

December 2016

Updated Inventory of Programs for the Prevention and Treatment of Youth Cannabis Use

Revised January 13, 2017 for technical corrections

Initiative 502 (I-502) legalized recreational cannabis for adults in Washington State. The law directs the Washington State Institute for Public Policy (WSIPP) to conduct a benefit-cost evaluation of the implementation of I-502.¹ State law also requires the Division of Behavioral Health and Recovery (DBHR) in the Department of Social and Health Services (DSHS) to allocate at least 85% of its disbursement of cannabis revenues to evidence-based and research-based programs and practices, including those to prevent and treat substance use among middle- and high school-aged youth, and up to 15% to promising practices.²

In this report we summarize the research evidence for 51 programs for the prevention or treatment of youth cannabis use. The programs reviewed include those nominated by DBHR as well as programs from WSIPP's current set of inventories that have evidence for cannabis outcomes.³ We rate the level of evidence for each program using the same methods used in other WSIPP inventories, described below.

This inventory is a snapshot of the evidence at a point in time.⁴ Ratings for a program may change as new research becomes available and refinements are made to the WSIPP benefit-cost model.

¹ RCW 69.50.550.

² RCW 69.50.540.

³ See, e.g., Miller, M., Goodvin, R., Grice, J., Hoagland, C., & Westley, E. (2016). *Updated Inventory of evidence-based, research-based, and promising practices: Prevention and intervention services for adult behavioral health*. (Doc. No. 16-09-4101). Olympia: Washington State Institute for Public Policy; Lemon, M. (2016). *Updated inventory of evidence- and research-based practices: Washington's K-12 Learning Assistance Program*. (Doc. No. 16-07-2201). Olympia: Washington State Institute for Public Policy; and WSIPP & EBPI. (2016). *Updated inventory of evidence-based, research-based, and promising practices: For prevention and intervention services for children and juveniles in the child welfare, juvenile justice, and mental health systems*. (Doc. No. E2SHB2536-7). Olympia: Washington State Institute for Public Policy.

⁴ This inventory is an update and includes the most current results for all programs that have been reviewed in the two prior versions of the inventory—Lemon, M., Pennucci, A., Hanley, S., & Aos, S. (2014). *Preventing and treating youth marijuana use: An updated review of the evidence*. (Doc. No. 14-10-3201). Olympia: Washington State Institute for Public Policy and Hanley, S., & Aos, S. (2014). *Preventing youth substance use: A review of thirteen programs*. (Doc. No. 14-09-3201). Olympia: Washington State Institute for Public Policy.

Creating the Youth Cannabis Inventory

WSIPP's approach to developing this inventory is the same approach we use for legislatively directed inventories in other policy areas. The first step is to estimate the degree to which various public policies and programs can achieve desired outcomes, such as reductions in youth substance use.⁵ For each program or policy, we carefully analyze all high-quality studies from the United States and elsewhere to identify interventions or policies that have been tried, tested, and found to either achieve or not achieve improvements in outcomes. We look for research studies with strong evaluation designs and exclude studies with weak research methods. Using all credible evaluations we can locate on a given topic, we then conduct a meta-analysis to determine the average effect of the program and a margin of error for that effect. The research standards are outlined in the box below.

Standards of Research Rigor for Meta-Analysis

When WSIPP is asked by the legislature to conduct an evidence-based review, we follow a number of steps to ensure a rigorous and consistent analysis. These procedures include the following:

- ✓ We consider all available studies we can locate on a topic rather than selecting only a few; that is, we do not "cherry pick" studies to include in our reviews.
- ✓ To be included in our reviews, we require that an evaluation's research design include treatment and comparison groups from intent-to-treat samples. Random assignment studies are preferred, but we include quasi-experimental studies when the study uses appropriate statistical techniques. Natural experimental designs including regression discontinuity and instrumental variables are also considered.
- ✓ We then use a formal statistical procedure, meta-analysis, to calculate an average "effect size," which indicates the expected magnitude of the relationship between the treatment and the outcome of interest. That is, we determine whether the weight of the evidence indicates outcomes are, on average, achieved.

The second step is to use the results from our analysis of program effects to determine whether the lifetime benefits of the program exceed the costs to Washington's taxpayers. That is, we conduct a formal benefit-cost analysis.

The third analytical step involves testing the robustness of our results. Any tabulation of benefits and costs involves some degree of uncertainty about future performance. This uncertainty is expected in any investment analysis, whether in the private or public sector. To assess the riskiness of our conclusions, we perform a "Monte Carlo simulation" in which we vary the key factors in our calculations. The purpose of the risk analysis is to determine the odds that the benefits of a particular policy option will exceed the costs.

⁵ Often studies on a given program produce evidence of effects on a variety of different outcomes (e.g., crime, grades, and substance use). Evidence-ratings and benefit-cost results are based on all outcomes available for a given program.

Thus, for each program, we produce two “big picture” findings: expected benefit-cost results (net present values and benefit-cost ratios) and, given our understanding of the risks involved, the odds that the policy will at least have benefits greater than costs (benefit-cost percentage).

Methods for meta-analysis and benefit-cost modeling are described in full detail in WSIPP’s [Technical Documentation](#).⁶

Classifying Practices as Evidence-based, Research-based, and Promising

Results from meta-analysis and benefit-cost modeling are then used to classify programs as evidence-based, research-based, and promising, based on the definitions in state law shown below.⁷

Legislative Definitions of Evidence-based, Research-based, and Promising Practices

Evidence-based practice

A program or practice that has been tested in heterogeneous or intended populations with multiple randomized, or statistically controlled evaluations, or both; or one large multiple site randomized, or statistically controlled evaluation, or both, where the weight of the evidence from a systemic review demonstrates sustained improvements in at least one outcome. "Evidence-based" also means a program or practice that can be implemented with a set of procedures to allow successful replication in Washington and, when possible, is determined to be cost-beneficial.

Research-based practice

A program or practice that has been tested with a single randomized, or statistically controlled evaluation, or both, demonstrating sustained desirable outcomes; or where the weight of the evidence from a systemic review supports sustained outcomes as described in subsection (14) of this section but does not meet the full criteria for evidence-based.

Promising practice

A practice that, based on statistical analyses or a well-established theory of change, shows potential for meeting the evidence-based or research-based criteria, which may include the use of a program that is evidence-based for outcomes other than those listed in subsection (14) of this section (defining “evidence-based”).

To classify programs, the criteria in the statutory definitions are operationalized as follows:

- 1) [Heterogeneity](#). To be designated as evidence-based a program must have been tested on a “heterogeneous” population. We operationalize heterogeneity in two ways. First, the proportion of program participants belonging to racial/ethnic minority groups must be greater than or equal to the proportion of minority children in Washington. From the 2010 Census, for children age 0-17 in Washington, 68% were white and 32% belonged to

⁶ <http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf>.

⁷ RCW 71.24.025.

racial/ethnic minority groups.⁸ Thus, if the weighted average of program participants in the outcome evaluations of the program was at least 32% racial/ethnic minority, then the program was considered to have been tested in a heterogeneous population.

Second, the heterogeneity criterion can also be achieved if at least one of a program's outcome evaluations has been conducted on children in Washington and a subgroup analysis demonstrates the program is effective for racial/ethnic minorities ($p < 0.20$).

- 2) Weight of evidence. To meet the evidence-based definition, results from at least one random effects meta-analysis (p -value < 0.20) of multiple evaluations or one large multiple-site evaluation must indicate the practice achieves the desired outcome(s). To meet the research-based definition, at least one single-site evaluation must indicate the practice achieves desired outcomes (p -value < 0.20).
- 3) Benefit-cost. The statute defining evidence-based practices requires that, when possible, a benefit-cost analysis be conducted. Programs that achieve at least a 75% chance of a positive net present value meet the benefit-cost criterion.⁹

To summarize, we begin with the pool of programs defined at the outset, and review the research literature for studies meeting WSIPP's criteria for methodological rigor. Programs that have no studies are not analyzed further, and these programs are noted in the report. Programs are deemed to be promising if some research on the program suggests effectiveness even though the studies do not meet WSIPP's methodological criteria, or if the program has a well-defined theory of change. For programs that do have studies that meet WSIPP's methodological criteria, meta-analysis is conducted. If meta-analysis indicates at least one effect on an outcome of interest according to the weight of evidence criterion, the program is eligible to be either research-based or evidence-based.

Many interventions produce effects on more than one type of outcome. In our evidence ratings and benefit-cost results we include all relevant outcomes, not just those related to substance abuse. To reach the top tier, a program must also meet heterogeneity and benefit-cost criteria. Finally, in rare cases that evidence from meta-analysis indicates harmful effects of a given program on any outcome, that program will be flagged.

⁸ United States Census Bureau, 2010. Retrieved from <http://factfinder2.census.gov/>.

⁹ To operationalize the benefit-cost criterion, net benefits must exceed costs at least 75% of the time. After considerable analysis, we found that a typical program that WSIPP has analyzed may produce benefits that exceed costs roughly 75% of the time with a p -value cut off of up to 0.20. Thus, we determined that programs with p -values < 0.20 on desired outcomes should be considered research-based to avoid classifying programs with desirable benefit-cost results as promising.

Summary of Changes to Program Ratings Since Last Update

Since the last WSIPP report on programs for the prevention and treatment of youth cannabis use, WSIPP analyzed an additional 23 programs.

Two newly reviewed programs are evidence-based.

- ✓ Positive Action
- ✓ School-based tobacco prevention (including Project Towards No Tobacco Use)

Thirteen newly reviewed programs are research-based.

- ✓ Alcohol Literacy Challenge (for college students)
- ✓ Brief intervention for youth in medical settings
- ✓ Compliance checks for alcohol (including Reward & Reminder)
- ✓ Coping Power Program
- ✓ Familias Unidas
- ✓ Family Matters
- ✓ Functional Family Therapy for substance-abusing adolescents (FFT-SA)
- ✓ Multicomponent environmental interventions to prevent youth tobacco use
- ✓ Multisystemic Therapy (MST) for substance abusers
- ✓ PROSPER
- ✓ Strong African American Families
- ✓ Strong African American Families—Teen
- ✓ Teen Intervene

Eight newly reviewed programs are promising.

- ✓ Alcohol Literacy Challenge (for high school students)
- ✓ Athletes Training and Learning to Avoid Steroids (ATLAS)
- ✓ Compliance checks for tobacco (including Reward & Reminder)
- ✓ Curriculum-Based Support Group (CBSG)
- ✓ Multicomponent environmental interventions to prevent youth alcohol use
- ✓ Protecting You/Protecting Me
- ✓ Raising Healthy Children
- ✓ STARS (Start Taking Alcohol Risks Seriously) for Families

Since the last update of this inventory, WSIPP modified the statistical calculations applied to some types of studies and adjusted its benefit-cost methodology.¹⁰ These calculations affected the results for each program. Due to these changes, WSIPP reclassified four programs from previous versions of this report.

Two programs have higher evidence ratings than previous.

- ✓ InShape (Null/poor outcomes → Research-based)
- ✓ Project Towards No Drug Abuse (TND) (Promising → Research-based)

Two programs have lower ratings than previous.

- ✓ keepin' it Real (Research-based → Promising)
- ✓ Life Skills Training (for middle school students) (Evidence-based → Research-based)

Finally, seven programs are not rated in this inventory because we found no studies meeting criteria for meta-analysis.

- ✓ Life Skills Training (for high school students)
- ✓ Love and Logic
- ✓ Marijuana Education Initiative
- ✓ Project Venture
- ✓ Red Cliff Wellness School Curriculum
- ✓ Restorative Justice
- ✓ Social Norms Marketing

Limitations

The benefit-cost analyses in this report reflect only those outcomes that were measured in the studies we reviewed and are “monetizable” with the current WSIPP benefit-cost model. “Monetizable” means that we can link the outcome to future economic consequences, such as labor market earnings, criminal justice involvement, or health care expenditures. At this time we are unable to monetize some relevant outcomes, such as attitudes towards drug use or intentions to use.

¹⁰ WSIPP’s meta-analytic and benefit-cost methods are described in detail in our Technical Documentation. <http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf>.

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Program/intervention	Level of evidence	Effective for cannabis [#]	Benefit-cost percentage	Reason program does not meet suggested evidence-based criteria (see full definitions below)	Percent minority
Prevention					
Alcohol Literacy Challenge (for college students)	⊙		48%	Benefit-cost	24%
Alcohol Literacy Challenge (for high school students)	P			Single evaluation	33%
Athletes Training and Learning to Avoid Steroids (ATLAS)	P			Weight of evidence	22%
Brief intervention for youth in medical settings	⊙		49%	Benefit-cost	65%
Caring School Community (formerly Child Development Project)	P		61%	Weight of evidence	47%
Case management in schools (including Communities in Schools)	⊙		96%	Mixed results	61%
Communities That Care	●		80%		33%
Compliance checks for alcohol (including Reward & Reminder)	⊙			Single evaluation	25%
Compliance checks for tobacco (including Reward & Reminder)	P			Single evaluation	28%
Coping Power Program	⊙		50%	Benefit-cost	80%
Curriculum-Based Support Group (CBSG)	P			Single evaluation	90%
Familias Unidas	⊙		41%	Benefit-cost	100%
Family Check-Up (also known as Positive Family Support)	⊙	✓	41%	Benefit-cost	61%
Family Matters	⊙		74%	Heterogeneity	22%
Guiding Good Choices (formerly Preparing for the Drug Free Years)	⊙		56%	Benefit-cost	46%
InShape	⊙		46%	Single evaluation	28%
keepin' it Real	P		62%	Weight of evidence	83%
Life Skills Training (for middle school students)	⊙		66%	Benefit-cost	38%
Lions Quest Skills for Adolescence	⊙	✓	65%	Benefit-cost	74%
Mentoring for students: Community-based (with volunteer costs) (including Big Brothers Big Sisters)	⊙		66%	Benefit-cost	78%
Multicomponent environmental interventions to prevent youth alcohol use	P		27%	Weight of evidence	19%
Multicomponent environmental interventions to prevent youth tobacco use	⊙		86%	Heterogeneity	21%
Positive Action	●	✓	88%		63%
Project ALERT	⊙		64%	Benefit-cost/heterogeneity	12%

● Evidence-based ⊙ Research-based P Promising See definitions and notes on page 9.

Notes:

[#] At least one cannabis outcome with a meta-analytic effect size estimate demonstrating reduced cannabis use with a p-value < 0.20.

Many interventions produce effects on more than one type of outcome. This is especially true for prevention programs that often target multiple issues. WSIPP analyzes all relevant outcomes, and the evidence rating and benefit-cost results for a given program are often based on a variety of different outcomes, such as school achievement, substance use, mental health, and crime. In the column to the right of the level of evidence, we denote with a check mark those programs that have evidence of effectiveness for cannabis use specifically (p < 0.20). In addition to the overall level of evidence for a program, it is important to consider the specific outcomes the program has achieved to determine suitability for a given application. This is especially true for programs listed as "Mixed results" which is indicated when a program has both favorable and harmful effects. Each program name in the table links to a results page where the table, "Meta-Analysis of Program Effects," lists all of the outcomes analyzed for each program.

The classifications in this document are current as of December 2016.

For the most up-to-date results, please visit the program's page on our website <http://www.wsipp.wa.gov/BenefitCost>

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Program/intervention	Level of evidence	Effective for cannabis [#]	Benefit-cost percentage	Reason program does not meet suggested evidence-based criteria (see full definitions below)	Percent minority
Prevention (continued)					
Project Northland	⊙		74%	Benefit-cost	36%
Project STAR	⊙	✓	73%	Benefit-cost/heterogeneity	5%
Project SUCCESS	⊙		41%	Weight of evidence	38%
Project Towards No Drug Abuse (TND)	⊙		57%	Benefit-cost	70%
PROSPER	⊙	✓	55%	Benefit-cost/heterogeneity	15%
Protecting You/Protecting Me	P			Weight of evidence	92%
Raising Healthy Children	P			Single evaluation	18%
School-based tobacco prevention programs (including Project Towards No Tobacco Use)	●		99%		41%
SPORT	⊙			Single evaluation	49%
STARS (Start Taking Alcohol Risks Seriously) for Families	P			Single evaluation	66%
Strengthening Families for Parents and Youth 10-14	⊙	✓	71%	Benefit-cost/heterogeneity	21%
Strong African American Families	⊙			Single evaluation	100%
Strong African American Families—Teen	⊙			Single evaluation	100%
Teen Intervene	⊙	✓	96%	Heterogeneity	29%
Treatment					
Adolescent Assertive Continuing Care	⊙	✓	37%	Benefit-cost/heterogeneity	26%
Functional Family Therapy for substance-abusing adolescents (FFT-SA)	⊙		0%	Benefit-cost	74%
Multidimensional Family Therapy (MDFT)	⊙	✓	12%	Benefit-cost	100%
Multidimensional Treatment Foster Care	⊙		61%	Benefit-cost/heterogeneity	23%
Multisystemic Therapy (MST) for substance abusers	⊙	✓	54%	Benefit-cost	63%
Teen Marijuana Check-Up	●	✓	100%		39%

● Evidence-based ⊙ Research-based P Promising See definitions and notes on page 9.

Notes:

[#] At least one cannabis outcome with a meta-analytic effect size estimate demonstrating reduced cannabis use with a p-value < 0.20.

Many interventions produce effects on more than one type of outcome. This is especially true for prevention programs that often target multiple issues. WSIPP analyzes all relevant outcomes, and the evidence rating and benefit-cost results for a given program are often based on a variety of different outcomes, such as school achievement, substance use, mental health, and crime. In the column to the right of the level of evidence, we denote with a check mark those programs that have evidence of effectiveness for cannabis use specifically ($p < 0.20$). In addition to the overall level of evidence for a program, it is important to consider the specific outcomes the program has achieved to determine suitability for a given application. This is especially true for programs listed as "Mixed results" which is indicated when a program has both favorable and harmful effects. Each program name in the table links to a results page where the table, "Meta-Analysis of Program Effects," lists all of the outcomes analyzed for each program.

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Definitions and Notes:

Reasons Programs May Not Meet Suggested Evidence-Based Criteria:

Benefit-cost: The proposed definition of evidence-based practices requires that, when possible, a benefit-cost analysis be conducted. We use WSIPP's benefit-cost model to determine whether a program meets this criterion. Programs that do not have at least a 75% chance of a positive net present value do not meet the benefit-cost test. The WSIPP model uses Monte Carlo simulation to test the probability that benefits exceed costs. The 75% standard was deemed an appropriate measure of risk aversion.

Heterogeneity: To be designated as evidence-based under current law or the proposed definition, a program must have been tested on a "heterogeneous" population. We operationalized heterogeneity in two ways. First, the proportion of minority program participants must be greater than or equal to the minority proportion of children under 18 in Washington State. From the 2010 Census, of all children in Washington, 68% were white and 32% minority. Thus, if the weighted average of program participants had at least 32% minorities then the program was considered to have been tested on a heterogeneous population.

Second, the heterogeneity criterion can also be achieved if at least one of the studies has been conducted on children in Washington and a subgroup analysis demonstrates the program is effective for minorities ($p < 0.20$). Programs passing the second test are marked with a ^. Programs that do not meet either of these two criteria do not meet the heterogeneity definition. Programs whose evaluations do not meet either of these two criteria do not meet the heterogeneity definition.

Mixed results: If findings are mixed from different measures (e.g., undesirable outcomes for behavior measures and desirable outcomes for test scores), the program does not meet evidence-based criteria.

Research on outcomes of interest not yet available: The program has not yet been tested with a rigorous outcome evaluation.

Single evaluation: The program does not meet the minimum standard of multiple evaluations or one large multiple-site evaluation contained in the current or proposed definitions.

Weight of evidence: To meet the evidence-based definition, results from a random effects meta-analysis (p -value < 0.20) of multiple evaluations or one large multiple-site evaluation must indicate the practice achieves the desired outcome(s). To meet the research-based definition, one single-site evaluation must indicate the practice achieves the desired outcomes (p -value < 0.20).

Level of Evidence:

Evidence-based: A program or practice that has been tested in heterogeneous or intended populations with multiple randomized and/or statistically-controlled evaluations, or one large multiple-site randomized and/or statistically-controlled evaluation, where the weight of the evidence from a systematic review demonstrates sustained improvements in at least one outcome. Further, "evidence-based" means a program or practice that can be implemented with a set of procedures to allow successful replication in Washington and, when possible, has been determined to be cost-beneficial.

Research-based: A program or practice that has been tested with a single randomized and/or statistically-controlled evaluation demonstrating sustained desirable outcomes; or where the weight of the evidence from a systematic review supports sustained outcomes as identified in the term "evidence-based" in RCW (the above definition) but does not meet the full criteria for "evidence-based."

Promising practice: A program or practice that, based on statistical analyses or a well-established theory of change, shows potential for meeting the "evidence-based" or "research-based" criteria, which could include the use of a program that is evidence-based for outcomes other than the alternative use.

Other Definitions:

Benefit-cost percentage: The percent of the time where the monetary benefits exceed costs.

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Washington State Institute for Public Policy

The Washington State Legislature created the Washington State Institute for Public Policy in 1983. A Board of Directors—representing the legislature, the governor, and public universities—governs WSIPP and guides the development of all activities. WSIPP's mission is to carry out practical research, at legislative direction, on issues of importance to Washington State.