

Supplementary Materials

Title: Family-based Interventions to Prevent Substance Use Among Youth: Community Guide Systematic Review

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Appendix A: Quality Assessment Tool for Estimates from Economic Review of Family-based Interventions to Prevent Substance Use Among Youth

This tool assesses the quality of estimates based on their adequacy for the objectives of the present systematic economic review of family-based interventions to prevent substance use among youth. Quality assessed here may differ from results produced by a tool designed with different objectives.

Intervention Cost Estimates

Part 1. Intervention Cost Drivers

Consult the abstracted intervention narratives and intervention methods sections to determine the components that are likely to be cost drivers. Compare the list of cost drivers to what the study explicitly states are included in intervention cost.

If you find there is missing cost drivers, enter “1” under the Limitation? column and add any notes as necessary under the Notes column. If your assessment is that the authors have adequately included and addressed the cost driver in the estimate for intervention cost, enter “0” under the Limitation? column.

Cost Driver		Limitation?	Notes
Component	Description		
Staff labor	Facilitator and other staff wages and benefits		
Staff training	• Training materials and time		
Compensation for parent or caregiver time	Valuation of time spent by parent or caregiver participating in intervention		
Fatal Flaw	Describe (e.g., Reported estimate for intervention cost almost certainly excludes all or most of the components known to be delivered based on methods described in the study).		
TOTAL LIMITATIONS			
QUALITY GRADE		☐ Good (0) ☐ Fair (1) ☐ Limited (≥ 2)	

Part 2. Intervention Cost Measurement Shortfalls

If you find there is a limitation for any measurement shortfalls, enter “1” under the Limitation? column and any comments in the Notes column. If your assessment is that the authors have adequately addressed the measurement aspect, enter “0” under the Limitation? Column; otherwise enter “1”.

Shortfall		Limitation?	Notes
Aspect	Description		
Sample size	Small intervention sample (<50 at baseline)		
Appropriate per capita measure	Appropriate measure (e.g., per family, per student, per participant)		
Data source	Appropriate data source (e.g., study records of staff time and supplies procured)		
Valuation	Appropriate valuation based on local prices and conditions		
Uncertainty	Reports measure of uncertainty of estimate		
Duration	Measured over duration the intervention is provided		
Deadweight loss	Deadweight loss if funded by taxes		
Fatal flaw	Describe (e.g., Inadequate information for reviewers to derive intervention cost where an explicit estimate was not provided)		
Total limitations			
QUALITY GRADE		☐ Good (0-2) ☐ Fair (≤ 4) ☐ Limited (≥ 5)	

Intervention Economic Benefit

Part 1. Intervention Benefit Drivers

Compare what types of economic benefits are estimated and reported by the study and compare them to what we expect are drivers of benefit identified in the table.

If you find there is missing information (i.e., a limitation) for any benefit drivers, enter “1” under the Limitation? Column and any comments in the Notes column. If your assessment is that the authors have adequately addressed the cost driver, enter “0” under the Limitation? column.

Cost Driver		Limitation?	Notes
Component	Description		
Healthcare	Change in healthcare cost because of intervention		
Injury of death	Monetized value of averted injury or death		
Justice system	Averted costs to the justice system		
Education or productivity	Value of improved education or productivity at worksites		
Fatal Flaw	Describe (e.g., Reported estimate for economic benefit almost certainly seriously underestimated or overestimated).		
TOTAL LIMITATIONS			
QUALITY GRADE		☐ Good (0-1) ☐ Fair (2) ☐ Limited (≥ 3)	

Part 2. Economic Benefits Measurement Shortfalls

If you find there is a limitation for the measurement area/aspect reported in the study based on information about how the measurements were made, enter "1" under the Limitation? column. Add notes as necessary. If your assessment is that the authors have adequately addressed the limitation enter "0" under the Limitation? column.

Shortfall	Limitation?	Notes
Population		
Small sample size (<50 at baseline)		
Appropriate population – families with adolescents or youth		
Intervention Design and Time Follow-Up		
Effect based on RCTs or mostly based on RCTs		
Appropriate time horizon (lifetime)		
Observed in trial or program		
Effectiveness and Benefit Valuation		
Benefit effects based on substance use outcomes (disorder or dependence) or linked outcomes		
Based on sufficient number of studies for meta-analysis		
Decay of effect where relevant		
Derived using appropriate statistical methods for RCT, natural experiment, quasi-experiment, other		
Local prices for valuation		
No double counting		
Appropriate discounting		
Uncertainty of estimate reported as probability, sensitivity or provides range or confidence interval		
Fatal Flaw		
Describe the fatal flaw in the notes column (e.g., conjecture based on outcomes not from trial population or based on pathways that are not founded in evidence)		
TOTAL LIMITATIONS		
QUALITY GRADE	☐ Good (0-3) ☐ Fair (4-8) ☐ Limited (≥ 9)	

QALY or Modeled Outcomes

QALY or Other Modeled Outcomes Measurement Shortfalls

If you find there is shortfall (i.e., a limitation) due to the population characteristics and other areas/aspects about how the measurements were made, enter "1" under the Limitation? column. Add notes as necessary. If your assessment is that the authors have adequately addressed the limitation enter "0" under the Limitation? column.

Characteristic	Limitation?	Notes
Modeled Population		
Appropriate population – families with adolescents or youth		
Model Input Values		
Based on substance use outcomes (disorder or dependence) or linked outcomes		
Substance use effect observed in trial or program		
Substance use effect based on RCTs or mostly RCTs		
Effects using appropriate statistical methods		
Based on sufficient number of studies for meta-analysis		
Model Characteristics and Outputs		
Utility weights for QALY derived from established instruments or cited secondary sources		
Decay of effect where relevant		
Appropriate time horizon (lifetime)		
Appropriate discounting		
Uncertainty of estimate reported as probability, sensitivity or provides range or confidence interval		
Fatal Flaw		
Describe the fatal flaw in the notes column (e.g., conjecture based on outcomes not from trial population or based on pathways that are not founded in evidence)		
TOTAL LIMITATIONS		
QUALITY GRADE	☐ Good (0-3) ☐ Fair (4-7) ☐ Limited (≥ 8)	

Appendix B: Evaluation Methods for WSIPP 2023 and SAMHSA 2008

Appendix Table B.2 summarizes the methods used by the Washington State Institute for Public Policy (WSIPP 2023)¹ and SAMHSA 2008.²

WSIPP provides economic evaluations to inform the legislature of the state of Washington about the effectiveness, fiscal impacts, and societal cost-benefit of various prevention and treatment programs. In keeping with its mandate, the analyses are conducted with inputs and outputs for the state of Washington. SAMHSA 2008 was published by the Substance Abuse and Mental Health Services Administration as a source of evidence about program costs, benefit, and cost-effectiveness of substance use prevention and treatment programs in the United States.

WSIPP 2023 uses results from a literature review or meta-analysis to obtain measures of program effectiveness in averting substance use which is then transformed for input into the cost-benefit model. WSIPP 2023's cost-benefit model was developed in 1983 and has been modified and enhanced over the years with expert review and input.³ Program cost is either drawn from published evaluations or estimated from local unit prices and quantities of resources required to implement the program as described. It is assumed that implementation cost is borne by taxpayers. Economic benefits within the cost-benefit model derive from program effectiveness in averting substance use. In the context of the present review, program effectiveness was most frequently defined as the number of youth at high school completion age whose substance use was prevented due to the program. Each case of averted substance use has impacts in money terms on increased labor income as adults through education, employment and productivity; healthcare cost savings through averted substance use disorder and related diseases; averted premature death due to substance use; savings from averted encounters with the justice system;

averted loss of property caused by substance use; and the loss of societal welfare due to taxation necessary to pay for the program. The linkages built into the cost-benefit model from substance use averted and the sectoral monetized benefits are informed by review of the research literature. Total benefit is obtained as the sum of benefits across sectors. Total benefit is then divided by program cost to obtain the benefit to cost ratio. Sensitivity analysis allowed the inputs into the cost-benefit model to vary across their estimated ranges in multiple simulations, and the proportion of instances where benefits exceeded cost was reported. On an ongoing basis, WSIPP 2023 reviews the inputs and outputs for each of the programs evaluated, as new evidence is published, and the cost-benefit methods are enhanced or improved.

SAMHSA 2008's inputs for the cost-benefit and cost-effectiveness models for several programs were drawn from an earlier publication from WSIPP for prevention programs for youth,⁴ and from primary effectiveness evaluations for other programs. Effectiveness was defined as the proportion of youth ages 12-14 years who delay initiation or reduce use for each substance due to effective prevention programs. Effectiveness was reduced by 25% to account for scale up from trials. SAMHSA 2008 required that program cost include material cost, training cost, and labor for intervention delivery. Existing estimates were used where these components were included. For the remaining programs, labor and training costs were computed based on teacher time, travel and cost and derived from implementation data maintained by teaching and educational resource sites and a state of Maryland site for program evaluation data. Benefits derive from averted costs over lifetimes because of delayed or reduced substance use by those ages 12-14 years. In simplified terms, averted costs are computed by multiplying measures of reduced incidence because of the program and the per person social cost burdens for each substance.

These benefits are averted healthcare cost, worksite productivity losses, and the monetized value of quality-of-life improvements. The benefit of quality-of-life improvements was computed by monetizing QALY gained, in accordance with a 2003 U.S. Office of Management and Budget mandate for regulatory impact analysis. QALY was monetized based on estimates from elsewhere for the value of statistical life. Cost-effectiveness was calculated as net cost per QALY gained, where net cost was intervention cost minus the sum of averted healthcare and other monetized benefits such as averted resource costs. Costs and benefits were discounted at 3%. No sensitivity analysis was conducted by SAMHSA 2008.

In cost-benefit methods, SAMHSA 2008 distinguishes from WSIPP 2023 in its monetization of quality-of-life. WSIPP 2023 monetized the deadweight loss due to taxation as a negative benefit while SAMHSA 2008 did not.

References

1. Washington State Institute for Public Policy. Various report on cost-benefit from the Washington State Institute for Public Policy. December 2023. Available from: www.wsipp.wa.gov/BenefitCost. Accessed April 10, 2024.
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3. Washington State Institute for Public Policy. Benefit-Cost Technical Documentation; 2023. Available from:

<https://www.wsipp.wa.gov/TechnicalDocumentation/2023/WsippBenefitCostTechnicalDocumentation.pdf>. Accessed May 15, 2024.

4. Washington State Institute for Public Policy. Benefits and Costs of Prevention and Early Intervention Programs for Youth; 2004. Available from:

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Appendix Table B.1. Programs Evaluated by Peer-reviewed Studies, WSIPP 2023¹ and SAMHSA 2008²

Program Name	Peer-reviewed Studies	WSIPP 2023	SAMHSA 2008
CASASTART (California's Striving Together to Achieve Rewarding Tomorrows)		✓	✓
Communities that Care	✓	✓	
Computer-based substance use prevention programs		✓	
Familias Unidas	✓	✓	
Family Empowerment Intervention (FEI)	✓		
Family Matters	✓	✓	✓
Guiding Good Choices (formerly Preparing for the Drug Free Years)	✓	✓	✓
Iowa Strengthening Families Program (ISFP)	✓		
Iowa Strengthening Families Program (ISFP) + Preparing for the Drug-Free Years (PDFY)	✓		
New Beginnings for children of divorce		✓	
Positive Family Support/Family Check-Up (AKA Adolescent Transitions)		✓	✓
Project Northland		✓	✓
Project STAR (Students Taught Awareness and Resistance, also known as the Midwestern Prevention Project)		✓	✓
PROSPER (PROmoting School-community-university Partnerships to Enhance Resilience)	✓	✓	
Protecting Strong African American Families (ProSAAF).	✓		
STARS for Families			✓
Staying Connected with Your Teen (SCYT)	✓		
Strengthening Families Program (SFP 10-14)	✓	✓	✓

Strengthening Families Program (SFP 10-14) + All Stars	✓		
Strengthening Families Program (SFP 10-14) + Life Skills Training (LST)	✓		
Strengthening Families Program (SFP 10-14) + Project Alert	✓		
Strong African American Families (SAAF)	✓	✓	
Strong African American Families—Teen (SAAF-T)	✓	✓	

Appendix Table B.2. WSIPP 2023¹ and SAMHSA 2008² Evaluation Methods

	WSIPP 2023¹	SAMHSA 2008²
Objective	Established 1983 to provide economic evaluations of social programs for the legislature in Washington state	“... to understand the costs of substance abuse prevention programs and the potential cost savings as a result of implementation”
Population	Input and parameter values for State of Washington	Estimated for U.S. na population
Overall Economic Analyses	Cost-benefit ³	Cost-benefit (Cite Rand and Millers various papers) and Cost-effectiveness
Intervention effect	Prevented substance use initiation at end of high school -- from review or meta-analysis of evaluation literature.	Prevented substance use initiation or reduced substance use ---from Aos 2004 ⁴ or primary studies of effectiveness.
Intervention Cost	From review of evaluation literature and micro costing	Primary evaluation studies, education and training resource, Maryland governor’s office on youth programs
Intervention Benefits (Monetized)	Reduced incidence modeled to impacts within sectors and monetized for • Healthcare • Mortality • Labor market • Justice system • Property • Deadweight loss	Reduced incidence modeled to impacts within sectors and monetized for • Healthcare • Quality of life • Other monetized benefits

Uncertainty of Estimates	Intervention cost uncertainty reported as bands +/- 10%-50%. Uncertainty of cost-benefit ratios reported as percent of simulations where cost-benefit ratio greater than 1.0.	Not Reported
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Appendix Table B.3. Economic Benefits of Programs Evaluated by WSIPP 2023¹ and SAMHSA 2008²

Program Name Source	Healthcare	Mortality	Quality of Life	Criminal Justice	Property	Deadweight Loss	Other Benefit	Total Benefits
CASASTART (California's Striving Together to Achieve Rewarding Tomorrows) WSIPP 2023	\$481	\$14	—	-\$298	\$5	-\$7,688	—	-\$5,117
Communities That Care WSIPP 2023	\$296	\$35	—	\$1,837	\$5	-\$363	—	\$4,129
Computer-based substance use prevention programs WSIPP 2023	\$590	\$82	—	-\$75	\$5	\$92	—	\$2,510
Familias Unidas WSIPP 2023	\$598	\$50	—	\$229	\$19	-\$914	—	\$7,618
Family Matters WSIPP 2023	\$376	\$49	—	\$117	\$4	-\$121	—	\$2,211
Guiding Good Choices (formerly Preparing for the Drug Free Years) WSIPP 2023	\$1	\$0	—	\$1,497	\$1	-\$404	—	\$1,095

New Beginnings for children of divorce WSIPP 2023	\$169	-\$28	—	\$1,622	-\$8	-\$445	—	-\$399
Positive Family Support/Family Check- Up (AKA Adolescent Transitions) WSIPP 2023	\$1,986	\$249	—	\$170	\$25	-\$27	—	\$12,130
Project Northland WSIPP 2023	\$18	\$6	—	\$65	\$2	-\$59	—	\$383
Project STAR (Students Taught Awareness and Resistance, also known as the Midwestern Prevention Project) WSIPP 2023	\$829	\$46	—	\$453	\$2	-\$39	—	\$3,192
PROSPER (PROmoting School-community- university Partnerships to Enhance Resilience) WSIPP 2023	\$118	\$12	—	\$62	\$1	-\$209	—	\$366
Strengthening Families for Parents and Youth 10- 14	\$224	\$36	—	\$1,872	\$11	-\$340	—	\$3,994

WSIPP 2023								
Strong African American Families			—				—	
WSIPP 2023	\$445	\$11		\$111	\$3	-\$442		\$2,022
Strong African American Families—Teen			—				—	
WSIPP 2023	\$117	\$42		\$170	\$11	-\$328		\$2,372
Adolescent Transitions (AKA Positive Family Support)		—		—	—	—		
SAMHSA 2008	\$627		\$11,128				\$4,353	\$16,090
CASA Start		—		—	—	—		
SAMHSA 2008	\$627		\$4,709				\$2,896	\$8,299
Family Matters		—		—	—	—		
SAMHSA 2008	\$305		\$5,589				\$2,168	\$8,130
Guiding Good Choices (a.k.a. PDFY)		—		—	—	—		
SAMHSA 2008	\$305		\$2,320				\$1,524	\$4,234
Strengthening Families		—		—	—	—		
SAMHSA 2008	\$932		\$10,332				\$5,420	\$16,937

Project Northland SAMHSA 2008	\$423	—	\$7,927	—	—	—	\$3,371	\$11,687
Project STAR (a.k.a. MPP) SAMHSA 2008	\$271	—	\$4,455	—	—	—	\$2,253	\$6,944
STARS for Families SAMHSA 2008	\$124	—	\$423	—	—	—	\$288	\$830