

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.

## Lifestyle interventions to prevent diabetes: Long-term, intensive, individual counseling programs

### Health Care: Obesity and Diabetes

Benefit-cost estimates updated May 2017. Literature review updated February 2017.

Program Description: All lifestyle programs target individuals at high risk for developing type 2 diabetes, providing them with counseling and other support. Typical programs in this specific category include three years of active intervention with individual counseling sessions and supervised exercise classes.

#### Benefit-Cost Summary Statistics Per Participant

##### Benefits to:

Taxpayers	\$11,936	Benefit to cost ratio	\$7.87
Participants	\$11,998	Benefits minus costs	\$26,000
Others	\$3,075	Chance the program will produce	
Indirect	\$2,779	benefits greater than the costs	100 %
<b>Total benefits</b>	<b>\$29,787</b>		
<b>Net program cost</b>	<b>(\$3,787)</b>		
<b>Benefits minus cost</b>	<b>\$26,000</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with diabetes	\$10,237	\$4,649	\$0	\$936	\$15,821
Health care associated with diabetes	\$1,761	\$7,287	\$3,075	\$3,753	\$15,876
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$1,910)	(\$1,910)
<b>Totals</b>	<b>\$11,998</b>	<b>\$11,936</b>	<b>\$3,075</b>	<b>\$2,779</b>	<b>\$29,787</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

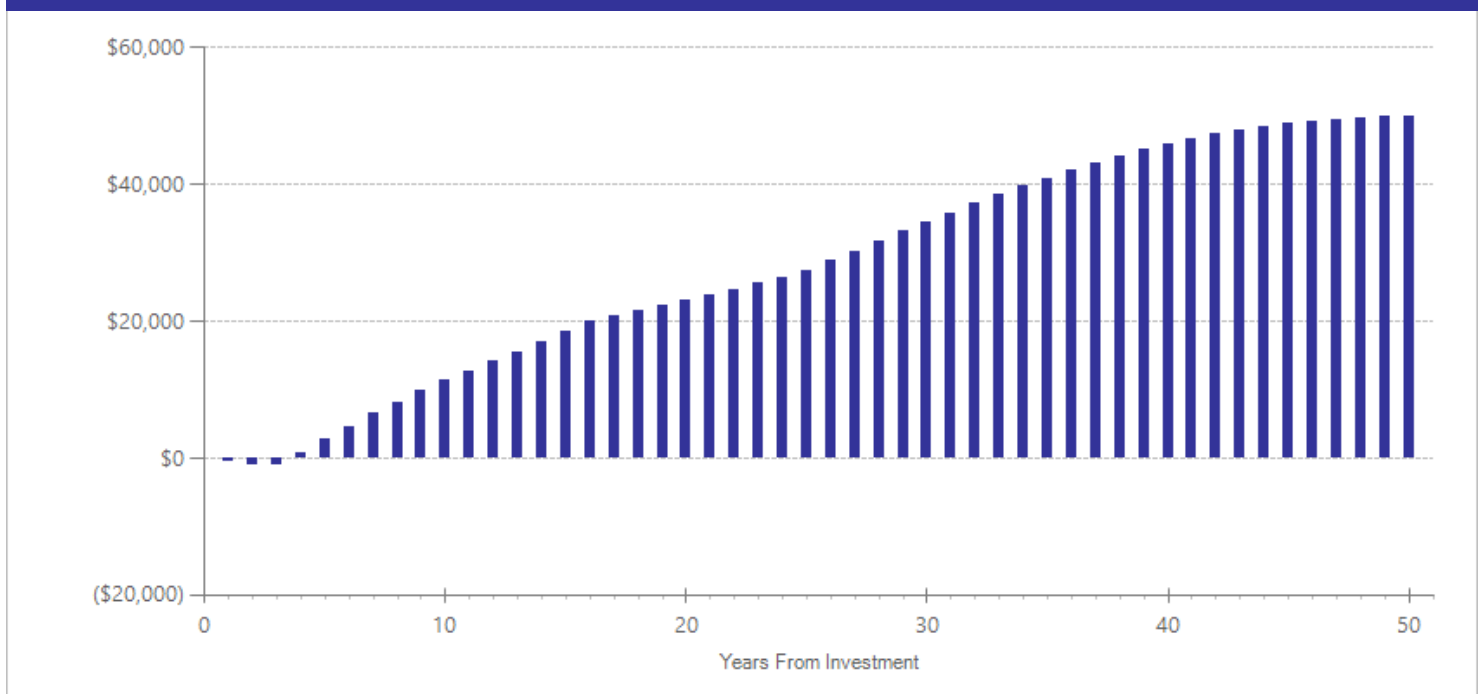
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$1,287	2014	Present value of net program costs (in 2016 dollars)	(\$3,787)
Comparison costs	\$0	2014	Cost range (+ or -)	10 %

These programs typically last for three years. Per-participant estimates are based on costs observed in the US Diabetes Prevention Program (DPP) trial. WSIPP averaged annual costs for treatment over control, inflated to 2014 dollars.

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	p-value
			ES	SE	Age	ES	SE	Age		
Diabetes incidence	2	1344	-0.533	0.098	53	-0.255	0.077	60	-0.533	0.001
Fasting glucose <sup>^</sup>	2	1344	-0.453	0.053	50	n/a	n/a	n/a	-0.453	0.001
Weight change	2	1344	-0.298	0.052	53	0.000	0.054	60	-0.298	0.001

<sup>^</sup>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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# Lifestyle interventions to prevent diabetes: Shorter-term programs with group-based counseling

## Health Care: Obesity and Diabetes

Benefit-cost estimates updated May 2017. Literature review updated February 2017.

Program Description: All lifestyle diabetes prevention programs target individuals at high risk for developing type 2 diabetes, providing them with counseling and other support. Programs in this specific category are shorter-term, lower-cost, group-based counseling programs provided in community settings (e.g., YMCA's, churches).

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$4,875	Benefit to cost ratio	\$30.82
Participants	\$6,303	Benefits minus costs	\$13,309
Others	\$1,359	Chance the program will produce	
Indirect	\$1,218	benefits greater than the costs	80 %
<b>Total benefits</b>	<b>\$13,756</b>		
<b>Net program cost</b>	<b>(\$446)</b>		
<b>Benefits minus cost</b>	<b>\$13,309</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with diabetes	\$5,767	\$2,619	\$0	\$316	\$8,703
Health care associated with diabetes	\$535	\$2,256	\$1,359	\$1,125	\$5,276
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$223)	(\$223)
<b>Totals</b>	<b>\$6,303</b>	<b>\$4,875</b>	<b>\$1,359</b>	<b>\$1,218</b>	<b>\$13,756</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

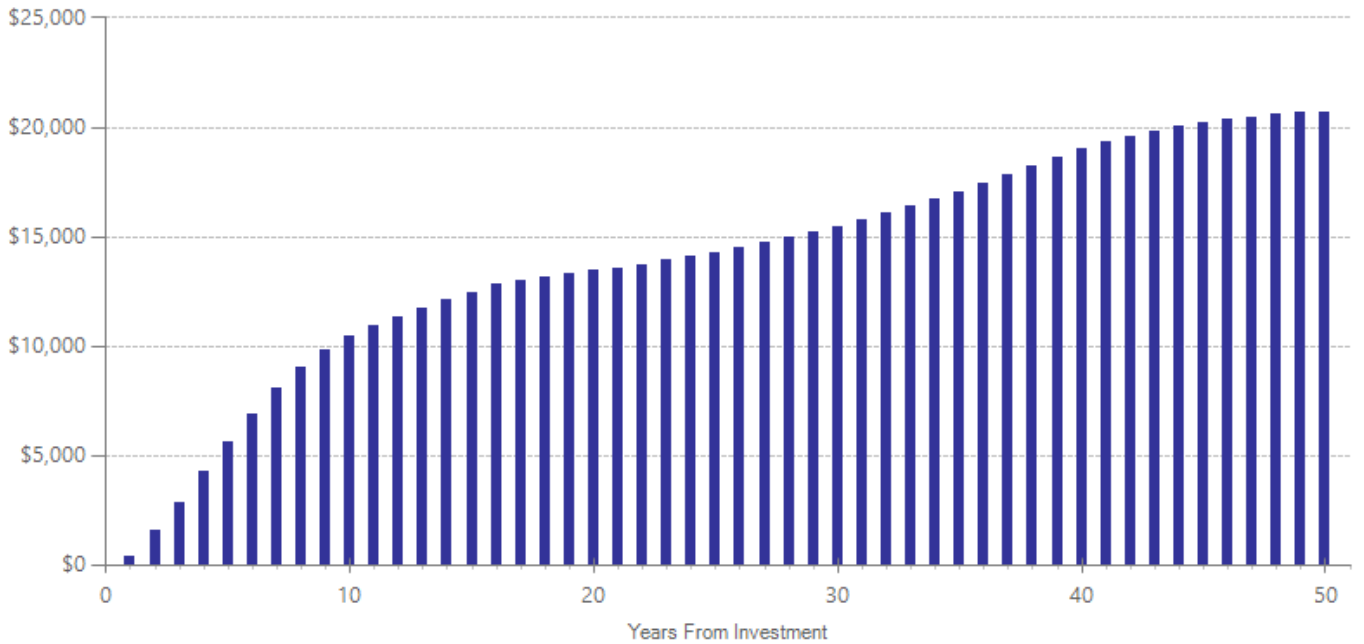
### Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$440	2014	Present value of net program costs (in 2016 dollars)	(\$446)
Comparison costs	\$0	2014	Cost range (+ or -)	10 %

These programs typically last for up to one year. Per-participant costs are based on a 2014 Washington Department of Health Diabetes Epidemic and Action Report (p. 133), accessed from: <http://www.doh.wa.gov/Portals/1/Documents/Pubs/345-342-DiabetesEpidemicActionReport.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	p-value
			ES	SE	Age	ES	SE	Age		
Fasting glucose <sup>^</sup>	7	763	-0.292	0.074	50	n/a	n/a	n/a	-0.292	0.001
Weight change	7	490	-0.156	0.101	53	-0.048	0.101	60	-0.218	0.002

<sup>^</sup>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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# Behavioral interventions to reduce obesity for adults: High-intensity, in-person programs

## Health Care: Obesity and Diabetes

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

Program Description: Behavioral interventions for obesity include behavioral counseling, therapy, and educational components, and often include diet and exercise components as well. For this review of interventions for obese adults, we excluded studies that targeted diabetic populations as well as those aimed at preventing obesity.

Programs in this specific category are delivered to obese adults, and conducted face-to-face, with 12 or more sessions a year for 12 months or more.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$500	Benefit to cost ratio	\$3.68
Participants	\$889	Benefits minus costs	\$1,673
Others	\$299	Chance the program will produce	
Indirect	\$609	benefits greater than the costs	59 %
<b>Total benefits</b>	<b>\$2,297</b>		
<b>Net program cost</b>	<b>(\$624)</b>		
<b>Benefits minus cost</b>	<b>\$1,673</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with obesity	\$834	\$379	\$0	\$859	\$2,071
Health care associated with obesity	\$56	\$122	\$299	\$59	\$536
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$310)	(\$310)
<b>Totals</b>	<b>\$889</b>	<b>\$500</b>	<b>\$299</b>	<b>\$609</b>	<b>\$2,297</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

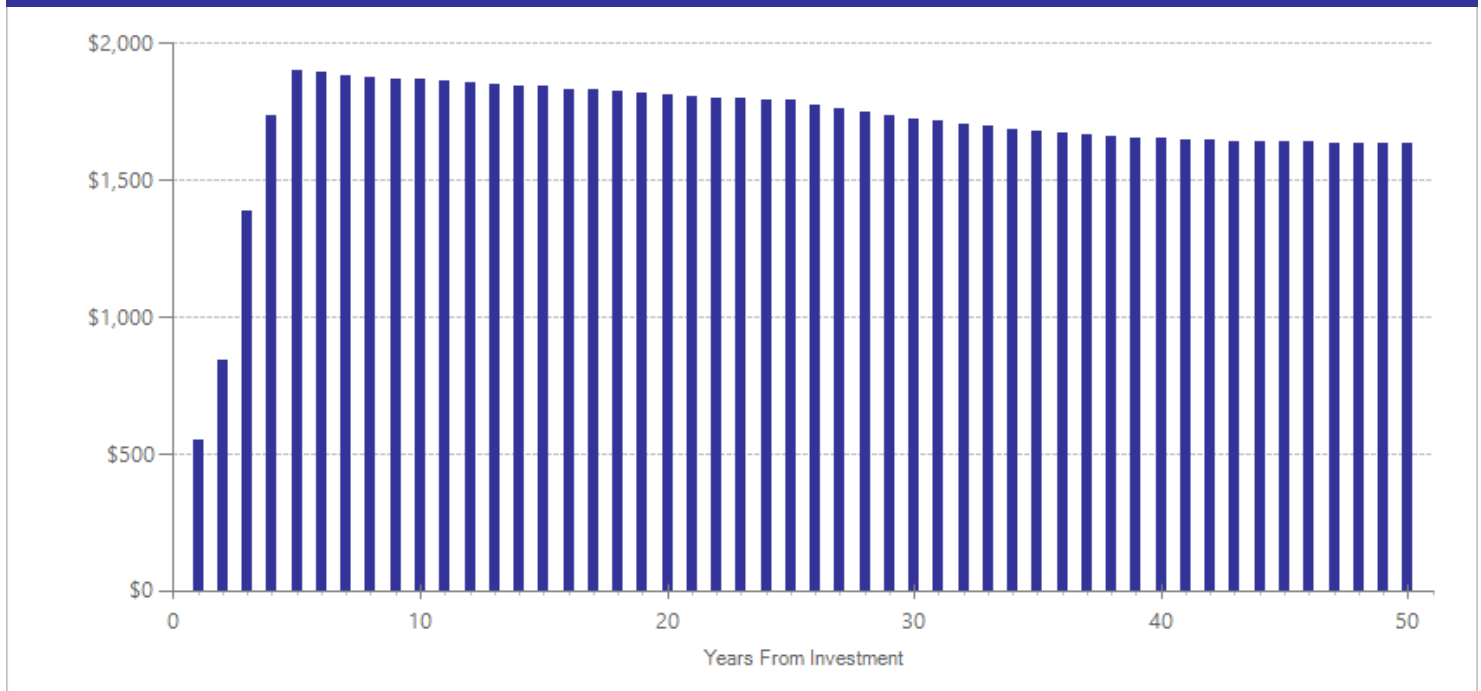
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$313	2014	Present value of net program costs (in 2016 dollars)	(\$624)
Comparison costs	\$0	2014	Cost range (+ or -)	25 %

On average, these programs provide approximately 52 contact hours over 24 months, including both group and individual sessions. The average per-participant cost of these programs was computed using contact hours and average Washington State 2014 hourly wages of the appropriate professionals who conducted the intervention (generally dietitians, nurses, general practitioners, or therapists).

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	p-value
			ES	SE	Age	ES	SE	Age		
Diastolic blood pressure <sup>^</sup>	8	1641	-0.340	0.165	50	n/a	n/a	n/a	-0.340	0.040
HDL cholesterol <sup>^</sup>	7	986	0.049	0.051	50	n/a	n/a	n/a	0.049	0.343
LDL cholesterol <sup>^</sup>	7	986	-0.011	0.051	50	n/a	n/a	n/a	-0.011	0.827
Obesity	9	1357	-0.238	0.087	50	0.000	0.086	55	-0.238	0.006
Systolic blood pressure <sup>^</sup>	8	1641	-0.123	0.047	50	n/a	n/a	n/a	-0.123	0.009
Weight change	12	2070	-0.174	0.050	50	0.000	0.012	55	-0.174	0.001

<sup>^</sup>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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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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# Behavioral interventions to reduce obesity for adults: Remotely-delivered programs

## Health Care: Obesity and Diabetes

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

Program Description: Behavioral interventions for obesity include behavioral counseling, therapy, and educational components, and often include diet and exercise components as well. For this review of interventions for obese adults, we excluded studies that targeted diabetic populations as well as those aimed at preventing obesity.

Programs in this specific category are delivered to obese adults, and conducted remotely, usually via computer or phone.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$153	Benefit to cost ratio	\$8.23
Participants	\$285	Benefits minus costs	\$689
Others	\$92	Chance the program will produce	
Indirect	\$255	benefits greater than the costs	54 %
<u>Total benefits</u>	<u>\$784</u>		
<u>Net program cost</u>	<u>(\$95)</u>		
Benefits minus cost	\$689		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with obesity	\$272	\$123	\$0	\$285	\$681
Health care associated with obesity	\$13	\$30	\$92	\$17	\$151
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$48)	(\$48)
Totals	\$285	\$153	\$92	\$255	\$784

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

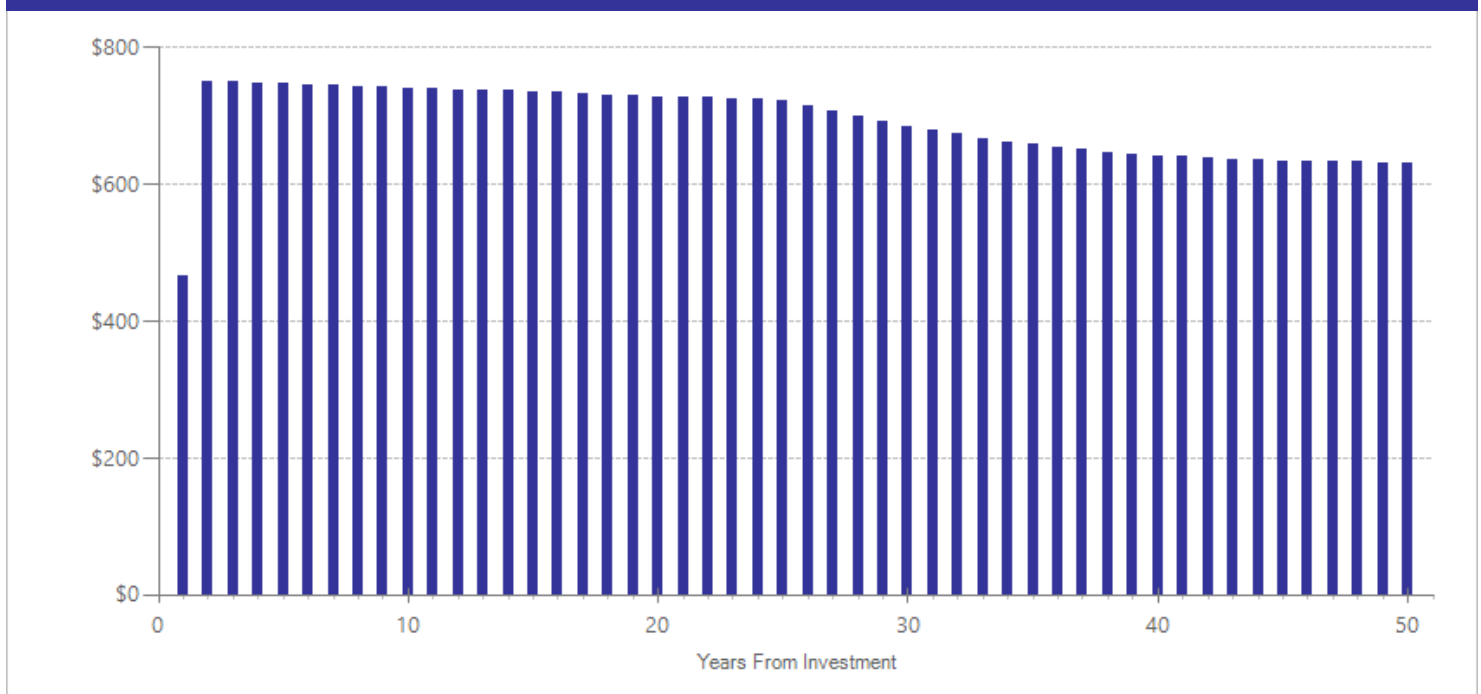
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$94	2014	Present value of net program costs (in 2016 dollars)	(\$95)
Comparison costs	\$0	2014	Cost range (+ or -)	25 %

On average, these interventions occur over approximately 18 months. For programs that require intervention staff time, participants received an average of approximately 2.5 contact hours. The average per-participant cost of these programs was computed using contact hours and average Washington State 2014 hourly wages of the appropriate professionals who conducted the intervention (generally dietitians, nurses, general practitioners, or therapists). For the remote programs with "eHealth" technology (web or computer programs, automated phone programs), we estimated costs from the calculations of Ritzwoller, D.P. et al., (2013). Economic analyses of the Be Fit Be Well Program: A weight loss program for community health centers. *Journal of General Internal Medicine*, 28(12), 1581-1588.

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	p-value
			ES	SE	Age	ES	SE	Age		
Diastolic blood pressure <sup>^</sup>	5	627	-0.069	0.056	50	n/a	n/a	n/a	-0.069	0.219
Obesity	5	608	-0.139	0.057	50	0.000	0.086	52	-0.139	0.015
Systolic blood pressure <sup>^</sup>	5	627	-0.101	0.056	50	n/a	n/a	n/a	-0.101	0.073
Weight change	9	1092	-0.115	0.046	50	0.000	0.012	52	-0.115	0.013

<sup>^</sup>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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# Behavioral interventions to reduce obesity for adults: Low-intensity, in-person programs

## Health Care: Obesity and Diabetes

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

Program Description: Behavioral interventions for obesity include behavioral counseling, therapy, and educational components—often including diet and exercise components. For this review of interventions for obese adults, we excluded studies that targeted diabetic populations as well as those aimed at preventing obesity.

Programs in this specific category are delivered to obese adults, and conducted face-to-face, with fewer than 12 sessions a year or for less than 12 months.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$48	Benefit to cost ratio	\$0.86
Participants	\$83	Benefits minus costs	(\$26)
Others	\$28	Chance the program will produce	
Indirect	(\$1)	benefits greater than the costs	46 %
<u>Total benefits</u>	<u>\$158</u>		
<u>Net program cost</u>	<u>(\$185)</u>		
Benefits minus cost	(\$26)		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with obesity	\$77	\$35	\$0	\$85	\$197
Health care associated with obesity	\$6	\$13	\$28	\$7	\$54
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$93)	(\$93)
<u>Totals</u>	<u>\$83</u>	<u>\$48</u>	<u>\$28</u>	<u>(\$1)</u>	<u>\$158</u>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

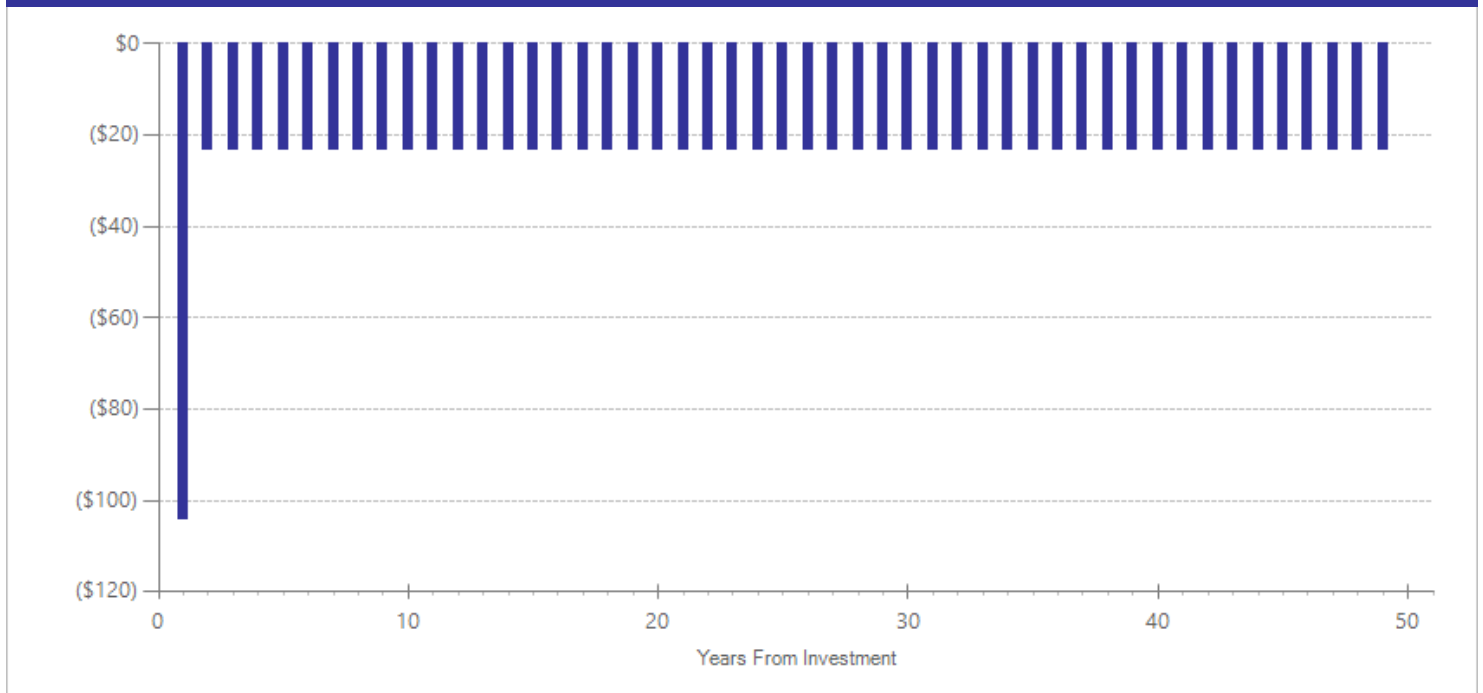
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$182	2014	Present value of net program costs (in 2016 dollars)	(\$185)
Comparison costs	\$0	2014	Cost range (+ or -)	25 %

On average, these programs provide approximately six contact hours over seven months, including both group and individual sessions. The average per-participant cost of these programs was computed using contact hours and average Washington State 2014 hourly wages of the appropriate professionals who conducted the intervention (generally dietitians, nurses, general practitioners, or therapists).

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	p-value
			ES	SE	Age	ES	SE	Age		
Diastolic blood pressure <sup>^</sup>	6	697	-0.146	0.073	51	n/a	n/a	n/a	-0.146	0.047
HDL cholesterol <sup>^</sup>	4	474	0.069	0.181	51	n/a	n/a	n/a	0.069	0.705
LDL cholesterol <sup>^</sup>	4	474	-0.205	0.100	51	n/a	n/a	n/a	-0.205	0.041
Obesity	4	554	-0.040	0.079	51	0.000	0.086	53	-0.040	0.610
Systolic blood pressure <sup>^</sup>	6	697	-0.112	0.078	51	n/a	n/a	n/a	-0.112	0.154
Weight change	10	1004	-0.084	0.057	51	0.000	0.012	53	-0.084	0.138

<sup>^</sup>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](#).

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# Behavioral interventions to reduce obesity for children: Remotely-delivered programs

## Health Care: Obesity and Diabetes

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

Program Description: The behavioral interventions included in this analysis target obese and overweight youth under age 18, providing them with counseling, education, and other supports to improve diet, increase physical activity, and reduce weight. The programs use techniques designed to promote and sustain behavioral changes, including goal setting, self-monitoring, stimulus control, and other strategies. The programs in this category provided were delivered remotely, usually via computer or phone.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$10	Benefit to cost ratio	\$0.47
Participants	\$2	Benefits minus costs	(\$34)
Others	\$28	Chance the program will produce	
Indirect	(\$8)	benefits greater than the costs	49 %
<b>Total benefits</b>	<b>\$31</b>		
<b>Net program cost</b>	<b>(\$65)</b>		
<b>Benefits minus cost</b>	<b>(\$34)</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with obesity	(\$3)	(\$2)	\$0	\$19	\$15
Health care associated with obesity	\$5	\$11	\$28	\$5	\$49
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$33)	(\$33)
<b>Totals</b>	<b>\$2</b>	<b>\$10</b>	<b>\$28</b>	<b>(\$8)</b>	<b>\$31</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

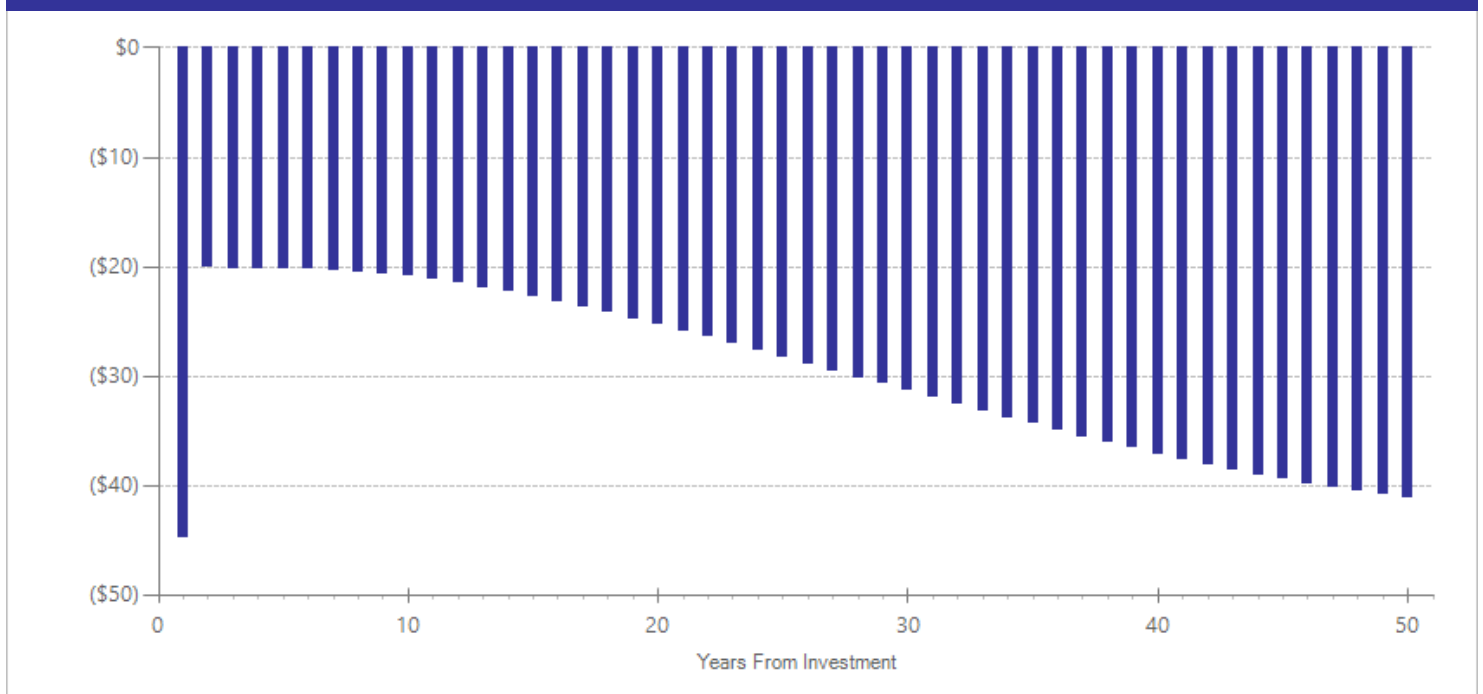
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$64	2014	Present value of net program costs (in 2016 dollars)	(\$65)
Comparison costs	\$0	2014	Cost range (+ or -)	25 %

On average, these interventions occur over approximately four months. For programs that require intervention staff time, participants received an average of approximately four contact hours. The average per-participant cost of these programs was computed using contact hours and average Washington State 2014 hourly wages of the appropriate professionals who conducted the intervention (generally dietitians, nurses, general practitioners, or therapists). For the remote programs with "eHealth" technology (web or computer programs, automated phone programs), we estimate costs from the calculations of Ritzwoller, D.P. et al., (2013). Economic analyses of the Be Fit Be Well Program: A weight loss program for community health centers. *Journal of General Internal Medicine*, 28(12), 1581-1588.

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	p-value
			ES	SE	Age	ES	SE	Age		
Obesity	4	142	-0.151	0.131	12	0.000	0.101	14	-0.151	0.249
Weight change	3	74	-0.117	0.178	12	0.000	0.070	14	-0.117	0.510

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

- Doyle, A. C., Goldschmidt, A., Huang, C., Winzelberg, A. J., Taylor, C. B., & Wilfley, D. E. (2008). Reduction of Overweight and Eating Disorder Symptoms via the Internet in Adolescents: A Randomized Controlled Trial. *Journal of Adolescent Health, 43*(2), 172-179.
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# Behavioral interventions to reduce obesity for children: Low-intensity, in-person programs

## Health Care: Obesity and Diabetes

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

**Program Description:** The behavioral interventions included in this analysis target obese and overweight youth under age 18, providing them with counseling, education, and other supports to improve diet, increase physical activity, and reduce weight. The programs use techniques designed to promote and sustain behavioral changes, including goal setting, self-monitoring, stimulus control, and other strategies.

The programs in this specific category provided less than 25 hours of face-to-face intervention.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$4	Benefit to cost ratio	(\$0.30)
Participants	(\$6)	Benefits minus costs	(\$215)
Others	\$23	Chance the program will produce	
Indirect	(\$70)	benefits greater than the costs	46 %
<b>Total benefits</b>	<b>(\$50)</b>		
<b>Net program cost</b>	<b>(\$165)</b>		
<b>Benefits minus cost</b>	<b>(\$215)</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with obesity	(\$10)	(\$5)	\$0	\$10	(\$5)
Health care associated with obesity	\$4	\$8	\$23	\$3	\$38
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$83)	(\$83)
<b>Totals</b>	<b>(\$6)</b>	<b>\$4</b>	<b>\$23</b>	<b>(\$70)</b>	<b>(\$50)</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

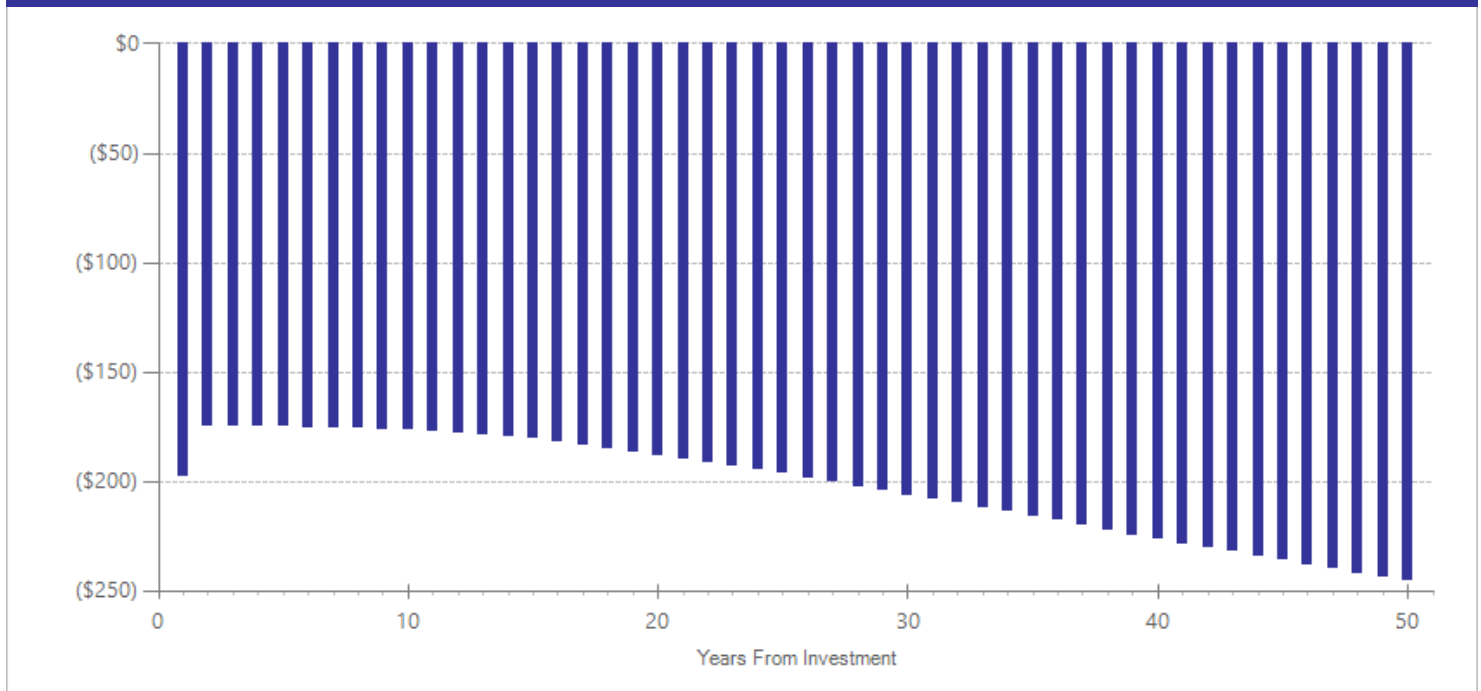
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$162	2014	Present value of net program costs (in 2016 dollars)	(\$165)
Comparison costs	\$0	2014	Cost range (+ or -)	25 %

On average, these programs provide approximately nine contact hours over six months, including both group and individual sessions. The average per-participant cost of these programs was computed using contact hours and average Washington State 2014 hourly wages of the appropriate professionals who conducted the intervention (generally dietitians, nurses, general practitioners, or therapists).

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	p-value
			ES	SE	Age	ES	SE	Age		
Obesity	12	778	-0.148	0.054	10	0.000	0.101	12	-0.148	0.006
Weight change	4	94	-0.201	0.143	10	0.000	0.070	12	-0.201	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](#).

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# Behavioral interventions to reduce obesity for children: Moderate- to high-intensity, face-to-face programs

## Health Care: Obesity and Diabetes

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

**Program Description:** The behavioral interventions included in this analysis target obese and overweight youth under age 18, providing them with counseling, education, and other supports to improve diet, increase physical activity, and reduce weight. The programs use techniques designed to promote and sustain behavioral changes, including goal setting, self-monitoring, stimulus control, and other strategies.

The programs in this specific category provided at least 25 hours of face-to-face intervention.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$35	Benefit to cost ratio	\$0.08
Participants	\$19	Benefits minus costs	(\$306)
Others	\$72	Chance the program will produce	
Indirect	(\$99)	benefits greater than the costs	46 %
<u>Total benefits</u>	<u>\$27</u>		
<u>Net program cost</u>	<u>(\$333)</u>		
Benefits minus cost	(\$306)		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with obesity	\$5	\$2	\$0	\$50	\$56
Health care associated with obesity	\$15	\$33	\$72	\$16	\$136
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$165)	(\$165)
<b>Totals</b>	<b>\$19</b>	<b>\$35</b>	<b>\$72</b>	<b>(\$99)</b>	<b>\$27</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

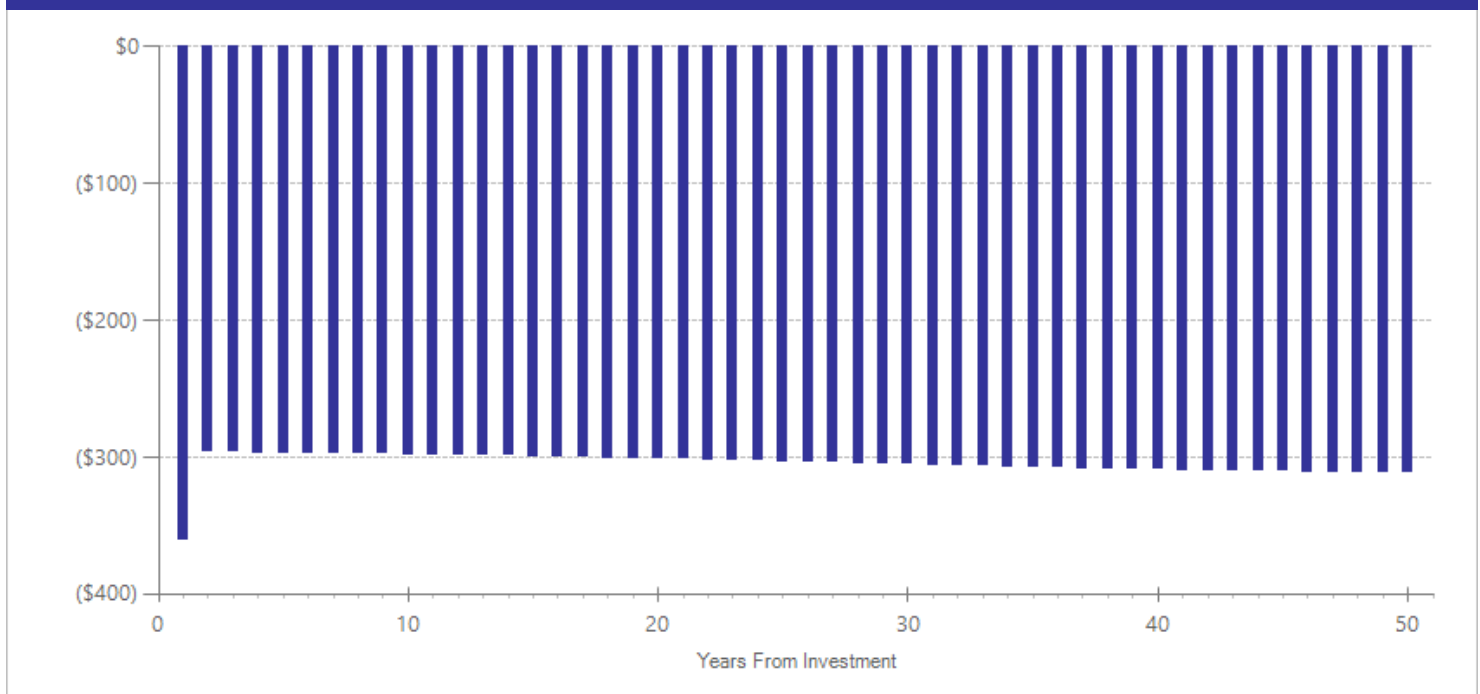
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$328	2014	Present value of net program costs (in 2016 dollars)	(\$333)
Comparison costs	\$0	2014	Cost range (+ or -)	25 %

On average, these programs provide approximately 48 contact hours over six months, including both group and individual sessions. The average per-participant cost of these programs was computed using contact hours and average Washington State 2014 hourly wages of the appropriate professionals who conducted the intervention (generally dietitians, nurses, general practitioners, or therapists).

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	p-value
			ES	SE	Age	ES	SE	Age		
Obesity	14	638	-0.378	0.087	12	0.000	0.101	14	-0.378	0.001
Weight change	11	493	-0.206	0.070	12	0.000	0.070	14	-0.206	0.003

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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# Transitional care programs to prevent hospital readmissions: Comprehensive programs

## Health Care: Health Care System Efficiency

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

Program Description: Comprehensive transitional care programs focus on preventing future hospital readmissions after discharge. Interventions include pre-discharge assistance (e.g., a transition coach, enhanced discharge planning, and primary care provider communication), as well as post-discharge follow-up.

The effects in this analysis reflect the effects of comprehensive transitional care programs on high-risk patient populations.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$834	Benefit to cost ratio	\$4.32
Participants	\$47	Benefits minus costs	\$1,390
Others	\$720	Chance the program will produce	
Indirect	\$208	benefits greater than the costs	100 %
<b>Total benefits</b>	<b>\$1,809</b>		
<b>Net program cost</b>	<b>(\$419)</b>		
<b>Benefits minus cost</b>	<b>\$1,390</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with hospital readmissions	\$47	\$834	\$720	\$417	\$2,018
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$209)	(\$209)
<b>Totals</b>	<b>\$47</b>	<b>\$834</b>	<b>\$720</b>	<b>\$208</b>	<b>\$1,809</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

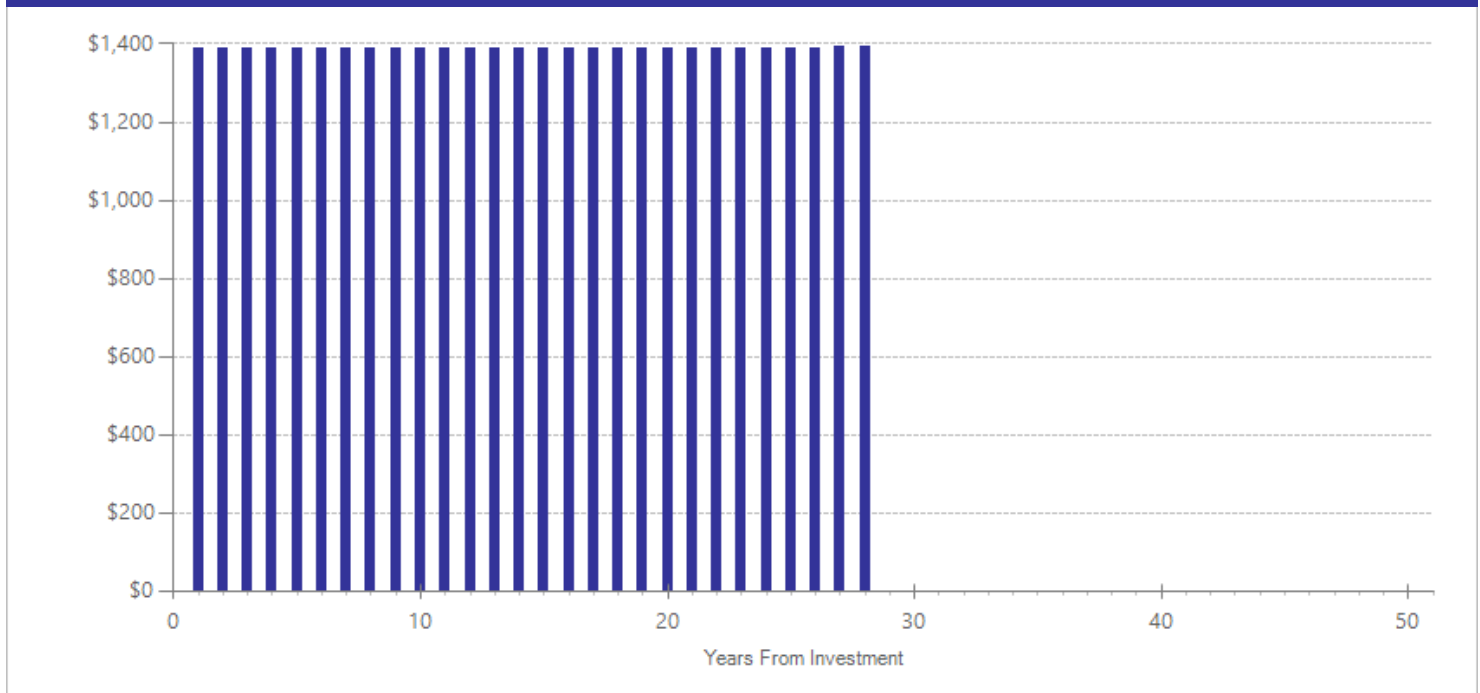
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$413	2014	Present value of net program costs (in 2016 dollars)	(\$419)
Comparison costs	\$0	2014	Cost range (+ or -)	37 %

We estimated an average per-participant cost by computing an average of the typical costs reported in each study in our analysis. These costs include the salary of the nurse practitioner (main cost), cell phone and pager costs, mileage expenses, and costs for the reproduction of personal health record. When a study reported nursing staff hours, we estimated nursing costs by applying the most recent reported average wages reported in Washington State.

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	p-value
			ES	SE	Age	ES	SE	Age		
Hospital readmissions	11	1597	-0.289	0.061	72	0.000	0.000	73	-0.289	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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# Transitional care programs to prevent hospital readmissions: All programs, general patient populations

## Health Care: Health Care System Efficiency

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

Program Description: Transitional care programs focus on preventing future hospital readmissions after discharge. The programs may include coaches, patient education, medication reconciliation, individualized discharge planning, enhanced provider communication, and patient follow-up after discharge.

The effects in this analysis reflect the effects of all reviewed transitional care programs on general patient populations.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$189	Benefit to cost ratio	\$8.34
Participants	\$11	Benefits minus costs	\$380
Others	\$163	Chance the program will produce	
Indirect	\$68	benefits greater than the costs	88 %
<b>Total benefits</b>	<b>\$431</b>		
<b>Net program cost</b>	<b>(\$52)</b>		
<b>Benefits minus cost</b>	<b>\$380</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with hospital readmissions	\$11	\$189	\$163	\$94	\$457
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$26)	(\$26)
<b>Totals</b>	<b>\$11</b>	<b>\$189</b>	<b>\$163</b>	<b>\$68</b>	<b>\$431</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

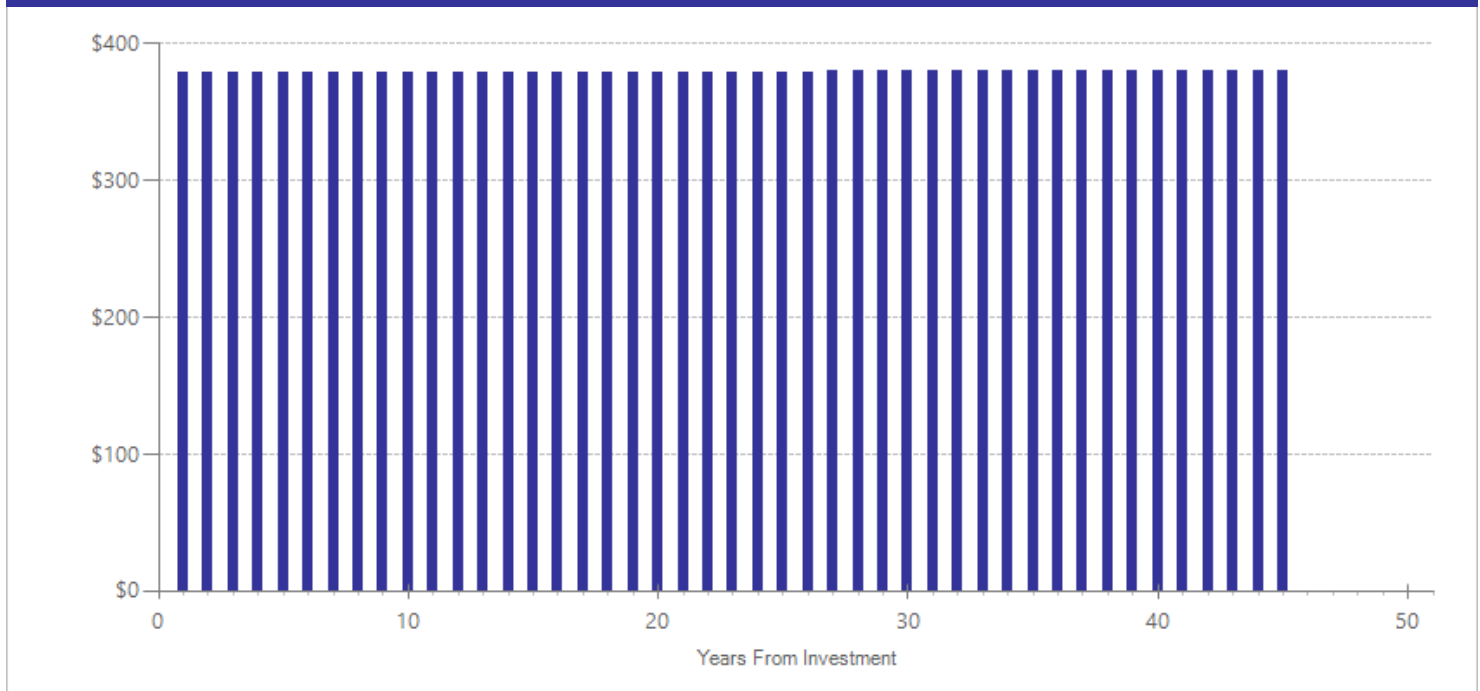
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$51	2014	Present value of net program costs (in 2016 dollars)	(\$52)
Comparison costs	\$0	2014	Cost range (+ or -)	39 %

We estimated an average per-participant cost by computing an average of the typical costs reported in each study in our analysis. These costs include the salary of the nurse practitioner (main cost), cell phone and pager costs, mileage expenses, and costs for the reproduction of personal health record. When a study reported nursing staff hours, we estimated nursing costs by applying the most recent reported average wages reported in Washington State.

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	p-value
			ES	SE	Age	ES	SE	Age		
Hospital readmissions	4	972	-0.155	0.107	55	0.000	0.000	56	-0.115	0.147

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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# Patient-centered medical homes in physician-led practices without explicit utilization or cost incentives (high-risk populations)

## Health Care: Health Care System Efficiency

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

Program Description: The patient-centered medical home (PCMH) model attempts to make health care more efficient by implementing a set of changes to primary care. Medical homes are designed to provide comprehensive care, treating both acute needs and promoting population health. The medical home model emphasizes care coordination across providers, patient engagement, evidence-based care, use of health information technology, and enhanced patient access.

This category includes PCMH programs we reviewed that were implemented in physician-led practices. These results are for chronically ill or older patients.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$75	Benefit to cost ratio	\$1.80
Participants	\$24	Benefits minus costs	\$66
Others	\$92	Chance the program will produce	
Indirect	(\$42)	benefits greater than the costs	45 %
<u>Total benefits</u>	<u>\$149</u>		
<u>Net program cost</u>	<u>(\$83)</u>		
Benefits minus cost	\$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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care (total costs)	\$24	\$75	\$92	\$0	\$191
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$42)	(\$42)
<b>Totals</b>	<b>\$24</b>	<b>\$75</b>	<b>\$92</b>	<b>(\$42)</b>	<b>\$149</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.



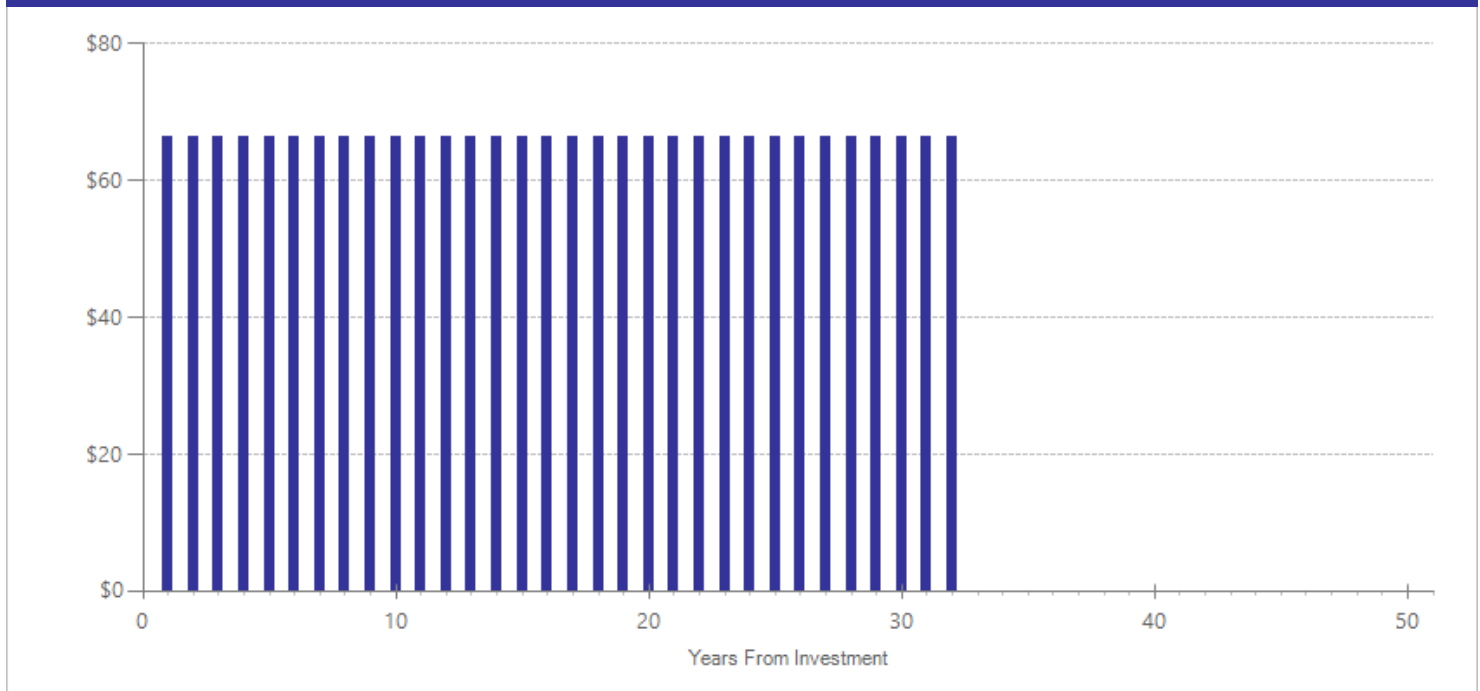
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$83	2016	Present value of net program costs (in 2016 dollars)	(\$83)
Comparison costs	\$0	2016	Cost range (+ or -)	16 %

We estimated an average per-participant cost based on the additional payments that insurers made to medical providers for implementing medical homes as reported in the studies. These additional payments were made to fund nurse care managers, to provide incentives for achieving patient-centered medical home recognition and quality-of-care targets, and to support other costs incurred in transforming practices.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	5	178888	-0.074	0.029	68	0.000	0.000	69	-0.074	0.011
Health care costs*	3	149593	-0.025	0.036	68	0.000	0.000	69	-0.025	0.491
Hospitalization*	4	150078	0.006	0.023	68	0.000	0.000	69	0.006	0.775
Specialist visits*^	3	3668	-0.043	0.047	68	0.000	0.000	69	-0.043	0.352

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

\*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

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# Interventions to reduce unnecessary emergency department visits: General education on appropriate ED use

## Health Care: Health Care System Efficiency

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

Program Description: The study included in this analysis evaluated the dissemination of a booklet to all members of a health insurance plan who received Medicaid benefits. The booklet explained when to use emergency services, offered assistance in finding a primary care physician, and described self-care for minor conditions.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$6	Benefit to cost ratio	\$1.43
Participants	\$1	Benefits minus costs	\$3
Others	\$7	Chance the program will produce	
Indirect	(\$2)	benefits greater than the costs	50 %
<u>Total benefits</u>	<u>\$12</u>		
<u>Net program cost</u>	<u>(\$8)</u>		
Benefits minus cost	\$3		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with emergency department visits	\$1	\$6	\$7	\$2	\$16
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$4)	(\$4)
Totals	\$1	\$6	\$7	(\$2)	\$12

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

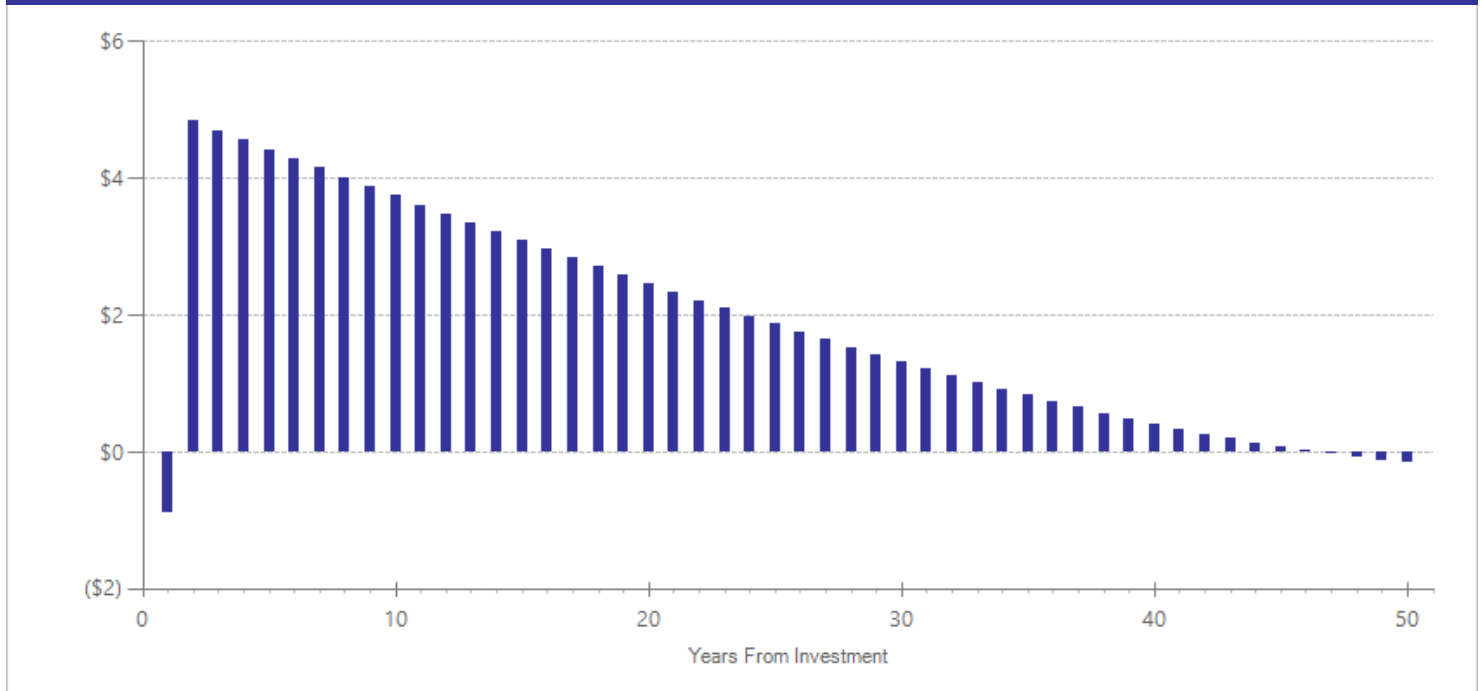
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$8	2014	Present value of net program costs (in 2016 dollars)	(\$8)
Comparison costs	\$0	2014	Cost range (+ or -)	10 %

The single study in this analysis evaluated the dissemination of a 44 page brochure to each household in the program. Each household in this population had an average of 2.75 individuals. The per-person cost of this program is estimated by dividing the cost for Washington State Department of Enterprise Services to print and mail a booklet by the number of individuals in each household. We also assumed that one full-time administrative staff member would be needed for content development and program administration.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits	1	9822	-0.032	0.021	18	0.000	0.086	20	-0.032	0.128

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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# Patient-centered medical homes in physician-led practices without explicit utilization or cost incentives (general population)

## Health Care: Health Care System Efficiency

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

Program Description: The patient-centered medical home (PCMH) model attempts to make health care more efficient by implementing a set of changes to primary care. Medical homes are designed to provide comprehensive care, treating both acute needs and promoting population health. The medical home model emphasizes care coordination across providers, patient engagement, evidence-based care, use of health information technology, and enhanced patient access.

This category includes PCMH programs we reviewed that were implemented in physician-led practices.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$29	Benefit to cost ratio	\$0.39
Participants	\$9	Benefits minus costs	(\$51)
Others	\$35	Chance the program will produce	
Indirect	(\$41)	benefits greater than the costs	34 %
<u>Total benefits</u>	<u>\$32</u>		
<u>Net program cost</u>	<u>(\$83)</u>		
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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care (total costs)	\$9	\$29	\$35	\$0	\$73
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$41)	(\$41)
<u>Totals</u>	<u>\$9</u>	<u>\$29</u>	<u>\$35</u>	<u>(\$41)</u>	<u>\$32</u>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

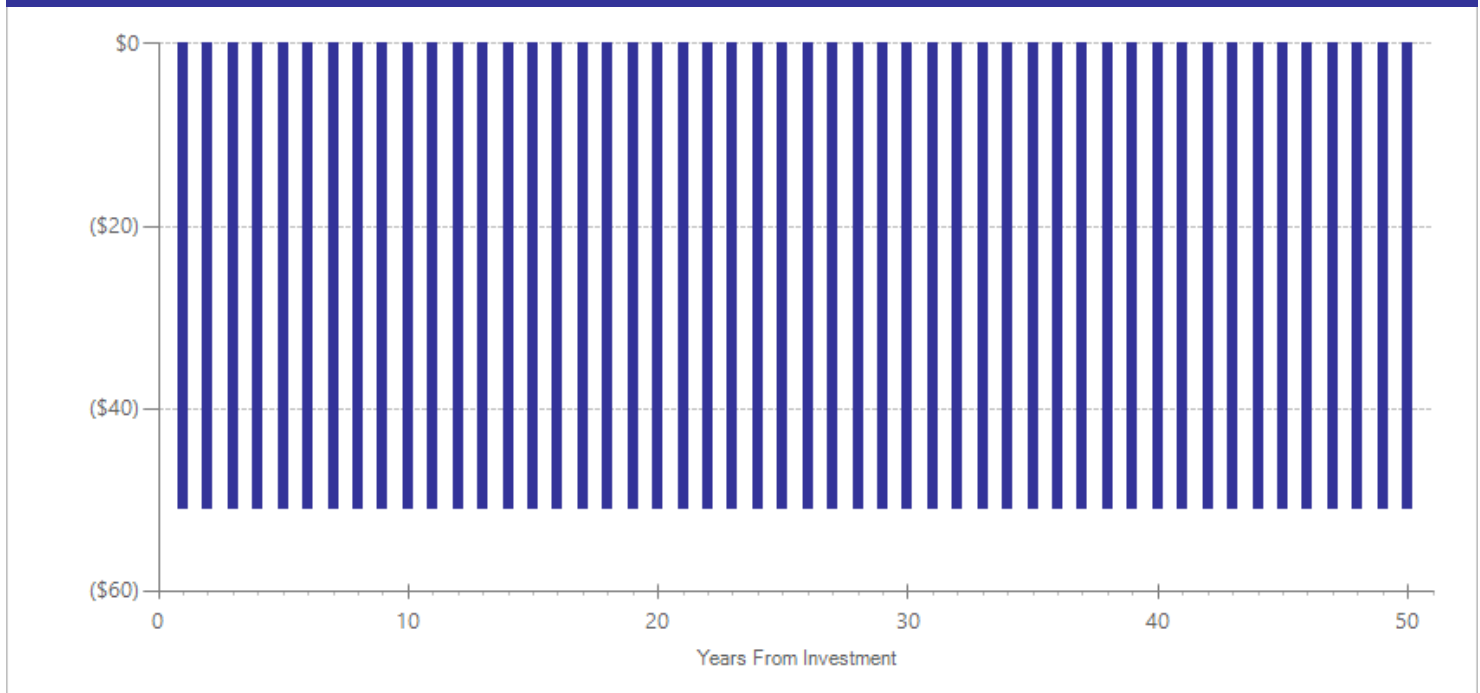
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$83	2016	Present value of net program costs (in 2016 dollars)	(\$83)
Comparison costs	\$0	2016	Cost range (+ or -)	16 %

We estimated an average per-participant cost based on the additional payments that insurers made to medical providers for implementing medical homes as reported in the studies. These additional payments were made to fund nurse care managers, to provide incentives for achieving patient-centered medical home recognition and quality-of-care targets, and to support other costs incurred in transforming practices.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	6	112332	-0.038	0.015	45	0.000	0.000	46	-0.038	0.010
Health care costs*	4	68571	-0.013	0.024	45	0.000	0.000	46	-0.013	0.575
Hospitalization*	4	70182	-0.032	0.040	45	0.000	0.000	46	-0.032	0.425
Specialist visits*^	4	70182	-0.017	0.013	45	0.000	0.000	46	-0.017	0.179

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

\*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

- David, G., Gunnarsson, C., Saynisch, P.A., Chawla, R., & Nigam, S. (2014). Do patient-entered medical homes reduce emergency department visits? *Health Services Research*, 5.
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# Patient-centered medical homes in physician-led practices with utilization or cost incentives (high-risk populations)

## Health Care: Health Care System Efficiency

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

**Program Description:** The patient-centered medical home (PCMH) model attempts to make health care more efficient by implementing a set of changes to primary care. Medical homes are designed to provide comprehensive care, treating both acute needs and promoting population health. The medical home model emphasizes care coordination across providers, patient engagement, evidence-based care, use of health information technology, and enhanced patient access.

This category includes PCMH programs we reviewed that were implemented in physician-led practices and where providers were offered financial incentives to reduce utilization and costs, such as shared cost-savings. These results are for chronically ill or older adults.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$65	Benefit to cost ratio	\$0.57
Participants	\$21	Benefits minus costs	(\$66)
Others	\$80	Chance the program will produce	
Indirect	(\$78)	benefits greater than the costs	35 %
<u>Total benefits</u>	<u>\$89</u>		
<u>Net program cost</u>	<u>(\$155)</u>		
Benefits minus cost	(\$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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care (total costs)	\$21	\$65	\$80	\$0	\$166
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$78)	(\$78)
<b>Totals</b>	<b>\$21</b>	<b>\$65</b>	<b>\$80</b>	<b>(\$78)</b>	<b>\$89</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

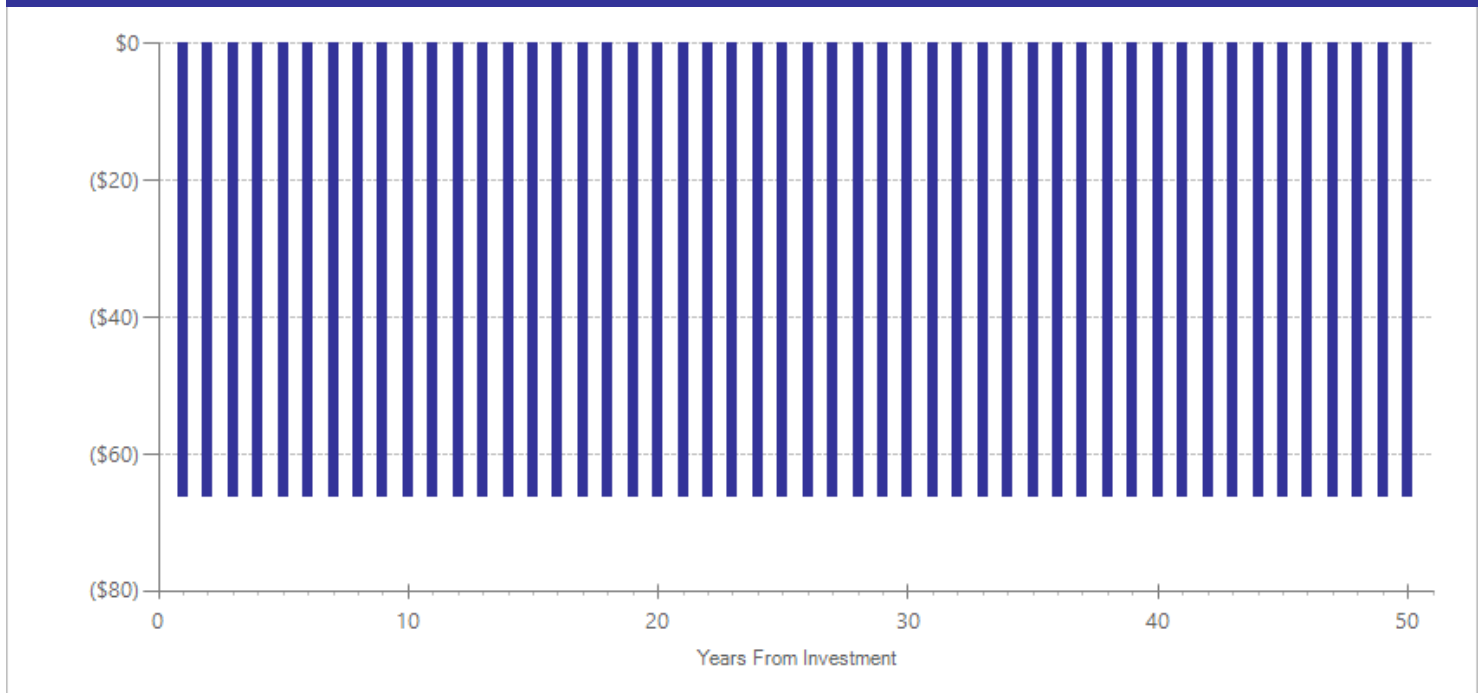
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$155	2016	Present value of net program costs (in 2016 dollars)	(\$155)
Comparison costs	\$0	2016	Cost range (+ or -)	20 %

We estimated an average per-participant cost based on the additional payments that insurers made to medical providers for implementing medical homes. These additional payments were made to fund nurse care managers, to provide bonuses for achieving quality-of-care targets, and, in this case, to provide financial incentives to reduce utilization and costs. Information on the actual incentive payments in these implementations is sparse, and our estimates are based on a single study, Rosenthal et al. (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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	2	297114	-0.022	0.023	47	0.000	0.000	48	-0.022	0.333

\*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

- Cuellar, A., Helmchen, L.A., Gimm, G., Want, J., Burla, S., Kells, B.J., . . . Nichols, L.M. (2016). The CareFirst patient-centered medical home program: cost and utilization effects in its first three years. *Journal of General Internal Medicine*, 1-7.
- Rosenthal, M.B., Alidina, S., Friedberg, M.W., Singer, S.J., Eastman, D., Li, Z., & Schneider, E.C. (2016). A difference-in-difference analysis of changes in quality, utilization and cost following the Colorado multi-payer patient-centered medical home pilot. *Journal of General Internal Medicine*, 31(3), 289-296.

# Interventions to reduce unnecessary emergency department visits: Asthma self-management education for children

## Health Care: Health Care System Efficiency

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

Program Description: Asthma self-management education aims to manage asthma symptoms and avoid emergency department visits by teaching children to identify and avoid asthma triggers, recognize symptoms, and take appropriate action to manage symptoms. In the studies included in this analysis, asthma self-management education was typically delivered by a social worker, nurse, or computer program. We included interventions delivered to children or children and their families in an individuals or group setting. This analysis focuses on interventions initiated in the healthcare system.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	(\$1)	Benefit to cost ratio	(\$0.48)
Participants	\$2	Benefits minus costs	(\$116)
Others	\$3	Chance the program will produce	
Indirect	(\$42)	benefits greater than the costs	48 %
<b>Total benefits</b>	<b>(\$38)</b>		
<b>Net program cost</b>	<b>(\$78)</b>		
<b>Benefits minus cost</b>	<b>(\$116)</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with general hospitalization	(\$1)	(\$17)	(\$14)	(\$10)	(\$42)
Health care associated with emergency department visits	\$3	\$15	\$18	\$7	\$43
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$39)	(\$39)
<b>Totals</b>	<b>\$2</b>	<b>(\$1)</b>	<b>\$3</b>	<b>(\$42)</b>	<b>(\$38)</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

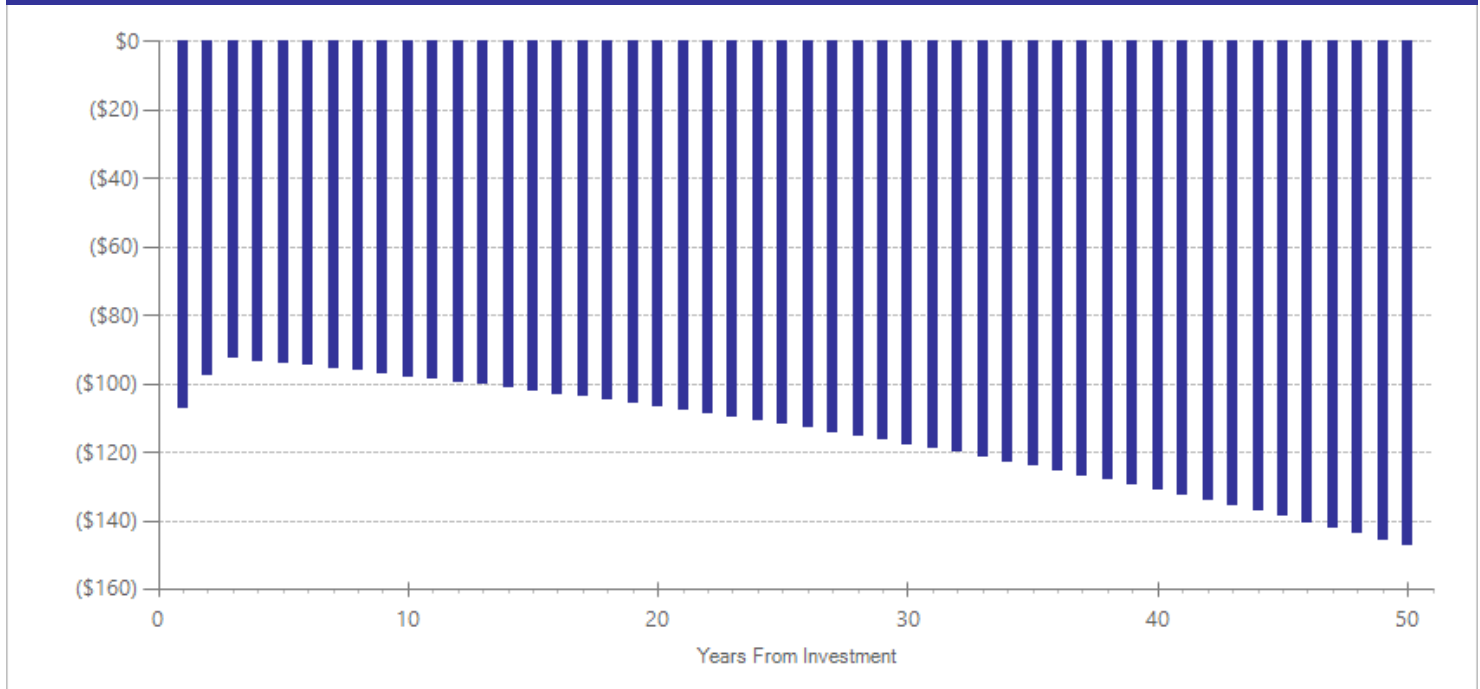
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$77	2014	Present value of net program costs (in 2016 dollars)	(\$78)
Comparison costs	\$0	2014	Cost range (+ or -)	25 %

The asthma self-management education programs that we reviewed required an average of 1.14 hours of staff time per child. A nurse educator provided the self-management education in most of these programs. We estimated the cost of the program by multiplying the hours of staff time by the average registered nurse's hourly salary in Washington State ([http://www.bls.gov/oes/current/oes\\_wa.htm#29-0000](http://www.bls.gov/oes/current/oes_wa.htm#29-0000)). This product is then multiplied by the ratio of total compensation to wages described in WSIPP's Technical Documentation.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits	7	688	-0.088	0.124	8	0.000	0.086	10	-0.088	0.475
Hospitalization	10	1342	0.015	0.101	8	0.000	0.086	10	0.153	0.475
School attendance <sup>^</sup>	4	142	0.002	0.219	8	0.002	0.219	8	0.002	0.994

<sup>^</sup>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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# Patient-centered medical homes in physician-led practices with utilization or cost incentives (general population)

## Health Care: Health Care System Efficiency

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

Program Description: The patient-centered medical home (PCMH) model attempts to make health care more efficient by implementing a set of changes to primary care. Medical homes are designed to provide comprehensive care, treating both acute needs and promoting population health. The medical home model emphasizes care coordination across providers, patient engagement, evidence-based care, use of health information technology, and enhanced patient access.

This category includes PCMH programs we reviewed that were implemented in physician-led practices and where providers were offered financial incentives to reduce utilization and costs, such as shared cost-savings.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$44	Benefit to cost ratio	\$0.23
Participants	\$14	Benefits minus costs	(\$119)
Others	\$55	Chance the program will produce	
Indirect	(\$78)	benefits greater than the costs	31 %
<u>Total benefits</u>	<u>\$36</u>		
<u>Net program cost</u>	<u>(\$155)</u>		
Benefits minus cost	(\$119)		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care (total costs)	\$14	\$44	\$55	\$0	\$113
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$78)	(\$78)
<b>Totals</b>	<b>\$14</b>	<b>\$44</b>	<b>\$55</b>	<b>(\$78)</b>	<b>\$36</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

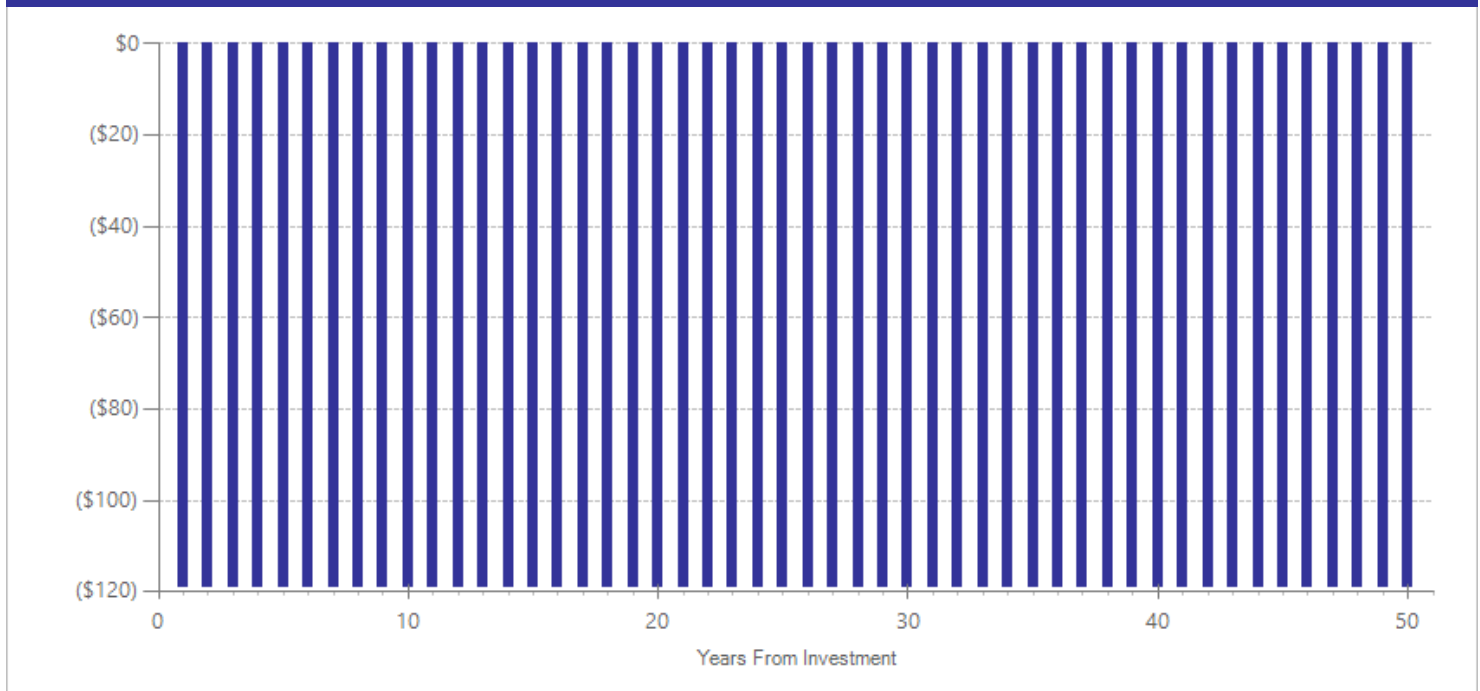
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$155	2016	Present value of net program costs (in 2016 dollars)	(\$155)
Comparison costs	\$0	2016	Cost range (+ or -)	20 %

We estimated an average per-participant cost based on the additional payments that insurers made to medical providers for implementing medical homes. These additional payments were made to fund nurse care managers, to provide bonuses for achieving quality-of-care targets, and, in this case, to provide financial incentives to reduce utilization and costs. Information on the actual incentive payments in these implementations is sparse, and our estimates are based on a single study, Rosenthal et al. (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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	3	622252	-0.073	0.030	43	0.000	0.000	44	-0.073	0.014
Health care costs*	2	604331	-0.022	0.016	43	0.000	0.000	44	-0.022	0.172
Hospitalization*	3	622252	-0.044	0.031	43	0.000	0.000	44	-0.044	0.150
Specialist visits*^	2	29366	-0.077	0.061	43	0.000	0.000	44	-0.077	0.207

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

\* 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

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- Rosenthal, M.B., Alidina, S., Friedberg, M.W., Singer, S.J., Eastman, D., Li, Z., & Schneider, E.C. (2016). A difference-in-difference analysis of changes in quality, utilization and cost following the Colorado multi-payer patient-centered medical home pilot. *Journal of General Internal Medicine*, 31(3), 289-296.

# Interventions to reduce unnecessary emergency department visits: Intensive case management for frequent ED users

## Health Care: Health Care System Efficiency

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

Program Description: These interventions target the highest-frequency emergency department visitors, providing a case manager or clinical case management team to assist in accessing appropriate medical care and community resources with the aim of reducing unnecessary emergency department visits.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$3,205	Benefit to cost ratio	\$0.36
Participants	\$324	Benefits minus costs	(\$6,151)
Others	\$3,082	Chance the program will produce	
Indirect	(\$3,182)	benefits greater than the costs	44 %
<b>Total benefits</b>	<b>\$3,430</b>		
<b>Net program cost</b>	<b>(\$9,581)</b>		
<b>Benefits minus cost</b>	<b>(\$6,151)</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with general hospitalization	\$122	\$2,139	\$1,845	\$1,074	\$5,179
Health care associated with emergency department visits	\$203	\$1,067	\$1,237	\$533	\$3,039
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$4,789)	(\$4,789)
<b>Totals</b>	<b>\$324</b>	<b>\$3,205</b>	<b>\$3,082</b>	<b>(\$3,182)</b>	<b>\$3,430</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

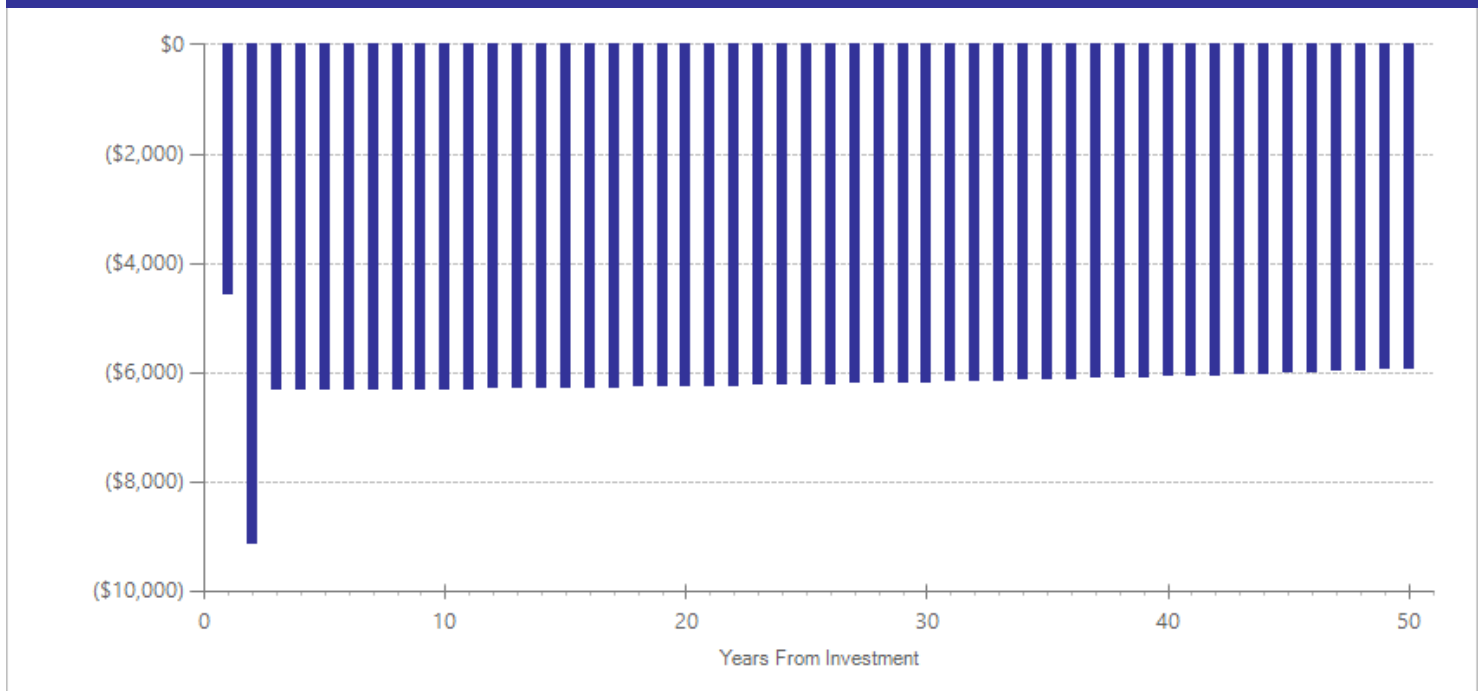
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$3,730	2001	Present value of net program costs (in 2016 dollars)	(\$9,581)
Comparison costs	\$0	2001	Cost range (+ or -)	20 %

The costs for case management for frequent emergency department users was estimated using the average per client costs during the first two years of the clinical case management program at San Francisco General Hospital described in Shumway et al. (2008). Cost-effectiveness of clinical case management for ED frequent users: results of a randomized trial. *The American Journal of Emergency Medicine*, 26(2), 155-164. We estimated the per-client costs as the average the first and second year of the program (\$4,270 and \$3,190 respectively in 2001 dollars) (Martha Shumway, personal communication, May 18, 2015).

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits	2	252	-0.438	0.095	46	0.000	0.118	47	-0.438	0.001
Hospitalization	2	252	-0.173	0.094	46	0.000	0.118	47	-0.173	0.067

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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## Other prenatal home visiting programs

### Health Care: Maternal and Infant Health

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

**Program Description:** This grouping of "other" prenatal home visiting programs provides services to women, children, and families during the prenatal period. In these programs, nurses, social workers, or trained paraprofessional providers make regular home visits to provide one or more non-clinical services that support maternal wellness and infant health during the prenatal period. Services may include case management, health education, risk assessment, psychosocial support, or nutritional counseling.

Programs are intended for women with high-risk pregnancies based on socioeconomic status, age, race, or other pregnancy risk factors. We exclude programs that solely target adolescent women from this analysis. Women are eligible for these programs during their pregnancy. Some program services continued for up to 12 months postpartum. All women in treatment and comparison groups receive clinical prenatal care (treatment as usual).

We performed sensitivity analysis on provider type (paraprofessional versus nurses/social workers) and length of program. We found no difference in cost or effect size, so all provider types are included in this analysis. This analysis does not include "name-brand" programs that provide prenatal home visiting as part of a larger model (e.g., Nurse Family Partnership, Healthy Families America).

#### Benefit-Cost Summary Statistics Per Participant

##### Benefits to:

Taxpayers	\$748	Benefit to cost ratio	\$16.77
Participants	\$1,210	Benefits minus costs	\$10,932
Others	\$0	Chance the program will produce	
Indirect	\$9,668	benefits greater than the costs	100 %
<b>Total benefits</b>	<b>\$11,625</b>		
<b>Net program cost</b>	<b>(\$693)</b>		
<b>Benefits minus cost</b>	<b>\$10,932</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$0	\$29	\$0	\$15	\$44
Health care associated with small for gestational age births	\$0	(\$2)	\$0	(\$1)	(\$3)
<b>Subtotals</b>	<b>\$0</b>	<b>\$27</b>	<b>\$0</b>	<b>\$14</b>	<b>\$41</b>
From secondary participant					
Health care associated with small for gestational age births	\$0	(\$40)	\$0	(\$20)	(\$60)
Infant mortality	\$1,210	\$549	\$0	\$9,914	\$11,673
Health care associated with very low birthweight births	\$0	\$212	\$0	\$107	\$318
<b>Subtotals</b>	<b>\$1,210</b>	<b>\$721</b>	<b>\$0</b>	<b>\$10,001</b>	<b>\$11,931</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$347)	(\$347)
<b>Totals</b>	<b>\$1,210</b>	<b>\$748</b>	<b>\$0</b>	<b>\$9,668</b>	<b>\$11,625</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

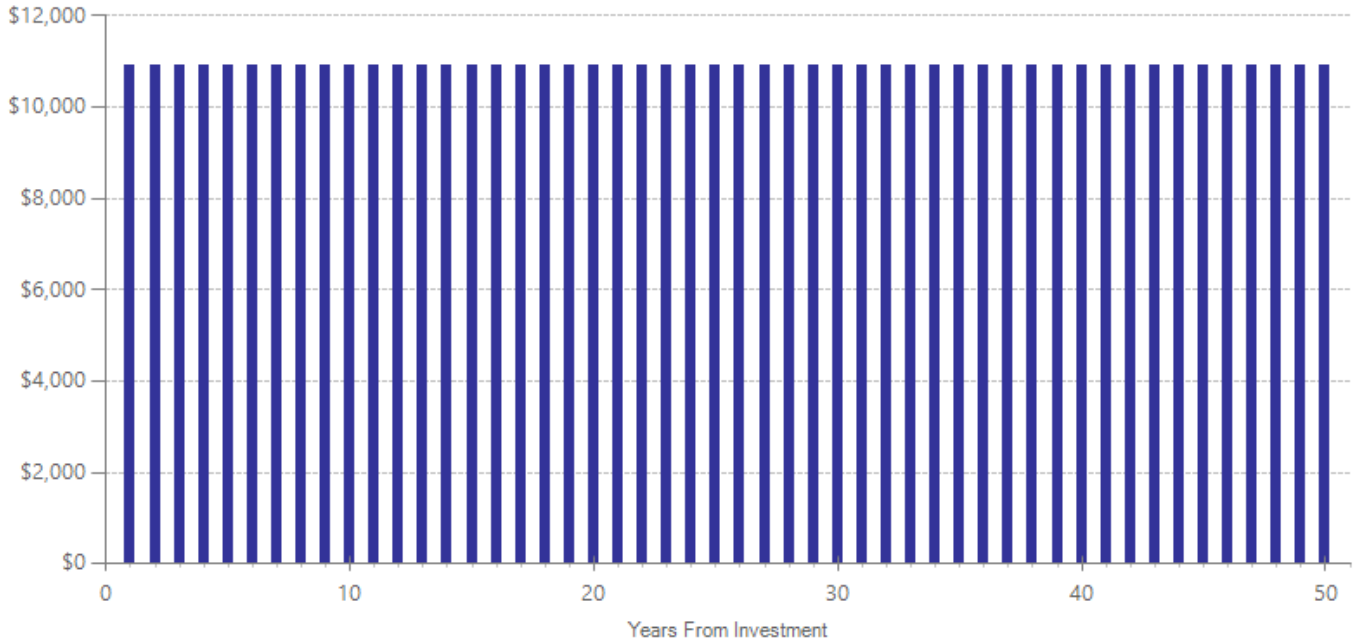
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$692	2016	Present value of net program costs (in 2016 dollars)	(\$693)
Comparison costs	\$0	2016	Cost range (+ or -)	15 %

Treatment cost estimates for this group of programs reflect costs beyond treatment as usual. Per-participant estimates are based on average costs for all included studies. We estimate provider hours including home visiting hours, training hours, and supervisory hours; apply the mean hourly wage estimate for Washington State reported by the Bureau of Labor Statistics (September 2016) for the appropriate provider; and increase wages by a factor of 1.441 to account for the cost of employee benefits. Included studies averaged 7 home visiting hours, 0.5 training hours, and 1 supervisory hour per participant. Supervisors varied by program and included social workers or nurses.

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
Adequate prenatal care <sup>^</sup>	Primary	3	19008	0.118	0.105	25	0.000	0.000	26	0.118	0.261
Cesarean sections	Primary	1	1033	-0.030	0.180	25	0.000	0.000	26	-0.084	0.167
Low birthweight births <sup>***</sup>	Primary	8	17785	-0.058	0.026	25	0.000	0.000	26	-0.060	0.108
Preterm birth (< 37 weeks) <sup>***</sup>	Primary	7	17670	-0.065	0.043	25	0.000	0.000	26	-0.068	0.087
Small for gestational age (SGA) <sup>***</sup>	Primary	2	1128	0.087	0.126	25	0.000	0.000	26	0.066	0.372
Very low birthweight birth (< 1500g) <sup>***</sup>	Primary	3	16139	-0.094	0.073	25	0.000	0.000	26	-0.094	0.198
Infant mortality	Secondary	2	63440	-0.195	0.045	1	0.000	0.000	2	-0.195	0.001
Low birthweight births <sup>***</sup>	Secondary	8	17785	-0.058	0.026	1	0.000	0.000	2	-0.060	0.108
NICU admission	Secondary	1	1033	-0.007	0.285	1	0.000	0.000	2	-0.018	0.825
Preterm birth (< 37 weeks) <sup>***</sup>	Secondary	7	17670	-0.065	0.043	1	0.000	0.000	2	-0.068	0.087
Small for gestational age (SGA) <sup>***</sup>	Secondary	2	1128	0.087	0.126	1	0.000	0.000	2	0.066	0.372
Very low birthweight birth (< 1500g) <sup>***</sup>	Secondary	3	16139	-0.094	0.073	1	0.000	0.000	2	-0.094	0.198

<sup>^</sup>WSIPP's benefit-cost model does not monetize this outcome.

<sup>\*\*\*</sup>We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Smoking cessation programs for pregnant women: Contingency management

## Health Care: Maternal and Infant Health

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

Program Description: Contingency management is a supplement to counseling treatment that rewards participants for attending treatment and/or abstaining from substance use. The intervention reviewed here focused on women who smoked during pregnancy who were also receiving smoking cessation counseling, and provided rewards contingent on quitting and remaining abstinent. Rewards were in the form of vouchers that could be exchanged for goods. Individuals received treatment for an average of three months.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$970	Benefit to cost ratio	\$47.61
Participants	\$917	Benefits minus costs	\$9,763
Others	\$564	Chance the program will produce	
Indirect	\$7,520	benefits greater than the costs	98 %
<b>Total benefits</b>	<b>\$9,972</b>		
<b>Net program cost</b>	<b>(\$209)</b>		
<b>Benefits minus cost</b>	<b>\$9,763</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with low birthweight births	\$2	\$47	\$47	\$24	\$119
<b>Subtotals</b>	<b>\$2</b>	<b>\$47</b>	<b>\$47</b>	<b>\$24</b>	<b>\$119</b>
From secondary participant					
Infant mortality	\$894	\$406	\$0	\$7,342	\$8,642
Health care associated with NICU admissions	\$21	\$517	\$517	\$261	\$1,316
<b>Subtotals</b>	<b>\$916</b>	<b>\$923</b>	<b>\$517</b>	<b>\$7,603</b>	<b>\$9,959</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$106)	(\$106)
<b>Totals</b>	<b>\$917</b>	<b>\$970</b>	<b>\$564</b>	<b>\$7,520</b>	<b>\$9,972</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

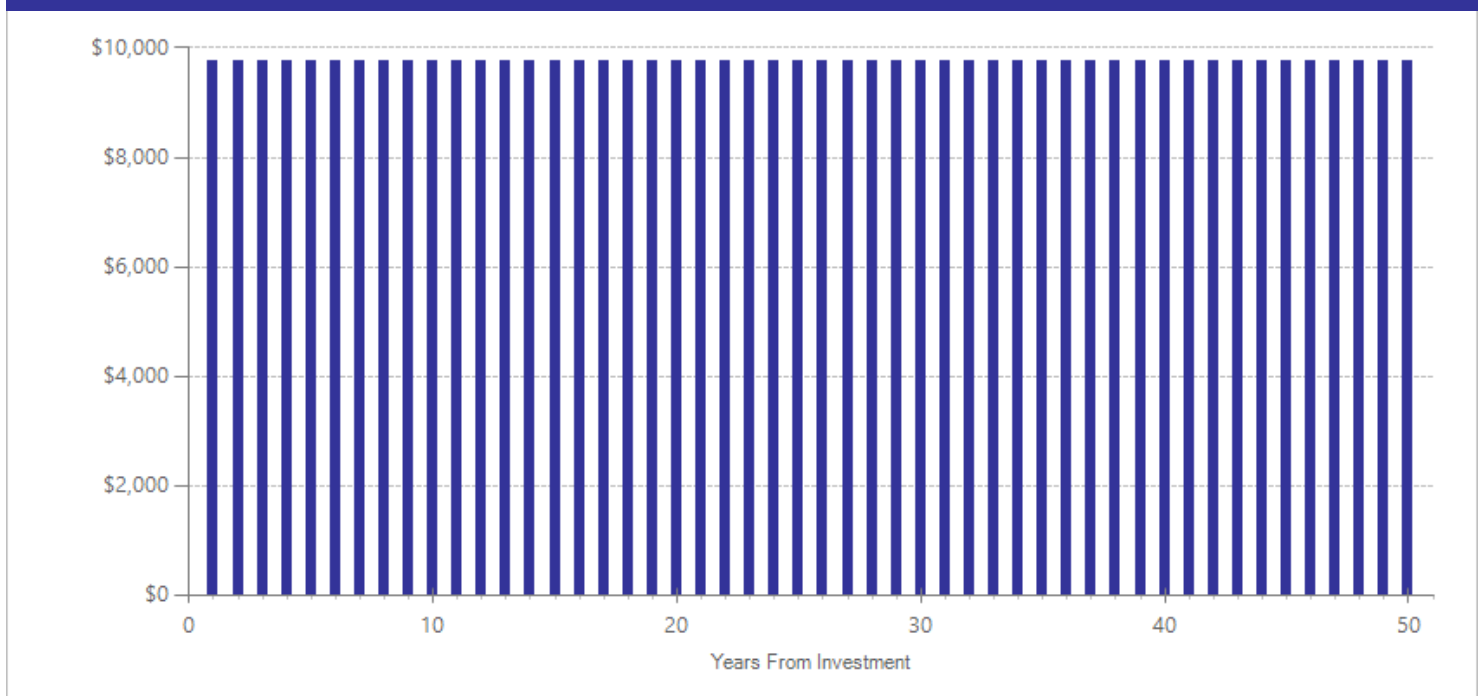
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$446	2016	Present value of net program costs (in 2016 dollars)	(\$209)
Comparison costs	\$237	2016	Cost range (+ or -)	30 %

The per-participant cost of treatment is based on average provider time reported in studies, plus the average incentive amount received by treatment participants. Physician/therapist time reported for smoking cessation counseling was multiplied by the Medicaid reimbursement rate for tobacco cessation for pregnant clients, reported by the Washington State Health Care Authority for physician-related/professional services. Provider time reported for abstinence monitoring during contingency management was calculated using the mean hourly wage for Washington State reported by the Bureau of Labor Statistics for the appropriate provider, and wages were increased by a factor of 1.441 to account for the cost of employee benefits. Costs were obtained from Heil et al. (2008), Higgins et al. (2004), Higgins et al. (2014), Ondersma et al. (2012), Tappin et al. (2015), and Tuten et al. (2012).

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	p-value
				ES	SE	Age	ES	SE	Age		
Low birthweight births***	Primary	4	151	-0.494	0.217	27	0.000	0.000	28	-0.494	0.023
Preterm**birth (< 37 weeks)	Primary	5	457	-0.340	0.130	27	0.000	0.000	28	-0.340	0.009
Regular smoking	Primary	4	422	-0.498	0.121	27	-0.498	0.121	37	-0.498	0.001
Smoking during late pregnancy	Primary	7	516	-0.752	0.110	27	0.000	0.000	28	-0.752	0.001
Low birthweight births***	Secondary	4	151	-0.494	0.217	1	0.000	0.000	2	-0.494	0.023
NICU admission	Secondary	4	151	-0.339	0.213	1	0.000	0.000	2	-0.339	0.112
Preterm**birth (< 37 weeks)	Secondary	5	457	-0.340	0.130	1	0.000	0.000	2	-0.340	0.009

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

\*\*\* We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Enhanced prenatal care programs delivered through Medicaid

## Health Care: Maternal and Infant Health

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

Program Description: Enhanced prenatal care programs delivered through Medicaid provide non-clinical services that support maternal wellness and infant health during the prenatal period, such as care coordination, health education, risk assessment, psychosocial support, or nutritional counseling. These programs are delivered in the primary healthcare setting and provided by either a nurse or a social worker. Women are eligible for these programs during their pregnancy, with some benefits continuing through the first 12 months postpartum. Participants typically receive program benefits for 3-16 months, including both prenatal and postpartum services.

All programs included in this analysis were implemented by Medicaid in their respective states. All women in treatment and comparison groups receive clinical prenatal care (treatment as usual).

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$841	Benefit to cost ratio	\$15.42
Participants	\$595	Benefits minus costs	\$5,981
Others	\$0	Chance the program will produce	
Indirect	\$4,961	benefits greater than the costs	98 %
<b>Total benefits</b>	<b>\$6,396</b>		
<b>Net program cost</b>	<b>(\$415)</b>		
<b>Benefits minus cost</b>	<b>\$5,981</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with preterm births	\$0	\$30	\$0	\$15	\$45
<b>Subtotals</b>	<b>\$0</b>	<b>\$30</b>	<b>\$0</b>	<b>\$15</b>	<b>\$45</b>
From secondary participant					
Infant mortality	\$595	\$270	\$0	\$4,882	\$5,747
Health care associated with NICU admissions	\$0	\$541	\$0	\$272	\$813
<b>Subtotals</b>	<b>\$595</b>	<b>\$811</b>	<b>\$0</b>	<b>\$5,154</b>	<b>\$6,560</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$208)	(\$208)
<b>Totals</b>	<b>\$595</b>	<b>\$841</b>	<b>\$0</b>	<b>\$4,961</b>	<b>\$6,396</b>

<sup>1</sup>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.

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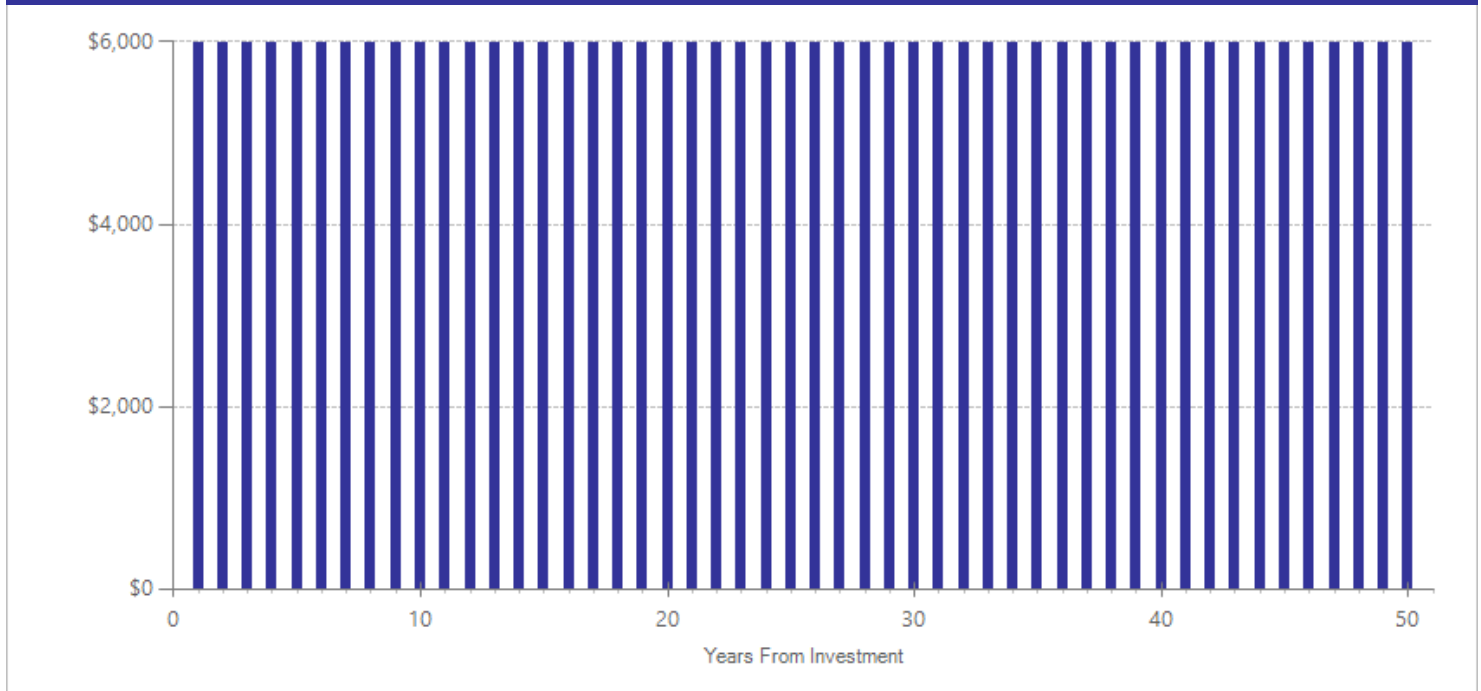
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$1,792	2014	Present value of net program costs (in 2016 dollars)	(\$415)
Comparison costs	\$1,383	2014	Cost range (+ or -)	10 %

Per-participant program cost estimates are based on costs of Maternity Support and Case Management programs in Washington State (Washington State Department of Health, September 2016). Participants typically receive program benefits for 3-16 months, including both prenatal and postpartum services. Both groups receive treatment as usual. The costs of treatment as usual are the average costs of usual prenatal care in Washington State (Washington State Department of Health, September 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	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
Low birthweight births***	Primary	5	51826	-0.087	0.017	25	0.000	0.000	26	-0.087	0.001
Preterm birth (< 37 weeks)	Primary	3	32638	-0.089	0.035	25	0.000	0.000	26	-0.089	0.011
Small for gestational age (SGA)	Primary	3	25588	-0.037	0.032	25	0.000	0.000	26	-0.037	0.252
Very low birthweight birth (< 1500g)	Primary	2	26241	-0.224	0.040	25	0.000	0.000	26	-0.224	0.001
Infant mortality	Secondary	2	35194	-0.088	0.049	1	0.000	0.000	2	-0.088	0.075
Low birthweight births***	Secondary	5	51826	-0.087	0.017	1	0.000	0.000	2	-0.087	0.001
NICU admission	Secondary	1	10715	-0.114	0.027	1	0.000	0.000	2	-0.114	0.001
Preterm birth (< 37 weeks)	Secondary	3	32638	-0.089	0.035	1	0.000	0.000	2	-0.089	0.011
Small for gestational age (SGA)	Secondary	3	25588	-0.037	0.032	1	0.000	0.000	2	-0.037	0.252
Very low birthweight birth (< 1500g)	Secondary	2	26241	-0.224	0.040	1	0.000	0.000	2	-0.224	0.001

\*\*\* We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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## Citations Used in the Meta-Analysis

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## Group prenatal care (compared to standard prenatal care)

### Health Care: Maternal and Infant Health

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

Program Description: Traditionally, prenatal care visits are conducted by an obstetrician or midwife in a clinical setting. Group prenatal care is an alternative strategy to deliver prenatal education and conduct clinical assessments in a non-clinical and group setting. Groups are typically led by an obstetrician or midwife and may also include a registered nurse or medical assistant as a second staff member. Five out of six studies included in this analysis use the CenteringPregnancy model of prenatal care, which includes ten sessions of education and clinical assessments in a group setting. On average, sessions are two hours long with groups of six to twelve women. One study in this analysis provided prenatal education in groups of six to eight and taught pregnant teens to conduct routine clinical measurements on their peers. In this analysis, individuals received group prenatal care for about seven months.

#### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$176	Benefit to cost ratio	n/a
Participants	\$203	Benefits minus costs	\$3,791
Others	\$85	Chance the program will produce	
Indirect	\$2,231	benefits greater than the costs	94 %
<b>Total benefits</b>	<b>\$2,695</b>		
<b>Net program cost</b>	<b>\$1,095</b>		
<b>Benefits minus cost</b>	<b>\$3,791</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$1	\$25	\$25	\$13	\$64
<b>Subtotals</b>	<b>\$1</b>	<b>\$25</b>	<b>\$25</b>	<b>\$13</b>	<b>\$64</b>
From secondary participant					
Infant mortality	\$200	\$91	\$0	\$1,639	\$1,930
Health care associated with low birthweight births	\$4	\$93	\$93	\$47	\$237
Health care associated with NICU admissions	(\$1)	(\$33)	(\$33)	(\$17)	(\$85)
<b>Subtotals</b>	<b>\$202</b>	<b>\$151</b>	<b>\$60</b>	<b>\$1,669</b>	<b>\$2,082</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	\$550	\$550
<b>Totals</b>	<b>\$203</b>	<b>\$176</b>	<b>\$85</b>	<b>\$2,231</b>	<b>\$2,695</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.



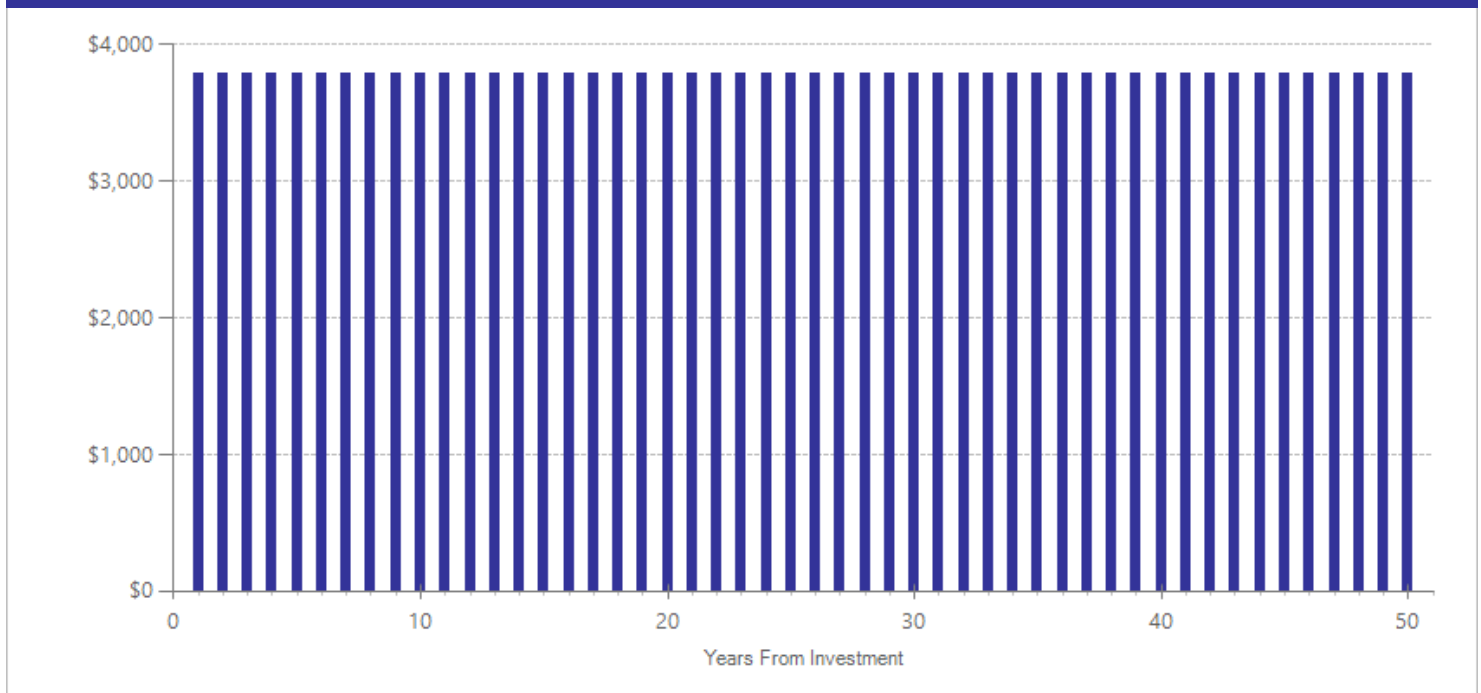
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$264	2015	Present value of net program costs (in 2016 dollars)	\$1,095
Comparison costs	\$1,348	2015	Cost range (+ or -)	20 %

Treatment cost estimates for this program reflect costs compared to treatment as usual. Costs are based on a weighted average of per-participant costs from included studies with sufficient staffing and programming information. The per-participant cost for the intervention group was calculated by multiplying the average staff hours per participant by the staffing costs from each study. We estimated average staffing hours from Fausett (2014), Ickovics et al. (2016), and Kennedy et al. (2011). We estimated staff salaries using the mean hourly wage estimate for Washington State reported by the Bureau of Labor Statistics, and multiplied the hourly wage by 1.441 to account for employee benefits. Comparison group costs were estimated in a similar way, assuming women received twelve prenatal care visits (the recommended number of visits for an uncomplicated pregnancy of 39 weeks), and that visits were either staffed by an obstetrician or midwife (Guidelines for Perinatal Care. The American Academy of Pediatrics and the American College of Obstetrics and Gynecologists. 2012).

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	p-value
				ES	SE	Age	ES	SE	Age		
Cesarean sections	Primary	1	162	-0.048	0.150	20	0.000	0.000	21	-0.048	0.750
Low birthweight births <sup>***</sup>	Primary	4	1523	-0.084	0.070	20	0.000	0.000	21	-0.084	0.229
Postpartum depression <sup>^</sup>	Primary	2	785	0.000	0.057	20	0.000	0.000	21	0.000	1.000
Preterm birth (< 37 weeks) <sup>***</sup>	Primary	4	1989	-0.054	0.072	20	0.000	0.000	21	-0.054	0.453
Small for gestational age (SGA) <sup>***</sup>	Primary	2	1196	-0.176	0.080	20	0.000	0.000	21	-0.176	0.028
Low birthweight births <sup>***</sup>	Secondary	4	1523	-0.084	0.070	1	0.000	0.000	2	-0.084	0.229
NICU admission	Secondary	3	1358	0.016	0.085	1	0.000	0.000	2	0.016	0.853
Preterm birth (< 37 weeks) <sup>***</sup>	Secondary	4	1989	-0.054	0.072	1	0.000	0.000	2	-0.054	0.453
Small for gestational age (SGA) <sup>***</sup>	Secondary	2	1196	-0.176	0.080	1	0.000	0.000	2	-0.176	0.028

<sup>^</sup>WSIPP's benefit-cost model does not monetize this outcome.

<sup>\*\*\*</sup>We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Smoking cessation programs for pregnant women: Nicotine replacement treatment

## Health Care: Maternal and Infant Health

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

Program Description: Nicotine replacement therapy (in the form of patches or gum) was provided to individuals in conjunction with behavioral counseling for smoking cessation during pregnancy. Individuals in comparison groups received either no nicotine replacement or a placebo patch along with behavioral counseling for smoking cessation. Individuals received treatment between 6 and 12 weeks.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$312	Benefit to cost ratio	\$28.82
Participants	\$317	Benefits minus costs	\$3,231
Others	\$171	Chance the program will produce	
Indirect	\$2,548	benefits greater than the costs	75 %
<b>Total benefits</b>	<b>\$3,347</b>		
<b>Net program cost</b>	<b>(\$116)</b>		
<b>Benefits minus cost</b>	<b>\$3,231</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with preterm births	\$1	\$19	\$19	\$9	\$48
<b>Subtotals</b>	<b>\$1</b>	<b>\$19</b>	<b>\$19</b>	<b>\$9</b>	<b>\$48</b>
From secondary participant					
Infant mortality	\$310	\$141	\$0	\$2,520	\$2,971
Health care associated with preterm births	\$6	\$152	\$152	\$76	\$386
<b>Subtotals</b>	<b>\$316</b>	<b>\$293</b>	<b>\$152</b>	<b>\$2,596</b>	<b>\$3,356</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$58)	(\$58)
<b>Totals</b>	<b>\$317</b>	<b>\$312</b>	<b>\$171</b>	<b>\$2,548</b>	<b>\$3,347</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

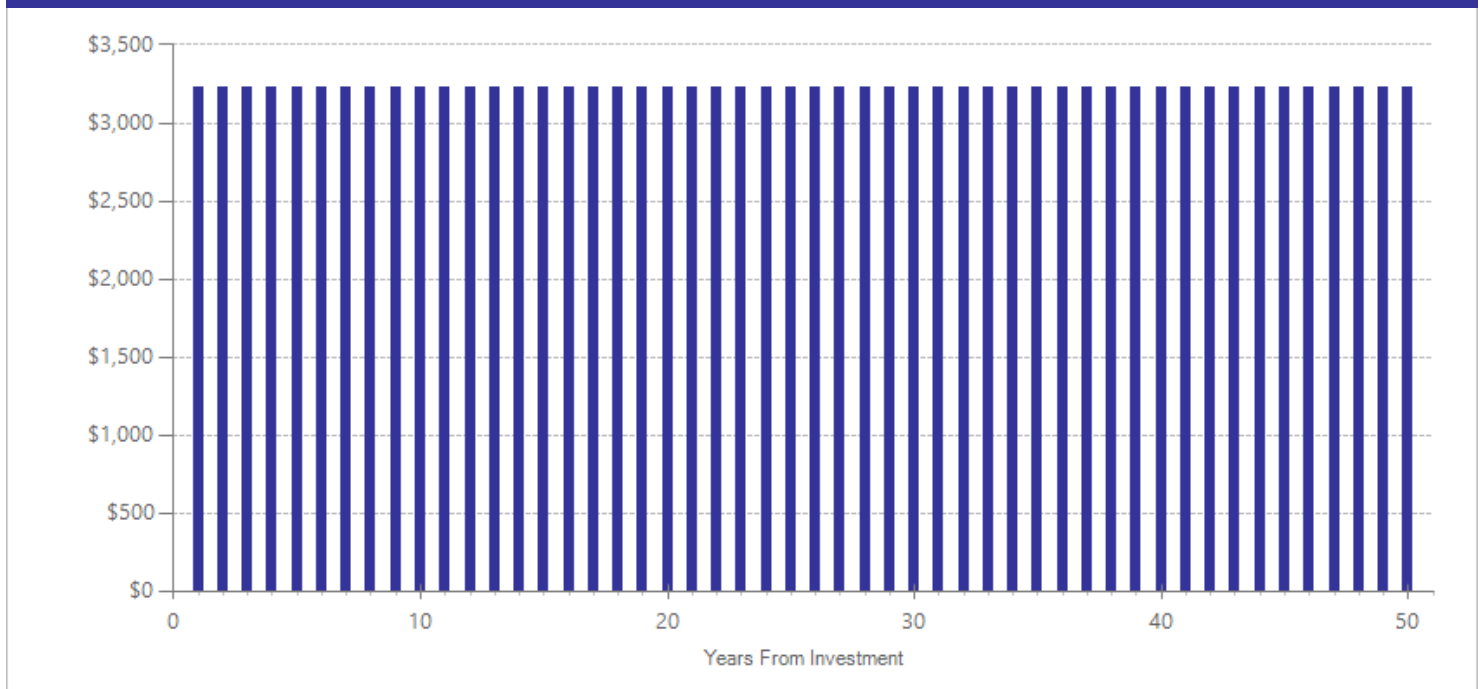
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$177	2016	Present value of net program costs (in 2016 dollars)	(\$116)
Comparison costs	\$61	2016	Cost range (+ or -)	30 %

The per-participant cost of treatment is based on physician/therapist time reported in studies, multiplied by the Medicaid reimbursement rate for tobacco cessation for pregnant clients (reported by the Washington State Health Care Authority for physician-related/professional service) plus the average unit cost of nicotine replacement treatments (either transdermal patches or gum) reported in Smoking Cessation During Pregnancy: Guidelines for Intervention. Washington State Department of Health. 2016. Costs were obtained from Berlin et al. (2014), Coleman et al. (2012), Oncken et al. (2008), and Pollak et al. (2007).

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
Low birthweight births <sup>***</sup>	Primary	4	830	-0.134	0.196	27	0.000	0.000	28	-0.134	0.494
Preterm <sup>***</sup> birth (< 37 weeks)	Primary	3	638	-0.138	0.125	27	0.000	0.000	28	-0.138	0.269
Smoking during late pregnancy <sup>^</sup>	Primary	5	972	-0.168	0.101	27	0.000	0.000	28	-0.168	0.096
Low birthweight births <sup>***</sup>	Secondary	4	830	-0.134	0.196	1	0.000	0.000	2	-0.134	0.494
NICU admission	Secondary	2	612	-0.073	0.135	1	0.000	0.000	2	-0.073	0.592
Preterm <sup>***</sup> birth (< 37 weeks)	Secondary	3	638	-0.138	0.125	1	0.000	0.000	2	-0.138	0.269

<sup>^</sup>WSIPP's benefit-cost model does not monetize this outcome.

<sup>\*\*\*</sup>We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Non-Medicaid enhanced prenatal care programs for African-American women

## Health Care: Maternal and Infant Health

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

Program Description: Non-Medicaid enhanced prenatal care programs for African-American women provide psychosocial support and health education regarding risk reduction. Some programs also include case management and nutritional counseling. Services are provided by paraprofessionals or nurses. Participants typically receive the program for five months, including prenatal and postpartum services. All women in treatment and comparison groups receive clinical prenatal care (treatment as usual).

### Benefit-Cost Summary Statistics Per Participant

#### Benefits to:

Taxpayers	\$561	Benefit to cost ratio	\$5.66
Participants	\$279	Benefits minus costs	\$2,763
Others	\$442	Chance the program will produce	
Indirect	\$2,074	benefits greater than the costs	69 %
<b>Total benefits</b>	<b>\$3,355</b>		
<b>Net program cost</b>	<b>(\$592)</b>		
<b>Benefits minus cost</b>	<b>\$2,763</b>		

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:<sup>1</sup>

#### Benefits to:

	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$3	\$82	\$82	\$41	\$209
Health care associated with low birthweight births	\$0	(\$2)	(\$2)	(\$1)	(\$6)
<b>Subtotals</b>	<b>\$3</b>	<b>\$80</b>	<b>\$80</b>	<b>\$40</b>	<b>\$203</b>
From secondary participant					
Infant mortality	\$261	\$118	\$0	\$2,149	\$2,528
Health care associated with low birthweight births	(\$1)	(\$20)	(\$20)	(\$10)	(\$50)
Health care associated with NICU admissions	\$16	\$382	\$382	\$192	\$970
<b>Subtotals</b>	<b>\$276</b>	<b>\$481</b>	<b>\$362</b>	<b>\$2,331</b>	<b>\$3,449</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$297)	(\$297)
<b>Totals</b>	<b>\$279</b>	<b>\$561</b>	<b>\$442</b>	<b>\$2,074</b>	<b>\$3,355</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

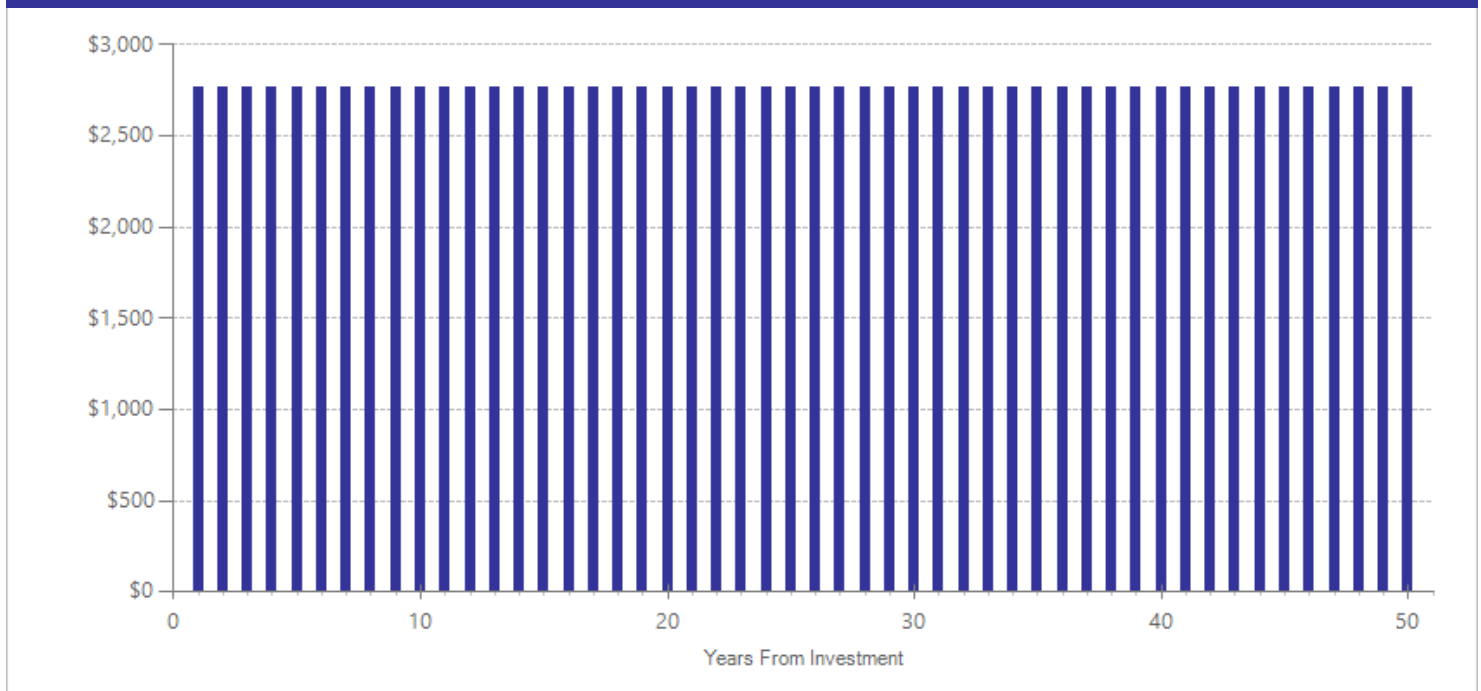
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$1,967	2014	Present value of net program costs (in 2016 dollars)	(\$592)
Comparison costs	\$1,383	2014	Cost range (+ or -)	15 %

Per-participant program cost estimates are based on average costs for included studies. We estimate provider hours, apply the mean hourly wage estimate for Washington State reported by the Bureau of Labor Statistics (September 2016) for the appropriate provider, and increase wages by a factor of 1.441 to account for the cost of employee benefits. Studies averaged ten provider hours, and providers varied (paraprofessionals or nurses). Both groups receive treatment as usual. The costs of treatment as usual are the average costs of usual prenatal care in Washington State (Washington State Department of Health, September 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	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	p-value
				ES	SE	Age	ES	SE	Age		
Cesarean sections	Primary	1	311	-0.158	0.136	23	0.000	0.000	24	-0.158	0.248
Low birthweight births ***	Primary	4	1432	0.015	0.086	23	0.000	0.000	24	-0.031	0.759
Preterm birth (< 37 weeks)	Primary	1	311	-0.192	0.151	23	0.000	0.000	24	-0.192	0.203
Very low birthweight birth (< 1500g)	Primary	1	669	-0.199	0.142	23	0.000	0.000	24	-0.199	0.161
Low birthweight births ***	Secondary	4	1432	0.015	0.086	1	0.000	0.000	2	-0.031	0.759
NICU admission	Secondary	1	311	-0.234	0.149	1	0.000	0.000	2	-0.234	0.115
Preterm birth (< 37 weeks)	Secondary	1	311	-0.192	0.151	1	0.000	0.000	2	-0.192	0.203
Very low birthweight birth (< 1500g)	Secondary	1	669	-0.199	0.142	1	0.000	0.000	2	-0.199	0.161

\*\*\* We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Non-Medicaid enhanced prenatal care programs for adolescents

## Health Care: Maternal and Infant Health

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

Program Description: Non-Medicaid enhanced prenatal care programs for pregnant adolescents include intensive case management, group classes, or both, provided by either a paraprofessional or team of health service providers. Adolescent women are eligible for these programs if they are 18 or under during their pregnancy. Participants typically receive services for four months during the prenatal period, with an average of 12 one-hour sessions. All women in treatment and comparison groups receive clinical prenatal care (treatment as usual).

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$644	Benefit to cost ratio	\$5.84
Participants	\$255	Benefits minus costs	\$2,483
Others	\$0	Chance the program will produce	
Indirect	\$2,096	benefits greater than the costs	73 %
<b>Total benefits</b>	<b>\$2,996</b>		
<b>Net program cost</b>	<b>(\$513)</b>		
<b>Benefits minus cost</b>	<b>\$2,483</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with preterm births	\$0	\$57	\$0	\$29	\$86
<b>Subtotals</b>	<b>\$0</b>	<b>\$57</b>	<b>\$0</b>	<b>\$29</b>	<b>\$86</b>
From secondary participant					
Infant mortality	\$255	\$116	\$0	\$2,089	\$2,460
Health care associated with preterm births	\$0	\$471	\$0	\$235	\$706
<b>Subtotals</b>	<b>\$255</b>	<b>\$587</b>	<b>\$0</b>	<b>\$2,323</b>	<b>\$3,166</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$256)	(\$256)
<b>Totals</b>	<b>\$255</b>	<b>\$644</b>	<b>\$0</b>	<b>\$2,096</b>	<b>\$2,996</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

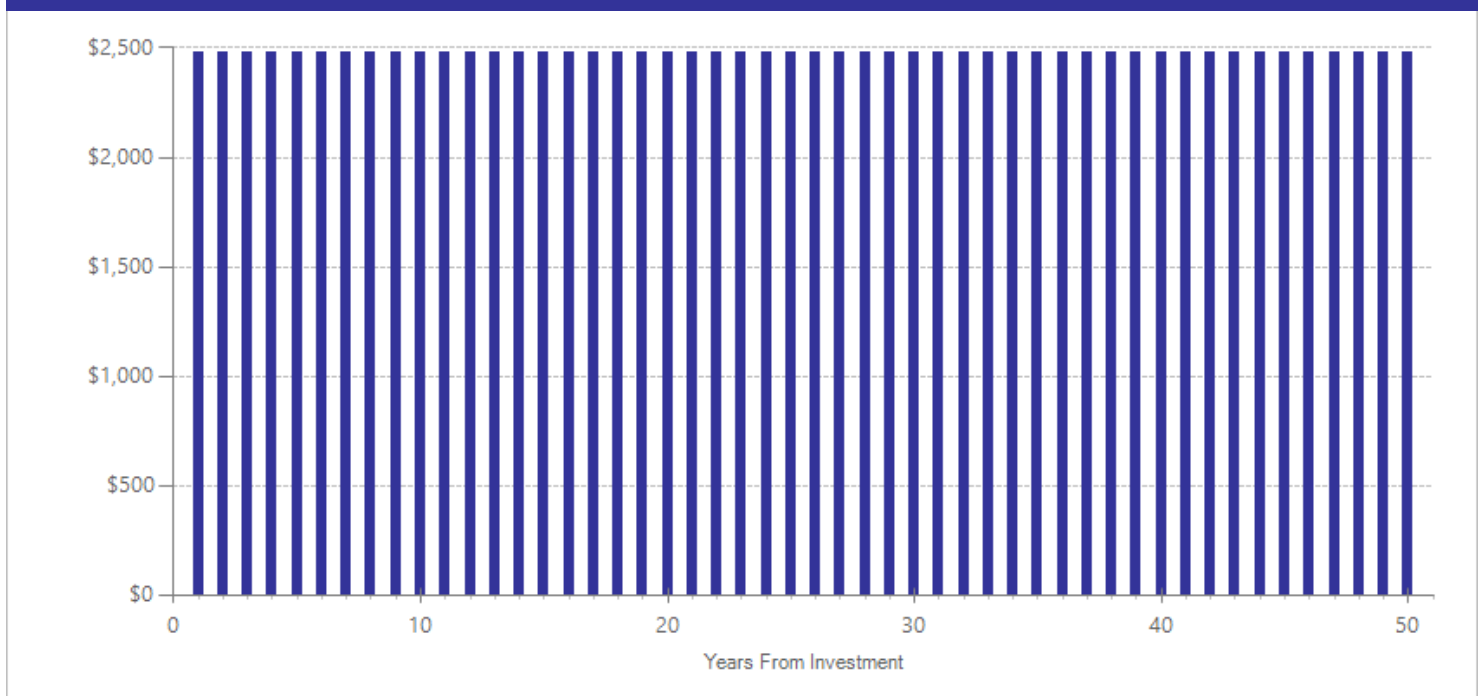
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$1,888	2014	Present value of net program costs (in 2016 dollars)	(\$513)
Comparison costs	\$1,383	2014	Cost range (+ or -)	15 %

Per-participant program cost estimates are based on estimated costs for included studies. For each study, we estimate provider hours, apply the mean hourly wage estimate for Washington State reported by the Bureau of Labor Statistics (September 2016), and increase wages by a factor of 1.441 to account for the cost of employee benefits. Studies averaged 12 provider hours, and providers varied (paraprofessional, social workers, nurse, or multiple providers). Program participants also receive treatment as usual, so we include the average cost of prenatal care in Washington in the total program cost. The comparison costs include the cost of treatment as usual, per participant. The costs of treatment as usual are the average costs of usual prenatal care in Washington State (Washington State Department of Health, September 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	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
Low birthweight births***	Primary	4	2556	-0.106	0.105	16	0.000	0.000	17	-0.155	0.185
Preterm***birth (< 37 weeks)	Primary	2	2004	-0.181	0.140	16	0.000	0.000	17	-0.216	0.041
Very low birthweight birth (< 1500g)	Primary	1	744	-0.058	0.069	16	0.000	0.000	17	-0.162	0.019
Infant mortality	Secondary	1	744	-0.037	0.069	1	0.000	0.000	2	-0.102	0.141
Low birthweight births***	Secondary	4	2556	-0.106	0.105	1	0.000	0.000	2	-0.155	0.185
Preterm***birth (< 37 weeks)	Secondary	2	2004	-0.181	0.140	1	0.000	0.000	2	-0.216	0.041
Very low birthweight birth (< 1500g)	Secondary	1	744	-0.058	0.069	1	0.000	0.000	2	-0.162	0.019

\*\*\* We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Smoking cessation programs for pregnant women: Intensive behavioral interventions

## Health Care: Maternal and Infant Health

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

**Program Description:** In this analysis, we reviewed research literature on behavioral interventions that provide moderate-to-intensive in-person or phone counseling. These programs are tailored for women who smoke during pregnancy, include more than a single brief counseling session, and offer self-help materials to encourage smoking cessation. Motivational interviewing is the most common type of counseling.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$204	Benefit to cost ratio	\$23.90
Participants	\$215	Benefits minus costs	\$2,168
Others	\$109	Chance the program will produce	
Indirect	\$1,735	benefits greater than the costs	89 %
<b>Total benefits</b>	<b>\$2,262</b>		
<b>Net program cost</b>	<b>(\$95)</b>		
<b>Benefits minus cost</b>	<b>\$2,168</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with low birthweight births	\$0	\$11	\$11	\$5	\$28
<b>Subtotals</b>	<b>\$0</b>	<b>\$11</b>	<b>\$11</b>	<b>\$5</b>	<b>\$28</b>
From secondary participant					
Infant mortality	\$210	\$96	\$0	\$1,728	\$2,034
Health care associated with low birthweight births	\$4	\$98	\$98	\$49	\$248
<b>Subtotals</b>	<b>\$214</b>	<b>\$193</b>	<b>\$98</b>	<b>\$1,777</b>	<b>\$2,282</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$47)	(\$47)
<b>Totals</b>	<b>\$215</b>	<b>\$204</b>	<b>\$109</b>	<b>\$1,735</b>	<b>\$2,262</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

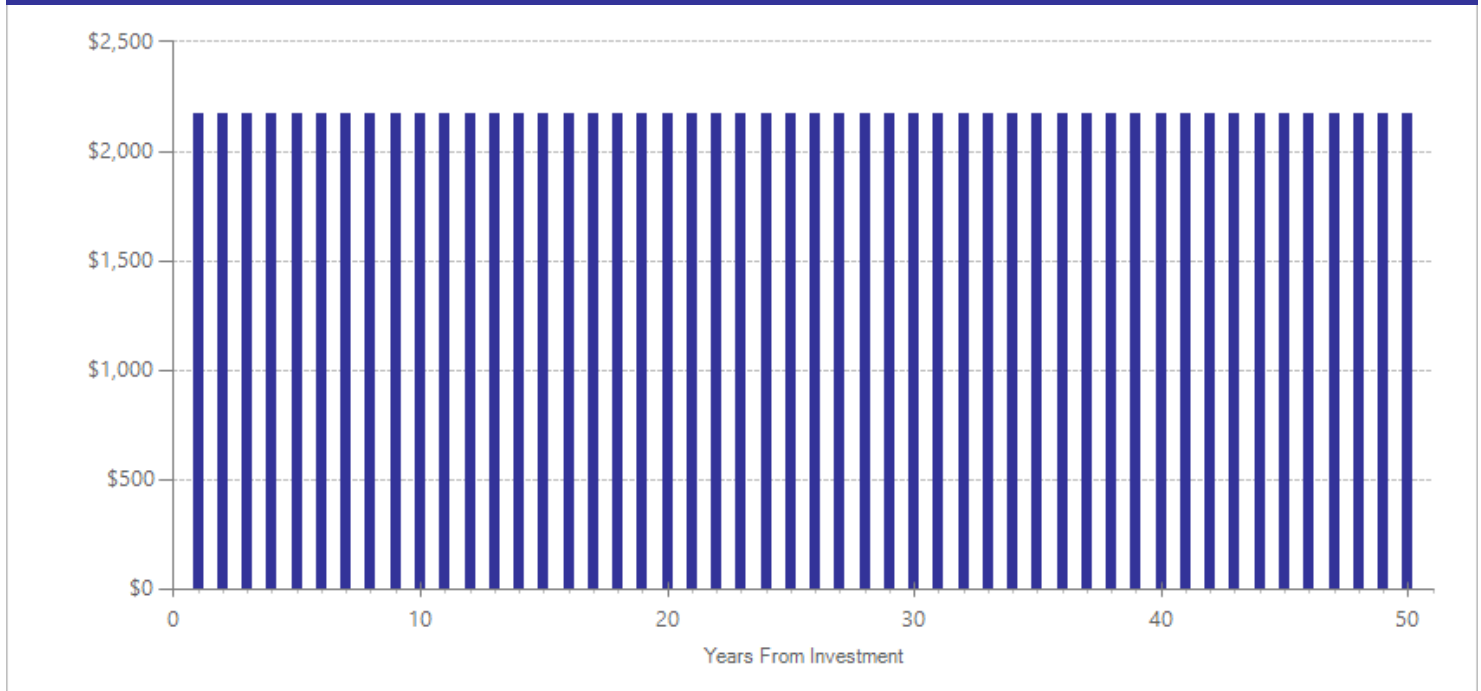
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$99	2016	Present value of net program costs (in 2016 dollars)	(\$95)
Comparison costs	\$5	2016	Cost range (+ or -)	30 %

The per-participant cost of treatment is based on physician/therapist time reported in studies, multiplied by the Medicaid reimbursement rate for tobacco cessation for pregnant clients, reported by the Washington State Health Care Authority for physician-related/professional services. Cost estimates were obtained from El-Mohandes et al. (2011), McBride, C.M. (1999), Patten et al. (2010) Rigotti et al. (2006), and Secker-Walker et al. (1994). Studies with reported treatment costs include Dornelas et al. (2006), Ruger et al. (2008), and Secker-Walker et al. (1998).

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	p-value
				ES	SE	Age	ES	SE	Age		
Low birthweight births***	Primary	3	793	-0.088	0.066	26	0.000	0.000	27	-0.088	0.183
Regular smoking	Primary	6	895	-0.043	0.074	26	-0.043	0.074	36	-0.043	0.559
Smoking during late pregnancy	Primary	16	2370	-0.228	0.079	26	0.000	0.000	27	-0.228	0.004
Low birthweight births***	Secondary	3	793	-0.088	0.066	1	0.000	0.000	2	-0.088	0.183

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

\*\*\* We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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## Resource Mothers Program Health Care: Maternal and Infant Health

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

Program Description: The Resource Mothers Program is a prenatal home visiting programs for pregnant adolescents age 19 and under. Adolescent women are eligible for this program during their pregnancy and for 12 months postpartum. In this program, a paraprofessional provider called a "resource mother" makes monthly visits to the adolescents' home to provide case management, risk assessments, psychosocial support, or health education. Resource mothers are supervised by a social worker.

The Resource Mothers Program provides an average of 16 home visiting hours, 1 training hour, and 1 supervisory hour per participant. All women in treatment and comparison groups receive clinical prenatal care (treatment as usual). Both studies included in this analysis were implemented in South Carolina.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$358	Benefit to cost ratio	\$2.80
Participants	\$205	Benefits minus costs	\$1,290
Others	\$0	Chance the program will produce	
Indirect	\$1,442	benefits greater than the costs	84 %
<b>Total benefits</b>	<b>\$2,005</b>		
<b>Net program cost</b>	<b>(\$716)</b>		
<b>Benefits minus cost</b>	<b>\$1,290</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with preterm births	\$0	\$29	\$0	\$14	\$43
<b>Subtotals</b>	<b>\$0</b>	<b>\$29</b>	<b>\$0</b>	<b>\$14</b>	<b>\$43</b>
From secondary participant					
Infant mortality	\$205	\$93	\$0	\$1,668	\$1,966
Health care associated with preterm births	\$0	\$237	\$0	\$119	\$356
<b>Subtotals</b>	<b>\$205</b>	<b>\$330</b>	<b>\$0</b>	<b>\$1,787</b>	<b>\$2,322</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$360)	(\$360)
<b>Totals</b>	<b>\$205</b>	<b>\$358</b>	<b>\$0</b>	<b>\$1,442</b>	<b>\$2,005</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.



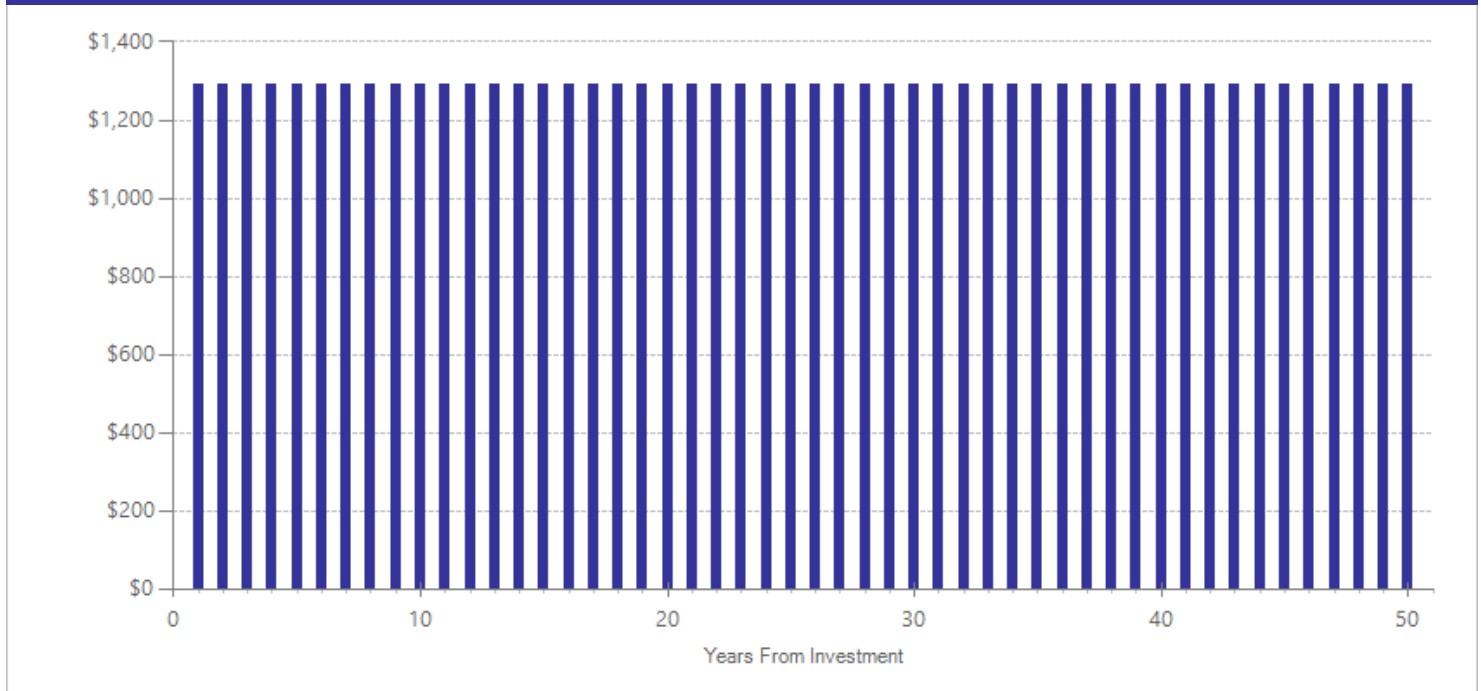
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$715	2016	Present value of net program costs (in 2016 dollars)	(\$716)
Comparison costs	\$0	2016	Cost range (+ or -)	10 %

Treatment cost estimates for this program reflect costs beyond treatment as usual. We estimate provider hours including home visiting hours, training hours, and supervisory hours; apply the mean hourly wage estimate for Washington State reported by the Bureau of Labor Statistics (September 2016) for the appropriate provider; and increase wages by a factor of 1.441 to account for the cost of employee benefits. Included studies averaged 16 home visiting hours, 1 training hour, and 1 supervisory hour per participant.

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
Low birthweight births***	Primary	2	2466	-0.037	0.044	16	0.000	0.000	17	-0.111	0.271
Preterm birth (< 37 weeks)	Primary	1	1901	-0.085	0.045	16	0.000	0.000	17	-0.085	0.058
Small for gestational age (SGA)	Primary	1	565	-0.088	0.079	16	0.000	0.000	17	-0.245	0.002
Very low birthweight birth (< 1500g)	Primary	1	565	-0.042	0.079	16	0.000	0.000	17	-0.118	0.137
Low birthweight births***	Secondary	2	2466	-0.037	0.044	1	0.000	0.000	2	-0.111	0.271
Preterm birth (< 37 weeks)	Secondary	1	1901	-0.085	0.045	1	0.000	0.000	2	-0.085	0.058
Small for gestational age (SGA)	Secondary	1	565	-0.088	0.079	1	0.000	0.000	2	-0.245	0.002
Very low birthweight birth (< 1500g)	Secondary	1	565	-0.042	0.079	1	0.000	0.000	2	-0.118	0.137

\*\*\* We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Cesarean section reduction programs: Multi-faceted hospital-based interventions (Medicaid population)

## Health Care: Maternal and Infant Health

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

**Program Description:** These interventions encompass bundled reform packages adopted by hospitals in order to change physician decision-making in performing cesarean sections. While the specific components of these bundled reform packages vary, they typically include the adoption of physician best practices, especially guidelines on when cesarean sections should be performed, and the limitation of inductions before 39 weeks of gestation. Most reform packages also attempt to change physician behavior by publishing either their anonymous or identified cesarean section rates via a report card or by creating a physician review board that regularly audits the appropriateness of performed cesarean sections. These packages can also include the recruitment of physicians to serve as local opinion leaders or potentially other clinical or non-clinical interventions.

The benefits presented in the benefit-cost analysis are specific to the Medicaid population.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$202	Benefit to cost ratio	\$8.31
Participants	\$0	Benefits minus costs	\$251
Others	\$0	Chance the program will produce	
Indirect	\$84	benefits greater than the costs	100 %
<b>Total benefits</b>	<b>\$286</b>		
<b>Net program cost</b>	<b>(\$34)</b>		
<b>Benefits minus cost</b>	<b>\$251</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$0	\$202	\$0	\$101	\$303
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$17)	(\$17)
<b>Totals</b>	<b>\$0</b>	<b>\$202</b>	<b>\$0</b>	<b>\$84</b>	<b>\$286</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

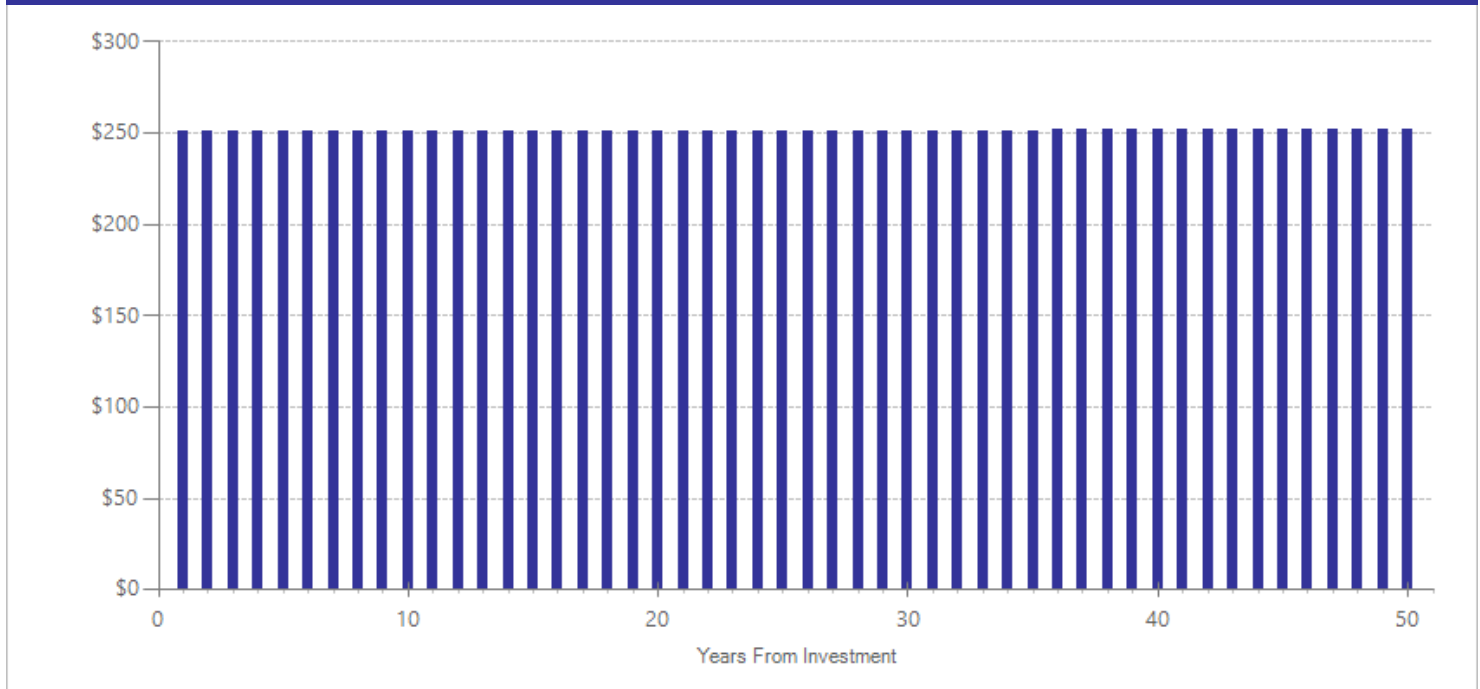
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$34	2014	Present value of net program costs (in 2016 dollars)	(\$34)
Comparison costs	\$0	2014	Cost range (+ or -)	20 %

The average per-participant cost of these programs was computed as the product of 80 hours per health care provider and average Washington State 2014 hourly wages of the appropriate professionals (typically obstetrician/gynecologists, general practitioners and nurse staff) for training in best practices, implementation of guidelines, and quarterly audit and review of hospital cesarean section rates. The estimate of the required staff hours were taken from Chaillet et al. (2015). A cluster-randomized trial to reduce cesarean delivery rates in Quebec. *New England Journal of Medicine*, 372(18), 1710-1721.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	7	115838	-0.243	0.075	26	0.000	0.000	27	-0.243	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

- Chaillet, N., Pasquier, J.-C., Dube, E., Fraser, W.D., Abrahamowicz, M., Dugas, M., Burne, R., et al. (2015). A cluster-randomized trial to reduce cesarean delivery rates in Quebec. *New England Journal of Medicine*, *372*(18), 1710-1721.
- Liang, W.H., Yuan, C.C., Hung, J.H., Yang, M.L., Yang, M.J., Chen, Y.J., & Yang, T.S. (2004). Effect of peer review and trial of labor on lowering cesarean section rates. *Journal of the Chinese Medical Association*, *6*(6), 281-6.
- Main, E.K. (1999). Reducing cesarean birth rates with data-driven quality improvement activities. *Pediatrics*, *103*(1), 374-83.
- Myers, S.A., & Gleicher, N. (1993). The Mount Sinai cesarean section reduction program: an update after 6 years. *Social Science & Medicine*, *3*(10), 1219-22.
- Poma, P.A. (1998). Effect of departmental policies on cesarean delivery rates: a community hospital experience. *Obstetrics and Gynecology*, *91*(6), 1013-8.
- Robson, M.S., Scudamore, I.W., & Walsh, S.M. (1996). Using the medical audit cycle to reduce cesarean section rates. *American Journal of Obstetrics and Gynecology*, *174*(1), 199-205.
- Sanchez-Ramos, L., Kaunitz, A.M., Peterson, H.B., Martinez-Schnell, B., & Thompson, R.J. (1990). Reducing cesarean sections at a teaching hospital. *American Journal of Obstetrics and Gynecology*, *163*(3), 1081-7.

# Cesarean section reduction programs: Multi-faceted hospital-based interventions (private pay population)

## Health Care: Maternal and Infant Health

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

**Program Description:** These interventions encompass bundled reform packages adopted by hospitals in order to change physician decision-making in performing cesarean sections. While the specific components of these bundled reform packages vary, they typically include the adoption of physician best practices, especially guidelines on when cesarean sections should be performed, and the limitation of inductions before 39 weeks of gestation. Most reform packages also attempt to change physician behavior by publishing either their anonymous or identified cesarean section rates via a report card or by creating a physician review board that regularly audits the appropriateness of performed cesarean sections. These packages can also include the recruitment of physicians to serve as local opinion leaders or potentially other clinical or non-clinical interventions.

The benefits presented in the benefit-cost analysis are specific to the privately insured population.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$0	Benefit to cost ratio	\$7.87
Participants	\$14	Benefits minus costs	\$236
Others	\$273	Chance the program will produce	
Indirect	(\$17)	benefits greater than the costs	100 %
<b>Total benefits</b>	<b>\$271</b>		
<b>Net program cost</b>	<b>(\$34)</b>		
<b>Benefits minus cost</b>	<b>\$236</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$14	\$0	\$273	\$0	\$288
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$17)	(\$17)
<b>Totals</b>	<b>\$14</b>	<b>\$0</b>	<b>\$273</b>	<b>(\$17)</b>	<b>\$271</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

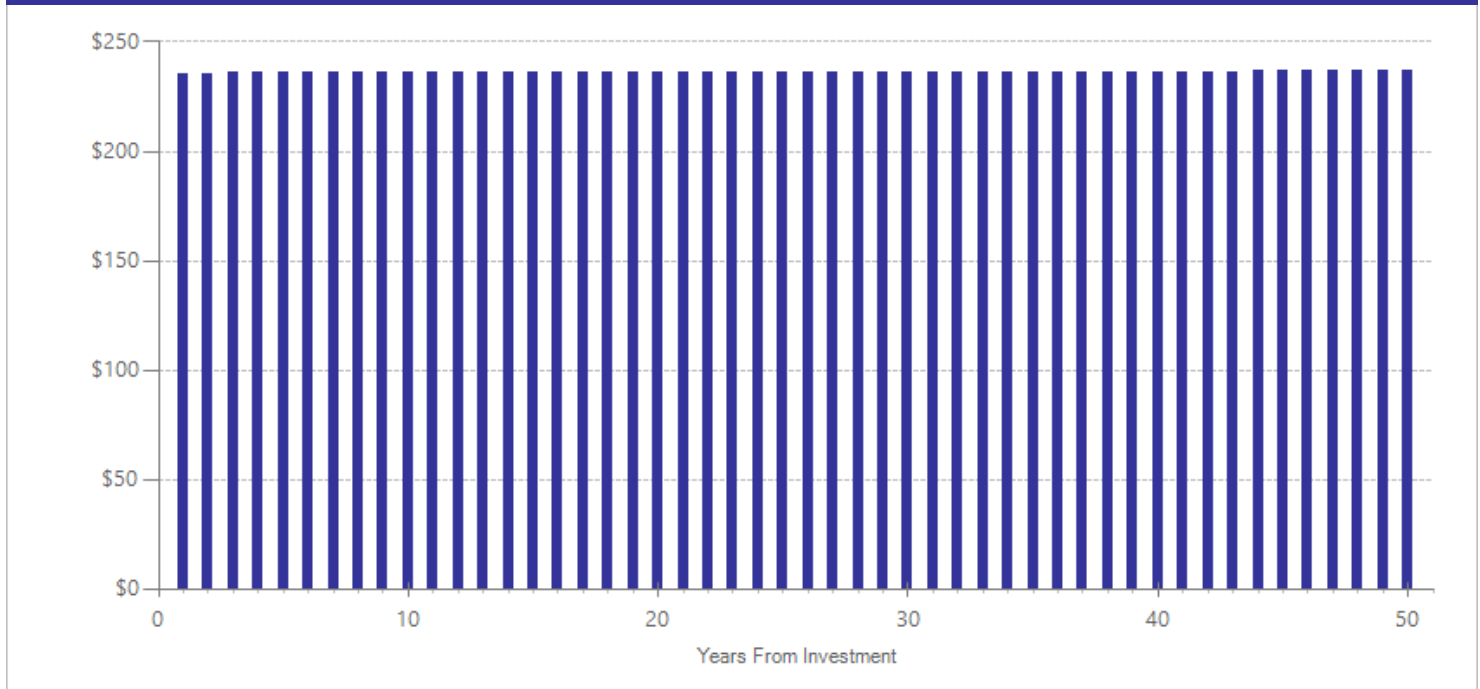
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$34	2014	Present value of net program costs (in 2016 dollars)	(\$34)
Comparison costs	\$0	2014	Cost range (+ or -)	20 %

The average per-participant cost of these programs was computed as the product of 80 hours per health care provider and average Washington State 2014 hourly wages of the appropriate professionals (typically obstetrician/gynecologists, general practitioners and nurse staff) for training in best practices, implementation of guidelines, and quarterly audit and review of hospital cesarean section rates. The estimate of the required staff hours were taken from Chaillet et al. (2015). A cluster-randomized trial to reduce cesarean delivery rates in Quebec. *New England Journal of Medicine*, 372(18), 1710-1721.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	7	115838	-0.243	0.075	26	0.000	0.000	27	-0.243	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

- Chaillet, N., Pasquier, J.-C., Dube, E., Fraser, W.D., Abrahamowicz, M., Dugas, M., Burne, R., et al. (2015). A cluster-randomized trial to reduce cesarean delivery rates in Quebec. *New England Journal of Medicine*, 372(18), 1710-1721.
- Liang, W.H., Yuan, C.C., Hung, J.H., Yang, M.L., Yang, M.J., Chen, Y.J., & Yang, T.S. (2004). Effect of peer review and trial of labor on lowering cesarean section rates. *Journal of the Chinese Medical Association : Jcma*, 6(6), 281-6.
- Main, E. K. (1999). Reducing cesarean birth rates with data-driven quality improvement activities. *Pediatrics*, 103(1), 374-83.
- Myers, S.A., & Gleicher, N. (1993). The Mount Sinai cesarean section reduction program: an update after 6 years. *Social Science & Medicine*, 3(10), 1219-22.
- Poma, P.A. (1998). Effect of departmental policies on cesarean delivery rates: a community hospital experience. *Obstetrics and Gynecology*, 91(6), 1013-8.
- Robson, M.S., Scudamore, I.W., & Walsh, S.M. (1996). Using the medical audit cycle to reduce cesarean section rates. *American Journal of Obstetrics and Gynecology*, 174(1), 199-205.
- Sanchez-Ramos, L., Kaunitz, A.M., Peterson, H.B., Martinez-Schnell, B., & Thompson, R.J. (1990). Reducing cesarean sections at a teaching hospital. *American Journal of Obstetrics and Gynecology*, 163(3), 1081-7.



# Cesarean section reduction programs: Audit and feedback (Medicaid population)

## Health Care: Maternal and Infant Health

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

Program Description: Audit and feedback is a physician-centered approach to reducing cesarean section rates by reviewing cesarean sections for their appropriateness according to pre-established guidelines. These interventions vary in the frequency with which the audits are performed and the feedback provided. There is also variation in whether information is provided anonymously or if physicians or departments are associated with their cesarean section rates.

The benefits presented in the benefit-cost analysis are specific to the Medicaid population.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$124	Benefit to cost ratio	\$6.25
Participants	\$0	Benefits minus costs	\$144
Others	\$0	Chance the program will produce	
Indirect	\$48	benefits greater than the costs	85 %
<b>Total benefits</b>	<b>\$172</b>		
<b>Net program cost</b>	<b>(\$28)</b>		
<b>Benefits minus cost</b>	<b>\$144</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$0	\$124	\$0	\$62	\$186
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$14)	(\$14)
<b>Totals</b>	<b>\$0</b>	<b>\$124</b>	<b>\$0</b>	<b>\$48</b>	<b>\$172</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

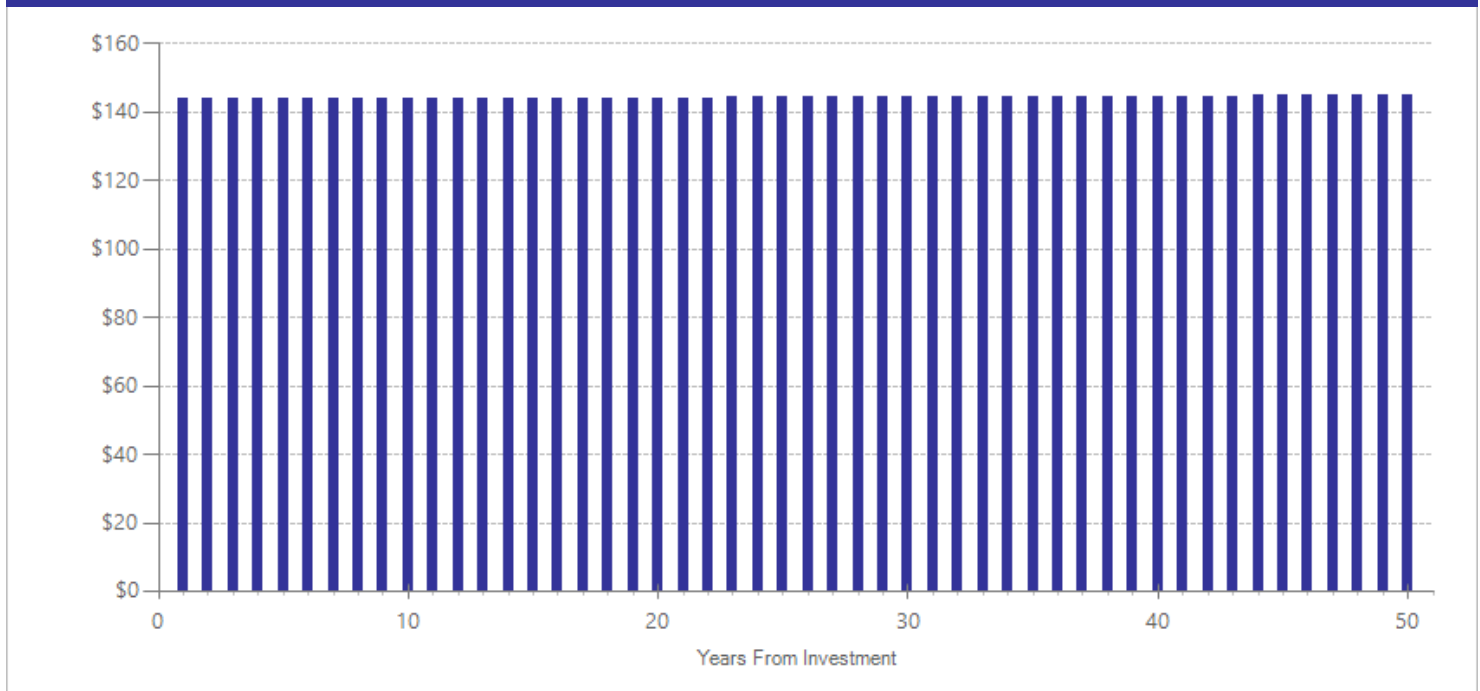
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$27	2014	Present value of net program costs (in 2016 dollars)	(\$28)
Comparison costs	\$0	2014	Cost range (+ or -)	20 %

The average per-participant cost of these programs was computed as the product of hours and average Washington State 2014 hourly wages of the appropriate professionals (typically obstetrician/gynecologists, general practitioners and nurse staff) for a typical quarterly audit and review of hospital cesarean section rates.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	3	2881	-0.142	0.109	26	0.000	0.000	27	-0.142	0.193

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

- Lomas, J., Enkin, M., Anderson, G.M., Hannah, W.J., Vayda, E., & Singer, J. (1991). Opinion leaders vs audit and feedback to implement practice guidelines. Delivery after previous cesarean section. *Jama*, *265*(17), 2202-7.
- Scarella, A., Chamy, V., Sepulveda, M., & Belizan, J.M. (2011). Medical audit using the Ten Group Classification System and its impact on the cesarean section rate. *European Journal of Obstetrics and Gynecology*, *154*(2), 136-140.
- van, D.J., Lim, F., & van, R.E. (2008). Introducing caesarean section audit in a regional teaching hospital in The Netherlands. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *139*(2), 151-156.

# Cesarean section reduction programs: Audit and feedback (private pay population)

## Health Care: Maternal and Infant Health

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

Program Description: Audit and feedback is a physician-centered approach to reducing cesarean section rates by reviewing cesarean sections for their appropriateness according to pre-established guidelines. These interventions vary in the frequency with which the audits are performed and the feedback provided. There is also variation in whether information is provided anonymously or if physicians or departments are associated with their cesarean section rates.

The benefits presented in the benefit-cost analysis are specific to the privately insured population.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$0	Benefit to cost ratio	\$5.80
Participants	\$9	Benefits minus costs	\$132
Others	\$165	Chance the program will produce	
Indirect	(\$14)	benefits greater than the costs	84 %
<u>Total benefits</u>	<u>\$160</u>		
<u>Net program cost</u>	<u>(\$28)</u>		
Benefits minus cost	\$132		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$9	\$0	\$165	\$0	\$174
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$14)	(\$14)
Totals	\$9	\$0	\$165	(\$14)	\$160

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

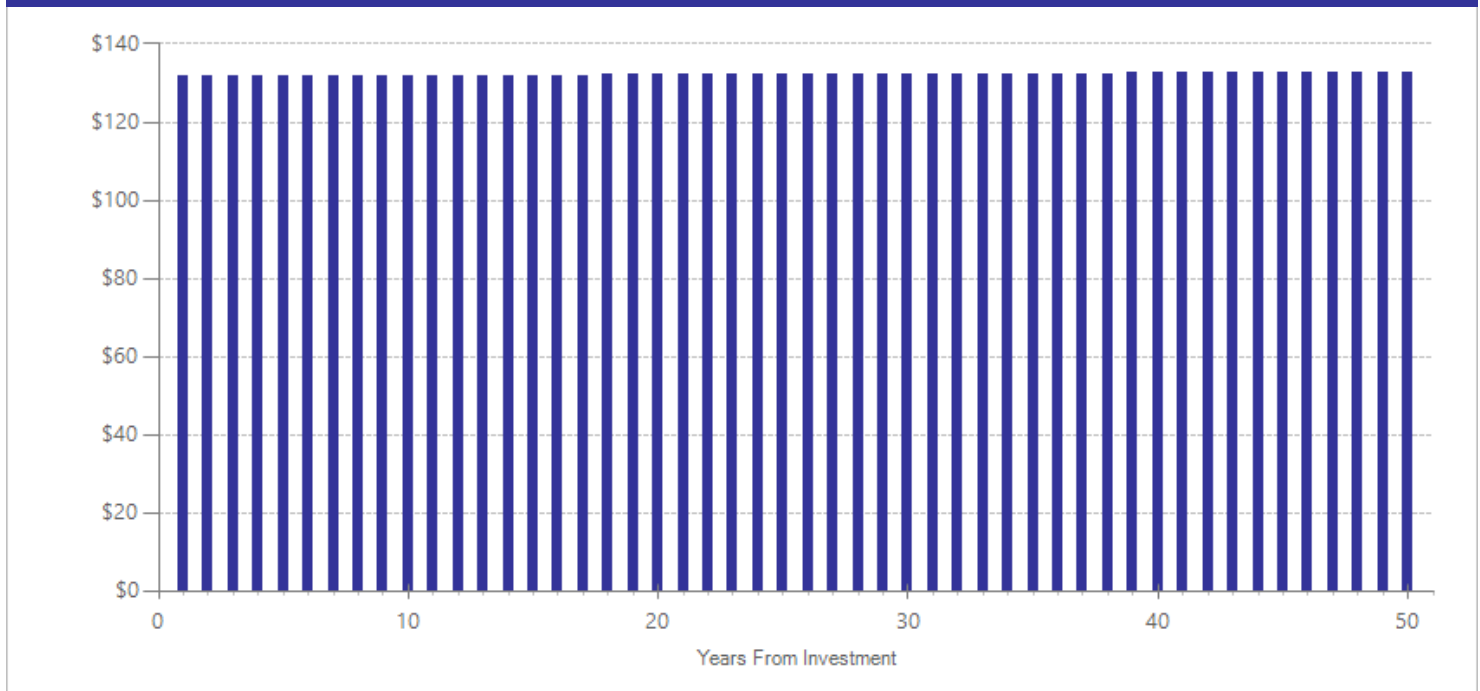
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$27	2014	Present value of net program costs (in 2016 dollars)	(\$28)
Comparison costs	\$0	2014	Cost range (+ or -)	20 %

The average per-participant cost of these programs was computed as the product of hours and average Washington State 2014 hourly wages of the appropriate professionals (typically obstetrician/gynecologists, general practitioners and nurse staff) for a typical quarterly audit and review of hospital cesarean section rates.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	3	2881	-0.142	0.109	26	0.000	0.000	27	-0.142	0.193

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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- Scarella, A., Chamy, V., Sepulveda, M., & Belizan, J.M. (2011). Medical audit using the Ten Group Classification System and its impact on the cesarean section rate. *European Journal of Obstetrics and Gynecology*, *154*(2), 136-140.
- van, D.J., Lim, F., & van, R.E. (2008). Introducing caesarean section audit in a regional teaching hospital in The Netherlands. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *139*(2), 151-156.

# Cesarean section reduction programs: Mandatory second opinion (Medicaid population)

## Health Care: Maternal and Infant Health

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

Program Description: These programs require physicians to consult an additional physician for a second opinion before conducting a cesarean section.

The benefits presented in the benefit-cost analysis are specific to the Medicaid population.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$124	Benefit to cost ratio	\$1.92
Participants	\$0	Benefits minus costs	\$71
Others	\$0	Chance the program will produce	
Indirect	\$24	benefits greater than the costs	100 %
<b>Total benefits</b>	<b>\$148</b>		
<b>Net program cost</b>	<b>(\$77)</b>		
<b>Benefits minus cost</b>	<b>\$71</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$0	\$124	\$0	\$62	\$186
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$38)	(\$38)
<b>Totals</b>	<b>\$0</b>	<b>\$124</b>	<b>\$0</b>	<b>\$24</b>	<b>\$148</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

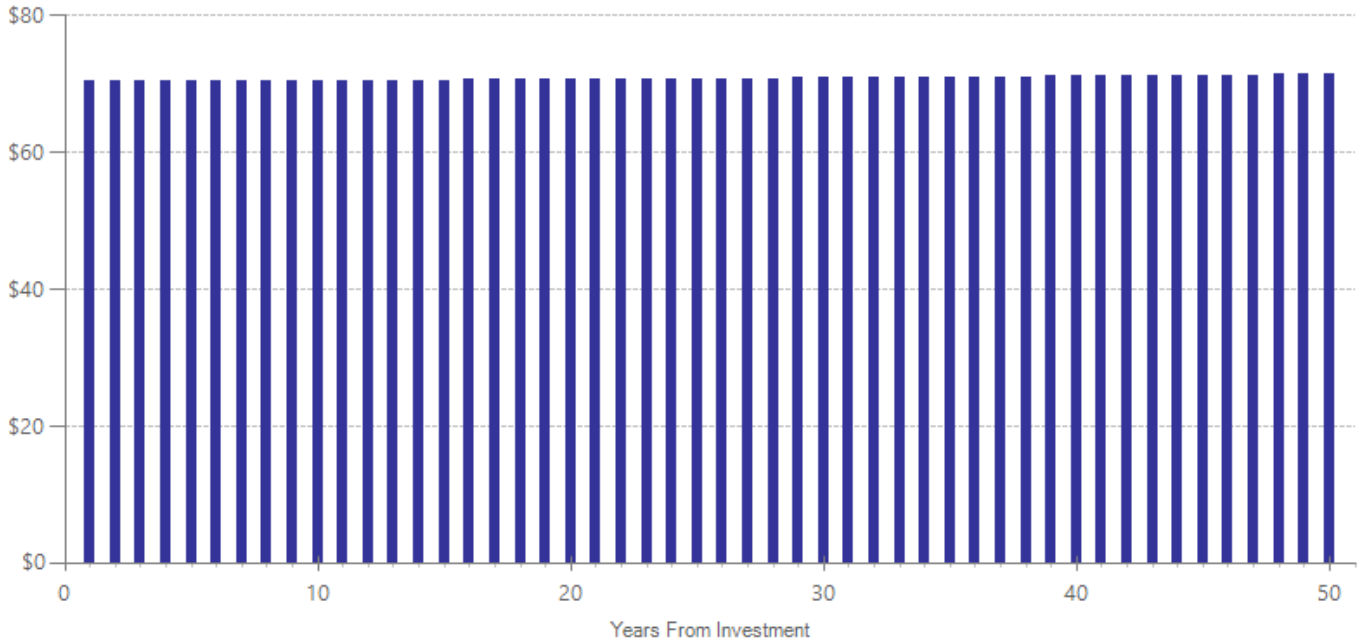
### Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$76	2014	Present value of net program costs (in 2016 dollars)	(\$77)
Comparison costs	\$0	2014	Cost range (+ or -)	20 %

The average cost of these programs was computed as the product of 30 minutes of contact time and average Washington State 2014 hourly wages of a consulting obstetrician. This cost estimate does not account for the possibility of increased costs due to an increased requirement for the number of physicians on shift.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	2	82761	-0.143	0.016	26	0.000	0.000	27	-0.143	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



- Althabe, F., Belizán, J.M., Villar, J., Alexander, S., Bergel, E., Ramos, S., . . . Latin American Caesarean Section Study Group. (2004). Mandatory second opinion to reduce rates of unnecessary caesarean sections in Latin America: a cluster randomised controlled trial. *The Lancet*, *363*(9425), 1934-1940.
- Sloan, N.L., Pinto, E., Calle, A., Langer, A., Winikoff, B., & Fassihian, G. (2000). Reduction of the cesarean delivery rate in Ecuador. *International Journal of Gynecology & Obstetrics*, *69*(3), 229-236.

# Cesarean section reduction programs: Mandatory second opinion (private pay population)

## Health Care: Maternal and Infant Health

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

Program Description: These programs require physicians to consult an additional physician for a second opinion before conducting a cesarean section.

The benefits presented in the benefit-cost analysis are specific to the privately insured population.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$0	Benefit to cost ratio	\$1.79
Participants	\$9	Benefits minus costs	\$61
Others	\$167	Chance the program will produce	
Indirect	(\$39)	benefits greater than the costs	98 %
<b>Total benefits</b>	<b>\$138</b>		
<b>Net program cost</b>	<b>(\$77)</b>		
<b>Benefits minus cost</b>	<b>\$61</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$9	\$0	\$167	\$0	\$176
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$39)	(\$39)
<b>Totals</b>	<b>\$9</b>	<b>\$0</b>	<b>\$167</b>	<b>(\$39)</b>	<b>\$138</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

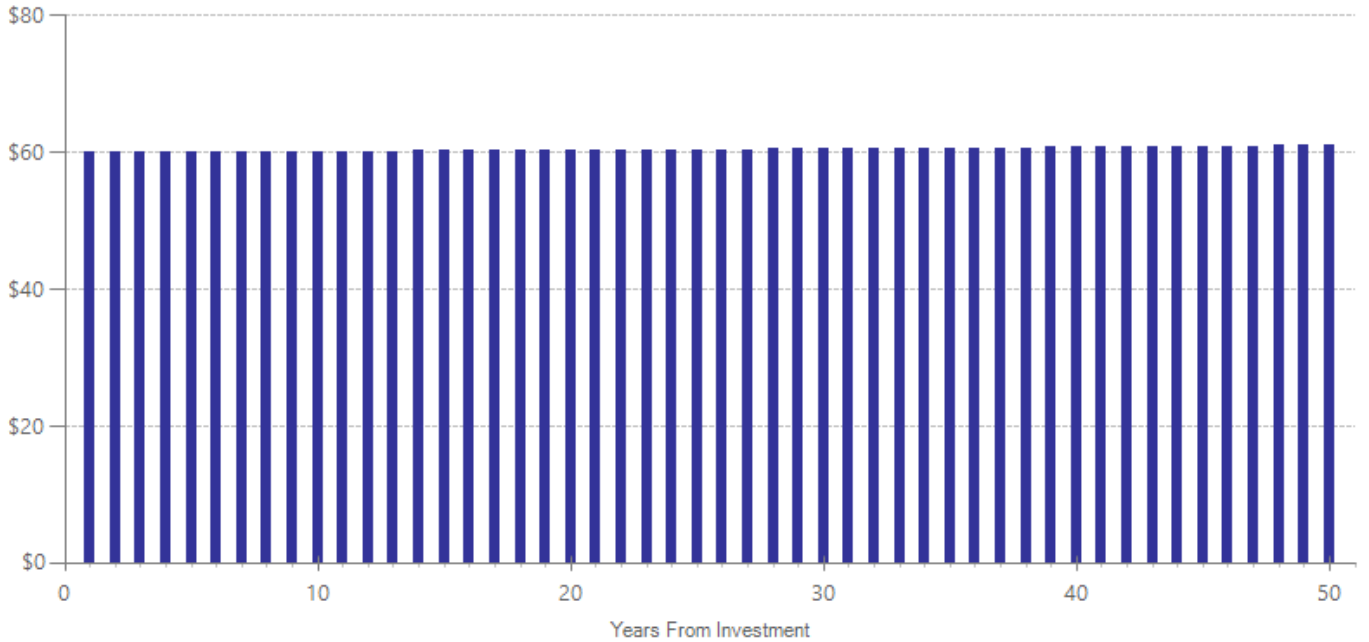
### Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$76	2014	Present value of net program costs (in 2016 dollars)	(\$77)
Comparison costs	\$0	2014	Cost range (+ or -)	20 %

The average cost of these programs was computed as the product of 30 minutes of contact time and average Washington State 2014 hourly wages of a consulting obstetrician. This cost estimate does not account for the possibility of increased costs due to an increased requirement for the number of physicians on shift.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	2	82761	-0.143	0.016	26	0.000	0.000	27	-0.143	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

- Althabe, F., Belizán, J.M., Villar, J., Alexander, S., Bergel, E., Ramos, S., . . . Latin American Caesarean Section Study Group. (2004). Mandatory second opinion to reduce rates of unnecessary caesarean sections in Latin America: a cluster randomised controlled trial. *The Lancet*, *363*(9425), 1934-1940.
- Sloan, N.L., Pinto, E., Calle, A., Langer, A., Winikoff, B., & Fassihian, G. (2000). Reduction of the cesarean delivery rate in Ecuador. *International Journal of Gynecology & Obstetrics*, *69*(3), 229-236.

# Cesarean section reduction programs: Continuous support (Medicaid population)

## Health Care: Maternal and Infant Health

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

**Program Description:** These hospital-based interventions measure the influence of continuous emotional and physical support for women in labor in reducing medical interventions, specifically cesarean sections. The scope of the interventions varies, from solely intrapartum support to pre-natal education and post-partum care and lactation support. Similarly, the nature of the practitioner also varies, including nurses with additional training, doulas who are not included in hospital staff, or friends or family of the laboring mother who have received additional training. Only studies that use a control group—women with a support person (e.g. partner or family member)—are included here to increase generalizability to Washington State’s population.

The benefits presented in the benefit-cost analysis are specific to the Medicaid population.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$83	Benefit to cost ratio	(\$0.03)
Participants	\$0	Benefits minus costs	(\$267)
Others	\$0	Chance the program will produce	
Indirect	(\$89)	benefits greater than the costs	1 %
<u>Total benefits</u>	<u>(\$7)</u>		
<u>Net program cost</u>	<u>(\$261)</u>		
Benefits minus cost	(\$267)		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$0	\$83	\$0	\$41	\$124
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$130)	(\$130)
<b>Totals</b>	<b>\$0</b>	<b>\$83</b>	<b>\$0</b>	<b>(\$89)</b>	<b>(\$7)</b>

<sup>1</sup>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.

<sup>2</sup>“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.

<sup>3</sup>“Indirect benefits” includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

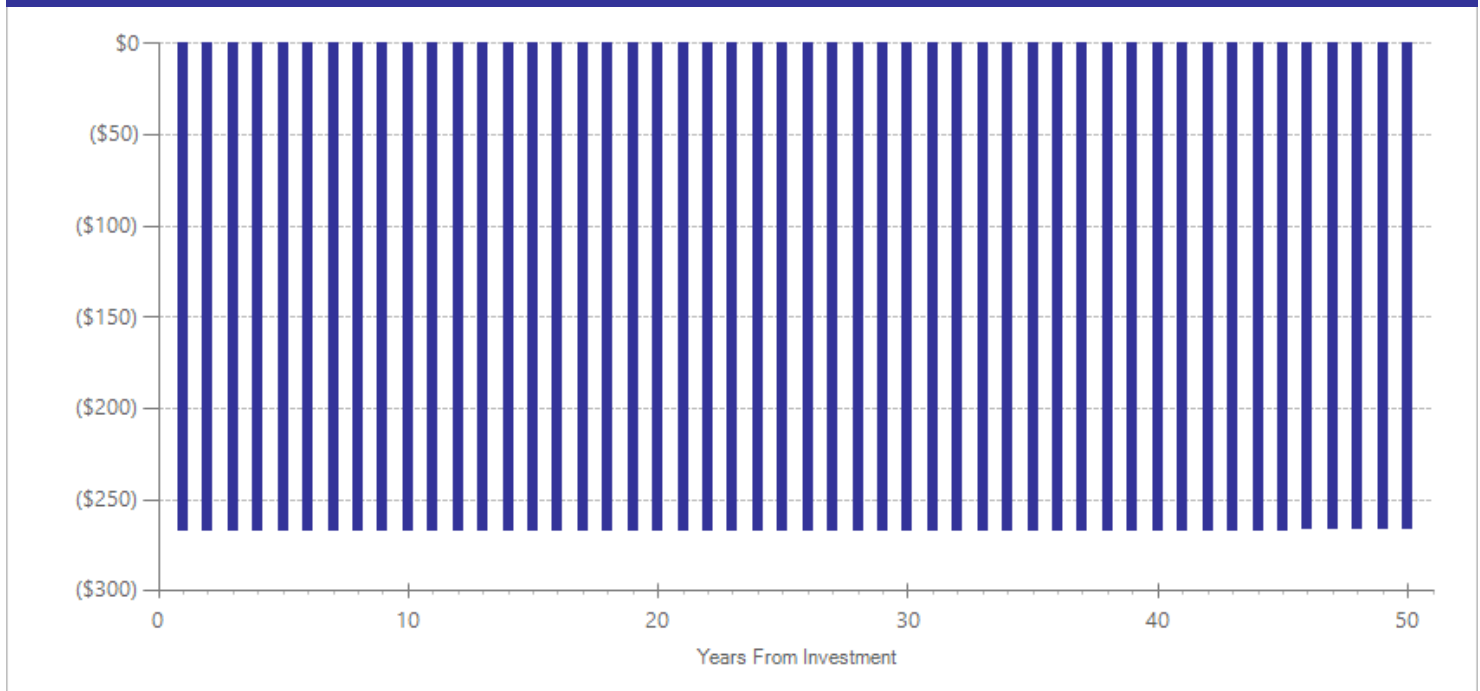
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$257	2014	Present value of net program costs (in 2016 dollars)	(\$261)
Comparison costs	\$0	2014	Cost range (+ or -)	10 %

Per-participant cost is the reimbursement rate from Minnesota Medicaid for the cost of a doula for a labor and delivery session. This does not include reimbursement for additional prenatal or postnatal education and/or counseling.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	5	4327	-0.093	0.090	26	0.000	0.000	27	-0.093	0.304

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

- Campbell, D.A., Lake, M.F., Falk, M., & Backstrand, J.R. (2006). A randomized control trial of continuous support in labor by a lay doula. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 35(4), 456-464.
- Gagnon, A.J., Waghorn, K., & Covell, C. (1997). A randomized trial of one-to-one nurse support of women in labor. *Birth*, 24(2), 71-77.
- Gordon, N.P., Walton, D., McAdam, E., Derman, J., Gallitero, G., & Garrett, L. (1999). Effects of providing hospital-based doulas in health maintenance organization hospitals. *Obstetrics & Gynecology*, 93(3), 422-426.
- Hodnett, E.D., Lowe, N.K., Hannah, M.E., Willan, A.R., Stevens, B., Weston, J.A., . . . Nursing Supportive Care in Labor Trial Group. (2002). Effectiveness of nurses as providers of birth labor support in North American hospitals: a randomized controlled trial. *Jama*, 288(11), 1373-1381.
- McGrath, S.K., & Kennell, J.H. (2008). A randomized controlled trial of continuous labor support for middle-class couples: Effect on cesarean delivery rates. *Birth*, 35(2), 92-97.

## Cesarean section reduction programs: Continuous support (private pay population)

### Health Care: Maternal and Infant Health

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

**Program Description:** These hospital-based interventions measure the influence of continuous emotional and physical support for women in labor in reducing medical interventions, specifically cesarean sections. The scope of the interventions varies, from solely intrapartum support to pre-natal education and post-partum care and lactation support. Similarly, the nature of the practitioner also varies, including nurses with additional training, doulas who are not included in hospital staff, or friends or family of the laboring mother who received additional training. Only studies that use a control group—women with a support person (e.g. partner or family member)—are included here to increase generalizability to Washington State’s population.

The benefits presented in the benefit-cost analysis are specific to the privately insured population.

#### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$0	Benefit to cost ratio	(\$0.05)
Participants	\$6	Benefits minus costs	(\$274)
Others	\$112	Chance the program will produce	
Indirect	(\$131)	benefits greater than the costs	1 %
<u>Total benefits</u>	<u>(\$13)</u>		
<u>Net program cost</u>	<u>(\$261)</u>		
Benefits minus cost	(\$274)		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with Cesarean sections	\$6	\$0	\$112	\$0	\$117
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$131)	(\$131)
<b>Totals</b>	<b>\$6</b>	<b>\$0</b>	<b>\$112</b>	<b>(\$131)</b>	<b>(\$13)</b>

<sup>1</sup>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.

<sup>2</sup>“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.

<sup>3</sup>“Indirect benefits” includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.



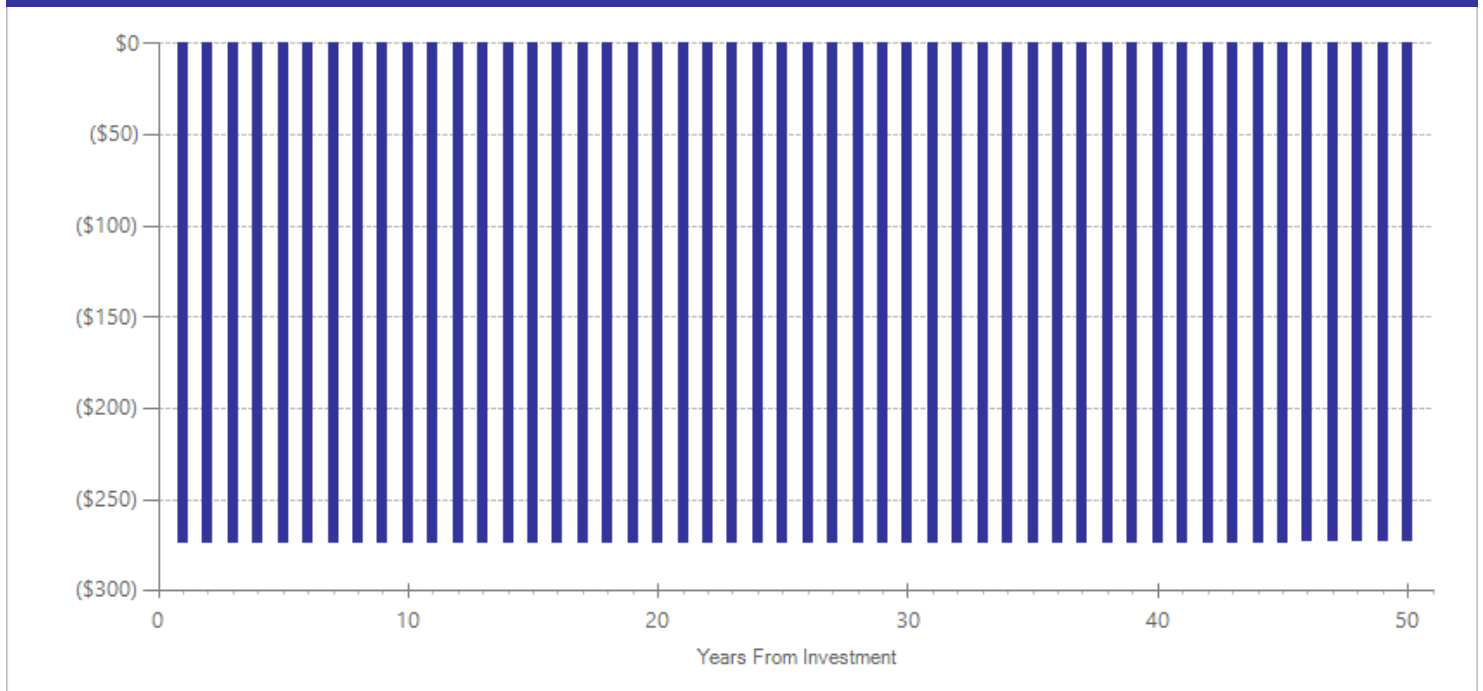
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$257	2014	Present value of net program costs (in 2016 dollars)	(\$261)
Comparison costs	\$0	2014	Cost range (+ or -)	10 %

Per-participant cost is the reimbursement rate from Minnesota Medicaid for the cost of a doula for a labor and delivery session. This does not include reimbursement for additional prenatal or postnatal education and/or counseling.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cesarean sections	5	4327	-0.093	0.090	26	0.000	0.000	27	-0.093	0.304

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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- Gagnon, A.J., Waghorn, K., & Covell, C. (1997). A randomized trial of one-to-one nurse support of women in labor. *Birth*, 24(2), 71-77.
- Gordon, N.P., Walton, D., McAdam, E., Derman, J., Gallitero, G., & Garrett, L. (1999). Effects of providing hospital-based doulas in health maintenance organization hospitals. *Obstetrics & Gynecology*, 93(3), 422-426.
- Hodnett, E.D., Lowe, N.K., Hannah, M.E., Willan, A.R., Stevens, B., Weston, J.A., . . . Nursing Supportive Care in Labor Trial Group. (2002). Effectiveness of nurses as providers of birth labor support in North American hospitals: a randomized controlled trial. *Jama*, 288(11), 1373-1381.
- McGrath, S.K., & Kennell, J.H. (2008). A randomized controlled trial of continuous labor support for middle-class couples: Effect on cesarean delivery rates. *Birth*, 35(2), 92-97.

# Interventions to prevent excessive gestational weight gain (population with obesity-related risk factors)

## Health Care: Maternal and Infant Health

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

Program Description: A wide range of programs aim to prevent excessive gestational weight gain in a population with obesity-related risk factors (based on their pre-pregnancy BMI). We included programs that offer an exercise class and programs that offer counseling on recommended weight gain during pregnancy. Typically athletic trainers lead exercise programs in groups and counseling is delivered one-on-one in a clinical setting by a health educator, midwife, psychologist, or obstetrician.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	(\$212)	Benefit to cost ratio	(\$3.71)
Participants	(\$17)	Benefits minus costs	(\$953)
Others	(\$215)	Chance the program will produce	
Indirect	(\$307)	benefits greater than the costs	47 %
<b>Total benefits</b>	<b>(\$751)</b>		
<b>Net program cost</b>	<b>(\$202)</b>		
<b>Benefits minus cost</b>	<b>(\$953)</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Health care associated with general hospitalization	\$3	\$49	\$42	\$24	\$118
Health care associated with low birthweight births	(\$2)	(\$41)	(\$41)	(\$21)	(\$104)
<b>Subtotals</b>	<b>\$1</b>	<b>\$8</b>	<b>\$1</b>	<b>\$4</b>	<b>\$14</b>
From secondary participant					
Infant mortality	(\$9)	(\$4)	\$0	(\$99)	(\$113)
Health care associated with preterm births	\$6	\$148	\$148	\$74	\$375
Health care associated with low birthweight births	(\$15)	(\$363)	(\$363)	(\$184)	(\$926)
<b>Subtotals</b>	<b>(\$18)</b>	<b>(\$220)</b>	<b>(\$216)</b>	<b>(\$209)</b>	<b>(\$663)</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$101)	(\$101)
<b>Totals</b>	<b>(\$17)</b>	<b>(\$212)</b>	<b>(\$215)</b>	<b>(\$307)</b>	<b>(\$751)</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

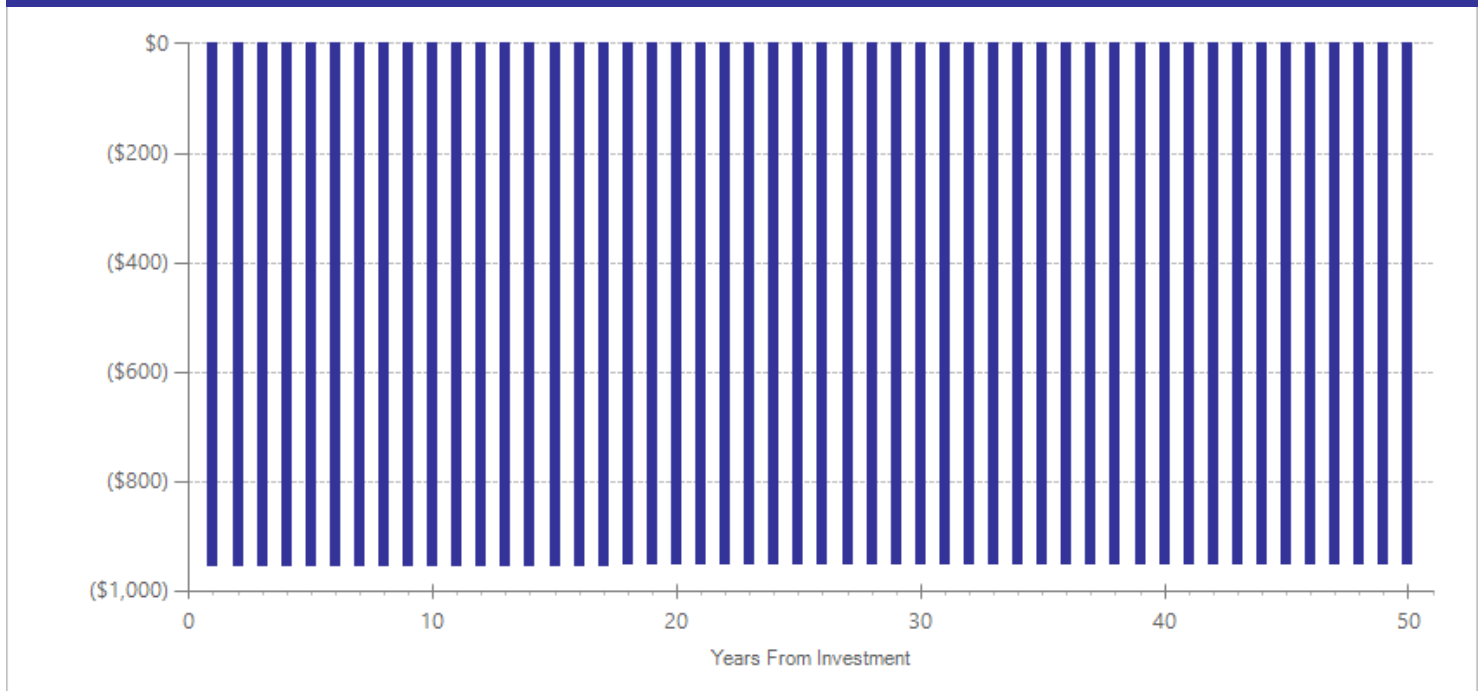
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$200	2015	Present value of net program costs (in 2016 dollars)	(\$202)
Comparison costs	\$0	2015	Cost range (+ or -)	50 %

These interventions varied in length, from a single session to seven months. The per-participant cost was calculated by multiplying the number of staff hours per participant by the average 2015 salary of the staff member as reported by the Bureau of Labor Statistics ([http://www.bls.gov/oes/current/oes\\_wa.htm#29-0000](http://www.bls.gov/oes/current/oes_wa.htm#29-0000)). We multiplied the average salary by 1.441 to estimate the total staff costs including benefits.

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	p-value
				ES	SE	Age	ES	SE	Age		
Blood pressure <sup>^</sup>	Primary	6	1641	-0.038	0.070	30	0.000	0.000	31	-0.038	0.584
Cesarean sections	Primary	8	2525	-0.063	0.058	30	0.000	0.000	31	-0.063	0.276
Excess gestational weight gain	Primary	10	1846	-0.240	0.110	30	0.000	0.000	31	-0.240	0.029
Gestational diabetes <sup>^</sup>	Primary	13	2906	-0.124	0.074	30	0.000	0.000	31	-0.124	0.093
Hospitalization	Primary	1	1075	-0.034	0.041	30	0.000	0.000	31	-0.034	0.398
Low birthweight births <sup>***</sup>	Primary	3	1101	0.252	0.209	30	0.000	0.000	31	0.252	0.230
Postpartum depression <sup>^</sup>	Primary	2	134	0.000	0.285	30	0.000	0.000	31	0.000	1.000
Preeclampsia <sup>^</sup>	Primary	5	2432	0.019	0.076	30	0.000	0.000	31	0.019	0.805
Preterm <sup>***</sup> birth (< 37 weeks)	Primary	4	2016	-0.132	0.087	30	0.000	0.000	31	-0.132	0.132
Small for gestational age (SGA) <sup>^</sup>	Primary	1	124	0.190	0.267	30	0.000	0.000	31	0.190	0.476
Infant mortality	Secondary	1	783	0.001	0.221	1	0.000	0.000	2	0.001	0.997
Low birthweight births <sup>***</sup>	Secondary	3	1101	0.252	0.209	1	0.000	0.000	2	0.252	0.230
Macrosomia (birth weight > 4000g) <sup>^</sup>	Secondary	7	2565	-0.118	0.053	1	0.000	0.000	2	-0.118	0.026
NICU admission	Secondary	3	1891	-0.005	0.050	1	0.000	0.000	2	-0.005	0.926
Preterm <sup>***</sup> birth (< 37 weeks)	Secondary	4	2016	-0.132	0.087	1	0.000	0.000	2	-0.132	0.132
Small for gestational age (SGA) <sup>^</sup>	Secondary	1	124	0.190	0.267	1	0.000	0.000	2	0.190	0.476

<sup>^</sup> WSIPP's benefit-cost model does not monetize this outcome.

<sup>\*\*\*</sup> We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Interventions to prevent excessive gestational weight gain (general population)

## Health Care: Maternal and Infant Health

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

Program Description: A wide range of programs aim to prevent excessive gestational weight gain. We included programs that offer an exercise class and programs that offer counseling on recommended weight gain during pregnancy. Typically athletic trainers lead exercise programs in groups and counseling is delivered one-on-one in a clinical setting by a health educator, midwife, or obstetrician. Counseling ranged from one to nine sessions.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	\$119	Benefit to cost ratio	(\$5.03)
Participants	(\$133)	Benefits minus costs	(\$1,112)
Others	\$183	Chance the program will produce	
Indirect	(\$1,097)	benefits greater than the costs	36 %
<b>Total benefits</b>	<b>(\$928)</b>		
<b>Net program cost</b>	<b>(\$184)</b>		
<b>Benefits minus cost</b>	<b>(\$1,112)</b>		

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: <sup>1</sup>	Benefits to:				
	Participants	Taxpayers	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Labor market earnings associated with diabetes	(\$8)	(\$4)	\$0	\$0	(\$12)
Health care associated with Cesarean sections	\$2	\$45	\$45	\$22	\$114
Health care associated with preterm births	\$0	(\$11)	(\$11)	(\$6)	(\$28)
<b>Subtotals</b>	<b>(\$6)</b>	<b>\$30</b>	<b>\$34</b>	<b>\$17</b>	<b>\$74</b>
From secondary participant					
Infant mortality	(\$133)	(\$60)	\$0	(\$1,097)	(\$1,289)
Health care associated with preterm births	(\$4)	(\$90)	(\$90)	(\$44)	(\$227)
Health care associated with NICU admissions	\$10	\$239	\$239	\$119	\$606
<b>Subtotals</b>	<b>(\$127)</b>	<b>\$89</b>	<b>\$149</b>	<b>(\$1,022)</b>	<b>(\$910)</b>
Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$92)	(\$92)
<b>Totals</b>	<b>(\$133)</b>	<b>\$119</b>	<b>\$183</b>	<b>(\$1,097)</b>	<b>(\$928)</b>

<sup>1</sup>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.

<sup>2</sup>"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.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

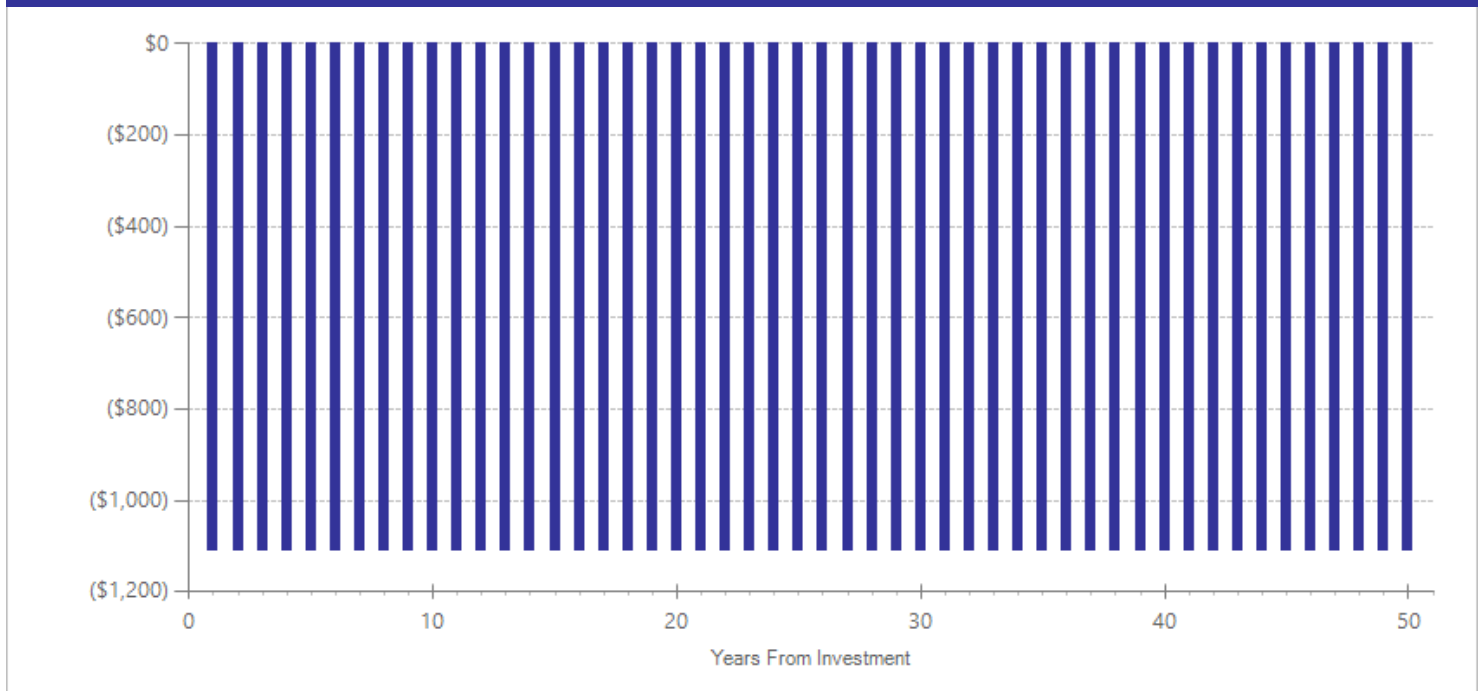
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$182	2015	Present value of net program costs (in 2016 dollars)	(\$184)
Comparison costs	\$0	2015	Cost range (+ or -)	50 %

The length of these interventions vary from a single session up to seven months. The average per-participant cost was calculated by multiplying the number of staff hours per participant by the average 2015 salary of the staff member as reported by the Bureau of Labor Statistics ([http://www.bls.gov/oes/current/oes\\_wa.htm#29-0000](http://www.bls.gov/oes/current/oes_wa.htm#29-0000)). We multiplied the average salary by 1.441 to estimate the total staff costs including benefits.

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	p-value
				ES	SE	Age	ES	SE	Age		
Blood pressure <sup>^</sup>	Primary	2	468	-0.461	0.189	31	0.000	0.000	32	-0.461	0.015
Cesarean sections	Primary	5	1054	-0.081	0.102	31	0.000	0.000	32	-0.081	0.425
Excess gestational weight gain	Primary	10	1172	-0.184	0.052	31	0.000	0.000	32	-0.184	0.001
Gestational diabetes <sup>^</sup>	Primary	5	621	-0.256	0.120	31	0.000	0.000	32	-0.256	0.033
Low birthweight births <sup>***</sup>	Primary	4	719	0.025	0.070	31	0.000	0.000	32	0.025	0.722
Preeclampsia <sup>^</sup>	Primary	3	706	-0.009	0.136	31	0.000	0.000	32	-0.009	0.945
Preterm birth (< 37 weeks)	Primary	6	1247	0.070	0.066	31	0.000	0.000	32	0.070	0.287
Weight change	Primary	2	148	0.048	0.117	31	0.000	0.000	32	0.048	0.682
Low birthweight births <sup>***</sup>	Secondary	4	719	0.025	0.070	1	0.000	0.000	2	0.025	0.722
Macrosomia (birth weight > 4000g) <sup>^</sup>	Secondary	7	1272	-0.131	0.111	1	0.000	0.000	2	-0.131	0.239
NICU admission	Secondary	1	421	-0.135	0.327	1	0.000	0.000	2	-0.135	0.680
Preterm birth (< 37 weeks)	Secondary	6	1247	0.070	0.066	1	0.000	0.000	2	0.070	0.287

<sup>^</sup>WSIPP's benefit-cost model does not monetize this outcome.

<sup>\*\*\*</sup>We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

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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# Oral health: Fluoride varnish treatment for permanent teeth

## Health Care: Obesity and Diabetes

Literature review updated October 2014.

Program Description: Fluoride varnish is a form of fluoride that temporarily adheres to the tooth in order to maintain contact between the fluoride and the tooth for several hours. In the studies we reviewed, fluoride varnish was applied every three to six months over a 12- to 36-month time period.

The analysis presented here reflects the effect of fluoride varnish applied to permanent teeth.

### 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	p-value
			ES	SE	Age	ES	SE	Age		
Tooth decay	14	3589	-0.267	0.086	8	n/a	n/a	n/a	-0.267	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.

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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](#).

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# Oral health: Fluoride varnish treatment for primary teeth

## Health Care: Obesity and Diabetes

Literature review updated October 2014.

Program Description: Fluoride varnish is a form of fluoride that temporarily adheres to the tooth in order to maintain contact between the fluoride and the tooth for several hours. In the studies we reviewed, fluoride varnish was applied every three to six months over a 12- to 36-month time period.

The analysis presented here reflects the effect of fluoride varnish applied to primary teeth.

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	p-value
			ES	SE	Age	ES	SE	Age		
Tooth decay	6	1042	-0.198	0.095	6	n/a	n/a	n/a	-0.198	0.036

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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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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# Oral health: Resin sealants for molars

## Health Care: Obesity and Diabetes

Literature review updated October 2014.

Program Description: Sealants are plastic films applied to the biting surfaces of molars to prevent decay. This analysis focuses on the effect of resin sealants compared to no treatment.

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	p-value
			ES	SE	Age	ES	SE	Age		
Tooth decay	12	2978	-0.973	0.117	8	n/a	n/a	n/a	-0.973	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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# Accountable Care Organizations: (a) Alternative Quality Contract

## Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

An Accountable Care Organization (ACO) is a provider group that is responsible for the cost and quality of medical care for a patient population. ACO contracts provide financial incentives for providers to reduce costs and improve the quality of care.

The Alternative Quality Contract (AQC) is an ACO model implemented in 2009 by Blue Cross Blue Shield (BCBS) of Massachusetts with providers in their commercial health plans. These ACOs cover general patient populations of children and adults under the age of 65.

Providers are paid a global budget (a fixed payment for expected patient costs), a share of savings relative to spending targets, and incentive payments for meeting quality thresholds. BCBS also provides technical support. Providers are required to absorb some of the costs if spending exceeds targets.

AQC contracts last for five years. Studies have examined provider performance during the first four contract years. The reductions in medical costs reported below do not represent net savings to BCBS. These estimates do not account for BCBS costs from shared savings payments, quality incentive payments, and other support costs.

### 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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	1	380142	0.007	0.013	34	n/a	n/a	n/a	0.007	0.607
Health care costs*	4	1348235	-0.075	0.013	34	n/a	n/a	n/a	-0.075	0.001
Prescription drug costs*	1	332624	-0.002	0.019	34	n/a	n/a	n/a	-0.002	0.923

\*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

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# Accountable Care Organizations: (b) Medicare Physician Group Practice Demonstration (PGPD)

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

An Accountable Care Organization (ACO) is a provider group that is responsible for the cost and quality of medical care for a patient population. ACO contracts provide financial incentives for providers to reduce costs and improve the quality of care.

The Centers for Medicare and Medicaid Services (CMS) implemented the Medicare Physician Group Practice Demonstration (PGPD) in 2005. Ten provider organizations entered five-year ACO contracts with Medicare. These organizations received up to 80% of savings relative to spending targets, if they demonstrated improvement on 32 quality measures. Providers were not responsible for costs above target (upside risk only), though they faced the financial risk of not covering the investments required to become an ACO (e.g., IT systems, additional staff).

The cost reduction reported below does not represent actual savings to Medicare. The estimate does not reflect cost sharing or performance bonus payments made by CMS.

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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	2	1213380	-0.019	0.002	71	n/a	n/a	n/a	-0.019	0.001

\*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

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# Accountable Care Organizations: (c) Medicare Pioneer ACOs

## Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

An Accountable Care Organization (ACO) is a provider group that is responsible for the cost and quality of medical care for a patient population. ACO contracts provide financial incentives for providers to reduce costs and improve the quality of care. In contracts with "upside and downside" financial risk, providers are able to share in savings relative to a spending target but they are required to absorb some of the costs if spending exceeds the target. In contracts with "upside" risk only, providers are not responsible for costs above target. The Centers for Medicare and Medicaid Services have established both types of ACO contracts.

The Medicare Pioneer ACO program was implemented for providers willing to assume both upside and downside financial risk. Pioneer ACOs can receive up to 60% of estimated savings relative to a spending benchmark, contingent upon performance on quality measures.

Thirty-two organizations entered the Pioneer ACO program in 2012, though 13 subsequently withdrew from the program. Studies have examined performance over the first two contract years. The cost reductions presented below do not represent actual savings to Medicare. The estimates do not reflect cost-sharing payments made to providers.

### 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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	3	1683614	-0.021	0.010	71	n/a	n/a	n/a	-0.021	0.030
Hospital costs (inpatient)*	3	1683614	-0.025	0.009	71	n/a	n/a	n/a	-0.025	0.004
Hospital costs (outpatient)*	3	1683614	-0.027	0.016	71	n/a	n/a	n/a	-0.027	0.092
Skilled nursing facility costs*	3	1683614	-0.019	0.004	71	n/a	n/a	n/a	-0.019	0.001

\*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

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# Cost sharing: (I) Copays for nonemergent emergency department visits, Medicaid adult population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effect reported below is for implementation of modest copays (in the range of \$3 to \$15) for emergency department visits that are judged not to be emergent (in these cases, a hospital determines, after an appropriate medical screening, that the individual does not need emergency medical services). These copays have been implemented by some state Medicaid programs.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	2	21074	0.031	0.064	40	n/a	n/a	n/a	0.031	0.630

\*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

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# Cost sharing: (n) Copays for prescription drugs, adults with a chronic illness

## Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effect reported below is for increases in prescription drug copays (ranging from \$8 to \$23) in employer-sponsored health plans. The estimate is for patients taking medications for hypertension and high cholesterol (ACE inhibitors and statins).

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	p-value
			ES	SE	Age	ES	SE	Age		
Medication adherence	2	652	-0.602	0.118	30	n/a	n/a	n/a	-0.602	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

Huskamp, H.A., Deverka, P.A., Epstein, A.M., Epstein, R.S., McGuigan, K.A., & Frank, R.G. (2003). The effect of incentive-based formularies on prescription-drug utilization and spending. *The New England Journal of Medicine*, 349(23), 2224-32.

# Cost sharing: (p) Copays for prescription drugs, low-income children (CHIP)

Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effect reported below is for modest increases (e.g., \$3 to \$5) in prescription drug copays for low-income children enrolled in Alabama's Children's Health Insurance Program (CHIP).

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	p-value
			ES	SE	Age	ES	SE	Age		
Prescription drug costs*	1	17200	-0.079	0.031	10	n/a	n/a	n/a	-0.079	0.009

\*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.

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## Citations Used in the Meta-Analysis

Sen, B., Blackburn, J., Morrissey, M., Becker, D., Kilgore, M., Caldwell, C., & Menachemi, N. (2014). Can increases in CHIP copayments reduce program expenditures on prescription drugs? *Medicare & Medicaid Research Review*, 4, 2.

# Cost sharing: (q) Copays for prescription drugs, low-income children (CHIP) with a chronic illness

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effect reported below is for modest increases (e.g., \$3 to \$5) in prescription drug copays for low-income children with a chronic illness enrolled in Alabama's Children's Health Insurance Program (CHIP).

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	p-value
			ES	SE	Age	ES	SE	Age		
Prescription drug costs*	1	4644	-0.036	0.014	10	n/a	n/a	n/a	-0.036	0.009

\*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

Sen, B., Blackburn, J., Morrissey, M., Becker, D., Kilgore, M., Caldwell, C., & Menachemi, N. (2014). Can increases in CHIP copayments reduce program expenditures on prescription drugs? *Medicare & Medicaid Research Review*, 4, 2.

# Cost sharing: (i) Copay increases across multiple services, low-income and chronically-ill population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effect reported below reflects changes in medical costs resulting from increases in patient copays for multiple services (prescription drugs, office visits, emergency department visits, and outpatient surgery). The effect size is the price elasticity for medical expenditures. Estimates are derived from data for low-income adults (< 300% Federal Poverty Line) with a chronic condition in a subsidized health plan.

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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs**	1	37961	-0.057	0.094	41	n/a	n/a	n/a	-0.057	0.545

\*\*The effect size for this outcome represents an elasticity, 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

Chandra, A., Gruber, J., & McKnight, R. (2014). The impact of patient cost-sharing on low-income populations: evidence from Massachusetts. *Journal of Health Economics*, 33, 57-66.

## Cost sharing: (j) Emergency department copays, general patient population

### Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effects reported below are for emergency department copays (ranging from \$25 to \$50 in 2014 dollars) versus no emergency department copays. The effects are for general patient populations.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	2	1158999	-0.121	0.003	33	n/a	n/a	n/a	-0.121	0.001
Emergency department visits (higher-severity)	1	30276	-0.058	0.095	33	n/a	n/a	n/a	-0.058	0.543
Emergency department visits (lower-severity)	1	30276	-0.292	0.046	33	n/a	n/a	n/a	-0.292	0.001
Hospitalization*	2	1158999	-0.039	0.009	33	n/a	n/a	n/a	-0.039	0.001

\*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

- Hsu, J., Price, M., Brand, R., Ray, G.T., Fireman, B., Newhouse, J.P., & Selby, J.V. (2006). Cost-sharing for emergency care and unfavorable clinical events: Findings from the Safety and Financial Ramifications of ED Copayments Study. *Health Services Research, 41*(5), 1801-1820.
- Selby, J.V., Fireman, B.H., & Swain, B.E. (1996). Effect of a copayment on use of the emergency department in a health maintenance organization. *The New England Journal of Medicine, 334*(10), 635-41.



# Cost sharing: (k) Emergency department copays, low-income patient population

## Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effects reported below are for emergency department copays (ranging from \$25 to \$50 in 2014 dollars) versus no emergency department copays. The effects are for low-income patients (living in census blocks with more than 20% of residents below the federal poverty line).

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	1	254431	-0.153	0.006	33	n/a	n/a	n/a	-0.153	0.001
Hospitalization*	1	254431	-0.053	0.019	33	n/a	n/a	n/a	-0.053	0.004

\*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.

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## Citations Used in the Meta-Analysis

Hsu, J., Price, M., Brand, R., Ray, G.T., Fireman, B., Newhouse, J.P., & Selby, J.V. (2006). Cost-sharing for emergency care and unfavorable clinical events: Findings from the Safety and Financial Ramifications of ED Copayments Study. *Health Services Research, 41*(5), 1801-1820.

# Cost sharing: (r) Copays for prescription drugs, Medicare beneficiaries

## Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effects reported below are for increases (ranging for \$5 to \$10) in prescription drug copays among Medicare beneficiaries in an HMO. Note that a \$10 office visit copay was also implemented for this population.

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	p-value
			ES	SE	Age	ES	SE	Age		
Hospital costs (inpatient)*	1	35456	0.054	0.019	70	n/a	n/a	n/a	0.054	0.005
Prescription drug costs*	1	35456	-0.320	0.026	70	n/a	n/a	n/a	-0.320	0.001

\*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

Chandra, A., Gruber, J., & McKnight, R. (2010). Patient cost-sharing and hospitalization offsets in the elderly. *American Economic Review*, 100(1), 193-213.

# Cost sharing: (m) Copays for prescription drugs, general patient population

## Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effects reported below are for moderate increases in prescription drug copays (ranging from \$3 to \$12) among general patient populations.

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	p-value
			ES	SE	Age	ES	SE	Age		
Hospitalization	1	6881	0.000	0.015	31	n/a	n/a	n/a	0.000	1.000
Prescription drug costs**	1	16783	-0.041	0.009	41	n/a	n/a	n/a	-0.041	0.001

\*\*The effect size for this outcome represents an elasticity, 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.

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## Citations Used in the Meta-Analysis

- Motheral, B., & Fairman, K.A. (2001). Effect of a three-tier prescription copay on pharmaceutical and other medical utilization. *Medical Care*, 39(12), 1293-304.
- Gibson, T.B., McLaughlin, C.G., & Smith, D.G. (2005). A copayment increase for prescription drugs: the long-term and short-term effects on use and expenditures. *Inquiry: a Journal of Medical Care Organization, Provision and Financing*, 42(3), 293-310.

# Cost sharing: (h) Copay increases across multiple services, low-income population

## Health Care: Health Care System Efficiency

Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

The effects reported below reflect changes in medical costs resulting from increases in patient copays for multiple services (prescription drugs, office visits, emergency department visits, and outpatient surgery). The effect sizes are price elasticities for expenditures on selected services. Estimates are derived from data for low-income adults (< 300% Federal Poverty Line) in a subsidized health plan.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department costs**	1	122456	-0.207	0.152	41	n/a	n/a	n/a	-0.207	0.175
Health care costs**	1	122456	-0.158	0.064	41	n/a	n/a	n/a	-0.158	0.014
Hospital costs (inpatient)**	1	122456	-0.115	0.250	41	n/a	n/a	n/a	-0.115	0.646
Prescription drug costs**	1	122456	-0.131	0.074	41	n/a	n/a	n/a	-0.131	0.076

\*\*The effect size for this outcome represents an elasticity, not a standardized mean difference effect size.

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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.

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## Citations Used in the Meta-Analysis

Chandra, A., Gruber, J., & McKnight, R. (2014). The impact of patient cost-sharing on low-income populations: evidence from Massachusetts. *Journal of Health Economics*, 33, 57-66.

# Cost sharing: (g) Coinsurance (25% rate or higher) versus no cost sharing, general patient population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

These estimates are from the RAND Health Insurance Experiment. Households were randomly assigned to different levels of cost sharing. The effect sizes reported below measure changes in medical costs, utilization, and health outcomes attributed to having a coinsurance rate of at least 25% versus free care.

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	p-value
			ES	SE	Age	ES	SE	Age		
Cholesterol	1	2262	-0.036	0.037	33	n/a	n/a	n/a	-0.036	0.327
Diastolic blood pressure	1	2339	0.079	0.036	33	n/a	n/a	n/a	0.079	0.027
Emergency department visits*	1	2296	-0.210	0.081	33	n/a	n/a	n/a	-0.210	0.010
Emergency department visits (higher-severity)	1	5392	-0.230	0.059	33	n/a	n/a	n/a	-0.230	0.001
Emergency department visits (lower-severity)	1	5392	-0.470	0.049	33	n/a	n/a	n/a	-0.470	0.001
Health care costs*	1	1137	-0.189	0.047	33	n/a	n/a	n/a	-0.189	0.001

\*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.

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## Citations Used in the Meta-Analysis

- Brook, R.H., United States., Rand Corporation., & Rand Health Insurance Experiment. (1984). *The effect of coinsurance on the health of adults: Results from the Rand Health Insurance Experiment*. Santa Monica, Calif: Rand.
- Manning, W.G., Rand Corporation., & Rand Health Insurance Study. (1987). *Health insurance and the demand for medical care: Evidence from a randomized experiment*. Santa Monica, CA: Rand.
- O'Grady, K.F., Manning, W.G., Newhouse, J.P., & Brook, R.H. (1985). *The impact of cost sharing on emergency department use*. Santa Monica, CA: Rand Corporation.

# Cost sharing: (f) High-Deductible Health Plans with higher deductibles (individual > \$1000) and HSA accounts, general patient population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

These results are for High-Deductible Health Plans (HDHPs) versus traditional plans. In this case, the HDHPs have individual deductibles are at least \$1000 and health savings accounts (HSA) are offered.

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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	2	14364	-0.238	0.057	33	n/a	n/a	n/a	-0.238	0.001

\*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

- Charlton, M.E., Levy, B.T., High, R.R., Schneider, J.E., & Brooks, J.M. (2011). Effects of health savings account-eligible plans on utilization and expenditures. *The American Journal of Managed Care*, 17(1), 79-86.
- Haviland, A., Sood, N., McDevitt, R., Marquis, M. (2011). How Do Consumer-Directed Health Plans Affect Vulnerable Populations? *Forum for Health Economics & Policy*, 14, 2.

## Cost sharing: (e) High-Deductible Health Plans with higher deductibles (individual > \$1000) and HRA accounts, general patient population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

These results are for High-Deductible Health Plans (HDHPs) versus traditional plans. In this case, the HDHPs have individual deductibles of at least \$1000 and health reimbursement arrangements (HRA) are provided.

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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	4	89701	-0.152	0.028	37	n/a	n/a	n/a	-0.152	0.001

\*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.

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## Citations Used in the Meta-Analysis

- Borah, B.J., Burns, M.E., & Shah, N.D. (2011). Assessing the impact of high deductible health plans on health-care utilization and cost: a changes-in-changes approach. *Health Economics*, 20(9), 1025-42.
- Beeuwkes, B.M., Haviland, A.M., McDevitt, R., & Sood, N. (2011). Healthcare spending and preventive care in high-deductible and consumer-directed health plans. *The American Journal of Managed Care*, 17(3), 222-30.
- Haviland, A., Sood, N., McDevitt, R., Marquis, M. (2011). How Do Consumer-Directed Health Plans Affect Vulnerable Populations? *Forum for Health Economics & Policy*, 14, 2.

## Cost sharing: (d) High-Deductible Health Plans with higher deductibles (individual > \$1000), general patient population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

These results are for High-Deductible Health Plans (HDHPs) versus traditional plans. In this case, the HDHPs have individual deductibles of at least \$1000. These plans may or may not include health reimbursement arrangements (HRA) or a health savings account (HSA).

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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	8	142933	-0.178	0.024	37	n/a	n/a	n/a	-0.178	0.001

\*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.

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- Beeuwkes, B.M., Haviland, A.M., McDevitt, R., & Sood, N. (2011). Healthcare spending and preventive care in high-deductible and consumer-directed health plans. *The American Journal of Managed Care*, 17(3), 222-30.
- Charlton, M.E., Levy, B.T., High, R.R., Schneider, J.E., & Brooks, J.M. (2011). Effects of health savings account-eligible plans on utilization and expenditures. *The American Journal of Managed Care*, 17(1), 79-86.
- Haviland, A., Sood, N., McDevitt, R., Marquis, M. (2011). How Do Consumer-Directed Health Plans Affect Vulnerable Populations? *Forum for Health Economics & Policy*, 14, 2.



## Cost sharing: (c) High-Deductible Health Plans with moderate deductibles (individual < \$1000), general patient population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

These results are for High-Deductible Health Plans (HDHPS) versus traditional plans. In this case, the HDHPS have moderate deductibles (individual deductibles between \$500 and \$1000). These plans may or may not include health reimbursement arrangements (HRA) or a health savings account (HSA).

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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	3	85731	-0.029	0.014	33	n/a	n/a	n/a	-0.029	0.044

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

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## Citations Used in the Meta-Analysis

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- Haviland, A., Sood, N., McDevitt, R., Marquis, M. (2011). How do consumer-directed health plans affect vulnerable populations? *Forum for Health Economics & Policy*, 14, 2.

# Cost sharing: (o) Copay reductions for prescription drugs used to treat chronic conditions (Value Based Insurance Design), adults with chronic illnesses

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: Evaluations of health care policies and programs often measure two broad types of outcomes: (1) those that reflect the health status of people (e.g., disease incidence) and (2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

These results are from value-based insurance designs where copays for drugs used to treat chronic conditions are reduced in order to encourage adherence to drug therapies. Conditions include diabetes, pre-diabetes, high blood pressure, and high cholesterol.

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	p-value
			ES	SE	Age	ES	SE	Age		
Medication adherence	10	76223	0.045	0.005	52	n/a	n/a	n/a	0.045	0.001

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# Patient-centered medical homes in integrated health systems (high-risk population)

## Health Care: Health Care System Efficiency

Literature review updated December 2016.

Program Description: The patient-centered medical home (PCMH) model attempts to make health care more efficient by implementing a set of changes to primary care. Medical homes are designed to provide comprehensive care, treating both acute needs and promoting population health. The medical home model emphasizes care coordination across providers, patient engagement, evidence-based care, use of health information technology, and enhanced patient access.

This category includes only PCMH programs we reviewed that were implemented in integrated health systems. The results are for higher risk, older patients.

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	p-value
			ES	SE	Age	ES	SE	Age		
Health care costs*	2	37989	-0.071	0.014	75	n/a	n/a	n/a	-0.071	0.001

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

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# Cost sharing: (a) High-Deductible Health Plans (moderate to high deductibles, with and without HRAs or HSAs), general patient population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: These results are for High-Deductible Health Plans (HDHPs) versus traditional plans. These plans have moderate to high deductibles (at least a \$500 individual deductible). They may or may not include health reimbursement arrangements (HRA) or a health savings account (HSA). Preventive services include cancer screening (breast, cervical, colorectal), preventive office visits, and preventive lab tests. The medication adherence effect size is for eight drug classes used to treat diabetes, high blood pressure, high cholesterol and other chronic conditions. The effect is for HDHPs where prescription drug costs are subject to the deductible.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department costs*	2	52058	-0.071	0.086	33	n/a	n/a	n/a	-0.071	0.407
Emergency department visits*	1	15847	-0.150	0.032	33	n/a	n/a	n/a	-0.150	0.001
Emergency department visits (higher-severity)	1	15847	-0.097	0.098	33	n/a	n/a	n/a	-0.097	0.323
Emergency department visits (lower-severity)	1	15847	-0.196	0.047	33	n/a	n/a	n/a	-0.196	0.001
Health care costs*	10	5052573	-0.116	0.026	33	n/a	n/a	n/a	-0.116	0.001
Hospitalization*	1	15847	-0.118	0.091	33	n/a	n/a	n/a	-0.118	0.196
Medication adherence	8	4865	-0.092	0.038	33	n/a	n/a	n/a	-0.092	0.016
Prescription drug costs*	3	63193	-0.047	0.013	33	n/a	n/a	n/a	-0.047	0.001
Preventive services	11	152096	-0.046	0.010	33	n/a	n/a	n/a	-0.046	0.001
Primary care visits*	1	7953	-0.090	0.015	45	n/a	n/a	n/a	-0.090	0.001

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

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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.

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# Cost sharing: (b) High-Deductible Health Plans (moderate to high deductible levels, with or without HSAs), low-income patient population

Health Care: Health Care System Efficiency  
Literature review updated November 2015.

Program Description: These results are for low-income patients in High-Deductible Health Plans (HDHPs) versus those in traditional plans. In this case, the HDHPs have moderate- to high-deductibles (at least a \$500 individual deductible). These plans may or may not include health reimbursement arrangements (HRA) or a health savings account (HSA). Preventive services refer to cancer screening (breast, cervical, colorectal). Low-income status is determined by residence in low-income areas.

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	p-value
			ES	SE	Age	ES	SE	Age		
Emergency department visits*	1	5854	-0.046	0.046	33	n/a	n/a	n/a	-0.046	0.319
Emergency department visits (higher-severity)	1	5854	-0.245	0.103	33	n/a	n/a	n/a	-0.245	0.017
Emergency department visits (lower-severity)	1	5854	-0.037	0.051	33	n/a	n/a	n/a	-0.037	0.471
Preventive services	6	29449	-0.031	0.012	33	n/a	n/a	n/a	-0.031	0.008

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

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## Citations Used in the Meta-Analysis

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- Wharam, J.F., Graves, A.J., Zhang, F., Soumerai, S.B., Ross-Degnan, D., & Landon, B. E. (2012). Two-year trends in cancer screening among low socioeconomic status women in an HMO-based high-deductible health plan. *Journal of General Internal Medicine*, 27 (9), 1112-9.
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# Transitional care programs to prevent hospital readmissions: Brief phone follow-up only

Health Care: Health Care System Efficiency  
Literature review updated December 2014.

Program Description: Transitional care programs focus on preventing future hospital readmissions after discharge. Programs in this specific category include those providing post-discharge patient follow-up by telephone only, with no pre-discharge assistance.

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	p-value
			ES	SE	Age	ES	SE	Age		
Hospital readmissions	5	750	-0.140	0.222	57	0.000	0.000	58	-0.143	0.107

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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# Smoking cessation programs for pregnant women: Postpartum smoking relapse prevention

Health Care: Maternal and Infant Health

Literature review updated December 2016.

Program Description: In this analysis, we reviewed studies of programs that recruited women who quit smoking during pregnancy and provided counseling to prevent relapse. These programs included at least some postpartum counseling.

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	p-value
			ES	SE	Age	ES	SE	Age		
Regular smoking	4	405	-0.359	0.117	27	-0.359	0.117	37	-0.359	0.002

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