

### Supplemental Materials

**Table S-1. Eligibility Criteria, Definitions, and Changes Implemented During Systematic Review**

CRITERION	DEFINITION	ADAPTATION/CHANGE
<b>1. School -based</b>	Programs delivered on the school premises either during the regular hours of the school day or during the after school hours. The review will not include school programs that are considered “extracurricular,” such as athletics, arts, academic tutoring, mentoring, etc.	Programs with primary components delivered mainly to parents, in home or community settings, were excluded.
<b>2. Interactive</b>	Involve participants in skill-building and engagement with other participants, compared to programs that are more lecture-oriented in nature distinguished from non-interactive didactic-type programs characterized by a lecture-style emphasizing only knowledge and attitudinal development.	
<b>3. Middle school adolescents</b>	Adolescents (aged 12-14) in middle school (grades 6-8) at the time of program delivery.	The primary program components must have been delivered during sixth, seventh, and eighth grade, and the majority of participants must be between ages 12 and 14.
<b>4. Measures alcohol or drug use or attitude</b>	The range of drug or alcohol use measured may include self-reported use of any illicit drugs or specific drugs (i.e., marijuana, cocaine, crack, methamphetamines, heroin, LSD, huffing glue or paint, etc.), abuse of prescription drugs, or alcohol. Behavioral measures may also include drug test results, official reports (by school, criminal record), or parent report. Only studies including sufficient statistical information from which to compute an effect size are eligible. Studies reporting insufficient information to determine the direction of the effect for the outcome will be excluded.	Refined attitudinal to mean intention to use and refusal/resistance skill measures. Refined usage to mean any drug use during trial period, coded as “initiation”, and usage during a defined recent time range during the trial period, such past 30 or 14 days, defined as “recent use”.
<b>5. Impact evaluation</b>	Studies must use a control or comparison group design that reports pretest and posttest measures. The	

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	<p>control condition must be “treatment as usual”, placebo, wait list, no treatment, or minimal treatment. The control condition should be intended to avoid influencing behavioral change. Acceptable study designs may include those with 1) randomly controlled trials or random assignment to treatment and control groups; 2) matched pair treatment and control groups using statistical scoring; 3) quasi-experimental groups using statistical controls. Studies measuring outcomes on completers only will be excluded</p>	
<p><b>6. English language North America</b></p>	<p>Studies must have been conducted in North America and reported in English.</p>	
<p><b>7. Since 1998</b></p>	<p>Only studies reported or published between 1998 and 2014 will be included. This restriction is to focus on contemporary program designs that will have likely incorporated the knowledge of effectiveness of programs designed and evaluated prior to the mid-1990s. The 1998 cutoff is based on the review by Tobler, et al., (2000) which included studies published up to 1998.</p>	<p>Only studies that were conducted during 1998 or later, published between 1998 and 2014. Final search conducted on March 06, 2014. Additional studies were identified and retrieved through bibliography searches during coding, through April 27, 2015.</p>
<p><b>8. Published &amp; unpublished</b></p>	<p>Published and unpublished studies are eligible, including refereed journals, non-refereed journals, unpublished manuscripts or white papers, dissertations and theses, government reports, technical reports, conference presentations.</p>	

**Table S-2. Studies with Multiple Reports Combined to Yield One Independent Effect Size for Each Outcome**

Study Name for Meta-Analysis	Studies Combined
<i>Outcomes reported at multiple follow-up periods</i>	
Hecht, Graham, & Elek (2006)	Effect sizes from outcomes reported at 14 months using the full sample were combined with effects from intermediate outcomes in Hecht, Marsiglia, Elek, Wagstaff, Kulis, Dustman, & Miller-Day (2003).
Clark, Ringwalt, Hanley & Shamblen (2010)	Effect sizes for intention and refusal skill outcomes at one and 12 months were combined.
<i>Multiple outcomes reported for subgroups</i>	
Eisen, Zellman, & Murray (2003)	Effect sizes for one-year follow-up were combined with effect sizes from intermediate outcomes based on the full sample reported in Eisen, Zellman, Massett, & Murray (2002) and Eisen (2001), which reported user subgroup outcomes.
Griffin, Botvin, Nichols, & Doyle (2003)	Effect sizes for a high-risk subsample were combined with effect sizes from Botvin, Griffin, Diaz, & Ifill-Williams (2001), which reported outcomes for the full sample.
Ringwalt, Clark, Hanley, Shamblen, & Flewelling (2010)	Effect sizes for cannabis use outcomes were combined with those effect sizes from Ringwalt, Kovach, Hanley, Shamblen, & Flewelling (2009).
Ellickson, McCaffrey, Gosh-Dastidar, & Longshore (2003)	Effect sizes for recent use and initiation outcomes at 18 months reported for separate risk-level groups were combined.
Aseltine, Dupre, & Lamlein (2000)	Effect sizes computed from outcomes reported for two treatment groups given variations of the same program compared to one control group were combined.
McNeal, Hansen, Harrington, & Giles (2004)	Effect sizes computed for total sample rather than two separate subsamples.
<i>Combination of reasons for multiple effect sizes from the same sample</i>	
Bacon, Hall & Ferron (2013)	Effect sizes for outcomes at six months reported separately for risk-level subgroups which were combined.
Vicary, Smith, Swisher, Hopkins, Elek, Bechtel, & Henry (2006)	Effects sizes for outcomes at 36 months reported separately for males and females in treatment groups given basic and enhanced versions of the same program were combined. Those effects sizes were then combined with effect sizes from outcomes in Vicary, Henry, Bechtel, Swisher, Smith, Wylie, & Hopkins (2004) and Smith, Swisher, Vicary, Bechtel, Minner, Henry & Palmer (2004), which reported outcomes at 24 months separately for males and females in two treatment groups with variations of the same program that

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Study Name for Meta-Analysis	Studies Combined
Longshore, Ellickson, McCaffrey, & Clair (2007)	were compared to a single control group. Effect sizes for outcomes at 30 months were combined with those in Ghosh-Dastidar, Longshore, Ellickson, & McCaffrey (2004), which reported intent and refusal skill outcomes at 18 months follow-up, and Ellickson et al. (2003), which reported use outcomes at 18 months by separate risk-level subgroups that were also combined.

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**Table S-3. All Coded Effect Sizes for Cannabis Use Outcomes**

Study (Author & Year)	Subgroup	Outcome Label	Sample Size		<i>d</i>	<i>SE</i>
			Treatment	Control		
Apsler et al. (2006)	--	Recent Use	87	85	0.000	0.451
Aseltine et al. (2000)	Mentor added	Initiation	76	118	-0.296	0.214
Aseltine et al. (2000)	Standard	Initiation	122	118	-0.156	0.216
Bacon et al. (2013)	High Risk, 1 month	Initiation	5251	5262	0.000	0.028
Bacon et al. (2013)	High Risk, 6 months	Initiation	5066	5097	-0.260	0.028
Bacon et al. (2013)	Low Risk, 1 month	Initiation	5251	5262	0.000	0.028
Bacon et al. (2013)	Low Risk, 6 months	Initiation	5066	5097	0.000	0.028
Bacon et al. (2013)	Moderate Risk, 1 month	Initiation	5251	5262	0.000	0.028
Bacon et al. (2013)	Moderate Risk, 6 months	Initiation	5066	5097	0.000	0.028
Botvin et al. (2001)	--	Recent Use	2144	1477	-0.061	0.057
D'Amico et al. (2007)	--	Recent Use	64	285	-0.357	0.187
DeWit et al. (2000)	--	Recent Use	87	80	-0.401	0.163
Eisen (2001)	Nonusers, 12 months	Initiation	2416	2416	-0.135	0.111
Eisen et al. (2002)	1 month	Initiation	2438	2438	-0.150	0.110
Eisen et al. (2003)	12 months	Initiation	2732	2732	-0.096	0.076
Eisen et al. (2003)	12 months	Recent Use	2732	2732	-0.137	0.082
Ellickson et al. (2003)	High Risk, 18 months	Initiation	2553	1723	-0.191	0.088
Ellickson et al. (2003)	Low Risk, 18 months	Initiation	2553	1723	-0.304	0.121
Ellickson et al. (2003)	Moderate Risk, 18 months	Initiation	2553	1723	-0.269	0.068
Fosco et al. (2013)	--	Recent Use	332	178	-0.183	0.103
Gottfredson et al. (2010)	--	Initiation	191	195	-0.073	0.167
Griffin et al. (2003)	--	Recent Use	379	379	-0.083	0.083
Griffin et al. (2009)	--	Recent Use	92	86	-0.295	0.163
Hecht et al. (2003)	2 months	Recent Use	1969	1969	-0.021	0.049
Hecht et al. (2003)	8 months	Recent Use	1910	1910	-0.022	0.050
Hecht et al. (2003)	14 months	Recent Use	1604	1604	-0.116	0.052
Hecht et al. (2006)	14 months	Recent Use	2143	1005	-0.072	0.061
Hecht et al. (2006)	14 months	Recent Use	2143	1005	-0.099	0.061
Longshore et al. (2007)	Boys, Enhanced, 30 months	Recent Use	208	305	-0.163	0.138
Longshore et al. (2007)	Boys, Standard, 30 months	Recent Use	266	305	0.081	0.131
Longshore et al. (2007)	Girls, Enhanced, 30 months	Recent Use	163	251	-0.486	0.155
Longshore et al. (2007)	Girls, Standard, 30 months	Recent Use	191	251	-0.072	0.149
McNeal et al. (2004)	--	Recent Use	342	911	0.008	0.181
Parent (2010)	--	Recent Use	67	62	0.616	0.216
Ringwalt et al. (2009)	1 month	Initiation	2324	2358	0.052	0.170
Ringwalt et al. (2010)	12 months	Initiation	2470	2470	-0.062	0.085
Slater et al. (2006)	--	Initiation	2108	2108	-0.010	0.062
Sloboda et al. (2009)	--	Initiation	5756	4678	0.017	0.040

Study (Author & Year)	Subgroup	Outcome	Sample Size		<i>d</i>	<i>SE</i>
		Label	Treatment	Control		
Smith et al. (2004)	Boys, Intensive, 24 months	Initiation	73	49	-0.125	0.201
Smith et al. (2004)	Boys, Standard, 24 months	Initiation	57	49	-0.131	0.208
Smith et al. (2004)	Girls, Intensive, 24 months	Initiation	61	41	-0.136	0.216
Smith et al. (2004)	Girls, Standard, 24 months	Initiation	48	41	-0.144	0.224
Spoth et al. (2008)	--	Initiation	428	347	-0.144	0.088
St. Pierre et al. (2005)	--	Initiation	597	597	0.114	0.098
Turner-Musa et al. (2008)	--	Recent Use	42	26	0.000	0.356
Vicary et al. (2004)	High Risk Girls, Intensive	Recent Use	22	24	-0.590	0.312
Vicary et al. (2004)	High Risk Girls, Standard	Recent Use	22	24	-0.199	0.300
Vicary et al. (2004)	Low Risk Girls, Intensive	Recent Use	106	74	-0.102	0.171
Vicary et al. (2004)	Low Risk Girls, Standard	Recent Use	86	74	-0.107	0.175
Vicary et al. (2006)	Boys, Intensive, 36 months	Initiation	81	55	0.118	0.192
Vicary et al. (2006)	Boys, Standard, 36 months	Initiation	64	55	0.125	0.198
Vicary et al. (2006)	Girls, Intensive, 36 months	Initiation	68	46	0.129	0.207
Vicary et al. (2006)	Girls, Standard, 36 months	Initiation	53	46	0.136	0.214

**Table S-4. All Coded Effect Sizes for Intention to Use Cannabis Outcomes**

Study (Author & Year)	Subgroup	Sample Size		<i>d</i>	<i>SE</i>
		Treatment	Comparison		
Clark et al. (2010)	1 month	2900	2900	-0.018	0.055
Clark et al. (2010)	12 months	2421	2421	-0.019	0.056
Eisen et al. (2003)	Full sample, 12 months	2732	2732	-0.013	0.050
Ghosh-Dastidar et al. (2004)	Full sample, 18 months	2553	1723	-0.080	0.052
Longshore et al. (2007)	Boys, Standard, 30 months	266	305	0.000	0.096
Longshore et al. (2007)	Boys, Enhanced, 30 months	208	305	-0.080	0.100
Longshore et al. (2007)	Girls, Standard, 30 months	191	251	-0.080	0.106
Longshore et al. (2007)	Girls, Enhanced, 30 months	163	251	-0.300	0.110

**Table S-5. All Coded Effect Sizes for Cannabis Use Refusal Skills Outcomes**

Study (Author & Year)	Subgroup	Sample Size		<i>d</i>	<i>SE</i>
		Treatment	Comparison		
Clark et al. (2010)	1 month	2900	2900	0.018	0.049
Clark et al. (2010)	12 months	2421	2421	-0.019	0.051
Ghosh-Dastidar et al. (2004)	Full sample, 18 months	2553	1723	0.070	0.048
Hecht et al. (2003)	2 months	1969	1969	0.062	0.055
Hecht et al. (2003)	8 months	1910	1910	0.022	0.055
Hecht et al. (2003)	14 months	1604	1604	0.024	0.057
Longshore et al. (2007)	Boys, Standard, 30 months	266	305	0.030	0.089
Longshore et al. (2007)	Boys, Enhanced, 30 months	208	305	-0.010	0.095
Longshore et al. (2007)	Girls, Standard, 30 months	191	251	0.100	0.100
Longshore et al. (2007)	Girls, Enhanced, 30 months	163	251	-0.290	0.106