Washington State Institute for Public Policy
110 Fifth Avenue SE, Suite 214 • PO Box 40999 • Olympia, WA 98504 • 360.664.9800 • www.wsipp.wa.gov

May 2017

Interventions to Promote Health and Increase Health Care Efficiency: *May 2017 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] In 2015 WSIPP's Board of Directors authorized WSIPP to work on a joint project with the MacArthur Foundation and the Pew Charitable Trusts, with additional support from the Robert Wood Johnson Foundation, to extend WSIPP's benefit-cost analysis to certain health care topics.

In December 2016 we presented meta-analytic results for a variety of interventions to promote health and increase health care efficiency.[2] In this report, we present our benefit-cost findings for these interventions.

In Section I we describe our research approach. In Section II we discuss benefit-cost findings for interventions in four health care areas:

1) Interventions to promote healthy pregnancy and birth;
2) Therapies to treat opioid use disorder;
3) Collaborative primary care; and
4) Patient-centered medical homes.

Summary

WSIPP's Board of Directors authorized WSIPP to work on a joint project with the MacArthur Foundation and the Pew Charitable Trusts, with additional support from the Robert Wood Johnson Foundation, to extend WSIPP's benefit-cost analysis to certain health care topics.

We present new benefit-cost findings for interventions in four health care areas: 1) interventions to promote healthy pregnancy and birth; 2) therapies to treat opioid use disorder; 3) collaborative primary care; and 4) patient-centered medical homes.

These benefit-cost findings build on our meta-analytic results released in December 2016. As described in the December report, we gathered all credible evaluations we could locate for each intervention. We screened the evaluations for methodological rigor and computed the average effects of the interventions on specific outcomes. The Center for Evidence-based Policy (CEbP) at Oregon Health & Science University collaborated in this research. We found evidence that a majority of the reviewed interventions achieve at least some desired outcomes.

For this report, we calculated the per-participant benefits and costs for each intervention in the December 2016 report (when possible) and conducted a risk analysis to determine which interventions consistently have benefits that exceed costs.

We find that some approaches achieve benefits that consistently exceed costs but others do not. We describe these findings in this report and display them in Exhibits 3-6.

[1] Engrossed Substitute House Bill 1244, Chapter 564, Laws of 2009.
[2] Bauer, J., Westley, E., Barch, M., Burley, M., Cramer, J., & Kay, N. (2016). *Interventions to promote health and increase health care efficiency: December 2016 update* (Doc. No. 16-12-3401). Olympia: Washington State Institute for Public Policy.

Research Methods

The Washington State Legislature often directs WSIPP to study the effectiveness and assess the potential benefits and costs of programs and policies that could be implemented in Washington State.

These studies are designed to provide policymakers with objective information about which programs or policy options ("programs") work to achieve desired outcomes (e.g. reduced crime or improved health) and what the long-term economic consequences of these options are likely to be.

WSIPP implements a rigorous three-step research approach to undertake this type of study. Through these three steps we:

1) Identify what works (and what does not). We systematically review all rigorous research evidence and estimate the program's effect on a desired outcome or set of outcomes. The evidence may indicate that a program worked (i.e. had a desirable effect on outcomes), caused harm (i.e. had an undesirable effect on outcomes), or had no detectable effect one way or the other.
2) Assess the return on investment. Given the estimated effect of a program from Step 1, we estimate—in dollars and cents—how much it would benefit people in Washington to implement the program, and how much it would cost the taxpayers to achieve this result. We use WSIPP's benefit-cost model to develop standardized, comparable results that illustrate the expected return on investment. We present these results with a net present value for each program, on a per-participant basis. We also consider to whom monetary benefits accrue: program participants, taxpayers, and other people in society.
3) Determine the risk of investment. We assess the riskiness of our conclusions by calculating the probability that a program will at least "break even" if critical factors—like the actual cost to implement the program and the precise effect of the program—are lower or higher than our estimates.

We follow a set of standardized procedures (see Exhibit 1) for each of these steps. These standardized procedures support the rigor of our analysis and allow programs to be compared on an apples-to-apples basis.

For full detail on WSIPP's methods, see WSIPP's Technical Documentation.[3]

[3] Washington State Institute for Public Policy (May 2017). *Benefit-cost technical documentation*. Olympia, WA: Author.

Exhibit 1

WSIPP's Three-Step Approach

Step 1: Identify what works (and what does not)

We conduct a meta-analysis—a quantitative review of the research literature—to determine if the weight of the research evidence indicates whether desired outcomes are achieved, on average.

WSIPP follows several key protocols to ensure a rigorous analysis for each program examined. We:

- Search for all studies on a topic—We systematically review the national and international research literature and consider all available studies on a program, regardless of their findings. That is, we do not "cherry pick" studies to include in our analysis.
- Screen studies for quality—We only include rigorous studies in our analysis. We require that a study reasonably attempt to demonstrate causality using appropriate statistical techniques. For example, studies must include both treatment and comparison groups with an intent-to-treat analysis. Studies that do not meet our minimum standards are excluded from analysis.
- Determine the average effect size—We use a formal set of statistical procedures to calculate an average effect size for each outcome, which indicates the expected magnitude of change caused by the program (e.g., group prenatal care) for each outcome of interest (e.g., preterm birth).

Step 2: Assess the return on investment

WSIPP has developed, and continues to refine, an economic model to provide internally consistent monetary valuations of the benefits and costs of each program on a per-participant basis.

Benefits to individuals and society may stem from multiple sources. For example, a program that reduces the need for government services decreases taxpayer costs. If that program also improves participants' educational outcomes, it will increase their expected labor market earnings. Finally, if a program reduces crime, it will also reduce expected costs to crime victims.

We also estimate the cost required to implement an intervention. If the program is operating in Washington State, our preferred method is to obtain the service delivery and administrative costs from state or local agencies. When this approach is not possible, we estimate costs using the research literature, using estimates provided by program developers, or using a variety of sources to construct our own cost estimate.

Step 3: Determine the risk of investment

Any tabulation of benefits and costs involves a degree of uncertainty about the inputs used in the analysis, as well as the bottom-line estimates. An assessment of risk is expected in any investment analysis, whether in the private or public sector.

To assess the riskiness of our conclusions, we look at thousands of different scenarios through a Monte Carlo simulation. In each scenario we vary a number of key factors in our calculations (e.g., expected effect sizes, program costs), using estimates of error around each factor. The purpose of this analysis is to determine the probability that a particular program or policy will produce benefits that are equal to or greater than costs if the real-world conditions are different than our baseline assumptions.

Interventions reviewed

In December 2016 WSIPP published meta-analytic findings for a variety of interventions intended to promote health and increase health care efficiency.[4] The current report presents benefit-cost findings for the interventions described in the December 2016 report.[5]

These interventions fall into four topics areas:

1) Programs to promote healthy pregnancy and birth;
2) Therapies to treat opioid use disorder;
3) Collaborative primary care; and
4) Patient-centered medical homes.

Brief descriptions of each intervention can be found in Section II. Complete meta-analytic results can be found on the WSIPP website.

Outcomes examined

Evaluations of the health care interventions considered in this report often measure two broad types of outcomes: 1) those that reflect the health status of people (e.g., the rate of disease in a given population) and 2) those that reflect the use of health care resources and associated costs.[6] Our approach captures both types of outcomes.

The primary economic benefits for the interventions reviewed are driven by the following: 1) changes in costs due to changes in the use of health care resources, 2) changes in the rate of certain health conditions, and 3) changes in total costs of care resulting from health care interventions.[7]

Many of the studies we reviewed report changes in the use of specific health care resources, such as emergency room visits, cesarean sections, and neonatal intensive care unit (NICU) admissions. We estimate the cost of these health care resources for the specific populations targeted by each intervention (e.g., pregnant women on Medicaid or chronically ill older adults).

Changes in the rate of certain health conditions can affect labor market earnings, health care costs, and the expected value of future statistical life years. For example, if a diabetes prevention program reduces the number of people who ultimately get diabetes, then a program participant would be expected to have greater labor market earnings; require fewer health care resources

[4] Bauer et al. (2016).

[5] We are unable to produce benefit-cost findings for interventions which do not report monetizable outcomes or which did not have sufficient information about program costs. These interventions include postpartum smoking relapse prevention; early initiation of methadone treatment; early initiation of buprenorphine treatment; telemedicine for treatment of posttraumatic stress disorder (PTSD) in primary care; telemedicine for treatment of depression in primary care; and patient-centered medical homes in integrated health systems. See our website for meta-analytic results for these interventions.

[6] Cost and utilization measures may or may not be an indication of health status or well-being.

[7] See WSIPP's Technical Documentation for a thorough description of these methods.

(and therefore have lower total medical costs); and live longer, on average, than if they had not participated in the program. Our benefit-cost model monetizes all of these benefits.

Studies of some interventions also report changes in the total cost of care. For example, a study on a diabetes prevention program may report lower average medical costs for program participants over five years, compared to individuals who did not participate in the program. Our model captures these directly measured changes in medical costs.

The specific outcomes captured and monetized vary by intervention and are discussed more completely within each relevant section of this report.

Notably, we conducted a primary analysis of Washington State birth certificate and hospital discharge data to estimate the costs related to key birth indicators. This analysis is a new addition to WSIPP's benefit-cost model and is discussed comprehensively in the Health Care Technical Appendix.[8]

In some cases, we examine outcomes that we cannot currently use for benefit-cost analysis. Some examples of health outcomes that we do not currently monetize include maternal hypertension, retention in treatment, and blood pressure measures. We report these outcomes for informational purposes in our meta-analytic results, which can be found on our website.

[8] Westley, E. & He, L. (2017). *Estimating effects of birth indicators on health care utilizations costs and infant mortality: Technical appendix.* Olympia: Washington State Institute for Public Policy.

II. Research Findings

We present benefit-cost findings for interventions in four topic areas:

1) Programs to promote healthy pregnancy and birth;
2) Therapies to treat opioid use disorder;
3) Collaborative primary care; and
4) Patient-centered medical homes.

For each topic area, we present key considerations relevant to that area and an exhibit displaying our per-participant bottom-line estimates for each intervention.

A description of how to read the exhibits is provided in Exhibit 2 below. Following each exhibit, we provide short descriptions of the interventions reviewed.

Exhibit 2

How to Interpret WSIPP's Benefit-Cost Results (Exhibits 3-6)

The numbered columns on Exhibits 3-6 are described below.

1) Program name describes the name of the intervention analyzed. Some programs are general categories of a type of intervention, while others are specific name-brand programs. Descriptions of each program can be found following each exhibit, as well as on our website.[#]
2) Total benefits are the average benefits of the intervention, per-participant. This is the sum of the taxpayer and non-taxpayer benefits.
3) Taxpayer benefits are benefits that accrue to the taxpayers of the state of Washington through avoided publicly funded health care system costs and/or taxes participants would pay on their increased labor market earnings.
4) Non-taxpayer benefits include benefits that accrue directly to program participants; benefits to others, such as reduced costs to private health insurance providers; and indirect benefits, such as the value of a statistical life and the deadweight costs of taxation.
5) Costs are the estimated per-participant cost to implement the program in Washington, relative to the cost of treatment as usual. If the cost is positive, the intervention is estimated to be cheaper than the treatment as usual.
6) Benefits minus costs are the net benefits, or the difference between the total benefits and the cost to implement the program, per participant. If this number is positive, the expected benefits of the program exceed the estimated cost. If this number is negative, the program is estimated to cost more than the sum of the expected benefits.
7) Benefit-to-cost ratios represent the estimated value to Washington State for each dollar invested in the program. It is the total benefits divided by the cost of the program. If a program cost is positive, the benefit-to-cost ratio is designated as "n/a" – not applicable.
8) Chances benefits will exceed costs describes the risk of the investment. In our benefit-cost analysis, we account for uncertainty in our estimates by allowing key inputs to vary across thousands of scenarios. We run our benefit-cost model 10,000 times; this statistic shows the percentage of cases in which the total benefits were greater than the costs.

[#] The benefit-cost section of WSIPP's website presents our current findings for a variety of public policy topics. Items on these tables are updated periodically as new information becomes available. Interested readers can find more information by clicking each entry in the tables.

1) Interventions to promote healthy pregnancy and birth

We examined interventions that aim to support healthy pregnancy and birth, including:

- Interventions to promote smoking cessation during pregnancy;
- Interventions to prevent excessive gestational weight gain;
- Group prenatal care;
- Enhanced prenatal care; and
- Prenatal home visiting programs.

These types of interventions are typically intended for women with high-risk pregnancies due to their age, race, socio-economic status, health behaviors, or health conditions. Generally, interventions that promote healthy pregnancy and birth aim to improve outcomes for both the mother and the infant. We reviewed the research evidence on these interventions and their effects on mortality, pregnancy indicators, birth indicators, and health care utilization.

The primary drivers of the benefit-cost findings for these interventions are 1) changes in health care utilization costs for the mother and the infant (e.g., increased inpatient hospitalization costs related to a preterm birth) and 2) the value of future statistical life years associated with changes in infant mortality.[9] Our model captures both direct and indirect costs associated with measured outcomes.

Outcomes that drive the benefit-cost results[10] for these interventions are:

- Infant mortality;
- Preterm, low birthweight, very low birthweight, and small for gestational age births;
- Cesarean sections; and
- Neonatal intensive care unit (NICU) admissions.

Exhibit 3 provides our benefit-cost findings for these interventions[11] and is followed by brief descriptions of each intervention. See our website for additional information on each intervention, including meta-analytic results and detailed benefit-cost findings.

[9] For interventions that do not directly measure effects on infant mortality, we use our primary data analysis to estimate the indirect effect of birth indicators on infant mortality. Our analysis links preterm, low birthweight, very low birthweight, and small for gestational age births to increased odds of infant mortality. See the Health Care Technical Appendix for details.

[10] For details on how we calculate the direct and indirect costs of these outcomes for both mothers and infants. See the Health Care Technical Appendix and WSIPP's Technical Document.

[11] In our meta-analysis, we also report pregnancy and birth outcomes including postpartum smoking, maternal hypertension, and adequate prenatal care. However, these outcomes are not currently monetized in our benefit-cost model. See our website for detailed meta-analytic findings.

Exhibit 3

Benefit-Cost Results: Interventions to Promote Healthy Pregnancy and Birth

Program name (1)	Total benefits (2)	Taxpayer benefits (3)	Non-taxpayer benefits (4)	Costs (5)	Benefits minus costs (net present value) (6)	Benefit to cost ratio (7)	Chance benefits will exceed costs (8)
Interventions to promote smoking cessation during pregnancy							
Smoking cessation programs for pregnant women: Contingency management	$9,972	$970	$9,002	($209)	**$9,763**	$47.61	**98%**
Smoking cessation programs for pregnant women: Nicotine replacement treatment	$3,347	$312	$3,035	($116)	**$3,231**	$28.82	**75%**
Smoking cessation programs for pregnant women: Intensive behavioral interventions	$2,262	$204	$2,058	($95)	**$2,168**	$23.90	**89%**
Interventions to prevent excessive gestational weight gain							
Interventions to prevent excessive gestational weight gain (population with obesity-related risk factors)	($751)	($212)	($538)	($202)	**($953)**	($3.71)	**47%**
Interventions to prevent excessive gestational weight gain (general population)	($928)	$119	($1,047)	($184)	**($1,112)**	($5.03)	**36%**
Group prenatal care							
Group prenatal care (compared to standard prenatal care)	$2,695	$176	$2,520	$1,095	**$3,791**	n/a*	**94%**
Enhanced prenatal care							
Enhanced prenatal care programs delivered through Medicaid	$6,396	$841	$5,555	($415)	**$5,981**	$15.42	**98%**
Non-Medicaid enhanced prenatal care programs for African-American women	$3,355	$561	$2,795	($592)	**$2,763**	$5.66	**69%**
Non-Medicaid enhanced prenatal care programs for adolescents	$2,996	$644	$2,351	($513)	**$2,483**	$5.84	**73%**
Prenatal home visiting programs							
Other prenatal home visiting programs	$11,625	$748	$10,878	($693)	**$10,932**	$16.77	**100%**
Resource Mothers Program	$2,005	$358	$1,647	($716)	**$1,290**	$2.80	**84%**

Note:
*This program costs less than standard treatment, and therefore does not have a "cost." For programs like this, we cannot compute a benefit-cost ratio.

Intervention descriptions

Contingency management for smoking cessation during pregnancy. Contingency management is a supplement to counseling that rewards participants for attending treatment and/or abstaining from substance use. The interventions reviewed recruited women who were smoking during pregnancy and provided rewards contingent on quitting and remaining abstinent. Rewards were in the form of vouchers exchangeable for goods. Participants typically received vouchers worth $400 to $600.

Nicotine replacement treatment during pregnancy. We reviewed program evaluations where nicotine replacement (patches or gum) was provided along with behavioral counseling for pregnant women. Individuals in comparison groups received either no nicotine replacement or a placebo patch along with behavioral counseling for smoking cessation. Individuals received treatment between 6 and 12 weeks.

Intensive behavioral interventions for smoking cessation during pregnancy. We reviewed behavioral interventions that provided intensive face-to-face or phone counseling for smoking cessation during pregnancy.[12] These interventions are tailored to pregnant smokers, include more than a single brief counseling session, and offer self-help materials to encourage smoking cessation. Motivational interviewing is the most common type of counseling.

[12] We excluded evaluations of programs that only included a single brief counseling session (< 15 minutes), that only provided self-help materials, and that did not use laboratory tests to confirm smoking status.

Interventions to prevent excessive gestational weight gain (population with obesity-related risk factors). A wide range of interventions aim to prevent excessive gestational weight gain in a population with obesity-related risk factors (based on their pre-pregnancy Body Mass Index [BMI]). We included interventions that offer an exercise class and interventions that offer counseling on recommended weight gain during pregnancy. Typically athletic trainers lead exercise programs in groups, and counseling is delivered one-on-one in a clinical setting by a health educator, midwife, psychologist, or obstetrician.

Interventions to prevent excessive gestational weight gain (general population). A wide range of interventions aim to prevent excessive gestational weight gain. We included interventions that offer an exercise class and interventions that offer counseling on recommended weight gain during pregnancy. Typically athletic trainers lead exercise programs in groups, and counseling is delivered one-on-one in a clinical setting by a health educator, midwife, or obstetrician. Counseling ranged from one to nine sessions.

Group prenatal care. Prenatal care visits are traditionally conducted by an obstetrician or midwife in a clinical setting. Group prenatal care is an alternative strategy to deliver prenatal education, clinical assessments, and testing in a non-clinical setting, such as a community center. Groups are typically led by an obstetrician or midwife and may also include a registered nurse or medical assistant as a second staff member.

Five out of six studies included in this analysis used the CenteringPregnancy model of prenatal care, which includes ten

sessions of education and clinical assessments in a group setting. On average, sessions are two hours long with groups of six to twelve women. One study in this analysis provided prenatal education in groups of six to eight and taught pregnant teens to conduct routine clinical measurements on their peers.[13] In this analysis, individuals received group prenatal care for about seven months. All women in the comparison groups received standard clinical prenatal care.

Enhanced prenatal care programs delivered through Medicaid. Since 1985, prenatal care coordination has been a part of the federal Medicaid program,[14] providing enhanced prenatal care services to low-income women. These services are intended to be provided in addition to clinical prenatal care. Enhanced prenatal care programs delivered through Medicaid typically included risk assessment, case management, psychosocial support, and health education. Women are eligible for these programs at any time during their pregnancy and for the first 12 months postpartum.

Participants typically received the program for 3-16 months, including both prenatal and postpartum services. All women in treatment and comparison groups received clinical prenatal care (treatment as usual).

Non-Medicaid enhanced prenatal care programs for African-American women. Non-Medicaid enhanced prenatal care programs for African-American women provide psychosocial support and health education regarding risk reduction. Some programs also include case management and nutritional counseling. Services are provided by paraprofessionals or nurses.

Participants in the reviewed studies typically received the program for five months, including prenatal and postpartum services.[15] All women in treatment and comparison groups received clinical prenatal care (treatment as usual).

Non-Medicaid enhanced prenatal care programs for adolescents. Non-Medicaid enhanced prenatal care programs for adolescents are tailored to meet the needs of pregnant women who are age 19 or under. These programs included intensive case management, group classes, or both, provided by either a paraprofessional or team of health service providers.

The programs reviewed focused exclusively on the prenatal period and did not include postpartum services. Participants could enroll at any time during their pregnancy and typically received the program for four months. All women in treatment and comparison groups received clinical prenatal care (treatment as usual).

Other prenatal home visiting programs. This broad grouping of interventions captures home visiting programs that focus on pregnant women.[16] These programs are intended for women with high-risk pregnancies based on socioeconomic status, race, or other pregnancy risk factors. In these programs, nurses, social workers, or

[13] The "routine measures" included fetal heart tones, fundal height measurement, weights, and blood pressure measures. Ford, et al. (2002).

[14] In 1985 the Omnibus Budget Act directed Health Care Financing to PNCC programs, as part of a larger effort to address disparate birth outcomes and infant mortality rates.

[15] Three of the four included programs required enrollment before the 3rd trimester of pregnancy. The fourth program allowed enrollment at any time during the pregnancy.

[16] We exclude interventions that solely target adolescent women from this analysis.

trained paraprofessional providers make regular home visits to provide one or more non-clinical services that support maternal wellness and infant health during the prenatal period.[17]

Services may include case management, health education, risk assessment, psychosocial support, or nutritional counseling. Some program services continued for up to 12 months postpartum. All women in treatment and comparison groups received clinical prenatal care (treatment as usual).

Resource Mothers Program. The Resource Mothers Program is a prenatal home visiting program for pregnant adolescents ages 19 and under. Adolescent women are eligible for this program during their pregnancy and for 12 months postpartum. In this program, a paraprofessional provider called a "resource mother" makes monthly visits to the adolescents' home to provide case management, risk assessments, psychosocial support, or health education. Resource mothers are supervised by a social worker.[18] All women in treatment and comparison groups received clinical prenatal care.

[17] We performed sensitivity analyses on provider type (paraprofessional versus nurses/social workers) and length of program. We found no difference in cost or effect size, so we included all provider types in this analysis.

[18] Both of the Resource Mothers Program studies included were implemented in South Carolina and provided an average of 16 home visiting hours, 1 training hour, and 1 supervisory hour per participant.

2) Therapies to treat opioid use disorder

Comprehensive responses to opioid use disorder include prevention, treatment and harm reduction.[19] This report focuses on treatment for opioid use disorder, including:

- Medication-assisted maintenance therapies and
- Nonpharmacological therapies for opioid use disorder.

Treatment for opioid use disorder typically includes detoxification, stabilization, and medication-assisted maintenance treatment with methadone or buprenorphine.[20] The medications are intended to prevent withdrawal symptoms and/or block the euphoric effects of opioids. Nonpharmacological therapies (such as counseling) are typically provided alongside medication-assisted therapies.

[19] See: Franklin, G., Sabel, J., Baumgartner, C., Jones, C.M., Mai, J., Banta-Green, C.J., . . . Tauben, D.J. (2015). A comprehensive approach to address the prescription opioid epidemic in Washington State: Milestones and lessons learned. *Am. J. Public Health American Journal of Public Health, 105*(3), 463-469; Compton, W., Boyle, M., & Wargo, E. (2015). Prescription opioid abuse: problems and responses. *Preventive Medicine. 80*, 5-9; Haegerich, T., Paulozzi, L., Manns, B. & Jones, C. (2014). What we know, and don't know, about the impact of state policy and systems-level interventions on prescription drug overdose. *Drug and Alcohol Dependence, 145*, 34-47; Kolodny, A., Courtwright, D., Hwang C., Kreiner, P., Eadie, J., Clark, T., & Alexander, G. (2015). The prescription opioid and heroin crisis: a public health approach to an epidemic of addiction. *Annual Review of Public Health. 36*, 559-74.

[20] Clausen T. (2015). Commentary on Evans et al. (2015): Coherent long-term treatment approaches—superior in treatment of opioid dependence. *Addiction 110*, 1006-1007; Mauger S., Fraser R., & Gill K. (2014). Utilizing buprenorphine-naloxone to treat illicit and prescription-opioid dependence. *Neuropsychiatric Disease and Treatment 10*, 587-598.

For these types of interventions, the primary drivers of our benefit-cost results are changes in labor market earnings and health care utilization costs associated with opioid use disorder.[21]

Exhibit 4 provides benefit-cost findings for these interventions and is followed by brief descriptions of each intervention. See our website for additional information on each intervention, including meta-analytic and detailed benefit-cost findings.

In addition, WSIPP recently published benefit-cost findings on long-acting medications[22] for opioid use disorder, including:

- Injectable naltrexone,
- Injectable bromocriptine,
- Naltrexone implants, and
- Buprenorphine implants.

Results for these topics can be found on our website and are detailed in a separate report.[23]

Exhibit 4

Benefit-Cost Results: Therapies to Treat Opioid Use Disorder

Program name (1)	Total benefits (2)	Taxpayer benefits (3)	Non-taxpayer benefits (4)	Costs (5)	Benefits minus costs (net present value) (6)	Benefit to cost ratio (7)	Chance benefits will exceed costs (8)
Contingency management (lower cost) for opioid use disorder	$8,305	$955	$7,350	($356)	**$7,949**	$23.35	**100%**
Methadone maintenance for opioid use disorder	$8,257	$1,140	$7,117	($3,769)	**$4,488**	$2.19	**88%**
Buprenorphine (or buprenorphine/naloxone) maintenance treatment for opioid use disorder	$8,092	$1,161	$6,931	($4,633)	**$3,458**	$1.75	**86%**
Cognitive-behavioral coping-skills therapy for opioid use disorder	($535)	($34)	($501)	($538)	**($1,073)**	($0.99)	**42%**

[21] See WSIPP's Technical Documentation for details on how we calculate the direct and indirect costs of this outcome. Note that WSIPP does not currently monetize the "opportunity costs" to the participant for these programs (i.e., the costs of need to attend a clinic every day to receive methadone medication).

[22] Patients treated with methadone or buprenorphine may struggle with adherence, as their doses are taken daily or several times a week. In the case of methadone maintenance treatment, patients must receive the daily medication in specialized clinics. Long-acting injectable medications for substance use disorders were developed in part to improve treatment adherence. Because these medications are administered as monthly injections, patients do not have to travel to a clinic for treatment every day. We also reviewed the evidence for more recently developed implantable medications that last for six months.

[23] Nafziger, M. (2016). *Long-acting injectable medications for alcohol and opiate dependence: Benefit-cost findings* (Document Number 16-12-3901). Olympia: Washington State Institute for Public Policy. See our website for findings.

Intervention descriptions

Contingency management (lower cost) for opioid use disorder. Contingency management is a supplement to counseling treatment that rewards participants for attending treatment and/or abstaining from substance use.

The interventions reviewed here focused on those with opioid use disorders who were also receiving medicated-assisted drug treatment and counseling. Contingencies were provided for remaining abstinent. Two methods of contingency management were reviewed: 1) A voucher system where abstinence was rewarded with vouchers exchangeable for goods provided by the clinic or counseling center and 2) a prize or raffle system where clients who remained abstinent could draw from a prize bowl.

Treatment in the included studies lasted between one and six months with reward opportunities occurring two to three times per week, on average. The value of contingencies in the programs reviewed ranged from $59-$253 per participant, with an average of $168 (in 2016 dollars).[24]

Methadone maintenance treatment for opioid use disorder. Methadone is an opiate substitution treatment used to treat opioid dependence. It is a synthetic opioid that blocks the effects of opiates, reduces withdrawal symptoms, and relieves cravings. Methadone is a daily medication dispensed in outpatient clinics that specialize in methadone treatment and is often used in conjunction with behavioral counseling approaches.

The studies included in our analysis evaluated methadone maintenance rather than short-term detoxification or stabilization. We excluded studies with treatment dosages below standard guidance (< 50 mg/day).

Buprenorphine (or buprenorphine/naloxone) maintenance treatment for opioid use disorder. Buprenorphine is an opiate substitution treatment for opioid dependence. Buprenorphine can be used to treat both heroin and prescription opioid users.[25] It is a daily medication generally provided in addition to counseling therapies.

Buprenorphine (or buprenorphine/naloxone) is a partial agonist that suppresses withdrawal symptoms and blocks the effects of opioids. Two versions of buprenorphine are used in the treatment of opioid dependence. Subutex consists of buprenorphine only while Suboxone is a version of buprenorphine that combines buprenorphine and naloxone.[26] Suboxone is generally given during the maintenance phase and many clinics will only provide take-home doses of Suboxone.

[24] Based on a statistical analysis of contingency management studies, we determined that programs with a maximum value of vouchers or prizes less than or equal to $500 (in 2012 dollars) represent lower-cost contingency management.

[25] Potter, J., Marino, E., Hillhouse, M., Nielsen, S., Wiest, K., Canamar, C., Martin, J., Ang, A., Baker, R., Saxon, A., & Ling, W. (2013). Buprenorphine/naloxone and methadone maintenance treatment outcomes for opioid analgesic, heroin, and combined users: findings from starting treatment with agonist replacement therapies (START). *Journal of Studies on Alcohol and Drugs, 74*(4), 605-13; McHugh, R., Nielson, S., & Weiss, R. (2015). Prescription drug abuse: from epidemiology to public policy. *Journal of Substance Abuse Treatment,. 48*(1), 1-7; Moore, B., Fiellin, D., Barry, D., Sullivan, L., Chawarski, M., O'Connor, P., & Schottenfied., R. (2007). Primary care office-based buprenorphine treatment: comparison of heroin and prescription opioid dependent patients. *Journal of General Internal Medicine, 22*(4), 527-530.

[26] The addition of naloxone reduces the probability of overdose and reduces misuse by producing severe withdrawal effects if taken any way except sublingually.

Buprenorphine and buprenorphine/naloxone are alternatives to methadone treatments and, unlike methadone, can be prescribed in office-based settings by physicians that have completed a special training.

We reviewed studies that evaluated the effectiveness of buprenorphine maintenance therapy.[27] We excluded studies with treatment dosages below current guidance (< 8 mg/day).

Cognitive-behavioral coping-skills therapy for opioid use disorder. Cognitive-behavioral coping-skills therapy is a manualized, standalone treatment for alcohol and/or drug use disorder. This intervention emphasizes identifying high-risk situations that could lead to relapse and developing associated coping skills. Clients engage in problem solving, role playing, and homework practice. The intervention is often provided in an individual therapy format but can also be conducted in groups.

Studies used in this analysis evaluated the program in a population of opioid users receiving methadone or buprenorphine maintenance treatment. Treatment in the included studies occurred over an average of three months.

[27] These studies compared outcomes for subjects receiving buprenorphine maintenance treatment with those receiving no medication-assisted therapy. Note that many recent studies, excluded from our analysis, compared the efficacy of methadone versus buprenorphine treatment.

3) Collaborative primary care

We examined collaborative primary care as an intervention that aims to improve treatment for patients with behavioral health diagnoses.[28] We analyzed the effect of collaborative primary care for several separate[29] populations, including:

- Adults with anxiety,
- Adults with depression,
- Older adults with depression,
- Adults with depression and comorbid medical conditions, and
- Older adults with depression and comorbid medical conditions.

Collaborative primary care models include care management, a team of at least two care providers, and individualized and measurement-based treatment plans.[30] Primary care providers initially screen patients for behavioral health conditions and provide an assessment. Care managers, usually located in a primary care setting, then develop an individualized and measurement-based treatment plan and coordinate with

[28] WSIPP previously investigated the use of telemedicine for behavioral health in primary care. There is insufficient data on program costs to conduct a benefit-cost analysis at this time. We report meta-analytic findings on this intervention on our website.

[29] For topics 1) collaborative primary care for depression and 2) collaborative primary care for depression and comorbid medical conditions, general adult and older adult populations were mutually exclusive. That is, studies that focused on adult populations (18 years and older) were included in the "general adult" meta-analysis. Some older adults were included in these studies, but collaborative care was not specifically targeted to older adult populations. Studies that focused on older adult populations were included in the "older adult" meta-analysis. See program descriptions for specific populations analyzed.

[30] Shippee et al. (2013) and American Psychiatric Association and the Academy of Psychosomatic Medicine. (2016). *Dissemination of integrated care within adult primary care settings: The Collaborative Care Model.* Retrieved from https://www.psychiatry.org/psychiatrists/practice/professional-interests/integrated-care/collaborative-care-model.

Exhibit 5

Benefit-Cost Results: Collaborative Primary Care

Program name (1)	Total benefits (2)	Taxpayer benefits (3)	Non-taxpayer benefits (4)	Costs (5)	Benefits minus costs (net present value) (6)	Benefit to cost ratio (7)	Chance benefits will exceed costs (8)
Collaborative primary care for anxiety (general adult population)	$12,301	$3,985	$8,316	($834)	**$11,467**	$14.76	**90%**
Collaborative primary care for depression (general adult population)	$10,471	$3,371	$7,100	($834)	**$9,637**	$12.56	**98%**
Collaborative primary care for depression with comorbid medical conditions (general adult population)	$6,877	$2,275	$4,602	($937)	**$5,939**	$7.34	**100%**
Collaborative primary care for depression with comorbid medical conditions (older adult population)	$1,968	$692	$1,276	($575)	**$1,392**	$3.42	**82%**
Collaborative primary care for depression (older adult population)	$1,275	$481	$794	($577)	**$698**	$2.21	**78%**

primary care and behavioral health care providers to administer care and regularly follow up with patients.

We reviewed evidence of the effect of collaborative primary care on anxiety, depression, total medical costs, and other quantifiable health outcomes related to comorbid medical conditions.[31] For this intervention, benefits are valued through health care utilization and labor market earnings associated with changes in the incidence of anxiety and depression[32].

For these interventions, the primary drivers of our benefit-cost results are changes in labor market earnings and health care utilization costs associated with changes in depression and anxiety.

Exhibit 5 provides our benefit-cost findings for the five populations analyzed and is followed by brief descriptions of the intervention for each population. See our website for additional information, including detailed benefit-cost findings.

[31] We report meta-analytic results for total medical costs (reported as percentage changes), suicidal ideation, and outcomes associated with comorbidity (e.g., HbA1c [blood sugar] and LDL cholesterol). However, these outcomes were not monetized in our benefit-cost model.

[32] See WSIPP's Technical Documentation for details on how we calculate the direct and indirect costs of these outcomes.

Intervention descriptions

Collaborative primary care for anxiety (general adult population). We examined the impact of collaborative primary care in reducing anxiety symptoms among adults ages 18 and older diagnosed with panic disorder, generalized anxiety disorder, or social anxiety disorder.[33] In these programs, patients received treatment for 6 to 12 months.

Collaborative primary care for depression (general adult population). This review focused on collaborative primary care programs for adults ages 18 and older with depressive disorders, including major or minor depression, dysthymia, or subthreshold depression.[34] In the included evaluations, patients received collaborative care for 3 to 36 months.

Collaborative primary care for depression with comorbid medical conditions (general adult population). In this analysis, collaborative primary care programs focused on adult patients ages 18 and older with depression and comorbid medical conditions including diabetes, heart disease, acute coronary syndrome, hypertension, or stroke.[35] In the included programs, patients received treatment for 3 to 12 months.

Collaborative primary care for depression with comorbid medical conditions (older adult population). In this analysis, we included collaborative primary care programs focused on older adults ages 50 and older diagnosed with depression and comorbid medical conditions, including diabetes and hypertension.[36] Patients received treatment for 1 to 12 months.

Collaborative primary care for depression (older adult population). Collaborative primary care programs for older adults with depression have a similar structure to collaborative care programs for adults, but care management and treatment approaches are tailored for patients ages 60 and older.[37] This approach can include screening patients using the Geriatric Depression Scale[38] and adhering to treatment guidelines for older adult populations. In the included studies, patients received collaborative care for 3 to 12 months.

[33] Among the included studies, the average age of participants was 44.
[34] Among the included studies, the average age of participants was 46.
[35] Among the included studies, the average age of participants was 57.
[36] Among the included studies, "older adults" was defined as adults ages 50 and older. The average age of participants was 67.
[37] Among the included studies, "older adults" was defined as adults ages 60 and over. The average age of participants was 72.
[38] The Geriatric Depression Scale is a 30-item self-assessment used to screen for depression among older adults.

4) Patient-centered medical homes

The patient-centered medical home (PCMH) model attempts to make health care more efficient by implementing a set of changes to primary care. PCMHs are designed to provide comprehensive care, treating both acute needs and promoting population health. The PCMH model emphasizes care coordination across providers, patient engagement, evidence-based care, use of health information technology, and enhanced patient access. Our analysis includes studies which evaluate "full" implementation of the PCMH model. [39]

All PCMH models share several features in common. Providers typically receive a per-member per-month care management payment, in addition to traditional fee-for-service payments, for establishing medical homes. Payers (private health insurers, Medicaid, and Medicare) may also provide pay-for-performance bonuses, usually for meeting certain quality of care measures. The PCMHs reviewed are implemented in physician-led practices that 1) serve either a general or high-risk population and 2) do or do not receive incentives to reduce utilization and costs. [40]

For these types of interventions, changes in health care utilization costs are the primary drivers of our benefit-cost results. The measured outcomes that drive these benefit-cost results include:

- Emergency department visits,
- Hospitalizations, and
- Total medical costs.

Exhibit 6 displays our benefit-cost findings for these PCMH models and is followed by brief descriptions of each intervention. See our website for additional information on each intervention, including meta-analytic and detailed benefit-cost findings.

[39] "Full" implementations are identified by National Committee for Quality Assurance (NCQA) recognition or by the inclusion of several of the criteria underlying this recognition (e.g., team-based care, comprehensive care, care coordination, system-based approaches to quality, patient-centered care, and enhanced access). We exclude studies that focus exclusively on care management or disease management.

[40] We also reviewed evidence on the effectiveness of patient-centered medical homes implemented in integrated health delivery systems but did not have sufficient cost information to conduct a benefit-cost analysis on this type of implementation. We provide meta-analytic findings on our website.

Exhibit 6

Benefit-Cost Results: Patient-Centered Medical Homes

Program name (1)	Total benefits (2)	Taxpayer benefits (3)	Non-taxpayer benefits (4)	Costs (5)	Benefits minus costs (net present value) (6)	Benefit to cost ratio (7)	Chance benefits will exceed costs (8)
Patient-centered medical homes in physician-led practices without explicit utilization or cost incentives (high-risk population)	$149	$75	$75	($83)	**$66**	$1.80	**45%**
Patient-centered medical homes in physician-led practices without explicit utilization or cost incentives (general population)	$32	$29	$3	($83)	**($51)**	$0.39	**34%**
Patient-centered medical homes in physician-led practices with utilization or cost incentives (high-risk population)	$89	$65	$24	($155)	**($66)**	$0.57	**35%**
Patient-centered medical homes in physician-led practices with utilization or cost incentives (general population)	$36	$44	($9)	($155)	**($119)**	$0.23	**31%**

Intervention descriptions

PCMHs in physician-led practices without explicit utilization or cost incentives (high-risk population). This category includes PCMH programs that were implemented in physician-led practices but had no explicit incentives regarding cost or utilization. These results are for chronically ill or older adults.

PCMHs in physician-led practices without explicit utilization or cost incentives (general population). This category includes PCMH programs that were implemented in physician-led practices but had no explicit incentives regarding cost or utilization.

PCMHs in physician-led practices with utilization or cost incentives (high-risk population). This category includes PCMH programs that were implemented in physician-led practices where providers were offered financial incentives to reduce utilization and costs, such as shared cost savings. These results are for chronically ill or older adults.

PCMHs in physician-led practices with utilization or cost incentives (general population). This category includes PCMH programs that were implemented in physician-led practices where providers were offered financial incentives to reduce utilization and costs, such as shared cost savings.

Studies used in the Meta-Analyses

Contingency management for smoking cessation during pregnancy

Heil, S.H., Higgins, S.T., Bernstein, I.M., Solomon, L.J., Rogers, R.E., Thomas, C.S., . . . Lynch, M.E. (2008). Effects of voucher-based incentives on abstinence from cigarette smoking and fetal growth among pregnant women. *Addiction 103*(6), 1009-18.

Higgins, S.T., Heil, S.H., Solomon, L.J., Bernstein, I.M., Lussier, J.P., Abel, R.L., . . . Badger, G.J. (2004). A pilot study on voucher-based incentives to promote abstinence from cigarette smoking during pregnancy and postpartum. *Nicotine & Tobacco Research, 6(*6), 1015-20.

Higgins, S.T., Washio, Y., Lopez, A.A., Heil, S.H., Solomon, L.J., Lynch, M.E., . . . Bernstein, I.M. (2014). Examining two different schedules of financial incentives for smoking cessation among pregnant women. *Preventive Medicine, 68,* 51-57.

Ondersma, S.J., Svikis, D.S., Lam, P.K., Connors-Burge, V.S., Ledgerwood, D.M., & Hopper, J.A. (2012). A randomized trial of computer-delivered brief intervention and low-intensity contingency management for smoking during pregnancy. *Nicotine & Tobacco Research, 14*(3), 351-60.

Tappin, D., Bauld, L., Purves, D., Boyd, K., Sinclair, L., MacAskill, S., . . . Cessation in Pregnancy Incentives Trial Team. (2015). Financial incentives for smoking cessation in pregnancy: randomised controlled trial. *BMJ (Clinical Research Ed.), 350,* h134.

Tuten, M., Fitzsimons, H., Chisolm, M.S., Nuzzo, P.A., & Jones, H.E. (2012). Contingent incentives reduce cigarette smoking among pregnant, methadone-maintained women: results of an initial feasibility and efficacy randomized clinical trial. *Addiction, 107*(10), 1868-1877.

Nicotine replacement treatment during pregnancy

Berlin, I., Grange, G., Jacob, N., & Tanguy, M.L. (2014). Nicotine patches in pregnant smokers: randomised, placebo controlled, multicentre trial of efficacy. *BMJ, 348,* g1622.

Coleman, T., Cooper, S., Thornton, J.G., Grainge, M.J., Watts, K., Britton, J., & Lewis, S. (2012). A randomized trial of nicotine-replacement therapy patches in pregnancy. *Obstetrical & Gynecological Survey, 67(*7), 387-388.

El-Mohandes, A.A., Windsor, R., Tan, S., Perry, D.C., Gantz, M.G., & Kiely, M. (2013). A randomized clinical trial of trans-dermal nicotine replacement in pregnant African-American smokers. *Maternal and Child Health Journal, 17(*5), 897-906.

Oncken, C., Dornelas, E., Greene, J., Sankey, H., Glasmann, A., Feinn, R., & Kranzler, H.R. (2008). Nicotine gum for pregnant smokers: a randomized controlled trial. *Obstetrics and Gynecology, 112*(4), 859-67.

Pollak, K.I., Oncken, C.A., Lipkus, I.M., Lyna, P., Swamy, G.K., Pletsch, P.K., . . . Myers, E.R. (2007). Nicotine replacement and behavioral therapy for smoking cessation in pregnancy. *American Journal of Preventive Medicine, 33*(4), 297-305.

Intensive behavioral interventions for smoking cessation during pregnancy

Albrecht, S.A., Caruthers, D., Patrick, T., Reynolds, M., Salamie, D., Higgins, L.W., . . . Mlynarchek, S. (2006). A randomized controlled trial of a smoking cessation intervention for pregnant adolescents. *Nursing Research, 55*(6), 402-410.

Bullock, L., Everett, K.D., Mullen, P.D., Geden, E., Longo, D.R., & Madsen, R. (2009). Baby BEEP: A randomized controlled trial of nurses' individualized social support for poor rural pregnant smokers. *Maternal and Child Health Journal, 13*(3), 395-406.

Cook, C., Ward, S., Myers, S., & Spinnato, J. (1995). A prospective, randomized evaluation of intensified therapy for smoking reduction in pregnancy. *American Journal of Obstetrics and Gynecology: Part 2, 172*(1), 290.

Dornelas, E.A., Magnavita, J., Beazoglou, T., Fischer, E.H., Oncken, C., Lando, H., Greene, J., Barbagallo, J., Stepnowski, R., & Gregonis, E. (2006). Efficacy and cost-effectiveness of a clinic-based counseling intervention tested in an ethnically diverse sample of pregnant smokers. *Patient Education and Counseling, 64,* 342-349.

El-Mohandes, A.A., El-Khorazaty, M.N., Kiely, M., & Gantz, M.G. (2011). Smoking cessation and relapse among pregnant African-American smokers in Washington, DC. *Maternal and Child Health Journal, 15,* 96-105.

Ershoff, D.H., Quinn, V.P., Boyd, N.R., Stern, J., Gregory, M., & Wirtschafter, D. (1999). The Kaiser Permanente prenatal smoking cessation trial: when more isn't better, what is enough? *American Journal of Preventive Medicine, 17*(3), 161-168.

McBride, C.M. (1999). Prevention of relapse in women who quit smoking during pregnancy. *American Journal of Public Health, 89*(5), 706-711.

Naughton, F., Prevost, A.T., Gilbert, H., & Sutton, S. (2012). Randomized controlled trial evaluation of a tailored leaflet and SMS text message self-help intervention for pregnant smokers (MiQuit). *Nicotine & Tobacco Research, 14*(5), 569-577.

Patten, C.A., Windsor, R.A., Renner, C.C., Enoch, C., Hochreiter, A., Nevak, C., . . . Brockman, T. (2010). Feasibility of a tobacco cessation intervention for pregnant Alaska Native women. *Nicotine and Tobacco Research, 12*(2), 79-87.

Rigotti, N.A., Park, E.R., Regan, S., Chang, Y., Perry, K., Loudin, B., & Quinn, V. (2006). Efficacy of telephone counseling for pregnant smokers. *Obstetrics & Gynecology, 108*(1), 83-92.

Ruger, J.P., Weinstein, M.C., Hammond, S.K., Kearney, M.H., & Emmons, K.M. (2008). Cost-effectiveness of motivational interviewing for smoking cessation and relapse prevention among low-income pregnant women: A randomized controlled trial. *Value in Health, 11*(2), 191-198.

Secker-Walker, R.H., Solomon, L.J., Flynn, B.S., Skelly, J.M., Lepage, S.S., Goodwin, G.D., & Mead, P.B. (1994). Individualized smoking cessation counseling during prenatal and early postnatal care. *American Journal of Obstetrics and Gynecology, 171*(5), 1347-1355.

Secker-Walker, R.H., Solomon, L.J., Flynn, B.S., Skelly, J.M., & Mead, P.B. (1998). Reducing smoking during pregnancy and postpartum: physician's advice supported by individual counseling. *Preventive Medicine, 27*(3), 422-430.

Sexton, M., & Hebel, J.R. (1984). A clinical trial of change in maternal smoking and its effect on birth weight. *JAMA: the Journal of the American Medical Association, 251*(7), 911-915.

Stotts, A.L., Diclemente, C.C., & Dolan-Mullen, P. (2002). One-to-one: A motivational intervention for resistant pregnant smokers. *Addictive Behaviors, 27*(2), 275-292.

Stotts, A.L., DeLaune, K.A., Schmitz, J.M., & Grabowski, J. (2004). Impact of a motivational intervention on mechanisms of change in low-income pregnant smokers. *Addictive Behaviors, 29*(8), 1649-1657.

Stotts, A.L., Groff, J.Y., Velasquez, M.M., Benjamin-Garner, R., Green, C., Carbonari, J.P., & DiClemente, C.C. (2009). Ultrasound feedback and motivational interviewing targeting smoking cessation in the second and third trimesters of pregnancy. *Nicotine & Tobacco Research, 11*(8), 961-968.

Interventions to prevent excessive gestational weight gain (population with obesity-related risk factors)

Bogaerts, A.F., Devlieger, R., Nuyts, E., Witters, I., Gyselaers, W., & Van den Bergh, B.R. (2013). Effects of lifestyle intervention in obese pregnant women on gestational weight gain and mental health: a randomized controlled trial. *International Journal of Obesity, 37*(6), 814-21.

Dodd, J.M., Turnbull, D., McPhee, A.J., Deussen, A.R., Grivell, R.M., Yelland, L.N., . . . Robinson, J.S. (2014). Antenatal lifestyle advice for women who are overweight or obese. *Obstetrical & Gynecological Survey, 69*(6), 311-313.

Harrison, C.L., Lombard, C.B., Strauss, B.J., & Teede, H.J. (2013). Optimizing healthy gestational weight gain in women at high risk of gestational diabetes: a randomized controlled trial. *Obesity, 21*(5), 904-909.

Hawkins, M., Hosker, M., Marcus, B.H., Rosal, M.C., Braun, B., Stanek, E.J., . . . Chasan-Taber, L. (2015). A pregnancy lifestyle intervention to prevent gestational diabetes risk factors in overweight Hispanic women: a feasibility randomized controlled trial. *Diabetic Medicine, 32(*1), 108-15.

Luoto, R., Kinnunen, T.I., Aittasalo, M., Kolu, P., Raitanen, J., Ojala, K., Mansikkamäki, K., . . . Tulokas, S. (2011). Primary prevention of gestational diabetes mellitus and large-for-gestational-age newborns by lifestyle counseling: A cluster-randomized controlled trial. *Plos Medicine, 8*(5), e1001036.

Nobles, C., Marcus, B.H., Stanek, E.J., Braun, B., Whitcomb, B.W., Solomon, C.G., . . . Chasan-Taber, L. (2015). Effect of an exercise intervention on gestational diabetes mellitus: a randomized controlled trial. *Obstetrics and Gynecology, 125(*5), 1195-204.

Oostdam, N., van Poppel, M.N.M., Wouters, M.G.A.J., Eekhoff, E.M.W., Bekedam, D.J., Kuchenbecker, W.K.H., . . . Mechelen, W. van. (2012). No effect of the FitFor2 exercise programme on blood glucose, insulin sensitivity, and birthweight in pregnant women who were overweight and at risk for gestational diabetes: Results of a randomised controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology, 119,* 1098-1107.

Poston, L., Briley, A.L., Barr, S., Bell, R., Croker, H., Coxon, K., . . . Sandall, J. (2013). Developing a complex intervention for diet and activity behaviour change in obese pregnant women (the UPBEAT trial); assessment of behavioural change and process evaluation in a pilot randomised controlled trial. *BMC Pregnancy and Childbirth, 13*(1) 148-164.

Poston, L., Bell, R., Croker, H., Flynn, A.C., Godfrey, K.M., Goff, L., . . . Briley, A. (2015). Effect of a behavioural intervention in obese pregnant women (the UPBEAT study): a multicentre, randomised controlled trial. *The Lancet. Diabetes & Endocrinology, 3*(10), 767-777.

Quinlivan, J.A., Lam, L.T., & Fisher, J. (2011). A randomised trial of a four-step multidisciplinary approach to the antenatal care of obese pregnant women. *Australian and New Zealand Journal of Obstetrics and Gynecology, 51*(2), 141-146.

Renault, K.M., Norgaard, K., Nilas, L., Carlsen, E.M., Cortes, D., Pryds, O., & Secher, N.J. (2014). The Treatment of Obese Pregnant Women (TOP) study: a randomized controlled trial of the effect of physical activity intervention assessed by pedometer with or without dietary intervention in obese pregnant women. *American Journal of Obstetrics and Gynecology, 210*(2), 134.el-9.

Thornton, Y.S., Smarkola, C., Kopacz, S.M., & Ishoof, S.B. (2009). Perinatal outcomes in nutritionally monitored obese pregnant women: a randomized clinical trial. *Journal of the National Medical Association, 101*(6), 569-577.

Vesco, K.K., Karanja, N., King, J.C., Gillman, M.W., Leo, M.C., Perrin, N., . . . Stevens, V.J. (2014). Efficacy of a group-based dietary intervention for limiting gestational weight gain among obese women: a randomized trial. *Obesity, 22*(9), 1989-96.

Interventions to prevent excessive gestational weight gain (general population)

Althuizen, E., Wijden, C.L.V.D., Mechelen, W.V., Seidell, J.C., & Poppel, M.N.M.V. (2012). The effect of a counseling intervention on weight changes during and after pregnancy: a randomised trial. *BJOG: an International Journal of Obstetrics & Gynecology, 120(*1), 92-99.

Barakat, R., Lucia, A., & Ruiz, J.R. (2009). Resistance exercise training during pregnancy and newborn's birth size: a randomised controlled trial. *International Journal of Obesity, 33*(9), 1048-1057.

Barakat, R., Pelaez, M., Lopez, C., Lucia, A., & Ruiz, J.R. (2013). Exercise during pregnancy and gestational diabetes-related adverse effects: a randomised controlled trial. *British Journal of Sports Medicine, 47*(10), 630-36.

Haakstad, L.A.H., & Bø, K. (2011). Effect of regular exercise on prevention of excessive weight gain in pregnancy: A randomised controlled trial. *The European Journal of Contraception and Reproductive Health Care, 16*(2), 116-125.

Hui, A.L., Ludwig, S.M., Gardiner, P., Sevenhuysen, G., Murray, R., Morris, M., & Shen, G.X. (2006). Community-based exercise and dietary intervention during pregnancy: A pilot study. *Canadian Journal of Diabetes, 30(*2), 169-175.

Hui, A.L., Back, L., Ludwig, S., Gardiner, P., Sevenhuysen, G., Dean, H.J., . . . Shen, G.X. (2014). Effects of lifestyle intervention on dietary intake, physical activity level, and gestational weight gain in pregnant women with different pre-pregnancy Body Mass Index in a randomized control trial. *BMC Pregnancy and Childbirth, 14*(1), 331-40.

Olson, C.M., Strawderman, M.S., & Reed, R.G. (2004). Efficacy of an intervention to prevent excessive gestational weight gain. *American Journal of Obstetrics and Gynecology, 191*(2), 530-536.

Polley, B.A., Wing, R.R., & Sims, C.J. (2002). Randomized controlled trial to prevent excessive weight gain in pregnant women. *International Journal of Obesity, 26*(11), 1494-1502.

Ronnberg, A.K., Ostlund, I., Fadl, H., Gottvall, T., & Nilsson, K. (2015). Intervention during pregnancy to reduce excessive gestational weight gain-a randomised controlled trial. *BJOG: an International Journal of Obstetrics & Gynaecology, 122*(4), 537-544.

Ruiz, J.R., Perales, M., Pelaez, M., Lopez, C., Lucia, A., & Barakat, R. (2013). Supervised exercise-based intervention to prevent excessive gestational weight gain: a randomized controlled trial. *Mayo Clinic Proceedings, 88*(12), 1388-97.

Smith, K.M. (2014). *The Blossom Project Online: Use of a behaviorally-based website to promote physical activity and prevent excessive gestational weight gain in previously sedentary pregnant women*. Digital Repository @ Iowa State University.

Stafne, S.N., Salvesen, K.A., Romundstad, P.R., Eggebø, T.M., Carlsen, S.M., & Mørkved, S. (2012). Regular exercise during pregnancy to prevent gestational diabetes: a randomized controlled trial. *Obstetrics and Gynecology, 119*(1), 29-36.

Group prenatal care (compared to standard prenatal care)

Fausett, M.B. (2014). *Centering Pregnancy (CP): A Longitudinal Correlational Study Designed to Evaluate Maternal and Fetal Outcomes After Participation in CP*. Air Force Medical Wing (59TH) Lackland AFB TX Wilford Hall Ambulatory Surgical Center.

Ford, K., Weglicki, L., Kershaw, T., Schram, C., Hoyer, P.J., & Jacobson, M.L. (2002). Effects of a prenatal care intervention for adolescent mothers on birth weight, repeat pregnancy, and educational outcomes at one year postpartum. *The Journal of Perinatal Education, 11*(1), 35-38.

Ickovics, J.R. (2007). Group prenatal care and perinatal outcomes: A randomized controlled trial. *Obstetrics and Gynecology, 111*(4), 993-994.

Ickovics, J.R., Earnshaw, V., Lewis, J.B., Kershaw, T.S., Magriples, U., Stasko, E., . . . Tobin, J.N. (2016). Cluster randomized controlled trial of group prenatal care: perinatal outcomes among adolescents in New York City health centers. *American Journal of Public Health, 106*(2), 359-365.

Ickovics, J.R., Reed, E., Magriples, U., Westdahl, C., Schindler, R.S., & Kershaw, T.S. (2011). Effects of group prenatal care on psychosocial risk in pregnancy: Results from a randomised controlled trial. *Psychology & Health, 26*(2), 235-250.

Kennedy, H.P., Farrell, T., Paden, R., Hill, S., Jolivet, R.R., Cooper, B.A., & Rising, S.S. (2011). A randomized clinical trial of group prenatal care in two military settings. *Military Medicine, 176(*10), 1169-77.

Enhanced prenatal care programs delivered through Medicaid

Arima, Y., Guthrie, B.L., Rhew, I.C., & De Roos, A.J. (2009). The impact of the First Steps prenatal care program on birth outcomes among women receiving Medicaid in Washington State. *Health Policy, 92*(1), 49-54.

Buescher, P.A., Roth, M.S., Williams, D., & Goforth, C.M. (1991). An evaluation of the impact of maternity care coordination on Medicaid birth outcomes in North Carolina. *American Journal of Public Health, 81*(12), 1625-9.

Hillemeier, M.M., Domino, M.E., Wells, R., Goyal, R.K., Kum, H.C., Cilenti, D., . . . Basu, A. (2015). Effects of maternity care coordination on pregnancy outcomes: propensity-weighted analyses. *Maternal and Child Health Journal, 19*(1), 121-7.

Korenbrot, C.C., Gill, A., Clayson, Z., & Patterson, E. (1995). Evaluation of California's statewide implementation of enhanced perinatal services as Medicaid benefits. *Public Health Reports (Washington, D.C.: 1974), 110*(2).

Nason, C.S., Alexander, G.R., Pass, M.A., & Bolland, J.M. (2003). An evaluation of a Medicaid managed maternity program: the impact of comprehensive care coordination on utilization and pregnancy outcomes. *Journal of Health and Human Services Administration, 26*(2), 239-67.

Willems Van Dijk, J., Anderko, L., & Stetzer, F. (2011). The impact of prenatal care coordination on birth outcomes. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 40*(1), 98-108.

Non-Medicaid enhanced prenatal care programs for African-American women

Herman, A.A., Berendes, H.W., Yu, K.F., Cooper, L.C., Overpeck, M.D., Rhoads, G., . . . Coates, D.L. (1996). Evaluation of the effectiveness of a community-based enriched model prenatal intervention project in the District of Columbia. *Health Services Research, 31*(5), 609-21.

Klerman, L.V., Ramey, S.L., Goldenberg, R.L., Marbury, S., Hou, J., & Cliver, S.P. (2001). A randomized trial of augmented prenatal care for multiple-risk, Medicaid-eligible African American women. *American Journal of Public Health, 91*(1), 105-11.

Norbeck, J.S., DeJoseph, J.F., & Smith, R.T. (1996). A randomized trial of an empirically-derived social support intervention to prevent low birthweight among African American women. *Social Science & Medicine, 43(*6), 947-954.

Peoples, M.D., Grimson, R.C., & Daughtry, G.L. (1984). Evaluation of the effects of the North Carolina Improved Pregnancy Outcome Project: implications for state-level decision-making. *American Journal of Public Health, 74*(6), 549-54.

Non-Medicaid enhanced prenatal care for adolescents

Hardy, J.B., King, T.M., & Repke, J.T. (1987). The Johns Hopkins Adolescent Pregnancy Program: an evaluation. *Obstetrics and Gynecology, 69*(3), 300-6.

Korenbrot, C.C., Showstack, J., Loomis, A., & Brindis, C. (1989). Birth weight outcomes in a teenage pregnancy case management project. *Journal of Adolescent Health Care, 10*(2), 97-104.

Sangalang, B.B., Barth, R.P., & Painter, J.S. (2006). First birth outcomes and timing of second births: A statewide case management program for adolescent mothers. *Health & Social Work, 31*(1), 54-63.

Covington, D.L., Peoples-Sheps, M.D., Buescher, P.A., Bennett, T.A., & Paul, M.V. (1998). An Evaluation of an Adolescent Prenatal Education Program. *American Journal of Health Behavior, 22*(5), 323-33.

Other prenatal home visiting programs

Jewell, N.A., & Russell, K.M. (2000). Increasing Access to Prenatal Care: An Evaluation of Minority Health Coalitions' Early Pregnancy Project. *Journal of Community Health Nursing, 17*(2), 93-105.

Kothari, C.L., Zielinski, R., James, A., Charoth, R.M., & Sweezy, L.C. (2014). Improved birth weight for Black infants: outcomes of a Healthy Start program. *American Journal of Public Health, 104*(96).

Meghea, C.I., Raffo, J.E., Zhu, Q., & Roman, L. (2013). Medicaid home visitation and maternal and infant healthcare utilization. *American Journal of Preventive Medicine, 45*(4), 441-7.

Meghea, C.I., You, Z., Raffo, J., Leach, R.E., & Roman, L.A. (2015). Statewide Medicaid Enhanced Prenatal Care Programs and infant mortality. *Pediatrics, 136*(2), 334-42.

Redding, S., Conrey, E., Porter, K., Paulson, J., Hughes, K., & Redding, M. (2015). Pathways community care coordination in low birth weight prevention. *Maternal and Child Health Journal, 19(*3), 643-50.

Roman, L., Raffo, J.E., Zhu, Q., & Meghea, C.I. (2014). A statewide Medicaid enhanced prenatal care program: impact on birth outcomes. *JAMA Pediatrics, 168*(3), 220-7.

Stabile, I., & Graham, M. (2000). *Florida Panhandle Healthy Start: A Randomized Trial of Prenatal Home Visitation*.

Villar, J., Farnot, U., Barros, F., Victora, C., Langer, A., & Belizan, J.M. (1992). A randomized trial of psychosocial support during high-risk pregnancies. The Latin American Network for Perinatal and Reproductive Research. *The New England Journal of Medicine, 327*(18), 1266-71.

The Resource Mothers Program

Heins, H.C. Jr., Nance, N.W., & Ferguson, J.E. (1987). Social support in improving perinatal outcome: the Resource Mothers Program. *Obstetrics and Gynecology, 70*(2), 263-6.

Rogers, M.M., Peoples-Sheps, M.D., & Suchindran, C. (1996). Impact of a social support program on teenage prenatal care use and pregnancy outcomes. *Journal of Adolescent Health, 19*(2), 132-140.

Contingency management (lower cost) for opioid use disorder

Brooner, R.K., Kidorf, M.S., King, V.L., Stoller, K.B., Neufeld, K.J., & Kolodner, K. (2007). Comparing adaptive stepped care and monetary-based voucher interventions for opioid dependence. *Drug and Alcohol Dependence, 88,* S14-S23.

Carroll, K.M., Ball, S.A., Nich, C., O'Connor, P.G., Eagan, D.A., Frankforter, . . . Rounsaville, B.J. (2001). Targeting behavioral therapies to enhance naltrexone treatment of opioid dependence: efficacy of contingency management and significant other involvement. *Archives of General Psychiatry, 58*(8), 755-761.

Chen, W., Hong, Y., Zou, X., McLaughlin, M.M., Xia, Y., & Ling, L. (2013). Effectiveness of prize-based contingency management in a methadone maintenance program in China. *Drug and Alcohol Dependence, 133*(1), 270-274.

Hser, Y.I., Li, J., Jiang, H., Zhang, R., Du, J., Zhang, C., Zhang, B., . . . Zhao, M. (2011). Effects of a randomized contingency management intervention on opiate abstinence and retention in methadone maintenance treatment in China. *Addiction, 106*(10), 1801-1809.

Kidorf, M., Brooner, R.K., Gandotra, N., Antoine, D., King, V.L., Peirce, J., & Ghazarian, S. (2013). Reinforcing integrated psychiatric service attendance in an opioid-agonist program: A randomized and controlled trial. *Drug and Alcohol Dependence, 133*(1), 30-36.

Ling, W., Hillhouse, M., Ang, A., Jenkins, J., & Fahey, J. (2013). Comparison of behavioral treatment conditions in buprenorphine maintenance. *Addiction, 108*(10), 1788-1798.

Preston, K.L., Umbricht, A., & Epstein, D.H. (2000). Methadone dose increase and abstinence reinforcement for treatment of continued heroin use during methadone maintenance. *Archives of General Psychiatry, 57*(4), 395-404.

Preston, K.L., Umbricht, A., & Epstein, D.H. (2002). Abstinence reinforcement maintenance contingency and one-year follow-up. *Drug and AlcoholDependence, 67*(2), 125-137.

Rowan-Szal, G.APD., Joe, GWED., Hiller, MLPD., & Simpson, DDPD. (1997). Increasing early engagement in methadone treatment. *Journal of Maintenance in the Addictions, 1*(1), 49-61.

Methadone maintenance for opioid use disorder

Bale, R.N., Van, S.W.W., Kuldau, J.M., Engelsing, T.M., Elashoff, R.M., & Zarcone, V.P.J. (1980). Therapeutic communities vs methadone maintenance. A prospective controlled study of narcotic addiction treatment: design and one-year follow-up. *Archives of General Psychiatry, 37*(2), 179-193.

Dolan, K.A., Shearer, J., MacDonald, M., Mattick, R.P., Hall, W., & Wodak, A.D. (2003). A randomised controlled trial of methadone maintenance treatment versus wait list control in an Australian prison system. *Drug and Alcohol Dependence, 72*(1), 59-65.

Gronbladh, L. & Gunne, L. (1989). Methadone-assisted rehabilitation of Swedish heroin addicts. *Drug and Alcohol Dependence, 24*(1), 31-37.

Gruber, V.A., Delucchi, K.L., Kielstein, A., & Batki, S.L. (2008). A randomized trial of 6-month methadone maintenance with standard or minimal counseling versus 21-day methadone detoxification. *Drug and Alcohol Dependence, 94*(1), 199-206.

Kinlock, T., Gordon, M., Schwartz, R., O'Grady, K., Fitzgerald, T., & Wilson, M. (2007). A randomized clinical trial of methadone maintenance for prisoners: Results at 1-month post-release. *Drug and Alcohol Dependence, 91*(2-3), 220-227.

Newman, R., & Whitehill, W. (1979). Double-blind comparison of methadone and placebo maintenance treatments of narcotic addicts in Hong Kong. *The Lancet*, *314*(8141), 485-488.

Schwartz, R.P., Highfield, D.A., Jaffe, J.H., Brady, J.V., Butler, C.B., Rouse, C.O., . . . Battjes, R.J. (2006). A randomized controlled trial of interim methadone maintenance. *Archives of General Psychiatry, 63*(1), 102-9.

Schwartz, R.P., Jaffe, J.H., Highfield, D.A., Callaman, J.M., & O'Grady, K.E. (2007). A randomized controlled trial of interim methadone maintenance: 10-Month follow-up. *Drug and Alcohol Dependence, 86*(1), 30-36.

Strain, E.C., Stitzer, M.L., Liebson, I.A., & Bigelow, G.E. (1993). Dose-response effects of methadone in the treatment of opioid dependence. *Annals of Internal Medicine*, *119*(1), 23-27.

Vanichseni, S., Wongsuwan, B., Choopanya, K., & Wongpanich, K. (1991). A controlled trial of methadone maintenance in a population of intravenous drug users in Bangkok: Implications for prevention of HIV. *International Journal of the Addictions, 26*(12), 1.

Wilson, M.E., Schwartz, R.P., O'Grady, K.E., & Jaffe, J.H. (2010). Impact of interim methadone maintenance on HIV risk behaviors. *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 87*(4), 586-591.

Buprenorphine/naloxone maintenance treatment for opioid use disorder

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

Fudala, P.J., Bridge, T.P., Herbert, S., Williford, W.O., Chiang, C.N., Jones, K., . . . Tusel, D. (2003). Office-based treatment of opiate addiction with a sublingual-tablet formulation of buprenorphine and naloxone. *The New England Journal of Medicine, 349*(10), 949-958.

Kakko, J., Svanborg, K.D., Kreek, M.J., & Heilig, M. (2003). 1-year retention and social function after buprenorphine-assisted relapse prevention treatment for heroin dependence in Sweden: A randomised, placebo-controlled trial. *Lancet, 361*(9358), 662-668.

Krook, A.L., Brørs, O., Dahlberg, J., Grouff, K., Magnus, P., Røysamb, E., & Waal, H. (2002). A placebo-controlled study of high dose buprenorphine in opiate dependents waiting for medication-assisted rehabilitation in Oslo, Norway. *Addiction, 97(*5), 533-542.

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

Ling, W., Charuvastra, C., et al. (1998). Buprenorphine maintenance treatment of opiate dependence: A multicenter, randomized clinical trial. *Addiction, 93*(4): 475.

Lucas, G.M., Chaudhry, A., Hsu, J., Woodson, T., Lau, B., Olsen, Y., . . . Moore, R.D. (2010). Clinic-based treatment of opioid-dependent HIV-infected patients versus referral to an opioid treatment program: A randomized trial. *Annals of Internal Medicine, 152*(11), 704-711.

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

Cognitive-behavioral coping skills therapy for opioid use disorder

Fiellin, D.A., Barry, D.T., Sullivan, L.E., Cutter, C.J., Moore, B.A., O'Connor, P.G., & Schottenfeld, R.S. (2013). A randomized trial of cognitive behavioral therapy in primary care-based buprenorphine. *The American Journal of Medicine, 126(1).*

Ling, W., Hillhouse, M., Ang, A., Jenkins, J., & Fahey, J. (2013). Comparison of behavioral treatment conditions in buprenorphine maintenance. *Addiction, 108*(10), 1788-1798.

Moore, B.A., Barry, D.T., Sullivan, L.E., O'Connor, P.G., Cutter, C.J., Schottenfeld, R.S., & Fiellin, D.A. (2012). Counseling and directly observed medication for primary care buprenorphine/naloxone maintenance. *Journal of Addiction Medicine,* 6(3), 205.

Moore, B.A., Fazzino, T., Barry, D.T., Fiellin, D.A., Cutter, C.J., Schottenfeld, R.S., & Ball, S.A. (2013). The Recovery Line: A pilot trial of automated, telephone-based treatment for continued drug use in methadone maintenance. *Journal of Substance Abuse Treatment, 45*(1), 63-69.

Collaborative primary care for anxiety (general adult population)

Craske, M.G., Stein, M.B., Sullivan, G., Sherbourne, C., Bystritsky, A., Rose, R.D., . . . Roy-Byrne, P. (2011). Disorder-specific impact of coordinated anxiety learning and management treatment for anxiety disorders in primary care. *Archives of General Psychiatry, 68*(4), 378-88.

Muntingh, A., van der Feltz-Cornelis, C., van Marwijk, H., Spinhoven, P., Assendelft, W., de Waal, M., Ader. A., van Balkom, A. (2014). Effectiveness of collaborative stepped care for anxiety disorders in primary care: A pragmatic cluster randomised controlled trial. *Psychotherapy and Psychosomatics, 83*(1), 37-44.

Price, D., Beck, A., Nimmer, C., & Bensen, S. (2000). The treatment of anxiety disorders in a primary care HMO setting. *The Psychiatric Quarterly, 71(*1), 31-45.

Rollman, B.L., Belnap, B.H., Mazumdar, S., Houck, P.R., Zhu, F., Gardner, W., . . . Shear, M.K. (2005). A randomized trial to improve the quality of treatment for panic and generalized anxiety disorders in primary care. *Archives of General Psychiatry, 62*(12), 1332-1341.

Collaborative primary care for depression (general adult population)

Adler, D.A., Bungay, K.M., Wilson, I.B., Pei, Y., Supran, S., Peckham, E., . . . Rogers, W.H. (2004). The impact of a pharmacist intervention on 6-month outcomes in depressed primary care patients. *General Hospital Psychiatry, 26*(3), 199-209.

Aragones, E., Lluis, P.J., Caballero, A., Lopez-Cortacans, G., Casaus, P., Maria, H. J., . . . Folch, S. (2012). Effectiveness of a multi-component programme for managing depression in primary care: A cluster randomized trial. The INDI project. *Journal of Affective Disorders, 142*(1-3)*,* 297-305.

Berghöfer, A., Hartwich, A., Bauer, M., Unützer, J., Willich, S.N., & Pfennig, A. (2012). Efficacy of a systematic depression management program in high utilizers of primary care: A randomized trial. *BMC Health Services Research, 12*(298).

Capoccia, K.L., Boudreau, D.M., Blough, D.K., Ellsworth, A.J., Clark, D.R., Stevens, N.G., . . . Sullivan, S.D. (2004). Randomized trial of pharmacist interventions to improve depression care and outcomes in primary care. *American Journal of Health-System Pharmacy, 61*(4), 364-372.

Datto, C.J., Thompson, R., Horowitz, D., Disbot, M., & Oslin, D.W. (2003). The pilot study of a telephone disease management program for depression. *General Hospital Psychiatry, 25*(3).

Dietrich, A.J., Oxman, T.E., Williams, J.J. W., Schulberg, H.C., Bruce, M.L., Lee, P.W., . . . Nutting, P.A. (2004). Re-engineering systems for the treatment of depression in primary care: Cluster randomised controlled trial. *BMJ: British Medical Journal, 329*(7466), 602.

Dobscha, S.K., Corson, K., Hickam, D.H., Perrin, N.A., Kraemer, D.F., & Gerrity, M.S. (2006) Depression decision support in primary care: A cluster randomized trial. *Annals of Internal Medicine, 145*(7), 477-487.

Finley, P.R., Rens, H.R., Pont, J.T., Gess, S.L., Louie, C., Bull, S.A., . . . Bero, L.A. (2003). Impact of a collaborative care model on depression in a primary care setting: A randomized controlled trial. *Pharmacotherapy, 23*(9), 1175-1185.

Gensichen, J., von Korff, M., Peitz, M., Muth, C., Beyer, M., Güthlin, C., . . . Gerlach, F.M. (2009). Case management for depression by health care assistants in small primary care practices: a cluster randomized trial. *Annals of Internal Medicine, 151*(6), 369-378.

Hedrick, S.C., Chaney, E.F., Felker, B., Liu, C.-F., Hasenberg, N., Heagerty, P., . . . Katon, W. (2003). Effectiveness of collaborative care depression treatment in veterans' affairs primary care. *Journal of General Internal Medicine, 18*(1), 9-16.

Katon, W., Robinson, P., Von Korff M., Lin, E., Bush, T., Ludman, E., . . . Walker, E. (1996). A multi-faceted intervention to improve treatment of depression in primary care. *Archives of General Psychiatry, 53*(10), 924-932.

Katon, W., Von Korff M., Lin, E., Simon, G., Walker, E., Unutzer, J., . . . Ludman, E. (1999). Stepped collaborative care for primary care patients with persistent symptoms of depression: a randomized trial. *Archives of General Psychiatry, 56*(12), 1109-15.

Katzelnick, D.J., Simon, G.E., Pearson, S.D., Manning, W.G., Helstad, C.P., Henk, H.J., . . . Kobak, K.A. (2000). Randomized trial of a depression management program in high utilizers of medical care. *Archives of Family Medicine, 9*(4), 345-351.

Klinkman, M.S., Bauroth, S., Fedewa, S., Kerber, K., Kuebler, J., Adman, T., & Sen, A. (2010). Long-term clinical outcomes of care management for chronically depressed primary care patients: A report from the depression in primary care project. *Annals of Family Medicine, 8*(5), 387-396.

Landis, S.E., Gaynes, B.N., Morrissey, J.P., Vinson, N., Ellis, A.R., & Domino, M.E. (2007). Generalist care managers for the treatment of depressed Medicaid patients in North Carolina: A pilot study. *BMC Family Practice, 8*(1), 7-11.

Lin, E.H., VonKorff, M., Russo, J., Katon, W., Simon, G.E., Unützer, J., . . . Ludman, E. (2000). Can depression treatment in primary care reduce disability? A stepped care approach. *Archives of Family Medicine, 9*(10), 1052-1058.

Menchetti, M., Sighinolfi, C., Di Michele, V., Peloso, P., Nespeca, C., Bandieri, P.V., . . . Berardi, D. (2013). Effectiveness of collaborative care for depression in Italy. A randomized controlled trial. *General Hospital Psychiatry, 35*(6), 579-586.

Richards, D.A., Lovell, K., Gilbody, S., Gask, L., Torgerson, D., Barkham, M., . . . Richardson, R. (2008). Collaborative care for depression in UK primary care: A randomized controlled trial. *Psychological Medicine, 38*(2), 279-287.

Richards, D.A., Hill, J.J., Gask, L., Lovell, K., Chew-Graham, C., Bower, P., . . . Barkham, M. (2013). Clinical effectiveness of collaborative care for depression in UK primary care (CADET): Cluster randomised controlled trial. *BMJ Clinical Research Ed, 347*.

Rost, K., Nutting, P., Smith, J., Werner, J., & Duan, N. (2001). Improving depression outcomes in community primary care practice. A randomized trial of the QuEST Intervention. *Journal of General Internal Medicine, 16*(3), 143-149.

Schoenbaum, M., Unutzer, J., Sherbourne, C., Duan, N., Rubenstein, L. V., Miranda, J., . . . Wells, K. (2001). Cost-effectiveness of practice-initiated quality improvement for depression: results of a randomized controlled trial. *Jama : the Journal of the American Medical Association, 286*(11), 1325-30.

Shippee, N.D., Shah, N.D., Angstman, K.B., DeJesus, R.S., Wilkinson, J.M., Bruce, S.M., & Williams, M.D. (2013). Impact of collaborative care for depression on clinical, functional, and work outcomes: A practice-based evaluation. *The Journal of Ambulatory Care Management, 36*(1), 13-23

Simon, G.E., VonKorff, M., Rutter, C., & Wagner, E. (2000). Randomised trial of monitoring, feedback, and management of care by telephone to improve treatment of depression in primary care. *BMJ, 320*(7234), 550-554.

Simon, G.E., Ludman, E.J., & Rutter, C.M. (2009). Incremental benefit and cost of telephone care management and telephone psychotherapy for depression in primary care. *Archives of General Psychiatry, 66*(10), 1081-9.

Smit, A., Kluiter, H., Conradi, H.J., van der Meer, K., Tiemens, B.G., Jenner, J.A., . . . Ormel, J. (2006). Short-term effects of enhanced treatment for depression in primary care: Results from a randomized controlled trial. *Psychological Medicine, 36*(1), 15-26.

Swindle, R.W., Rao, J.K., Helmy, A., Plue, L., Zhou, X. H., Eckert, G.J., & Weinberger, M. (2003). Integrating clinical nurse specialists into the treatment of primary care patients with depression. *International Journal of Psychiatry in Medicine, 33*(1), 17-37.

Uebelacker, L.A., Marootian, B.A., Tigue, P., Haggarty, R., Primack, J.M., & Miller, I.W. (2011). Telephone depression care management for Latino Medicaid health plan members: A pilot randomized controlled trial. *The Journal of Nervous and Mental Disease, 199*(9), 678-683.

Wells, K.B., Sherbourne, C., Schoenbaum, M., Duan, N., Meredith, L., Unützer, J., . . . Rubenstein, L.V. (2000). Impact of disseminating quality improvement programs for depression in managed primary care: a randomized controlled trial. *JAMA, 283*(2), 212-220.

Collaborative primary care for depression with comorbid medical conditions (general adult population)

Bogner, H.R., de Vries, H.F., Kaye, E.M., & Morales, K.H. (2013). Pilot trial of a licensed practical nurse intervention for hypertension and depression. *Family Medicine, 45*(5), 323-329.

Coventry, P., Lovell, K., Dickens, C., Bower, P., Chew-Graham, C., McElvenny, D., . . . Gask, L. (2015). Integrated primary care for patients with mental and physical multimorbidity: cluster randomised controlled trial of collaborative care for patients with depression comorbid with diabetes or cardiovascular disease. BMJ*, 350,* h638.

Davidson, K.W., Rieckmann, N., Clemow, L., Schwartz, J.E., Shimbo, D., . . . Burg, M. M. (2010). Enhanced depression care for patients with acute coronary syndrome and persistent depressive symptoms: Coronary psychosocial evaluation studies randomized controlled trial. *Archives of Internal Medicine, 170*(7), 600-608.

Davidson, K.W., Bigger, J.T., Burg, M.M., Duer-Hefele, J., Medina, V., Newman, J.D., . . . Vaccarino, V. (2013). Centralized, stepped, patient preference-based treatment for patients with post-acute coronary syndrome depression: CODIACS vanguard randomized controlled trial. *JAMA Internal Medicine, 173*(11), 997-1004.

Ell, K., Katon, W., Xie, B., Lee, P.J., Kapetanovic, S., Guterman, J., & Chou, C.P. (2010). Collaborative care management of major depression among low-income, predominantly Hispanic subjects with diabetes: A randomized controlled trial. *Diabetes Care, 33*(4), 706-713.

Katon, W., Russo, J., Lin, E. H., Schmittdiel, J., Ciechanowski, P., Ludman, E., . . . Von Korff, M. (2012). Cost-effectiveness of a multicondition collaborative care intervention: a randomized controlled trial. *Archives of General Psychiatry, 69*(5), 506-514.

Katon, W.J., Von Korff, M., Lin, E.H., Simon, G., Ludman, E., Russo, J., . . . Bush, T. (2004). The Pathways Study: A randomized trial of collaborative care in patients with diabetes and depression. *Archives of General Psychiatry, 61*(10), 1042-1049.

Katon, W.J., Lin, E.H., Von, K.M., Ciechanowski, P., Ludman, E.J., Young, B., . . . McCulloch, D. (2010). Collaborative care for patients with depression and chronic illnesses. *The New England Journal of Medicine, 363*(27), 2611-2620.

Morgan, M.A.J., Coates, M.J., Dunbar, J.A., Schlicht, K., Reddy, P., & Fuller, J. (2013). The TrueBlue model of collaborative care using practice nurses as case managers for depression alongside diabetes or heart disease: A randomised trial. *BMJ Open, 3*(1).

Rollman, B.L., Belnap, B.H., LeMenager, M.S., Mazumdar, S., Houck, P.R., Counihan, P.J., . . . Reynolds, C.F. (2009). Telephone-delivered collaborative care for treating post-CABG depression: A randomized controlled trial. *JAMA : The Journal of the American Medical Association, 302*(19), 2095-2103.

Simon, G.E., Katon, W.J., Lin, E.H., Rutter, C., Manning, W.G., Von, K.M., . . . Young, B. A. (2007). Cost-effectiveness of systematic depression treatment among people with diabetes mellitus. *Archives of General Psychiatry, 64*(1), 65-72.

Vera, M., Perez-Pedrogo, C., Huertas, S.E., Reyes-Rabanillo, M.L., Juarbe, D., Huertas, A., . . . Chaplin, W. (2010). Collaborative care for depressed patients with chronic medical conditions: A randomized trial in Puerto Rico. *Psychiatric Services, 61*(2), 144-150.

Williams, L.S., Kroenke, K., Bakas, T., Plue, L.D., Brizendine, E., Tu, W., & Hendrie, H. (2007). Care management of poststroke depression: A randomized, controlled trial. *Stroke, 38*(3), 998-1003.

Wu, B., Jin, H., Vidyanti, I., Lee, P.J., Ell, K., & Wu, S. (2014). Collaborative depression care among Latino patients in diabetes disease management, Los Angeles, 2011-2013. *Preventing Chronic Disease, 11,* E148.

Collaborative primary care for depression with comorbid medical conditions (older adult population)

Bogner, H.R., & de Vries, H.F. (2008). Integration of depression and hypertension treatment: A pilot, randomized controlled trial. *Annals of Family Medicine, 6*(4), 295-301.

Bogner, H.R., & de Vries, H.F. (2010). Integrating type 2 diabetes mellitus and depression treatment among African Americans a randomized controlled pilot trial. *The Diabetes Educator, 36*(2), 284-292.

Williams, J.W.J., Katon, W., Lin, E.H., Nöel, P.H., Worchel, J., Cornell, J., . . . IMPACT Investigators. (2004). The effectiveness of depression care management on diabetes-related outcomes in older patients. *Annals of Internal Medicine, 140*(12), 1015-24.

Collaborative primary care for depression (older adult population)

Blanchard, M.R., Waterreus, A., & Mann, A.H. (1995). The effect of primary care nurse intervention upon older people screened as depressed. *International Journal of Geriatric Psychiatry, 10*(4), 289-298.

Bruce, M.L., Ten, H.T.R., Reynolds, C.F., Katz, I.I., Schulberg, H.C., Mulsant, B.H., . . . Alexopoulos, G.S. (2004). Reducing suicidal ideation and depressive symptoms in depressed older primary care patients: A randomized controlled trial. *JAMA, 291*(9), 1081-1091.

Chew-Graham, C.A., Lovell, K., Roberts, C., Baldwin, R., Morley, M., Burns, A., . . . Burroughs, H. (2007). A randomised controlled trial to test the feasibility of a collaborative care model for the management of depression in older people. *The British Journal of General Practice: The Journal of the Royal College of General Practitioners, 57*(538), 364-370.

Gallo, J.J., Bogner, H.R., Morales, K.H., Post, E.P., Lin, J.Y., & Bruce, M.L. (2007). The effect of a primary care practice-based depression intervention on mortality in older adults: a randomized trial. *Annals of Internal Medicine, 146*(10), 689-98.

McCusker, J., Sewitch, M., Cole, M., Yaffe, M., Cappeliez, P., Dawes, M., . . . Latimer, E. (2008). Project Direct: Pilot study of a collaborative intervention for depressed seniors. *Canadian Journal of Community Mental Health, 27*(2), 201-218.

Unützer, J., Katon, W., Callahan, C.M., Williams, J.W., Hunkeler, E., Harpole, L., . . . Lin, E.H.B. (2002). Collaborative care management of late-life depression in the primary care setting: A randomized controlled trial. *Journal- American Medical Association, 288,* 2836-2845.

Unützer, J., Tang, L., Oishi, S., Katon, W., Williams, J. W., Hunkeler, E., . . . Langston, C. (2006). Reducing suicidal ideation in depressed older primary care patients. *Journal of the American Geriatrics Society, 54*(10), 1550-1556.

Patient-centered medical homes in physician-led practices without explicit utilization or cost incentives (high-risk population)

Boult, C., Leff, B., Boyd, C.M., Wolff, J.L., Marsteller, J.A., Frick, K.D., . . . Scharfstein, D.O. (2013). A matched-pair cluster-randomized trial of guided care for high-risk older patients. *Journal of General Internal Medicine, 28*(5), 612-621.

David, G., Gunnarsson, C., Saynisch, P.A., Chawla, R., & Nigam, S. (2014). Do patient-entered medical homes reduce emergency department visits? *Health Services Research,* 5.

Rosenthal, M.B., Alidina, S., Friedberg, M.W., Singer, S.J., Eastman, D., Li, Z., & Schneider, E.C. (2016). Impact of the Cincinnati aligning forces for quality multi-payer patient centered medical home pilot on health care quality, utilization, and costs. *Medical Care Research and Review, 73*(5), 532-45.

van Hasselt, M., McCall, N., Keyes, V., Wensky, S.G., & Smith, K.W. (2014). Total cost of care lower among Medicare fee-for service beneficiaries receiving care from patient-centered medical homes. *Health Services Research, 50*(1), 253-272.

Wang, Q.C., Chawla, R., Colombo, C.M., Snyder, R.L., & Nigam, S. (2014). Patient-centered medical home impact on health plan members with diabetes. *Journal of Public Health Management and Practice, 20*(5), E12-E20.

Patient-centered medical homes in physician-led practices without explicit utilization or cost incentives (general population)

David, G., Gunnarsson, C., Saynisch, P.A., Chawla, R., & Nigam, S. (2014). Do patient-entered medical homes reduce emergency department visits? *Health Services Research,* 5.

Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C . . . Volpp, K.G. (2014). Association between participation in a multipayer medical home intervention and changes in quality, utilization, and costs of care. *Journal of the American Medical Association, 311(*8), 815-825.

Rosenthal, M.B. (2013). Effect of a multipayer patient-centered medical home on health care utilization and quality: The Rhode Island Chronic Care Sustainability Initiative Pilot Program. *Jama Internal Medicine, 173*(20), 1907.

Rosenthal, M.B., Sinaiko, A.D., Eastman, D., Chapman, B., & Partridge, G. (2015). Impact of the Rochester medical home initiative on primary care practices, quality, utilization, and costs. *Medical Care, 53*(11), 967-73.

Rosenthal, M.B., Alidina, S., Friedberg, M.W., Singer, S.J., Eastman, D., Li, Z., & Schneider, E.C. (2016B). Impact of the Cincinnati aligning forces for quality multi-payer patient centered medical home pilot on health care quality, utilization, and costs. *Medical Care Research and Review, 73*(5), 532-45.

Werner, R.M., Duggan, M., Duey, K., Zhu, J., & Stuart, E.A. (2013). The Patient-centered Medical Home: An Evaluation of a Single Private Payer Demonstration in New Jersey. *Medical Care Philadelphia-, 51*(6), 487-493.

Patient-centered medical homes in physician-led practices with utilization or cost incentives (high-risk population)

Cuellar, A., Helmchen, L.A., Gimm, G., Want, J., Burla, S., Kells, B.J., . . . Nichols, L.M. (2016). The CareFirst patient-centered medical home program: Cost and utilization effects in its first three years. *Journal of General Internal Medicine,* 1-7.

Rosenthal, M.B., Alidina, S., Friedberg, M.W., Singer, S.J., Eastman, D., Li, Z., & Schneider, E.C. (2016). A difference-in-difference analysis of changes in quality, utilization and cost following the Colorado multi-payer patient-centered medical home pilot. *Journal of General Internal Medicine, 31*(3), 289-296.

Patient-centered medical homes in physician-led practices with utilization or cost incentives (general population)

Cuellar, A., Helmchen, L.A., Gimm, G., Want, J., Burla, S., Kells, B.J., . . . Nichols, L.M. (2016). The CareFirst patient-centered medical home program: Cost and utilization effects in its first three years. *Journal of General Internal Medicine,* 1-7.

Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C., . . . Volpp, K.G. (2015). Effects of a medical home and shared savings intervention on quality and utilization of care. *Jama Internal Medicine, 175*(8), 1362-1368.

Rosenthal, M.B., Alidina, S., Friedberg, M.W., Singer, S.J., Eastman, D., Li, Z., & Schneider, E.C. (2016). A difference-in-difference analysis of changes in quality, utilization and cost following the Colorado multi-payer patient-centered medical home pilot. *Journal of General Internal Medicine, 31*(3), 289-296.

Suggested citation: Westley, E., Cramer, J., Bauer, J., Lee, S., Hirsch, M., Burley, M., & Kay, N. (2017). *Interventions to promote health and increase health care efficiency: May 2017 update* (Document Number 17-05-3401). Olympia: Washington State Institute for Public Policy.

For further information, contact:
Eva Westley at 360.664.9089, eva.westley@wsipp.wa.gov

Document Number: 17-05-3401