

## Multifactorial interventions: nurse-led (high-risk population)

### Health Care: Falls Prevention for Older Adults

Benefit-cost estimates updated December 2023. Literature review updated November 2017.

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:** Multifactorial falls prevention programs offer more than one type of intervention, with each participant receiving a tailored combination of interventions following a falls risk assessment. A nurse-led multifactorial intervention begins with a basic risk assessment that may take place in the home or a primary care clinic. After the initial assessment, the nurse coordinates follow-up care or provides referrals to other providers, including physicians, physical therapists, and occupational therapists. Among studies included in this analysis, the most common conditions identified for treatment were mobility problems (47%), polypharmacy (46%), and high blood pressure (43%). Among included studies, participants received four home visits on average, with a range of 1 to 22.

This meta-analysis includes only interventions delivered to community-dwelling older adults with a high risk of falling. We classify participants as high risk if they were selected for falls risk factors or if they were recruited from an inpatient setting. We analyze nurse-led multifactorial interventions for a general population of community-dwelling older adults separately.

### Benefit-Cost Summary Statistics Per Participant

#### Benefits to:

Taxpayers	(\$689)	Benefit to cost ratio	(\$8.76)
Participants	(\$87)	Benefits minus costs	(\$6,460)
Others	(\$107)	Chance the program will produce	
Indirect	(\$4,915)	benefits greater than the costs	0%
<b>Total benefits</b>	<b>(\$5,798)</b>		
<b>Net program cost</b>	<b>(\$662)</b>		
<b>Benefits minus cost</b>	<b>(\$6,460)</b>		

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	p-value
				ES	SE	Age	ES	SE	Age		
Fall-related hospitalization <sup>^</sup>	83	1	136	-0.361	0.194	83	n/a	n/a	n/a	-0.361	0.062
Falls <sup>‡</sup>	83	2	1037	1.155	0.036	83	1.000	0.000	84	1.155	0.001

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

<sup>‡</sup>The effect size for this outcome indicates an incidence rate ratio (IRR), not a standardized mean difference effect size. An IRR less than one indicates a lower rate of the outcome in the treatment group relative to the comparison group; an IRR greater than one indicates a higher rate of the outcome. The treatment n for this outcome represents person-years.

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: <sup>1</sup>	Benefits accrue to:				
		Taxpayers	Participants	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Falls	Health care associated with falls	(\$689)	(\$87)	(\$107)	(\$344)	(\$1,227)
Falls	Mortality associated with falls	\$0	\$0	\$0	(\$4,240)	(\$4,240)
Program cost	Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$331)	(\$331)
<b>Totals</b>		<b>(\$689)</b>	<b>(\$87)</b>	<b>(\$107)</b>	<b>(\$4,915)</b>	<b>(\$5,798)</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.

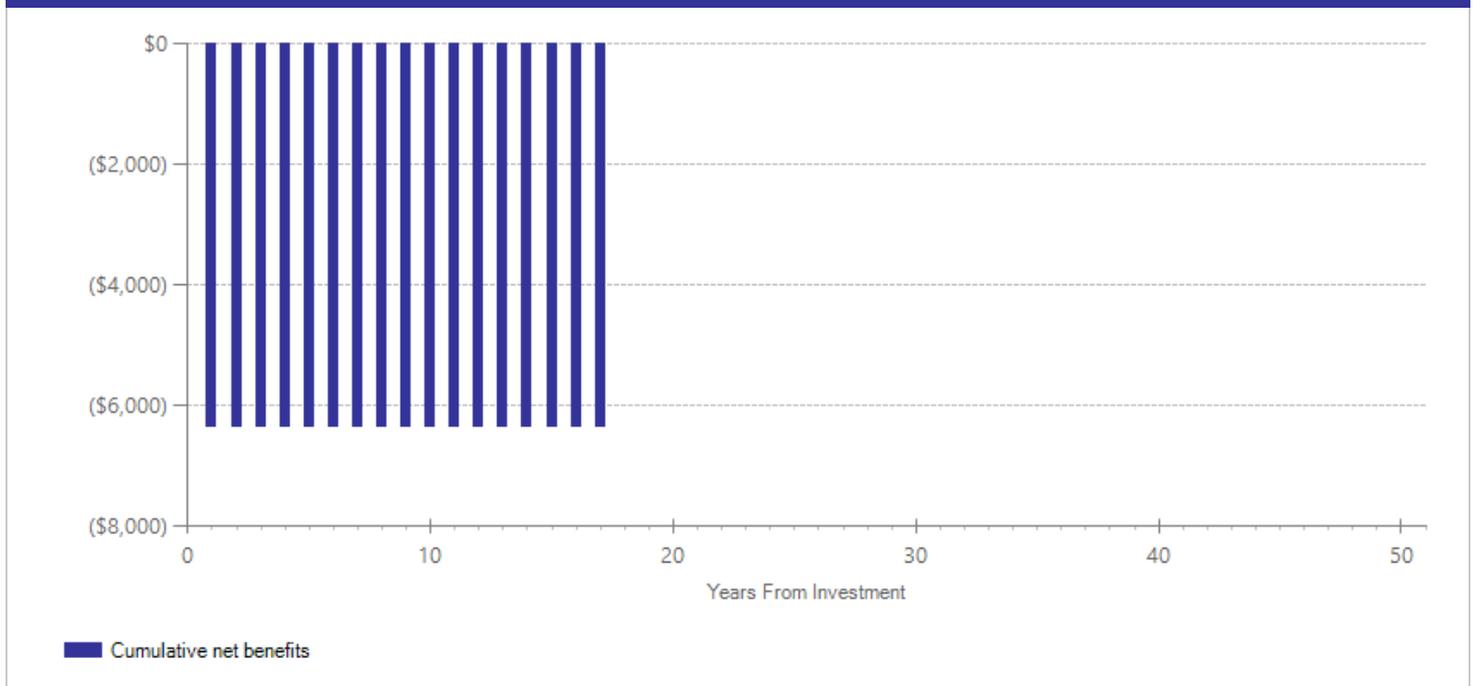
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$561	2016	Present value of net program costs (in 2022 dollars)	(\$662)
Comparison costs	\$0	2016	Cost range (+ or -)	50%

Per-participant cost estimates are based on weighted average costs of the assessments and additional services directly provided in the included studies. We do not include the cost of additional treatment provided as a result of the intervention (i.e., services provided through referrals). We include staff hours including home visits, transportation, telephone contacts, and training. We assume the duration of home visits, phone calls, and support by a general practitioner were the same as reported in van Rijn, 2017. For the included study that provided care coordination or case management, we assume the nurse's time spent on these activities was the same as that spent on home visits. For the included studies that provided training, we include the cost of a ten-day training, provider time spent in attendance, and trainer compensation. We use 2016 U.S. Bureau of Labor Statistics information (retrieved March 2018) to estimate Washington State mean wages for the providers represented in the studies, including registered nurses, physical therapists, and geriatricians. We increase wages by a factor of 1.441 to account for the cost of employee benefits.

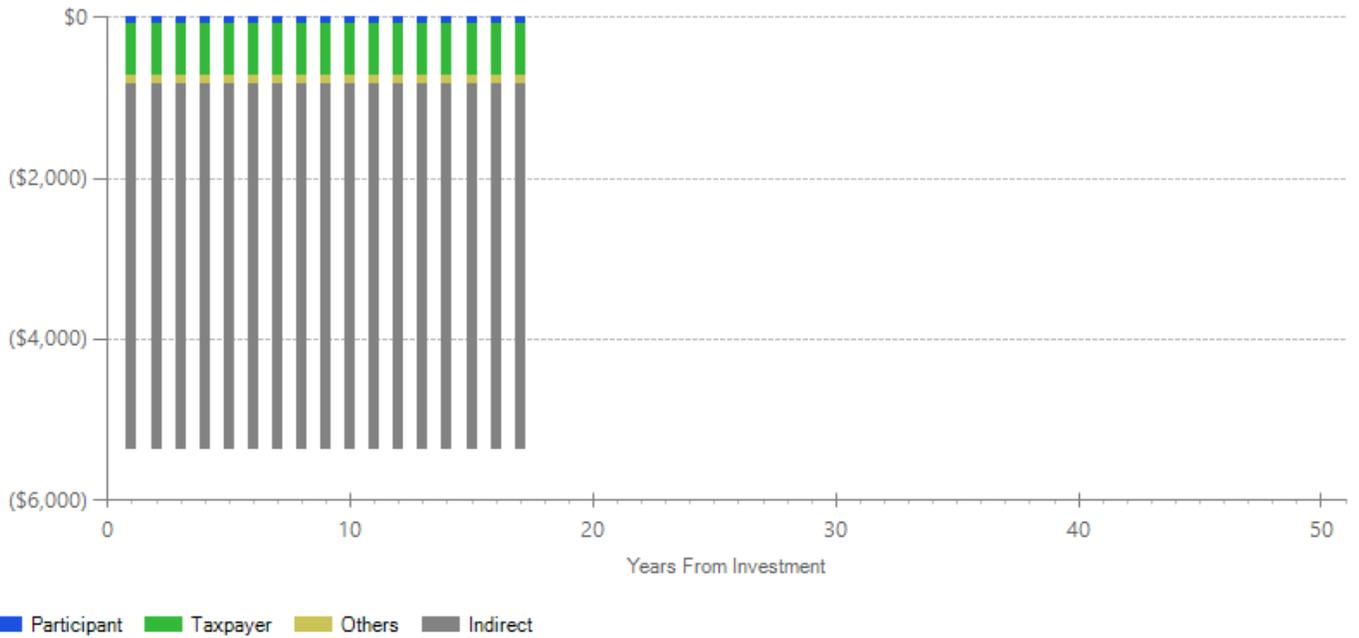
The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty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

## Benefits Minus Costs Over Time (Cumulative Discounted Dollars)



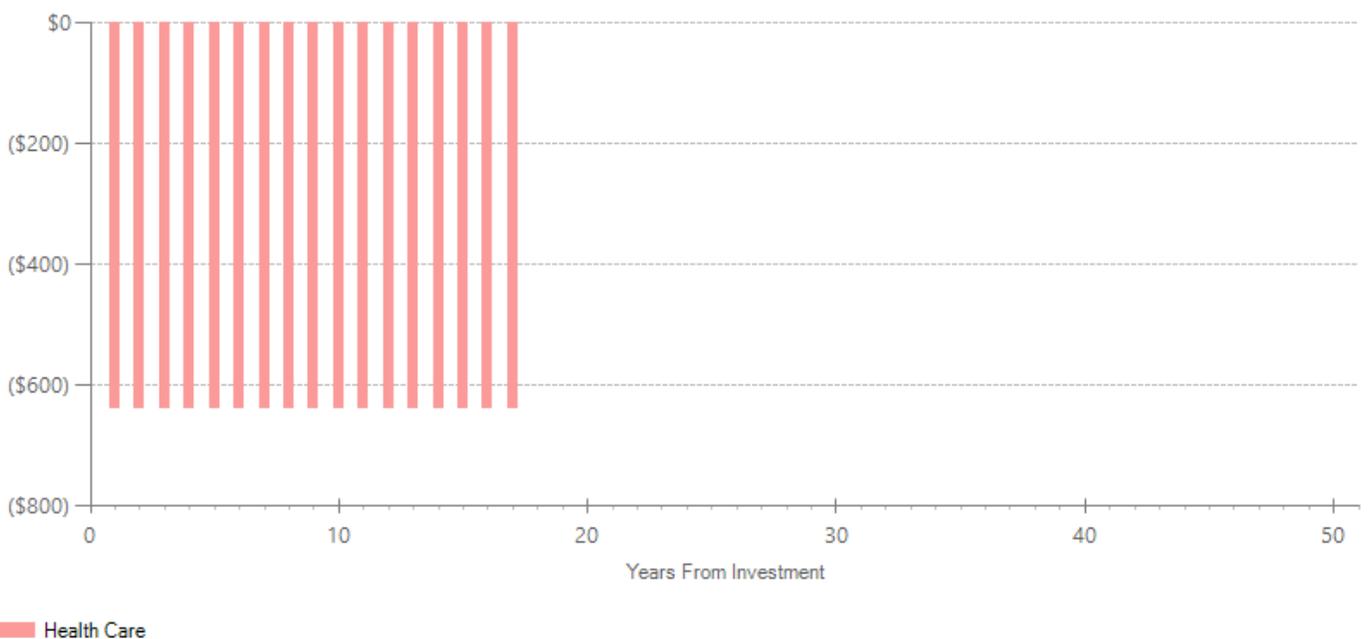
The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in discounted dollars. If the dollars are negative (bars below \$0 line), the cumulative benefits do not outweigh the cost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

- Olsson Möller, O., Kristensson, J., Midlöv, P., Ekdahl, C., & Jakobsson, U. (2014). Effects of a one-year home-based case management intervention on falls in older people: a randomized controlled trial. *Journal of aging and physical activity*, 22(4), 457-464.
- Spice, C.L., Morotti, W., George, S., Dent, T.H., Rose, J., Harris, S., & Gordon, C.J. (2009). The Winchester falls project: A randomised controlled trial of secondary prevention of falls in older people. *Age and Ageing*, 38(1), 33-40.
- van Rijn, M. (2017). *Nurse-led multifactorial care in community-dwelling older people: Outcomes on daily functioning, experiences and costs*. (Doctoral thesis, University of Amsterdam).

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