

# Ohio Health Gaps Report

What's driving health differences across the state and how can those gaps be closed?



Every year, **over 8,900 deaths in Ohio could be avoided** if all residents in the state had a fair chance to be healthy.

If residents of all counties in Ohio had the same opportunities for health, there could be:

**366,000** fewer adult smokers

**201,000** fewer adults who are obese

**205,000** fewer people who are uninsured

**174,000** more adults, ages 25-44, with some education beyond high school

**65,000** fewer people who are unemployed

**263,000** fewer children in poverty

**30,000** fewer violent crimes

**205,000** fewer households with severe housing problems

## Introduction

Why is there so much difference in the health of residents in one county compared to other counties in the same state? In this report, the *County Health Rankings & Roadmaps* program explores how wide gaps are throughout Ohio and what is driving those differences.

This information can help Ohio state leaders as they identify ways for everyone to have a fair chance to lead the healthiest life possible. Specifically, this document can help state leaders understand:

1. What health gaps are and why they matter
2. The size and nature of the health gaps among counties within Ohio
3. What factors are influencing the health of residents, and
4. What state and local communities can do to address health gaps.

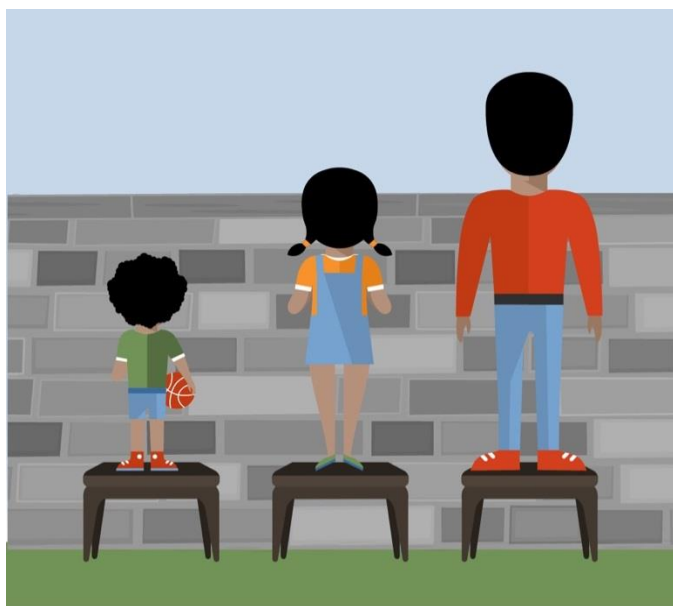
### What are health gaps and why do they matter?

As a country, we have achieved significant health improvements over the past century. We have benefited from progress in automobile safety, better workplace standards, good schools and medical clinics, and reductions in smoking or infectious diseases. But when you look closer, within each state across the country—including Ohio—there are significant differences in health outcomes according to where people live, learn, work, and play. It is clear that not all Americans have the means and opportunity to be their healthiest.

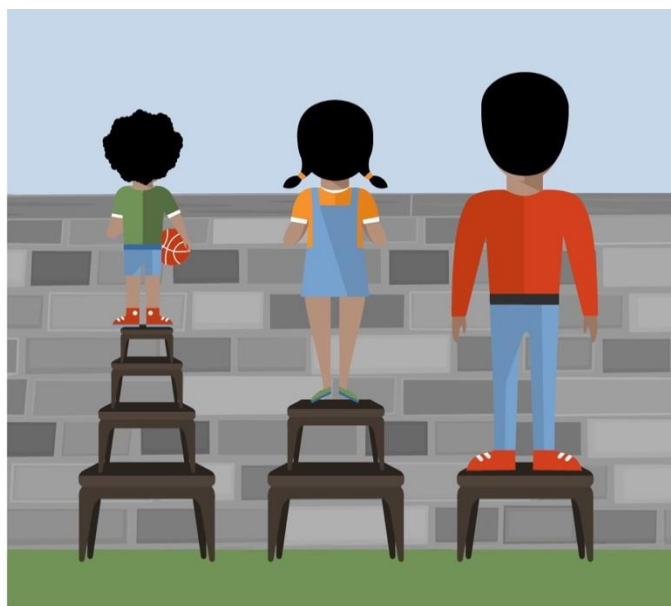
***Gaps in length and quality of life.*** Residents in one county are more likely to die prematurely or not be as healthy as residents in another county in the same state if they do not have the same kinds of opportunities to be their healthiest.

***Gaps in the factors that influence health.*** Health is influenced by every aspect of how and where we live. Access to affordable housing, safe neighborhoods, job training programs and quality early childhood education are examples of important changes that can put people on a path to a healthier life even more than access to medical care. But access to these opportunities varies county to county. This limits choices and makes it hard to be healthy.

Poor health disproportionately burdens people who live in places that limit opportunities to live long and well. These gaps in health outcomes are costly and preventable. Gaps in health could be narrowed, if not eliminated, if we took steps to create more equitable opportunities. Improving education in counties that need it most is one example. That step and others can lead to higher incomes and more lifetime stability.



Giving everyone a fair chance to be healthy does not necessarily mean offering everyone the same resources to be healthy, but rather offering people specific resources necessary for their good health. For example, consider three children of different heights. Offering them all the same size bench to stand on would mean that shorter children do not have a fair chance to see over the wall. Offering each child a bench to stand on that is the right size for their height gives all children a fair chance to see over the wall.

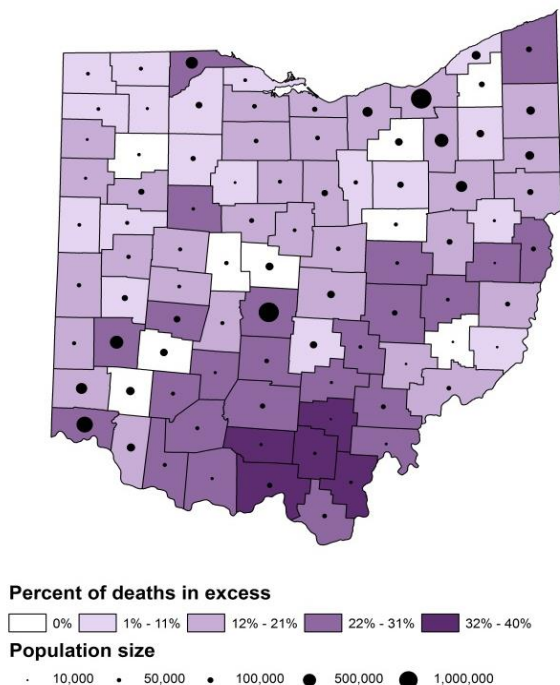


Health gaps can exist in many dimensions—for residents across neighboring county lines, or between various groups within a community according to race, ethnicity, age, income, education or sexual orientation, among others. For this report, we focus on the gaps in opportunities for health that exist between counties within Ohio, and provide strategies to address factors that influence these differences.



## How big are the gaps in health outcomes between counties within Ohio?

Every year, **over 8,900 deaths in Ohio could be avoided** if all residents in the state had a fair chance to be healthy.



Most of Ohio's 8,900 excess deaths tend to occur in counties with higher populations (such as Franklin and Hamilton). However, some counties with smaller populations also have a disproportionate share of avoidable lives lost. For example, nearly 40 percent of premature deaths in Pike County could be avoided if Pike residents had the opportunities of those in healthier counties (no shading).

Of course, population size is not the only factor that state leaders should take into account when selecting strategies to solve health gaps. We know that there are many factors that shape health. The next page of this report highlights factors state leaders may want to pay particular attention to as they work to improve health for all.

### What do gaps in opportunities for health mean for people in Ohio?

If residents of all counties in Ohio had the same opportunities for health,\* there could be:

- 366,000 fewer adult smokers
- 201,000 fewer adults who are obese
- 205,000 fewer people who are uninsured
- 174,000 more adults, ages 25-44, with some education beyond high school
- 65,000 fewer people who are unemployed
- 263,000 fewer children in poverty
- 30,000 fewer violent crimes
- 205,000 fewer households with severe housing problems

\* see page 6

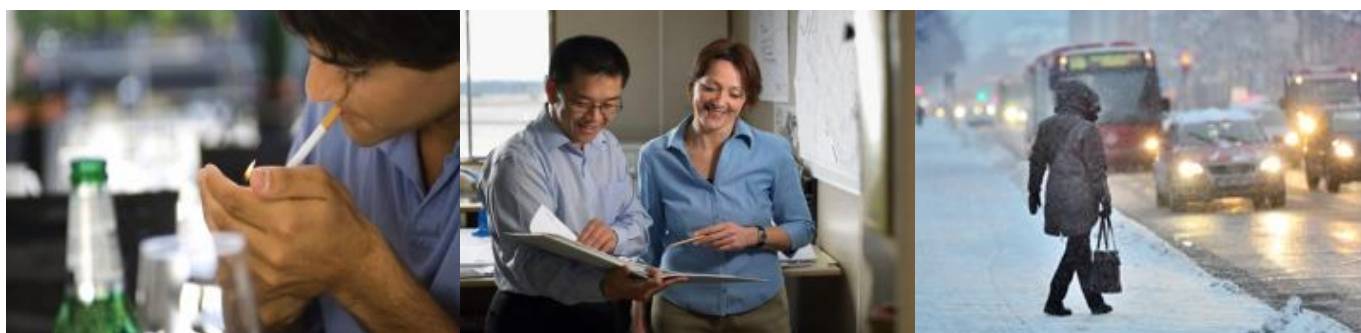
## Highlighted health gaps in Ohio

Highlighted measures (→) indicate *meaningful gaps* that policymakers and leaders may want to examine more closely. We define *meaningful gaps* as those that are noteworthy or statistically different from a state or U.S. value for factors that have the greatest influence on health (e.g., social and economic factors have a greater influence than clinical care). The best and worst counties represent the top and bottom 10% of county-level values for a given measure in the state or the U.S., respectively.

HEALTH FACTORS	Best OH Counties	Worst OH Counties	OH Mean	Best US Counties
<b>Health Behaviors</b>				
→ <b>Adult smoking:</b> adults who are current smokers	17%	31%	21%	14%
→ <b>Adult obesity:</b> adults that report a BMI of 30 or more	28%	36%	30%	25%
<b>Food environment index:</b> access to healthy food and food insecurity	8.3	6.5	7.1	8.4
<b>Physical inactivity:</b> adults reporting no leisure-time physical activity	24%	34%	26%	20%
<b>Access to exercise opportunities:</b> adequate access to locations for physical activity	91%	44%	83%	92%
<b>Excessive drinking:</b> adults reporting binge or heavy drinking	12%	23%	18%	10%
<b>Alcohol-impaired driving deaths:</b> driving deaths with alcohol involvement	22%	45%	36%	14%
<b>Sexually transmitted infections:</b> newly diagnosed chlamydia cases per 100,000 population	144	488	460	138
<b>Teen births:</b> births per 1,000 females ages 15-19	19	52	36	20
<b>Clinical Care</b>				
<b>Uninsured:</b> population under age 65 without health insurance	12%	15%	14%	11%
<b>Primary care physicians:</b> ratio of population to primary care physicians	1,126:1	4,189:1	1,336:1	1,039:1
<b>Dentists:</b> ratio of population to dentists	1,584:1	4,778:1	1,746:1	1,362:1
<b>Mental health providers:</b> ratio of population to mental health providers	564:1	3,657:1	716:1	383:1
→ <b>Preventable hospital stays:</b> hospital stays for ambulatory-care sensitive conditions per 1,000 Medicare enrollees	55	99	72	41
<b>Diabetic monitoring:</b> diabetic Medicare enrollees, ages 65-75, that receive HbA1c monitoring	88%	80%	84%	90%
<b>Mammography screening:</b> female Medicare enrollees, ages 67-69, that receive mammography screening	65%	53%	60%	71%



HEALTH FACTORS	Best OH Counties	Worst OH Counties	OH Mean	Best US Counties
<b>Social &amp; Economic Factors</b>				
→ <b>High school graduation:</b> ninth-grade cohort that graduates in 4 years	95%	81%	82%	93%
<b>Some college:</b> adults ages 25-44 with some post-secondary education	68%	45%	63%	71%
→ <b>Unemployment:</b> population 16+ that are unemployed but seeking work	6 %	10 %	7%	4%
→ <b>Children in poverty:</b> children under age 18 living in poverty	13%	32%	23%	13%
<b>Income inequality:</b> ratio of 80 <sup>th</sup> /20 <sup>th</sup> percentile of income	3.7	4.8	4.7	3.7
<b>Children in single-parent households:</b> children that live in a household headed by a single parent	20%	40%	35%	20%
<b>Social associations:</b> social associations per 10,000 population	18	9	11	22
<b>Violent crime:</b> violent crime offenses per 100,000 population	40	346	307	59
<b>Injury deaths:</b> deaths due to injury per 100,000 population	50	82	62	50
<b>Physical Environment</b>				
<b>Air pollution:</b> average daily density ( $\mu\text{g}/\text{m}^3$ ) of fine particulate matter (2.5)	13.2	13.9	13.5	9.5
<b>Drinking water violations:</b> population potentially exposed to water exceeding violation limit during past year	0%	28%	4%	0%
<b>Severe housing problems:</b> households with $\geq 1$ of 4 housing problems: overcrowding, high housing costs, lack of kitchen or plumbing facilities	11%	17%	15%	9%
<b>Driving alone to work:</b> workforce that drives alone to work	80%	87%	83%	71%
<b>Long commute - driving alone:</b> among workers who commute in their car alone, those that commute more than 30 minutes	21%	46%	29%	15 %



## What can be done to help close gaps in Ohio?

Here are some examples of evidence-informed strategies to improve the above highlighted health factors:

### ➔ Tobacco Use (Adult smoking)

- Proactive tobacco quitlines Deliver phone-based behavioral counseling and follow-up for tobacco users who want to quit
- Tobacco marketing Limit the pricing, flavoring, placement, or promotion of tobacco products via regulation
- Tobacco pricing Increase tobacco per unit prices through taxes or point-of-sale fees

### ➔ Diet and Exercise (Adult obesity)

- Access to places for physical activity Modify local environments to support physical activity, increase access to new or existing facilities for physical activity, or build new facilities
- Healthy food in convenience stores Encourage convenience stores, corner stores, or gas station markets to carry fresh produce and other healthier food options
- Land use zoning regulations Use zoning regulations to address elements important to physical activity such as street continuity and connectivity, residential density, and proximity of residential areas to businesses, schools, and recreation
- School breakfast programs Support programs to provide students with a nutritious breakfast, in the cafeteria, from grab and go carts in hallways, or in classrooms

### ➔ Quality of Care (Preventable hospital stays)

- Behavioral health and primary care practice integration Revise health care processes and provider roles to integrate mental health and substance abuse treatment into primary care
- Chronic disease self-management programs Provide education and behavioral interventions that support patients' ability to actively manage their condition(s) in everyday life
- Interventions to improve health literacy Offer outreach and education with enhanced written materials and other approaches to increase patients' health-related knowledge
- Medical homes Provide continuous, comprehensive, whole person primary care that uses a coordinated team of medical providers across the healthcare system

### ➔ Education (High school graduation)

- Community schools Combine academics, physical health, mental health, and social service resources for students and families through partnerships with community organizations
- Dropout prevention programs Provide services such as remedial education, vocational training, case management, health care, and transportation assistance, to help students complete high school
- Targeted truancy interventions Support interventions that provide at-risk students and families with resources to improve self-esteem, social skills, discipline, and unmet needs in order to increase school attendance
- Universal pre-kindergarten (pre-K) Provide pre-K education to all 4-year-olds, regardless of family income



## ➔ Employment (Unemployment)

- Unemployment insurance Extend or raise the compensation provided to eligible, unemployed workers looking for jobs
- Vocational training for adults Support acquisition of job-specific skills through education, certification programs, or on-the-job training

## ➔ Income (Children in poverty)

- Earned income tax credits Look for ways to expand various earned income tax credits for low to moderate income working individuals and families
- Funding for child care subsidy Increase financial assistance to working parents or parents attending school to pay for center-based or certified in-home child care
- Living wage laws Establish locally or state mandated wages that are higher than federal minimum wage levels
- Paid family leave Provide employees with paid time off for circumstances such as a recent birth or adoption, a parent or spouse with a serious medical condition, or a sick child



## Choosing strategies that work

Taking time to choose policies and programs that have been shown to work in real life and that are a good fit for your state will maximize the chances of success. Focusing on policy, systems, and environmental changes – or implementing programs in a broad, systematic way – can lead to the most substantial improvements over time.

The strategies listed above are among many resources in *What Works for Health*, a searchable database of policies or programs that have worked in other places or are recommended by unbiased experts.

Visit *What Works for Health* at [countyhealthrankings.org/what-works-for-health](https://countyhealthrankings.org/what-works-for-health) for information on these and other strategies to improve health in Ohio.

## How have states and local communities taken action?

The approach to reducing health gaps is not 'one size fits all.' Each state and community has different assets and opportunities they can use.

Many communities across the U.S. are already addressing health gaps and building a Culture of Health. States and local communities have improved health by taking action and making changes. Just look at community revitalization efforts, the expansion of education programs that empower young people, and local and state economic development.

For more detailed tools and guidance on how to improve health for all, visit the **Roadmaps to Health Action Center**:  
[www.countyhealthrankings.org/roadmaps/action-center](http://www.countyhealthrankings.org/roadmaps/action-center)

### Robert Wood Johnson Foundation Culture of Health Prize

State and local efforts can harness the collective power of leaders, partners, and community members to provide everyone with opportunities for better health. The 2015 *RWJF Culture of Health Prize* winners are prime examples of making this a reality. Here are links to examples of how these communities are cultivating a shared belief in good health for all:

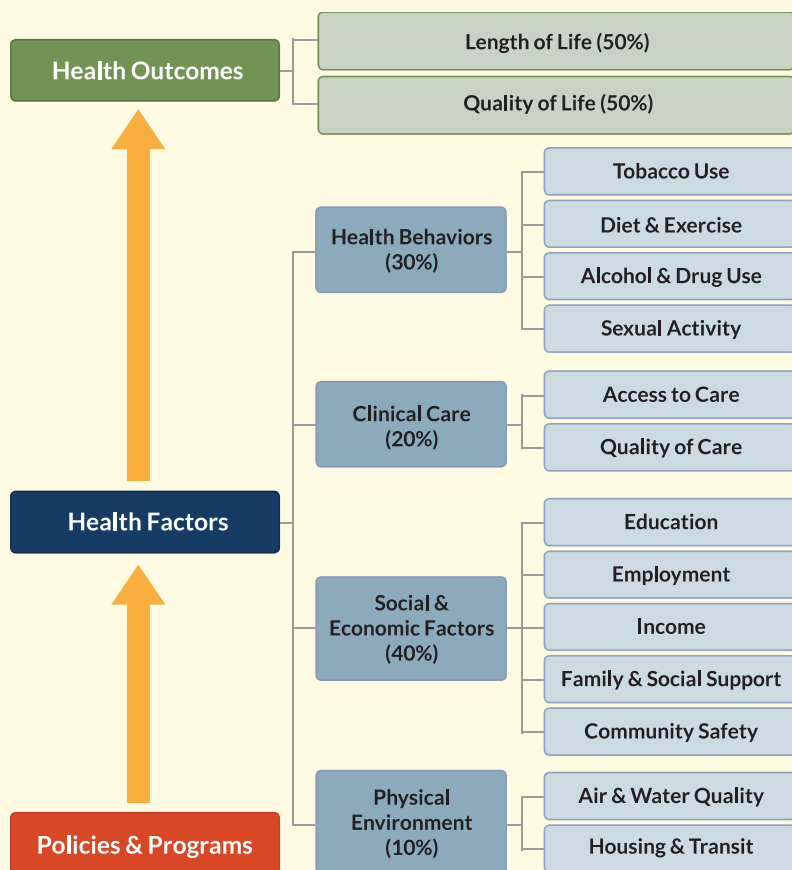
- [Bridgeport, Connecticut](#)
- [Bronx, New York](#)
- [Everett, Massachusetts](#)
- [Kansas City, Missouri](#)
- [Lawrence, Massachusetts](#)
- [Menominee Nation, Wisconsin](#)
- [Spartanburg County, South Carolina](#)
- [Waaswaaganing Anishinaabeg \(Lac du Flambeau Tribe\), Wisconsin](#)



## About County Health Rankings & Roadmaps

The *County Health Rankings & Roadmaps* program brings actionable data and strategies to communities to make it easier for people to be healthy in their neighborhoods, schools, and workplaces. Ranking the health of nearly every county in the nation, the *County Health Rankings* illustrate **what we know** when it comes to what is keeping people healthy or making them sick. The *Roadmaps* show **what we can do** to create healthier places to live, learn, work, and play. The Robert Wood Johnson Foundation (RWJF) collaborates with the University of Wisconsin Population Health Institute (UWPHI) to bring this program to cities, counties, and states across the nation.

Visit the *County Health Rankings & Roadmaps* website at [www.countyhealthrankings.org](http://www.countyhealthrankings.org) to learn more about the *Rankings*, the health gaps for each state, and how you can take action in your community.



County Health Rankings model © 2014 UWPHI

### How did we measure excess deaths?

Excess deaths were estimated using two measures: population size and the difference in premature mortality risk between the county's age-adjusted mortality rate and the rate for the top performing 10% of counties within each state or region (for states with fewer, less populated counties). Premature deaths were considered those that occurred before the age of 75. Mortality rates were calculated using [CDC WONDER](#) data for 2011-2013. For each county, we examined the difference in mortality rates and then applied this risk difference to the county's population to estimate the number of excess deaths. To estimate the total for each state, the number of excess deaths was tallied for each county within the state.

This approach considers both the magnitude of the gap in mortality rates and the population living with that rate. So, if two communities had the same mortality risk gap, more excess deaths would be observed in the community with the larger population. Similarly, if two communities had the same population size, more excess deaths would be observed in the community with the greatest gap in mortality risk.

### How did we identify health factors to improve?

*County Health Rankings* data can help to identify factors with meaningful differences across counties. Accounting for the relative influence of various factors on health outcomes, a range of techniques were used to identify those factors that seem to have the greatest potential opportunity for improvement. We identified measures where there are meaningful differences between the state's or poor performing counties' value and that of a U.S. or state reference value for the factor. Meaningful differences indicate that for a given state, the magnitude of the difference is consequential and/or statistically significant compared to this reference value.

## Credits

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This publication would not have been possible without the following contributions:

### Research Assistance

- Alison Bergum, MPA
- Kathryn Hatchell
- Amanda Jovaag, MS
- Hyojun Park, MS
- Elizabeth Pollock
- Matthew Rodock, MPH

### Outreach Assistance

- Mary Bennett, MFA
- Kitty Jerome, MA
- Stephanie Johnson, MSW
- Jan O'Neill, MPA

### Communications and Website Development

- Burness
- Forum One

#### Recommended citation

University of Wisconsin Population Health Institute. *County Health Rankings* Health Gaps Report 2015.

### Data

- Centers for Disease Control and Prevention: National Center for Health Statistics
- Dartmouth Institute for Health Policy & Clinical Practice

### Robert Wood Johnson Foundation

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February 2015

## What Works and What Does Not? *Benefit-Cost Findings from WSIPP*

Since the late 1990s, the Washington State Legislature has directed the Washington State Institute for Public Policy (WSIPP) to calculate the return on investment to taxpayers from a variety of education, prevention, and intervention programs and policies.<sup>1</sup>

On WSIPP's website, readers can download all of our current findings. In this report, we also present the results, current as of February 2015.

To carry out legislative assignments, WSIPP reviews research evidence from around the United States and elsewhere on the effectiveness of policy options in crime, child welfare, K–12 education, mental health, substance abuse, public health, prevention, and health care. To date, we have analyzed rigorous research evidence and computed return on investment findings for over 200 programs.

### Summary

For the last 20 years, WSIPP has conducted systematic evidence reviews and economic analysis on a variety of topics for the Washington State Legislature. Over time, we have improved and refined the methods we use to conduct this research.

When WSIPP undertakes an economic analysis at the direction of the legislature, we use a standardized set of procedures to collect and analyze research literature. We then apply consistent methods to translate the research findings to dollars and cents, asking, "What are the overall benefits and costs?" of each program or policy option. Finally, we use information about the uncertainty in the research findings and economic assumptions to compute the risk associated with each policy option.

The primary goal of this research is to provide the legislature with objective information about the long-term economic consequences of each program or policy option reviewed.

In this report, we summarize our current findings.

<sup>1</sup> Additionally, in 2013, WSIPP's Board of Directors authorized WSIPP to work on a project (the Pew-MacArthur Results First Initiative) with the MacArthur Foundation and the Pew Charitable Trusts to extend WSIPP's benefit-cost analysis beyond areas previously assigned through legislation.

Suggested citation: Lee, S., Aos, S., & Pennucci, A. (2015). *What works and what does not? Benefit-cost findings from WSIPP*. (Doc. No. 15-02-4101). Olympia: Washington State Institute for Public Policy.



## I. Research Approach

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When WSIPP carries out study assignments from the legislature to identify what works in public policy, we implement a three-step research approach.

### Step 1: What Works? What Does Not?

In the first step, we estimate whether various programs and policies can achieve desired outcomes. These outcomes might be reductions in undesirable outcomes like crime or child abuse and neglect or increases in desirable outcomes like high school graduation. We carefully analyze all high-quality studies from the United States and elsewhere to identify programs and policies that have been demonstrated to change outcomes. We focus on research studies with strong evaluation designs and exclude studies with weak research methods.

Our empirical approach follows a “meta-analytic” framework where we assess systematically all credible evaluations we can locate on a given topic. Given the weight of the collective evidence, we calculate an average expected effect of a program or policy on each particular outcome of interest. These outcomes vary across topic areas but include crime, education, child abuse and neglect, symptoms of mental health disorders, alcohol and drug abuse and dependence, early use of drugs and alcohol, and use of health care resources.

### **Example Legislative Study Direction**

The Washington Legislature directs WSIPP to undertake research when it passes a policy or budget bill. Since the late 1990s, the legislature has directed WSIPP to conduct “what works?” and return on investment reviews more than 20 times. For example, the 2009 Legislature included the following study language in WSIPP’s budget:

*(4) \$100,000 of the general fund state appropriation for fiscal year 2010 and \$100,000 of the general fund state appropriation for fiscal year 2011 are provided solely for the Washington state institute for public policy to report to the legislature regarding efficient and effective programs and policies. The report shall calculate the return on investment to taxpayers from evidence-based prevention and intervention programs and policies that influence crime, K–12 education outcomes, child maltreatment, substance abuse, mental health, public health, public assistance, employment, and housing. The institute for public policy shall provide the legislature with a comprehensive list of programs and policies that improve these outcomes for children and adults in Washington and result in more cost-efficient use of public resources.*

Engrossed Substitute House Bill 1244, Sec. 610, Chapter 564, Laws of 2009 PV.

## Step 2: What Makes Economic Sense?

Next, we consider the benefits and costs of implementing a program or policy by answering two questions.

- How much would it cost Washington taxpayers to produce the results found in Step 1?
- How much would it be worth to people in Washington State to achieve the results found in Step 1?

That is, in dollars and cents, what are the benefits and costs of each program or policy?

To answer these questions, we have developed, and continue to refine, an economic model. The model provides an internally consistent monetary valuation so program and policy options can be compared on an apples-to-apples basis. Our benefit-cost results are expressed with standard financial statistics: net present values and benefit-cost ratios.

We present monetary estimates from three perspectives:

- 1) program participants
- 2) taxpayers
- 3) other people in society

The sum of these perspectives provides a “total Washington” view on whether a program or policy produces benefits that exceed costs.

Benefits to individuals and society may stem from multiple sources. For example, a policy option that reduces juvenile crime leads to the decreased use of resources such as juvenile state institutions, thereby reducing taxpayer costs. In addition, preventing juveniles from committing

crime also increases their likelihood of high school graduation. Thus, program participants will have higher earnings, on average, in the labor market. Finally, less crime means fewer victims who benefit monetarily from avoided crime. Our benefit-cost model produces estimates of these types of effects.

## Step 3: What is the Risk in the Benefit-Cost Findings?

Any tabulation of benefits and costs involves a degree of risk about the estimates calculated. This is expected in any investment analysis, whether in the private or public sector. To assess the riskiness of our conclusions, we perform a “Monte Carlo simulation” in which we vary key factors in our calculations. The purpose of this analysis is to determine the probability that a particular program or policy will at least have benefits that are equal to or greater than costs (“break even”).

Thus, we produce two “big picture” findings for each program: an expected benefit-cost result and, given our understanding of the risks, the probability that the program or policy will at least break even.

Readers interested in an in-depth description of the research methods for these three steps can review our [Technical Documentation](#).<sup>2</sup>

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<sup>2</sup> Washington State Institute for Public Policy, (2014). *Benefit-cost technical documentation*. Olympia, WA: Author. Available online at <http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf>



## II. Findings

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To date, we have located and analyzed sufficiently rigorous research on nearly 300 separate programs and policy options. Of these, we have been able to conduct benefit-cost analysis on over 200 topics.<sup>3</sup> We have found that many produce, on average, benefits that outweigh the costs; some programs and policies, however, do not.

Exhibit 1 displays WSIPP's current list of benefit-cost results for all of the programs and policies for which we have been able to estimate benefits and costs to date. The results are organized into the following categories:

- Juvenile justice
- Adult criminal justice
- Child welfare
- Pre-K to 12 education
- Children's mental health
- Substance abuse
- Adult mental health
- Public health and prevention

In addition, we have recently completed meta-analytic reviews of several health care interventions; these results can be found on our website.<sup>4</sup> Benefit-cost findings for these programs are forthcoming in 2015.

Exhibit 1 reports our estimates of the total monetary benefits of each specific topic, along with the cost and a measure of risk.

In the "Benefits minus costs" column, we present one of our two bottom-line estimates for each program, expressed in 2013 dollars on a per-participant basis. Of the 218 programs and policies listed, we find that 180 (83%) have benefits that outweigh costs, while 38 (17%) do not.

While the benefit-minus-cost estimate provides one summary of how long-term monetary benefits of a program stack up against the costs, there is always uncertainty when estimating this value. We take this uncertainty into account in our second bottom-line estimate for each program's return on investment. In the "Chance benefits will exceed costs" column in Exhibit 1, we present the results of a 10,000 case Monte Carlo simulation, where we ask, "in what percent of the simulation runs did the program *at least* pay for itself?"

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<sup>3</sup> We are able to estimate benefits and costs for many of the programs with rigorous research evidence. However, in some cases, we are unable to estimate the total costs involved with certain programs or policies. In other cases, we are, at this time, unable to monetize some outcomes measured in evaluation research. For the meta-analytic results of those programs for which we are unable to conduct benefit-cost analysis, see: <http://www.wsipp.wa.gov/BenefitCost>

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<sup>4</sup> <http://www.wsipp.wa.gov/BenefitCost?topicId=6>

A 75% statistic in this column would indicate that, after considering the uncertainty in the estimates, three out of four times a program's benefits would exceed its costs, while 25% of the time, the program would not pay off.

Based on this second investment criterion, we find that 110 of the 218 programs (about half) have at least a 75% chance of breaking even.

Together, these two summary measures indicate that some, but not all, policy options provide attractive returns on investment. The purpose of the information in [Exhibit 1](#) is, therefore, to help the legislature craft budgets that are likely to improve outcomes.

### Exhibit 1 Juvenile Justice

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
Functional Family Therapy (youth in state institutions)	\$37,554	\$8,012	\$29,542	(\$3,358)	<b>\$34,196</b>	\$11.21	<b>100 %</b>
Aggression Replacement Training (youth in state institutions)	\$28,955	\$6,126	\$22,829	(\$1,552)	<b>\$27,403</b>	\$18.69	<b>96 %</b>
Functional Family Therapy (youth on probation)	\$29,944	\$7,728	\$22,216	(\$3,357)	<b>\$26,587</b>	\$8.94	<b>100 %</b>
Multisystemic Therapy for substance abusing juvenile offenders	\$27,227	\$5,235	\$21,991	(\$7,578)	<b>\$19,648</b>	\$3.60	<b>76 %</b>
Multisystemic Therapy	\$23,082	\$5,495	\$17,587	(\$7,576)	<b>\$15,507</b>	\$3.05	<b>92 %</b>
Aggression Replacement Training (youth on probation)	\$16,076	\$4,121	\$11,955	(\$1,552)	<b>\$14,524</b>	\$10.38	<b>96 %</b>
Family Integrated Transitions (youth in state institutions)	\$25,586	\$6,419	\$19,167	(\$11,565)	<b>\$14,021</b>	\$2.22	<b>76 %</b>
Functional Family Parole (with quality assurance)	\$14,478	\$3,475	\$11,003	(\$4,478)	<b>\$10,000</b>	\$3.24	<b>79 %</b>
Multidimensional Treatment Foster Care	\$17,286	\$4,256	\$13,031	(\$8,111)	<b>\$9,175</b>	\$2.13	<b>67 %</b>
Multidimensional Family Therapy (MDFT) for substance abusers	\$14,185	\$4,281	\$9,904	(\$7,805)	<b>\$6,380</b>	\$1.82	<b>67 %</b>
Coordination of Services	\$6,446	\$1,693	\$4,753	(\$406)	<b>\$6,040</b>	\$15.90	<b>76 %</b>
Therapeutic communities for chemically dependent juvenile offenders	\$10,364	\$2,628	\$7,735	(\$4,576)	<b>\$5,788</b>	\$2.27	<b>76 %</b>
Drug court	\$7,318	\$2,092	\$5,226	(\$3,159)	<b>\$4,159</b>	\$2.32	<b>65 %</b>
Victim offender mediation	\$4,386	\$1,197	\$3,189	(\$596)	<b>\$3,790</b>	\$7.37	<b>88 %</b>
Drug treatment for juvenile offenders	\$6,133	\$1,947	\$4,186	(\$3,744)	<b>\$2,388</b>	\$1.64	<b>70 %</b>
Other chemical dependency treatment for juveniles (non-therapeutic communities)	\$220	\$441	(\$221)	(\$3,193)	<b>(\$2,973)</b>	\$0.07	<b>28 %</b>
Scared Straight	(\$13,491)	(\$3,429)	(\$10,062)	(\$66)	<b>(\$13,557)</b>	(\$204.33)	<b>1 %</b>

**Exhibit 1 continued**  
**Adult Criminal Justice**

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
Electronic monitoring (probation)	\$27,363	\$6,691	\$20,673	\$1,102	<b>\$28,465</b>	n/a	<b>94 %</b>
Offender Re-entry Community Safety Program (dangerously mentally ill offenders)	\$58,499	\$19,337	\$39,162	<b>(\$33,254)</b>	<b>\$25,245</b>	\$1.76	<b>95 %</b>
Therapeutic communities for offenders with co-occurring disorders	\$27,658	\$7,511	\$20,148	<b>(\$3,665)</b>	<b>\$23,994</b>	\$7.56	<b>100 %</b>
Correctional education (basic or post-secondary) in prison	\$23,346	\$6,088	\$17,258	<b>(\$1,161)</b>	<b>\$22,185</b>	\$20.13	<b>100 %</b>
Vocational education in prison	\$21,377	\$5,649	\$15,727	<b>(\$1,619)</b>	<b>\$19,757</b>	\$13.22	<b>100 %</b>
Drug Offender Sentencing Alternative (for drug offenders)	\$21,204	\$5,494	\$15,710	<b>(\$1,576)</b>	<b>\$19,629</b>	\$13.48	<b>99 %</b>
Mental health courts	\$20,253	\$5,541	\$14,711	<b>(\$3,007)</b>	<b>\$17,245</b>	\$6.75	<b>100 %</b>
Electronic monitoring (parole)	\$15,979	\$3,950	\$12,030	\$1,102	<b>\$17,081</b>	n/a	<b>100 %</b>
Outpatient/non-intensive drug treatment (incarceration)	\$15,982	\$4,195	\$11,788	<b>(\$923)</b>	<b>\$15,060</b>	\$17.35	<b>100 %</b>
Inpatient/intensive outpatient drug treatment (incarceration)	\$16,436	\$4,390	\$12,046	<b>(\$1,575)</b>	<b>\$14,861</b>	\$10.45	<b>100 %</b>
Risk Need & Responsivity supervision (for high and moderate risk offenders)	\$18,571	\$5,311	\$13,260	<b>(\$4,906)</b>	<b>\$13,665</b>	\$3.79	<b>100 %</b>
Therapeutic communities for chemically dependent offenders (community)	\$12,489	\$3,310	\$9,179	<b>(\$1,541)</b>	<b>\$10,948</b>	\$8.12	<b>100 %</b>
Cognitive behavioral treatment (for high and moderate risk offenders)	\$11,201	\$2,884	\$8,317	<b>(\$424)</b>	<b>\$10,777</b>	\$26.47	<b>100 %</b>
Case management: swift & certain/graduated sanctions for substance abusing offenders	\$15,652	\$4,510	\$11,142	<b>(\$4,897)</b>	<b>\$10,755</b>	\$3.20	<b>96 %</b>
Drug courts	\$14,687	\$3,919	\$10,768	<b>(\$4,870)</b>	<b>\$9,816</b>	\$3.06	<b>100 %</b>
Drug Offender Sentencing Alternative (for property offenders)	\$11,389	\$3,042	\$8,347	<b>(\$1,576)</b>	<b>\$9,813</b>	\$7.24	<b>70 %</b>
Sex offender treatment in the community	\$10,358	\$2,213	\$8,145	<b>(\$1,630)</b>	<b>\$8,728</b>	\$6.36	<b>85 %</b>
Work release	\$6,831	\$1,828	\$5,003	<b>(\$679)</b>	<b>\$6,152</b>	\$10.08	<b>99 %</b>
Employment training/job assistance in the community	\$6,203	\$1,568	\$4,635	<b>(\$139)</b>	<b>\$6,064</b>	\$44.66	<b>99 %</b>
Therapeutic communities for chemically dependent offenders (incarceration)	\$10,676	\$3,368	\$7,308	<b>(\$4,933)</b>	<b>\$5,743</b>	\$2.17	<b>96 %</b>
Correctional industries in prison	\$6,953	\$1,961	\$4,992	<b>(\$1,462)</b>	<b>\$5,491</b>	\$4.77	<b>100 %</b>
Intensive supervision (surveillance & treatment)	\$12,769	\$4,197	\$8,572	<b>(\$8,061)</b>	<b>\$4,707</b>	\$1.59	<b>78 %</b>
Sex offender treatment during incarceration	\$9,559	\$2,413	\$7,146	<b>(\$5,122)</b>	<b>\$4,436</b>	\$1.87	<b>78 %</b>
Outpatient/non-intensive drug treatment (community)	\$5,064	\$1,368	\$3,696	<b>(\$838)</b>	<b>\$4,226</b>	\$6.05	<b>91 %</b>
Inpatient/intensive outpatient drug treatment (community)	\$1,416	\$481	\$935	<b>(\$1,032)</b>	<b>\$384</b>	\$1.38	<b>52 %</b>
Case management: not swift and certain for substance abusing offenders	\$3,052	\$1,369	\$1,683	<b>(\$4,900)</b>	<b>(\$1,848)</b>	\$0.62	<b>34 %</b>
Intensive supervision (surveillance only)	<b>(\$3,414)</b>	<b>(\$324)</b>	<b>(\$3,090)</b>	<b>(\$4,239)</b>	<b>(\$7,653)</b>	<b>(\$0.81)</b>	<b>7 %</b>
Domestic violence perpetrator treatment (Duluth-based model)	<b>(\$8,459)</b>	<b>(\$1,948)</b>	<b>(\$6,511)</b>	<b>(\$1,405)</b>	<b>(\$9,864)</b>	<b>(\$6.29)</b>	<b>18 %</b>

**Exhibit 1 continued**  
Adult Criminal Justice, Prison and Policing Strategies

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
<b>Strategies to reduce prison population</b>							
For lower risk offenders, decrease prison average daily population by 250, by lowering length of stay by 3 months	(\$1,258)	(\$517)	(\$741)	\$5,703	\$4,445	n/a	98 %
For moderate risk offenders, decrease prison average daily population by 250, by lowering length of stay by 3 months	(\$5,463)	(\$1,055)	(\$4,408)	\$5,703	\$240	n/a	53 %
For high risk offenders, decrease prison average daily population by 250, by lowering length of stay by 3 months	(\$10,256)	(\$1,692)	(\$8,564)	\$5,702	(\$4,554)	n/a	18 %
<b>Strategies to increase police presence (costs and benefits are presented per-officer)</b>							
Deploy one additional police officer with hot spots strategies	\$645,751	\$69,865	\$575,885	(\$93,684)	\$552,066	\$6.94	100 %
Deploy one additional police officer with statewide average practices	\$577,533	\$62,192	\$515,342	(\$89,158)	\$488,375	\$6.52	100 %

Child Welfare

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
Parent Child Interaction Therapy (PCIT) for families in the child welfare system	\$18,320	\$4,287	\$14,033	(\$1,589)	\$16,731	\$11.55	100 %
Intensive family preservation services (Homebuilders(c))	\$19,697	\$11,195	\$8,503	(\$3,376)	\$16,322	\$5.84	100 %
Subsidized guardianship (Title IV-E waivers)	\$3,655	\$512	\$3,142	\$4,128	\$7,783	n/a	100 %
SafeCare	\$2,932	\$684	\$2,248	(\$179)	\$2,753	\$16.54	99 %
Alternative response	\$929	\$217	\$712	(\$236)	\$693	\$3.94	96 %
Flexible funding (Title IV-E waivers)	\$503	\$142	\$361	\$0	\$503	n/a	100 %
Other family preservation services (non-Homebuilders®)	(\$3,767)	(\$347)	(\$3,420)	(\$3,096)	(\$6,863)	(\$1.22)	0 %

**Exhibit 1 continued**  
Pre-K to 12 Education

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (NPV)	Benefit to cost ratio	Chance benefits will exceed costs
School-wide positive behavior programs	\$31,741	\$7,631	\$24,110	(\$221)	\$31,521	\$143.98	99 %
State and district early childhood education programs	\$33,423	\$10,375	\$23,048	(\$7,037)	\$26,386	\$4.76	89 %
Consultant teachers: Literacy Collaborative	\$18,566	\$4,482	\$14,084	(\$730)	\$17,836	\$25.44	89 %
Head Start	\$24,728	\$7,786	\$16,942	(\$8,661)	\$16,068	\$2.86	83 %
Tutoring: By peers	\$15,876	\$3,771	\$12,105	(\$111)	\$15,765	\$143.20	84 %
Teacher professional development: Use of data to guide instruction	\$13,546	\$3,221	\$10,325	(\$107)	\$13,439	\$126.97	100 %
Consultant teachers: Online coaching	\$11,245	\$2,693	\$8,552	(\$191)	\$11,054	\$58.98	73 %
Summer book programs: Multi-year intervention	\$11,191	\$2,687	\$8,504	(\$212)	\$10,979	\$52.94	71 %
Project Lead The Way (PLTW)	\$11,837	\$3,011	\$8,826	(\$1,744)	\$10,093	\$6.79	88 %
Tutoring: By certificated teachers, small-group, structured	\$11,211	\$2,820	\$8,391	(\$1,406)	\$9,804	\$7.98	96 %
Consultant teachers: Content-Focused Coaching	\$8,014	\$1,899	\$6,115	(\$57)	\$7,957	\$141.00	68 %
Tutoring: By adults, one-on-one, structured	\$9,956	\$2,631	\$7,326	(\$2,290)	\$7,667	\$4.36	87 %
Special literacy instruction for English language learner students	\$7,638	\$1,893	\$5,745	(\$291)	\$7,347	\$26.37	69 %
Tutoring: By non-certificated adults, small-group, structured	\$6,740	\$1,658	\$5,083	(\$536)	\$6,205	\$12.60	77 %
Tutoring: By adults for English language learner students	\$7,607	\$2,029	\$5,578	(\$1,408)	\$6,198	\$5.45	61 %
Out-of-school-time tutoring by adults	\$6,678	\$1,689	\$4,988	(\$917)	\$5,761	\$7.29	75 %
Case management in schools	\$5,252	\$1,479	\$3,773	(\$248)	\$5,005	\$21.21	66 %
Teacher professional development: Targeted	\$5,135	\$1,247	\$3,888	(\$260)	\$4,875	\$19.79	84 %
Summer learning programs: Academically focused	\$5,345	\$1,400	\$3,945	(\$1,132)	\$4,213	\$4.73	92 %
Summer book programs: One-year intervention, with additional support	\$3,650	\$881	\$2,769	(\$114)	\$3,536	\$32.12	60 %
Consultant teachers: Coaching	\$3,455	\$847	\$2,607	(\$252)	\$3,203	\$13.72	86 %
Teacher professional development: Induction/mentoring	\$2,238	\$541	\$1,697	(\$74)	\$2,164	\$30.26	60 %
Parents as tutors with teacher oversight	\$2,933	\$789	\$2,145	(\$794)	\$2,139	\$3.70	55 %
National Board for Professional Teaching Standards (NBPTS)	\$2,277	\$557	\$1,721	(\$187)	\$2,090	\$12.20	100 %
Per-pupil expenditures: 10% increase for one student cohort from	\$12,309	\$3,398	\$8,911	(\$10,705)	\$1,604	\$1.14	53 %
Class size: reducing average class size by one student in kindergarten	\$1,633	\$475	\$1,158	(\$204)	\$1,430	\$8.02	95 %
Summer book programs: One-year intervention	\$1,488	\$366	\$1,123	(\$77)	\$1,411	\$19.36	57 %
Teacher professional development: Online, targeted	\$1,610	\$417	\$1,194	(\$291)	\$1,319	\$5.54	57 %
Class size: reducing average class size by one student in grade 1	\$850	\$262	\$588	(\$203)	\$646	\$4.18	84 %
Tutoring: By adults, one-on-one, non-structured	\$2,032	\$653	\$1,380	(\$1,425)	\$608	\$1.43	51 %
Teacher performance pay programs	\$632	\$154	\$478	(\$35)	\$597	\$18.14	63 %
Educator professional development: Use of data to guide instruction	\$566	\$136	\$430	(\$18)	\$548	\$31.80	53 %
Class size: reducing average class size by one student in grade 2	\$476	\$159	\$317	(\$204)	\$272	\$2.34	65 %

## Exhibit 1 continued

### Pre-K to 12 Education

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
Class size: reducing average class size by one student in grade 3	\$344	\$123	\$221	(\$204)	\$141	\$1.69	55 %
Class size: reducing average class size by one student in one grade, 9-12	\$257	\$90	\$168	(\$164)	\$93	\$1.57	51 %
Class size: reducing average class size by one student in one grade, 4-6	\$258	\$96	\$161	(\$184)	\$74	\$1.40	52 %
Class size: reducing average class size by one student in one grade, 7-8	\$237	\$87	\$150	(\$167)	\$70	\$1.42	51 %
Teacher professional development: Not targeted	(\$27)	\$5	(\$31)	(\$86)	(\$113)	(\$0.31)	24 %
Full-day kindergarten	(\$519)	\$192	(\$711)	(\$2,677)	(\$3,195)	(\$0.19)	14 %
Even Start	(\$3,982)	(\$447)	(\$3,535)	(\$4,187)	(\$8,169)	(\$0.95)	26 %
Early Head Start	(\$1,725)	\$3,103	(\$4,828)	(\$10,767)	(\$12,492)	(\$0.16)	16 %

**Exhibit 1 continued**  
Children's Mental Health

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
<b>Anxiety</b>							
Remote Cognitive Behavioral Therapy (CBT) for anxious children	\$24,492	\$7,284	\$17,207	\$766	<b>\$25,257</b>	n/a	<b>100 %</b>
Group Cognitive Behavioral Therapy (CBT) for anxious children	\$7,918	\$2,330	\$5,588	\$405	<b>\$8,322</b>	n/a	<b>100 %</b>
Individual Cognitive Behavioral Therapy (CBT) for anxious children	\$5,711	\$1,837	\$3,874	<b>(\$757)</b>	<b>\$4,954</b>	\$7.56	<b>96 %</b>
Parent Cognitive Behavioral Therapy (CBT) for anxious children	\$2,315	\$606	\$1,708	\$627	<b>\$2,942</b>	n/a	<b>99 %</b>
<b>Attention Deficit Hyperactivity Disorder</b>							
Behavioral Parent Training (BPT) for children with ADHD	\$172	\$30	\$143	\$110	<b>\$282</b>	n/a	<b>95 %</b>
Multimodal Therapy (MMT) for children with ADHD	\$8,217	\$3,338	\$4,880	<b>(\$8,620)</b>	<b>(\$403)</b>	\$0.96	<b>43 %</b>
Cognitive Behavioral Therapy (CBT) for children with ADHD	<b>(\$782)</b>	<b>(\$69)</b>	<b>(\$713)</b>	<b>(\$1,015)</b>	<b>(\$1,797)</b>	<b>(\$0.77)</b>	<b>0 %</b>
<b>Depression</b>							
Cognitive Behavioral Therapy (CBT) for depressed adolescents	\$555	\$90	\$464	<b>(\$500)</b>	<b>\$55</b>	\$1.11	<b>51 %</b>
<b>Disruptive Behavior</b>							
Triple P Positive Parenting Program: Level 4, group	\$1,126	\$233	\$893	\$541	<b>\$1,668</b>	n/a	<b>100 %</b>
Other Behavioral Parent Training (BPT) for children with disruptive behavior disorders	\$1,241	\$320	\$920	\$109	<b>\$1,349</b>	n/a	<b>96 %</b>
Brief Strategic Family Therapy (BSFT)	\$1,611	\$594	\$1,017	<b>(\$527)</b>	<b>\$1,084</b>	\$3.06	<b>75 %</b>
Triple P Positive Parenting Program: Level 4, individual	\$1,665	\$597	\$1,069	<b>(\$961)</b>	<b>\$705</b>	\$1.74	<b>72 %</b>
Multimodal Therapy (MMT) for children with disruptive behavior	\$1,811	\$563	\$1,248	<b>(\$1,314)</b>	<b>\$497</b>	\$1.39	<b>50 %</b>
Incredible Years: parent training	\$1,535	\$646	\$889	<b>(\$1,286)</b>	<b>\$248</b>	\$1.19	<b>52 %</b>
Parent Child Interaction Therapy (PCIT) for children with disruptive behavior	\$1,419	\$581	\$839	<b>(\$1,369)</b>	<b>\$50</b>	\$1.04	<b>47 %</b>
Incredible Years: parent training and child training	\$1,004	\$512	\$491	<b>(\$1,681)</b>	<b>(\$678)</b>	\$0.60	<b>22 %</b>
Families and Schools Together (FAST)	\$863	\$311	\$552	<b>(\$1,815)</b>	<b>(\$952)</b>	\$0.47	<b>46 %</b>
<b>Serious Emotional Disturbance</b>							
Multisystemic Therapy (MST) for youth with serious emotional disturbance (SED)	\$3,558	\$2,525	\$1,033	<b>(\$6,683)</b>	<b>(\$3,124)</b>	\$0.53	<b>26 %</b>
<b>Trauma</b>							
Eye Movement Desensitization and Reprocessing (EMDR) for child trauma	\$8,594	\$2,583	\$6,012	\$160	<b>\$8,754</b>	n/a	<b>85 %</b>
Cognitive Behavioral Therapy (CBT)-based models for child trauma	\$6,412	\$1,920	\$4,491	\$327	<b>\$6,738</b>	n/a	<b>99 %</b>



## Exhibit 1 continued

### Substance Abuse

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
<b>Substance Abuse Early Intervention</b>							
Brief Intervention in primary care	\$7,243	\$2,028	\$5,215	(\$264)	\$6,978	\$27.43	94 %
Brief Intervention in a medical hospital	\$6,027	\$1,670	\$4,357	(\$156)	\$5,871	\$38.82	75 %
Brief Intervention in emergency department (SBIRT)	\$4,465	\$1,228	\$3,238	(\$420)	\$4,045	\$10.64	78 %
Brief Alcohol Screening and Intervention of College Students (BASICS): A Harm Reduction Approach	\$2,473	\$660	\$1,813	(\$71)	\$2,401	\$34.76	74 %
<b>Substance Abuse Treatment for Youth</b>							
Adolescent Assertive Continuing Care	\$11,089	\$3,387	\$7,701	(\$2,181)	\$8,907	\$5.09	68 %
Teen Marijuana Check-Up	\$1,898	\$588	\$1,311	(\$106)	\$1,793	\$17.94	100 %
<b>Substance Abuse Treatment for Adults</b>							
Cognitive Behavior Coping Skills Therapy	\$48,869	\$2,287	\$46,582	(\$258)	\$48,611	\$189.66	99 %
Contingency management (higher-cost) for substance abuse	\$23,489	\$1,394	\$22,095	(\$554)	\$22,936	\$42.66	79 %
Seeking Safety: A Psychotherapy for Trauma/PTSD and Substance Abuse	\$13,191	\$605	\$12,585	(\$385)	\$12,806	\$34.31	71 %
Family Behavior Therapy (FBT)	\$13,659	\$1,461	\$12,197	(\$1,847)	\$11,812	\$7.40	69 %
Motivational Interviewing to enhance treatment engagement	\$10,695	\$2,792	\$7,902	(\$260)	\$10,435	\$41.22	66 %
Brief Cognitive Behavioral Intervention for Amphetamine Users	\$10,322	\$1,047	\$9,275	(\$205)	\$10,117	\$50.60	67 %
12-Step Facilitation Therapy	\$8,409	\$573	\$7,836	\$319	\$8,728	n/a	66 %
Matrix Intensive Outpatient Model for the Treatment of Stimulant Abuse	\$9,808	\$515	\$9,293	(\$1,244)	\$8,565	\$7.91	62 %
Contingency management (higher-cost) for marijuana use	\$8,398	\$2,603	\$5,795	(\$554)	\$7,844	\$15.28	79 %
Motivational Enhancement Therapy (MET) (problem drinkers)	\$8,103	\$2,285	\$5,817	(\$330)	\$7,772	\$24.55	62 %
Community Reinforcement Approach (CRA) with Vouchers	\$8,448	\$908	\$7,540	(\$1,170)	\$7,278	\$7.26	62 %
Brief Marijuana Dependence Counseling	\$7,588	\$2,357	\$5,232	(\$542)	\$7,047	\$14.03	92 %
Relapse Prevention Therapy	\$6,188	\$396	\$5,792	\$0	\$6,188	n/a	58 %
Holistic Harm Reduction Program (HHRP+)	\$6,515	\$460	\$6,056	(\$791)	\$5,725	\$8.31	60 %
Peer support for substance abuse	\$5,389	\$503	\$4,886	(\$2,728)	\$2,661	\$2.00	54 %
Contingency management (lower-cost) for substance abuse	\$2,575	\$216	\$2,360	(\$242)	\$2,334	\$10.96	60 %
Individual Drug Counseling Approach for the Treatment of Cocaine Addiction	\$4,401	\$182	\$4,218	(\$2,311)	\$2,090	\$1.91	54 %
Contingency management (lower-cost) for marijuana use	\$367	\$146	\$221	(\$243)	\$125	\$1.53	51 %
Supportive-Expressive Psychotherapy for substance abuse	(\$2,915)	\$172	(\$3,087)	(\$1,979)	(\$4,894)	(\$1.49)	43 %
Behavioral Self-Control Training (BSCT)	(\$17,168)	(\$4,422)	(\$12,746)	(\$153)	(\$17,321)	(\$112.03)	23 %
<b>Substance Abuse Medication-assisted Treatment</b>							
Methadone maintenance treatment	\$14,603	\$1,664	\$12,939	(\$3,658)	\$10,944	\$4.02	99 %
Buprenorphine/Buprenorphine-Naloxone (Suboxone and Subutex) treatment	\$9,944	\$1,107	\$8,836	(\$4,485)	\$5,459	\$2.25	90 %

**Exhibit 1 continued**  
Adult Mental Health

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
Cognitive Behavioral Therapy (CBT) for adult anxiety	\$38,398	\$11,584	\$26,814	(\$352)	\$38,046	\$109.40	99 %
Cognitive Behavioral Therapy for posttraumatic stress disorder (PTSD)	\$36,690	\$11,281	\$25,408	(\$345)	\$36,345	\$106.74	100 %
Cognitive Behavioral Therapy (CBT) for adult depression	\$26,148	\$7,445	\$18,703	(\$233)	\$25,914	\$112.16	100 %
Collaborative Primary Care for anxiety	\$25,649	\$7,824	\$17,825	(\$796)	\$24,853	\$32.36	94 %
Collaborative Primary Care for depression	\$8,739	\$2,408	\$6,331	(\$797)	\$7,942	\$11.01	100 %
Cognitive Behavioral Therapy for schizophrenia/psychosis	\$7,336	\$4,633	\$2,703	(\$1,421)	\$5,915	\$5.18	59 %
PTSD prevention following trauma	\$4,922	\$1,634	\$3,288	(\$826)	\$4,096	\$5.98	99 %
Collaborative Primary Care for Depression with comorbid medical conditions	\$4,815	\$1,269	\$3,547	(\$840)	\$3,976	\$5.75	99 %
Individual Placement and Support (IPS) for individuals with serious mental illness	\$1,487	\$562	\$924	(\$780)	\$707	\$2.04	66 %
Primary care in integrated settings (Veteran's Administration, Kaiser Permanente)	\$552	\$199	\$353	(\$225)	\$327	\$2.46	57 %
Primary care in behavioral health settings	\$530	\$172	\$359	(\$215)	\$315	\$2.48	56 %
Mobile crisis response	\$752	\$820	(\$68)	(\$1,158)	(\$406)	\$0.65	28 %
Primary care in behavioral health settings (community-based settings)	(\$599)	(\$130)	(\$469)	(\$267)	(\$866)	(\$2.26)	16 %
Peer support: Substitution of a peer specialist for a non-peer on the treatment team	(\$1,138)	(\$346)	(\$791)	\$0	(\$1,138)	n/a	20 %
Peer support: Addition of a peer specialist to the treatment team	\$633	\$741	(\$109)	(\$3,407)	(\$2,775)	\$0.19	1 %
Illness Management and Recovery (IMR)	(\$1,172)	\$339	(\$1,511)	(\$3,396)	(\$4,568)	(\$0.35)	17 %
Forensic Assertive Community Treatment (FACT)	(\$4,443)	\$597	(\$5,039)	(\$12,548)	(\$16,990)	(\$0.35)	0 %
Supported housing for chronically homeless adults	(\$5,801)	\$561	(\$6,362)	(\$14,944)	(\$20,745)	(\$0.39)	0 %
Assertive Community Treatment	(\$9,463)	\$187	(\$9,649)	(\$17,720)	(\$27,183)	(\$0.53)	4 %

**Exhibit 1 continued**  
Public Health & Prevention

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
<b>School-based</b>							
Mentoring for students: school-based (taxpayer costs only)	\$34,137	\$9,538	\$24,599	(\$1,146)	\$32,991	\$29.82	79 %
Mentoring for students: school-based (with volunteer costs)	\$33,515	\$9,445	\$24,069	(\$1,786)	\$31,729	\$18.77	78 %
Elementary school-based social development programs	\$13,946	\$3,952	\$9,994	(\$236)	\$13,710	\$59.31	77 %
Seattle Social Development Project	\$15,238	\$4,591	\$10,647	(\$3,081)	\$12,157	\$4.94	68 %
Good Behavior Game	\$9,081	\$2,788	\$6,294	(\$158)	\$8,924	\$57.53	93 %
Caring School Community (formerly Child Development Project)	\$8,611	\$2,171	\$6,440	(\$1,218)	\$7,393	\$7.06	62 %
School-based tobacco prevention programs	\$4,012	\$986	\$3,026	(\$62)	\$3,950	\$64.64	99 %
Project EX	\$3,511	\$819	\$2,692	(\$58)	\$3,452	\$60.13	86 %
Minnesota Smoking Prevention Program	\$2,712	\$652	\$2,061	(\$32)	\$2,681	\$86.00	94 %
All Stars	\$2,389	\$735	\$1,654	(\$101)	\$2,288	\$23.59	99 %
Drug Abuse Resistance Education (D.A.R.E.)	\$1,941	\$334	\$1,607	(\$53)	\$1,888	\$36.44	84 %
Behavioral Monitoring and Reinforcement Program (BMRP)	\$3,004	\$967	\$2,037	(\$1,300)	\$1,705	\$2.31	59 %
SPORT	\$1,333	\$325	\$1,008	(\$38)	\$1,294	\$34.70	74 %
Life Skills Training	\$1,125	\$246	\$879	(\$97)	\$1,028	\$11.58	84 %
American Indian adolescent substance abuse prevention programs	\$787	\$265	\$522	(\$55)	\$733	\$14.45	78 %
keepin' it REAL	\$646	\$201	\$445	(\$48)	\$598	\$13.51	72 %
ATHENA (Athletes Targeting Healthy Exercise and Nutrition Alternatives)	\$503	\$127	\$376	(\$37)	\$466	\$13.53	57 %
Too Good for Drugs	\$498	\$158	\$341	(\$52)	\$446	\$9.56	97 %
Lions Quest Skills for Adolescence	\$477	\$96	\$381	(\$94)	\$383	\$5.06	79 %
Project ALERT	\$504	\$176	\$329	(\$147)	\$357	\$3.43	77 %
Project Towards No Drug Abuse (TND)	\$182	\$46	\$136	(\$64)	\$118	\$2.86	53 %
Promoting Alternative Thinking Strategies (PATHS)	\$10	\$18	(\$8)	(\$117)	(\$107)	\$0.09	8 %
Youth advocacy/empowerment programs for tobacco prevention	(\$155)	(\$35)	(\$120)	(\$22)	(\$178)	(\$6.92)	33 %
Project SUCCESS	(\$178)	(\$19)	(\$159)	(\$155)	(\$333)	(\$1.15)	42 %
InShape	(\$395)	(\$119)	(\$276)	(\$15)	(\$410)	(\$26.60)	46 %
Reconnecting Youth	(\$6,147)	(\$1,385)	(\$4,762)	(\$750)	(\$6,897)	(\$8.21)	0 %
<b>Home- or Family-based</b>							
Nurse Family Partnership for low-income families	\$27,174	\$9,955	\$17,219	(\$9,842)	\$17,332	\$2.77	71 %
Family-based tobacco and substance use prevention	\$5,407	\$1,357	\$4,050	(\$178)	\$5,229	\$30.46	93 %
Strengthening Families for Parents and Youth 10-14	\$3,850	\$981	\$2,869	(\$1,098)	\$2,751	\$3.51	66 %
Computer-based substance use prevention programs	\$1,390	\$349	\$1,041	(\$69)	\$1,321	\$20.26	68 %
Guiding Good Choices (formerly Preparing for the Drug Free Years)	\$1,419	\$526	\$893	(\$654)	\$765	\$2.17	61 %
Parents as Teachers	\$2,875	\$988	\$1,887	(\$2,684)	\$191	\$1.07	50 %
Other home visiting programs for at-risk mothers and children	\$5,533	\$3,333	\$2,201	(\$5,746)	(\$212)	\$0.96	47 %

**Exhibit 1 continued**  
Public Health & Prevention

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
Family Check-Up (also known as Positive Family Support)	\$68	\$51	\$18	(\$323)	(\$255)	\$0.21	47 %
Healthy Families America	\$2,394	\$2,092	\$302	(\$4,698)	(\$2,305)	\$0.51	46 %
Parent Child Home Program	\$1,210	\$1,394	(\$184)	(\$5,668)	(\$4,458)	\$0.21	33 %
<b>Community-based</b>							
Computer-based programs for smoking cessation	\$30,799	\$5,650	\$25,149	(\$39)	\$30,760	\$782.07	100 %
Text messaging programs for smoking cessation	\$18,069	\$3,208	\$14,861	(\$51)	\$18,018	\$351.58	100 %
Quantum Opportunities Program	\$42,802	\$17,932	\$24,870	(\$26,432)	\$16,370	\$1.64	63 %
Mentoring for students: community-based (taxpayer costs only)	\$11,626	\$3,493	\$8,133	(\$1,262)	\$10,364	\$9.24	67 %
Mentoring for students: community-based (with volunteer costs)	\$10,694	\$3,513	\$7,181	(\$3,193)	\$7,501	\$3.36	60 %
Project STAR	\$4,261	\$1,049	\$3,212	(\$499)	\$3,761	\$8.55	97 %
Communities That Care	\$1,826	\$561	\$1,265	(\$573)	\$1,253	\$3.25	85 %
Project Northland	\$692	\$187	\$505	(\$185)	\$507	\$3.74	73 %
Children's Aid Society--Carrera	\$7,565	\$4,059	\$3,507	(\$14,474)	(\$6,909)	\$0.52	38 %
CASASTART	(\$3,742)	\$212	(\$3,953)	(\$6,937)	(\$10,679)	(\$0.54)	12 %
Fast Track prevention program	(\$24,400)	\$1,273	(\$25,673)	(\$60,013)	(\$84,412)	(\$0.41)	0 %
<b>Population-level policies</b>							
Access to tobacco quitlines	\$33,436	\$2,017	\$31,419	(\$211)	\$33,225	\$158.44	98 %
More intensive tobacco quitlines (compared to less intensive quitlines)	\$9,702	\$1,390	\$8,312	(\$128)	\$9,574	\$75.68	100 %
Anti-smoking media campaign, youth effect	\$3,398	\$813	\$2,585	(\$27)	\$3,371	\$125.82	99 %
Enforcement of tobacco age-of-sale laws	\$2,293	\$697	\$1,596	(\$6)	\$2,288	\$399.16	100 %
Anti-smoking media campaigns, adult effect	\$1,899	\$530	\$1,369	(\$35)	\$1,865	\$55.38	89 %
Triple P Positive Parenting Program (System)	\$469	\$154	\$315	(\$147)	\$322	\$3.22	99 %

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Document No. 15-02-4101



## 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.

December 2015

## Interventions to Promote Health and Increase Health Care Efficiency: *December 2015 Update*

The Washington State Legislature directed the Washington State Institute for Public Policy (WSIPP) to “calculate the return on investment to taxpayers from evidence-based prevention and intervention programs and policies.”<sup>1</sup> Additionally, WSIPP’s Board of Directors authorized WSIPP to work on a joint project with the MacArthur Foundation and Pew Charitable Trusts to extend WSIPP’s benefit-cost analysis to certain health care topics.

In this report, we present our new and updated benefit-cost results for a variety of interventions to promote health and increase health care efficiency. We consulted with Washington State legislative staff to identify the specific health care topics of interest.

In [Section I](#) we review our research approach.

In [Section II](#) we discuss new findings for four topics: 1) hospital-based programs to reduce cesarean sections; 2) school-, workplace-, and community-based obesity prevention programs; 3) accountable care organizations; and 4) patient cost sharing.

In [Section III](#) we summarize the updated findings from six topics that we previously reviewed.

### Summary

WSIPP’s Board of Directors authorized WSIPP to work on a joint project with the MacArthur Foundation and the Pew Charitable Trusts to extend WSIPP’s benefit-cost analysis to certain health care topics. An important goal is to determine whether there are strategies that can help states control Medicaid and other health care costs. We consulted with Washington State legislative staff to identify the specific health care topics of interest.

We present findings for four new topics: 1) hospital-based programs to reduce cesarean sections; 2) school-, workplace-, and community-based obesity prevention programs; 3) accountable care organizations; and 4) patient cost sharing. We also summarize prior findings for six topics: 1) “lifestyle” programs designed to prevent diabetes; 2) behavioral interventions to reduce obesity in adults and children; 3) transitional care to prevent hospital readmissions; 4) patient-centered medical homes to reduce health care costs; 5) programs to reduce avoidable emergency department visits; and 6) smoking cessation programs in pregnancy.

For each topic, we gathered all credible evaluations we could locate. We screened the studies for methodological rigor and computed an average effect of the programs on specific outcomes. Where possible, we then calculated benefits and costs and conducted a risk analysis to determine which programs consistently have benefits that exceed costs.

We found evidence that some approaches can achieve benefits that exceed costs but others do not. We explain these results in this report and display them in [Exhibits 2 and 3](#).

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<sup>1</sup> Engrossed Substitute House Bill 1244, Chapter 564, Laws of 2009.

## I. Research Methods

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When WSIPP is asked by the Washington Legislature to identify “what works” and “what does not work” on a given topic, we begin by locating all of the studies we can find from around the United States and elsewhere.

We analyze all high-quality studies to identify program effects. We look for research studies with strong evaluation designs and exclude studies with weak research methods. For example, to be included in our review, a study must have a treatment and comparison group and demonstrate comparability between groups.<sup>2</sup>

We first calculate “effect sizes” for each study. An effect size measures the degree to which a program has been shown to change an outcome (such as diabetes incidence) for program participants relative to a comparison group.

Our empirical approach then follows a meta-analytic framework to assess systematically all credible evaluations that have passed our test for methodological rigor. Given the weight of the evidence, we calculate an average expected effect of a policy on a particular outcome of interest, as well as an estimate of the margin of error for that effect. The average effect size is a measure of the degree to which a program works.

Next, we consider the benefits and costs of implementing a program or policy by answering two questions:

- How much would it cost Washington taxpayers to produce the results found?
- How much would it be worth to people in Washington State to achieve the results found?

That is, in dollars and cents, what are the benefits and costs of each program or policy?

Our benefit-cost results are expressed with standard financial statistics: net present values and benefit-cost ratios. We present monetary estimates from three perspectives:

- 1) program participants,
- 2) taxpayers, and
- 3) other people in society.

The sum of these perspectives provides a “total Washington” view on whether a program or policy produces benefits that exceed costs.

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<sup>2</sup> Common reasons for excluding studies include treatment groups consisting solely of program completers, high study attrition rates without intent-to-treat analysis, and insufficient information reported to estimate effect sizes for outcomes of interest.

Benefits to individuals and society may stem from multiple sources. For example, a policy that reduces diabetes incidence decreases the use of health care resources, thereby reducing taxpayer costs and personal, out-of-pocket costs. In addition, preventing diabetes increases a person's employment and earnings outlook. Thus, program participants will have higher earnings, on average, in the labor market. Our benefit-cost model produces estimates of both the health care and labor market effects.

Any tabulation of benefits and costs involves a degree of risk about the estimates calculated. This is expected in any investment analysis, whether in the private or public sector. To assess the riskiness of our conclusions, we perform a "Monte Carlo simulation" in which we vary key factors in our calculations. The purpose of this analysis is to determine the probability that a particular program or policy will have benefits that are at least equal to or greater than costs ("break even").

In the end, we produce two "big picture" findings for each program: an expected benefit-cost result and, given our understanding of the risks, the probability that the program or policy will at least break even.

We describe these methods in detail in WSIPP's [Technical Documentation](#).<sup>3</sup>

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<sup>3</sup> Washington State Institute for Public Policy. (December 2015). *Benefit-cost technical documentation*. Olympia, WA: Author.  
<http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf>



## II. Summary of New Findings

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This section presents new findings for four topics:

- 1) Hospital-based interventions to reduce cesarean sections;
- 2) School-based, workplace-based, and community-wide approaches to reduce obesity;
- 3) Accountable care organizations; and
- 4) Patient cost sharing.

These topics were identified through consultation with Washington State legislative staff.

Evaluations of health care policies and programs often measure two broad types of outcomes: 1) those that reflect the health status of people (e.g., disease incidence), and 2) those that reflect health care system costs and utilization. Cost and utilization measures may or may not be an indication of health status or well-being.

Benefit-cost summary statistics are in [Exhibit 2](#), while [Exhibit 3](#) summarizes meta-analytic results of programs for which we did not have enough information to conduct a formal benefit-cost analysis.

### 1) [Hospital-based interventions to reduce cesarean sections](#)

Hospital-based interventions attempt to reduce unnecessary cesarean section (C-section) rates by targeting physician or maternal behavior.<sup>4</sup>

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<sup>4</sup> These interventions vary in the type of patients that they target—first-time mothers, women with prior C-sections, or all women regardless of birth history. Some interventions

We examined three non-clinical interventions that target physicians and one additional intervention that targets patients. We reviewed 45 studies that evaluated non-clinical interventions targeting physician behavior. Of those studies, 12 satisfied WSIPP’s methodological requirements. Two of these studies evaluated the requirement that physicians seek a second opinion before performing a C-section.

Three studies evaluated requiring hospitals or departments to perform an audit of C-section cases and provide feedback. These studies varied in the frequency of audits; the specificity of the feedback (either at the department or physician-level); and whether information was provided anonymously or publicly.

We also reviewed seven studies that took a multi-faceted approach to reducing C-section rates. These multi-faceted approaches differed and could include audit and feedback; the implementation of clinical guidelines; the recruitment of local opinion leaders; and potentially other clinical or non-clinical interventions.

We find that all three of the programs targeting physicians reduce C-sections and produce benefits that consistently outweigh their costs.

We also reviewed one patient-targeted intervention that provides women in labor with continuous support from a doula,<sup>5</sup>

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exclude women with multiple births or complicated pregnancies, while others aim to reduce rates hospital-wide.  
<sup>5</sup> The Doula Organization of North America (DONA) defines a doula as someone who provides continuous emotional reassurance and comfort for the entire labor.

nurse, or volunteer. From the 68 studies we reviewed, we identified five rigorous evaluations that were comparable to labor and delivery conditions in Washington State.<sup>6</sup> We find that continuous support for women in labor moderately reduces the likelihood of a C-section delivery, but the effect is not significant. The benefits of this program do not exceed the costs.

We examined six additional interventions to reduce C-sections that did not have sufficient rigorous research for WSIPP to analyze: a) publishing clinical guidelines; b) equalizing fees paid to physicians for vaginal and C-section births; c) switching health care plans from fee-for-service to managed care; d) self-evaluation by obstetricians; e) publishing hospital C-section rates; and f) the role of local opinion leaders.

## 2) [School-based, workplace-based, and community-wide approaches to reduce obesity](#)

### School-based programs

We categorized school-based public health approaches to reduce obesity based on the intervention strategy and the age of participants. Some of these programs are delivered in preschool settings, while others are based in K–12.

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[http://www.dona.org/PDF/Birth%20Position%20Paper\\_rev%200912.pdf](http://www.dona.org/PDF/Birth%20Position%20Paper_rev%200912.pdf)

<sup>6</sup> We included only studies where the comparison group was allowed to have a support person. For details on the continuous support meta-analysis used to populate the benefit cost analysis, see: Bauer J, & Barch, M. (2015). *Intervention to promote health and increase health care efficiency: Technical appendix*. Olympia: Washington State Institute for Public Policy <http://wsipp.wa.gov/Reports/577>

We reviewed 26 studies and found 12 rigorous evaluations of programs that increased physical activity or improved access to healthy food in preschools.

We find that, on average, preschool programs that increase physical activity or improve access to healthy food reduce participants' body mass index (BMI). For example, we estimate that these programs lower the obesity rate from 8.4% without the intervention to 6.7% with the intervention.<sup>7</sup> Although there is a small reduction in short-term rates of obesity, we do not find evidence that the effects persist over time.<sup>8</sup>

We find that, on average, the program benefits do not exceed the costs for preschool programs that increase physical activity or improve access to healthy food.

We reviewed 99 studies and found 40 rigorous evaluations of programs that used a school-based public health approach to obesity reduction for children in grades K–12. Two studies examined BMI screening with parental notification, seven examined obesity prevention education, 17 evaluated increased physical activity during the school day, and 14 focused on improved access to healthy food in schools.

We find that, on average, K–12 programs that provide access to healthy food reduce participants' BMI. For example, we estimate that K–12 programs that provide access to

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<sup>7</sup> Between 2011–2012, 8.4% of two to five year olds in the US were obese. Fryar, C.D., Carroll, M.D., and Ogden, C.L. (2014). Prevalence of overweight and obesity among children and adolescents: United States, 1963–1965 through 2011–2012. Retrieved from [http://www.cdc.gov/nchs/pressroom/calendar/2014\\_schedule.htm#NHANES](http://www.cdc.gov/nchs/pressroom/calendar/2014_schedule.htm#NHANES).

<sup>8</sup> We did not find evidence that any of the obesity prevention strategies we investigated had persistent effects on BMI.

healthy food lower the obesity rate from 10.0% without the program to 8.4% with the program.<sup>9</sup>

On average, other school-based obesity prevention programs that we analyzed do not impact BMI. Our results suggest that K–12 programs that increase physical activity during the school day may increase academic test scores, although not to a level of statistical significance.

We had sufficient program cost information to conduct a benefit-cost analysis of BMI screening and parental notification, K–12 obesity prevention education, and K–12 programs that increase physical activity during the school day.

We find that, on average, the program benefits do not exceed the costs for BMI screening and parental notification or K–12 obesity prevention education.

Most of the school-based obesity prevention programs we investigated only measured BMI. However, one type of intervention (K–12 programs that increase physical activity during the school day) also measured performance on standardized tests. These programs have an average positive net benefit, due to increased test scores, with a 66% chance that benefits outweigh costs.

### Workplace-based programs

We reviewed 41 evaluations and found only four rigorous evaluations of workplace-wide initiatives to reduce obesity. The

interventions included in this analysis varied widely and included at least one of the following program components: weight loss or healthy eating competitions; fitness classes and walking clubs; classes or information on obesity prevention; newsletters, signs, and posters promoting healthy choices; onsite farmers markets; increased availability of healthy food; and, decreased price of healthy food and drinks. We only included studies that measured the effects of these interventions on all employees, not solely program participants.

We find that, on average, workplace-wide interventions to reduce obesity do not have a statistically significant impact on BMI. We do not have sufficient program cost information to conduct a benefit-cost analysis of these programs.

### Community-wide interventions

We searched for evaluations of the following community-wide interventions to reduce obesity: calorie labeling on menus, media campaigns to promote healthy eating or physical activity, bans on advertising unhealthy food to children, and soda taxes.

We found two rigorous evaluations of soda taxes. The other community-wide interventions that we investigated have not been rigorously evaluated.

We find that, on average, a soda tax that is one percentage point higher than the tax on other food items does not statistically significantly impact BMI. We do not have sufficient program cost information to conduct a benefit-cost analysis of soda taxes.

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<sup>9</sup> In 2012, 10% of Washington 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> grade students were obese. Washington State Department of Health. (2014). *Washington State Health Youth Survey 2012 Analytic Report*. Retrieved from <http://www.doh.wa.gov/DataandStatisticalReports/DataSystems/HealthyYouthSurvey/Reports>.

### 3) [Accountable care organizations](#)

An accountable care organization (ACO) is a group of medical providers responsible for the cost and quality of care for a patient population. ACO contracts offer financial incentives to increase efficiency. Providers may receive a share of cost savings relative to a spending target and bonus payments for meeting quality of patient care benchmarks.

Commercial insurers, the federal Centers for Medicare and Medicaid Services (CMS), and state Medicaid programs have established ACOs.

We reviewed 35 studies of ACOs and included 11 rigorous evaluations in our analysis. These studies evaluated three ACOs: 1) the Alternative Quality Contract for commercial insurance plans in Massachusetts, 2) the Physicians Group Practice Demonstration for Medicare beneficiaries, and 3) the Medicare Pioneer ACO Program. Evidence for recent Medicaid ACOs is emerging, but the research does not yet support a meta-analysis.

Studies have examined ACO effects on costs and quality of care. We focused on the extent to which ACOs have been able to reduce total medical costs ([Exhibit 3](#)).<sup>10</sup> Again, cost and utilization measures may or may not be an indication of health status or well-being.

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<sup>10</sup> Our primary outcome is percentage change in medical costs per person. We use inverse variance weights, based on standard errors for estimates, to calculate average effects for ACO implementations.

### Commercial ACOs

Blue Cross Blue Shield, Cigna, Aetna, United Healthcare, and other insurers have established ACOs.<sup>11</sup> We were able to estimate effect sizes for one of the largest and most heavily studied commercial ACOs, the Alternative Quality Contract (AQC) implemented in 2009 by Blue Cross Blue Shield (BCBS) of Massachusetts. BCBS pays providers a global budget (a fixed payment reflecting total expected costs for a patient population), shared savings relative to targets, and incentive payments for meeting quality thresholds. Providers are at risk for costs above the target.

The AQC has achieved substantial reductions in medical costs. On average, between 2009 and 2012, AQC provider costs were 8% lower relative to comparison group providers.

These cost reductions, however, do not represent net savings to BCBS. One report stated that BCBS incentive payments (including shared savings, quality bonuses, and infrastructure investments) exceeded cost savings during the first three contract years but that BCBS had modest net savings in the fourth year.<sup>12</sup>

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<sup>11</sup> Lewis, V., Colla, C., Schpero, W., Shortell, S., & Fisher, E. (2014). ACO contracting with private and public payers: a baseline comparative analysis. *American Journal of Managed Care*, 20(12), 1008-1014.

<sup>12</sup> Estimated AQC savings in 2012 were 10% in terms of total claims costs; incentive payments were in the range of 6% to 9%. Song, Z., Rose, S., Safran, D.G., Landon, B.E., Day, M.P., & Chernew, M.E. (2014). Changes in health care spending and quality 4 years into global payment. *The New England Journal of Medicine*, 371(18), 1704-14.

## Medicare Demonstration

The CMS implemented the Medicare Physician Group Practice Demonstration from 2005 to 2009. Ten provider organizations entered five-year ACO contracts. The providers were eligible to receive up to 80% of savings relative to spending targets, conditional upon performance on quality measures. Providers were not responsible for costs above target but were at risk of not recouping the investments required to become an ACO (e.g., improvements in information technology and additional staffing).

Over the five-year contract, the organizations reduced costs, on average, by 2% relative to comparison groups. Net savings to Medicare, which paid performance bonuses to these organizations, was lower.<sup>13</sup> Performance varied substantially across the ten organizations, with some achieving large savings and others none.<sup>14</sup>

## Medicare ACOs

The CMS began to implement Medicare ACOs in 2012. There are two main models with different levels of financial risk for providers. In the Medicare Shared Savings Program, ACOs may receive up to 50% of savings relative to cost benchmarks and are not responsible for costs that exceed

targets. In the Pioneer ACO program, organizations can receive up to 60% of savings relative to a spending benchmark, but they are also responsible for costs above target. In both models, cost sharing payments are contingent upon performance on quality of care measures.

We found two rigorous studies that evaluated the Pioneer ACO program. Thirty-two organizations entered the Pioneer ACO program in 2012 but 13 subsequently withdrew from the program. These studies examined performance over the first two contract years. On average, Pioneer ACOs achieved a 2% cost reduction relative to comparison groups. Again, these reductions do not represent net savings to Medicare.

We do not have sufficient information to conduct a benefit-cost analysis for ACOs. A separate [Technical Appendix](#) to this report contains more detailed discussions of these analyses.<sup>15</sup>

## 4) [Patient cost sharing](#)

Copays, coinsurance rates, deductibles, and out-of-pocket maximums determine patient cost-sharing levels in health plans (see [Exhibit 1](#) next page).

Health reform elevated the importance of patient cost sharing on state policy agendas. Medicaid expansion and new federal regulations allow for more extensive use of cost sharing in public health insurance programs for low income populations. Also, many individuals with moderate incomes

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<sup>13</sup> Pope and colleagues estimate net savings to Medicare to be \$69 (about 0.8%) per person year. See Pope, G., Kautter, J., Leung, M., Trisolini, M., Adamache, W., & Smith, K. (2014). Financial and quality impacts of the Medicare physician group practice demonstration. *Medicare & Medicaid Research Review*, 4, 3.

<sup>14</sup> Colla, C.H., Wennberg, D.E., Meara, E., Skinner, J.S., Gottlieb, D., Lewis, V.A., . . . Fisher, E.S. (2012). Spending differences associated with the Medicare Physician Group Practice Demonstration. *JAMA: The Journal of the American Medical Association*, 308(10), 1015-1023; Pope et al., 2014.

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<sup>15</sup> Bauer & Barch, (2015) <http://wsipp.wa.gov/Reports/577>

are opting for high-deductible health plans offered on state health exchanges.<sup>16</sup>

We reviewed 113 studies that examine the effects of patient cost sharing, and 42 were included in our meta-analyses.<sup>17</sup> Outcomes include medical costs, utilization of medical services (emergency departments, prescription drugs, etc.), potential adverse impacts (reduced medication adherence and receipt of preventive services), offsets to cost savings (hospitalizations), and effects on health.<sup>18</sup>

Effects vary by the level and type of cost sharing (e.g., modest copays versus high-deductible health plans). They also vary across different patient populations (general, low-income, and chronically ill). Details follow. In several cases, our findings are based on only one or two studies.

### Medical spending

We find higher coinsurance rates, larger copays, and replacement of traditional insurance with high-deductible health plans (HDHPs) reduce medical spending, at least in the short-term. People respond to higher

prices by reducing utilization. Among general patient populations, a 10% increase in the price of medical services reduces expenditures by about 2%. We find a similar price effect for low-income individuals, but spending by the chronically ill appears to be less responsive to price increases.

### Exhibit 1

#### Cost-sharing Mechanisms

**Copays**—a fixed amount paid for a service (for example, \$20 per office visit)

**Coinsurance**—a percentage of total charges for a service, paid after the deductible is exceeded (for example, 20% of allowable charges for a hospital stay)

**Deductible**—amount that the insured must pay before insurance pays a claim

**High-Deductible Health Plan (HDHP)**—insurance plans with higher deductible levels than traditional plans<sup>#</sup>

**Health savings accounts (HSAs)**—funds used to cover patient cost-shares in HDHPs, both employers and employees can contribute, employee-owned (portable)

**Health reimbursement arrangements (HRAs)**—funds used to cover patient cost-shares in HDHPs, funded by employers, employer-owned (not portable), unused amounts may rollover

**Out-of-pocket maximum**—the maximum amount an insured person has to pay during a year<sup>#</sup>

<sup>#</sup>2016 IRS guidelines specify HDHP deductibles of at least \$1,300 for individuals/\$2,600 family and HDHP out-of-pocket maximums of \$6,550 individual/\$13,100 family.

<sup>16</sup> Wharam, J.F., Zhang, F., Landon, B.E., Soumerai, S.B., & Ross-Degnan, D. (2013). Low-socioeconomic-status enrollees in high-deductible plans reduced high-severity emergency care. *Health Affairs*, 32(8), 1398-406.; Wharam, J., Ross-Degnan, D., & Rosenthal, M. (2013). The ACA and high-deductible insurance—strategies for sharpening a blunt instrument. *New England Journal of Medicine*, 369(16), 1481-1484.

<sup>17</sup> We excluded studies that: failed to address self-selection of individuals into health plans; had no comparison group or did not control for differences between groups; did not provide sufficient information to assess methodology; did not report data required to calculate effect sizes; and were unable to isolate effects of cost sharing changes from other benefit or enrollment changes.

<sup>18</sup> Average effect sizes for these outcomes are calculated using inverse variance weights. In cases where the effect size is a percentage change in the outcome, inverse variance weights are derived from standard error estimates.



These effects may seem small, but when coupled with observed changes in cost sharing, we find substantial effects on utilization and spending. For example:

- A 25% coinsurance rate (versus free care) reduces total medical expenditures by 19%.
- Emergency department (ED) copays of \$25 to \$50 (2014 dollars) reduce ED visits by 12% among the general population.
- Modest increases in prescription drug copays (\$3 to \$5) reduce drug spending by 8% in a public health insurance program serving low-income children (CHIP).
- Replacing traditional insurance with high deductible health plan reduces total medical spending, on average, by 18%.<sup>19</sup> Effects vary with the type of optional health spending accounts offered; costs are reduced by 24% in plans with HSA accounts.

### Unintended effects

These cost reductions may have unintended, potentially adverse effects, especially for individuals with modest incomes and chronic illnesses. In our meta-analyses, we find:

- Cost sharing, in some cases, reduces emergent and potentially non-emergent ED visits; effects vary by the level of cost sharing and patient populations.
- Prescription drug copays reduce adherence to drugs used to treat chronic conditions, such as high blood pressure and cholesterol; reducing copays improves adherence. Medication

adherence is also reduced in HDHPs when prescription drug costs are subject to the high deductibles.

- HDHPs moderately reduce utilization of cancer screening (breast, cervical, and colorectal), preventive office visits, and preventive lab tests. This occurs even though these services are not subject to the high deductibles, possibly because of reduced contact with medical providers.<sup>20</sup>

In WSIPP's review of the research, we found little information on the long-term health effects that might arise from high levels of cost-sharing and have not conducted a benefit-cost analysis for this topic.<sup>21</sup>

### Cost offsets

We did not find evidence that cost reductions from higher copays and HDHP implementations are offset by higher hospitalization rates in either general or low-income populations. Based on one study, we find that higher prescription drug and office visit copays among the elderly (Medicare beneficiaries) are associated with an increase in hospital costs per member.

### Medicaid emergency department copays for non-emergent visits

Medicaid plans may only impose copays for ED visits that are determined to be non-emergent. We did not find evidence that these non-emergent copays effect ED visits.

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<sup>19</sup> This estimate is for HDHPs with individual deductibles of \$1,000 or more.

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<sup>20</sup> The Affordable Care Act prohibits cost sharing for many preventive services.

<sup>21</sup> See Bauer & Barch, (2015) more information. <http://wsipp.wa.gov/Reports/577>



A separate [Technical Appendix](#) to this report contains more detailed discussions of these analyses.<sup>22</sup>

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<sup>22</sup> Ibid.

### III. Summary of Prior Findings

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This section summarizes prior findings for six additional topics:

- 1) Lifestyle programs designed to prevent type 2 diabetes;
- 2) Behavioral interventions to reduce obesity;
- 3) Care transition to prevent hospital readmissions;
- 4) Patient-centered medical homes;
- 5) Programs to reduce avoidable emergency department (ED) visits; and
- 6) Smoking cessation programs in pregnancy.

#### 1) Lifestyle interventions to prevent diabetes

Lifestyle programs to prevent diabetes target individuals at high risk for developing the disease, providing them with counseling and other support. We found that these programs have benefits that consistently outweigh the costs. This finding holds true for both long-term, intensive programs and shorter-term, group-based programs. A separate [Technical Appendix](#) to this report contains more detailed discussions of these analyses.<sup>23</sup>

#### 2) Clinical behavioral interventions to reduce obesity

In contrast to the population focused school-, workplace- and community-based interventions that we reviewed in Section II, the behavioral interventions discussed in this section are delivered or initiated in a

clinical setting. Clinical behavioral interventions for obesity include behavioral counseling and education delivered remotely, in primary care, or in other clinical environments. The programs often include diet and exercise components.

We found that high-intensity, in-person programs for adults are cost beneficial on average, though the risk that a given intervention will not break-even is relatively high ([Exhibit 2](#)). Among low-intensity programs, there is only a 50% chance benefits exceed costs.

While clinical behavioral interventions for obesity can have positive short-term effects on weight outcomes in children, we found little evidence that these effects are maintained over time.<sup>24</sup> On average, benefits do not exceed costs for in-person programs, and programs delivered remotely have only a 50% chance of breaking even.

#### 3) Transitional care programs to prevent hospital readmissions

Transitional care may include coaches, patient education, medication reconciliation, individualized discharge planning, enhanced

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<sup>23</sup> Bauer & Barch, (2015). <http://wsipp.wa.gov/Reports/577>

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<sup>24</sup> These findings are consistent with US Preventive Services Task Force recommendations regarding obesity in children and adolescents, which found that moderate- to high-intensity interventions showed modest effects on weight status but that evidence for long-term sustainability of BMI changes was limited. US Preventive Services Task Force. (2014). *Final Recommendation Statement: Obesity in Children and Adolescents: Screening*. Retrieved from <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/obesity-in-children-and-adolescents-screening>.

provider communication, and patient follow-up after discharge.<sup>25</sup>

We found that the benefits of these programs consistently outweigh the costs, especially for comprehensive programs that target high-risk elderly or chronically ill patients. A separate [Technical Appendix](#) to this report contains more detailed discussions of these analyses.<sup>26</sup>

#### 4) [Patient-centered medical homes](#)

The “patient-centered medical home” (PCMH) model attempts to make health care more efficient by restructuring primary care. The aims are to a) facilitate care coordination across providers; b) ensure that all the patient’s care needs (preventive, acute, chronic, and mental health) are met; c) promote care quality and patient safety; d) increase responsiveness to patient preferences and needs; and e) enhance access to care.

Both physician-led primary care practices and integrated health delivery systems have established medical homes. Some PCMHs include general patient populations and others recruit high-risk elderly or chronically ill patients.<sup>27</sup>

We found that PCMHs targeting high-risk patients are very likely to have benefits that outweigh costs. Those implemented with general patient populations, however, are

less likely to “break even.” A separate [Technical Appendix](#) to this report contains more detailed discussions of these analyses.<sup>28</sup>

#### [Interventions to reduce emergency department \(ED\) use](#)

In Section II, we reviewed cost-sharing interventions aimed at reducing ED use. Here, we describe three additional interventions to prevent the need for ED visits and reduce non-urgent ED use that we reviewed previously: 1) intensive case management for frequent ED users, 2) general education on appropriate ED use, and 3) asthma self-management education for children.

We found that, although intensive case management for frequent ED users reduces ED visits, this approach is costly to implement. Therefore, the benefits do not outweigh the costs, on average.

Our analysis found that for both asthma self-management education for children and general education on appropriate ED use there is only about a 50% chance that benefits outweigh the costs.

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<sup>25</sup> Hansen, L.O., Young, R.S., Hinami, K., Leung, A., & Williams, M.V. (2011). Interventions to reduce 30-day hospitalization: A systematic review. *Annals of Internal Medicine*, 155(8), 520-528.

<sup>26</sup> Bauer & Barch, (2015). <http://wsipp.wa.gov/Reports/577>

<sup>27</sup> The Medicaid Health Home, a more recent variant of the medical home model, focuses on patients with serious mental illness and substance abuse disorders. WSIPP has reviewed the evidence on health homes; those findings are reported on our website:

<http://www.wsipp.wa.gov/BenefitCost/Program/496>

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<sup>28</sup> Bauer & Barch, (2015). <http://wsipp.wa.gov/Reports/577>

## 5) Smoking cessation programs during pregnancy

Smoking during pregnancy has been shown to increase the risks of low birth weight and preterm delivery and add to health care costs.<sup>29</sup> We examined evidence for the effectiveness of smoking cessation counseling programs in reducing smoking rates during late pregnancy. These programs recruit women who smoke early in their pregnancy and provide them with face-to-face counseling, phone counseling, and self-help materials to help them quit.<sup>30</sup> Interventions vary in the number of contacts and duration of sessions.

We identified 18 studies that a) met our methodological requirements; b) included counseling services in the intervention; c) were conducted in the US; d) recruited women who smoked early in their pregnancy; and e) used laboratory tests to confirm smoking status.<sup>31</sup> Eleven of the studies recruited women with low incomes; thus, the results are relevant to Medicaid enrollees.<sup>32</sup>

Across the 18 studies, smoking cessation programs significantly reduced smoking among pregnant women (see [Exhibit 3](#)). On average, 19% of women in the treatment groups quit smoking versus 12% of women in the control groups. Nine of the studies included more substantial, face-to-face counseling.<sup>33</sup> The effect for these more intensive interventions was slightly higher than for programs with only brief or no face-to-face counseling.

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<sup>29</sup> Adams E., Markowitz S., Dietz P., & Tong V. (2013). Expansion of Medicaid Covered Smoking Cessation Services: Maternal Smoking and Birth Outcomes. *Medicare & Medicaid Research Review*, 3(3), E1-E23 and Coleman T., Chamberlain C., Davey M.A., Cooper S.E., Leonardi-Bee J. (2012). Pharmacological interventions for promoting smoking cessation during pregnancy (Review). *Cochrane Database of Systematic Reviews*. Issue 9.

<sup>30</sup> We did not review evidence for the effectiveness of nicotine replacement (NRT) and other pharmacotherapy.

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<sup>31</sup> In identifying potential studies, we relied heavily on Chamberlain, C., O'Mara-Eves, A., Oliver, S., Caird, J.R., Perlen, S.M., Eades, S.J., & Thomas, J. (2013). Psychosocial interventions for supporting women to stop smoking in pregnancy. *Cochrane Database of Systematic Reviews*, 10.

<sup>32</sup> The US Centers for Disease Control and Prevention (CDC) estimates that among women who gave birth during 2011, one in ten smoked during the last three months of pregnancy. The rate was higher among Medicaid enrollees, with one in five women smoking during late pregnancy.

<sup>33</sup> These studies included more than one personal contact or one lengthy face-to-face session with additional phone counseling.

**Exhibit 2**  
Health Care and Health Promotion Benefit-Cost Results

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
<b>Health Promotion</b>							
Lifestyle interventions to prevent diabetes: Long-term, intensive, individual counseling programs	\$26,474	\$10,726	\$15,748	(\$3,732)	\$22,743	\$7.09	100 %
Lifestyle interventions to prevent diabetes: Shorter-term programs with group-based counseling	\$13,366	\$4,745	\$8,621	(\$440)	\$12,926	\$30.35	81 %
Behavioral interventions to reduce obesity for adults: High-intensity, in-person programs	\$3,968	\$955	\$3,031	(\$615)	\$3,371	\$6.48	66 %
Behavioral interventions to reduce obesity for adults: Remotely-delivered programs	\$1,222	\$281	\$941	(\$94)	\$1,128	\$13.02	56 %
Behavioral interventions to reduce obesity for adults: Low-intensity, in-person programs	\$292	\$86	\$206	(\$182)	\$109	\$1.60	55%
Cesarean section reduction programs: Multi-faceted hospital based intervention (private pay population)	\$326	\$112	\$213	(\$34)	\$292	\$9.61	100%
Cesarean section reduction programs: Multi-faceted hospital based intervention (Medicaid population)	\$223	\$79	\$144	(\$34)	\$189	\$6.56	99%
Cesarean section reduction programs: Audit and feedback (private pay population)	\$194	\$68	\$126	(\$27)	\$167	\$7.15	85%
Cesarean section reduction programs: Audit and feedback (Medicaid population)	\$135	\$49	\$87	(\$27)	\$108	\$5.00	83%
Cesarean section reduction programs: Mandatory second opinion (private pay population)	\$172	\$69	\$103	(\$76)	\$96	\$2.26	100%
Cesarean section reduction programs: Mandatory second opinion (Medicaid population)	\$111	\$49	\$62	(\$76)	\$35	\$1.46	56%
Behavioral interventions to reduce obesity for children: Remotely-delivered programs	\$67	\$18	\$49	(\$64)	\$3	\$1.04	50%
Behavioral interventions to reduce obesity for children: Low-intensity, in-person programs	(\$26)	\$7	(\$33)	(\$162)	(\$188)	(\$0.16)	49%
Cesarean section reduction programs: Continuous support(private pay population)	\$9	\$45	(\$36)	(\$257)	(\$248)	\$0.04	4%
Cesarean section reduction programs: Continuous support (Medicaid population)	(\$32)	\$32	(\$64)	(\$257)	(\$289)	(\$0.12)	0%
Behavioral interventions to reduce obesity for children: Moderate- to high-intensity, face-to-face programs	\$34	\$31	\$3	(\$328)	(\$294)	\$0.10	47%

These results are current as of December 2015. More recent results may be available on WSIPP's website <http://www.wsipp.wa.gov/BenefitCost?topicId=6>

**Exhibit 2 (Continued)**  
Health Care and Health Promotion Benefit-Cost Results

Program name	Total benefits	Taxpayer benefits	Non-taxpayer benefits	Costs	Benefits minus costs (net present value)	Benefit to cost ratio	Chance benefits will exceed costs
<b>System Efficiency</b>							
Transitional care to prevent hospital readmissions: Comprehensive programs	\$1,827	\$840	\$987	(\$413)	\$1,414	\$4.43	100%
Patient-centered medical homes with high-risk patients	\$660	\$273	\$387	(\$81)	\$579	\$8.16	87%
Transitional care to prevent hospital readmissions: All programs, general patient populations	\$438	\$192	\$246	(\$51)	\$387	\$8.60	89%
Patient-centered medical homes in integrated health systems	\$254	\$114	\$139	(\$81)	\$173	\$3.13	56%
Interventions to reduce unnecessary emergency department visits: General education on appropriate ED use	\$16	\$7	\$9	(\$8)	\$8	\$2.04	50%
Interventions to reduce unnecessary emergency department visits: Asthma self-management education for children	\$27	\$23	\$4	(\$77)	(\$50)	\$0.35	49%
Patient-centered medical homes in physician-led practices	(\$61)	(\$8)	(\$53)	(\$81)	(\$142)	(\$0.76)	7%
Interventions to reduce unnecessary emergency department visits: Intensive case management for frequent ED users	\$4,946	\$3,772	\$1,174	(\$9,425)	(\$4,479)	\$0.52	46%
<b>Public Health &amp; Prevention</b>							
School-based programs to increase physical activity	\$15,532	\$3,497	\$12,035	(\$463)	\$15,069	\$33.54	66%
School-based BMI screening and parental notification	(\$54)	(\$16)	(\$38)	(\$25)	(\$79)	(\$2.15)	49%
School-based obesity prevention education	(\$153)	(\$32)	(\$121)	(\$116)	(\$269)	(\$1.32)	49%
Preschool programs to create a healthy food environment and increase physical activity	(\$152)	(\$11)	(\$140)	(\$248)	(\$399)	(\$0.61)	47%

These results are current as of December 2015. More recent results may be available on WSIPP's website <http://www.wsipp.wa.gov/BenefitCost?topicId=6>

**Exhibit 3**  
 Meta-Analytic Results for Other Health Care Topics Reviewed  
 Benefit-Cost Results Not Yet Available

Topic and specific outcomes measured	No. of effect sizes	Average effect size	Standard error	p-value	Treatment N
<b>Accountable Care Organizations: Alternative Quality Contract (AQC)</b>					
Health care costs*	4	-0.075	0.013	0.001	1,348,235
Emergency department visits*	1	0.007	0.013	0.607	380,142
Prescription drug costs*	1	-0.002	0.019	0.923	332,624
<b>Accountable Care Organizations: Medicare Physician Group Practice Demonstration (PGPD)</b>					
Health care costs*	2	-0.019	0.002	0.001	1,213,380
<b>Accountable Care Organizations: Medicare Pioneer ACOs</b>					
Health care costs*	3	-0.021	0.01	0.03	1,683,614
Hospital costs (inpatient)*	3	-0.025	0.009	0.004	1,683,614
Hospital costs (outpatient)*	3	-0.027	0.016	0.092	1,683,614
Skilled nursing facility costs*	3	-0.019	0.004	0.001	1,683,614
<b>Cost sharing: Coinsurance (25% rate or higher) versus no cost sharing, general patient population</b>					
Health care costs**	1	-0.170	0.020	0.001	1,137
Health care costs*	1	-0.189	0.047	0.001	1,137
Emergency department visits*	1	-0.21	0.081	0.01	2,296
Emergency department visits (higher-severity)*	1	-0.23	0.059	0.001	5,392
Emergency department visits (lower-severity)*	1	-0.47	0.049	0.001	5,392
Diastolic blood pressure	1	0.079	0.036	0.027	2,339
Cholesterol	1	-0.036	0.037	0.327	2,262
<b>Cost sharing: Copay increases across multiple services, low-income population</b>					
Health care costs**	1	-0.158	0.064	0.014	122,456
Emergency department costs**	1	-0.207	0.152	0.175	122,456
Hospital costs (inpatient)**	1	-0.115	0.25	0.646	122,456
Prescription drug costs**	1	-0.131	0.074	0.076	122,456
<b>Cost sharing: Copay increases across multiple services, low-income and chronically-ill population</b>					
Health care costs**	1	-0.057	0.094	0.545	37,961
<b>Cost sharing: Copays for prescription drugs, adults with a chronic illness</b>					
Medication adherence	2	-0.602	0.118	0.001	652
<b>Cost sharing: Copay reductions for prescription drugs used to treat chronic conditions (Value Based Insurance Design), adults with chronic illnesses</b>					
Medication adherence	10	0.045	0.005	0.001	76,223
<b>Cost sharing: Copays for prescription drugs, general patient population</b>					
Hospitalization (general)	1	0	0.015	1	6,881
Prescription drug costs**	1	-0.041	0.009	0.001	16,783
<b>Cost sharing: Copays for prescription drugs, low-income children (CHIP)</b>					
Prescription drug costs*	1	-0.079	0.031	0.009	17,200
<b>Cost sharing: Copays for prescription drugs, low-income children (CHIP) with a chronic illness</b>					
Prescription drug costs*	1	-0.036	0.014	0.009	4,644
<b>Cost sharing: Copays for prescription drugs, Medicare beneficiaries</b>					
Hospital costs (inpatient)*	1	0.054	0.019	0.005	35,456
Prescription drug costs*	1	-0.32	0.026	0.001	35,456
<b>Cost sharing: Emergency department copays, general patient population</b>					
Emergency department visits*	2	-0.121	0.003	0.001	1,158,999
Emergency department visits (higher-severity)*	1	-0.058	0.095	0.543	30,276
Emergency department visits (lower-severity)*	1	-0.292	0.046	0.001	30,276
Hospitalization (general)*	2	-0.039	0.009	0.001	1,158,999
<b>Cost sharing: Emergency department copays, low-income patient population</b>					
Emergency department visits*	1	-0.153	0.006	0.001	254,431
Hospitalization (general)*	1	-0.053	0.019	0.004	254,431

These results are current as of December 2015. More recent results may be available on WSIPP's website  
<http://www.wsipp.wa.gov/BenefitCost?topicId=6>



**Exhibit 3 (Continued)**  
Meta-Analytic Results for Other Health Care Topics Reviewed  
Benefit-Cost Results Not Yet Available

Topic and specific outcomes measured	No. of effect sizes	Average effect size	Standard error	p-value	Treatment N
<b>Cost sharing: Copays for nonemergent emergency department visits, Medicaid adult population</b>					
Emergency department visits*	2	0.031	0.064	0.63	21,074
<b>Cost sharing: Various High-Deductible Health Plan designs (moderate to high deductibles, with and without HRAs or HSAs), general patient population</b>					
Health care costs*	10	-0.116	0.026	0.001	5,052,573
Emergency department costs*	2	-0.071	0.086	0.407	52,058
Emergency department visits*	1	-0.15	0.032	0.001	15,847
Emergency department visits (lower-severity)*	1	-0.196	0.047	0.001	15,847
Emergency department visits (higher-severity)*	1	-0.097	0.098	0.323	15,847
Hospitalization (general)*	1	-0.118	0.091	0.196	15,847
Prescription drug costs*	3	-0.047	0.013	0.001	63,193
Medication adherence	8	-0.092	0.038	0.016	4,865
Preventive services	11	-0.046	0.01	0.001	152,096
Primary care visits*	1	-0.09	0.015	0.001	7,953
<b>Cost sharing: Various High-Deductible Health Plan Designs (moderate to high deductible levels, with or without HSAs), low-income patient population</b>					
Emergency department visits*	1	-0.046	0.046	0.319	5,854
Emergency department visits (higher-severity)*	1	-0.245	0.103	0.017	5,854
Emergency department visits (lower-severity)*	1	-0.037	0.051	0.471	5,854
Preventive services	6	-0.031	0.012	0.008	29,449
<b>Cost sharing: High-Deductible Health Plans with moderate deductibles (individual &lt; \$1000), general patient population</b>					
Health care costs*	3	-0.029	0.014	0.044	85,731
<b>Cost sharing: High-Deductible Health Plans with higher deductibles (individual &gt; \$1000), general patient population</b>					
Health care costs*	8	-0.178	0.024	0.001	142,933
<b>Cost sharing: High-Deductible Health Plans with higher deductibles (individual &gt; \$1000) and HRA accounts, general patient population</b>					
Health care costs*	4	-0.152	0.028	0.001	89,701
<b>Cost sharing: High-Deductible Health Plans with higher deductibles (individual &gt; \$1000) and HSA accounts, general patient population</b>					
Health care costs*	2	-0.238	0.057	0.001	14,364
<b>Smoking cessation programs during pregnancy (all programs)</b>					
Regular smoking	18	-0.276	0.075	0.001	3,186
<b>Smoking cessation programs in pregnancy (face-to-face counseling programs)</b>					
Regular smoking	9	-0.301	0.114	0.008	1,427
<b>Smoking cessation programs in pregnancy (programs without significant face-to-face counseling)</b>					
Regular smoking	9	-0.235	0.094	0.013	1,759
<b>School-based programs to create a healthy food environment</b>					
Obesity	14	-0.106	0.039	0.007	12,400
<b>Soda taxes: a 1% higher tax on soda than on other food items</b>					
Obesity	2	0	0.001	0.857	1,365,734
<b>Workplace-wide interventions to prevent obesity</b>					
Obesity	4	-0.01	0.039	0.809	1,338

\* The effect size for this outcome indicates percentage change, not a standardized mean difference effect size.

\*\* The effect size for this outcome represents an elasticity, not a standardized mean difference effect size.

These results are current as of December 2015. More recent results may be available on WSIPP's

<http://www.wsipp.wa.gov/BenefitCost?topicId=6>



Suggested citation: Bauer, J., Barch, M. Kay, N., Lemon, M., Aos, S., Burley, M., Hirsch, M., & Lee, S. (2015). *Interventions to promote health and increase health care efficiency: December 2015 update*. Olympia: Washington State Institute for Public Policy.

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Document Number: 15-12-3402



## 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.



# Guide to evidence-based prevention

## Part 1. What is “evidence-based prevention?”

The term “evidence-based” is used in two different ways in the context of prevention and public health. First, “evidence-based practice” and “evidence-based public health” are broad terms, often used interchangeably, that refer to the process of using scientific evidence to identify health problems and effective health improvement strategies. The following definition, which has been adopted by the Public Health Accreditation Board (PHAB)<sup>1</sup>, embraces this broad understanding of the use of evidence in public health practice:

**Evidence-based practice** (Brownson, et. al, 2009). Evidence-based practice involves making decisions on the basis of the best available scientific evidence, using data and information systems systematically, applying program-planning frameworks, engaging the community in decision making, conducting sound evaluation, and disseminating what is learned.<sup>2</sup> Note: This definition can also be applied to evidence-based *public health*.

The term “evidence based” is also used as a “seal of approval” to indicate that a specific program or strategy has been evaluated and proven to be effective in improving health. This “seal of approval” can be given by academic researchers, expert panels or government agencies that have reviewed evidence about the program, or independent organizations that rate the effectiveness of programs. The following definition refers to this more specific use of the term “evidence based,” which is the primary focus of this online guide:

**Evidence-based prevention strategy** (HPIO, 2013). Programs, policies or other strategies that have been evaluated and demonstrated to be effective in preventing health problems based upon the best-available research evidence, rather than upon personal belief or anecdotal evidence.

Criteria for classifying a program, policy or other strategy as “evidence-based” vary across disciplines and agencies, which can make it challenging for policymakers and prevention planners to determine which strategies they should implement. Regardless of these challenges, however, evidence about the effectiveness of prevention strategies should be an important factor in policymaking decisions, and evidence-based practice is a foundational public health capability. (See Public Health Accreditation Board (PHAB) **Domain 10 Evidence-Based Practice and Standard 10.1** regarding the identification and use of best available evidence.)

When done well, evidence-based practice increases the effectiveness, efficiency and accountability of public health interventions by steering resources toward “what really works” based on expert evidence, while also providing space for innovative development and evaluation of new strategies informed by the experiences of community members and front-line practitioners.

Three concepts are useful for understanding what is meant by the term “evidence based:”

1. **Types of evidence that inform decision making:** Best available research evidence, experiential evidence, and contextual evidence
2. **Level of effectiveness in reaching desired outcomes:** Continuum from highly effective to ineffective or harmful
3. **Strength of scientific evidence:** Continuum from well-supported through rigorous research methods to undetermined programs that have not yet been evaluated.

The next two sections of this guide describe these concepts.

## Types of evidence that inform decision making

Research-based evidence of effectiveness is very important to consider when selecting prevention strategies to fund and implement. Many other factors, however, impact the success of public health activities, such as cultural appropriateness, how well the strategy fits with community conditions, and the availability of adequate resources to implement the strategy. Good decision making, therefore, balances research-based evidence with experiential evidence and contextual evidence (see Figures 1a and 1b). Experiential evidence refers to professional insight and intuitive expertise that is accumulated over time. Contextual evidence is based on factors that address whether a strategy is useful and feasible for a particular community.<sup>3</sup> A well-designed policymaking or community health planning process will acknowledge and incorporate these three types of evidence.

## Level of effectiveness and strength of scientific evidence

Research-based evidence can tell us if a prevention strategy has been shown to be highly effective, moderately effective, or ineffective in achieving its desired outcomes. This is referred to as level of effectiveness. In order to assess the quality and meaningfulness of research-based evidence, the strength of the scientific evidence must also be considered. The strength of scientific evidence refers to how rigorously a program has been evaluated and how strong the evidence is that the program produced the desired outcomes, rather than other factors. *The Continuum of Evidence of Effectiveness*<sup>5</sup> provides a useful framework for understanding level of effectiveness and strength of

Figure 1a.

### A framework for thinking about evidence<sup>4</sup>



Figure 1b.

### Local community health improvement plan example

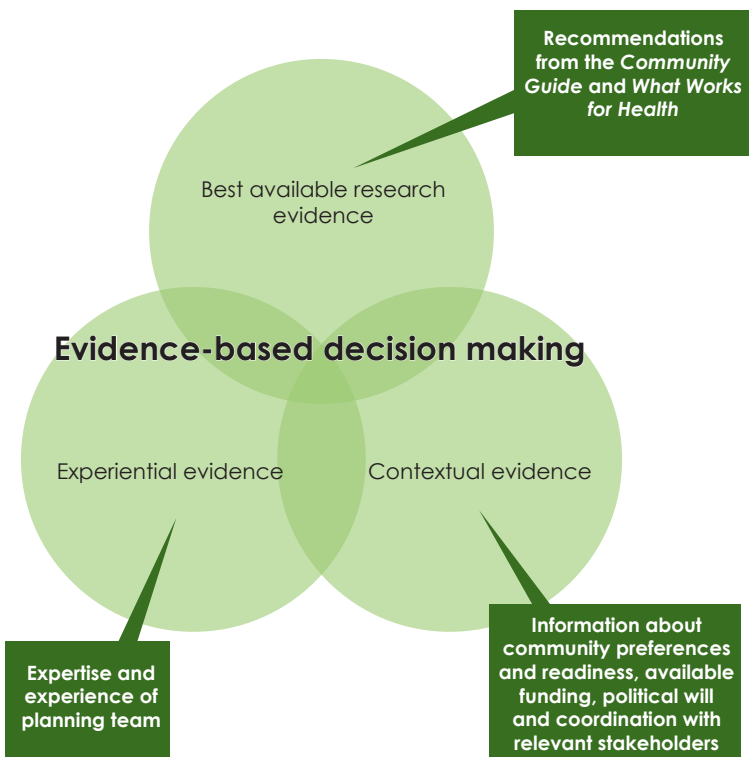
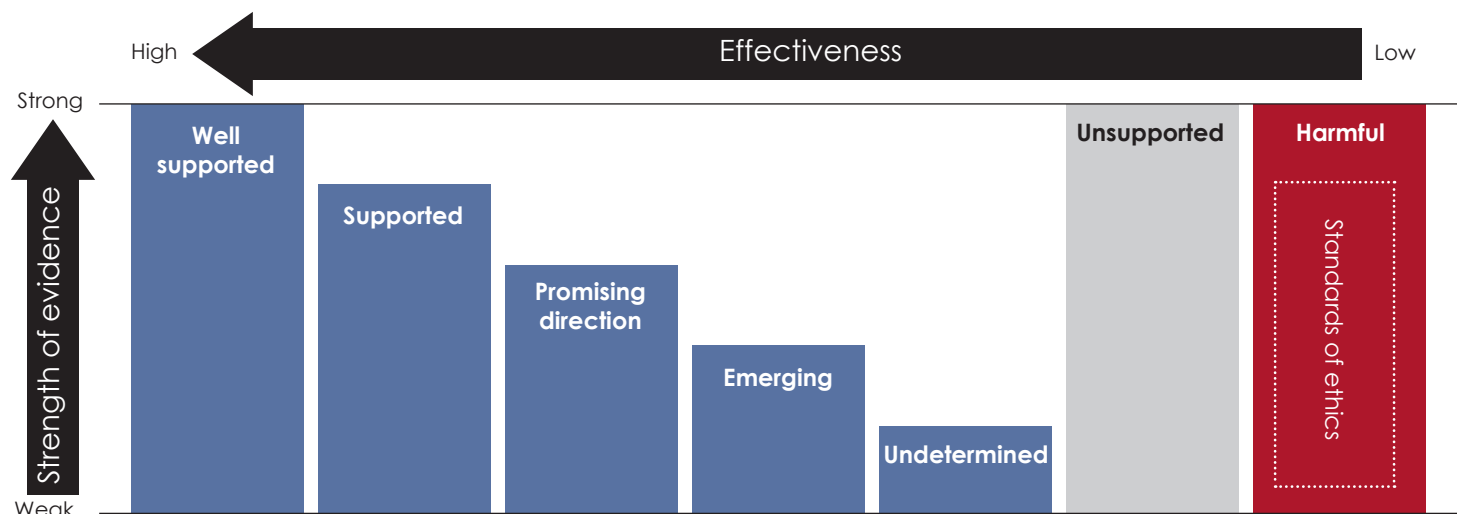


Figure 2.  
Continuum of evidence of effectiveness



**Source:** Puddy, R.W. and Wilkins, N. (2011). Understanding Evidence Part 1: Best Available Research Evidence. A Guide to the Continuum of Evidence of Effectiveness. US Centers for Disease Control and Prevention.

evidence (See Figure 2).

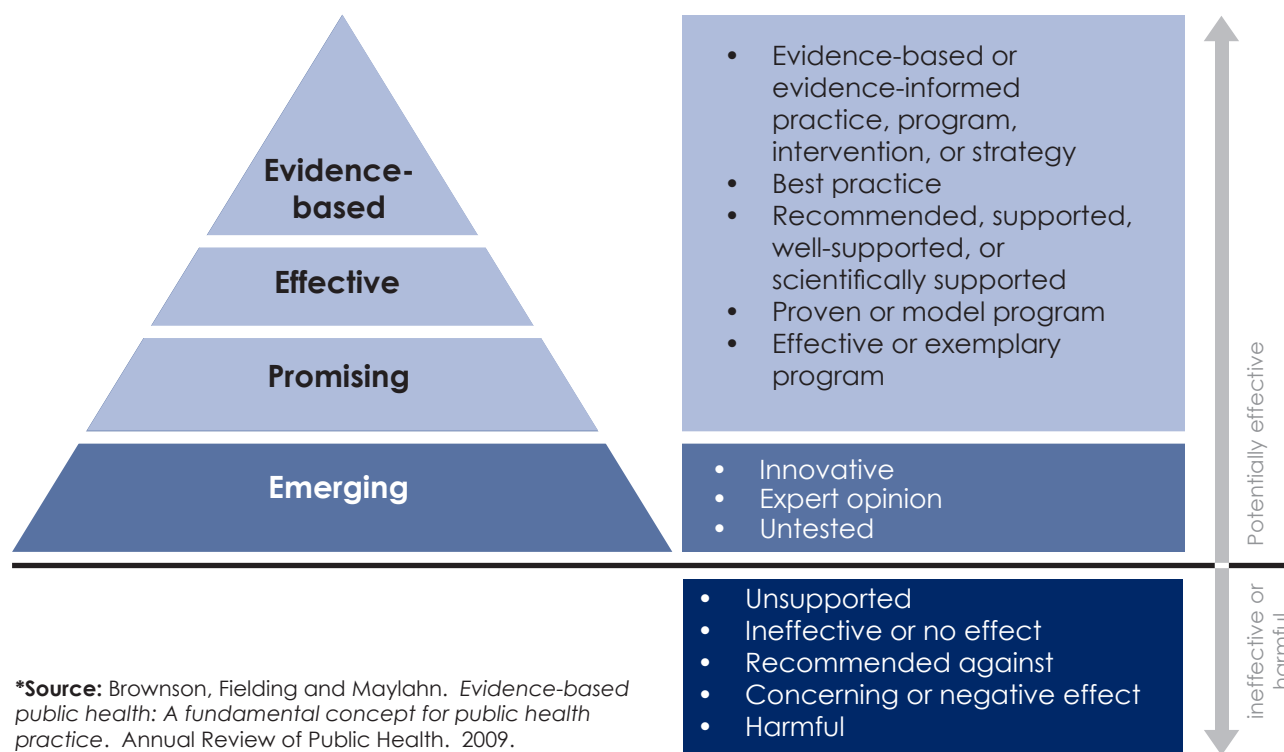
Systematic reviews and evidence registries typically combine the two concepts of effectiveness and strength of evidence in order to categorize prevention strategies and make recommendations. Programs that have strong evidence demonstrating that they

are effective in achieving outcomes are generally classified as "evidence based," but may also be referred to as a "best practice," "well supported," or a "model program." Programs that have been shown to be effective through less rigorous evaluation methods are often referred to as "promising," "emerging," "innovative," or "untested." Figure 3

Figure 3.  
Terms commonly used to classify prevention strategies by level of effectiveness and strength of scientific evidence

Brownson typology for classifying interventions by level of scientific evidence\*

Additional terms used for evidence-based prevention



**\*Source:** Brownson, Fielding and Maylahn. *Evidence-based public health: A fundamental concept for public health practice*. Annual Review of Public Health. 2009.

displays a well-recognized typology for classifying interventions by level of scientific evidence on the left and related terms that are often used in prevention practice guidelines on the right. Figure 4 lists several credible registries of evidence-based prevention programs and displays the terms they use to classify programs along the continuum of evidence of effectiveness. This analysis highlights the range of terms used by expert panels, government agencies, and other organizations that make recommendations about prevention

Figure 4.

### Evidence of effectiveness categories used by online prevention evidence registries

Online evidence registry	Evidence of Effectiveness*		
	Well Supported or Supported	Promising Direction, Emerging, or Undetermined	Unsupported or Harmful
<b>Guide to Community Preventive Services (Community Guide)</b> <i>Comprehensive range of health-related topics</i>	<ul style="list-style-type: none"> <li>Recommended-Strong evidence</li> <li>Recommended-Sufficient evidence</li> </ul>	Insufficient evidence	Recommended against
<b>What Works for Health</b> <i>Comprehensive range of health-related topics</i>	<ul style="list-style-type: none"> <li>Scientifically supported</li> <li>Some evidence</li> </ul>	<ul style="list-style-type: none"> <li>Expert opinion</li> <li>Insufficient evidence</li> <li>Mixed evidence</li> </ul>	Evidence of ineffectiveness
<b>National Registry of Evidence-based Programs and Practices (NREPP)</b> <i>Mental health promotion, substance abuse prevention, mental health and substance abuse treatment</i>	NREPP rates programs based upon quality of research and readiness for dissemination. NREPP does not recommend specific programs or rate their overall effectiveness.		
<b>Promising Practices Network</b> <i>Child and adolescent physical and mental health, school success, juvenile justice, and poverty</i>	Proven program	Promising program	
<b>California Evidence-Based Clearinghouse for Child Welfare</b> <i>Child welfare, mental health, and early childhood intervention</i>	<ul style="list-style-type: none"> <li>Well-supported by research evidence</li> <li>Supported by research evidence</li> </ul>	Promising research evidence	<ul style="list-style-type: none"> <li>Evidence fails to demonstrate effect</li> <li>Not able to be rated</li> <li>Concerning practice</li> </ul>
<b>Blueprints for Healthy Youth Development</b> <i>Youth behavior, education, emotional well-being, health, and positive relationships</i>	<ul style="list-style-type: none"> <li>Promising programs</li> <li>Model programs</li> </ul>		
<b>What Works Clearinghouse**</b> <i>Education (early childhood, K-12 and post-secondary)</i>	Positive	<ul style="list-style-type: none"> <li>Potentially positive</li> <li>Mixed</li> </ul>	<ul style="list-style-type: none"> <li>No discernible effect</li> <li>Potentially negative</li> <li>Negative</li> </ul>
<b>Crimesolutions.gov</b> <i>Criminal justice, juvenile justice, and crime victim services</i>	Effective	Promising	No effects
<b>Public Health Law Research — Evidence Briefs</b> <i>Physical and mental health and housing</i>	Effective	Uncertain	Harmful
<b>Office of Juvenile Justice and Delinquency Prevention (OJJDP) Model Programs Guide</b> <i>Juvenile justice, delinquency prevention mental health, violence prevention, and school success</i>	<ul style="list-style-type: none"> <li>Exemplary</li> <li>Effective</li> </ul>	Promising	
<b>Research-tested Intervention Programs (RTIPs)</b> <i>Cancer screening, nutrition, physical activity, tobacco, sun safety and other aspects of cancer control</i>	RTIPs rates each intervention on a five-point scale for three categories: Research integrity, intervention impact and dissemination capability		

\*Based upon the *Continuum of Evidence of Effectiveness*. Puddy, R.W. and Wilkins, N. (2011). *Understanding Evidence Part 1: Best Available Research Evidence. A Guide to the Continuum of Evidence of Effectiveness*. US Centers for Disease Control and Prevention. [http://www.cdc.gov/violenceprevention/pdf/understanding\\_evidence-a.pdf](http://www.cdc.gov/violenceprevention/pdf/understanding_evidence-a.pdf)

\*\*In addition to assigning an Effectiveness Rating (shown above), What Works Clearinghouse also rates programs based upon an Improvement index and an Extent of Evidence classification.



programs.

### **Limitations and challenges of “research-based” evidence**

Despite its value for improving the efficiency and effectiveness of public health prevention, there are several shortcomings to the way “research-based” evidence is sometimes used in planning and policymaking. First, rigid requirements to only fund evidence-based interventions may stifle innovation and authentic community engagement. Second, a narrow focus on highly rigorous research methods (such as randomized control trials and other experimental designs) tends to side-line or undervalue approaches that are implemented at the population level (such as policy change) and primary prevention efforts that require a long time period to achieve outcomes. Unlike evidence-based medicine which is based upon studies in highly-controlled clinical settings, evidence-based public health draws upon research conducted in complex real-world conditions that often do not allow for control groups or other aspects of experimental designs that help to pin-point the impact of a specific intervention. Similarly, evidence ratings and registries such as NREPP have largely focused on “programs in a box” that are delivered to individuals or groups (often in school and social service settings) and are easily evaluated using traditional pre/post-intervention research methods. Policy, system, and environmental change approaches, however, are more difficult to evaluate and are therefore less prominent in many systematic reviews and evidence registries.

When implementing programs or strategies classified as “evidence-based,” public health professionals must balance two priorities: fidelity and community fit. Fidelity refers to the extent to which a program is implemented as intended. High fidelity occurs when a program is replicated using the same methods, protocols, population groups, and settings that were in place when the program was evaluated and found to be effective. Clear implementation guidance — such as a training manual, policy templates, or other documentation—is critical for effective replication. Community fit and socio-cultural relevance refer to the extent to which a program is compatible with cultural beliefs, local community norms, and participant needs and interests. A program developed for inner-city African American students in a classroom setting, for example, may need to be modified in order to be effective for rural White youth in a 4-H Club setting. The ability to adapt an evidence-based approach to fit unique community settings and needs—while maintaining the core elements of the strategy that make it effective—is an important aspect of evidence-based public health practice.

### **Notes**

1. Public Health Accreditation Board (PHAB) Acronyms and Glossary of Terms, Version 1.0. 2011.
2. Brownson, Fielding and Maylahn. Evidence-based public health: A fundamental concept for public health practice. *Annual Review of Public Health*. 2009.
3. Puddy, R.W. and Wilkins, N. (2011). Understanding Evidence Part 1: Best Available Research Evidence. A Guide to the Continuum of Evidence of Effectiveness. US Centers for Disease Control and Prevention. [http://www.cdc.gov/violenceprevention/pdf/understanding\\_evidence-a.pdf](http://www.cdc.gov/violenceprevention/pdf/understanding_evidence-a.pdf)
4. Ibid.
5. Ibid.

# Guide to evidence-based prevention

## Part 2. How to navigate sources of evidence

There are numerous systematic reviews and online registries of evidence-based prevention strategies. Each has its benefits and drawbacks, and no one source is complete. It can therefore be challenging to sort out which of these sources has the most credible information and is the best fit for a decision-making process. Figure 5 below displays the types of sources where available evidence on prevention strategies can typically be found.

Figure 5.

### Sources of evidence-based strategies

Type of source	Examples	Rigor, credibility, and strength of evidence	Ease of use
<b>Systematic reviews</b> A literature review that attempts to identify, appraise and synthesize all the empirical evidence that meets pre-specified eligibility criteria. <sup>10</sup> Systematic reviews of randomized controlled trials are considered the "gold standard" of evidence.	<ul style="list-style-type: none"> <li>• Guide to Community Preventive Services (Community Guide)</li> <li>• US Preventive Services Task Force recommendations (USPSTF)</li> <li>• The Cochrane Collaborative</li> <li>• The Campbell Collaboration Library of Systematic Reviews</li> </ul>	High	Moderate
<b>Peer-reviewed literature</b> Articles and reports that have gone through a formal process to assess quality, accuracy, and validity.	Articles published in academic and scientific journals, such as the <i>American Journal of Public Health</i> , <i>American Journal of Preventive Medicine</i> or the <i>New England Journal of Medicine</i> . Many can be accessed online through PubMed, Medline, Google Scholar, etc.	Moderate to high	Low
<b>Searchable databases and evidence registries</b> Online clearinghouses designed to disseminate information about evidence-informed strategies in a user-friendly format. These databases use specific criteria to screen programs and policies, and most also rate strategies on the strength of their available evidence of effectiveness (such as, scientifically supported, some evidence, insufficient evidence, evidence of ineffectiveness).	<ul style="list-style-type: none"> <li>• What Works for Health (County Health Rankings and Roadmaps)*</li> <li>• National Registry of Evidence-Based Programs and Practices (NREPP)</li> <li>• Research-tested Intervention Programs (RTIPs)*</li> <li>• Promising Practices Network — Programs That Work*</li> <li>• California Evidence-based Clearinghouse for Child Welfare*</li> <li>• What Works Clearinghouse*</li> <li>• Blueprints for Health Youth Development*</li> <li>• Public Health Law Research — Evidence briefs*</li> <li>• Crimesolutions.gov*</li> <li>• Office of Juvenile Justice and Delinquency Prevention (OJJDP) Model Programs Guide*</li> </ul> *Provide evidence-of-effectiveness ratings	Moderate to high	High
<b>Grey literature</b> Electronic or print format documents produced by government agencies, academic institutions, and other organizations not controlled by commercial publishing. <sup>11</sup>	<ul style="list-style-type: none"> <li>• Recommendations from expert panels, such as the Institute of Medicine (IOM) and the National Prevention, Health Promotion, and Public Health Council</li> <li>• Reports from federal agencies such as the US Centers for Disease Control (CDC) and Prevention or the US Department of Health and Human Services (HHS)</li> <li>• Reports from nonpartisan organizations, such as the Association of State and Territorial Health Officials (ASTHO), the RAND Corporation, Prevention Institute, PolicyLink, and Trust for America's Health</li> </ul>	Varies widely	Moderate

Source: Modified from Searching the Evidence, County Health Rankings and Roadmaps. [http://www.countyhealthrankings.org/sites/default/files/CHOOSE\\_CHRR%20Searching%20the%20Evidence.pdf](http://www.countyhealthrankings.org/sites/default/files/CHOOSE_CHRR%20Searching%20the%20Evidence.pdf) (accessed 9/9/13)

## Where to start

When considering prevention strategies to implement in community settings (rather than clinical settings), including policy and environmental change approaches, as well as programs that are delivered to individuals, the following sources are excellent places to start (see Figure 6):

- The Community Guide (US Centers for Disease Control and Prevention)
- What Works for Health (County Health Rankings and Roadmaps)
- Topic-specific recommendations from expert panels and other “grey literature”
- Topic-specific evidence registries

As a rigorous systematic review, the US Centers for Disease Control and Prevention’s Community Guide is considered to be the “gold standard” source for evidence-based public health interventions in community settings. Not all topics, however, are covered by the Community Guide so it is useful to refer to multiple sources. The What Works for Health online evidence registry covers a broader range of topics and, along with other online evidence registries and recommendations from expert panels, makes an excellent supplement to the Community Guide. The Community Guide and What Works for Health stand out among sources of evidence for being comprehensive (addressing a wide range of health-related topics), including policy and environmental change approaches, and being easy to use. Starting with these sources and then supplementing them with additional materials, such as reports from expert panels and other grey literature, is an excellent first step.

## Clarifying goals and narrowing scope

Defining the goals for a prevention strategy and the scope of the search will help to narrow down the types of sources to consult. Key considerations include:

1. **Time and expertise.** It can be time-consuming to comb through peer-reviewed literature or through some of the systematic review databases such as the Cochrane Collaborative and Campbell Collaborative. Websites such as the Community Guide and What Works for Health, however, are designed to be user-friendly and do not require a great deal of time or expertise to use.
2. **Desired outcomes and goals.** Is the aim to reduce risk factors or increase protective factors, or to decrease the prevalence of a disease or condition? Being clear about specific desired outcomes will help to guide the search for evidence. For example, the Community Guide includes sections on obesity and cardiovascular disease (health conditions), but also has recommendations for physical activity and nutrition which address the risk and protective factors, behaviors, and community conditions that affect obesity and cardiovascular disease.
3. **Type of health issue to be addressed.** Many grey literature reports and searchable databases focus on specific diseases or health conditions, such as cancer, asthma, violence, or drug and alcohol use. Some sources address the social determinants of health. For example, the Campbell Collaboration specializes in crime, justice, education, and social welfare, and the Promising Practices Network reviews programs that address school readiness and poverty. The Community Guide includes recommendations for health equity and What Works for Health reviews a comprehensive set of programs and policies designed to address social and economic factors.
4. **Type of approach and setting.** Some sources, such as the USPSTF recommendations, only include preventive services for clinical settings, such as screening, counseling, and preventive medications. The Community Guide and What Works for Health include a wide range of approaches, including behavioral and educational programs delivered in community and health care settings, and policy, system, and environmental change strategies.

Online registries, expert panels, and systematic reviews always address a specific scope of topics and intended uses; rather than including the universe of all prevention activities, they narrow the range of programs and strategies they will assess. Figure 7 displays a framework for

understanding how the scope and content of online evidence registries varies depending upon the types of outcomes being addressed, intervention approaches being used, and settings for the programs and strategies they include.

For more information about the steps involved in selecting prevention strategies, including an Ohio case study, view the following publication prepared by the Health Policy Institute of Ohio and the Ohio Department of Health: [Evidence in Action: A guide to selecting effective prevention strategies](#).

Figure 6.

## Where to start your search for evidence-based prevention strategies for community settings

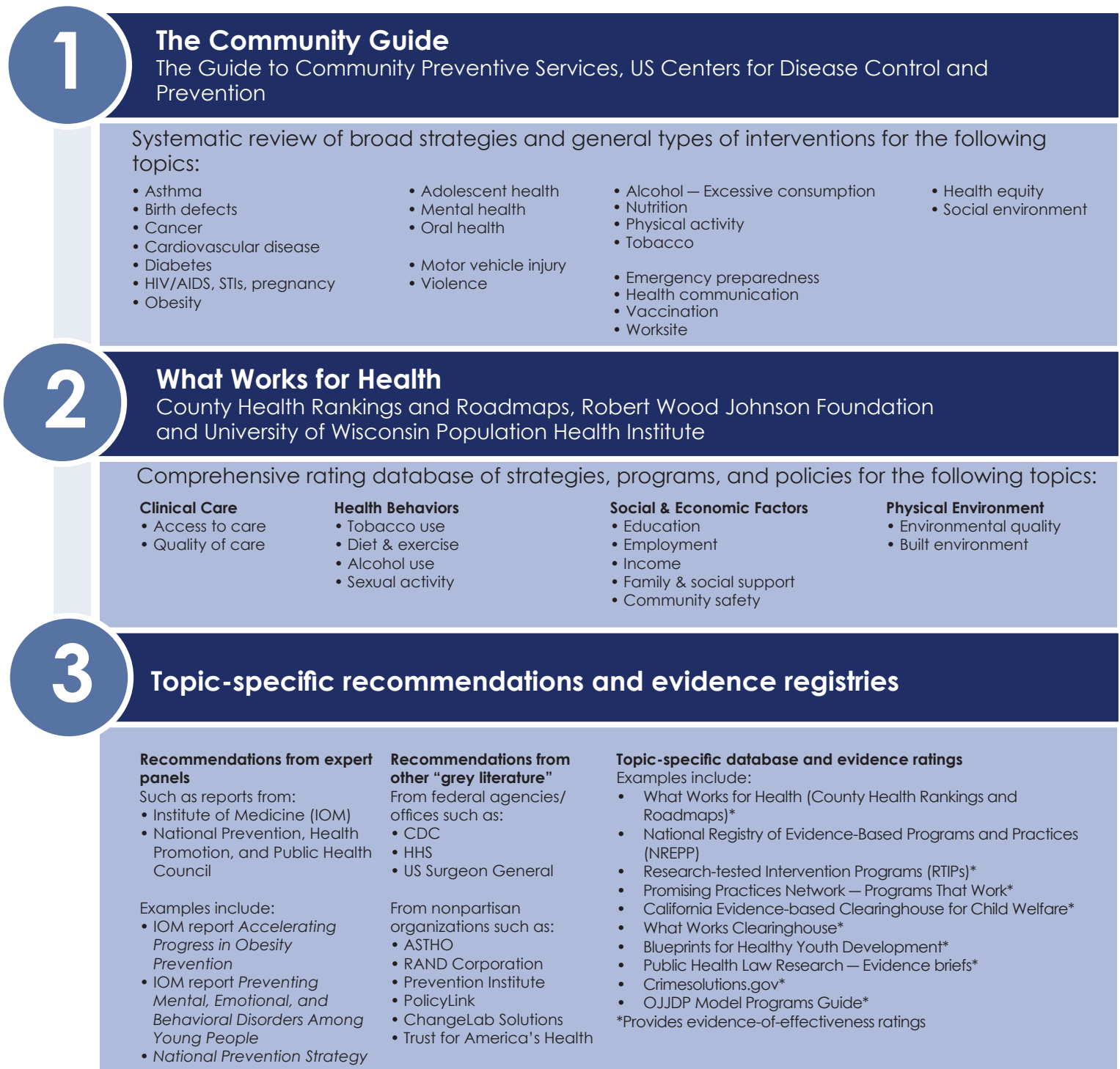
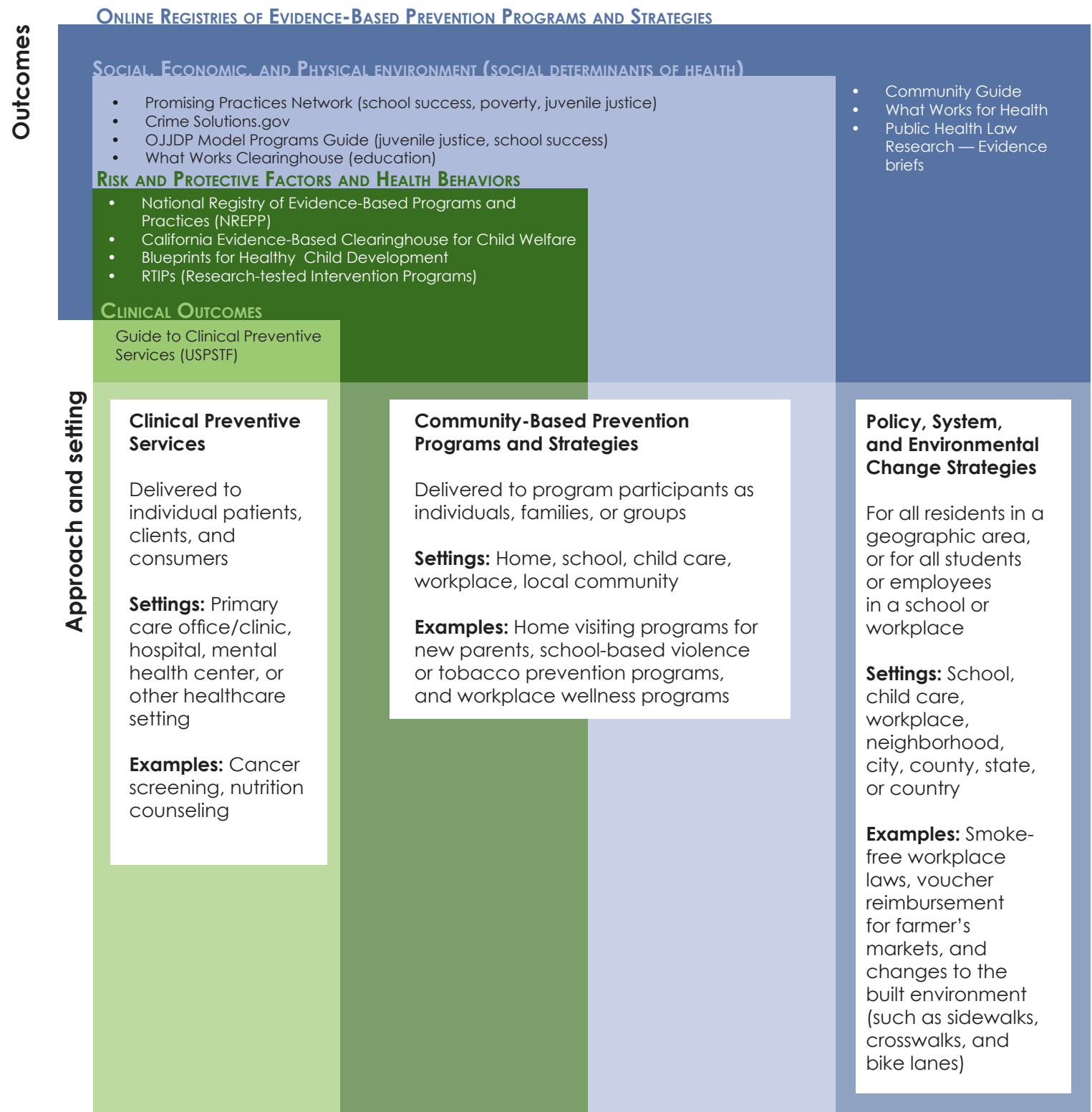


Figure 7.

## Outcomes, approaches and settings addressed by online registries of evidence-based programs and strategies



### Notes

- The Cochrane Library: About Cochrane Systematic Reviews and Protocols. <http://www.thecochranelibrary.com/view/0/AboutCochraneSystematicReviews.html> (accessed 9/9/13)
- GreyNet International: Grey Literature Network Service. <http://www.greynet.org/> (accessed 9/9/13)