Buprenorphine (or buprenorphine/naloxone) maintenance treatment for opioid use disorder

Substance Use Disorders: Medication-assisted Treatment

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: Buprenorphine/buprenorphine/naloxone is an opiate substitution treatment for opioid dependence. It is a daily medication generally provided in addition to counseling therapies. Buprenorphine/buprenorphine/naloxone is a partial agonist that suppresses withdrawal symptoms and blocks the effects of opioids. Two versions of buprenorphine are used in the treatment of opioid dependence. Subutex consists of buprenorphine only while Suboxone is a version of buprenorphine that combines buprenorphine and naloxone. The addition of naloxone reduces the probability of overdose and reduces misuse by producing severe withdrawal effects if taken any way except sublingually. Suboxone is generally given during the maintenance phase and many clinics will only provide take-home doses of Suboxone. Buprenorphine and buprenorphine/naloxone are alternatives to methadone treatments and, unlike methadone, can be prescribed in office-based settings by physicians that have completed a special training. We reviewed studies that evaluated the effectiveness of buprenorphine maintenance therapy. We excluded studies with treatment dosages below current guidance (< 8 mg/day).

Benefit-Cost Summary Statistics Per Participant

Benefits to:			
Taxpayers	$2,053	Benefit to cost ratio	$1.85
Participants	$2,692	Benefits minus costs	$4,652
Others	$965	Chance the program will produce	
Indirect	$4,387	benefits greater than the costs	81%
Total benefits	$10,096		
Net program cost	($5,444)		
Benefits minus cost	$4,652		

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	37	9	793	-0.941	0.181	37	0.000	0.000	38	-0.941	0.001
Emergency department visits^^	37	1	46	-0.026	0.263	37	n/a	n/a	n/a	-0.026	0.920
Psychiatric symptoms^	37	1	51	-0.156	0.201	37	n/a	n/a	n/a	-0.156	0.437

^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
Opioid use disorder	Criminal justice system	$0	$0	$1	$0	$1
Opioid use disorder	Labor market earnings associated with opioid drug abuse or dependence	$755	$1,779	$0	$0	$2,535
Opioid use disorder	Health care associated with opioid drug abuse or dependence	$967	$135	$964	$483	$2,549
Opioid use disorder	Mortality associated with opioids	$330	$778	$0	$6,625	$7,733
Program cost	Adjustment for deadweight cost of program	$0	$0	$0	($2,722)	($2,722)
Totals		$2,053	$2,692	$965	$4,387	$10,096

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

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

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

## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	$4,431	2012	Present value of net program costs (in 2022 dollars)	($5,444)
Comparison costs	$0	2012	Cost range (+ or -)	30%

We estimated the per-participant costs of providing buprenorphine/buprenorphine/naloxone in addition to standard substance abuse treatment for 12 months. Costs reflect the average of costs reported in numerous cost-effectiveness studies (Polsky et al., 2010; Rosenheck and Kosten, 2001; Schackman et al., 2012). Costs included vary by study but generally include costs of medication, dispensing, toxicology screens, and when available, costs of medical care related to methadone treatment, equipment, administration, and clinic space. The figures shown are estimates of the costs to implement programs in Washington. Comparison group participants may have recieved counseling and other services.

Polsky, D., Glick, H.A., Yang, J., Subramaniam, G.A., Poole, S.A., & Woody, G.E. (2010). Cost-effectiveness of extended buprenorphine-naloxone treatment for opioid-dependent youth: data from a randomized trial. Addiction, 105(9), 1616-1624. Rosenheck, R., & Kosten, T. (2001). Buprenorphine for opiate addiction: potential economic impact. Drug and Alcohol Dependence, 63(3), 253-262. Schackman, B.R., Leff, J.A., Moore, B.A., Moore, B.A., & Fiellin, D.A. (2012). Cost-effectiveness of long-term outpatient buprenorphine-naloxone treatment for opioid dependence in primary care. Journal of General Internal Medicine, 27(6), 669-676. Polsky, D., Glick, H.A., Yang, J., Subramaniam, G.A., Poole, S.A., & Woody, G.E. (2010). Cost-effectiveness of extended buprenorphine-naloxone treatment for opioid-dependent youth: data from a randomized trial. Addiction, 105(9), 1616-1624. Rosenheck, R., & Kosten, T. (2001). Buprenorphine for opiate addiction: potential economic impact. Drug and Alcohol Dependence, 63(3), 253-262. Schackman, B.R., Leff, J.A., Moore, B.A., Moore, B.A., & Fiellin, D.A. (2012). Cost-effectiveness of long-term outpatient buprenorphine-naloxone treatment for opioid dependence in primary care. Journal of General Internal Medicine, 27(6), 669-676.

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)
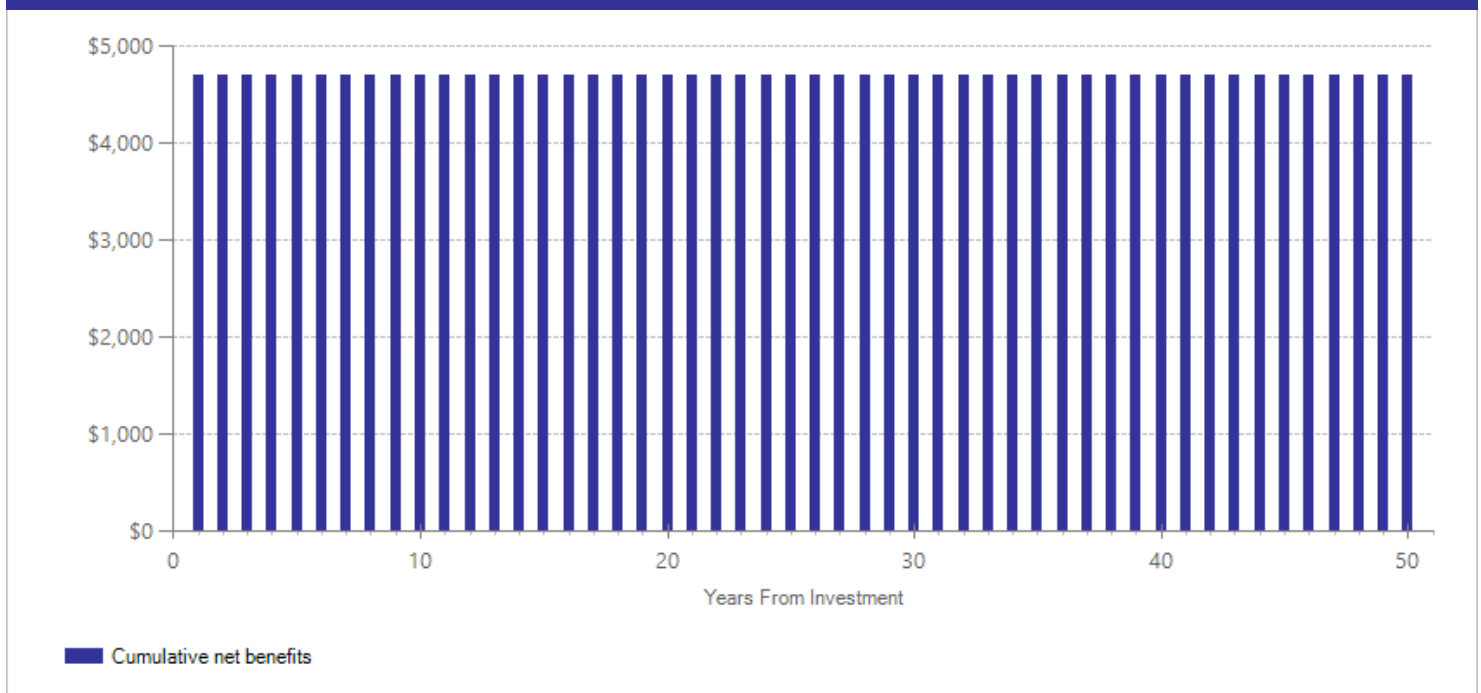
The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in discounted dollars. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost 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)
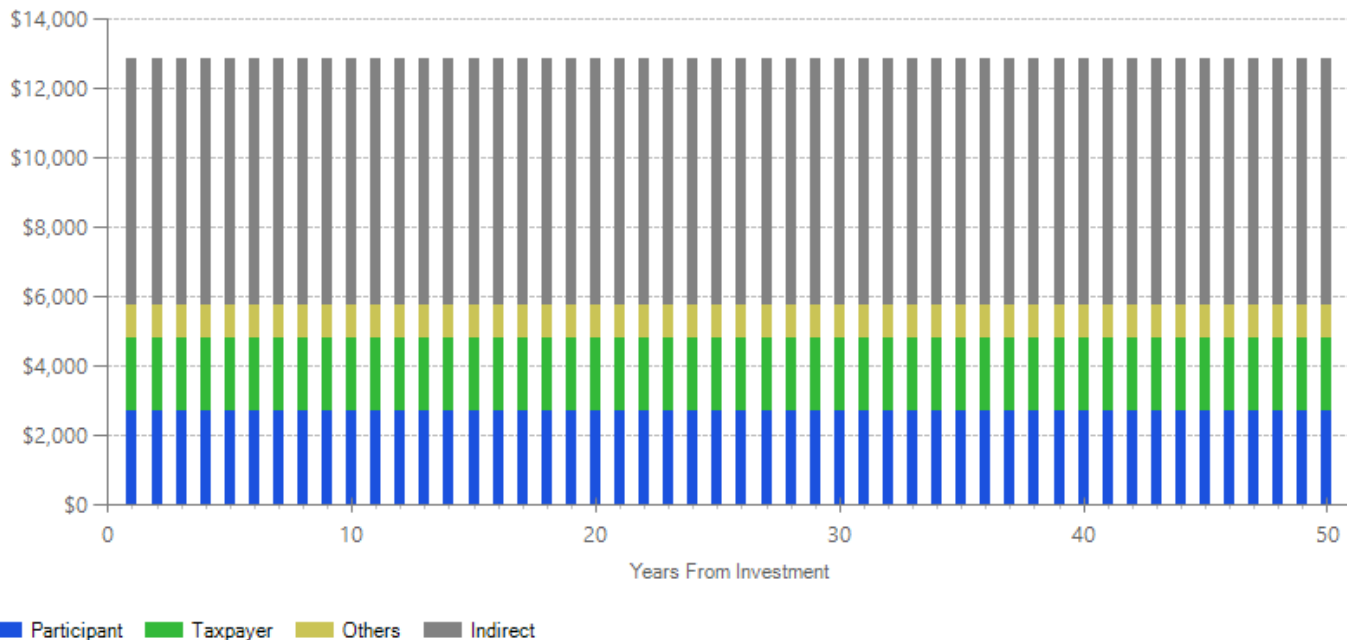
The graph above illustrates the breakdown of the estimated cumulative benefits (not including program costs) per-participant for the first fifty years beyond the initial investment in the program. These cash flows provide a breakdown of the classification of dollars over time into four perspectives: 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

Cropsey, K.L., Lane, P.S., Hale, G.J., Jackson, D.O., Clark, C.B., Ingersoll, K.S., Islam, M.A., Stitzer, M.L. (2011). Results of a pilot randomized controlled trial of buprenorphine for opioid dependent women in the criminal justice system. *Drug and Alcohol Dependence, 119*(3), 172-178.

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Liebschutz, J.M., Crooks, D., Herman, D., Anderson, B., Tsui, J., Meshesha, L.Z., Dossabhoy, S., Stein, M. (2014). Buprenorphine treatment for hospitalized, opioid-dependent patients: a randomized clinical trial. *Jama Internal Medicine, 174*(8), 1369-76.

Ling, W., Charuvastra, C., Collins, J.F., Batki, S., Brown, L.S., Kintaudi, P., . . . Segal, D. (1998). Buprenorphine maintenance treatment of opiate dependence: A multicenter, randomized clinical trial. *Addiction, 93*(4), 475.

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Rosenthal, R.N., Ling, W., Casadonte, P., Vocci, F., Bailey, G.L., Kampman, K., ... & Beebe, K.L. (2013). Buprenorphine implants for treatment of opioid dependence: Randomized comparison to placebo and sublingual buprenorphine/naloxone. *Addiction, 108*(12), 2141-2149.