

Methadone maintenance for opioid use disorder

Substance Use Disorders: Medication-assisted Treatment

Benefit-cost estimates updated December 2019. 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: Methadone is an opiate substitution treatment used to treat opioid dependence. It is a synthetic opioid that blocks the effects of opiates, reduces withdrawal symptoms, and relieves cravings. Methadone is a daily medication dispensed in outpatient clinics that specialize in methadone treatment and is often used in conjunction with behavioral counseling approaches. The studies included in our analysis evaluated methadone maintenance rather than short-term detoxification or stabilization. We excluded studies with treatment dosages below standard guidances (< 50 mg/day).

Benefit-Cost Summary Statistics Per Participant

Benefits to:

Taxpayers	\$1,689	Benefit to cost ratio	\$2.30
Participants	\$2,063	Benefits minus costs	\$5,162
Others	\$868	Chance the program will produce	
Indirect	\$4,503	benefits greater than the costs	82 %
Total benefits	\$9,124		
Net program cost	(\$3,962)		
Benefits minus cost	\$5,162		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2018). 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	p-value
				ES	SE	Age	ES	SE	Age		
Alcohol use [^]	37	2	223	-0.281	0.250	37	n/a	n/a	n/a	-0.281	0.261
Crime	37	3	259	-0.672	0.112	37	0.000	0.000	38	-0.672	0.001
Death	37	3	137	-0.236	0.261	37	0.000	0.000	38	-0.236	0.365
Hospitalization ^{^^}	37	3	286	0.242	0.464	37	n/a	n/a	n/a	0.242	0.602
Opioid use disorder	37	8	623	-0.945	0.304	37	0.000	0.000	38	-0.945	0.002
STD risky behavior [^]	37	3	492	-0.559	0.242	37	n/a	n/a	n/a	-0.559	0.021

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

^{^^}WSIPP does not include this outcome when conducting benefit-cost analysis for this program.

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

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

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

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

Detailed Monetary Benefit Estimates Per Participant

Affected outcome:	Resulting benefits: ¹	Benefits accrue to:				
		Taxpayers	Participants	Others ²	Indirect ³	Total
Crime	Criminal justice system	\$1	\$0	\$3	\$1	\$4
Opioid use disorder	Labor market earnings associated with opioid drug abuse or dependence	\$564	\$1,324	\$0	\$0	\$1,888
Opioid use disorder	Health care associated with opioid drug abuse or dependence	\$862	\$123	\$865	\$431	\$2,282
Opioid use disorder	Mortality associated with opioids	\$262	\$616	\$0	\$6,053	\$6,930
Program cost	Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$1,981)	(\$1,981)
Totals		\$1,689	\$2,063	\$868	\$4,503	\$9,124

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

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

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

Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$3,613	2012	Present value of net program costs (in 2018 dollars)	(\$3,962)
Comparison costs	\$0	2012	Cost range (+ or -)	20 %

We estimate the per-participant costs of providing methadone in addition to standard substance abuse treatment for 12 months. Costs reflect the average of costs reported in numerous cost-effectiveness studies (Rosenhack and Kosten, 2001; Jones et al., 2009; Nordlund et al., 2004; Masson et al, 2004). Costs included vary by study but generally include costs of medication, dispensing, toxicology screens, medical care related to methadone treatment, and when available, costs of equipment, administration, and clinic space. Treatment as usual in this case may include counseling or other services.

Jones, E.S., Moore, B.A., Sindelar, J.L., O'Connor, P.G., Schottenfeld, R.S., & Fiellin, D.A. (2009). Cost analysis of clinic and office-based treatment of opioid dependence: Results with methadone and buprenorphine in clinically stable patients. *Drug and Alcohol Dependence*, 99(1), 132-140.

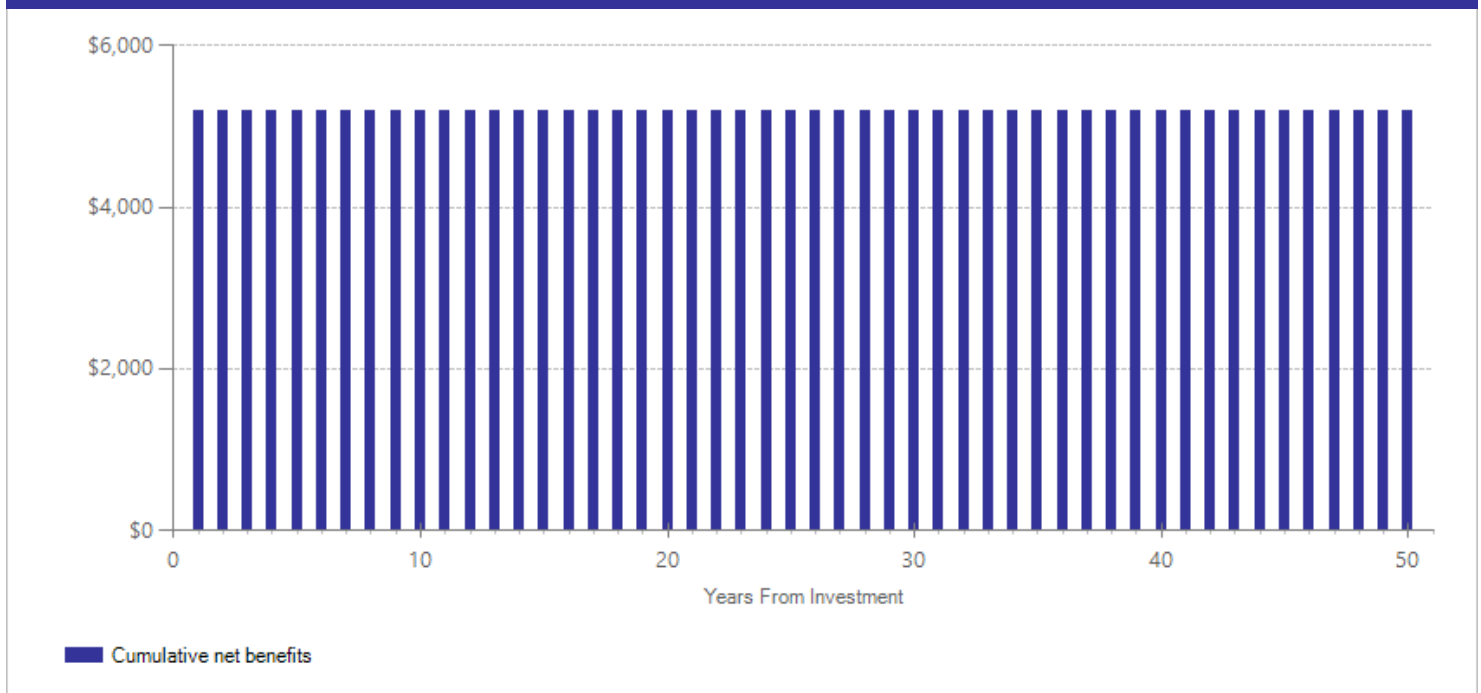
Masson, C.L., Barnett, P.G., Sees, K.L., Delucchi, K.L., Rosen, A., Wong, W., & Hall, S.M. (2004). Cost and cost-effectiveness of standard methadone maintenance treatment compared to enriched 180-day methadone detoxification. *Addiction*, 99(6), 718-726.

Nordlund, D.J., Estee, S., Mancuso, D., & Felver, B. (2004). Methadone treatment for opiate addiction lowers health care costs and reduces arrests and convictions. Olympia, Wash.: Washington State Dept. of Social and Health Services, Research and Data Analysis Division.

Rosenheck, R., & Kosten, T. (2001). Buprenorphine for opiate addiction: potential economic impact. *Drug and Alcohol Dependence*, 63(3), 253-262.

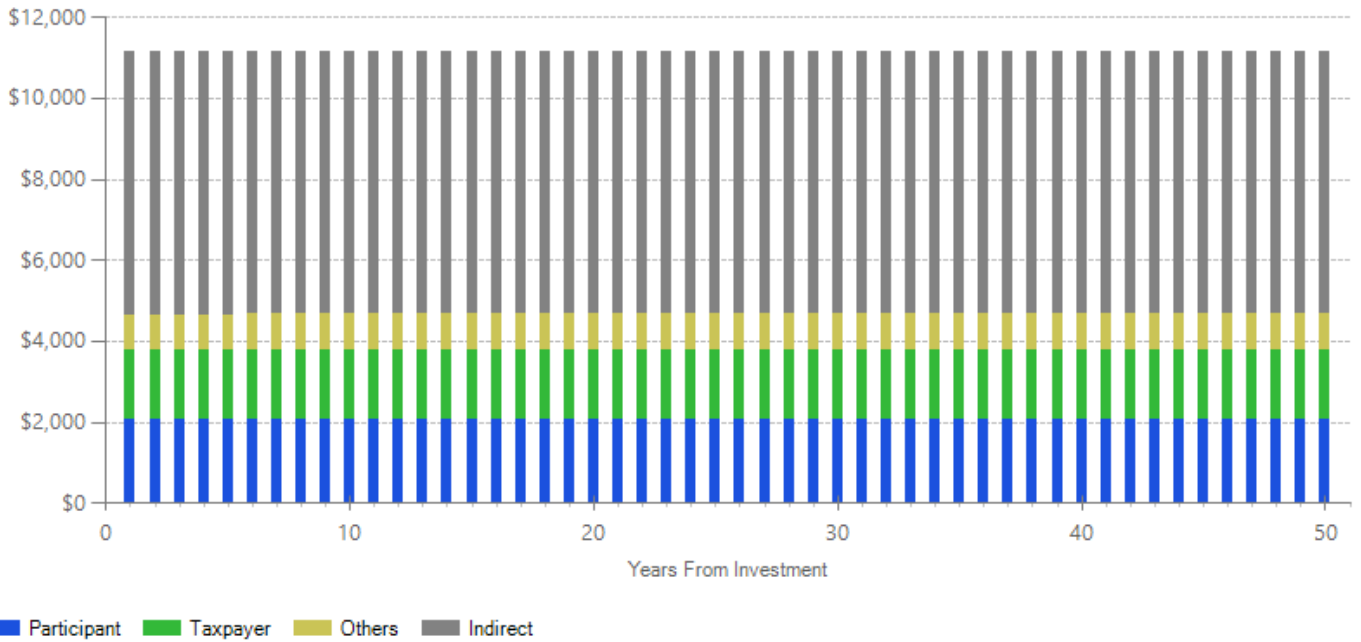
The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty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

Benefits Minus Costs Over Time (Cumulative Discounted Dollars)



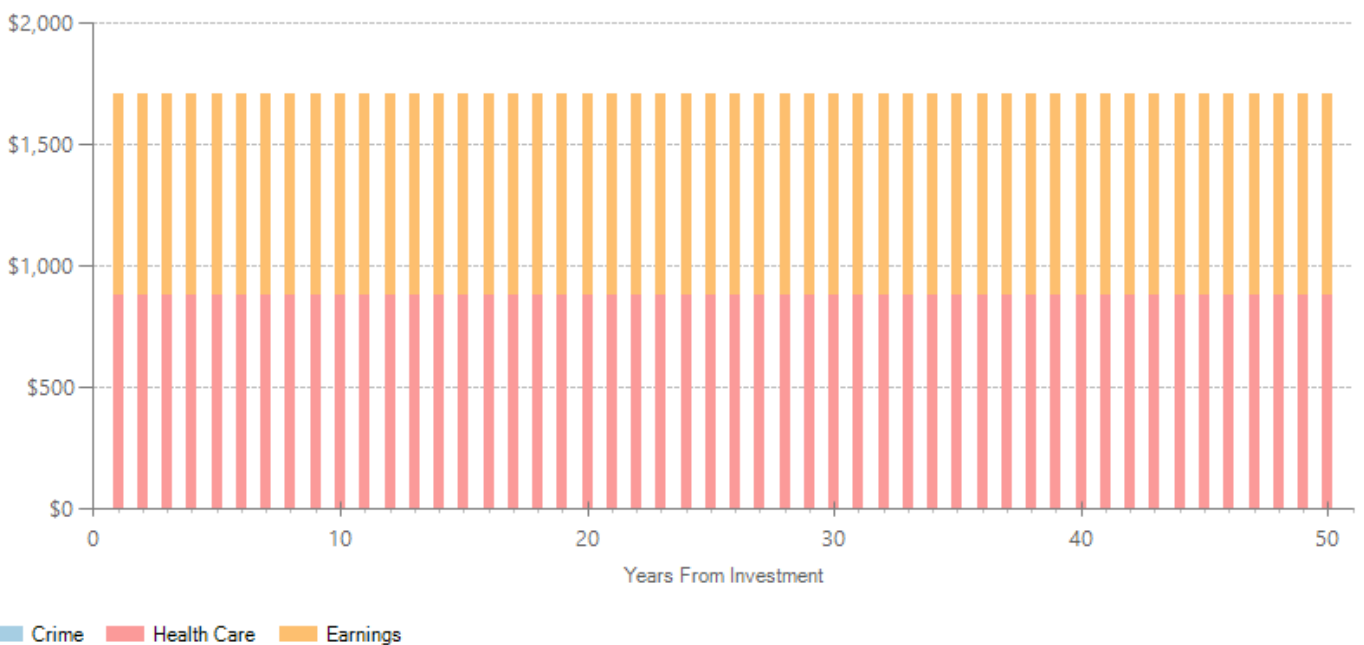
The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in discounted dollars. If the dollars are negative (bars below \$0 line), the cumulative benefits do not outweigh the cost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

- Bale, R.N., Van, S.W.W., Kuldau, J.M., Engelsing, T.M., Elashoff, R.M., & Zarcone, V.P.J. (1980). Therapeutic communities vs methadone maintenance. A prospective controlled study of narcotic addiction treatment: design and one-year follow-up. *Archives of General Psychiatry*, 37, 2, 179-193.
- Dolan, K.A., Shearer, J., MacDonald, M., Mattick, R.P., Hall, W., & Wodak, A.D. (2003). A randomised controlled trial of methadone maintenance treatment versus wait list control in an Australian prison system. *Drug and Alcohol Dependence*, 72(1), 59-65.
- Gronbladh, L. & Gunne, L. (1989). Methadone-assisted rehabilitation of Swedish heroin addicts. *Drug and Alcohol Dependence*, 24(1), 31-37.
- Gruber, V.A., Delucchi, K.L., Kielstein, A., & Batki, S.L. (2008). A randomized trial of 6-month methadone maintenance with standard or minimal counseling versus 21-day methadone detoxification. *Drug and Alcohol Dependence*, 94, 1, 199-206.
- Kinlock, T., Gordon, M., Schwartz, R., O'Grady, K., Fitzgerald, T., & Wilson, M. (2007). A randomized clinical trial of methadone maintenance for prisoners: Results at 1-month post-release. *Drug and Alcohol Dependence*, 91(2-3), 220-227.
- Newman, R., & Whitehill, W. (1979). Double-blind comparison of methadone and placebo maintenance treatments of narcotic addicts in Hong Kong. *The Lancet*, 314(8141), 485-488.
- Schwartz, R.P., Highfield, D.A., Jaffe, J.H., Brady, J.V., Butler, C.B., Rouse, C.O., Callaman, J.M., ... Battjes, R.J. (2006). A randomized controlled trial of interim methadone maintenance. *Archives of General Psychiatry*, 63(1), 102-9.
- Schwartz, R.P., Jaffe, J.H., Highfield, D.A., Callaman, J.M., & O'Grady, K.E. (2007). A randomized controlled trial of interim methadone maintenance: 10-Month follow-up. *Drug and Alcohol Dependence*, 86(1), 30-36.
- Strain, E.C., Stitzer, M. L., Liebson, I.A., & Bigelow, G.E. (1993). Dose-response effects of methadone in the treatment of opioid dependence. *Annals of Internal Medicine*, 119(1), 23-27.
- Vanichseni, S., Wongsuwan, B., Choopanya, K., & Wongpanich, K. (1991). A controlled trial of methadone maintenance in a population of intravenous drug users in Bangkok: Implications for prevention of HIV. *International Journal of the Addictions*, 26(12), 1.
- Wilson, M.E., Schwartz, R.P., O'Grady, K.E., & Jaffe, J.H. (2010). Impact of interim methadone maintenance on HIV risk behaviors. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 87(4), 586-591.

For further information, contact:
(360) 664-9800, institute@wsipp.wa.gov

Printed on 05-16-2021



Washington State Institute for Public Policy

The Washington State Legislature created the Washington State Institute for Public Policy in 1983. A Board of Directors—representing the legislature, the governor, and public universities—governs WSIPP and guides the development of all activities. WSIPP's mission is to carry out practical research, at legislative direction, on issues of importance to Washington State.