Contingency management (lower cost) for opioid use disorder
Substance Use Disorders: Treatment for Adults
Benefit-cost estimates updated December 2023. Literature review updated December 2016.

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

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.

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 those with opiate abuse or dependence who were also receiving medicated-assisted drug treatment (methadone, buprenorphine or naloxone) and counseling. Contingencies were provided for remaining abstinent. Two methods of contingency management were reviewed: (1) A voucher system where abstinence earned vouchers that were exchangeable for goods provided by the clinic or counseling center, (2) a prize or raffle system where clients who remained abstinent could earn the opportunity to draw from a prize bowl. Treatment in the included studies lasted between 1 and 6 months with a weighted average of 3.3 months of contingency management and reward opportunities occurring two to three times per week, on average. The value of contingencies in the programs reviewed ranged from $59-$253 per participant, with an average of $168 (in 2016 dollars).

Based on a statistical analysis of contingency management studies, we determined that programs with a maximum value of vouchers or prizes less than or equal to $500 (in 2012 dollars) represent lower-cost contingency management.

Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	$828	Benefit to cost ratio	$11.81
Participants	$1,088	Benefits minus costs	$4,533
Others	$388	Chance the program will produce	
Indirect	$2,648	benefits greater than the costs	58%
Total benefits	$4,952		
Net program cost	($419)		
Benefits minus cost	$4,533		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2022). 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.

Meta-Analysis of Program Effects

Outcomes measured	Treatment age	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
Opioid use disorder	38	9	520	-0.291	0.068	38	0.000	0.075	39	-0.291	0.001
Engagement/Retention^	38	7	433	0.314	0.145	38	n/a	n/a	n/a	0.314	0.031

^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.

Detailed Monetary Benefit Estimates Per Participant

Affected outcome:	Resulting benefits:[1]	Benefits accrue to:				
		Taxpayers	Participants	Others[2]	Indirect[3]	Total
Opioid use disorder	Criminal justice system	$0	$0	$0	$0	$0
Opioid use disorder	Labor market earnings associated with opioid drug abuse or dependence	$310	$730	$0	$0	$1,040
Opioid use disorder	Health care associated with opioid drug abuse or dependence	$389	$54	$387	$194	$1,024
Opioid use disorder	Mortality associated with opioids	$129	$304	$0	$2,663	$3,097
Program cost	Adjustment for deadweight cost of program	$0	$0	$0	($210)	($210)
Totals		$828	$1,088	$388	$2,648	$4,952

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

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

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

Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$1,007	2016	Present value of net program costs (in 2022 dollars)	($419)
Comparison costs	$651	2016	Cost range (+ or -)	10%

Program cost estimates reflect costs beyond treatment as usual. The per-participant cost of treatment is based on physician/therapist time, multiplied by Medicaid reimbursement rates, plus the average amount of incentive received by treatment participants. Reimbursement rates are based on individual or group treatment sessions for non-disabled adults in Mercer (2016) Mental Health and Substance Use Disorder Services Data Book for the State of Washington. Program and comparison group costs are weighted by treatment and comparison group samples. Costs were obtained from Carroll et al. (2001), Hser et al. (2011), Kidorf et al. (2013), Preston et al. (2000), and Preston et al. (2002).

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.

## Benefits Minus Costs Over Time (Cumulative Discounted Dollars)
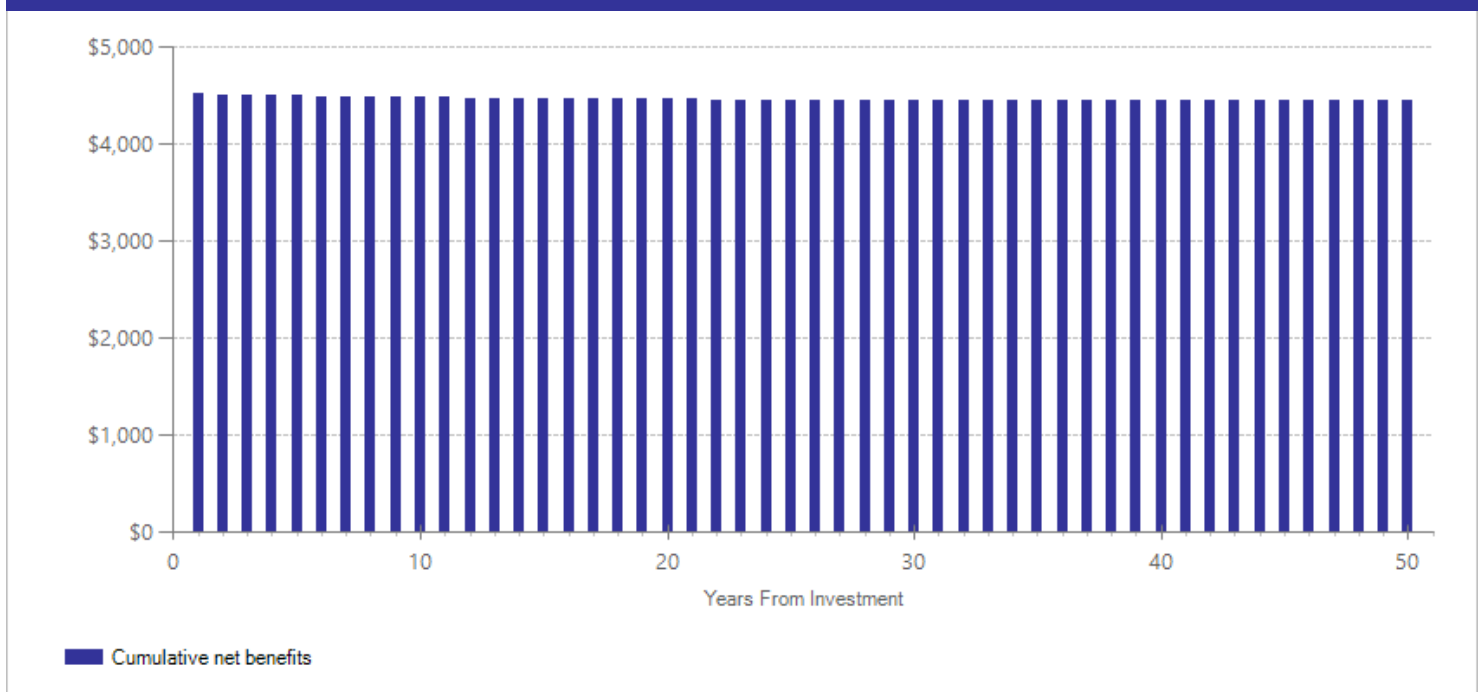
The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in discounted dollars. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost 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.

Benefits by Perspective Over Time (Cumulative Discounted Dollars)
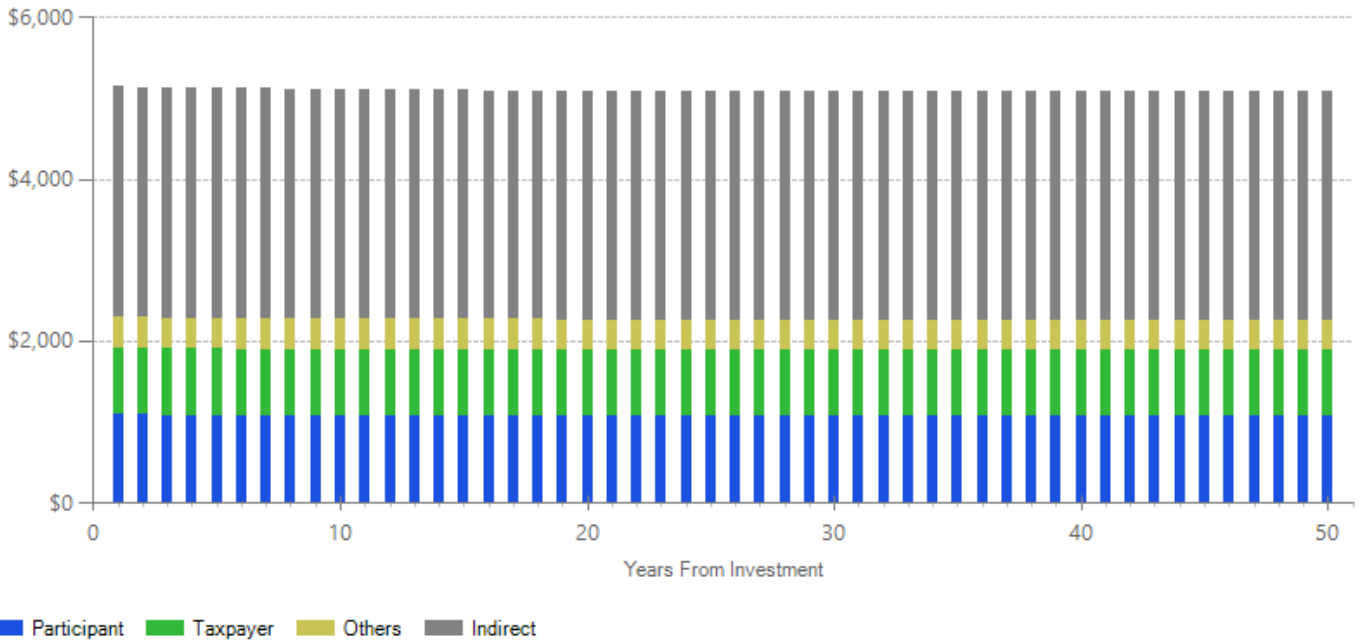
The graph above illustrates the breakdown of the estimated cumulative benefits (not including program costs) per-participant for the first fifty years beyond the initial investment in the program. These cash flows provide a breakdown of the classification of dollars over time into four perspectives: taxpayer, participant, others, and indirect. "Taxpayers" includes expected savings to government 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. If a section of the bar is below the $0 line, the program is creating a negative benefit, meaning a loss of value from that perspective.

Taxpayer Benefits by Source of Value Over Time (Cumulative Discounted Dollars)
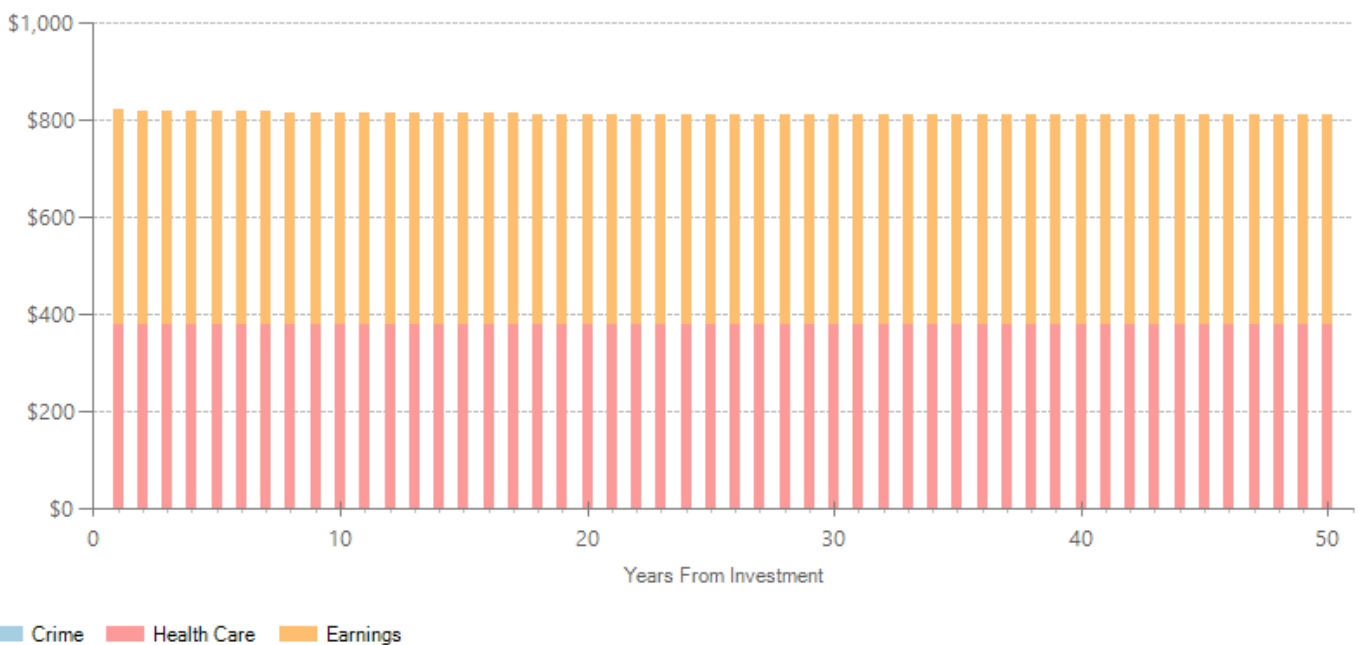
The graph above focuses on the subset of estimated cumulative benefits that accrue to taxpayers. The cash flows are divided into the source of the value.

Citations Used in the Meta-Analysis

Brooner, R.K., Kidorf, M.S., King, V.L., Stoller, K.B., Neufeld, K.J., & Kolodner, K. (2007). Comparing adaptive stepped care and monetary-based voucher interventions for opioid dependence. *Drug and Alcohol Dependence, 88,* S14-S23.

Carroll, K.M., Ball, S.A., Nich, C., O'Connor, P.G., Eagan, D.A., Frankforter, . . . Rounsaville, B.J. (2001). Targeting behavioral therapies to enhance naltrexone treatment of opioid dependence: efficacy of contingency management and significant other involvement. *Archives of General Psychiatry, 58*(8), 755-761.

Chen, W., Hong, Y., Zou, X., McLaughlin, M.M., Xia, Y., & Ling, L. (2013). Effectiveness of prize-based contingency management in a methadone maintenance program in China. *Drug and Alcohol Dependence, 133*(1), 270-274.

Hser, Y.I., Li, J., Jiang, H., Zhang, R., Du, J., Zhang, C., Zhang, B., . . . Zhao, M. (2011). Effects of a randomized contingency management intervention on opiate abstinence and retention in methadone maintenance treatment in China. *Addiction, 106*(10), 1801-1809.

Kidorf, M., Brooner, R.K., Gandotra, N., Antoine, D., King, V.L., Peirce, J., & Ghazarian, S. (2013). Reinforcing integrated psychiatric service attendance in an opioid-agonist program: A randomized and controlled trial. *Drug and Alcohol Dependence, 133*(1), 30-36.

Ling, W., Hillhouse, M., Ang, A., Jenkins, J., & Fahey, J. (2013). Comparison of behavioral treatment conditions in buprenorphine maintenance. *Addiction, 108*(10), 1788-1798.

Preston, K.L., Umbricht, A., & Epstein, D.H. (2000). Methadone dose increase and abstinence reinforcement for treatment of continued heroin use during methadone maintenance. *Archives of General Psychiatry, 57*(4), 395-404.

Preston, K.L., Umbricht, A., & Epstein, D.H. (2002). Abstinence reinforcement maintenance contingency and one-year follow-up. *Drug and Alcohol Dependence, 67*(2), 125-137.

Rowan-Szal, G.APD., Joe, GWED., Hiller, MLPD., & Simpson, DDPD. (1997). Increasing early engagement in methadone treatment. *Journal of Maintenance in the Addictions, 1*(1), 49-61.

Washington State Institute for Public Policy