

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.”¹ 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](#).

¹ Engrossed Substitute House Bill 1244, Chapter 564, Laws of 2009.

I. Research Methods

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.²

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.

² 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](#).³

³ 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

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.⁴

⁴ 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,⁵

exclude women with multiple births or complicated pregnancies, while others aim to reduce rates hospital-wide. ⁵ 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.⁶ 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.

http://www.dona.org/PDF/Birth%20Position%20Paper_rev%200912.pdf

⁶ 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.⁷ Although there is a small reduction in short-term rates of obesity, we do not find evidence that the effects persist over time.⁸

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

⁷ 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.

⁸ 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.⁹

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.

⁹ In 2012, 10% of Washington 8th, 10th, and 12th 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](#)).¹⁰ Again, cost and utilization measures may or may not be an indication of health status or well-being.

¹⁰ 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.¹¹ 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.¹²

¹¹ 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.

¹² 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.¹³ Performance varied substantially across the ten organizations, with some achieving large savings and others none.¹⁴

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.¹⁵

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

¹³ 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.

¹⁴ 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.

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

are opting for high-deductible health plans offered on state health exchanges.¹⁶

We reviewed 113 studies that examine the effects of patient cost sharing, and 42 were included in our meta-analyses.¹⁷ 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.¹⁸

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[#]

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[#]

[#]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.

¹⁶ 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.

¹⁷ 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.

¹⁸ 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%.¹⁹ 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

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

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.²⁰

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.²¹

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.

²⁰ The Affordable Care Act prohibits cost sharing for many preventive services.

²¹ 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.²²

²² Ibid.

III. Summary of Prior Findings

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.²³

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.²⁴ 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

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

²⁴ 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.²⁵

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.²⁶

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.²⁷

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.²⁸

[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.

²⁵ 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.

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

²⁷ 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>

²⁸ 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.²⁹ 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.³⁰ 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.³¹ Eleven of the studies recruited women with low incomes; thus, the results are relevant to Medicaid enrollees.³²

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.³³ The effect for these more intensive interventions was slightly higher than for programs with only brief or no face-to-face counseling.

²⁹ 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.

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

³¹ 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.

³² 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.

³³ 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
Health Promotion							
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
System Efficiency							
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%
Public Health & Prevention							
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
Accountable Care Organizations: Alternative Quality Contract (AQC)					
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
Accountable Care Organizations: Medicare Physician Group Practice Demonstration (PGPD)					
Health care costs*	2	-0.019	0.002	0.001	1,213,380
Accountable Care Organizations: Medicare Pioneer ACOs					
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
Cost sharing: Coinsurance (25% rate or higher) versus no cost sharing, general patient population					
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
Cost sharing: Copay increases across multiple services, low-income population					
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
Cost sharing: Copay increases across multiple services, low-income and chronically-ill population					
Health care costs**	1	-0.057	0.094	0.545	37,961
Cost sharing: Copays for prescription drugs, adults with a chronic illness					
Medication adherence	2	-0.602	0.118	0.001	652
Cost sharing: Copay reductions for prescription drugs used to treat chronic conditions (Value Based Insurance Design), adults with chronic illnesses					
Medication adherence	10	0.045	0.005	0.001	76,223
Cost sharing: Copays for prescription drugs, general patient population					
Hospitalization (general)	1	0	0.015	1	6,881
Prescription drug costs**	1	-0.041	0.009	0.001	16,783
Cost sharing: Copays for prescription drugs, low-income children (CHIP)					
Prescription drug costs*	1	-0.079	0.031	0.009	17,200
Cost sharing: Copays for prescription drugs, low-income children (CHIP) with a chronic illness					
Prescription drug costs*	1	-0.036	0.014	0.009	4,644
Cost sharing: Copays for prescription drugs, Medicare beneficiaries					
Hospital costs (inpatient)*	1	0.054	0.019	0.005	35,456
Prescription drug costs*	1	-0.32	0.026	0.001	35,456
Cost sharing: Emergency department copays, general patient population					
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
Cost sharing: Emergency department copays, low-income patient population					
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
Cost sharing: Copays for nonemergent emergency department visits, Medicaid adult population					
Emergency department visits*	2	0.031	0.064	0.63	21,074
Cost sharing: Various High-Deductible Health Plan designs (moderate to high deductibles, with and without HRAs or HSAs), general patient population					
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
Cost sharing: Various High-Deductible Health Plan Designs (moderate to high deductible levels, with or without HSAs), low-income patient population					
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
Cost sharing: High-Deductible Health Plans with moderate deductibles (individual < \$1000), general patient population					
Health care costs*	3	-0.029	0.014	0.044	85,731
Cost sharing: High-Deductible Health Plans with higher deductibles (individual > \$1000), general patient population					
Health care costs*	8	-0.178	0.024	0.001	142,933
Cost sharing: High-Deductible Health Plans with higher deductibles (individual > \$1000) and HRA accounts, general patient population					
Health care costs*	4	-0.152	0.028	0.001	89,701
Cost sharing: High-Deductible Health Plans with higher deductibles (individual > \$1000) and HSA accounts, general patient population					
Health care costs*	2	-0.238	0.057	0.001	14,364
Smoking cessation programs during pregnancy (all programs)					
Regular smoking	18	-0.276	0.075	0.001	3,186
Smoking cessation programs in pregnancy (face-to-face counseling programs)					
Regular smoking	9	-0.301	0.114	0.008	1,427
Smoking cessation programs in pregnancy (programs without significant face-to-face counseling)					
Regular smoking	9	-0.235	0.094	0.013	1,759
School-based programs to create a healthy food environment					
Obesity	14	-0.106	0.039	0.007	12,400
Soda taxes: a 1% higher tax on soda than on other food items					
Obesity	2	0	0.001	0.857	1,365,734
Workplace-wide interventions to prevent obesity					
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.

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