greater than the costs	72 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$20,691	$9,396	$9,167	$0	$39,254
Health care associated with educational attainment	($221)	$808	($885)	$403	$105
Costs of higher education	($438)	($518)	($143)	($258)	($1,357)
Adjustment for deadweight cost of program	$0	$0	$0	($2,267)	($2,267)
Totals	$20,031	$9,686	$8,139	($2,122)	$35,735

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

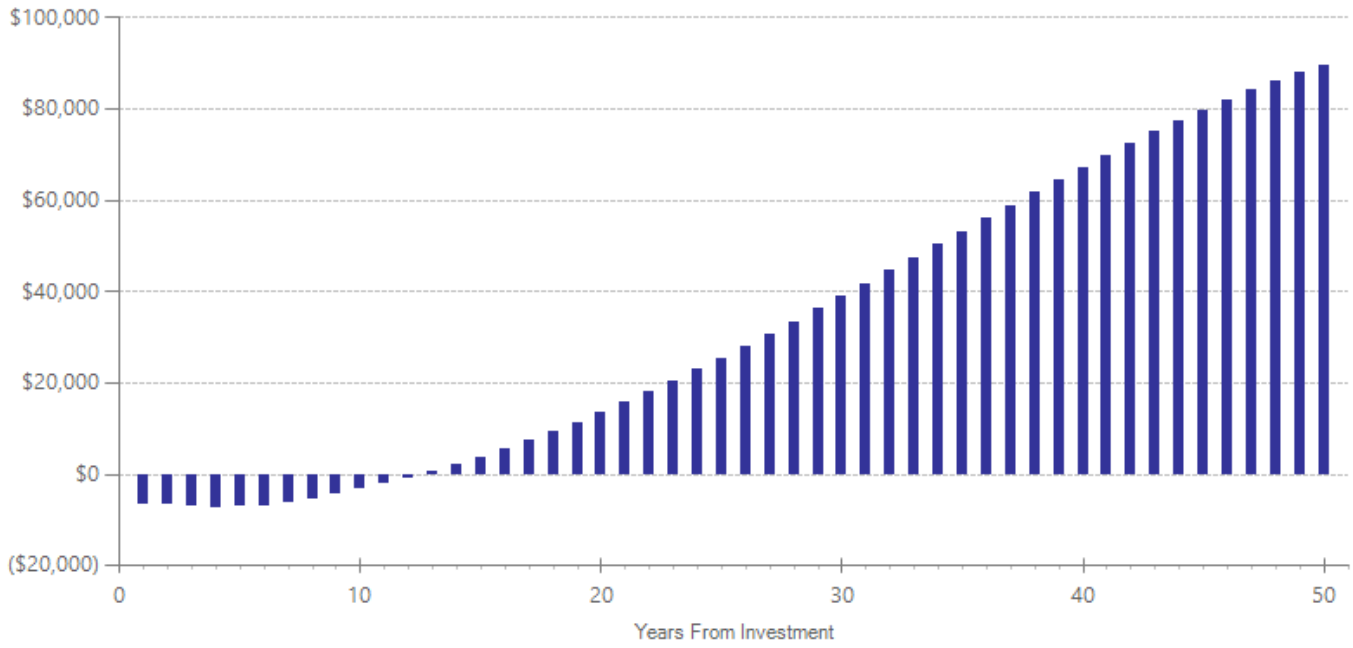
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$4,400	2013	Present value of net program costs (in 2016 dollars)	($4,532)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

The intervention in this analysis occurred over one school year. The estimated cost for BAM with high-dosage tutoring is $4,400 per student as reported in Cook, P.J., Dodge, K., Farkas, G., Fryer, R.G., Guryan, J., Ludwig, J., ... Steinberg, L.. (2014). The (surprising) efficacy of academic and behavioral intervention with disadvantaged youth: Results from a randomized experiment in Chicago (NBER Working Paper 19862). Cambridge, MA: National Bureau of Economic Research.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Grade point average^	1	72	0.350	0.210	16	0.350	0.210	16	0.350	0.095
Office discipline referrals^	1	72	0.073	0.208	16	0.073	0.208	16	0.073	0.726
School attendance^	1	68	0.352	0.221	16	0.352	0.221	16	0.352	0.111
Suspensions/expulsions^	1	68	-0.210	0.220	16	-0.210	0.220	16	-0.210	0.338
Test scores	1	60	0.217	0.251	16	0.208	0.276	17	0.217	0.387

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Cook, P.J., Dodge, K., Farkas, G., Fryer, R.G., Guryan, J., Ludwig, J., ... Steinberg, L.. (2014). *The (surprising) efficacy of academic and behavioral intervention with disadvantaged youth: Results from a randomized experiment in Chicago* (NBER Working Paper 19862). Cambridge, MA: National Bureau of Economic Research.

Consultant teachers: Literacy Collaborative

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2018.

Program Description: Literacy Collaborative is a comprehensive teacher professional development model that uses coaching for teachers as a primary strategy to improve instructional practices and student outcomes. The program provides up to 35 days of training at university sites to literacy coaches before placement in schools, as well as on-going training and support. Coaches provide professional development and work one-on-one with classroom teachers with a focus on the specific instructional strategies in the Literacy Collaborative model. The evaluation included in this analysis measures the impact of the model on students in grades K–2 after three years of implementation.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$6,515
Participants	$13,512
Others	$5,710
Indirect	($264)
Total benefits	$25,473
Net program cost	($751)
Benefits minus cost	$24,721

Benefit to cost ratio	$33.90
Benefits minus costs	$24,721
Chance the program will produce benefits greater than the costs	100 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$13,853	$6,291	$6,196	$0	$26,341
Health care associated with educational attainment	($104)	$382	($416)	$192	$54
Costs of higher education	($237)	($157)	($71)	($79)	($544)
Adjustment for deadweight cost of program	$0	$0	$0	($377)	($377)
Totals	$13,512	$6,515	$5,710	($264)	$25,473

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

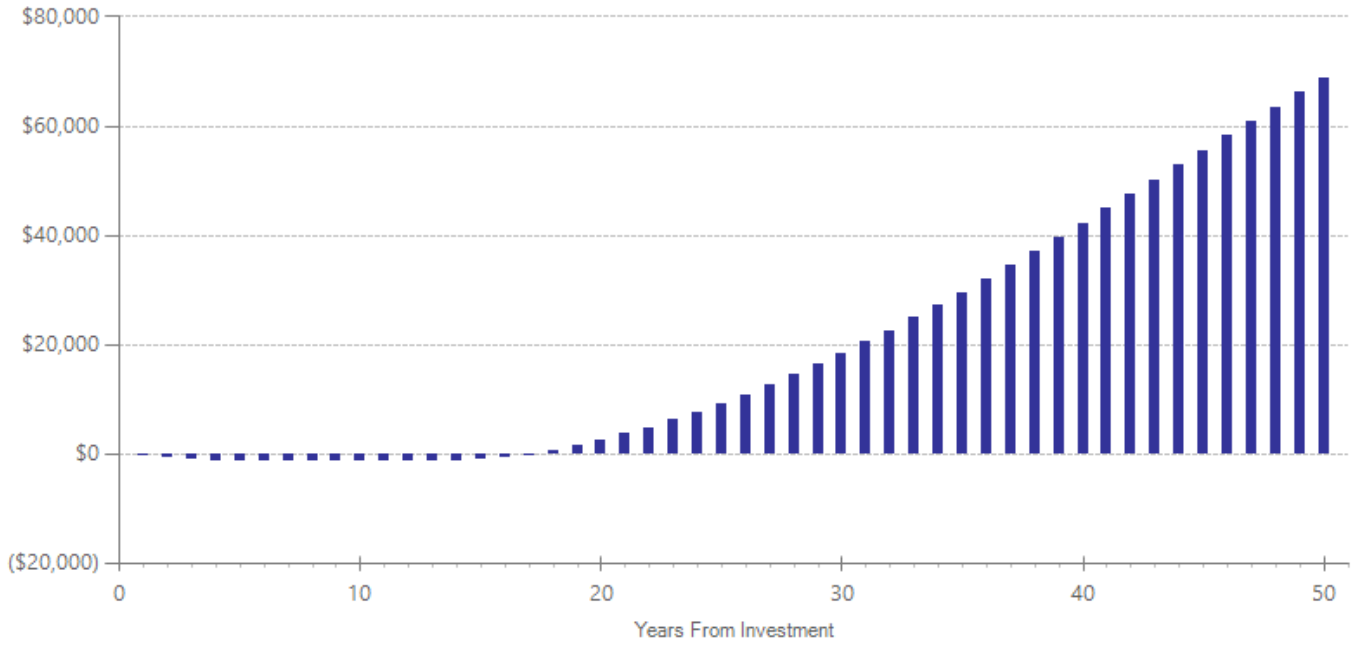
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$192	2013	Present value of net program costs (in 2016 dollars)	($751)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

Cost is based on published literacy coach training costs, including training fees, travel, and materials, from Ohio State University (2014). *Costs for Literacy Collaborative literacy coach training 2014-2015*, Columbus Ohio, OH: author. The estimate also includes salary costs for coach and teacher time based on the average compensation cost (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction. To calculate a per-student annual cost, we used the number of students in grades K–2 in Washington's prototypical schools formula. Costs reflect the average annual cost per-student assuming three years of implementation and one year of training.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	1	3348	0.428	0.025	6	0.171	0.028	17	0.428	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Biancarosa, G., Bryk, A.S., & Dexter, E.R. (2010). Assessing the value-added effects of Literacy Collaborative professional development on student learning. *The Elementary School Journal, 111*(1), 7-34.

Head Start

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated December 2013.

Program Description: Head Start is a federal program that funds early childhood education, social services and health services for children ages 0-5. Studies in this analysis focus on center-based Head Start programs for 3- and 4- year olds.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$9,371
Participants	$14,367
Others	$8,267
Indirect	($3,300)
Total benefits	$28,706
Net program cost	($8,946)
Benefits minus cost	$19,760

Benefit to cost ratio	$3.21
Benefits minus costs	$19,760
Chance the program will produce benefits greater than the costs	81 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$1,428	$3,195	$712	$5,335
Labor market earnings associated with high school graduation	$15,555	$7,064	$7,132	$0	$29,751
K-12 grade repetition	$0	$72	$0	$36	$109
Public assistance	($3)	$7	$0	$3	$7
Health care associated with educational attainment	($462)	$1,698	($1,841)	$844	$238
Costs of higher education	($792)	($937)	($259)	($466)	($2,454)
Subtotals	$14,297	$9,332	$8,226	$1,130	$32,986
From secondary participant					
Labor market earnings associated with high school graduation	$76	$35	$35	$0	$145
K-12 grade repetition	$0	$1	$0	$0	$1
Health care associated with educational attainment	($2)	$8	$7	$4	$18
Costs of higher education	($4)	($4)	($1)	($2)	($12)
Subtotals	$70	$39	$41	$2	$153
Adjustment for deadweight cost of program	$0	$0	$0	($4,432)	($4,432)
Totals	$14,367	$9,371	$8,267	($3,300)	$28,706

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

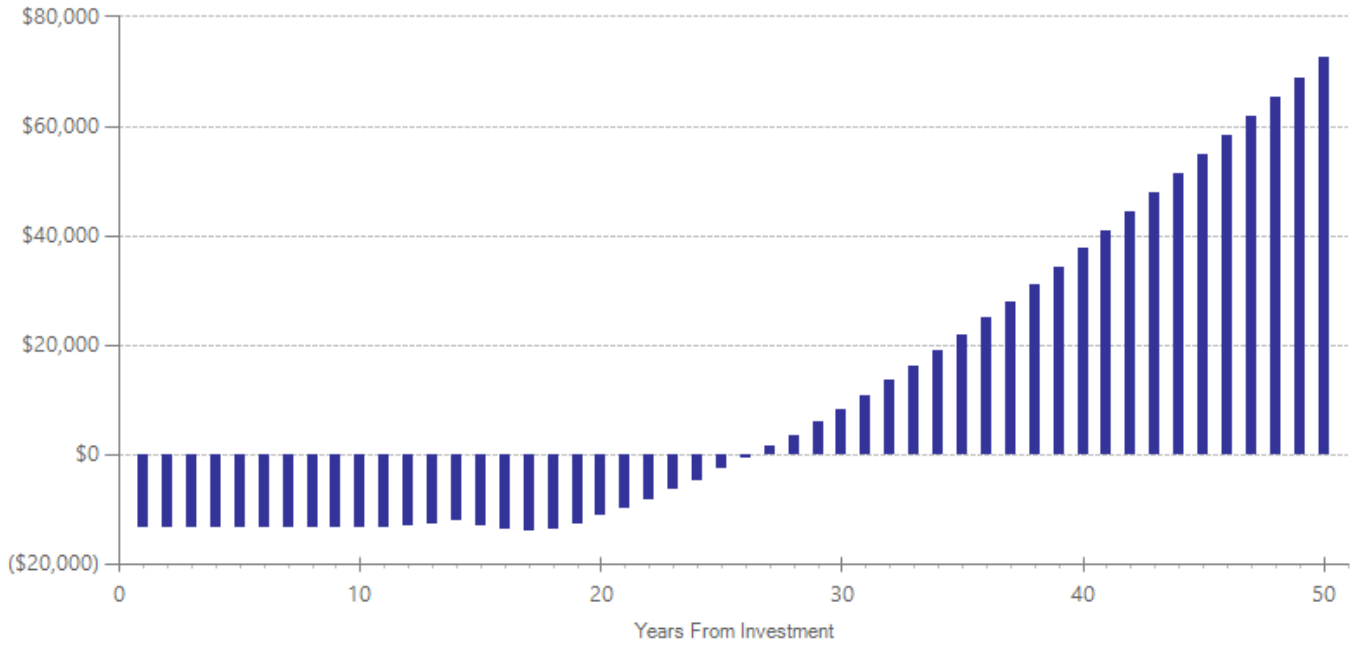
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$9,469	2012	Present value of net program costs (in 2016 dollars)	($8,946)
Comparison costs	$903	2012	Cost range (+ or -)	10 %

Per-child costs calculated using a weighted average of Head Start, American Indian Alaska Native Head Start and Migrant and Seasonal Head Start costs, including administrative costs per slot (http://www.del.wa.gov/publications/partnerships/docs/ECEAP_HS_Profile_2012.pdf). Comparison group costs reflect the range of other options that low-income children in Washington might receive, including state-subsidized child care and Washington's Early Childhood Education and Assistance Program (ECEAP). Comparison group costs were calculated by dividing the cost of ECEAP ($55,867,278) by the number of children who are eligible but not served by HS (32,291). The number of eligible students includes all ECEAP students; http://www.del.wa.gov/publications/partnerships/docs/ECEAP_HS_Profile_2012.pdf.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
				First time ES is estimated			Second time ES is estimated				
				ES	SE	Age	ES	SE	Age	ES	p-value
Crime	Primary	2	517	-0.183	0.270	21	-0.183	0.270	31	-0.183	0.497
High school graduation	Primary	2	517	0.181	0.077	18	0.181	0.077	18	0.181	0.018
K-12 grade repetition	Primary	5	1738	-0.075	0.133	12	-0.075	0.133	12	-0.075	0.572
Teen births under age 18	Primary	1	327	-0.466	0.292	19	-0.466	0.292	19	-0.466	0.111
Test scores	Primary	7	4750	0.172	0.027	4	0.036	0.006	17	0.172	0.001
Teen births (second generation)	Secondary	1	327	-0.466	0.292	19	-0.466	0.292	19	-0.466	0.111

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Double-dose classes

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated May 2015.

Program Description: Double dose classes are provided to middle and high school students struggling in reading or, more typically, math. Students participating in this intervention enroll in two reading or math classes instead of one, thus doubling their instructional time in these subjects.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$4,431
Participants	$8,448
Others	$3,299
Indirect	$19
Total benefits	$16,196
Net program cost	($493)
Benefits minus cost	$15,703

Benefit to cost ratio	$32.86
Benefits minus costs	$15,703
Chance the program will produce benefits greater than the costs	98 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$24	$59	$12	$95
Labor market earnings associated with test scores	$8,587	$3,899	$3,793	$0	$16,279
Health care associated with educational attainment	($139)	$507	($553)	$253	$68
Adjustment for deadweight cost of program	$0	$0	$0	($246)	($246)
Totals	$8,448	$4,431	$3,299	$19	$16,196

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

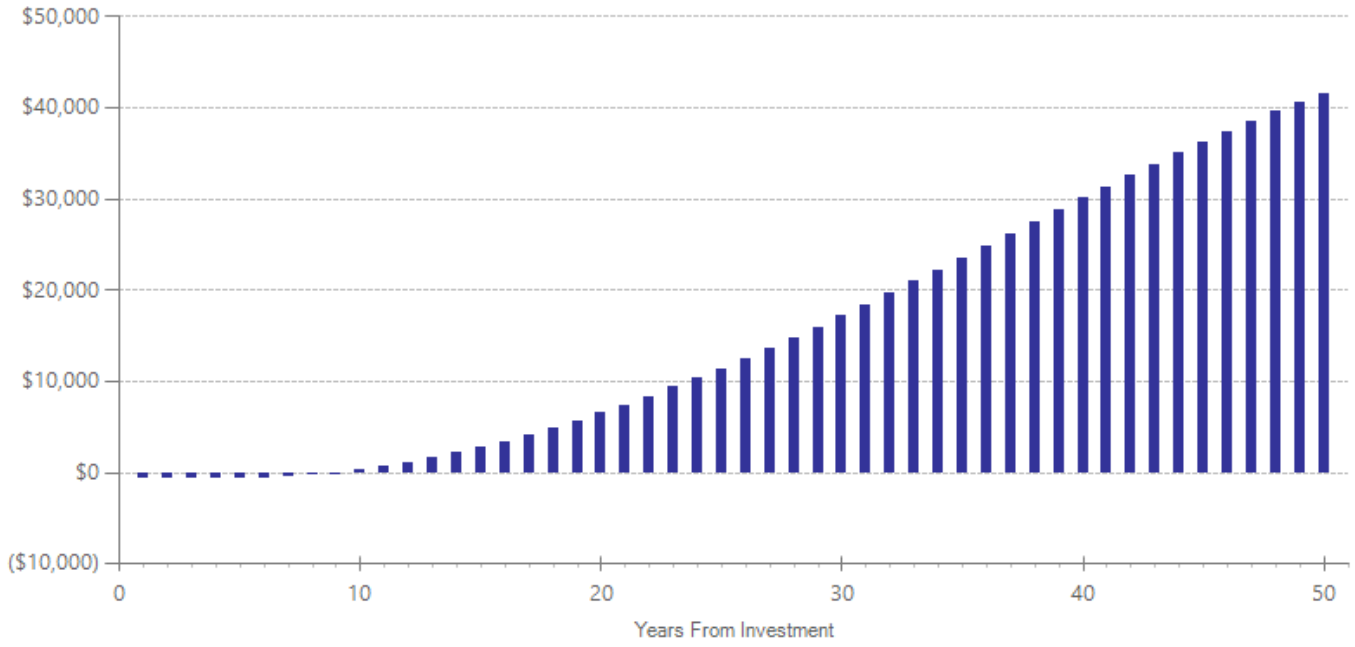
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$479	2013	Present value of net program costs (in 2016 dollars)	($493)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the studies reviewed for this estimate, providing "double dose" classes required hiring approximately 15% more teachers to cover the additional classes (this figure accounts for a partial cost offset from hiring fewer elective course teachers). Teachers were provided with three days of professional development and curriculum materials for implementation. To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for teachers as reported by the Office of the Superintendent of Public Instruction and add per-student curriculum and teacher training costs.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	2	10463	0.045	0.022	18	0.045	0.022	18	0.045	0.040
Test scores	5	30857	0.093	0.041	13	0.093	0.041	17	0.093	0.023

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Tutoring: By peers

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated July 2014.

Program Description: Generally, peer tutoring is an instructional strategy that uses students to provide academic assistance to struggling peers. Peer tutoring may use students from the same classrooms or pair older students with younger struggling students. Tutoring assistance can occur through one-on-one interactions or in small groups and in some instances students alternate between the role of tutor and tutee. The specific types of peer tutoring that have been evaluated and are included in this meta-analysis are (in no particular order) ClassWide Peer Tutoring, Peer-Assisted Learning Strategies, and Reciprocal Peer Tutoring. The evaluated tutoring programs in this analysis provide, on average, about 30 hours of peer tutoring time each year and about six hours of training time for teachers and students to learn program procedures.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$3,779
Participants	$7,837
Others	$3,283
Indirect	$7
Total benefits	$14,905
Net program cost	($114)
Benefits minus cost	$14,791

Benefit to cost ratio	$130.41
Benefits minus costs	$14,791
Chance the program will produce benefits greater than the costs	82 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$8,041	$3,652	$3,568	$0	$15,260
Health care associated with educational attainment	($61)	$223	($242)	$111	$31
Costs of higher education	($143)	($95)	($43)	($48)	($329)
Adjustment for deadweight cost of program	$0	$0	$0	($57)	($57)
Totals	$7,837	$3,779	$3,283	$7	$14,905

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

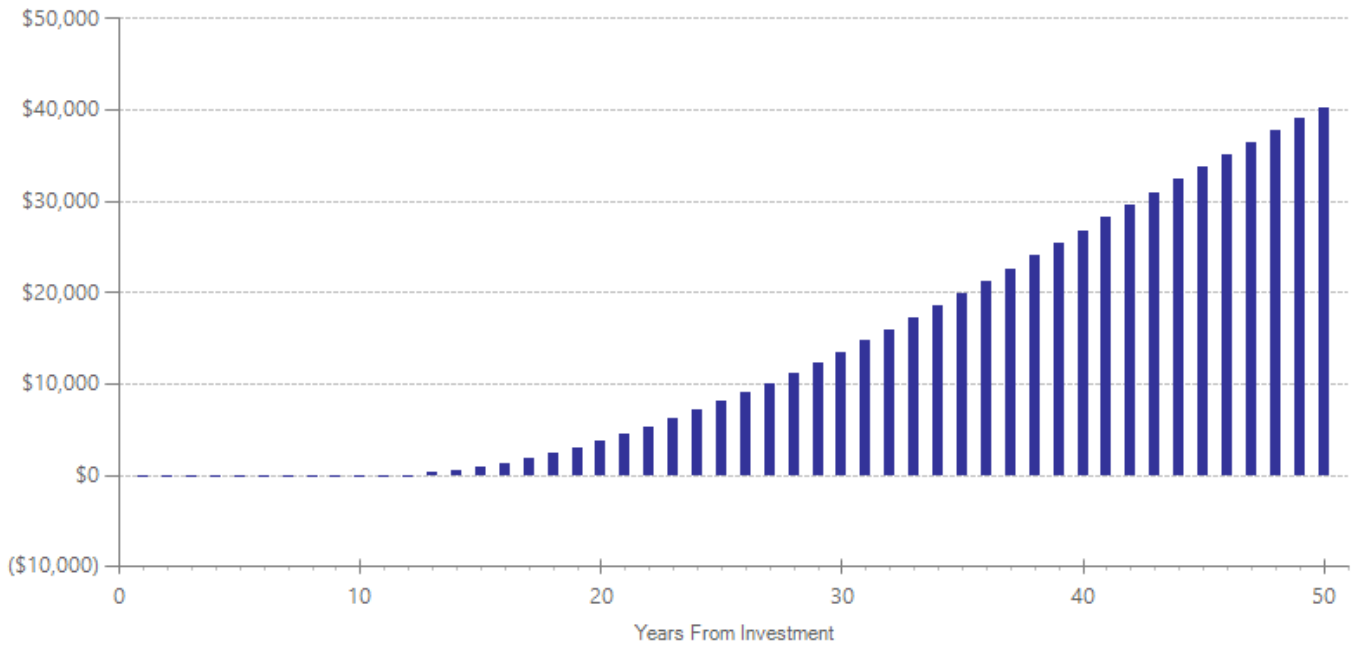
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$111	2013	Present value of net program costs (in 2016 dollars)	($114)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in this meta-analysis, the average peer tutoring program provides 30 hours tutoring time and six hours of training time per class. To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction, divided by the number of students per classroom in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	8	400	0.159	0.090	9	0.095	0.099	17	0.334	0.002

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Case management in schools

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: Case management involves placing a full-time social worker or counselor in a school to help identify at-risk students' needs and connect students and families with relevant services in and outside of the K–12 system. Three such models have been evaluated and are included in this analysis are (in no particular order) Communities in Schools, City Connects, and Comer School Development Program. In practice, each of these models includes other services (such as extended learning time and educator training), but the program evaluations focus on the impact of the case management component.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$4,315
Participants	$7,475
Others	$2,714
Indirect	$156
Total benefits	$14,660
Net program cost	($229)
Benefits minus cost	$14,431

Benefit to cost ratio	$64.07
Benefits minus costs	$14,431
Chance the program will produce benefits greater than the costs	96 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$30	$68	$15	$113
Labor market earnings associated with high school graduation	$8,309	$3,773	$3,802	$0	$15,884
K-12 grade repetition	$0	$0	$0	$0	$0
K-12 special education	$0	$3	$0	$1	$4
Property loss associated with alcohol abuse or dependence	$0	$0	$0	$0	$0
Health care associated with educational attainment	($246)	$899	($980)	$450	$124
Costs of higher education	($588)	($390)	($176)	($196)	($1,350)
Adjustment for deadweight cost of program	$0	$0	$0	($115)	($115)
Totals	$7,475	$4,315	$2,714	$156	$14,660

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

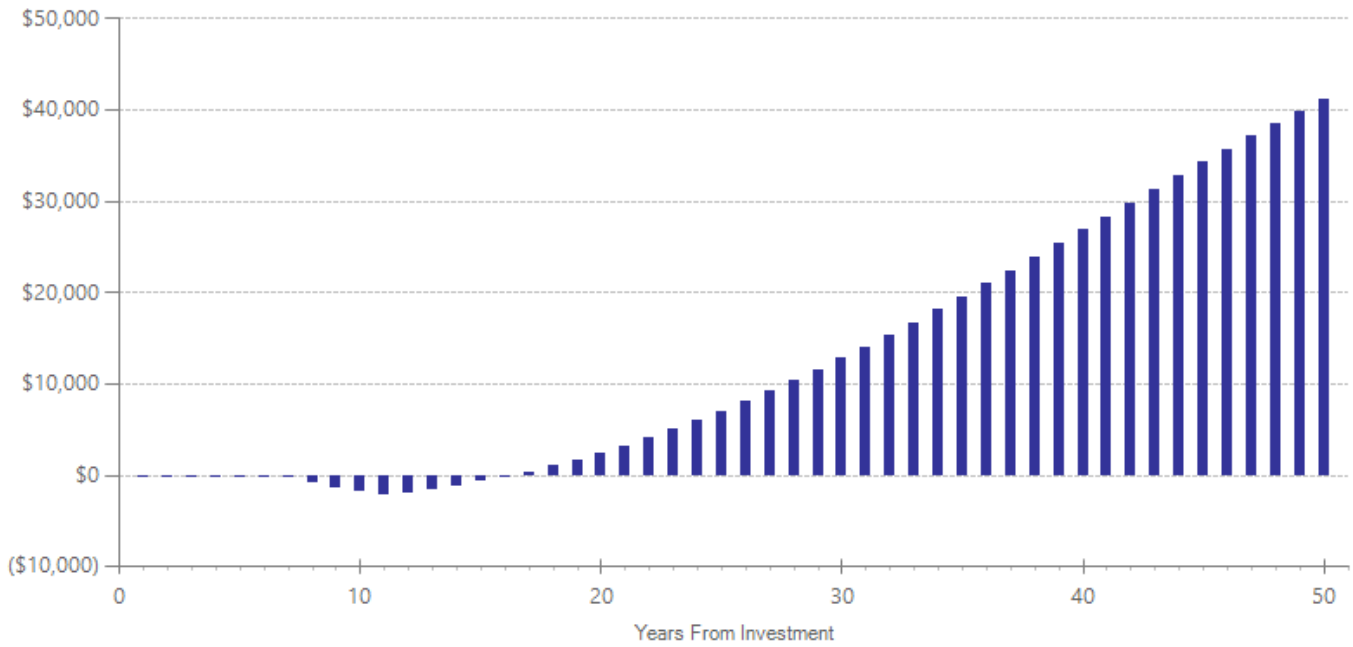
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$222	2013	Present value of net program costs (in 2016 dollars)	($229)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

To calculate a per-student annual cost, we used average compensation costs (including benefits) for a social worker as reported by the Office of the Superintendent of Public Instruction, divided by the number of students in a prototypical elementary school. The estimate also includes a half-hour of principal and administrative support time per week.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



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Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Alcohol use before end of middle school	3	6199	0.002	0.085	12	0.002	0.085	12	0.032	0.705
Cannabis use before end of middle school	3	6199	0.001	0.085	12	0.001	0.085	12	0.013	0.880
Externalizing behavior symptoms	1	573	-0.016	0.161	12	-0.008	0.083	15	-0.325	0.044
Grade point average^	7	7448	0.113	0.037	12	0.115	0.148	13	0.097	0.328
High school graduation	3	1335	0.109	0.059	18	0.109	0.059	18	0.215	0.191
Illicit drug use before end of middle school	4	6772	-0.002	0.075	12	-0.002	0.075	12	-0.034	0.654
Internalizing symptoms	4	6772	-0.002	0.075	12	-0.001	0.055	14	-0.030	0.686
Office discipline referrals^	3	252	0.194	0.149	12	0.141	0.162	13	0.194	0.192
School attendance^	6	8095	-0.007	0.042	12	0.002	0.054	13	-0.007	0.867
Smoking before end of middle school	3	6199	0.001	0.085	12	0.001	0.085	12	0.015	0.862
Suspensions/expulsions^	4	1321	-0.025	0.110	12	-0.025	0.110	12	-0.025	0.819
Test scores	11	8553	0.026	0.026	12	0.020	0.028	17	0.061	0.018

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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Citations Used in the Meta-Analysis

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Walsh, M., Foley, C., Denny, B.R., Lindsay, L., Coyle, J., & Howard, M. (2011). *The impact of City Connects* (Annual report 2011). Boston: Boston College Center for Optimized Student Support

Summer book programs: Multi-year intervention

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated February 2018.

Program Description: The summer book program included in this analysis provides 12 free books to elementary students each year for three consecutive years. The program focuses on early elementary students in 1st and 2nd grade. The main goal is to increase book access and voluntary summer reading for children from low-income families. Students self-select books each year at a book fair. The available books are screened for text difficulty. The studies included in this analysis measure the program's impact after three years.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$3,541
Participants	$7,350
Others	$3,080
Indirect	($50)
Total benefits	$13,921
Net program cost	($218)
Benefits minus cost	$13,703

Benefit to cost ratio	$63.90
Benefits minus costs	$13,703
Chance the program will produce benefits greater than the costs	70 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$7,543	$3,425	$3,346	$0	$14,314
Health care associated with educational attainment	($56)	$206	($225)	$102	$26
Costs of higher education	($136)	($90)	($41)	($45)	($312)
Adjustment for deadweight cost of program	$0	$0	$0	($108)	($108)
Totals	$7,350	$3,541	$3,080	($50)	$13,921

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

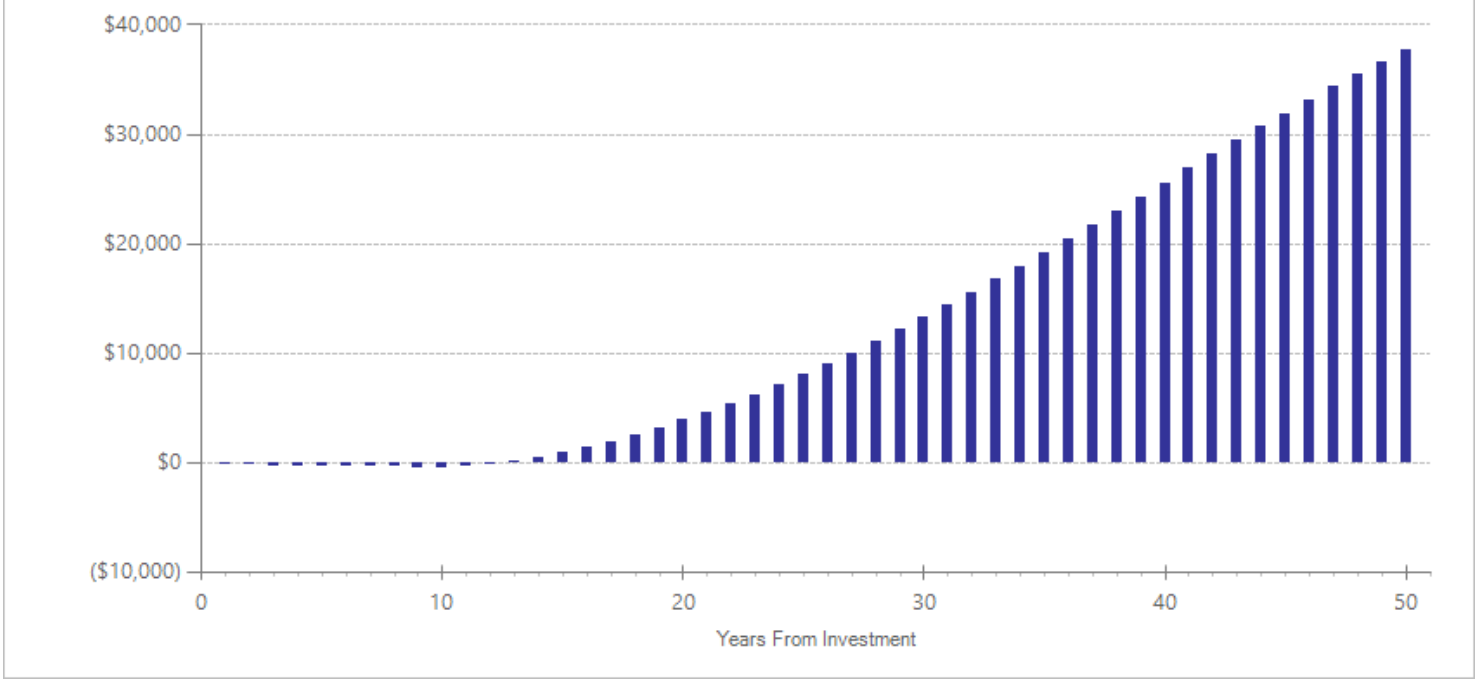
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$73	2013	Present value of net program costs (in 2016 dollars)	($218)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

These multi-year interventions typically run for three years. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction to account for the time it takes teachers to administer the program divided by the average number of students per classroom in Washington's prototypical schools formula. In addition to compensation, the estimate accounts for the cost of purchasing 12 books per student each year.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	1	852	0.138	0.147	10	0.091	0.162	17	0.138	0.346

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Tutoring: By adults for English language learner students

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated July 2014.

Program Description: In this analysis, we include studies that compared one-on-one tutoring programs for English Language Learner (ELL) students, with regular classroom reading instruction without supplemental tutoring.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$4,041
Participants	$8,303
Others	$3,355
Indirect	($650)
Total benefits	$15,049
Net program cost	($1,453)
Benefits minus cost	$13,595

Benefit to cost ratio	$10.35
Benefits minus costs	$13,595
Chance the program will produce benefits greater than the costs	69 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$8,571	$3,892	$3,795	$0	$16,258
Health care associated with educational attainment	($96)	$353	($384)	$175	$48
Costs of higher education	($172)	($204)	($56)	($101)	($534)
Adjustment for deadweight cost of program	$0	$0	$0	($724)	($724)
Totals	$8,303	$4,041	$3,355	($650)	$15,049

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

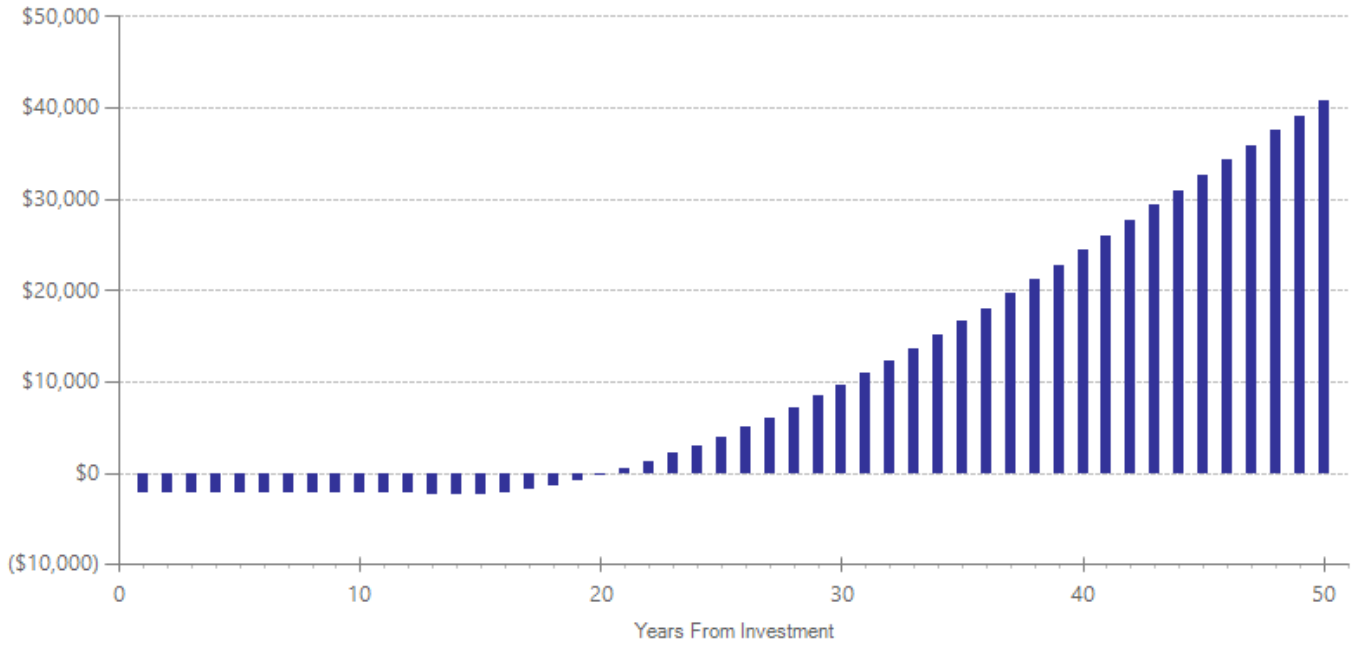
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$2,612	2009	Present value of net program costs (in 2016 dollars)	($1,453)
Comparison costs	$1,298	2009	Cost range (+ or -)	20 %

Per-participant cost estimates are based on the following assumptions derived from the programs described in the studies included in the meta-analysis: on average, the programs lasted for 4.5 months, with 60 tutoring sessions of about 25 minutes each. The programs provided one to three hours of teacher training. We used average teacher salaries (including benefits) in Washington State to compute the value of tutors' time. We assumed that tutoring costs are in addition to regular classroom instruction, for which the cost estimate reflects the sum of local, state, and federal dollars allocated per-student (averaged across Washington State school districts) for the 2008-09 school year. We estimated the uncertainty around the cost estimate at 20%. Source for dollars allocated per student from Washington's Office of Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	4	114	0.155	0.163	10	0.102	0.179	17	0.183	0.264

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Teacher professional development: Use of data to guide instruction

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: One form of teacher professional development (PD) involves training teachers how to use student academic assessment data to modify and improve instruction. This type of PD is usually paired with computer software that tracks and reports student assessment data to teachers. The specific types of assessments and software that have been evaluated and are included in this meta-analysis are (in no particular order) ISI (Individualized Student Instruction) using A2i software, Data-Driven District (3D), mCLASS/Acuity, Looking at Student Work, Formative Assessments of Student Thinking in Reading (FAST-R), and 4sight.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$3,423
Participants	$7,102
Others	$2,966
Indirect	$2
Total benefits	$13,493
Net program cost	($110)
Benefits minus cost	$13,383

Benefit to cost ratio	$122.55
Benefits minus costs	$13,383
Chance the program will produce benefits greater than the costs	98 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1]	Benefits to:				
	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$7,286	$3,309	$3,222	$0	$13,817
Health care associated with educational attainment	($55)	$200	($218)	$99	$27
Costs of higher education	($129)	($86)	($39)	($43)	($296)
Adjustment for deadweight cost of program	$0	$0	$0	($55)	($55)
Totals	$7,102	$3,423	$2,966	$2	$13,493

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

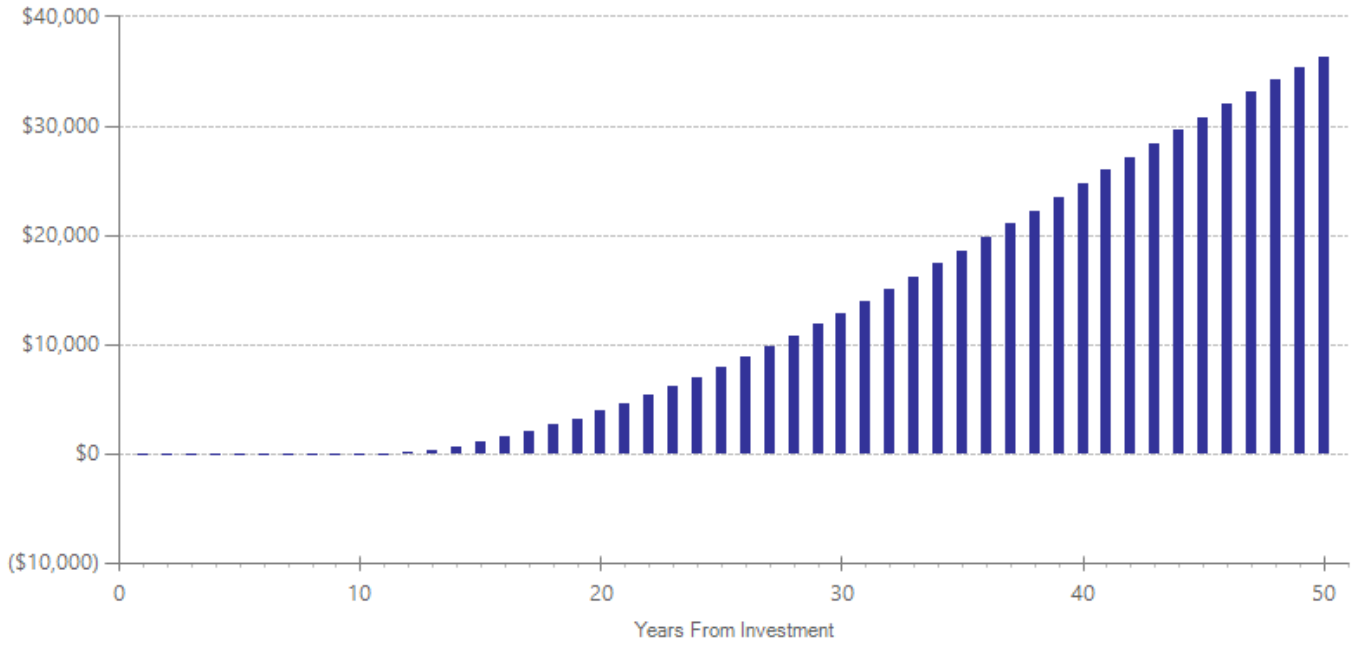
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$107	2013	Present value of net program costs (in 2016 dollars)	($110)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 26 hours of training in how to use student assessment data to guide instruction. We calculated the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divided compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs to account for the overhead (i.e. facility, computer, and administrative costs) associated with providing PD.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	10	10541	0.117	0.035	11	0.084	0.038	17	0.190	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Al Otaiba, S., Connor, C.M., Folsom, J.S., Greulich, L., Meadows, J., & Li, Z. (2011). Assessment data-informed guidance to individualize kindergarten reading instruction: Findings from a cluster-randomized control field trial. *The Elementary School Journal, 111*(4), 535-560.

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Tutoring: By certificated teachers, small-group, structured

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: The programs included in this analysis are structured, systematic approaches to tutoring small-groups of struggling students in grades K–6 in specific English language arts and/or mathematics skills. The evaluated programs include a variety of specific approaches and curricula such as (in no particular order) Read Aloud, Proactive Reading, Responsive Reading, Leveled Literacy, Spell Read, Corrective Reading, and Number Rockets. An average program provides about 40 hours of tutoring time to groups of two to six (usually three) early elementary students. Certificated teachers provide tutoring and receive about 35 hours of training with a focus on the specific content and strategies used in the programs.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$3,773
Participants	$7,822
Others	$3,273
Indirect	($655)
Total benefits	$14,213
Net program cost	($1,447)
Benefits minus cost	$12,767

Benefit to cost ratio	$9.82
Benefits minus costs	$12,767
Chance the program will produce benefits greater than the costs	96 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$8,021	$3,643	$3,556	$0	$15,220
Health care associated with educational attainment	($61)	$223	($242)	$111	$31
Costs of higher education	($138)	($92)	($41)	($46)	($317)
Adjustment for deadweight cost of program	$0	$0	$0	($720)	($720)
Totals	$7,822	$3,773	$3,273	($655)	$14,213

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

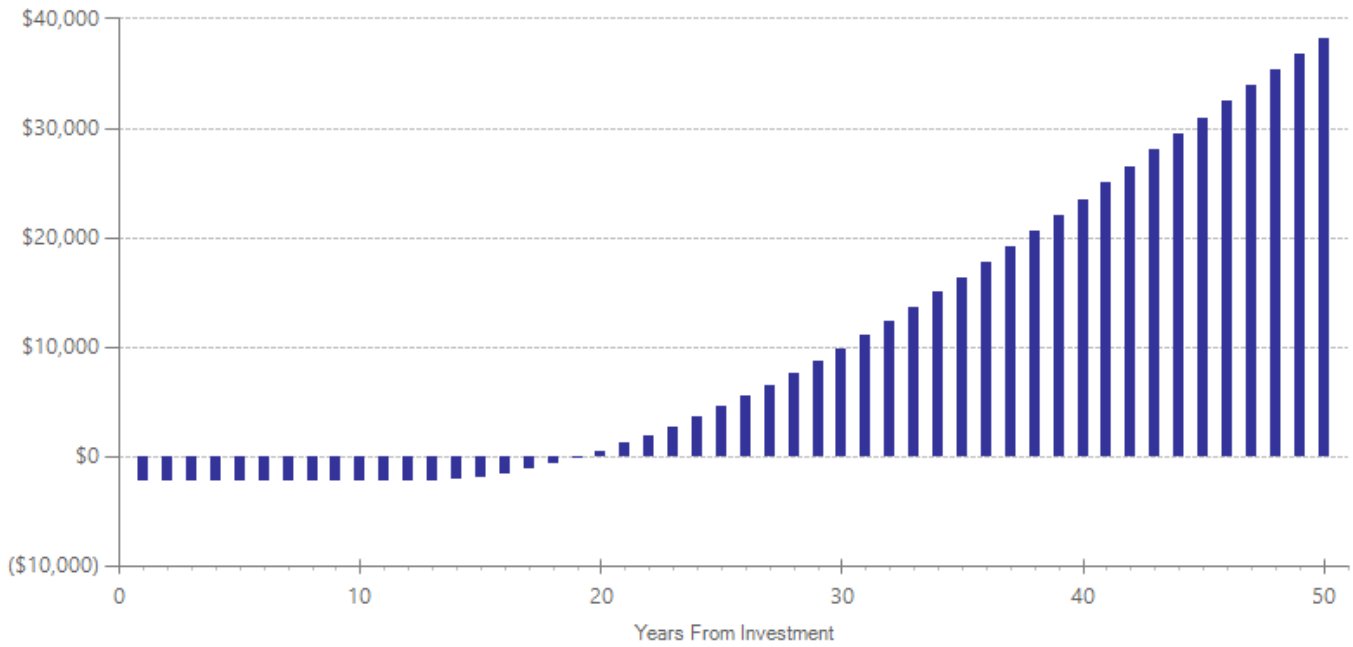
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$1,406	2013	Present value of net program costs (in 2016 dollars)	($1,447)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in this meta-analysis, a certificated teacher provides, on average, 40 hours of tutoring to nine students per year in groups of three and receives 35 hours of training. To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction, divided by the total number of students served.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	14	1649	0.209	0.039	7	0.098	0.043	17	0.254	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

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Citations Used in the Meta-Analysis

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Consultant teachers: Online coaching

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: Online coaching programs provide professional development support and feedback to classroom teachers in a web-based environment. The program included in this analysis (My Teaching Partner—Secondary) provides teachers with feedback and guidance on methods to improve their interactions with students. In the online coaching program, teachers upload video recordings of class sessions twice per month. Trained teacher consultants review the recordings and provide feedback to teachers online and over the phone.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$3,122
Participants	$6,489
Others	$2,727
Indirect	($50)
Total benefits	$12,288
Net program cost	($198)
Benefits minus cost	$12,090

Benefit to cost ratio	$61.94
Benefits minus costs	$12,090
Chance the program will produce benefits greater than the costs	92 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$6,659	$3,024	$2,959	$0	$12,642
Health care associated with educational attainment	($49)	$179	($195)	$90	$24
Costs of higher education	($121)	($80)	($36)	($40)	($278)
Adjustment for deadweight cost of program	$0	$0	$0	($100)	($100)
Totals	$6,489	$3,122	$2,727	($50)	$12,288

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

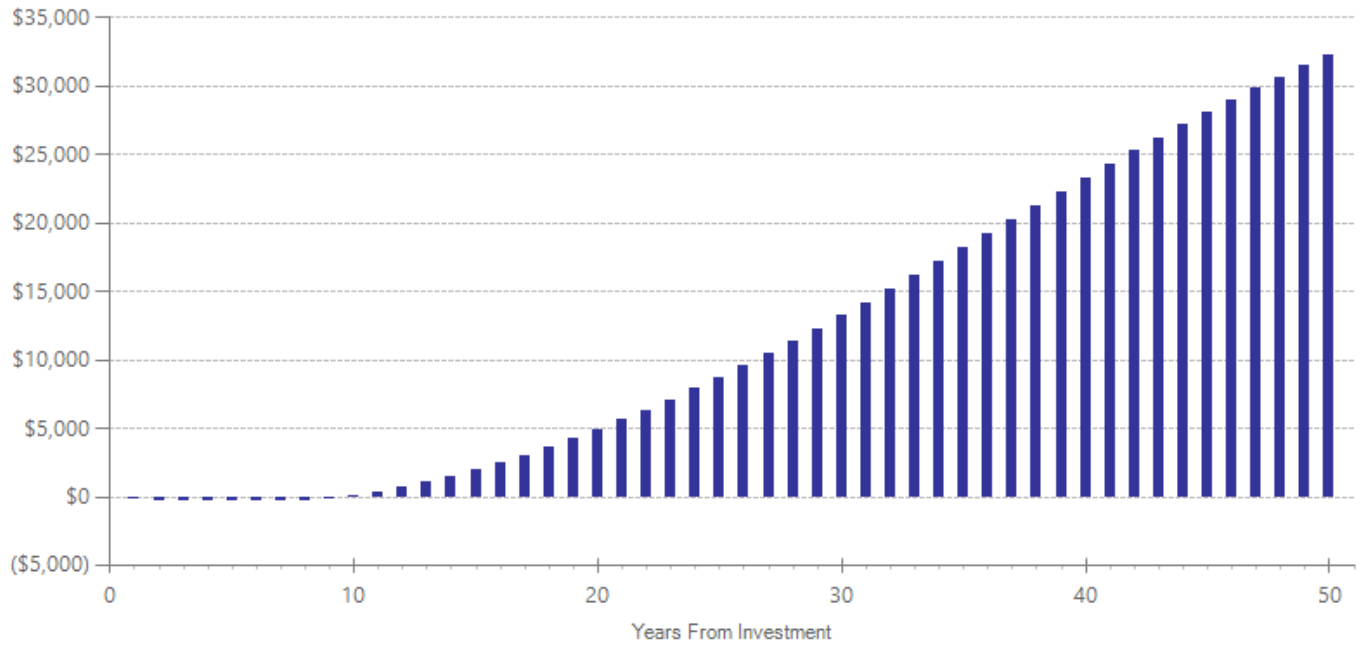
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$98	2013	Present value of net program costs (in 2016 dollars)	($198)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluation included this analysis, teachers participated in an average of 20 hours of training and coaching time. We calculated the value of staff time using average Washington State compensation costs (including benefits) for teachers as reported by the Office of the Superintendent of Public Instruction. We added additional costs reported in the evaluation to account for consultant time and video equipment. To calculate a per-student annual cost, we used the average number of students per classroom in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	2	1078	0.082	0.043	14	0.071	0.048	17	0.190	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Tutoring: By adults, one-on-one, structured

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: The programs included in this analysis are structured, systematic approaches to tutoring struggling students in specific English language arts and/or mathematics skills. They include a variety of specific programs and curricula such as (in no particular order) Reading Recovery, Mathematics Recovery, Edmark Reading Program, Howard Street Tutoring, and Early Intervention Program. The programs typically serve early elementary school students and provide, on average, about 30 hours of tutoring time to an individual student each year. Tutors are typically certificated teachers or specially trained adults (e.g. instructional aides and community volunteers). Tutors receive approximately ten hours of training per year with a focus on the specific content and general tutoring strategies.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$3,806
Participants	$7,887
Others	$3,289
Indirect	($1,115)
Total benefits	$13,866
Net program cost	($2,359)
Benefits minus cost	$11,508

Benefit to cost ratio	$5.88
Benefits minus costs	$11,508
Chance the program will produce benefits greater than the costs	94 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$8,090	$3,674	$3,577	$0	$15,341
Health care associated with educational attainment	($62)	$226	($245)	$113	$32
Costs of higher education	($142)	($94)	($42)	($47)	($325)
Adjustment for deadweight cost of program	$0	$0	$0	($1,181)	($1,181)
Totals	$7,887	$3,806	$3,289	($1,115)	$13,866

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

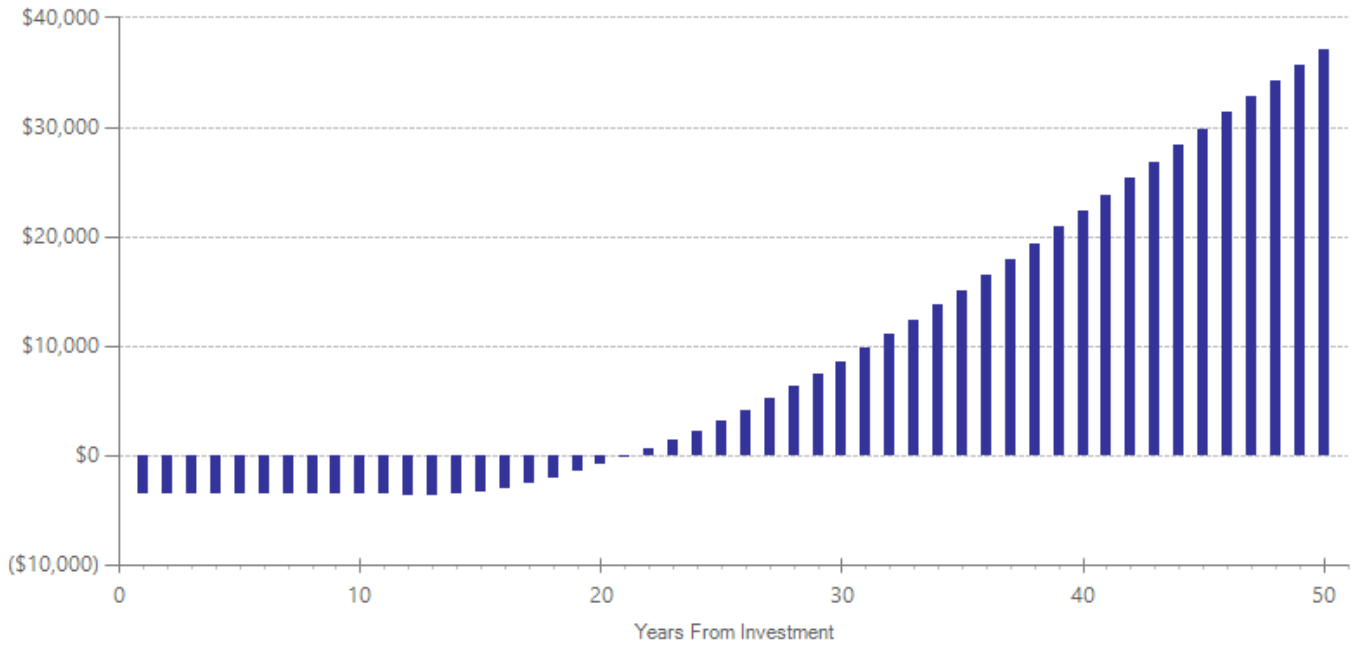
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$2,291	2013	Present value of net program costs (in 2016 dollars)	($2,359)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in the meta-analysis, the average structured one-on-one tutoring program provides 30 hours of intervention per student and ten hours of training time per tutor. The estimates assume that both certificated teachers and other adults (e.g. instructional aides) provide tutoring. To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for K–8 teachers and instructional aides as reported by the Office of the Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	23	2097	0.211	0.038	7	0.099	0.042	17	0.508	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Project Lead The Way (PLTW)

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated September 2014.

Program Description: Project Lead the Way (PLTW) is an example of project-based learning focused on science, technology, engineering, and mathematics (STEM) education. PLTW is a nonprofit organization that develops engineering courses for high schools and middle schools and biomedical sciences courses for high schools. The curriculum is delivered through an online "virtual academy." Computer software and classroom materials for hands-on activities, as well as required teacher training, are the main costs related to the program. We present the findings for math scores here.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$3,530
Participants	$7,331
Others	$3,084
Indirect	($842)
Total benefits	$13,104
Net program cost	($1,795)
Benefits minus cost	$11,309

Benefit to cost ratio	$7.30
Benefits minus costs	$11,309
Chance the program will produce benefits greater than the costs	82 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$7,526	$3,418	$3,349	$0	$14,292
Health care associated with educational attainment	($56)	$204	($223)	$103	$28
Costs of higher education	($138)	($92)	($41)	($46)	($318)
Adjustment for deadweight cost of program	$0	$0	$0	($898)	($898)
Totals	$7,331	$3,530	$3,084	($842)	$13,104

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

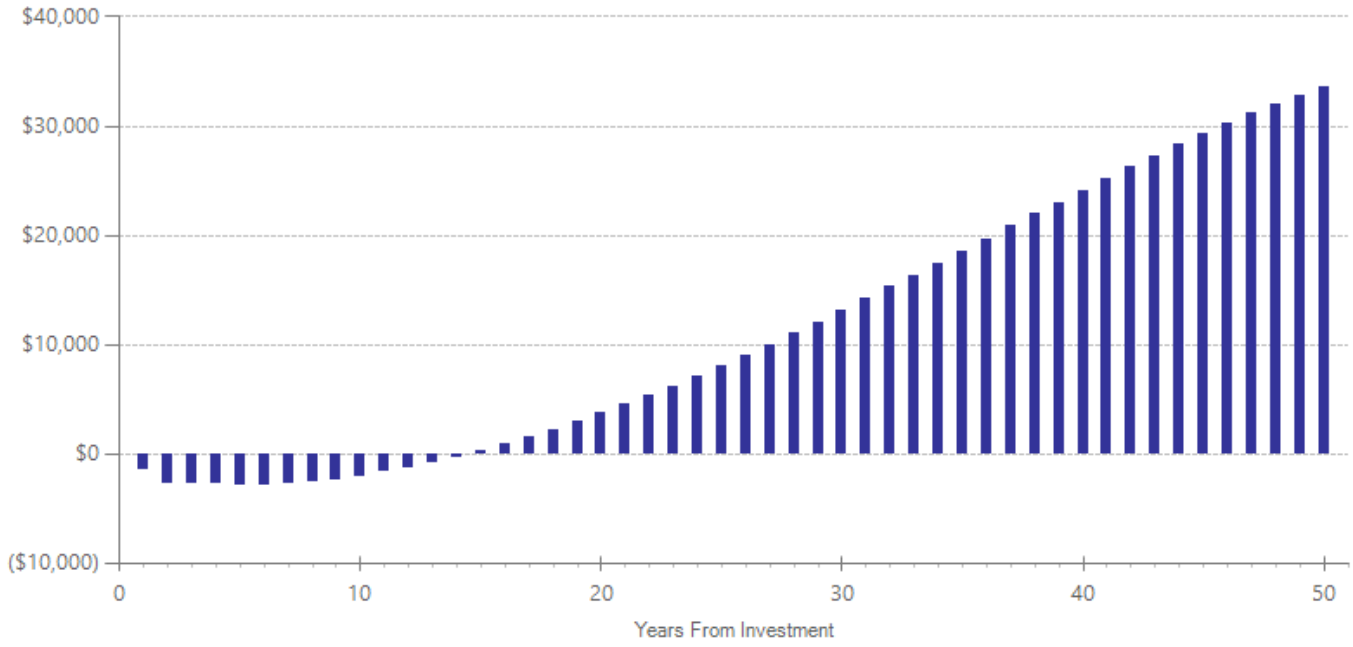
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$887	2013	Present value of net program costs (in 2016 dollars)	($1,795)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

The per-student cost estimate assumes that a participating school would offer four sections of PLTW per year with no more than 20 students per class. Students in the evaluated studies typically participated for two years. We calculate the value of teacher time to participate in training and teach courses using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. The estimate includes an annual participation fee, training costs, and supply costs for course set-up and consumable materials obtained from PLTW (https://www.pltw.org/get-involved/register-pltw/program-support/equipment-and-supplies).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	5	9319	0.084	0.060	16	0.081	0.066	17	0.084	0.160

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Consultant teachers: Content-Focused Coaching

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2018.

Program Description: Content-Focused Coaching is a professional development model that provides structured training to administrators, coaches, and teachers in order to improve instructional practices and student outcomes. The program provides training for school coaches and principals led by staff from the University of Pittsburgh's Institute for Learning. Coaches, in turn, provide professional development and one-on-one feedback to classroom teachers with a focus on specific reading comprehension strategies. The evaluation included in this analysis compared the effects of Content-Focused Coaching to coaching-as-usual.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$2,573
Participants	$5,340
Others	$2,234
Indirect	$13
Total benefits	$10,161
Net program cost	($59)
Benefits minus cost	$10,102

Benefit to cost ratio	$173.17
Benefits minus costs	$10,102
Chance the program will produce benefits greater than the costs	94 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$5,477	$2,487	$2,426	$0	$10,390
Health care associated with educational attainment	($41)	$150	($163)	$74	$20
Costs of higher education	($96)	($64)	($29)	($32)	($220)
Adjustment for deadweight cost of program	$0	$0	$0	($29)	($29)
Totals	$5,340	$2,573	$2,234	$13	$10,161

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

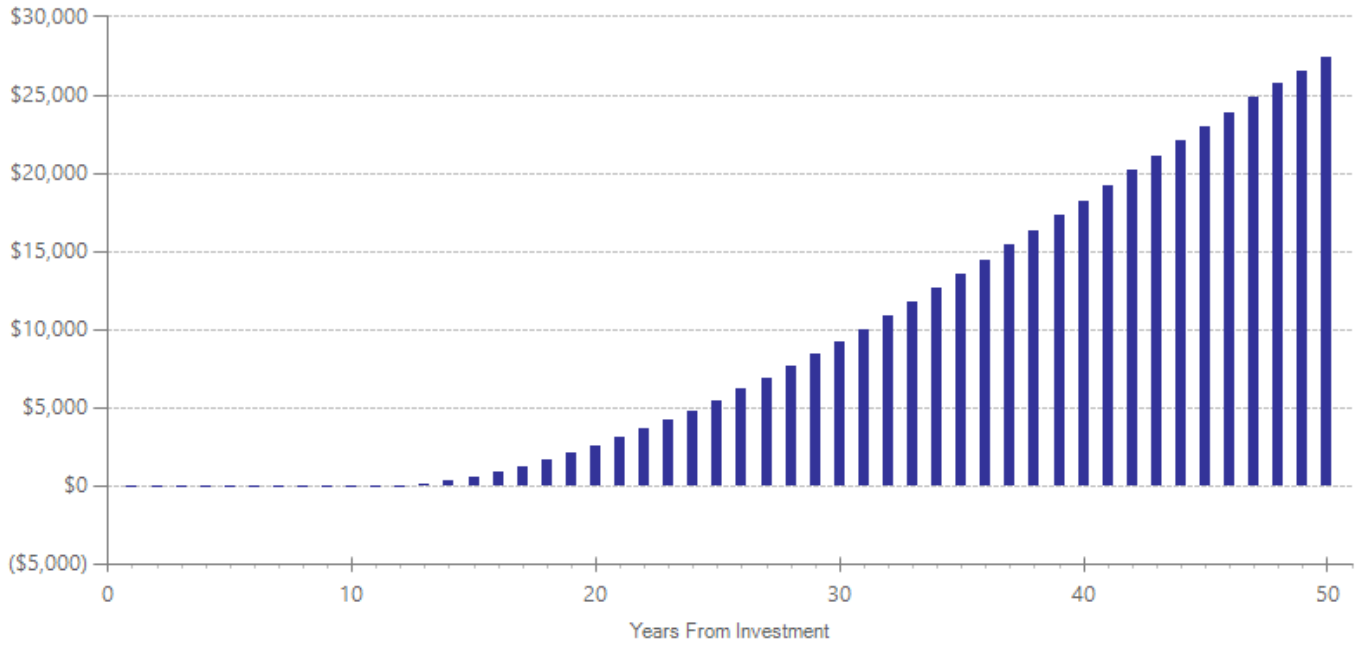
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$299	2013	Present value of net program costs (in 2016 dollars)	($59)
Comparison costs	$242	2013	Cost range (+ or -)	10 %

Content-Focused Coaching provides additional training time for principals, coaches, and teachers beyond the usual amount of time in other coaching programs. We calculated the cost of Content-Focused Coaching by adding this additional time to the WSIPP estimate for coaching-as-usual based on the framework described in Knight, D.S. (2012). Assessing the cost of instructional coaching. *Journal of Education Finance, 38*(1), 52-80. The estimate is based on one-full time coach per school at the average compensation cost (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction. In addition, the estimate includes costs related to administrator time, materials, professional development, and classroom teacher time to work with coaches. To calculate a per-student annual cost, we used the average number of students per school in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	1	1543	0.107	0.037	9	0.064	0.041	17	0.250	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Special literacy instruction for English language learner students

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated July 2014.

Program Description: English-based literacy programs in these evaluations involve a structured, direct instruction approach to teaching reading to English language learner (ELL) students. Some programs include multimedia components such as computer-based instruction. These programs are compared with literacy instruction-as-usual after about three years of schooling. Instruction is provided in a classroom setting during the regular school day.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$2,615
Participants	$5,365
Others	$2,171
Indirect	($102)
Total benefits	$10,049
Net program cost	($301)
Benefits minus cost	$9,748

Benefit to cost ratio	$33.42
Benefits minus costs	$9,748
Chance the program will produce benefits greater than the costs	80 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$5,539	$2,516	$2,459	$0	$10,514
Health care associated with educational attainment	($63)	$231	($251)	$115	$32
Costs of higher education	($112)	($132)	($36)	($66)	($346)
Adjustment for deadweight cost of program	$0	$0	$0	($151)	($151)
Totals	$5,365	$2,615	$2,171	($102)	$10,049

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

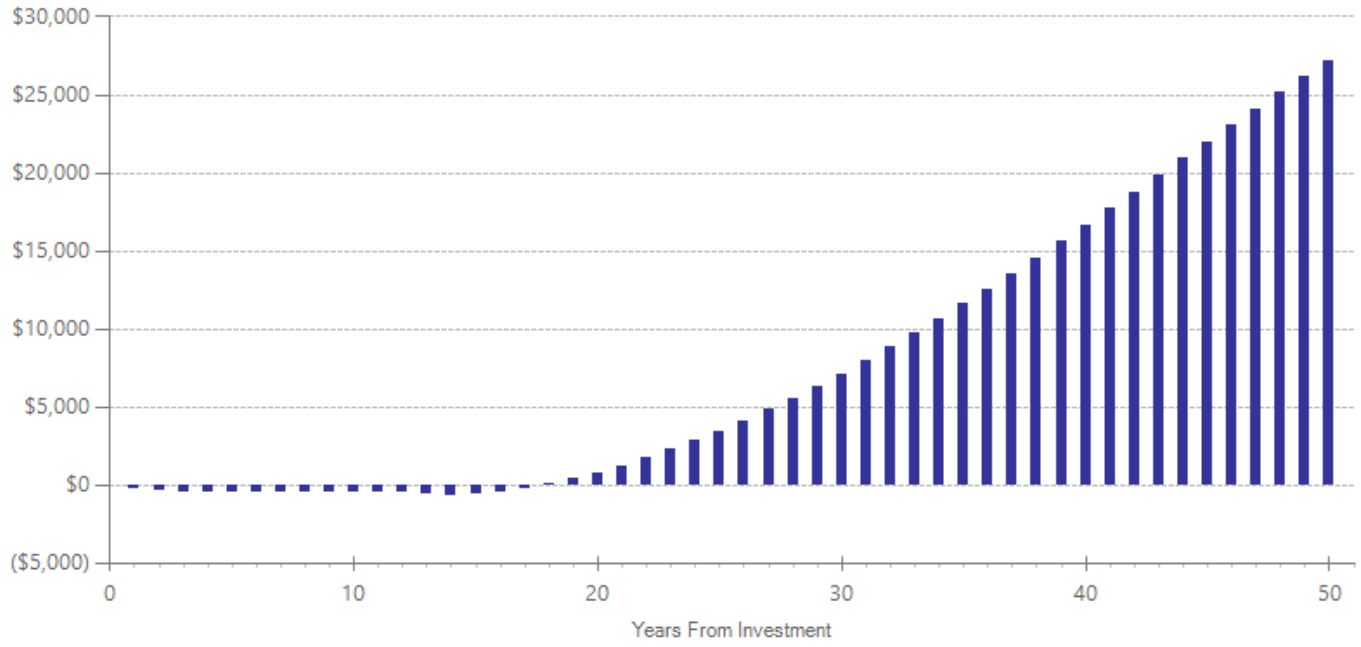
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$1,398	2009	Present value of net program costs (in 2016 dollars)	($301)
Comparison costs	$1,298	2009	Cost range (+ or -)	20 %

The per-participant cost estimate reflects the sum of local, state, and federal dollars allocated per student (averaged across Washington State school districts) for the 2008-09 school year. All students who qualify for the state Transitional Bilingual Instructional Program (TBIP) receive some form of services, so the comparison group's general instructional costs are the same as for the program group. Because specialized literacy programs may require supplemental materials and training, we added $100 to the cost estimate and estimated the uncertainty around the cost estimate at 20%. Source for dollars allocated per student come from Washington's Office of Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	6	423	0.148	0.069	7	0.070	0.076	17	0.306	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Tutoring: By non-certificated adults, small-group, structured

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: The programs included in this analysis are structured, systematic approaches to tutoring small-groups of struggling students in grades K–4 in specific English language arts and/or mathematics skills. The evaluated programs include a variety of specific programs and curricula such as (in no particular order) Quick Reads, Gottshall Early Reading Intervention, and Hot Math. The evaluated tutoring programs provide, on average, 22 hours of tutoring time to groups of two to six (usually three) early elementary students. Tutors are typically instructional aides or college student volunteers who receive 20 hours of training each year. Certificated teachers provide oversight and planning support.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$2,364
Participants	$4,902
Others	$2,046
Indirect	($235)
Total benefits	$9,078
Net program cost	($552)
Benefits minus cost	$8,525

Benefit to cost ratio	$16.44
Benefits minus costs	$8,525
Chance the program will produce benefits greater than the costs	78 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1]	Benefits to:				
	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$5,028	$2,283	$2,223	$0	$9,534
Health care associated with educational attainment	($38)	$139	($151)	$70	$20
Costs of higher education	($87)	($58)	($26)	($29)	($201)
Adjustment for deadweight cost of program	$0	$0	$0	($275)	($275)
Totals	$4,902	$2,364	$2,046	($235)	$9,078

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

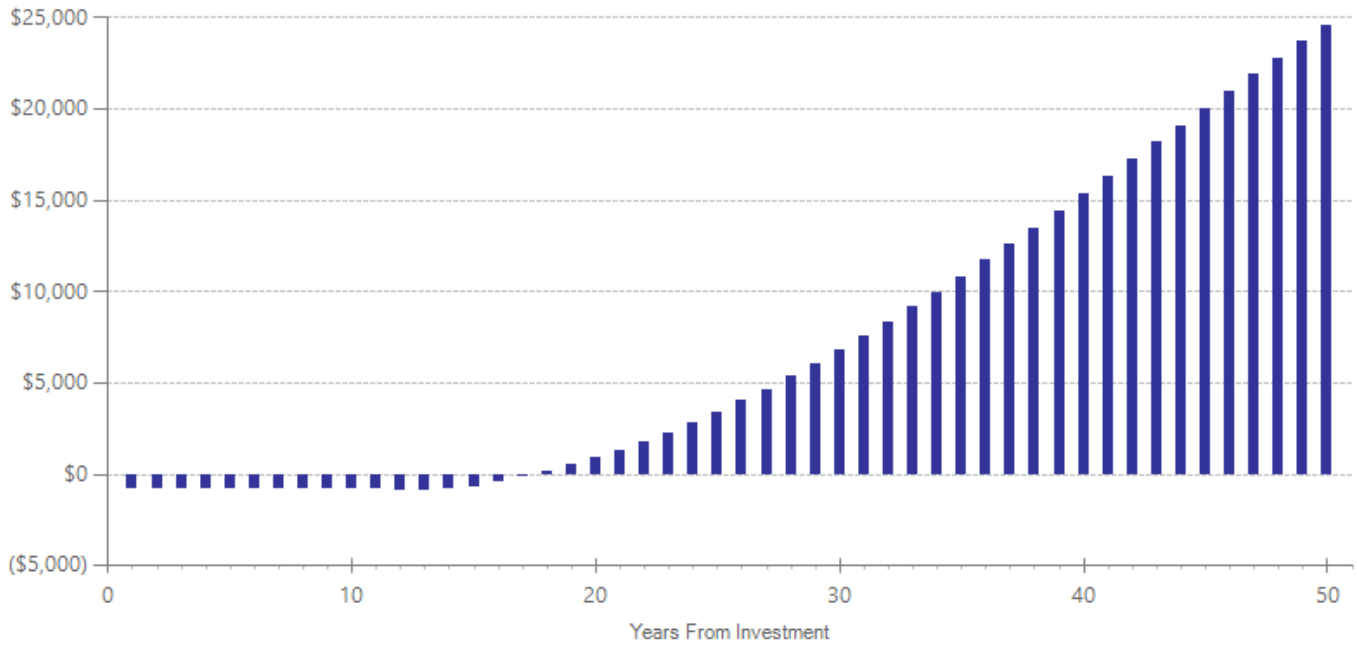
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$536	2013	Present value of net program costs (in 2016 dollars)	($552)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in this meta-analysis, a non-certificated adult (such as an instructional aide or college student) provides, on average, 22 hours of tutoring to six students per year in groups of three and receives 20 hours of training. A certificated teacher provides six hours of planning support and oversight per group. To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for K–8 teachers and instructional aides as reported by the Office of the Superintendent of Public Instruction, divided by the total number of students served.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	9	611	0.126	0.063	7	0.059	0.069	17	0.318	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Case, L.P., Speece, D.L., Silverman, R., Ritchey, K.D., Schatschneider, C., Cooper, D.H., . . . Jacobs, D. (2010). Validation of a supplemental reading intervention for first-grade children. *Journal of Learning Disabilities,* 43, 5.

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Teacher professional development: Targeted

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: Generally, professional development (PD) for K–12 teachers includes activities such as workshops, conferences, summer institutes, and time set aside during the school year for staff development. Targeted PD focuses on improving teaching in a particular content area (such as reading, math, and science) and/or a particular grade level. The specific types of PD evaluated and included in this meta-analysis are (in no particular order) Language Essentials for Teachers of Reading and Spelling (LETRS), Pacific Communities with High Performance in Literacy Development (Pacific CHILD), Cognitively Guided Instruction, Math & Science Partnerships (MSP), Teaching Science, Mathematics and Relevant Technologies (Teaching SMART), Discovery Model Schools Initiative, the Integrated Mathematics Assessment, Teaching Cases, and Metacognitive Analysis. Most forms of targeted PD include a summer institute in addition to training provided during the regular school year.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$2,121
Participants	$4,401
Others	$1,845
Indirect	($98)
Total benefits	$8,269
Net program cost	($268)
Benefits minus cost	$8,001

Benefit to cost ratio	$30.89
Benefits minus costs	$8,001
Chance the program will produce benefits greater than the costs	79 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1]	Benefits to:				
	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$4,514	$2,050	$2,004	$0	$8,569
Health care associated with educational attainment	($34)	$124	($135)	$62	$18
Costs of higher education	($80)	($53)	($24)	($27)	($184)
Adjustment for deadweight cost of program	$0	$0	$0	($134)	($134)
Totals	$4,401	$2,121	$1,845	($98)	$8,269

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

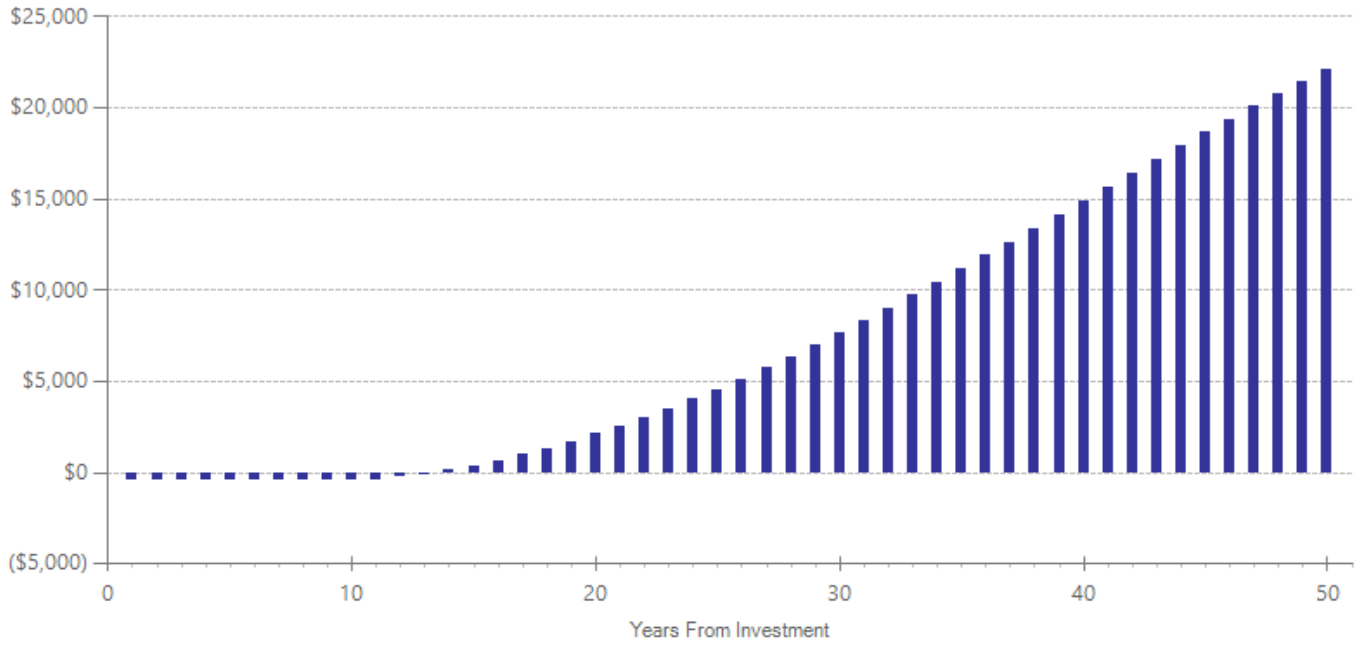
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$260	2013	Present value of net program costs (in 2016 dollars)	($268)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 63 additional hours of targeted professional development (PD) in comparison with the usual amount of PD time. We calculated the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divided compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs to account for the overhead (i.e. facility and administrative costs) associated with providing PD.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	14	11652	0.071	0.055	11	0.051	0.060	17	0.198	0.008

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Consultant teachers: Coaching

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: Coaching is a form of job-embedded professional development for teachers. Coaching programs (sometimes called literacy coaching, mathematics coaching, or instructional coaching) typically assign a full-time, trained teacher to an individual school to serve as a coach. Generally, coaches work directly with classroom teachers (usually one-on-one or in small groups) to help them improve their instructional strategies. Coaches observe teaching, provide individual feedback, engage in co-teaching sessions, model effective instructional practices, and provide professional development workshops. The studies in this analysis focused on providing coaching to teachers in 2nd-7th grades.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,632
Participants	$3,387
Others	$1,409
Indirect	($102)
Total benefits	$6,326
Net program cost	($259)
Benefits minus cost	$6,067

Benefit to cost ratio	$24.40
Benefits minus costs	$6,067
Chance the program will produce benefits greater than the costs	81 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$3,474	$1,578	$1,531	$0	$6,583
Health care associated with educational attainment	($26)	$95	($104)	$48	$13
Costs of higher education	($61)	($41)	($18)	($20)	($141)
Adjustment for deadweight cost of program	$0	$0	$0	($129)	($129)
Totals	$3,387	$1,632	$1,409	($102)	$6,326

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

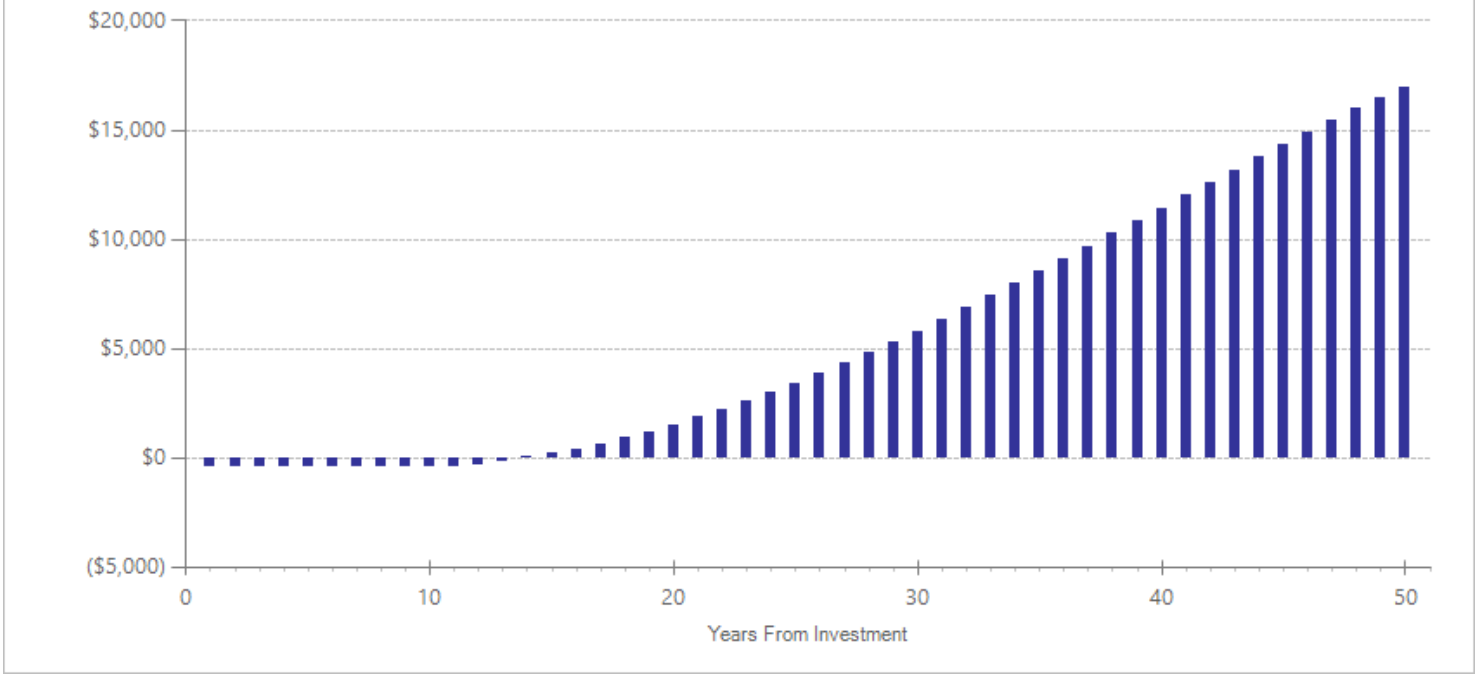
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$252	2013	Present value of net program costs (in 2016 dollars)	($259)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

The cost is a WSIPP estimate based on the framework described in Knight, D.S. (2012). Assessing the cost of instructional coaching. *Journal of Education Finance, 38*(1), 52-80. The estimate is based on one-full time coach per school at the average compensation cost (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction. In addition, the estimate includes costs related to administrator time, materials, professional development, and classroom teacher time to work with coaches. To calculate a per-student annual cost, we use the average number of students per school in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	11	12805	0.060	0.037	10	0.040	0.041	17	0.060	0.105

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Teacher professional development: Induction/mentoring

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: Teacher induction programs typically assign an experienced teacher-mentor to new teachers in the first and second year of their careers. In more intensive programs, additional support includes professional development opportunities and structured collaboration time with other teachers at the school. The evaluations included in the meta-analysis examine more-intensive programs compared to less-intensive programs.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,376	Benefit to cost ratio	$70.72
Participants	$2,854	Benefits minus costs	$5,337
Others	$1,199	Chance the program will produce	
Indirect	($15)	benefits greater than the costs	64 %
Total benefits	$5,414		
Net program cost	($77)		
Benefits minus cost	$5,337		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$2,927	$1,329	$1,302	$0	$5,559
Health care associated with educational attainment	($22)	$80	($88)	$40	$11
Costs of higher education	($51)	($34)	($15)	($17)	($118)
Adjustment for deadweight cost of program	$0	$0	$0	($38)	($38)
Totals	$2,854	$1,376	$1,199	($15)	$5,414

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

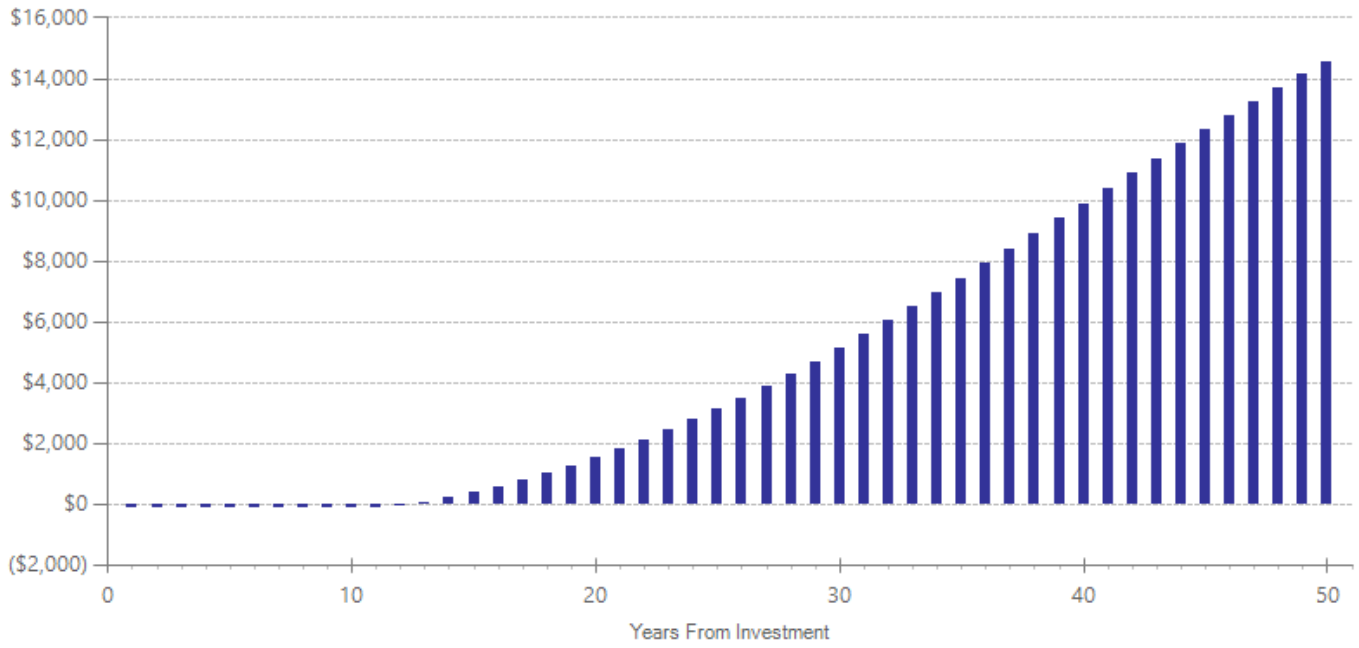
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$106	2013	Present value of net program costs (in 2016 dollars)	($77)
Comparison costs	$29	2009	Cost range (+ or -)	20 %

The cost estimate for the treatment group—receiving more intensive mentoring—is based on Washington State's per-first-year teacher allocation for the Beginning Educator Support Team (BEST) program in FY 2013. The cost estimate for the comparison group is the FY 2009 per-teacher allocation for the Teacher Assistance Program (TAP) in Washington State. Each of these estimates is divided by the number of students per classroom in Washington's prototypical schools formula.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	4	1623	0.046	0.082	11	0.033	0.090	17	0.046	0.572

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Per-pupil expenditures: 10% increase for one student cohort from kindergarten through grade 12

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated April 2012.

Program Description: In the 2011-12 school year, Washington State school districts spent an average of $9,739 per public school student (including state, federal, local, and other sources). This analysis estimates the benefits and costs for increasing per-pupil expenditures by 10% for one cohort of students starting in kindergarten and continuing those increased expenditures for 13 years (grades K through 12).

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$4,708
Participants	$8,423
Others	$3,042
Indirect	$0
Total benefits	$16,173
Net program cost	($11,044)
Benefits minus cost	$5,129

Benefit to cost ratio	$1.46
Benefits minus costs	$5,129
Chance the program will produce benefits greater than the costs	66 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1]	Benefits to:				
	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$26	$53	$0	$79
Labor market earnings associated with test scores	$8,631	$3,919	$3,818	$0	$16,368
Health care associated with educational attainment	($208)	$763	($829)	$0	($275)
Totals	$8,423	$4,708	$3,042	$0	$16,173

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

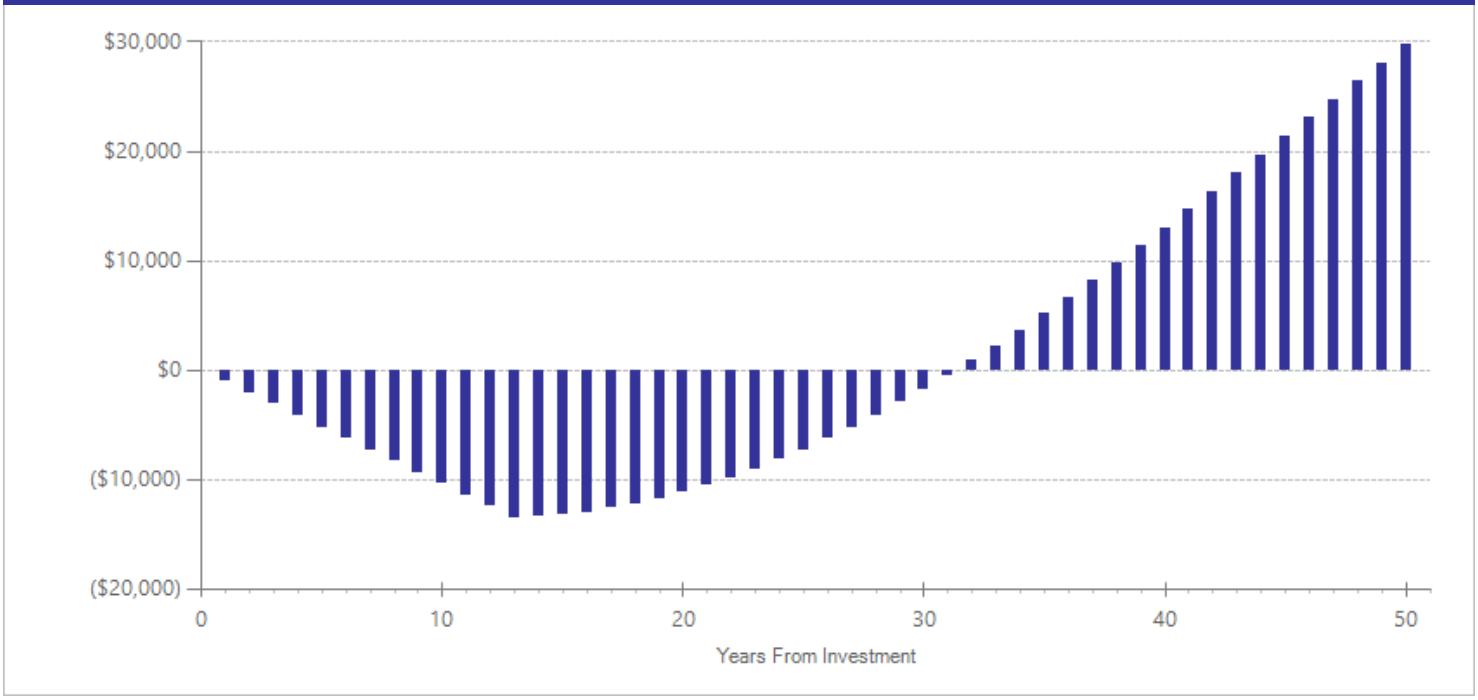
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$974	2011	Present value of net program costs (in 2016 dollars)	($11,044)
Comparison costs	$0	2011	Cost range (+ or -)	0 %

Office of Superintendent of Public Instruction (2013). Financial Reporting Summary, Washington State School Districts and Educational Service Districts, Fiscal Year 9/2011-8/2012. The estimated per-pupil annual cost equals 10% of the total per-pupil expenditures reported in Table 7. http://www.k12.wa.us/safs/PUB/FIN/1112/2011-12%20Financial%20Reporting%20Summary.pdf

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	40	1000	0.101	0.042	16	0.101	0.042	20	0.101	0.050
Test scores	40	1000	0.120	0.055	16	0.109	0.047	18	0.120	0.050

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

Per-pupil expenditures: 10% increase for one student cohort from kindergarten through grade 12

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Out-of-school-time tutoring by adults

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: The out-of-school time tutoring programs included in this analysis provide one-on-one or small-group tutoring support to struggling students in English language arts and/or mathematics outside of the regular school day (usually after school). The evaluated tutoring programs provide, on average, about 40 hours of tutoring time to students each year. Tutors are typically specially trained adults (e.g. instructional aides and community volunteers) and receive approximately 10 hours of training.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,644
Participants	$3,410
Others	$1,434
Indirect	($442)
Total benefits	$6,046
Net program cost	($945)
Benefits minus cost	$5,101

Benefit to cost ratio	$6.40
Benefits minus costs	$5,101
Chance the program will produce benefits greater than the costs	93 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$3,498	$1,588	$1,557	$0	$6,643
Health care associated with educational attainment	($26)	$96	($105)	$48	$13
Costs of higher education	($62)	($41)	($18)	($20)	($141)
Adjustment for deadweight cost of program	$0	$0	$0	($470)	($470)
Totals	$3,410	$1,644	$1,434	($442)	$6,046

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

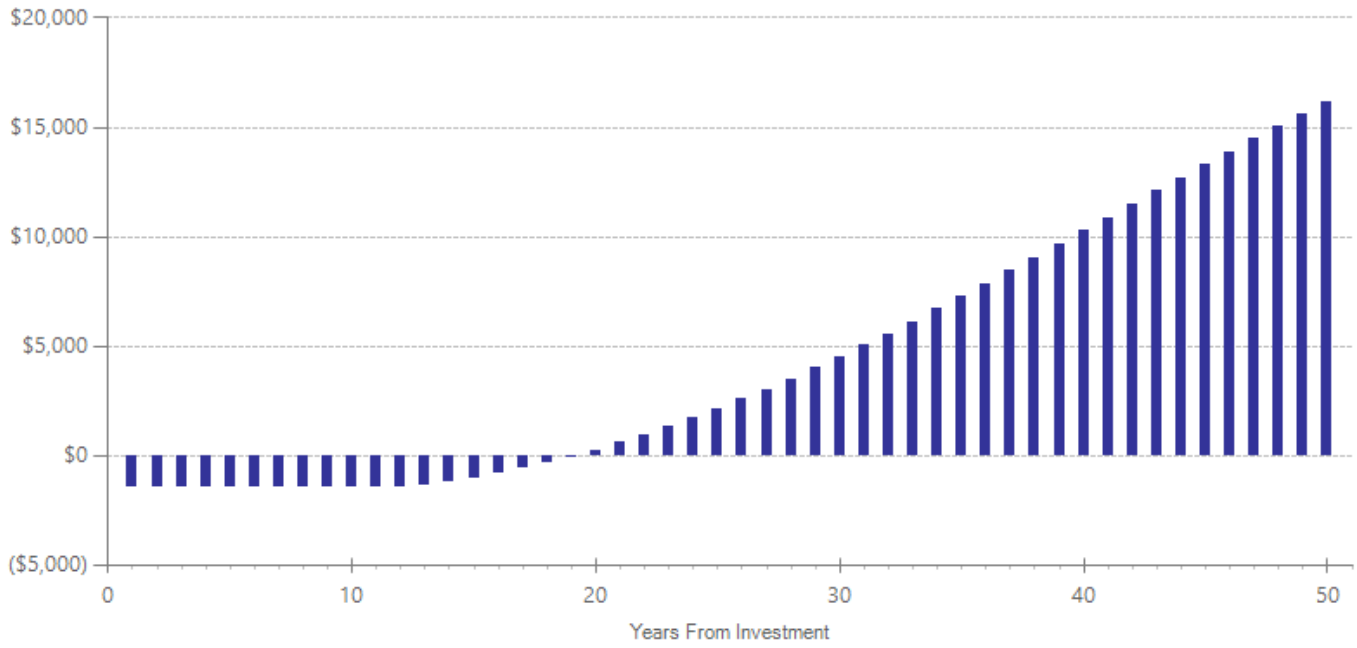
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$917	2013	Present value of net program costs (in 2016 dollars)	($945)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in the meta-analysis, the average after-school tutoring program provides 40 hours of intervention and ten hours of training. The cost estimate assumes that adult instructional aides or community volunteers provide tutoring to groups of two students. To calculate a per-student annual cost, we use average Washington State compensation costs (including benefits) for instructional aides as reported by the Office of the Superintendent of Public Instruction and add per-student materials, supplies, and operating costs to account for overhead (i.e. facility and administrative costs).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	6	6082	0.068	0.018	9	0.041	0.020	17	0.259	0.033

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

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Citations Used in the Meta-Analysis

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Summer learning programs: Academically focused

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: This analysis includes a variety of summer learning programs for students in grades K–8 in which academic improvement is the main goal, often with a focus on remediation and/or prevention of summer learning loss. The programs encompass a range of models and include both community- and school-provided programs. Some programs offer services beyond academic support, such as enrichment and recreation. Based on the studies in this analysis, a typical program lasts about six weeks. This analysis excludes programs that focus on other goals such as general youth development or job training and programs that combine summer learning programs with additional support during the school year.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,521
Participants	$3,157
Others	$1,324
Indirect	($559)
Total benefits	$5,443
Net program cost	($1,166)
Benefits minus cost	$4,277

Benefit to cost ratio	$4.67
Benefits minus costs	$4,277
Chance the program will produce benefits greater than the costs	86 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$3,238	$1,470	$1,438	$0	$6,147
Health care associated with educational attainment	($24)	$89	($97)	$44	$12
Costs of higher education	($57)	($38)	($17)	($19)	($131)
Adjustment for deadweight cost of program	$0	$0	$0	($585)	($585)
Totals	$3,157	$1,521	$1,324	($559)	$5,443

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

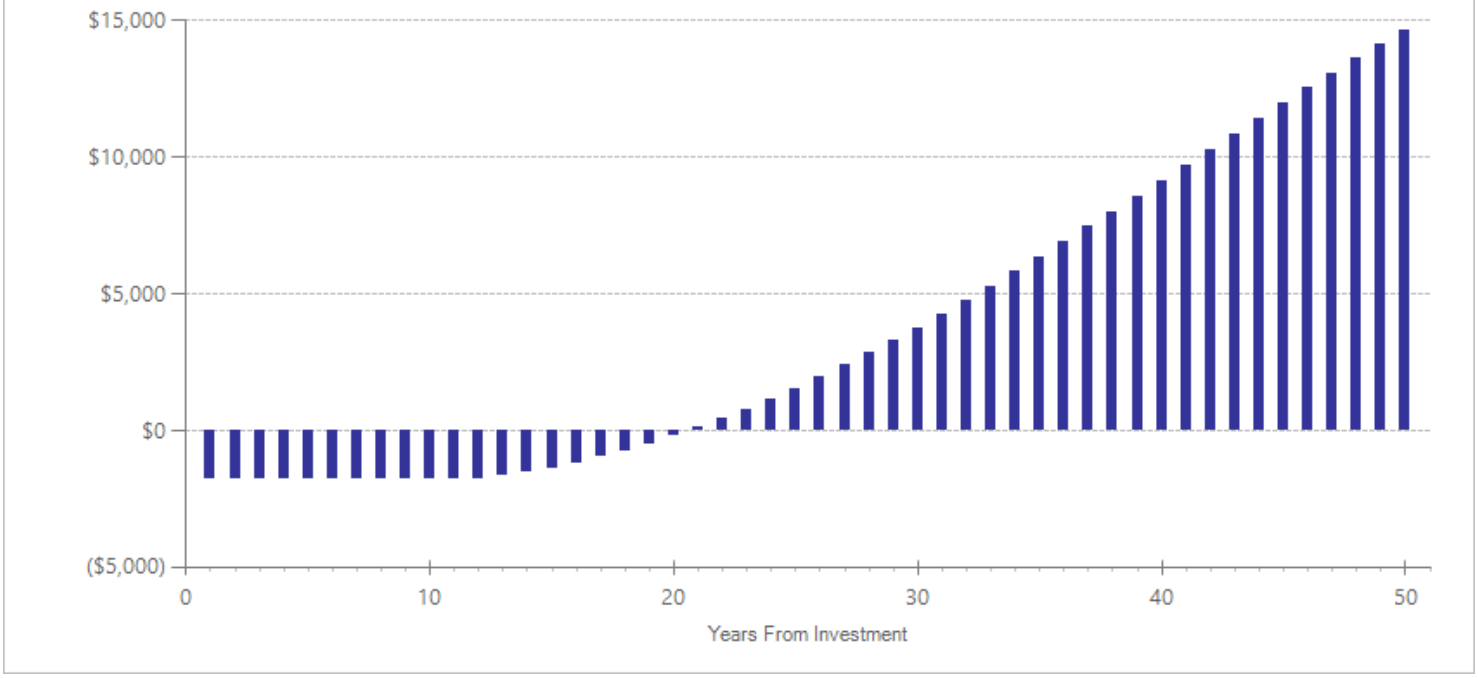
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$1,132	2013	Present value of net program costs (in 2016 dollars)	($1,166)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in this meta-analysis, the average summer program included 140 service hours and 40 hours of staff training/planning time. Teachers had, on average, 15 students in each class. To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for K–8 teachers as reported by the Office of the Superintendent of Public Instruction, divided by the average number of students per class in the evaluated programs. We include per-student annual materials, supplies, and operating costs. The cost estimate provided here does not account for meals or transportation.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	13	46259	0.064	0.020	9	0.038	0.022	17	0.064	0.002

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Growth mindset interventions

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated February 2018.

Program Description: This analysis evaluates psychological interventions that encourage students to believe that intelligence is malleable and can be changed with experience and learning. Growth mindset interventions teach students scientific facts about the brain's plasticity and the physiological nature of learning. The interventions aim to enhance students' persistence and prevent students from attributing setbacks to innate ability. Most students in this analysis were in grades four through nine. Students receive between two to eight lessons, each lasting about one hour. Lessons can be delivered by teachers, mentors, or through the use of internet software. Lessons occur during regular class periods.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$898
Participants	$1,865
Others	$783
Indirect	($5)
Total benefits	$3,541
Net program cost	($39)
Benefits minus cost	$3,501

Benefit to cost ratio	$90.33
Benefits minus costs	$3,501
Chance the program will produce benefits greater than the costs	58 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$1,915	$870	$850	$0	$3,635
Health care associated with educational attainment	($14)	$52	($57)	$26	$7
Costs of higher education	($36)	($24)	($11)	($12)	($82)
Adjustment for deadweight cost of program	$0	$0	$0	($20)	($20)
Totals	$1,865	$898	$783	($5)	$3,541

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

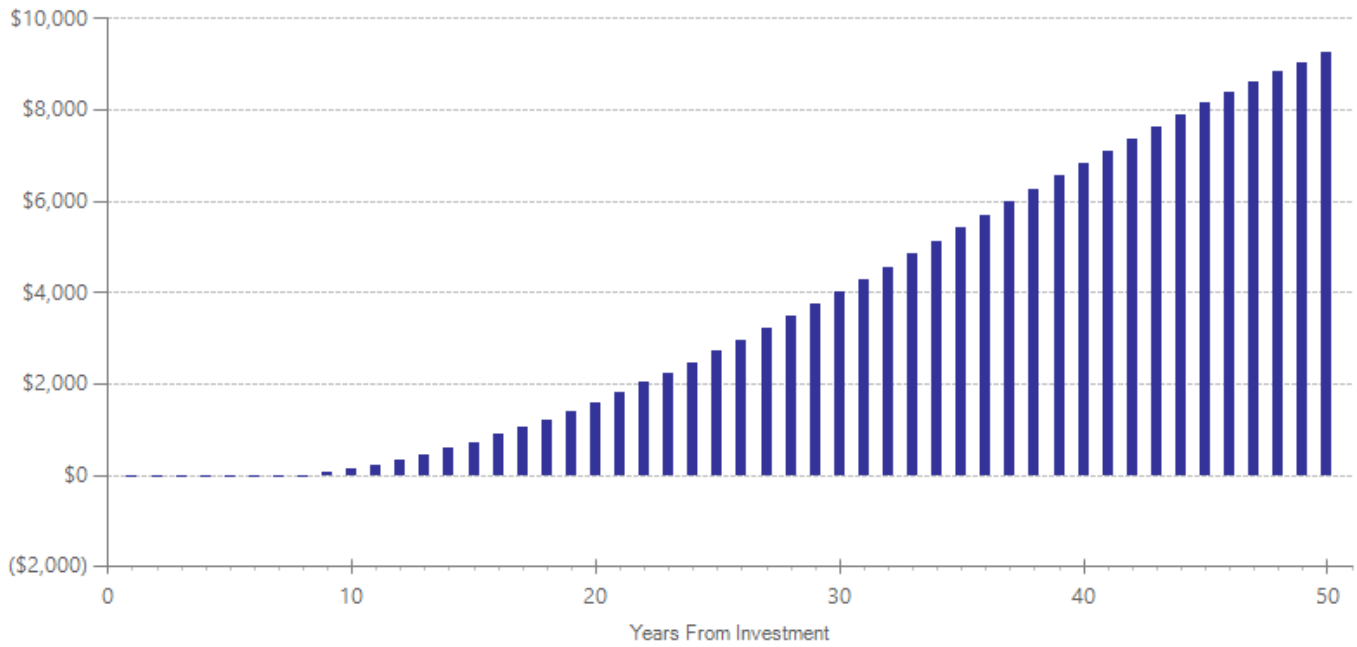
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$39	2016	Present value of net program costs (in 2016 dollars)	($39)
Comparison costs	$0	2016	Cost range (+ or -)	60 %

To estimate the annual per-participant program cost, we used the average Washington State compensation costs (including benefits) for certificated teachers. We retrieved teacher salary and benefits figures from the Office of Superintendent of Public Instruction (OSPI). We assume students receive five hourly lessons.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Grade point average^	4	2165	0.062	0.085	14	n/a	n/a	n/a	0.145	0.096
Test scores	3	266	0.032	0.098	14	0.019	0.108	17	0.057	0.679

^WSIPP’s benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Tutoring: Supplemental computer-assisted instruction for struggling readers

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2016.

Program Description: We included computer assisted instruction that was a supplement rather than a replacement for regular instruction. Studies that were focused exclusively on special education populations were excluded. Of the four studies that we included, three were evaluations of Fast ForWord and one was an evaluation of FLASH. On average, the reviewed programs required 4.03 hours of teacher time per student, and effects were reported after one school year.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,085
Participants	$2,247
Others	$937
Indirect	($256)
Total benefits	$4,012
Net program cost	($553)
Benefits minus cost	$3,460

Benefit to cost ratio	$7.26
Benefits minus costs	$3,460
Chance the program will produce benefits greater than the costs	58 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$2,307	$1,047	$1,019	$0	$4,374
Health care associated with educational attainment	($18)	$65	($70)	$32	$9
Costs of higher education	($42)	($28)	($12)	($14)	($95)
Adjustment for deadweight cost of program	$0	$0	$0	($275)	($275)
Totals	$2,247	$1,085	$937	($256)	$4,012

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

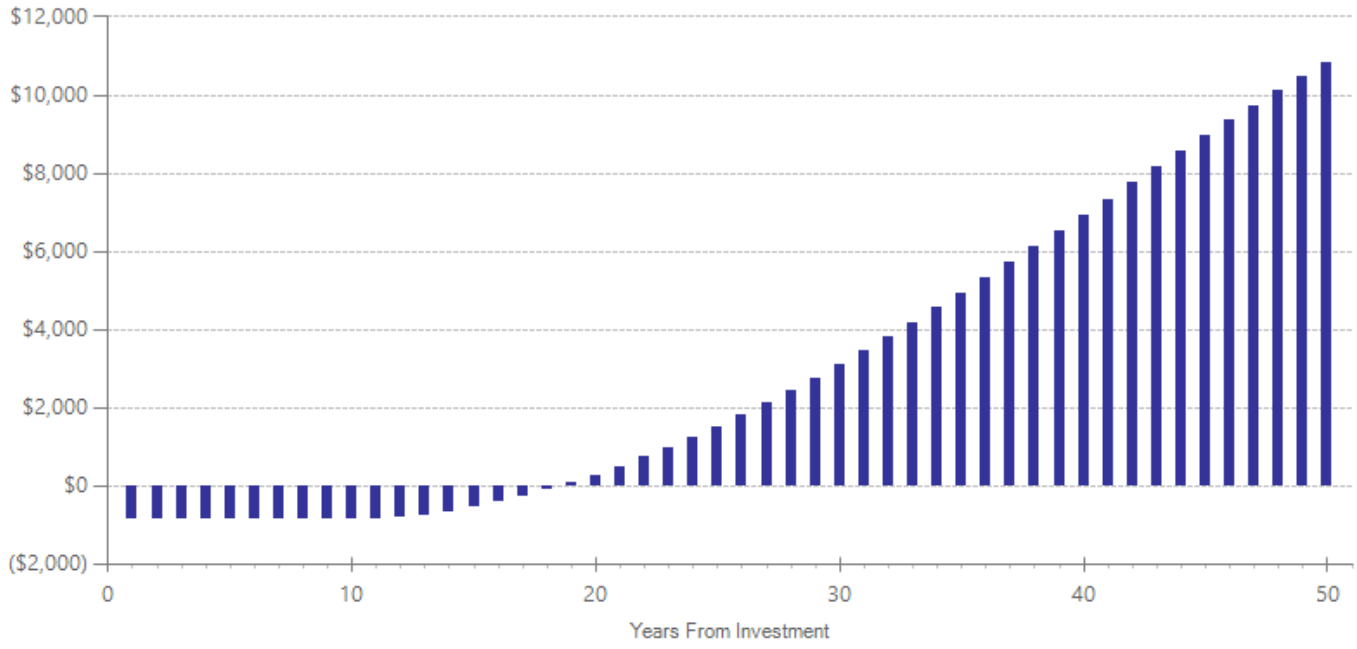
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$535	2013	Present value of net program costs (in 2016 dollars)	($553)
Comparison costs	$0	2013	Cost range (+ or -)	50 %

In this review, studies reported the effect of one year of the program. The cost of the supplemental computer assisted instruction can vary widely based on the number of students in each school using the program and the number of students using the program at one time. The interventions included in this review required an average of 4.03 hours of teacher time per student. The per student staff costs were calculated by multiplying the staff hours/student by the hour rate of a K-8 teacher in 2013 (https://www.k12.wa.us/safs/PUB/PER/1314/tbl34.pdf). We estimated that the per student licensing cost was $210 per student for a program like Fast ForWord in 2016 based on a school license of $21,000 assuming that 100 students in each school use the program (personal communication with Gayle Davies, Scientific Learning, March 30, 2016).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	4	326	0.047	0.089	9	0.028	0.098	17	0.136	0.317

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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National Board for Professional Teaching Standards (NBPTS) certification bonuses

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated April 2012.

Program Description: National Board for Professional Teaching Standards (NBPTS) certification is an advanced teaching credential that complements (and does not replace) state certification. Teachers earn NBPTS certification upon completion of a one to three year assessment process. Washington State provides a salary bonus to NBPTS-certified teachers.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$910
Participants	$1,889
Others	$790
Indirect	($41)
Total benefits	$3,549
Net program cost	($112)
Benefits minus cost	$3,436

Benefit to cost ratio	$31.61
Benefits minus costs	$3,436
Chance the program will produce benefits greater than the costs	100 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$1,939	$880	$858	$0	$3,677
Health care associated with educational attainment	($14)	$53	($58)	$26	$7
Costs of higher education	($35)	($23)	($10)	($11)	($80)
Adjustment for deadweight cost of program	$0	$0	$0	($56)	($56)
Totals	$1,889	$910	$790	($41)	$3,549

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

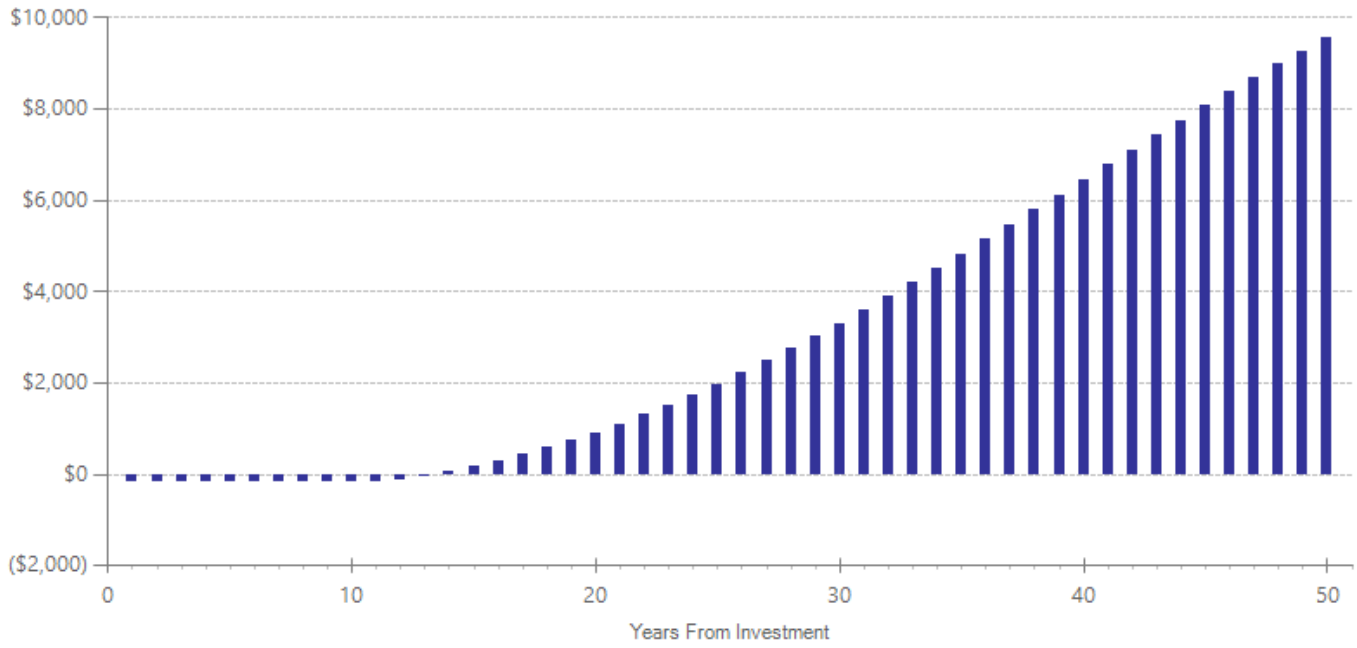
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$111	2015	Present value of net program costs (in 2016 dollars)	($112)
Comparison costs	$0	2015	Cost range (+ or -)	10 %

Washington State provided NBPTS-certified teachers with a $5,090 annual bonus in the 2014-15 school year. To calculate a per-student annual cost, we assumed teachers, across all K–12 grade levels, have an average of two classrooms with an average of 25 students per classroom. This cost estimate does not include the additional bonus provided to teachers who work in high-poverty schools or the private costs teachers incur when they apply for and participate in the certification process.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	14	387957	0.031	0.005	11	0.022	0.005	17	0.032	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Parents as tutors with teacher oversight

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: In "parents as tutors" programs, teachers meet with parents in person and maintain contact over the phone to train and encourage parents to engage in planned, structured academic activities with their children at home, usually in the form of one-on-one reading tutoring. This review does not include the impact on children's academic achievement from parent involvement in general; only school-based programs are included.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,149
Participants	$2,384
Others	$1,024
Indirect	($391)
Total benefits	$4,166
Net program cost	($818)
Benefits minus cost	$3,348

Benefit to cost ratio	$5.09
Benefits minus costs	$3,348
Chance the program will produce benefits greater than the costs	56 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$2,444	$1,110	$1,109	$0	$4,663
Health care associated with educational attainment	($18)	$67	($73)	$33	$9
Costs of higher education	($42)	($28)	($12)	($14)	($96)
Adjustment for deadweight cost of program	$0	$0	$0	($410)	($410)
Totals	$2,384	$1,149	$1,024	($391)	$4,166

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

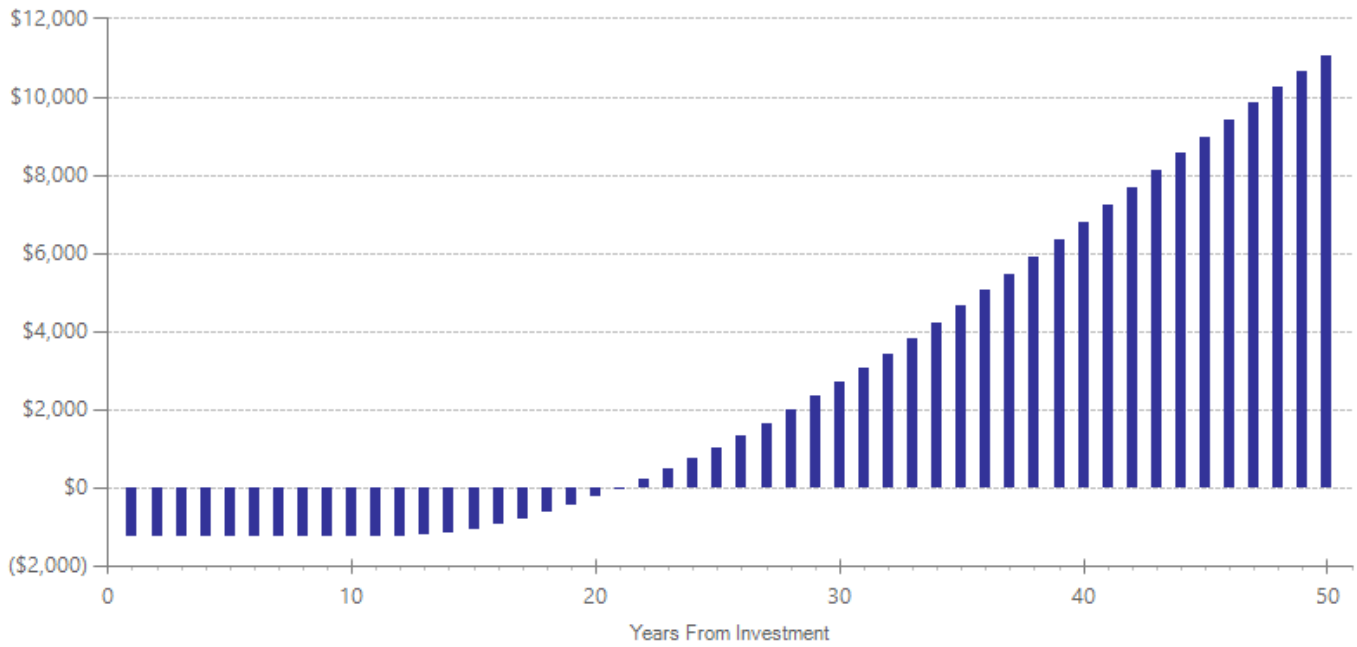
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$794	2013	Present value of net program costs (in 2016 dollars)	($818)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

To estimate costs, we assume that teachers spend an average of one-quarter hour per week to maintain contact with parents during the school year, based on the evaluations included in our analysis. We calculated the value of teacher time using average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	9	149	0.050	0.115	9	0.030	0.127	17	0.167	0.149

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Becoming a Man (BAM)

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated April 2018.

Program Description: Becoming a Man (BAM) is a high school behavioral program that provides a non-academic intervention to disadvantaged and at-risk males through exposure to prosocial adults and skills training based on cognitive behavioral therapy. The program focuses on teaching character and social-emotional skills including considering another person's perspective, evaluating consequences ahead of time, and reducing automatic decision-making. Participants in this analysis attended weekly one-hour group sessions during the school day over the course of one academic school year.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,637	Benefit to cost ratio	$2.62
Participants	$1,601	Benefits minus costs	$3,272
Others	$2,648	Chance the program will produce benefits greater than the costs	79 %
Indirect	($592)		
Total benefits	$5,295		
Net program cost	($2,023)		
Benefits minus cost	$3,272		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$771	$2,083	$385	$3,240
Labor market earnings associated with high school graduation	$1,753	$796	$804	$0	$3,353
Health care associated with educational attainment	($52)	$189	($206)	$95	$25
Costs of higher education	($100)	($119)	($33)	($59)	($312)
Adjustment for deadweight cost of program	$0	$0	$0	($1,012)	($1,012)
Totals	$1,601	$1,637	$2,648	($592)	$5,295

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

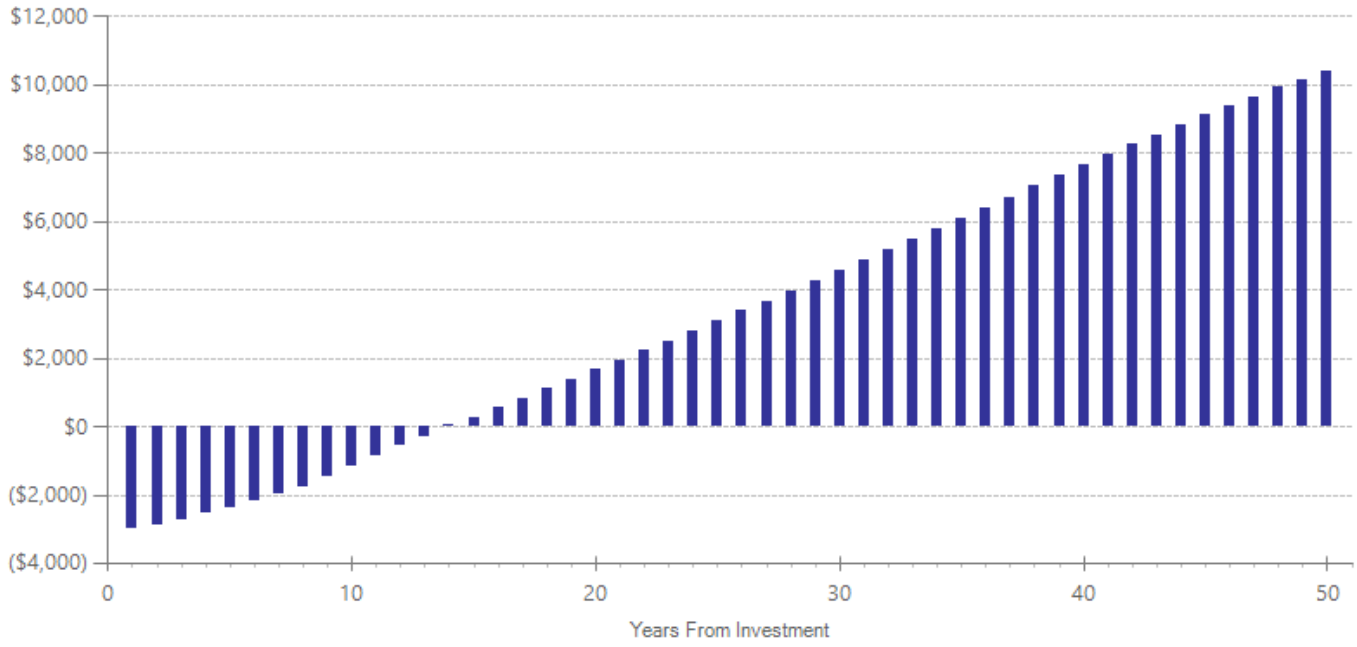
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$2,000	2015	Present value of net program costs (in 2016 dollars)	($2,023)
Comparison costs	$0	2015	Cost range (+ or -)	10 %

We used a per-participant program cost reported in Heller et al. (2015). Thinking, fast and slow: Some field experiments to reduce crime and dropout in Chicago (NBER Working Paper 21178). Cambridge, MA: National Bureau of Economic Research.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Crime	1	1016	-0.072	0.044	14	-0.072	0.044	24	-0.072	0.100
Grade point average^	1	1016	-0.005	0.044	14	n/a	n/a	n/a	-0.005	0.913
School attendance^	1	1016	0.010	0.044	14	n/a	n/a	n/a	0.010	0.815

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Heller, S.B., Shah, A.K., Guryan, J., Ludwig, J., Mullainathan, S., & Pollack, H.A. (2015). *Thinking, fast and slow?: Some field experiments to reduce crime and dropout in Chicago* (NBER Working Paper 21178). Cambridge, MA: National Bureau of Economic Research.

Teacher performance pay programs

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated October 2015.

Program Description: Teacher performance pay programs distribute bonuses to individual teachers and sometimes to school wide staff. Performance is usually measured as value-added student test scores alone or in combination with some other assessment (such as principal evaluations). These evaluations examine the impact on student test scores from short-term, pilot performance pay programs.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$605
Participants	$1,255
Others	$527
Indirect	($8)
Total benefits	$2,379
Net program cost	($36)
Benefits minus cost	$2,342

Benefit to cost ratio	$65.55
Benefits minus costs	$2,342
Chance the program will produce benefits greater than the costs	88 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$1,288	$585	$572	$0	$2,445
Health care associated with educational attainment	($10)	$35	($38)	$18	$5
Costs of higher education	($23)	($15)	($7)	($8)	($53)
Adjustment for deadweight cost of program	$0	$0	$0	($18)	($18)
Totals	$1,255	$605	$527	($8)	$2,379

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

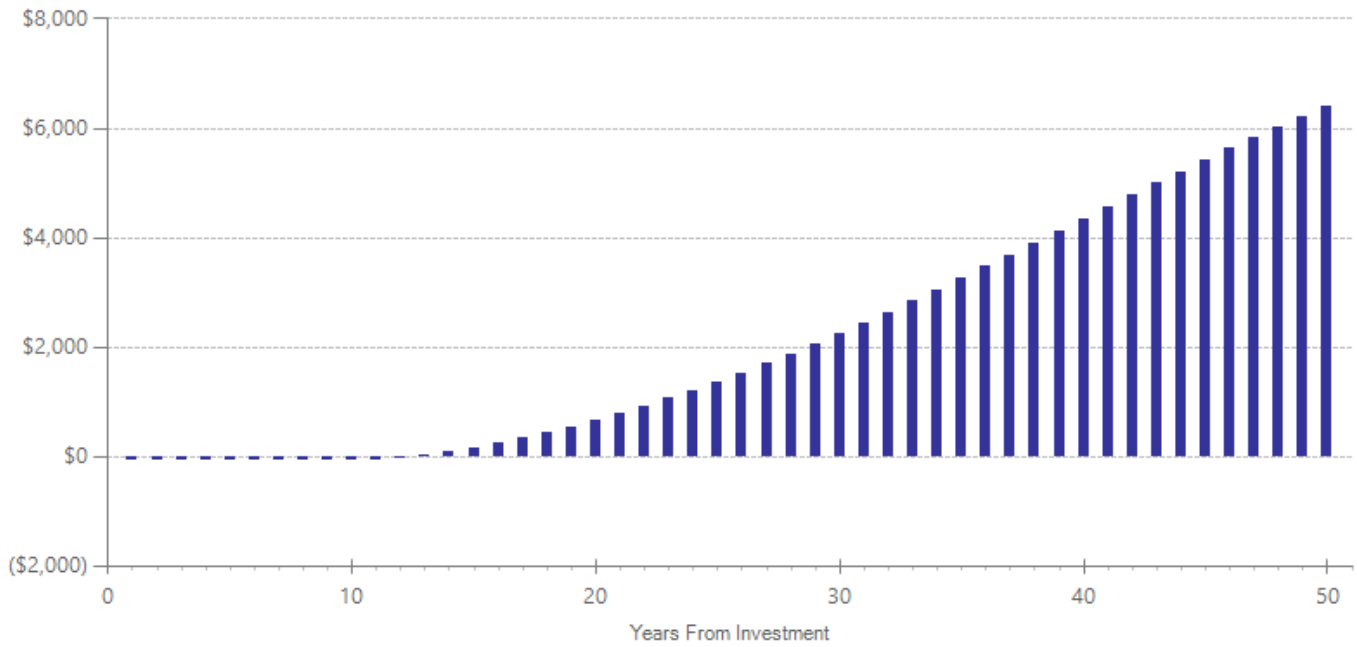
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$33	2010	Present value of net program costs (in 2016 dollars)	($36)
Comparison costs	$0	2010	Cost range (+ or -)	20 %

The performance bonuses in the evaluated programs ranged from a minimum of $1,500 to a maximum of $15,000; in over half of the programs, the maximum award was $3,000. For this estimate, we use the median bonus of approximately $2,500 per teacher (including administrative costs), spread across 25 students.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	28	652322	0.019	0.011	12	0.015	0.013	17	0.019	0.095

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Dee, T.S., & Keys, B.J. (2004). Does merit pay reward good teachers? Evidence from a randomized experiment. *Journal of Policy Analysis and Management, 23*(3), 471-488.

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Tutoring: By adults, one-on-one, non-structured

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: The tutoring programs included in this analysis provide one-on-one assistance to struggling students in English language arts and/or mathematics. The evaluated programs typically allow tutors to exercise their own discretion when selecting and implementing tutoring strategies. The programs typically serve early elementary school students and provide, on average, about 30 hours of tutoring time to an individual student each year. The tutors are non-certificated adults (e.g. instructional aides and community volunteers) who receive approximately two hours of training per year.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$1,116
Participants	$2,313
Others	$973
Indirect	($717)
Total benefits	$3,685
Net program cost	($1,468)
Benefits minus cost	$2,216

Benefit to cost ratio	$2.51
Benefits minus costs	$2,216
Chance the program will produce benefits greater than the costs	71 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$2,372	$1,077	$1,057	$0	$4,506
Health care associated with educational attainment	($18)	$66	($72)	$33	$9
Costs of higher education	($41)	($27)	($12)	($14)	($94)
Adjustment for deadweight cost of program	$0	$0	$0	($736)	($736)
Totals	$2,313	$1,116	$973	($717)	$3,685

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

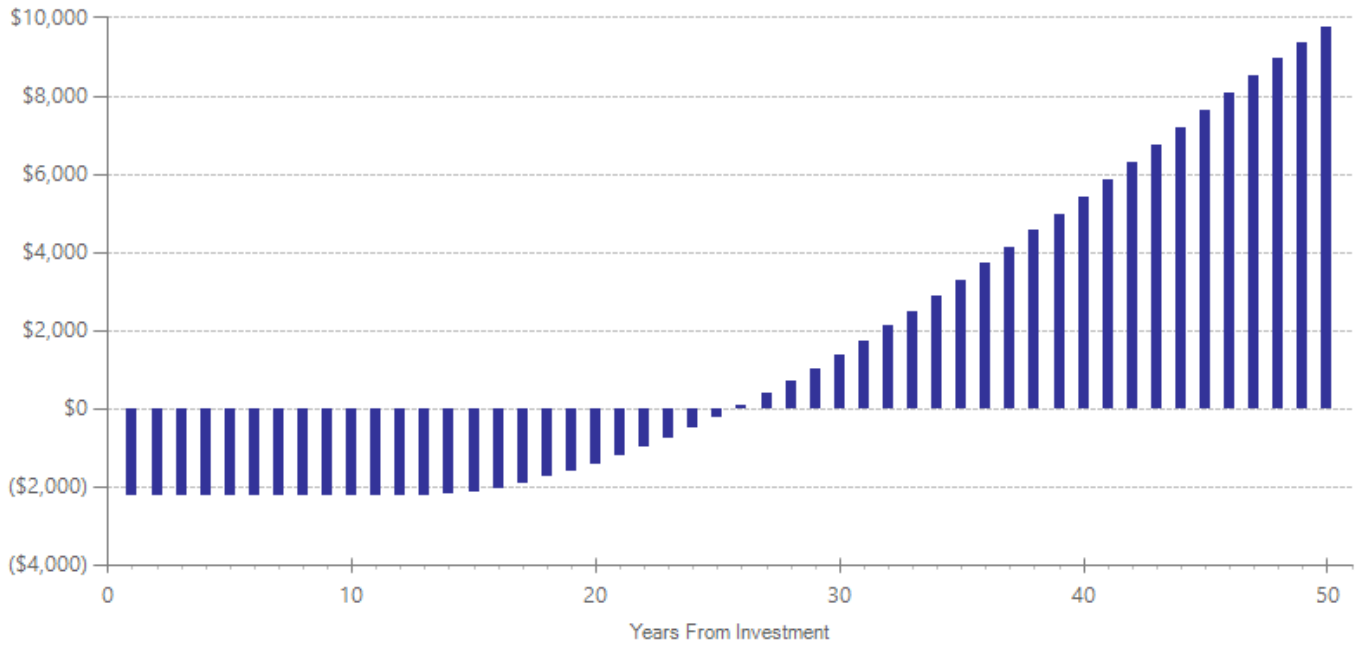
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$1,425	2013	Present value of net program costs (in 2016 dollars)	($1,468)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in the meta-analysis, the average non-structured one-on-one tutoring program provides 30 hours of intervention per student and two hours of training time per tutor. The estimate assumed that certificated teachers provide approximately four hours of planning support and oversight. To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for a K–8 teacher and instructional aides as reported by the Office of the Superintendent of Public Instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



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Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	12	6253	0.061	0.018	7	0.029	0.020	17	0.062	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Teacher professional development: Online, targeted

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: Generally, professional development (PD) for K–12 teachers includes activities such as workshops, conferences, summer institutes, and time set aside during the school year for staff development. Online, targeted PD provides online training and collaboration with a focus on improving teaching in a particular content area (such as reading, math, or science) and/or a particular grade level.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$615
Participants	$1,276
Others	$538
Indirect	($140)
Total benefits	$2,290
Net program cost	($300)
Benefits minus cost	$1,990

Benefit to cost ratio	$7.64
Benefits minus costs	$1,990
Chance the program will produce benefits greater than the costs	61 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$1,308	$594	$584	$0	$2,486
Health care associated with educational attainment	($10)	$36	($39)	$18	$5
Costs of higher education	($23)	($15)	($7)	($8)	($52)
Adjustment for deadweight cost of program	$0	$0	$0	($150)	($150)
Totals	$1,276	$615	$538	($140)	$2,290

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

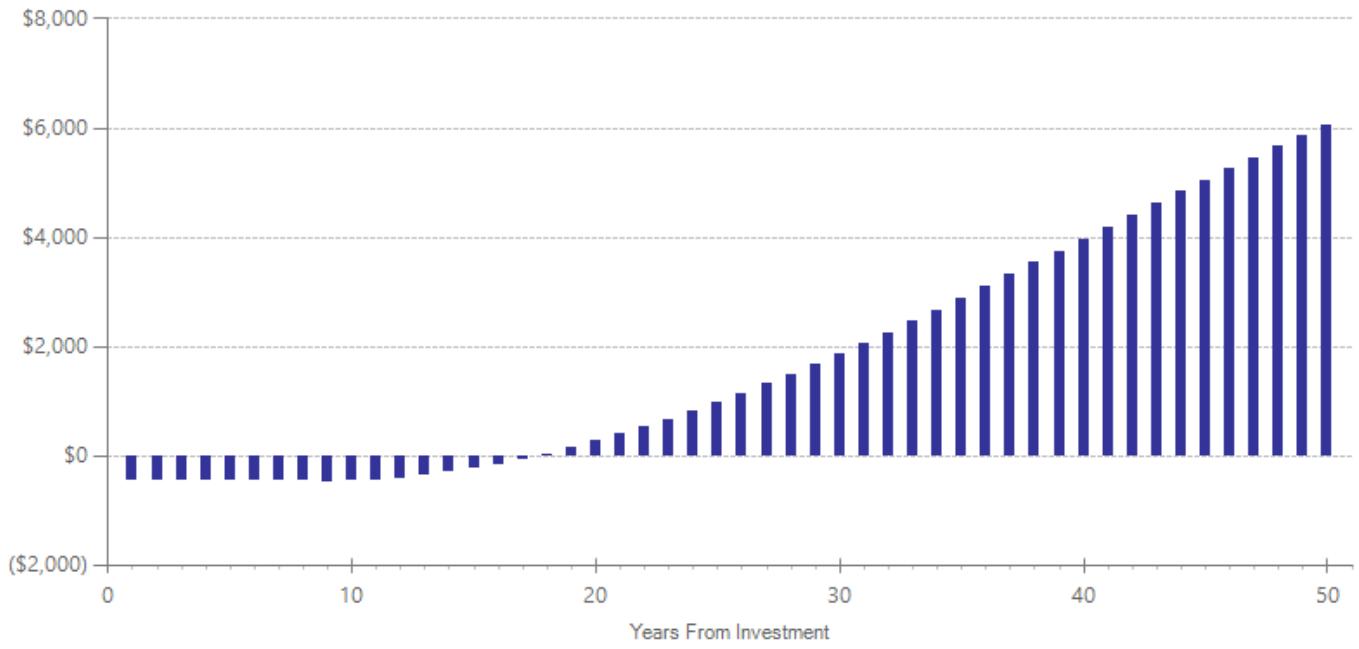
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$291	2013	Present value of net program costs (in 2016 dollars)	($300)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 70 additional hours of targeted online professional development (PD) in comparison with the usual amount of PD time. We calculated the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divided compensation costs by the number of students per classroom in Washington's prototypical schools formula and added per-student materials, supplies, and operating costs to account for the overhead (i.e. computer and administrative costs) associated with providing PD.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	3	2245	0.020	0.037	11	0.014	0.041	17	0.143	0.002

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Dash, S., de, Kramer, R.M., O'Dwyer, L.M., Masters, J., & Russell, M. (2012). Impact of online professional development on teacher quality and student achievement in fifth grade mathematics. *Journal of Research on Technology in Education, 45*(1), 1-26.

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Summer book programs: One-year intervention

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: The summer book programs included in this analysis provide free books to elementary school students. Generally, the goal of summer book programs is to increase print exposure, the number of books at home, and voluntary reading time. Books are matched to each student's reading level and area of interest and are mailed to students weekly over the summer break. The mailing includes a form for the student to complete after finishing the book. This analysis includes school-based programs only and does not include bookmobiles or public library programs. The studies included in this analysis measure the program's impact after one summer.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$494
Participants	$1,024
Others	$424
Indirect	($31)
Total benefits	$1,910
Net program cost	($79)
Benefits minus cost	$1,831

Benefit to cost ratio	$24.08
Benefits minus costs	$1,831
Chance the program will produce benefits greater than the costs	56 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$1,050	$477	$461	$0	$1,988
Health care associated with educational attainment	($8)	$29	($31)	$15	$5
Costs of higher education	($18)	($12)	($6)	($7)	($43)
Adjustment for deadweight cost of program	$0	$0	$0	($40)	($40)
Totals	$1,024	$494	$424	($31)	$1,910

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

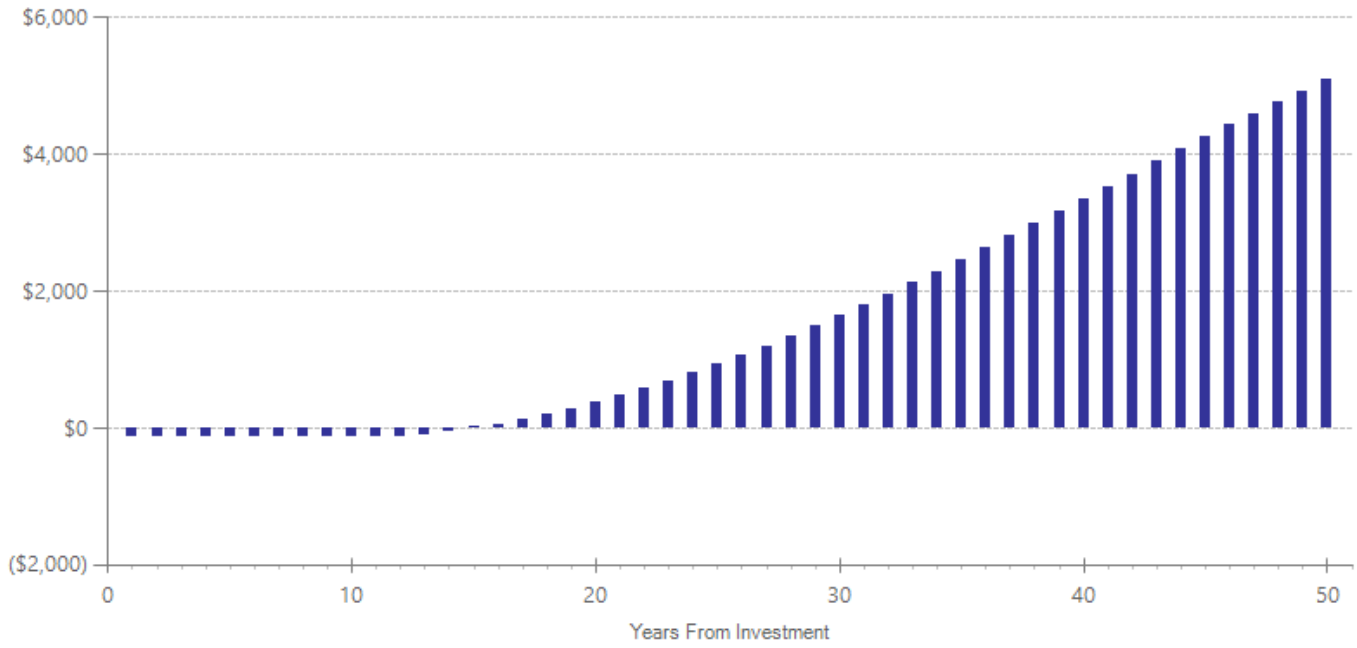
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$77	2013	Present value of net program costs (in 2016 dollars)	($79)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction to account for the time it takes teachers to administer the program divided by the average number of students per classroom in Washington's prototypical schools formula. In addition to compensation, the estimate accounts for the cost of purchasing and shipping ten books to each student's home.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	3	1018	0.019	0.061	10	0.013	0.067	17	0.019	0.752

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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First Step to Success

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated May 2015.

Program Description: First Step to Success is an early intervention program for students at risk for behavior problems. The program has three components: universal screening, classroom intervention, and home-based intervention. In the classroom intervention, behavior coaches and teachers provide visual cues to identified students to indicate when the student is on-task and exhibiting appropriate behaviors. Students earn points and may receive rewards if they meet their daily goal. In the home-based component, the behavior coach conducts six weekly home-visits and works with families to teach parenting skills and encourage collaboration between the home and the school. The intervention typically runs for three months.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$640
Participants	$1,364
Others	$626
Indirect	($295)
Total benefits	$2,335
Net program cost	($600)
Benefits minus cost	$1,735

Benefit to cost ratio	$3.89
Benefits minus costs	$1,735
Chance the program will produce benefits greater than the costs	53 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$5	$11	$3	$19
Labor market earnings associated with test scores	$1,383	$628	$602	$0	$2,613
K-12 grade repetition	$0	$1	$0	$0	$1
K-12 special education	$0	$5	$0	$3	$8
Health care associated with disruptive behavior disorder	$5	$16	$20	$8	$50
Costs of higher education	($24)	($16)	($7)	($8)	($55)
Adjustment for deadweight cost of program	$0	$0	$0	($301)	($301)
Totals	$1,364	$640	$626	($295)	$2,335

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

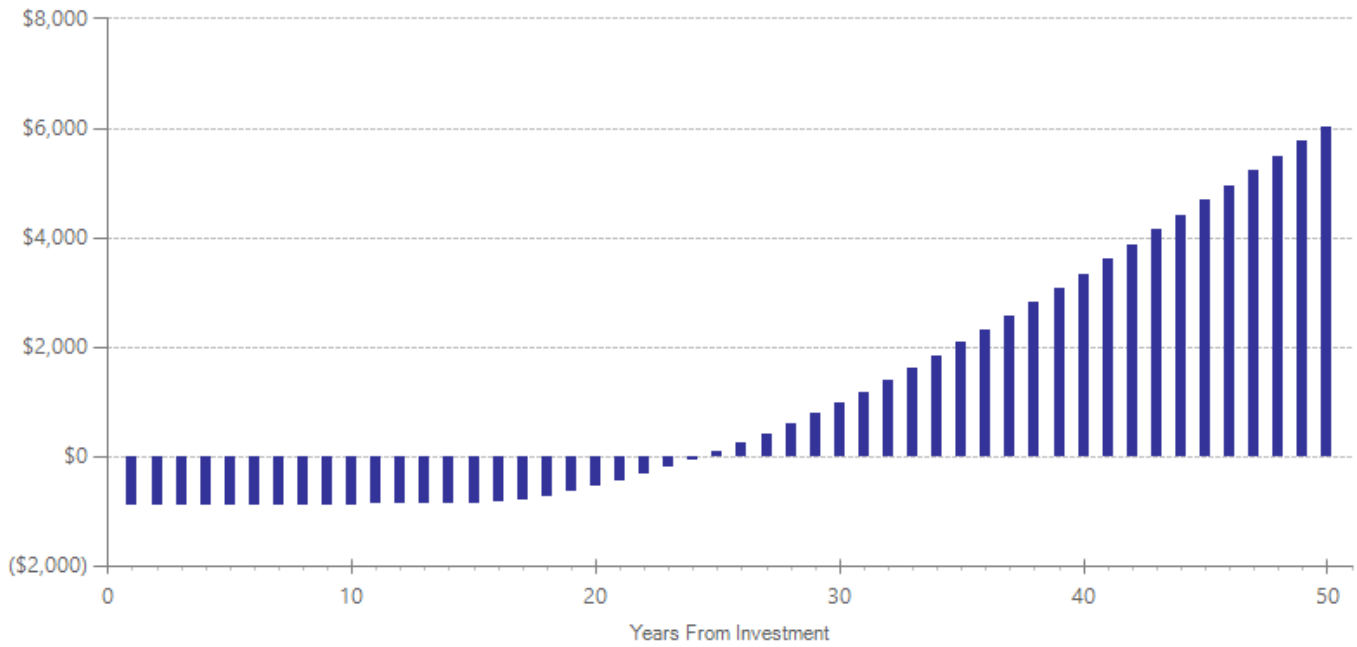
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$500	2005	Present value of net program costs (in 2016 dollars)	($600)
Comparison costs	$0	2005	Cost range (+ or -)	10 %

This program is typically implemented over a three-month period. Per-student cost information is based on program materials and behavior coach time, as documented in Walker, H.M., Golly, A., McLane, J.Z., & Kimmich, M. (2005). The Oregon First Step to Success replication initiative: Statewide results of an evaluation of program's impact. *Journal of Emotional and Behavioral Disorders, 13*(3), 163–172.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Disruptive behavior disorder symptoms	1	23	-0.105	0.298	5	-0.050	0.156	8	-1.066	0.001
Test scores	2	243	0.033	0.114	8	0.018	0.125	17	0.022	0.847

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Sumi, W.C., Woodbridge, M.W., Javitz, H.S., Thornton, S.P., Wagner, M., Rouspil, . . . & Severson, H.H. (2013). Assessing the effectiveness of First Step to Success: Are short-term results the first step to long-term behavioral improvements?. *Journal of Emotional and Behavioral Disorders, 21*(1), 66-78.

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Class size: reducing average class size by one student in kindergarten

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K–3 (RCW 28A.150.260). We estimate the benefits and costs of reducing kindergarten average class sizes by one student.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$567	Benefit to cost ratio	$8.74
Participants	$981	Benefits minus costs	$1,627
Others	$357	Chance the program will produce benefits greater than the costs	98 %
Indirect	($68)		
Total benefits	$1,837		
Net program cost	($210)		
Benefits minus cost	$1,627		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$4	$8	$2	$14
Labor market earnings associated with high school graduation	$1,085	$493	$499	$0	$2,077
Health care associated with educational attainment	($32)	$118	($129)	$59	$17
Costs of higher education	($72)	($48)	($22)	($24)	($165)
Adjustment for deadweight cost of program	$0	$0	$0	($105)	($105)
Totals	$981	$567	$357	($68)	$1,837

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

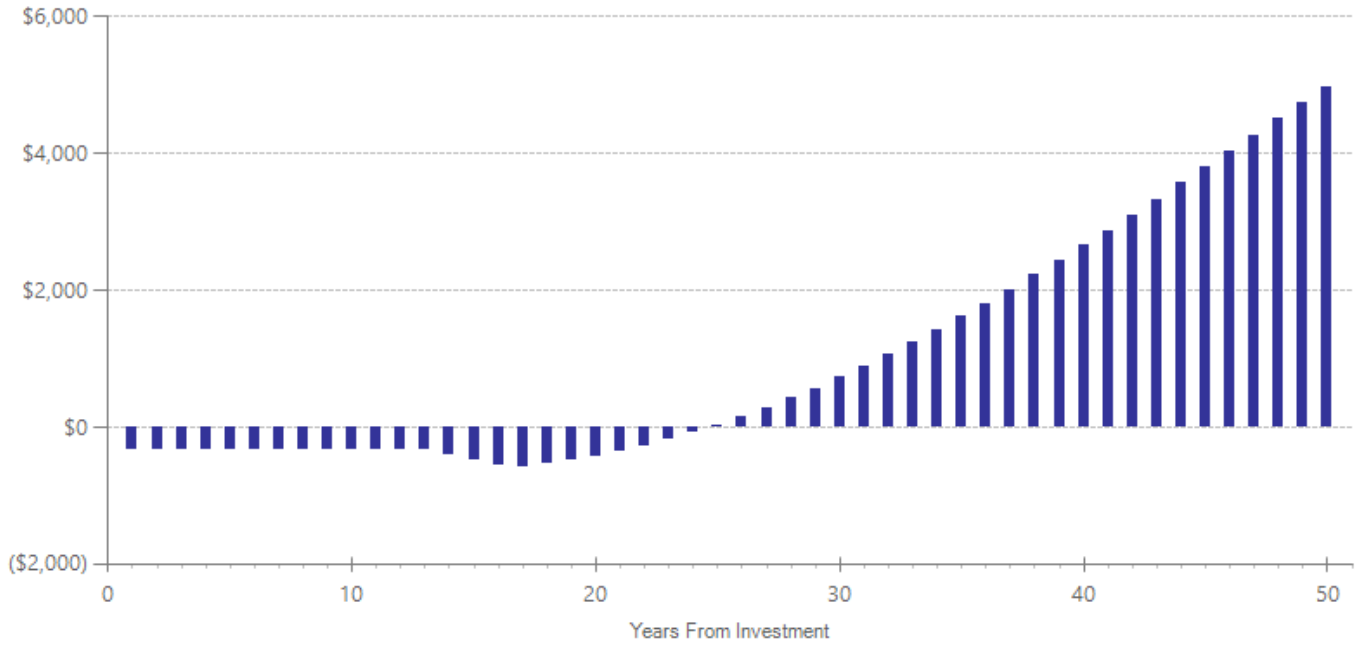
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$198	2011	Present value of net program costs (in 2016 dollars)	($210)
Comparison costs	$0	2011	Cost range (+ or -)	0 %

The cost estimate accounts for state and school district teacher compensation, marginal operating, and capital costs. Annual teacher costs were calculated using the 2011-12 average total (state and local) salary for Washington certificated teachers reported in the Office of Superintendent of Public Instruction School District Personnel Summary Profiles. The calculation included salaries and benefits as well as central administration and special education costs. Assumptions for capital cost calculations were provided by legislative staff, with one exception: the interest rate on bonds is from the Federal Reserve's November 2012 state and local rate. Aos, S., & Pennucci, A. (2013). *K–12 class size reductions and student outcomes: A review of the evidence and benefit-cost analysis* (Doc. No. 13-01-2201). Olympia: Washington State Institute for Public Policy.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	77	1000	0.015	0.005	5	0.015	0.005	17	0.015	0.005
Test scores	77	1000	0.036	0.013	5	0.011	0.005	17	0.036	0.005

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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Summer book programs: One-year intervention, with additional support

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: The summer book programs included in this analysis provide free books to elementary school students paired with additional reading support (e.g., lessons from certified teachers). Generally, the goal of summer book programs is to increase print exposure, the number of books at home, and voluntary reading time. Books are matched to each student's reading level and area of interest and are mailed to students weekly over the summer break. The mailing includes a form for the student to complete after finishing the book. This analysis includes school-based programs only and does not include bookmobiles or public library programs. The studies included in this analysis measure the program's impact after one summer.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$257
Participants	$534
Others	$227
Indirect	($55)
Total benefits	$963
Net program cost	($118)
Benefits minus cost	$845

Benefit to cost ratio	$8.19
Benefits minus costs	$845
Chance the program will produce benefits greater than the costs	57 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$548	$249	$246	$0	$1,043
Health care associated with educational attainment	($4)	$15	($16)	$7	$2
Costs of higher education	($10)	($7)	($3)	($3)	($23)
Adjustment for deadweight cost of program	$0	$0	$0	($59)	($59)
Totals	$534	$257	$227	($55)	$963

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

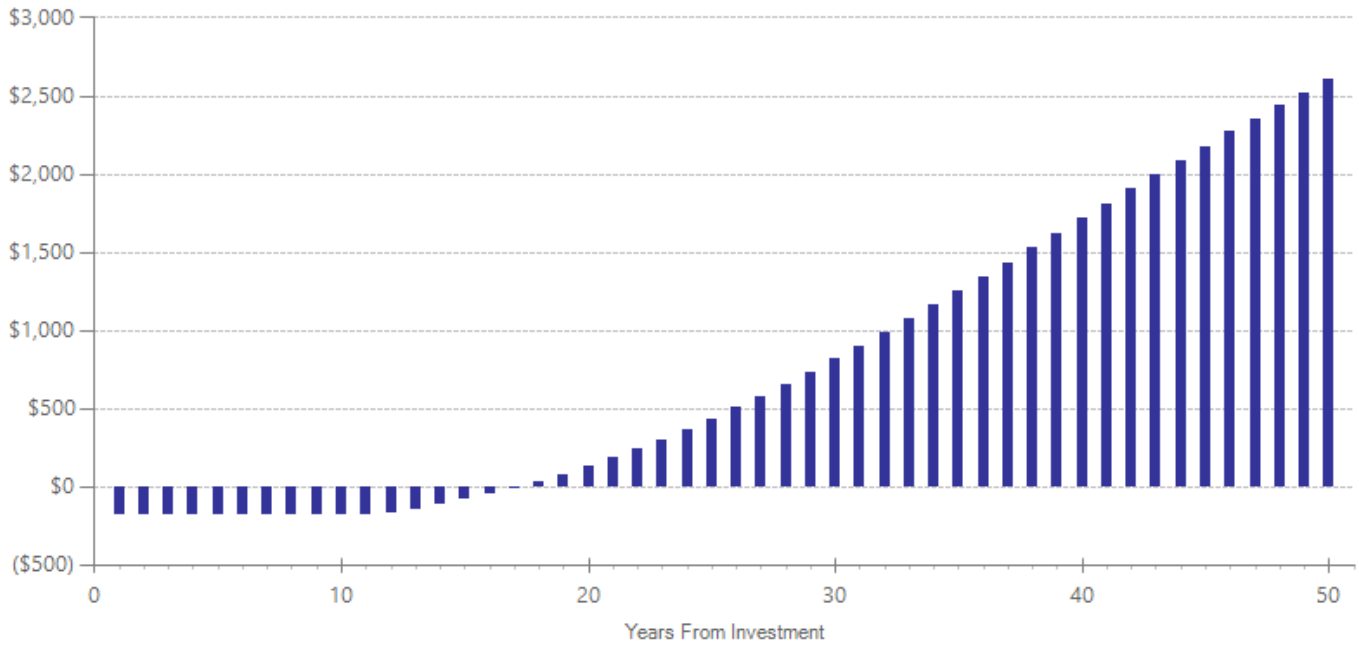
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$114	2013	Present value of net program costs (in 2016 dollars)	($118)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

To calculate a per-student annual cost, we used average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction to account for class time and time to administer the program divided by the average number of students per classroom in Washington's prototypical schools formula. In addition to compensation, the estimate accounts for the cost of purchasing and shipping ten books to each student's home. The costs do not include parent time for involvement in reading instruction.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	5	3340	0.010	0.026	10	0.007	0.029	17	0.021	0.419

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Tutoring: Supplemental Educational Services (under Title I)

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated May 2015.

Program Description: Current federal education law directs school districts who do not make "Adequate Yearly Progress" toward student proficiency standards to provide "Supplemental Educational Services"—primarily out-of-school-time tutoring—to eligible students at no charge to students and their families. Providers of SES include local and national for-profit and non-profit organizations as well as school districts themselves (unless they are identified as "in need of improvement" under AYP or have a waiver). Delivery methods (e.g., one-on-one, group, or online) vary; the amount of tutoring ranges from approximately 20 to 40 hours. This analysis estimates the impact of offering SES in school districts throughout the United States on reading and math test scores.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$838
Participants	$1,726
Others	$702
Indirect	($830)
Total benefits	$2,436
Net program cost	($1,692)
Benefits minus cost	$744

Benefit to cost ratio	$1.44
Benefits minus costs	$744
Chance the program will produce benefits greater than the costs	58 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1]	Benefits to:				
	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$1,782	$809	$793	$0	$3,385
Health care associated with educational attainment	($20)	$72	($79)	$36	$10
Costs of higher education	($37)	($44)	($12)	($22)	($115)
Adjustment for deadweight cost of program	$0	$0	$0	($844)	($844)
Totals	$1,726	$838	$702	($830)	$2,436

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

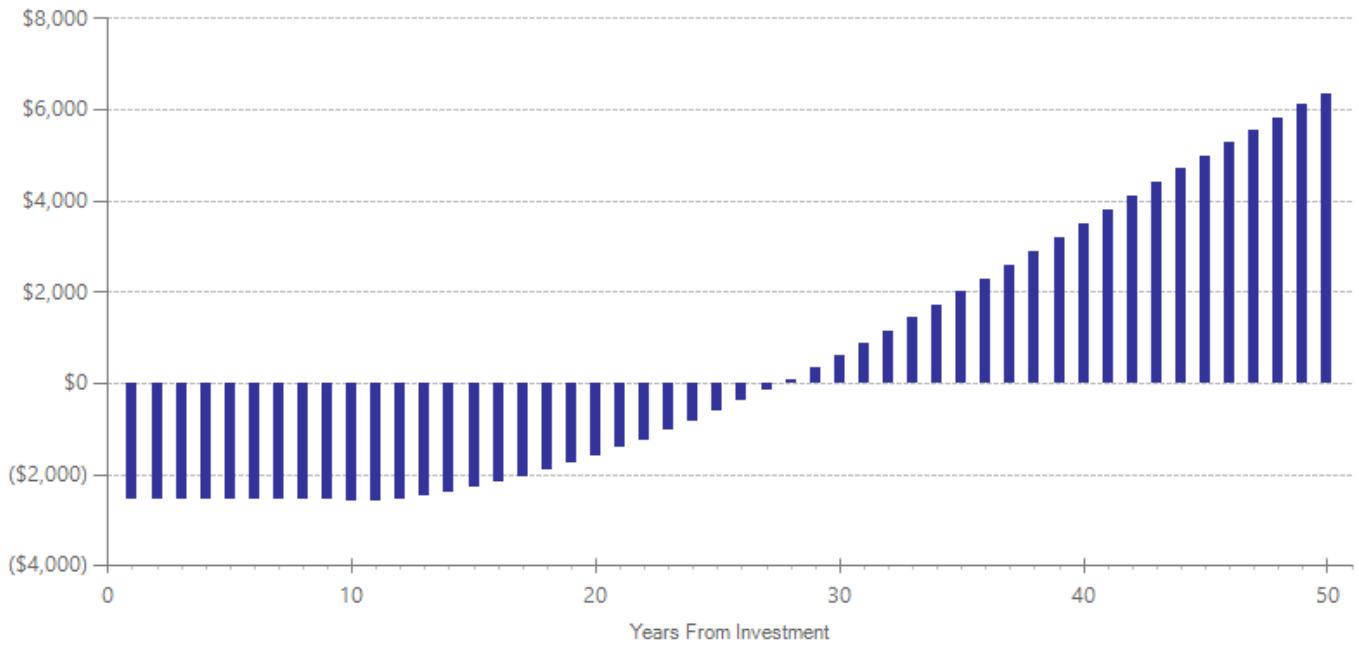
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$1,550	2010	Present value of net program costs (in 2016 dollars)	($1,692)
Comparison costs	$0	2010	Cost range (+ or -)	30 %

Average costs are estimated in the range ($1,100 to $2,000) reported in Heinrich, C.J., Burch, P., Good, A., Acosta, R., Cheng, H., Dillender, M., Kirshbaum, C., . . . Stewart, M. (2014). Improving the implementation and effectiveness of out-of-school time tutoring. *Journal of Policy Analysis and Management,* 1-34.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	22	293256	0.029	0.010	11	0.021	0.011	17	0.029	0.006

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Deke, J., Gill, B., Dragoset, L., & Bogen, K. (2014). Effectiveness of Supplemental Educational Services. *Journal of Research on Educational Effectiveness,* 7(2), 137-165.

Heinrich, C.J., Burch, P., Good, A., Acosta, R., Cheng, H., Dillender, M., . . . Stewart, M. (2014). Improving the implementation and effectiveness of out of-school time tutoring. *Journal of Policy Analysis and Management,* 1-34.

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Class size: reducing average class size by one student in grade 1

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K–3 (RCW 28A.150.260). We estimate the benefits and costs of reducing 1st grade average class sizes by one student.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$309
Participants	$534
Others	$193
Indirect	($85)
Total benefits	$951
Net program cost	($210)
Benefits minus cost	$741

Benefit to cost ratio	$4.53
Benefits minus costs	$741
Chance the program will produce benefits greater than the costs	89 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$2	$5	$1	$8
Labor market earnings associated with high school graduation	$592	$269	$271	$0	$1,132
Health care associated with educational attainment	($18)	$65	($70)	$32	$9
Costs of higher education	($40)	($27)	($12)	($13)	($92)
Adjustment for deadweight cost of program	$0	$0	$0	($106)	($106)
Totals	$534	$309	$193	($85)	$951

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

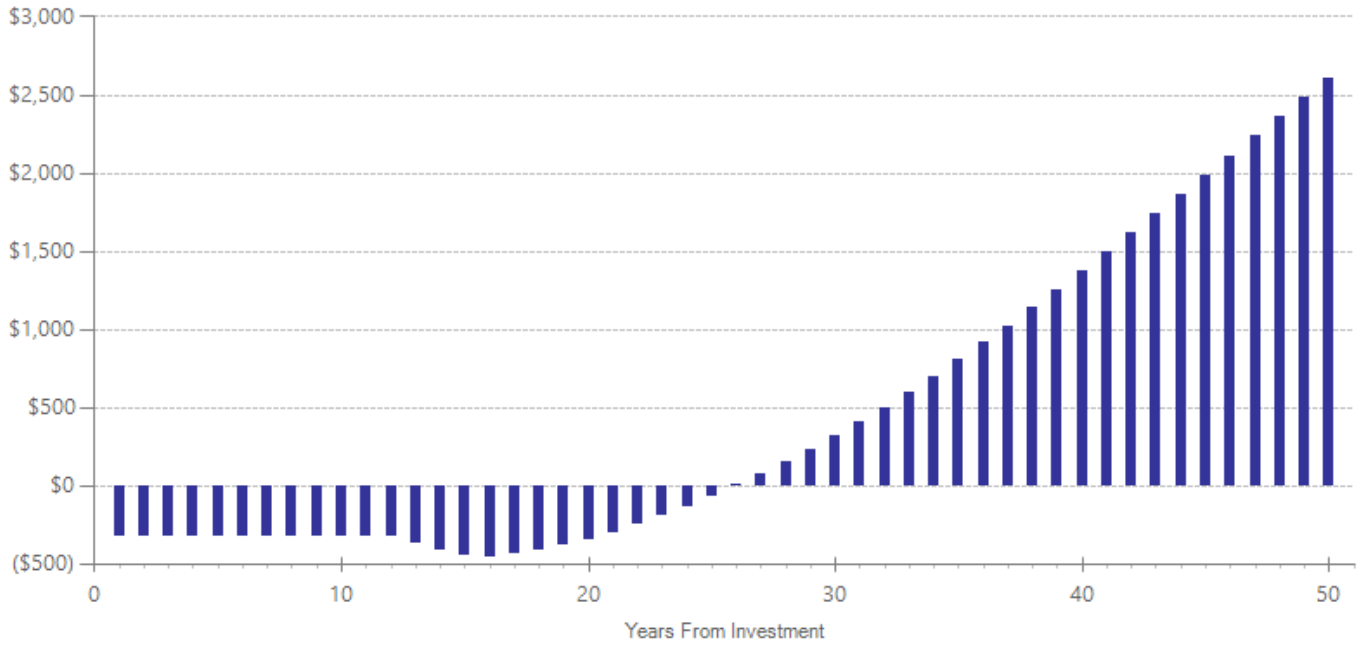
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$198	2011	Present value of net program costs (in 2016 dollars)	($210)
Comparison costs	$0	2011	Cost range (+ or -)	10 %

The cost estimate accounts for state and school district teacher compensation, marginal operating, and capital costs. Annual teacher costs were calculated using the 2011-12 average total (state and local) salary for Washington certificated teachers reported in the Office of Superintendent of Public Instruction School District Personnel Summary Profiles. The calculation includes salaries and benefits as well as central administration and special education costs. Assumptions for capital cost calculations were provided by legislative staff, with one exception: the interest rate on bonds is from the Federal Reserve's November 2012 state and local rate. Aos, S., & Pennucci, A. (2013). *K–12 class size reductions and student outcomes: A review of the evidence and benefit-cost analysis* (Doc. No. 13-01-2201). Olympia: Washington State Institute for Public Policy.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	77	1000	0.008	0.004	6	0.008	0.004	17	0.008	0.163
Test scores	77	1000	0.018	0.010	6	0.007	0.005	17	0.018	0.059

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

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Class size: reducing average class size by one student in grade 2

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K–3 (RCW 28A.150.260). We estimate the benefits and costs of reducing 2nd grade average class sizes by one student.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$205
Participants	$355
Others	$123
Indirect	($86)
Total benefits	$598
Net program cost	($210)
Benefits minus cost	$388

Benefit to cost ratio	$2.85
Benefits minus costs	$388
Chance the program will produce benefits greater than the costs	67 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$1	$3	$1	$5
Labor market earnings associated with test scores	$366	$166	$162	$0	$693
Health care associated with educational attainment	($10)	$38	($41)	$19	$5
Adjustment for deadweight cost of program	$0	$0	$0	($105)	($105)
Totals	$355	$205	$123	($86)	$598

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

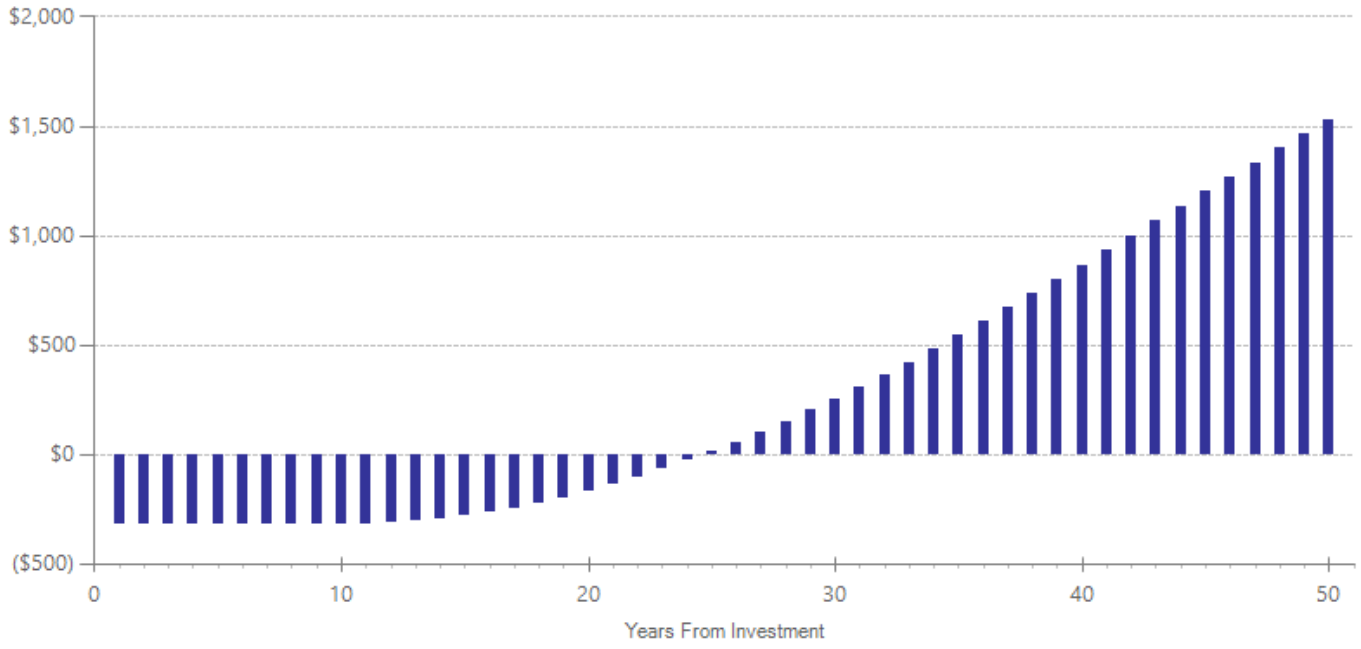
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$198	2011	Present value of net program costs (in 2016 dollars)	($210)
Comparison costs	$0	2011	Cost range (+ or -)	0 %

The cost estimate accounts for state and school district teacher compensation, marginal operating, and capital costs. Annual teacher costs are calculated using the 2011-12 average total (state and local) salary for Washington certificated teachers reported in the Office of Superintendent of Public Instruction School District Personnel Summary Profiles. The calculation includes salaries and benefits as well as central administration and special education costs. Assumptions for capital cost calculations were provided by legislative staff, with one exception: the interest rate on bonds is from the Federal Reserve's November 2012 state and local rate. Aos, S., & Pennucci, A. (2013). *K–12 class size reductions and student outcomes: A review of the evidence and benefit-cost analysis* (Doc. No. 13-01-2201). Olympia: Washington State Institute for Public Policy.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	77	1000	0.005	0.004	7	0.005	0.004	17	0.005	0.204
Test scores	77	1000	0.010	0.009	7	0.005	0.005	17	0.010	0.286

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

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Class size: reducing average class size by one student in grade 3

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 25.23 students in grades K–3 (RCW 28A.150.260). We estimate the benefits and costs of reducing 3rd grade average class sizes by one student.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$170
Participants	$298
Others	$105
Indirect	($90)
Total benefits	$484
Net program cost	($210)
Benefits minus cost	$273

Benefit to cost ratio	$2.30
Benefits minus costs	$273
Chance the program will produce benefits greater than the costs	60 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$1	$2	$1	$4
Labor market earnings associated with test scores	$306	$139	$136	$0	$581
Health care associated with educational attainment	($8)	$30	($33)	$15	$4
Adjustment for deadweight cost of program	$0	$0	$0	($105)	($105)
Totals	$298	$170	$105	($90)	$484

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

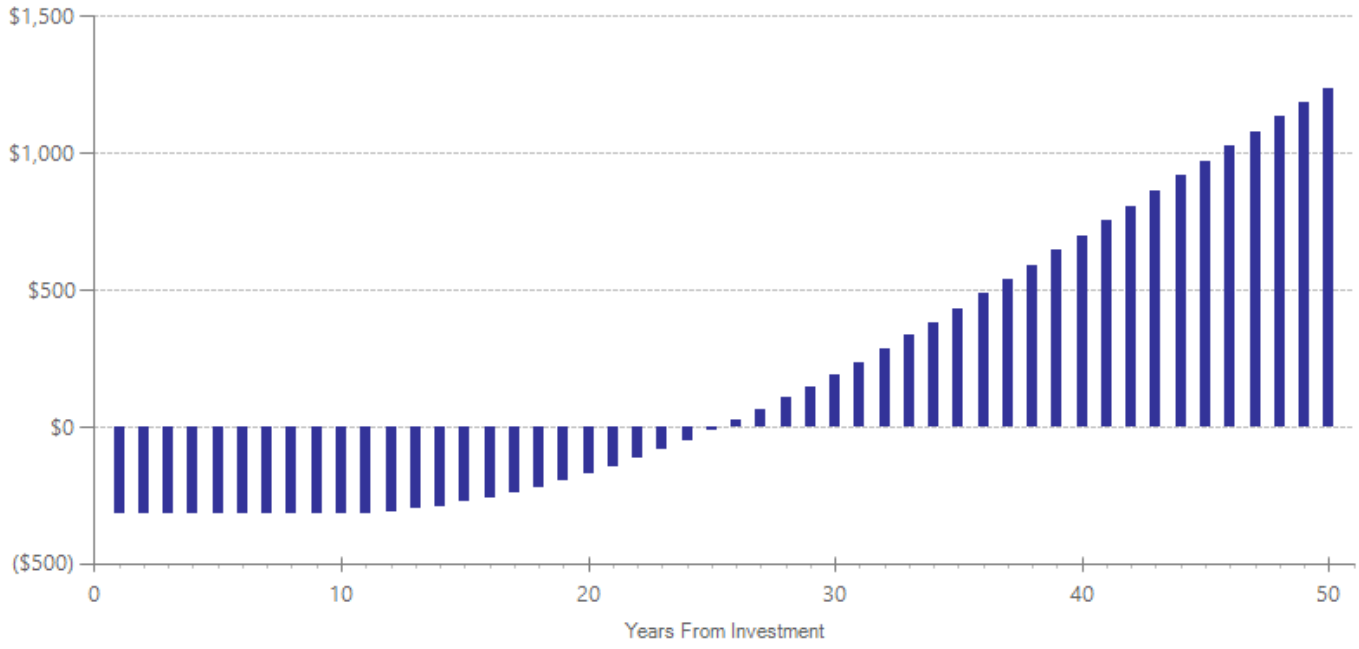
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$198	2011	Present value of net program costs (in 2016 dollars)	($210)
Comparison costs	$0	2011	Cost range (+ or -)	0 %

The cost estimate accounts for state and school district teacher compensation, marginal operating, and capital costs. Annual teacher costs are calculated using the 2011-12 average total (state and local) salary for Washington certificated teachers reported in the Office of Superintendent of Public Instruction School District Personnel Summary Profiles. The calculation includes salaries and benefits as well as central administration and special education costs. Assumptions for capital cost calculations were provided by legislative staff, with one exception: the interest rate on bonds is from the Federal Reserve's November 2012 state and local rate. Aos, S., & Pennucci, A. (2013). *K–12 class size reductions and student outcomes: A review of the evidence and benefit-cost analysis* (Doc. No. 13-01-2201). Olympia: Washington State Institute for Public Policy.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	77	1000	0.004	0.004	8	0.004	0.004	17	0.004	0.317
Test scores	77	1000	0.007	0.009	8	0.004	0.005	17	0.007	0.452

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Class size: reducing average class size by one student in one grade, 4-6

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 27 students in grades 4-6 (RCW 28A.150.260). We estimate the benefits and costs of reducing 4th-6th grade average class sizes by one student.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$127
Participants	$224
Others	$79
Indirect	($84)
Total benefits	$346
Net program cost	($190)
Benefits minus cost	$156

Benefit to cost ratio	$1.82
Benefits minus costs	$156
Chance the program will produce benefits greater than the costs	54 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$1	$2	$0	$3
Labor market earnings associated with test scores	$230	$104	$101	$0	$435
Health care associated with educational attainment	($6)	$22	($24)	$11	$3
Adjustment for deadweight cost of program	$0	$0	$0	($95)	($95)
Totals	$224	$127	$79	($84)	$346

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

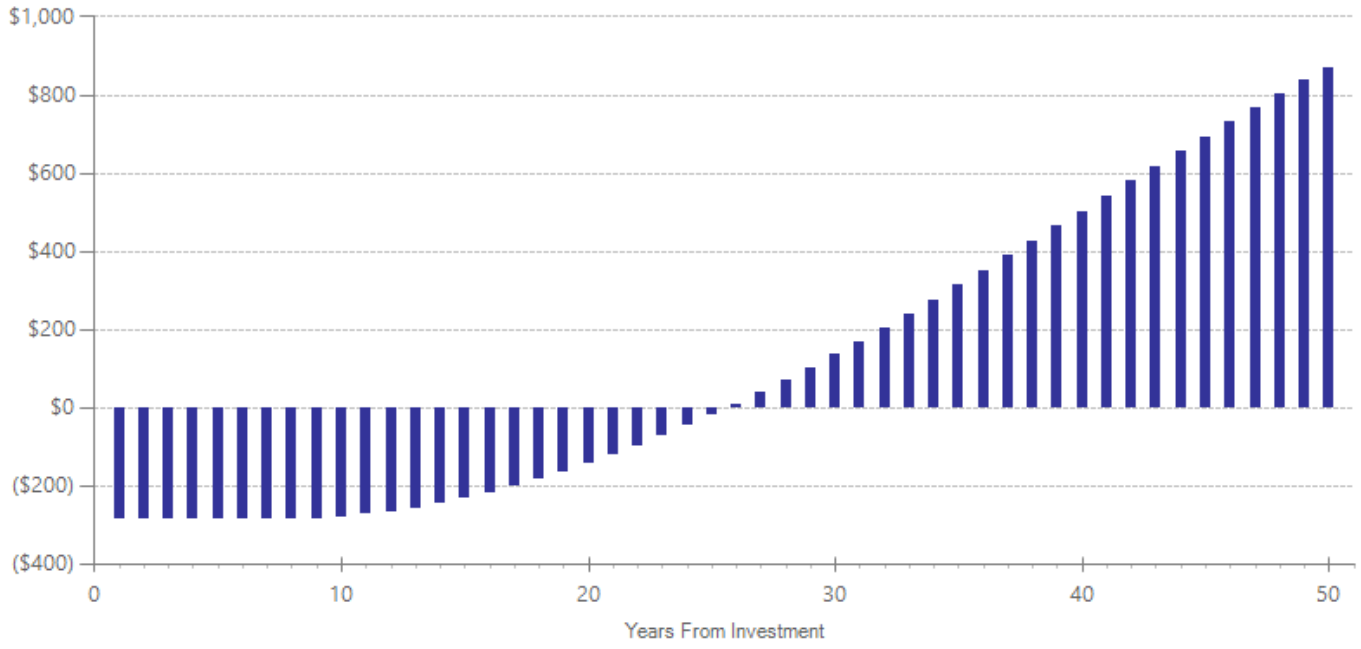
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$179	2011	Present value of net program costs (in 2016 dollars)	($190)
Comparison costs	$0	2011	Cost range (+ or -)	0 %

The cost estimate accounts for state and school district teacher compensation, marginal operating, and capital costs. Annual teacher costs were calculated using the 2011-12 average total (state and local) salary for Washington certificated teachers reported in the Office of Superintendent of Public Instruction School District Personnel Summary Profiles. The calculation includes salaries and benefits as well as central administration and special education costs. Assumptions for capital cost calculations were provided by legislative staff, with one exception: the interest rate on bonds is from the Federal Reserve's November 2012 state and local rate. Aos, S., & Pennucci, A. (2013). *K–12 class size reductions and student outcomes: A review of the evidence and benefit-cost analysis* (Doc. No. 13-01-2201). Olympia: Washington State Institute for Public Policy.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



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Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	77	1000	0.003	0.003	10	0.003	0.003	17	0.003	0.431
Test scores	77	1000	0.004	0.008	10	0.003	0.006	17	0.004	0.621

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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Class size: reducing average class size by one student in one grade, 9-12

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 28.74 students in grades 9 through 12 (RCW 28A.150.260). We estimate the benefits and costs of reducing high school average class sizes by one student.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$111
Participants	$204
Others	$76
Indirect	($77)
Total benefits	$314
Net program cost	($170)
Benefits minus cost	$144

Benefit to cost ratio	$1.85
Benefits minus costs	$144
Chance the program will produce benefits greater than the costs	53 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$1	$1	$0	$2
Labor market earnings associated with test scores	$208	$95	$92	$0	$395
Health care associated with educational attainment	($4)	$16	($18)	$8	$2
Adjustment for deadweight cost of program	$0	$0	$0	($85)	($85)
Totals	$204	$111	$76	($77)	$314

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

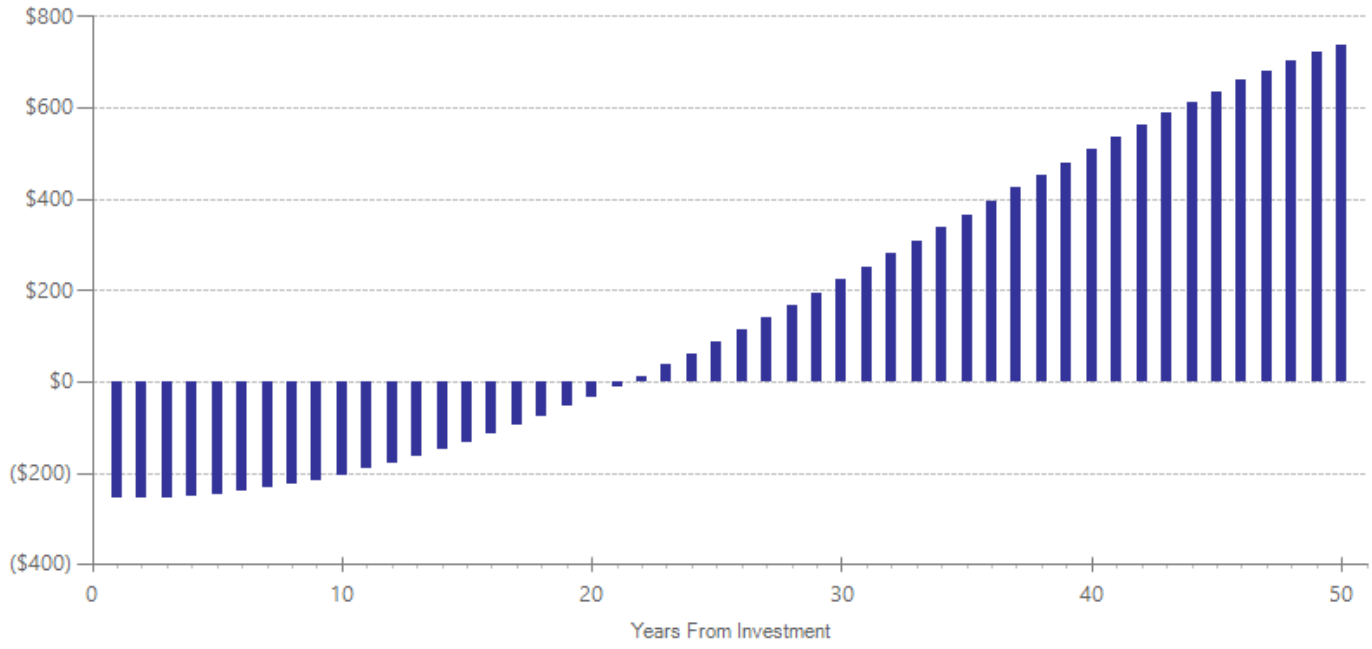
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$160	2011	Present value of net program costs (in 2016 dollars)	($170)
Comparison costs	$0	2011	Cost range (+ or -)	0 %

The cost estimate accounts for state and school district teacher compensation, marginal operating, and capital costs. Annual teacher costs are calculated using the 2011-12 average total (state and local) salary for Washington certificated teachers reported in the Office of Superintendent of Public Instruction School District Personnel Summary Profiles. The calculation includes salaries and benefits as well as central administration and special education costs. Assumptions for capital cost calculations were provided by legislative staff, with one exception: the interest rate on bonds is from the Federal Reserve's November 2012 state and local rate. Aos, S., & Pennucci, A. (2013). *K–12 class size reductions and student outcomes: A review of the evidence and benefit-cost analysis* (Doc. No. 13-01-2201). Olympia: Washington State Institute for Public Policy.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	77	1000	0.002	0.003	16	0.002	0.003	17	0.002	0.583
Test scores	77	1000	0.002	0.008	16	0.002	0.007	17	0.002	0.781

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Class size: reducing average class size by one student in one grade, 7-8

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated January 2013.

Program Description: Washington State's prototypical school funding formula allocates funding for an average class size of 28.53 students in grades 7 and 8 (RCW 28A.150.260). We estimate the benefits and costs of reducing 7th and 8th grade average class sizes by one student.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$111
Participants	$198
Others	$72
Indirect	($77)
Total benefits	$305
Net program cost	($172)
Benefits minus cost	$133

Benefit to cost ratio	$1.77
Benefits minus costs	$133
Chance the program will produce benefits greater than the costs	53 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$1	$1	$0	$2
Labor market earnings associated with test scores	$203	$92	$91	$0	$386
Health care associated with educational attainment	($5)	$18	($20)	$9	$2
Adjustment for deadweight cost of program	$0	$0	$0	($86)	($86)
Totals	$198	$111	$72	($77)	$305

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

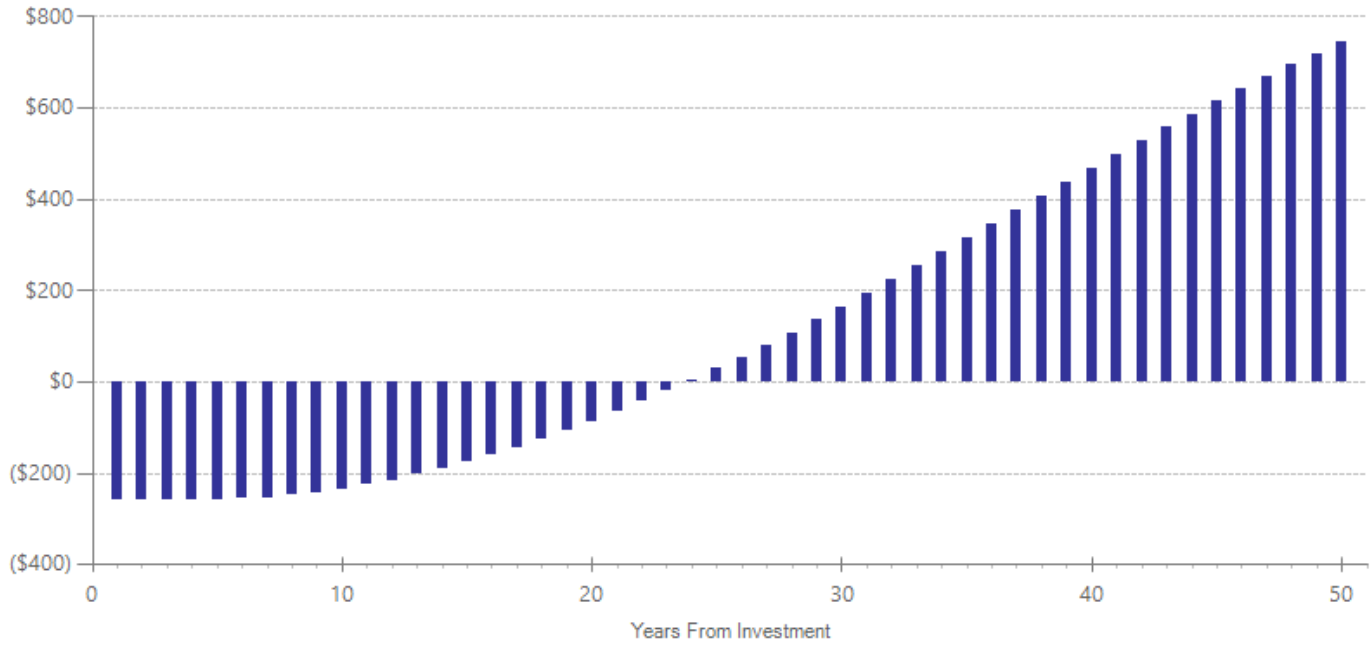
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$162	2011	Present value of net program costs (in 2016 dollars)	($172)
Comparison costs	$0	2011	Cost range (+ or -)	0 %

The cost estimate accounts for state and school district teacher compensation, marginal operating, and capital costs. Annual teacher costs are calculated using the 2011-12 average total (state and local) salary for Washington certificated teachers reported in the Office of Superintendent of Public Instruction School District Personnel Summary Profiles. The calculation includes salaries and benefits as well as central administration and special education costs. Assumptions for capital cost calculations were provided by legislative staff, with one exception: the interest rate on bonds is from the Federal Reserve's November 2012 state and local rate. Aos, S., & Pennucci, A. (2013). *K–12 class size reductions and student outcomes: A review of the evidence and benefit-cost analysis* (Doc. No. 13-01-2201). Olympia: Washington State Institute for Public Policy.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
High school graduation	77	1000	0.002	0.003	13	0.002	0.003	17	0.002	0.532
Test scores	77	1000	0.003	0.008	13	0.002	0.006	17	0.003	0.723

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Second Step

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated May 2015.

Program Description: Second Step is a classroom-based social skills program for reducing aggressive behavior in elementary school-aged children. Second Step focuses on teaching social-emotional competencies and self-regulation skills including nonviolent response techniques. Lessons are taught by a trained teacher in a classroom setting.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$32	Benefit to cost ratio	$0.57
Participants	$38	Benefits minus costs	($51)
Others	$35	Chance the program will produce benefits greater than the costs	30 %
Indirect	($36)		
Total benefits	$69		
Net program cost	($121)		
Benefits minus cost	($51)		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$3	$7	$1	$11
Labor market earnings associated with high school graduation	$37	$17	$17	$17	$88
K-12 special education	$0	$4	$0	$2	$6
Health care associated with disruptive behavior disorder	$3	$10	$12	$5	$30
Costs of higher education	($3)	($2)	($1)	($1)	($6)
Adjustment for deadweight cost of program	$0	$0	$0	($60)	($60)
Totals	$38	$32	$35	($36)	$69

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

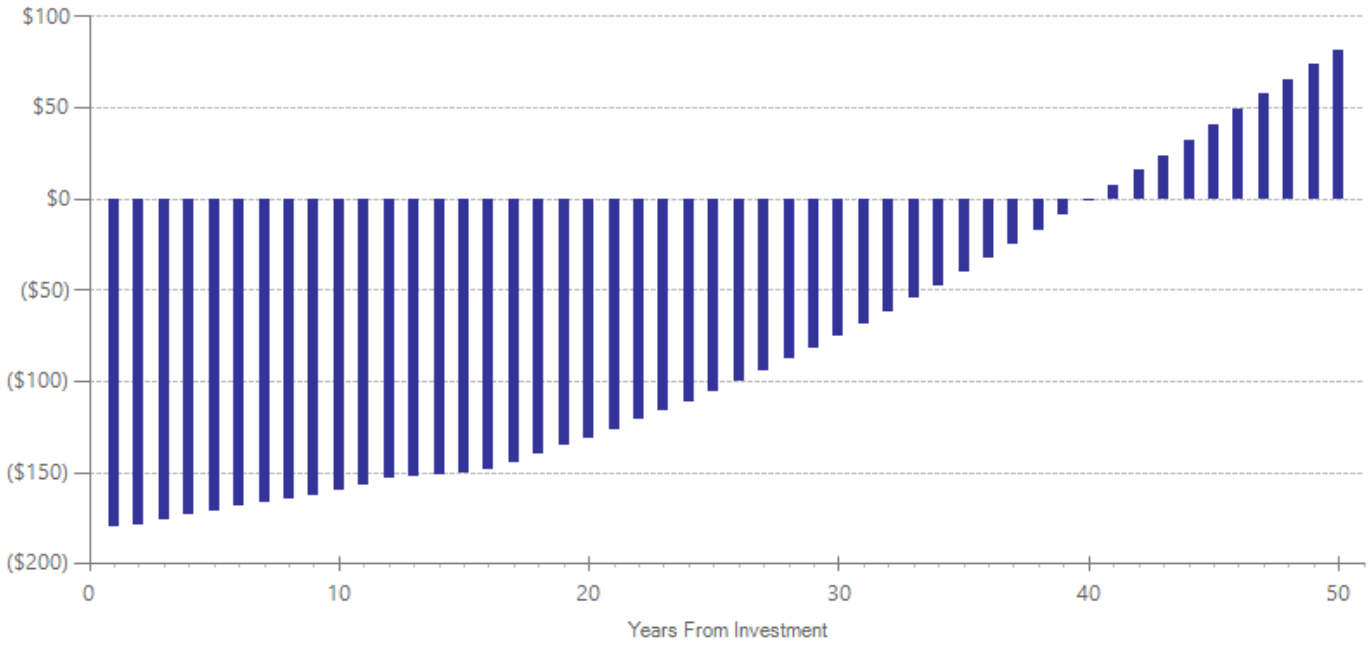
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$117	2013	Present value of net program costs (in 2016 dollars)	($121)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

To estimate costs, we assume that teachers spend an average of 15 hours teaching Second Step lessons (30 sessions of 30 minutes) and attend a two-day training. To estimate a per-student annual cost, we calculated the value of teacher time using average Washington State compensation costs (including benefits) for a K–8 teacher as reported by the Office of the Superintendent of Public Instruction and divide by the number of students in a prototypical elementary school. The estimate also includes curriculum cost as reported by Second Step (https://store.cfchildren.org/elementary-kindergarten--grade-5-c29.aspx) and registration costs for teachers to attend two days of training (http://legacy.nreppadmin.net/ViewIntervention.aspx?id=66).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Attention-deficit/hyperactivity disorder symptoms	1	3637	-0.108	0.024	6	0.000	0.005	7	-0.108	0.001
Externalizing behavior symptoms	3	4214	-0.060	0.041	7	-0.028	0.024	10	-0.060	0.172
School attendance^	1	1074	0.203	0.144	10	0.203	0.144	10	0.203	0.159
Suspensions/expulsions^	1	1074	0.028	0.144	10	0.028	0.144	10	0.028	0.849

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Teacher professional development: Not targeted

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: Generally, professional development (PD) for K–12 teachers includes activities such as workshops, conferences, summer institutes, and time set aside during the school year for staff development. The evaluations included in this analysis examine impacts on student outcomes from providing more time and funding for teacher PD without directing how those resources are used.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$4
Participants	$8
Others	$4
Indirect	($44)
Total benefits	($28)
Net program cost	($89)
Benefits minus cost	($117)

Benefit to cost ratio	($0.32)
Benefits minus costs	($117)
Chance the program will produce benefits greater than the costs	35 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$8	$4	$4	$0	$16
Health care associated with educational attainment	$0	$0	$0	$0	$0
Costs of higher education	$0	$0	$0	$0	$0
Adjustment for deadweight cost of program	$0	$0	$0	($44)	($44)
Totals	$8	$4	$4	($44)	($28)

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

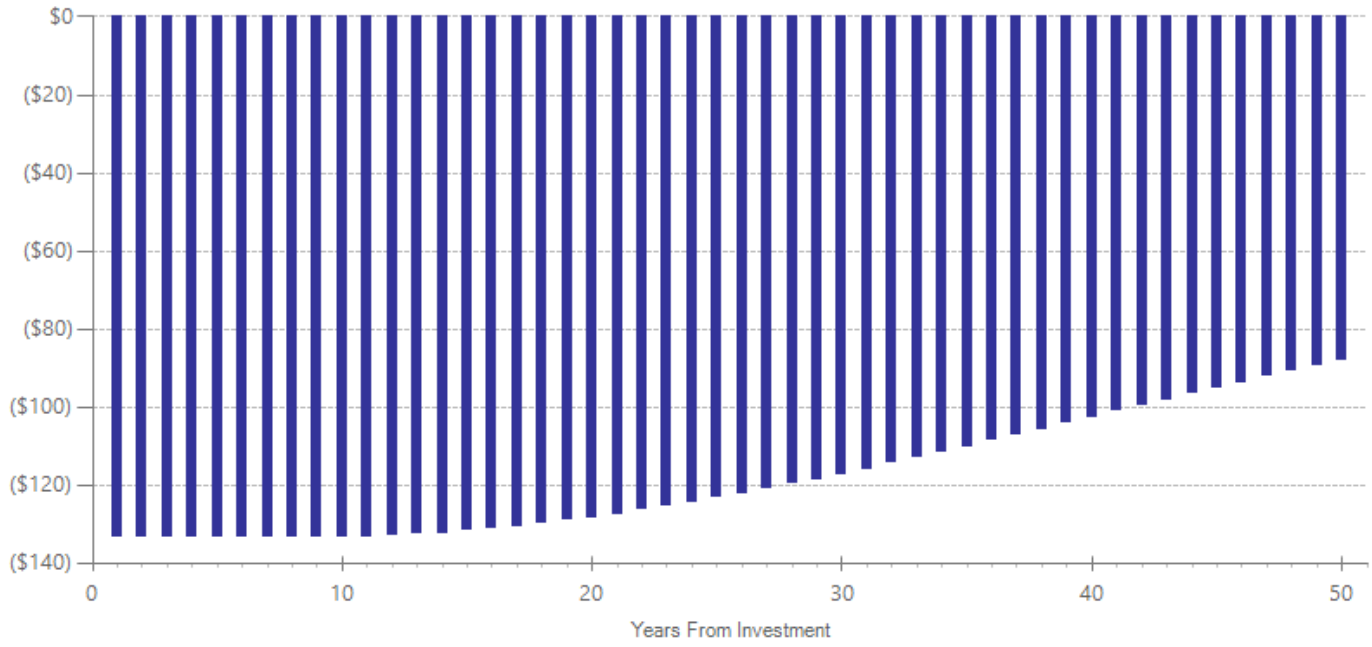
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$86	2013	Present value of net program costs (in 2016 dollars)	($89)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in the meta-analysis, teachers received an average of 20 additional hours of non-targeted professional development (PD) in comparison with the usual amount of PD time. We calculated the value of PD time using average teacher salaries (including benefits) in Washington State as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divided compensation costs by the number of students per classroom in Washington's prototypical schools formula and add per-student materials, supplies, and operating costs to account for the overhead (i.e. facility and administrative costs) associated with providing PD.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	12	461497	0.000	0.002	11	0.000	0.002	17	0.000	0.996

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Full-day kindergarten

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated December 2013.

Program Description: In this analysis, we compare the effects of full day kindergarten programs with the effects of half day kindergarten among public school students.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$445
Participants	$924
Others	$393
Indirect	($1,383)
Total benefits	$378
Net program cost	($2,762)
Benefits minus cost	($2,384)

Benefit to cost ratio	$0.14
Benefits minus costs	($2,384)
Chance the program will produce benefits greater than the costs	37 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	$946	$430	$425	$0	$1,801
Health care associated with educational attainment	($7)	$25	($27)	$13	$4
Costs of higher education	($15)	($10)	($5)	($5)	($35)
Adjustment for deadweight cost of program	$0	$0	$0	($1,391)	($1,391)
Totals	$924	$445	$393	($1,383)	$378

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

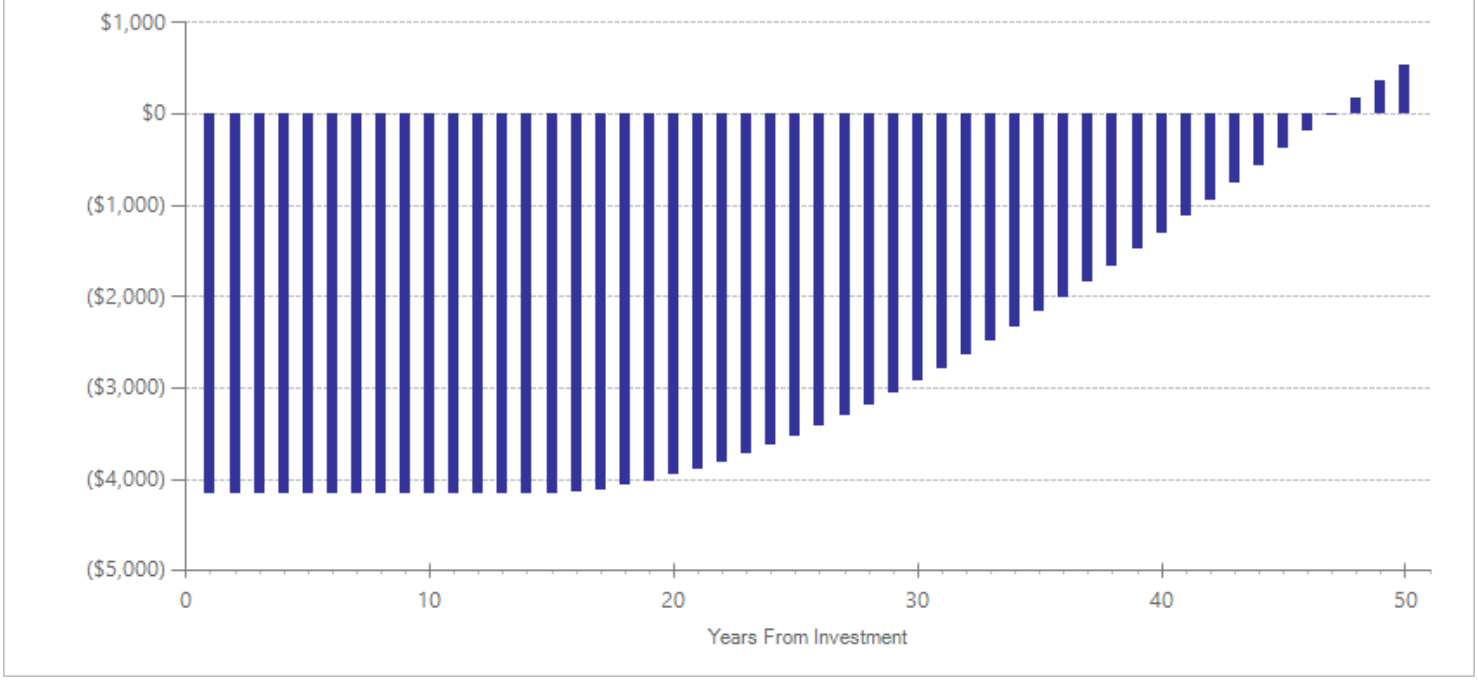
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$3,151	2012	Present value of net program costs (in 2016 dollars)	($2,762)
Comparison costs	$505	2012	Cost range (+ or -)	10 %

Treatment costs are the increased cost to provide full-day kindergarten rather than half-day kindergarten including twice the staff costs and additional classroom space. We estimated the construction costs of new classrooms based on a kindergarten class size of twenty, 90 square foot of space per student and $188.55 (2012 dollars) of construction costs per square foot; We estimated that 50% of the comparison group students who were eligible would use a half day of child care subsidies. We estimated that 48.91% of students would be eligible for child care subsidies based on the number of students eligible for free and reduced-priced meals (Office of Superintendent of Public Instruction. (2012). 2012-2013 Washington Public School Free and Reduced-Price Meal Eligibility. http://k12.wa.us/ChildNutrition/Reports/FreeReducedMeals.aspx and Department of Early Learning. (2013). Child Care Subsidy Rates. http://www.del.wa.gov/publications/subsidy/docs/ChildCareSubsidyRates.pdf)

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	2	23127	0.022	0.091	8	0.012	0.068	17	0.022	0.812

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Educator professional development: Use of data to guide instruction

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated June 2014.

Program Description: One form of professional development (PD) involves training senior/mentoring/coaching teachers how to use student academic assessment data to modify and improve instruction. In this "train the trainers" approach, teacher-leaders directly receive the training and then share what they have learned with classroom teachers. This type of PD is usually paired with computer software that tracks and reports student assessment data to teachers. The specific types of assessments and software evaluated and included in this meta-analysis are (in no particular order) Individualized Student Instruction (ISI) using A2i software and Ohio's Personalized Assessment Reporting System (PARS).

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	($803)
Participants	($1,667)
Others	($703)
Indirect	($22)
Total benefits	($3,195)
Net program cost	($18)
Benefits minus cost	($3,213)

Benefit to cost ratio	($174.30)
Benefits minus costs	($3,213)
Chance the program will produce benefits greater than the costs	31 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	($1,710)	($777)	($762)	$0	($3,249)
Health care associated with educational attainment	$13	($46)	$51	($23)	($6)
Costs of higher education	$30	$20	$9	$10	$69
Adjustment for deadweight cost of program	$0	$0	$0	($9)	($9)
Totals	($1,667)	($803)	($703)	($22)	($3,195)

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

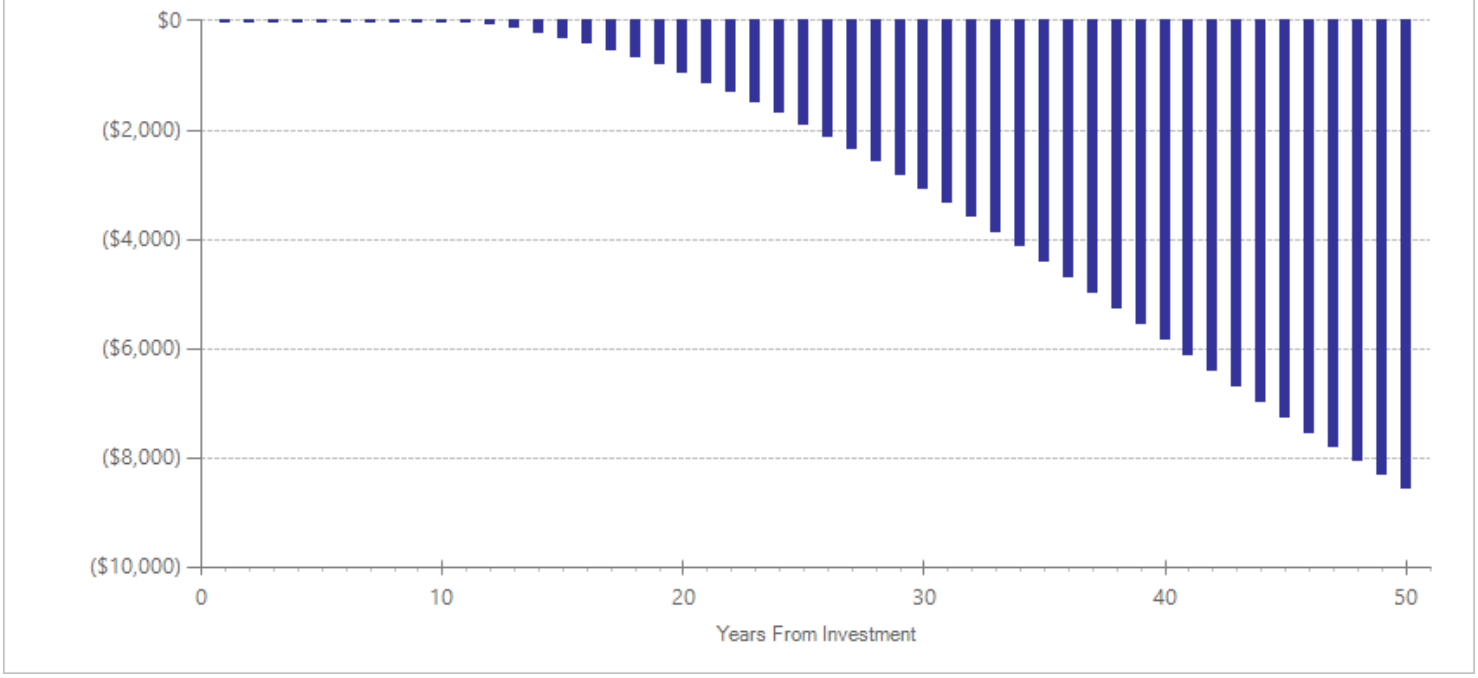
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$18	2013	Present value of net program costs (in 2016 dollars)	($18)
Comparison costs	$0	2013	Cost range (+ or -)	10 %

In the evaluations included in this meta-analysis, educators received an average of three hours of training in how to use student assessment data to guide instruction. We calculated the value of PD time using average teacher salaries (including benefits) as reported by the Office of Superintendent of Public Instruction. To calculate a per-student annual cost, we divided compensation costs by the number of students per classroom in Washington's prototypical schools formula and added per-student materials, supplies, and operating costs to account for the overhead (i.e. facility, computer, and administrative costs) associated with providing PD.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	2	26047	-0.030	0.036	10	-0.020	0.040	17	-0.030	0.409

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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"Check-in" behavior interventions

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated May 2015.

Program Description: Check-in behavior interventions provide support for at-risk students in grades K–12 in order to reduce dropouts, promote engagement at school, and reduce problem behaviors. Typically, students must check-in with a designated adult at the school each day. The designated adult collects and monitors data on at-risk indicators (e.g. tardiness, absenteeism, discipline referrals, and poor grades); provides feedback and mentoring; facilitates individualized interventions as appropriate; and ensures communication with parents. The programs included in this analysis are (in no particular order) Check-In, Check-Out (also known as the Behavior Education Program); Check and Connect; and Check, Connect, and Expect.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	($371)
Participants	($888)
Others	($389)
Indirect	($660)
Total benefits	($2,307)
Net program cost	($1,349)
Benefits minus cost	($3,656)

Benefit to cost ratio	($1.71)
Benefits minus costs	($3,656)
Chance the program will produce benefits greater than the costs	46 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$5	$11	$2	$18
Labor market earnings associated with test scores	($892)	($405)	($419)	$0	($1,716)
K-12 grade repetition	$0	$5	$0	$3	$8
K-12 special education	$0	$9	$0	$5	$14
Health care associated with disruptive behavior disorder	$5	$16	$20	$8	$49
Costs of higher education	($1)	($1)	$0	($1)	($3)
Adjustment for deadweight cost of program	$0	$0	$0	($676)	($676)
Totals	($888)	($371)	($389)	($660)	($2,307)

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

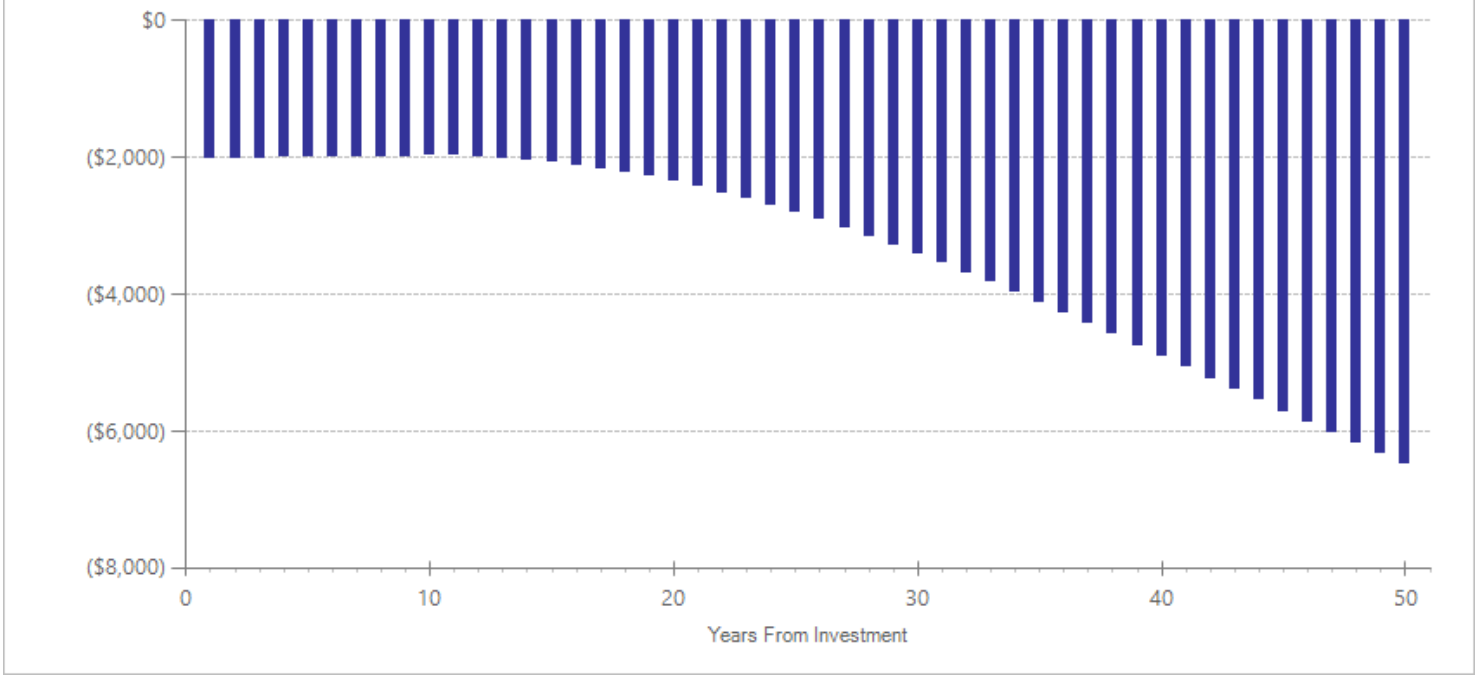
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$1,329	2014	Present value of net program costs (in 2016 dollars)	($1,349)
Comparison costs	$0	2014	Cost range (+ or -)	30 %

Costs for check-in programs can vary depending on the type and intensity of the intervention. To calculate a per-student annual cost, we use the average between a minimal check-in program facilitated by a paraprofessional serving a caseload of up to 15 students and a more intensive program facilitated by a school counselor with a caseload of up to 35 students. We use average Washington State compensation costs (including benefits) for K-12 staff as reported by the Office of the Superintendent of Public Instruction and include training time in our estimate. Program implementation details are based in part on information provided by the following sources: National Center on Intensive Intervention. (n.d.) Behavior Education Program (BEP) or Check-in/Check-out (CICO). Retrieved from http://www.intensiveintervention.org/chart/behavioral-intervention-chart and Coalition for Evidence-Based Policy. (2015). Check and Connect. Retrieved from http://evidencebasedprograms.org/1366-2/check-and-connect.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Externalizing behavior symptoms	1	121	-0.094	0.209	9	-0.045	0.110	12	-0.218	0.298
Grade point average^	1	89	0.070	0.146	15	0.070	0.146	15	0.070	0.633
Internalizing symptoms	1	121	-0.140	0.209	9	-0.102	0.168	11	-0.325	0.122
Office discipline referrals^	2	116	-0.276	0.143	15	-0.276	0.143	15	-0.276	0.054
School attendance^	1	89	0.010	0.146	15	0.010	0.146	15	0.010	0.945
Test scores	1	121	-0.016	0.209	9	-0.010	0.230	17	-0.037	0.858

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Even Start

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated April 2012.

Program Description: Even Start is a federally-funded program that provides early childhood education, adult education (including basic education and/or instruction for English language learners), parenting education, and parent-child literacy activities to low-income families with young children.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	($716)
Participants	($1,482)
Others	($603)
Indirect	($2,158)
Total benefits	($4,959)
Net program cost	($4,324)
Benefits minus cost	($9,283)

Benefit to cost ratio	($1.15)
Benefits minus costs	($9,283)
Chance the program will produce benefits greater than the costs	31 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Labor market earnings associated with test scores	($1,527)	($693)	($675)	$0	($2,895)
Health care associated with educational attainment	$16	($57)	$63	($27)	($5)
Costs of higher education	$29	$34	$9	$16	$88
Adjustment for deadweight cost of program	$0	$0	$0	($2,147)	($2,147)
Totals	($1,482)	($716)	($603)	($2,158)	($4,959)

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

Detailed Annual Cost Estimates Per Participant

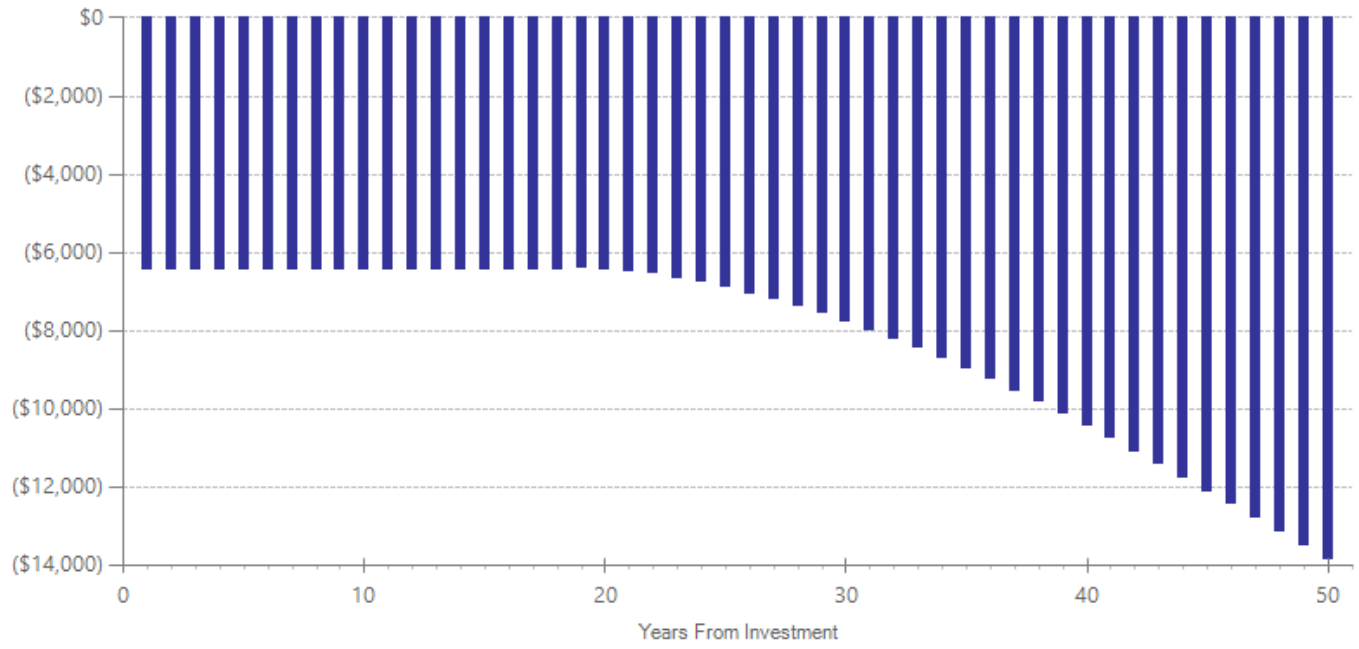
	Annual cost	Year dollars
Program costs	$4,708	2001
Comparison costs	$1,679	2010

Summary	
Present value of net program costs (in 2016 dollars)	($4,324)
Cost range (+ or -)	10 %

Families typically participate in Even Start for a year or less. Per-family costs from St. Pierre, R.G., Ricciuti, A., Tao, F., Creps, C., Swartz, J., Lee, W., Parsad, A., & Rimdzius, T. (2003). *Third National Even Start Evaluation: Program impacts and implications for improvement.* Cambridge, MA. Abt Associates, Inc.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
				First time ES is estimated			Second time ES is estimated				
				ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	Primary	2	183	-0.051	0.142	6	-0.021	0.156	17	-0.051	0.718
Adult literacy^	Secondary	2	234	0.006	0.124	31	0.006	0.124	31	0.006	0.961
Employment^^	Secondary	2	234	0.004	0.216	31	0.004	0.216	31	0.004	0.984
GED attainment^	Secondary	2	249	0.074	0.234	31	0.074	0.234	31	0.074	0.753

^WSIPP's benefit-cost model does not monetize this outcome.

^^WSIPP does not include this outcome when conducting benefit-cost analysis for this program.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Early Head Start

Pre-K to 12 Education

Benefit-cost estimates updated December 2017. Literature review updated April 2012.

Program Description: Early Head Start is a federally-funded program for low-income pregnant women and families with infants or toddlers that aims to enhance children's development and health and strengthen families. Families can receive services until the children are three years old. Early Head Start accounts for 10% of the Head Start budget; program providers determine the specific services offered following Head Start guidelines.

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	$2,176
Participants	$713
Others	$357
Indirect	($4,740)
Total benefits	($1,494)
Net program cost	($11,123)
Benefits minus cost	($12,617)

Benefit to cost ratio	($0.13)
Benefits minus costs	($12,617)
Chance the program will produce benefits greater than the costs	25 %

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

	Participants	Taxpayers	Others[2]	Indirect[3]	Total
Crime	$0	$4	$9	$2	$14
Labor market earnings associated with test scores	$575	$261	$250	$0	$1,086
K-12 grade repetition	$0	$37	$0	$19	$56
K-12 special education	$0	$599	$0	$301	$900
Health care associated with disruptive behavior disorder	$2	$6	$8	$3	$20
Costs of higher education	($11)	($13)	($4)	($7)	($35)
Subtotals	$566	$894	$262	$317	$2,040
From secondary participant					
Labor market earnings associated with major depression	$531	$241	$0	$6	$778
Health care associated with major depression	$25	$77	$95	$38	$234
Public assistance	($409)	$963	$0	$483	$1,037
Subtotals	$147	$1,281	$95	$527	$2,050
Adjustment for deadweight cost of program	$0	$0	$0	($5,585)	($5,585)
Totals	$713	$2,176	$357	($4,740)	($1,494)

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

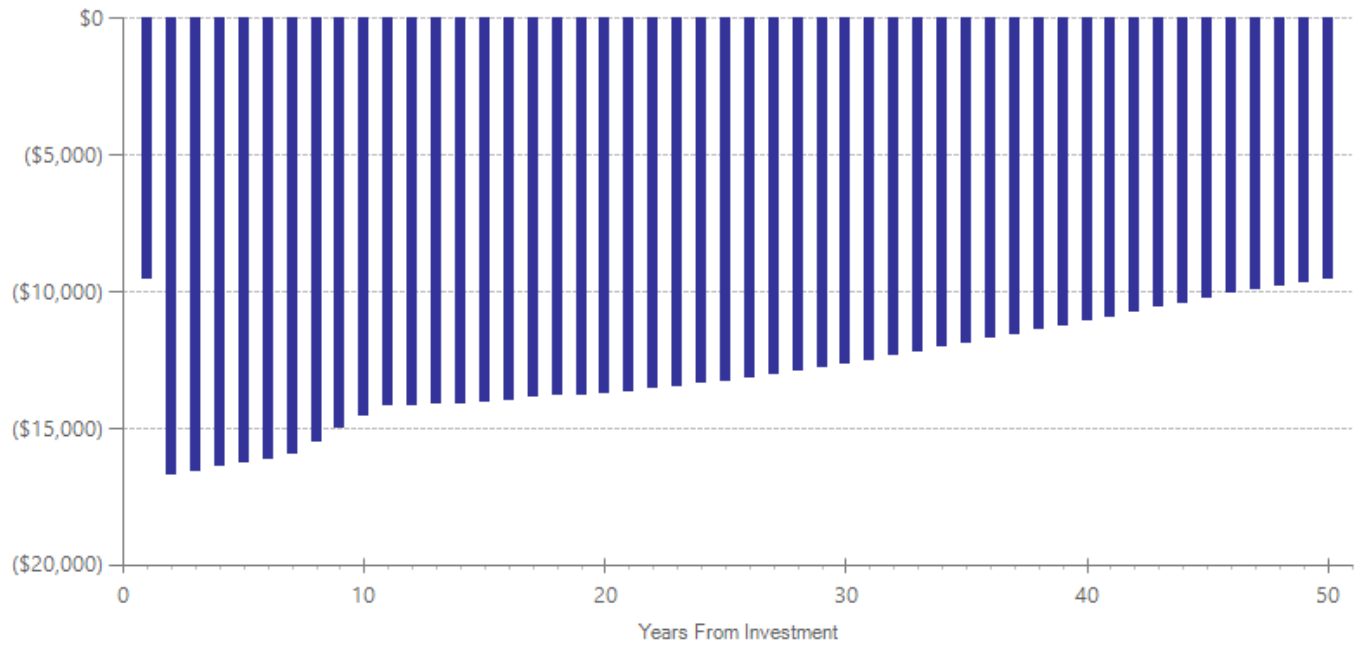
Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$7,600	2010	Present value of net program costs (in 2016 dollars)	($11,123)
Comparison costs	$1,679	2010	Cost range (+ or -)	10 %

Families who participate in Early Head Start typically participate for 1.75 years. Per-family costs from the US Department of Health and Human Services, Administration for Children & Families, FY 2010.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
				First time ES is estimated			Second time ES is estimated				
				ES	SE	Age	ES	SE	Age	ES	p-value
Crime	Primary	1	842	0.000	0.050	10	0.000	0.050	20	0.000	1.000
Externalizing behavior symptoms	Primary	1	842	-0.038	0.050	10	-0.018	0.027	13	-0.038	0.447
Internalizing symptoms	Primary	1	842	-0.052	0.050	10	-0.038	0.042	12	-0.052	0.296
K-12 grade repetition	Primary	1	842	-0.041	0.088	10	-0.041	0.088	17	-0.041	0.637
K-12 special education	Primary	1	842	-0.093	0.081	10	-0.093	0.081	17	-0.093	0.252
Test scores	Primary	1	842	0.011	0.052	10	0.007	0.057	17	0.011	0.827
Employment^^	Secondary	1	842	0.000	0.050	29	0.000	0.050	39	0.000	1.000
Major depressive disorder	Secondary	1	842	-0.045	0.050	29	-0.023	0.274	31	-0.045	0.364
Public assistance	Secondary	1	842	-0.073	0.060	29	-0.073	0.060	39	-0.073	0.224
Substance misuse^	Secondary	1	842	-0.008	0.112	29	-0.008	0.112	39	-0.008	0.940
Years of education	Secondary	1	842	0.000	0.050	29	0.000	0.050	39	0.000	1.000

^WSIPP's benefit-cost model does not monetize this outcome.

^^WSIPP does not include this outcome when conducting benefit-cost analysis for this program.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

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Daily Behavior Report Cards

Pre-K to 12 Education

Literature review updated April 2018.

Program Description: Daily behavior report cards (DBRC) are a systematic method of communicating with parents about a student's behavior in school. Typically, teachers identify students exhibiting behavior problems for participation. The report cards are sent home with the child or electronically, and the student must return the form the following morning with the parent's signature. Behavioral reinforcements or consequences are delivered to students by parents or teachers and are selected based on the individual child. In this analysis, teachers issued electronic report cards to students in 3rd grade over a three-week period, and parents issued behavioral rewards or consequences.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Attention-deficit/hyperactivity disorder symptoms	1	31	-0.065	0.340	8	0.000	0.017	9	-0.284	0.405
Externalizing behavior symptoms	1	31	-0.158	0.340	8	-0.075	0.179	11	-0.685	0.049
Internalizing symptoms	1	31	-1.070	0.359	8	-0.779	0.410	10	-1.070	0.003

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Citations Used in the Meta-Analysis

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Charter schools: overall impact

Pre-K to 12 Education

Literature review updated August 2013.

Program Description: A charter school is a public school governed under a “charter,” or contract, between the group operating the school and an authorizing agency, typically a state or local jurisdiction. Charter schools are often exempt from some state or local rules and regulations but must meet accountability standards articulated in its charter. The studies included in this analysis measure the impact of attending a charter school compared to a traditional public school. We present the findings for reading scores here.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	65	1597623	0.013	0.007	12	0.010	0.007	17	0.013	0.057

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Citations Used in the Meta-Analysis

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Academic vocabulary instruction

Pre-K to 12 Education

Literature review updated March 2018.

Program Description: Academic Vocabulary Instruction is a structured approach to teaching specialized vocabulary words that appear frequently in expository, informational, and academic texts across disciplines (especially in secondary grades) but that are not commonly used in spoken English, such as hypothesis, generate, and domain. The program included in this analysis (Academic Language Instruction for All Students, or ALIAS) was designed for use in classrooms with low performance in English Language Arts and high numbers of English Language Learners. The program provided daily lessons to middle school students over 20 weeks, covered 70 vocabulary words, and provided teachers with materials and monthly implementation support meetings.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	1	971	0.019	0.044	11	0.013	0.048	17	0.043	0.326

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Citations Used in the Meta-Analysis

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Pre-K and elementary bilingual instruction for English language learners

Pre-K to 12 Education

Literature review updated June 2014.

Program Description: Bilingual instructional programs provide English language learner (ELL) students with classroom instruction partially in their native language and partially in English. The evaluations included in this analysis compare programs that use bilingual instruction to those in which instruction is conducted entirely in English, such as English as a Second Language (ESL) teaching strategies.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	21	58227	0.014	0.006	9	0.008	0.006	17	0.014	0.016

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Charter schools: urban charter schools

Pre-K to 12 Education

Literature review updated August 2013.

Program Description: Charter schools have traditionally been located in cities; many are designed to serve minority students in high-poverty areas. A body of literature suggests that charter schools located in urban areas may be more effective than charters located outside of the urban core. The studies in this analysis measure the impact of attending a charter school compared to a traditional public school in urban areas. The analysis includes findings from specific cities (e.g. New York or Chicago), as well as statewide studies that examine impacts by urbanicity. We present the findings for reading scores here.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	38	339551	0.044	0.013	12	0.034	0.014	17	0.044	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Principal quality

Pre-K to 12 Education

Literature review updated August 2013.

Program Description: Do school principals directly affect student academic outcomes? The studies in this analysis use a "fixed effects" statistical approach to examine variation in principal quality. The studies focus on principals that move from one school to another; impacts on student outcomes can be estimated for different principals in the same school. The effects presented here represent the impact on test scores from a principal who is one standard deviation above average principal effectiveness.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	6	2580828	0.107	0.020	11	0.077	0.022	17	0.107	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Charter schools: Knowledge Is Power Program (KIPP)

Pre-K to 12 Education

Literature review updated August 2013.

Program Description: The Knowledge is Power Program (KIPP) is a network of public charter schools operating in 20 states and the District of Columbia. The schools predominantly enroll low-income and minority students. The studies included in this analysis are of KIPP middle schools around the country and measure the impact of attending a KIPP school compared to a traditional public school. The evidence suggests that KIPP charter schools improve test scores in both reading and math. We present the findings for reading scores here.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	9	16665	0.053	0.011	11	0.038	0.012	17	0.053	0.001

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

Citations Used in the Meta-Analysis

Angrist, J.D., Dynarski, S.M., Kane, T.J., Pathak, P.A., & Walters, C.R. (2012). *Who benefits from KIPP? Journal of Policy Analysis and Management.* Advance online publication. doi: 10.1002/pam.21647.

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Teacher in-subject graduate degrees

Pre-K to 12 Education

Literature review updated April 2012.

Program Description: This analysis examines the impact of having a teacher with a graduate degree in the subject that they teach (e.g., a math teacher with a graduate degree in mathematics), versus having a teacher without a graduate degree, holding all other measured school, teacher, and student characteristics equal.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	7	58621	0.028	0.011	11	0.020	0.012	17	0.028	0.013

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

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Citations Used in the Meta-Analysis

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Teacher graduate degrees

Pre-K to 12 Education

Literature review updated April 2012.

Program Description: This analysis examines the impact of having a teacher with a graduate degree, versus having a teacher without a graduate degree, holding all other measured school, teacher, and student characteristics equal.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	31	5242072	0.000	0.002	11	0.000	0.002	17	0.000	0.931

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

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Model early childhood education programs

Pre-K to 12 Education

Literature review updated December 2013.

Program Description: This analysis focuses on pre-kindergarten programs developed and administered by researchers primarily in the 1960s and 1970s, including demonstration and pilot programs such as Abecedarian and Perry Preschool. The curriculum and philosophy of these programs varied widely and programs ranged in length from one to five years.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
				First time ES is estimated			Second time ES is estimated				
				ES	SE	Age	ES	SE	Age	ES	p-value
Crime	Primary	2	110	-0.322	0.214	29	-0.322	0.214	39	-0.322	0.132
High school graduation	Primary	3	203	0.314	0.265	18	0.314	0.265	18	0.314	0.237
K-12 grade repetition	Primary	3	192	-0.463	0.253	17	-0.463	0.253	17	-0.463	0.067
K-12 special education	Primary	3	204	-0.470	0.263	17	-0.470	0.263	17	-0.470	0.074
Teen births under age 18	Primary	2	109	-0.441	0.395	17	-0.441	0.395	17	-0.441	0.265
Test scores	Primary	2	309	0.568	0.123	4	0.119	0.136	17	0.568	0.001
Teen births (second generation)	Secondary	2	109	-0.441	0.395	17	-0.441	0.395	17	-0.441	0.265

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An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Transition programs for incoming kindergarteners

Pre-K to 12 Education

Literature review updated March 2018.

Program Description: Transition programs for incoming kindergarteners provide support to at-risk students and their caregivers in order to enhance school readiness, improve academic and social skills, and increase caregiver involvement in school. In the program included in this analysis (Kids in Transition to School [KITS]), students attend 24 structured group sessions over two months in the summer prior to kindergarten entry and two months in the fall after school begins. The sessions focus on early literacy, prosocial skills, and self-regulation. In addition, caregivers attend 12 workshops with a focus on parenting skills, behavior management, and strategies to help their student develop literacy skills and consistent academic routines.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Externalizing behavior symptoms	1	102	-0.094	0.282	6	-0.045	0.147	9	-0.218	0.440
Test scores	1	102	0.052	0.215	5	0.016	0.236	17	0.122	0.570

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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Teacher experience

Pre-K to 12 Education

Literature review updated April 2012.

Program Description: We performed an analysis of how student test scores improved as their teacher's years of experience increased—more experienced teachers are compared with beginning teachers. This estimate represents the average annual gain in the first five years of teaching.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	53	14393842	0.058	0.005	11	0.042	0.005	17	0.058	0.001

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Charter schools: non-urban charter schools

Pre-K to 12 Education

Literature review updated August 2013.

Program Description: While charter schools traditionally operate in urban areas, there is a growing body of literature that examines the impact of attending charters located outside of central cities. This analysis include only studies that measure the impact of attending charter schools located outside of urban areas, including suburban and rural schools. The evidence suggests that charter schools located outside of urban areas have no consistent impact on student test scores compared to traditional public schools. We present the findings for reading scores here.

Meta-Analysis of Program Effects

Outcomes measured	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
			First time ES is estimated			Second time ES is estimated				
			ES	SE	Age	ES	SE	Age	ES	p-value
Test scores	5	21015	0.011	0.028	11	0.008	0.031	17	0.011	0.695

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

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