



Overview of WSIPP's Benefit-Cost Model

A Brief Guide

This document is a brief guide to WSIPP's benefit-cost approach. For additional detail on WSIPP's methods, see WSIPP's [Technical Documentation](#).

The WSIPP benefit-cost model estimates the dollar value of offering a program—a defined set of government efforts—to an additional person. The WSIPP benefit-cost model does this by valuing changes in outcomes (e.g. crime, depression, test scores) produced by programs and comparing them to the costs of providing those programs. For example, “cognitive behavioral therapy for adult depression” is a program that provides a specific type of talk therapy to adults to reduce the symptoms of depression. The benefit and cost estimates reflect the difference between a person who receives the program and one who does not.

The strength of the WSIPP benefit-cost model is that it uses a consistent framework for all programs. The model uses the same modeling algorithms and background information, along with consistent estimates of the value of different outcomes. That framework is combined with information on specific programs to create comparable benefit-cost results.¹

Estimating Net Benefits

The WSIPP benefit-cost model relies on the following formula to calculate the results on a per-participant basis:

$$Net\ Benefits = Q \times P - C$$

- **Quantity (Q):** The estimated amount of change in measured outcomes resulting from the program. See the effect-size document for a description of how WSIPP estimates quantity.
- **Price (P):** How much an outcome is worth in dollars. WSIPP prices outcomes by reviewing methodologies and data published by economists, findings from academic studies on the values of various outcomes, and longitudinal studies measuring the relationship between outcomes. WSIPP synthesizes this information along with its own analyses and information from Washington State agencies to estimate the price.
- **Cost (C):** The cost to implement the program in Washington. Costs are estimated on a per-participant basis and estimated relative to costs absent the program.

These estimates are produced for each year that the program is expected to have an effect over a person's life course. The numbers on the site represent the present value of a lifetime of changes resulting from the program.

¹ The WSIPP benefit-cost model cannot monetize certain programs and program outcomes. These instances are labelled in the program effects tables on individual results pages.

Interpreting WSIPP's Benefit-Cost Results

This section describes how to interpret the benefit-cost findings displayed on WSIPP's website.²

Benefit-Cost Summary Statistics

Benefit-Cost Summary Statistics Per Participant			
Benefits to:			
Taxpayers	\$7,996	Benefits minus costs	\$25,549
Participants	\$15,203	Benefit to cost ratio	\$49.85
Others	\$1,788	Chance the program will produce	
Indirect	\$1,085	benefits greater than the costs	100 %
Total benefits	\$26,072		
Net program cost	(\$523)		
Benefits minus cost	\$25,549		

The benefit-cost summary statistics table reports the aggregated benefits and program costs. All values are expressed in consistent year dollars: prices from previous years are [inflated](#) to the current year and future projected dollars are reduced to their present value with a consistent [discount rate](#).

The "Total benefits" represent the total value of the program to society and can be classified into four perspectives: taxpayer, participant, others, and indirect. "Taxpayers" includes expected savings to government (e.g., from reduced expenditures in the criminal justice, child welfare, or other systems) and expected increases in tax revenue. "Participants" includes expected increases in earnings and expenditures for items such as health care and college tuition. "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. "Indirect benefits" includes estimates of the changes in the [value of a statistical life](#) and changes in the [deadweight costs of taxation](#).

"Total benefits" reflect the effect of the program. A program with helpful effects has positive benefits, a program with harmful effects has negative benefits. "Net program costs" are the costs of the program to the government compared to services the government typically offers. The "Benefit to cost ratio" is calculated as the total benefits divided by the net program cost.

Finally, WSIPP runs a sensitivity analysis, called a Monte Carlo analysis, to account for the risk and uncertainty around many of the inputs and assumptions of the model. As part of this analysis, the model calculates the benefit-cost results of a program 10,000 different times, each time varying the inputs randomly within a defined range. The "chance the program will produce benefits greater than the costs" reflects the proportion of those runs in which benefits minus costs are greater than zero.

² <http://www.wsipp.wa.gov/BenefitCost>.

Detailed Benefit Estimates

WSIPP reports a detailed breakdown of the calculation of the overall benefits by perspective and by the source of the benefits.

Detailed Monetary Benefit Estimates Per Participant						
Affected Outcome:	Resulting Benefits: ¹	Benefits accrue to:				Total
		Taxpayers	Participants	Others ²	Indirect ³	
Major depressive disorder	Labor market earnings associated with major depression	\$6,336	\$14,882	\$0	\$0	\$21,217
	Health care associated with major depression	\$1,764	\$499	\$1,820	\$882	\$4,965
	Mortality associated with depression	\$16	\$38	\$0	\$487	\$541
Program Cost	Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$265)	(\$265)
Totals		\$8,116	\$15,418	\$1,820	\$1,104	\$26,459

The first column shows which outcome produces the source of monetary value. The second column shows where the benefits come from. For example, the table above shows that depression is associated with changes in earnings, health care, and mortality.

Outcomes can derive value from a variety of sources. WSIPP currently bases the monetary effects of outcomes on these sources of value:

- Labor market earnings – wages and benefits
- Health care – cost for health care insurance and services
- Crime – cost of the criminal justice system and harm to victims of crimes
- Child welfare – child welfare system costs and costs to victims of child abuse and neglect
- K–12 education – school system costs
- Higher education – tuition costs for college education
- Public assistance – direct and food assistance
- Mortality – value of a reduction in mortality risk
- Deadweight cost – loss of value to society from market distortions

Detailed Cost Estimates

WSIPP’s program cost estimates reflect the costs to implement the program for an additional person. Comparison costs are the costs the state typically spends per participant for alternative programs (also known as usual services or treatment-as-usual). Both costs are shown in the year dollars used to create the estimates. The present value of the net program costs is displayed as the cost of the comparison minus the cost of the program. This value is inflated to the current year dollars for use in the benefit-cost model.

Detailed Annual Cost Estimates Per Participant				
Annual cost	Year dollars		Summary	
Program costs	\$1,231	2014	Present value of net program costs (in 2018 dollars)	(\$523)
Comparison costs	\$672	2008	Cost range (+ or -)	10 %

For further information, contact:

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Washington State Institute for Public Policy

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