

Systematic Review of Mentoring to Prevent or Reduce Tobacco Use by Adolescents

Roger E. Thomas, MD, PhD; Diane L. Lorenzetti, MLIS; Wendy Spragins, BA

From the Departments of Family Medicine (Dr Thomas), Community Health Sciences (Ms Lorenzetti), and Independent Research Consultant, University of Calgary (Ms Spragins), Calgary, Alberta, Canada
Address correspondence to Roger E. Thomas, MD, PhD, Department of Family Medicine, University of Calgary, G012, Health Sciences Centre, 3330 Hospital Drive NW, Calgary, Alberta, T2N 4N1, Canada (e-mail: rthomas@ucalgary.ca).
Received for publication July 20, 2012; accepted March 15, 2013.

ABSTRACT

BACKGROUND: Surveys conducted 1998 to 2008 (530,849 13- to 15-year-olds, 100 countries) by the World Health Organization and the Centers for Disease Control and Prevention found increased tobacco use.

OBJECTIVES: To conduct a systematic review of mentoring to prevent/reduce youth smoking.

DATA SOURCES: Eight electronic peer-reviewed databases and gray literature searched through January 2013.

STUDY ELIGIBILITY CRITERIA, PARTICIPANTS, AND INTERVENTIONS: Studies were included if they were randomized controlled trials, included children or adolescents, employed mentoring (consistent companionship, support, guidance to develop youth competence and character), and reported tobacco use.

STUDY APPRAISAL/SYNTHESIS METHODS: Two reviewers independently assessed abstracts and full-text studies. Disagreements were resolved through consensus.

RESULTS: Four randomized controlled trials were identified. Two studies focused exclusively on tobacco outcomes; the other 2 reported on both drug and tobacco use reductions. Only 1 study reported that mentoring (by peers) reduced adolescent smoking. Heterogeneity of both participants and outcome measures did not permit meta-analysis.

CONCLUSIONS AND IMPLICATIONS OF KEY FINDINGS: There is limited literature on this topic. Further research achieving sample sizes required by power computations, minimizing attrition, and ascertaining mentoring content and achievements from mentor and mentee perspectives is needed.

KEYWORDS: adolescents; children; mentors; tobacco use cessation

ACADEMIC PEDIATRICS 2013;13:300–307

WHAT'S NEW

This systematic review evaluates the literature on the effectiveness of mentoring to prevent or reduce youth smoking. We identified only 4 randomized controlled trials. Three were underpowered, and only 1 found that mentoring prevented or reduced tobacco use.

THE WORLD HEALTH Organization (WHO) and Centers for Disease Control and Prevention (CDC) surveys of the smoking behavior of 530,849 13- to 15-year-olds during 1998–2008 in 6 WHO world regions found lower prevalences (monthly tobacco use) in Southeast Asia, Eastern Mediterranean, and Africa, with 10% to 20% of boys and <10% of girls smoking and higher prevalences in the Americas, the Western Pacific, and Europe, with 10% to 20% of boys and girls smoking and in more countries per region.

Over the decade, cigarette smoking increased in 27 of 100 survey sites and decreased at 10 sites, and other tobacco products increased at 33 sites and decreased at 13 sites.¹ The highest rates were in poorer Eastern European countries. Tobacco-attributable deaths are expected to increase from 5.4 million in 2005 to 8.3 million in 2030.²

Interventions to prevent or reduce youth smoking include programs based in the school, with the family, and in the community, as well as restrictions of tobacco sales. The Cochrane Collaboration systematic review of school interventions to prevent smoking found that for never-smokers (49 randomized controlled trials [RCTs], 142,447 youth) for studies with a follow-up of <1 year, intervention curricula compared to no-intervention control groups were not effective in preventing smoking initiation (odds ratio [OR] 0.94, 95% confidence interval [CI] 0.85–1.05), although the combined social competence and social influences curricula (6 RCTs) showed a statistically significant effect in preventing smoking (OR 0.49, 95% CI 0.28–0.87).³ All 36 RCTs with follow-up of >1 year showed an overall significant effect favoring intervention (OR 0.88, 95% CI 0.82–0.96) as also did the social competence curricula (OR 0.52, 95% CI 0.30–0.88) and the combined social competence and social influences curricula (OR 0.50, 95% CI 0.28–0.87). Sensitivity analyses for RCTs at low risk of selection or attrition bias did not change these conclusions.³ There were no differences between tobacco-focused and multifocal interventions. There is no evidence that school not-smoking competitions are effective.⁴

A Cochrane review found significantly higher quit rates (8% to 20%) in 3 of 5 studies for the intervention compared

to the control after 12 months, but minimal impact on community prevalence rates (<1 in 500 smokers quit), with concern that deception affected results.⁵

The Cochrane Collaboration systematic review of family interventions found 22 RCTs (24 comparisons). Four of the 9 that compared a family intervention to control found significant positive effects, 1 of 5 which compared a family to a school intervention, none of the 7 which added a family to a school intervention, both of those which were used a family risk reduction intervention, and the one that compared a family to a home safety intervention found no effect.⁶ There is minimal evidence any community interventions are effective.⁴ A Cochrane Collaboration systematic review of interventions with indigenous youth (defined as people who have inhabited a country for thousands of years) found 2 RCTs (1505 youth) but drew no conclusions.⁷ Of 9 RCTs to prevent shops selling tobacco to minors, 4 of the 6 that randomized shops and all 3 that randomized communities to the intervention found significant decreases in sales to minors.⁴

There are estimates of the cost-effectiveness of interventions in communities, schools, and mentoring to prevent youth smoking. The Communities That Care RCT assessed public health interventions in 24 communities in 7 US states to reduce the prevalence of adolescent behavior and health problems. For students followed from grades 5 through 8, net benefit was estimated at \$5250 per youth (\$812 from preventing smoking and \$4438 from preventing delinquency).⁸

The PASE smoking prevention program in 80 schools (6700 students) in Barcelona estimated for each student prevented from smoking the health care benefits were €1997.57; indirect benefits (productivity losses) were €21,260.80.⁹ Dijkstra et al¹⁰ in Holland compared a social influences intervention (peer-led discussions in 32 schools) with a control (20 schools). The incremental cost-effectiveness of preventing smoking was estimated as €19,900 per quality-adjusted life-year (QALY).¹¹ In Project Toward No Tobacco Use in 48 Junior High schools in California (6716 7th graders), for 770 who received the combined 2-year social influences curriculum estimated savings preventing established smoking were \$13,316 per life-year and \$8482 per QALY.¹²

The peer mentoring study of Campbell and colleagues^{13,14} cost £32 (95% CI 29.70–33.80) per student. The incremental cost per student not smoking after 2 years was £1500 (95% CI 699–9947).¹⁵ Costs of implementing proven mentoring interventions would include only organization maintenance and mentors' expenses.

Youth who smoke incur a prolonged burden. For those in the United States during 1975–1979 who began smoking in adolescence, the median quitting age for male subjects was 33 years (after 16 years' smoking) and 37 years for female subjects (after 20 years' smoking).¹⁶ Sixty percent of US smokers aged 12 to 18 reported quitting attempts. The 1993 Teenage Attitudes and Practices Survey reported 18% of 10- to 18-year-old monthly smokers and 74% of daily smokers said that it would be "really hard to quit."¹⁷

There is no systematic review of mentoring to prevent or reduce youth tobacco use. Our objective was to conduct a systematic review of mentoring to prevent or reduce youth tobacco use.

METHODS

LITERATURE SEARCH

Eight electronic peer reviewed databases (CINAHL, the Cochrane Library, Embase, Eric, Medline, PsycINFO, Social Sciences Abstracts, Sociological Abstracts), and ClinicalTrials.gov and the gray literature were searched through January 2013 (Figs. 1 and 2). Reference lists of included studies were scanned to identify additional studies. Two authors independently assessed abstracts and full texts for inclusion/exclusion criteria.

DEFINITION OF MENTORING

MENTOR, the National Mentoring Partnership organization, provides the simplest definition of youth mentoring: "A personal relationship in which a caring individual provides consistent companionship, support, and guidance aimed at developing the competence and character of a child or adolescent."¹⁸

Mentoring may vary in the age difference from the mentor, mentor roles, and intensity of emotional relationship, as well as whether the mentor provides knowledge, coaching, advocacy, friendship, acceptance, and support.¹⁹

Youth mentoring can also differ in focus on relationships or on instrumental outcomes. Relationship-focused mentoring may be either youth-centered or prescriptive. Youth-centered mentoring emphasizes kindness, nonjudgmental help, and avoidance of criticism/lectures, in hopes that the youth may disclose problems with the mentor. In prescriptive mentoring, the mentor establishes the ground rules and works to change the youth to achieve the mentor's goals. Techniques may include praise but also pointing out mistakes and showing disappointment. In instrumental mentoring, the mentor challenges the youth to set goals, and the youth may appreciate the help provided to achieve skills, find opportunities, and develop character and social and occupational skills that the mentee values. Each mentorship is likely to be unique.¹⁹ Youth mentoring differs from teacher–student, advisor–advisee, supervisor–subordinate, and coach–client relationships in organizations because the scope can extend beyond career/academics to social and personal development, and mentoring about drug/alcohol use, delinquency, and abuse and violence. The participants usually show mutuality and informality, mutual goal setting, and limited power difference.¹⁹ Because youth mentoring relationships can be varied and complex,²⁰ we considered other definitions that attempted to capture these dimensions.

The definition of Bronfenbrenner et al is cited by Hamilton et al.²¹ as:

A mentor is an older, more experienced person who seeks to further the development of character and competence in a younger person by guiding the latter in acquiring mastery of progressively more complex

Electronic searches

1. Electronic Bibliographic Databases:

- CINAHL (1982 to January 2013)
- Cochrane Central Register of Controlled Trials (CENTRAL) (January 2013)
- EMBASE (1980-to January 2013)
- ERIC (1965 to January 2013)
- MEDLINE (1950-to January 2013)
- PsycINFO (1806 to January 2013)
- Social Sciences Abstracts (1982 to January 2013)
- Sociological Abstracts (1980 to January 2013)

2. Electronic Gray Literature Databases:

- Campbell Collaboration <http://www.campbellcollaboration.org/ECG/index.asp>
- Clinical Trials.gov <http://www.clinicaltrials.gov/>
- Current Controlled Trials *meta*Register of Controlled Trials (*mRCT*) www.controlled-trials.com/mrct/
- Canadian Research Index (Microlog)
- Dissertation Abstracts (ProQuest)
- EDResearch Online (Education Research Database) <http://cunningham.acer.edu.au/dbtw-wpd/sample/edresearch.htm>
- EPPI Centre Database of Health Promotion Research (BiblioMap) <http://eppi.ioe.ac.uk/webdatabases/Intro.aspx?ID=7>
- Health Promotion and Education Database (National Center for Chronic Disease Prevention and Health Promotion) <http://www.cdc.gov/cdp/he.htm>
- Health Technology Assessment (HTA) database <http://www.york.ac.uk/inst/crd/crddatabases.htm>
- PapersFirst (OCLC)
- ProceedingsFirst (OCLC)

All databases were searched from inception of each data base to present

3. Targeted Internet searching of organization websites including:

- Australian Policy Online <http://www.apo.org.au/>
- Big Brothers/Big Sisters <http://www.bbbs.org/site/c.diJKKYPLJvH/b.1539751/k.BDB6/Home.htm>
- Canadian and International Departments of Health
- Canadian Association for School Health <http://www.schoolfile.com/CASH.htm>
- GLOBALink <http://www.globalink.org/>
- International Institute for Health Promotion <http://www.american.edu/academic.depts/cas/health/iihp/>
- Peer Resources Network: <http://www.peer.ca/mentor.html>
- Youth Leadership Institute www.yli.org
- Young Women Leaders Program <http://ywlp.virginia.edu/>
- World Health Organization <http://www.who.int/en>

Figure 1. Literature search of databases.

skills and tasks in which the mentor is already proficient. The guidance is accomplished through demonstration, instruction, challenge, and encouragement on a more or less regular basis over an extended period of time. In the course of this process, the mentor and young person develop a special bond of mutual commitment. In addition, the young person's relationship to the mentor takes on an emotional character of respect, loyalty and identification.²¹

The definition of Eby et al is as follows:

A sustained relationship between a caring, supportive adult and youth. . . . In this relationship the adult

provides ongoing guidance, instruction, and encouragement aimed at developing the competence and character of the protégé. Over the course of their time together, the mentor and protégé often develop a special bond of mutual commitment, respect, identification, and loyalty which facilitates the youth's transition into adulthood. . . . A mentor provides guidance and support in various areas of life such as academics, career-planning, and decision-making, and social interactions. Interactions between mentor and youth may revolve around leisure activities, academic assistance, and personal concerns (eg, peer relationships, parental relationships). Mentors can fulfill the role of teacher, role

1. exp Tobacco, Smokeless/ or exp Tobacco/ or exp "tobacco use disorder"/ or "substance related disorders"/
2. exp "tobacco use cessation"/
3. exp smoking cessation/
4. Smoking/
5. (tobacco or smoking or smoke or cigar or cigars or cigarette* or snuff).ti,ab.
6. 1 or 2 or 3 or 4 or 5
7. limit 6 to ("preschool child (2 to 5 years)" or "child (6 to 12 years)" or "adolescent (13 to 18 years)")
8. exp Child/
9. exp Adolescent/
10. 8 or 9
11. 6 and 10
12. (child or children or adolescen* or teen or teens or teenager* or youth or youths).ti,ab.
13. 6 and 12
14. 7 or 11 or 13
15. exp Mentors/
16. exp peer group/
17. (peer or mentor or mentors or mentoring or mentorship* or mentee or mentees or protégé*).ti,ab.
18. (coach or coaches or coaching).ti,ab.
19. (adviser or advisers or advisor or advisors or advising).ti,ab.
20. 15 or 16 or 17 or 18 or 19
21. 14 and 20

Figure 2. Medline search strategy.

model, friend and ally, and in some cases serve as surrogate parents for youth. . . . Youth mentors can provide both emotional and instrumental support in an effort to help youth effectively navigate through predictable yet difficult developmental transitions.¹⁹

We found these 2 definitions as too prescriptive for a systematic review, as they could exclude mentoring interventions of interest. Instead, we used the MENTOR organization definition, which we operationalized as part of our search terms resulting in the following key concepts for our literature search: children (age 6 to 12) or adolescents (age 13 to 18), mentor (peer or adult), relationship (consistent, companionship, support and guidance), and tobacco outcome data.

We planned separate analyses for RCTs that compared an intervention to a control group and those that compared 2 interventions. Because studies of tobacco use by children and adolescents have varying outcome measures (monthly, weekly, or daily frequency; number of cigarettes smoked per period; or an index) we planned to meta-analyze RCTs if participants, interventions, and outcome measures were sufficiently similar to make pooling appropriate, and if heterogeneity as measured by I^2 was <50%. If comparable outcome measures were not used, we planned to dichotomize baseline never-users into never/began to use, and smokers into declined/unchanged or increased. We planned to explore clinical heterogeneity (differences in participants, interventions, and outcomes) and methodological heterogeneity (study design and risk of bias) if there were sufficient studies.

STUDY APPRAISAL AND SYNTHESIS METHODS

Two reviewers independently assessed each study. Studies were included if they were RCTs, included children or adolescents, employed mentoring (consistent

companionship, support, guidance to develop youth competence and character), and reported tobacco use.

Studies were excluded if they were counseling, or interventions to improve parent–child relationships. Two reviewers independently evaluated abstracts and full-text studies for inclusion. Disagreements were resolved through consensus. Two authors independently extracted data (using longest follow-up) and assessed study risk of bias using *Cochrane Handbook* criteria.²² In cases of uncertainty, we contacted study authors for clarification. No review protocol was registered.

RESULTS

LITERATURE SEARCH

We assessed 4227 abstracts and 359 full-text articles, and included 4 RCTs (Fig. 3).

DESCRIPTION OF INCLUDED RCTs

Albrecht et al²³ randomized 143 pregnant smoking adolescents to either the Teen FreshStart program (8 weeks' cognitive behavioral therapy to promote/maintain smoking abstinence, delivered by doctors or nurse practitioners), or the Teen FreshStart Plus Buddy program (participants brought a nonsmoking peer to "reinforce smoking cessation strategies and provide social support throughout the study"), or the control group (educational materials on smoking in pregnancy). Bartle-Haring et al²⁴ randomly assigned 90 homeless youth in a US city (of whom 29 were 14 to 18) either to substance abuse treatment plus mentoring or to substance abuse treatment for 6 months. The mentors were asked to help the youth set goals; access Medicaid, housing, and food resources; identify rewarding recreational activities and alternative support systems; and then transition to alternative support

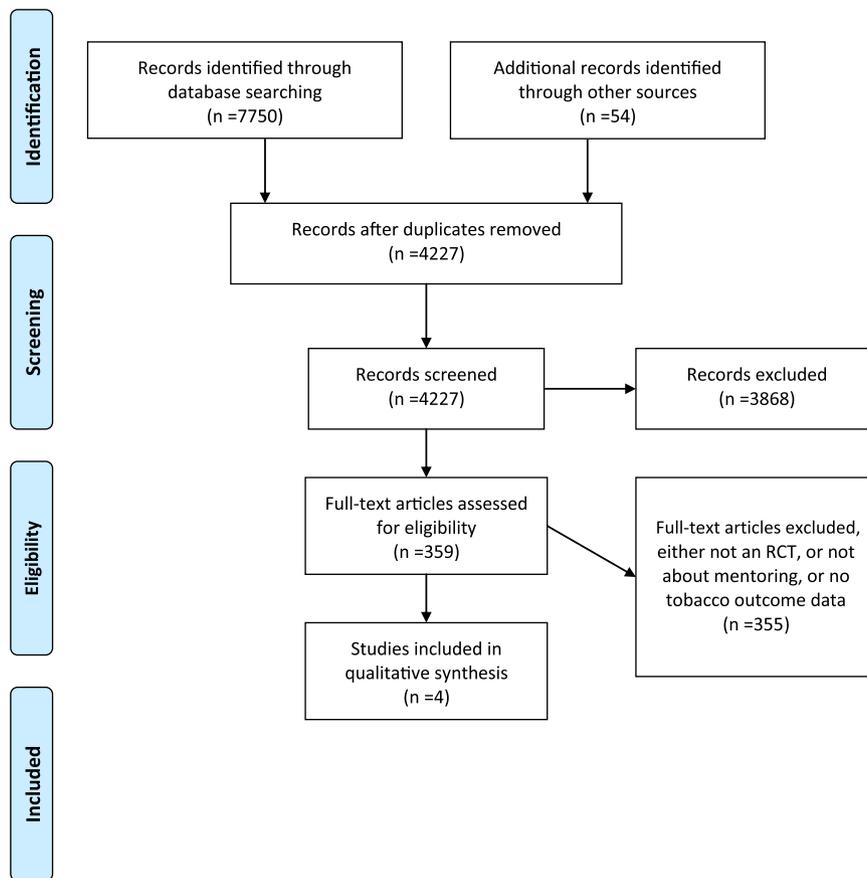


Figure 3. Flow diagram of studies.

systems. Bodin et al²⁵ randomized 128 14-year-olds in 28 schools in suburban Stockholm, Gothenburg, and Malmö to either mentoring by the MENTOR Foundation (pairs chose their own activities) or to the control group (research staff called 6 times a year about the “frequency and perceived quality of contacts with nonparental adults”). The MENTOR Foundation’s purpose is health promotion/drug abuse prevention among young people. Campbell and colleagues, in a cluster randomized controlled trial (C-RCT), randomized schools in England and Wales either to “normal smoking education” (29 schools, 5562 students), or “normal smoking education” plus the 10-week ASSIST peer mentoring (30 schools, 5481 pupils). Students nominated 17.5% of their peers as “respected,” “looked up to,” and “good leaders in sports and other group activities,” and these “influential peers” were trained to “use informal contacts with peers in their school year group to encourage them not to smoke” (Table 1).^{13,14}

RISK OF BIAS

The studies of Bodin et al and Campbell and colleagues were rated low risk for random sequence generation.^{13,14,25} Only the study of Campbell and colleagues^{13,14} was rated low risk on allocation concealment. No study described blinding, and all were rated unclear. No study made a differential analysis of attrition (Bartle-Haring et al²⁴ was rated high risk and the other 3 as unclear risk). All studies were assessed as low risk for selective reporting and other biases (Fig. 4).

OUTCOMES

Albrecht et al,²³ at 8 weeks and 1 year after randomization, found no significant differences between the Teen FreshStart, the Teen FreshStart Plus Buddy, and the control groups. Bartle-Haring et al²⁴ found no difference either for the whole sample or the subgroup of 29 14- to 18-year-olds. Bodin et al²⁵ found no significant differences (OR 1.74, 95% CI 0.71–4.24; $P = .22$) of being a “tobacco user” (not further defined) for the intervention compared to the control group at the 12-month follow-up. Campbell and colleagues^{13,14} found a significant difference at the 1-year follow-up (OR 0.77, 95% CI 0.59–0.99) of smoking in the intervention compared to the control group, no significant difference at the 2-year follow up (OR 0.85, 95% CI 0.72–1.01); and a significant result for a 3-tier multilevel model with data from all 3 follow-ups (OR 0.78, 95% CI 0.64–0.96) (Table 1).

Three studies were underpowered.^{23–25} Albrecht et al²³ estimated 180 participants were required “to detect differences in proportions” (not further specified) with a power of 80% (no alpha level specified) and randomized 143. Bodin et al²⁵ estimated 200 youth would provide power of 0.80 to detect a small effect size difference of 0.10 with an alpha of 0.05, and randomized 128. She commented post hoc that “the study was underpowered with a 60% chance of detecting a small effect size between groups.” Bartle-Haring et al²⁴ did not perform a power computation, but the 29 subjects in the 14- to 18-year-old group are too few to draw conclusions. Campbell and

Table 1. Description of Included Studies and Results

Study	Study Participants	Duration and Follow-up	Intervention Elements	Outcomes of Interest	Results: Intervention(s) Versus Control
Albrecht ²³ 2006	Pregnant smoking adolescents aged 14 to 19 y (n = 143) in 5 hospital in 2 community prenatal clinics in Pittsburgh.	Total study duration 8 wk; follow-up at 8 wk and 1 y	Intervention 1: Teen FreshStart: cognitive behavioral therapy group program with information on smoking in pregnancy delivered by nurse practitioners and PhD nurses. Intervention 2: Teen FreshStart Plus Buddy: participants brought a nonsmoking peer with them to the program to reinforce smoking cessation strategies and provide social support. Control: usual care: provision of educational materials on smoking in pregnancy	Cigarettes per day (self-report); smoking history questionnaire; saliva cotinine level	Difference at 8 wk and 1 y between intervention 1, intervention 2, and control: no significant differences
Bartle-Haring ²⁴ 2012	Homeless adolescents (n = 90) in a US city	Total study duration 6 mo; 6-mo evaluation at completion of intervention	Substance use treatment and mentoring group: rapport building and goal setting, social stability, reinforcers (recreational activities and support systems). Substance use treatment only group. No control group	Tobacco use (tool not specified)	E-mail from Dr Bartle-Haring (January 15, 2012): results noted for 28 youth at 6-mo evaluation: "Number of mentoring sessions nonsignificant in predicting the variation in the slopes for drug use, alcohol use, and tobacco use . . . age did not matter for either the intercepts or slopes."
Bodin ²⁵ 2011	Students (aged 14 y) from 28 schools with self-reported need for additional adult contact in Stockholm, Gothenburg, and Malmö (n = 128)	Total study duration 12 mo; average follow-up at completion of intervention: intervention = 396 d, control = 400 d	Intervention: mentoring organized by Swedish branch of Mentoring Foundation: pairs chose own activities. Control: research staff conducted 5-min phone calls 6 times over the course of a year to ask about "frequency and perceived quality of contacts with nonparental adults"	Tobacco use (tool not specified)	12-mo follow-up compared to baseline: intervention compared to control: tobacco user, OR 1.74, 95% CI 0.71–4.24, <i>P</i> = .22
Campbell ¹³ 2008	All students in Year 8 (12- to 13-year-olds) from 59 schools in England and Wales. Intervention n = 5562; control n = 5481	Total study duration 10 wk; follow-up at completion of intervention, and at 1 y and 2 y	Intervention: ASSIST Peer Mentoring Intervention: using trained peer-nominated Year 8 students to provide encouragement not to smoke. Control: usual smoking education and policies for tobacco control	Prevalence of smoking in the past week (self-report). Some saliva samples taken to assess misreporting	Difference in smoking: intervention compared to control: at 1-y follow-up: significant difference (OR 0.77, 95% CI 0.59–0.99); at 2-y follow-up: no significant difference (OR 0.85, 95% CI 0.72–1.01). Using a 3-tier multilevel model with data from all 3 follow-ups, significant difference (OR 0.78, 95% CI 0.64–0.96)

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Albrecht 2006	?	?	?	?	?	+	+
Bartle-Haring 2012	?	?	?	?	-	+	+
Bodin 2011	+	?	?	?	?	+	+
Campbell 2008	+	+	?	?	?	+	+

Figure 4. Risk of bias for included studies.

colleagues^{13,14} estimated the study would have 80% power to detect a 4.3% difference in weekly smoking among all students, assuming control group prevalence at 12 months was 15%. With 33 schools per group, the study was powered to detect either a 7.5% or 8.5% difference, depending on loss to follow-up (10% or 15%, respectively), and although “only 59 of 66 schools agreed to randomisation . . . the average size of the year group was much larger than was anticipated.”

DISCUSSION

We identified only 4 RCTs that tested mentoring to prevent or reduce tobacco use in children/adolescents, and only 1 reported a positive effect.

Mentors received training in 3 RCTs. In the study of Bartle-Haring et al,²⁴ the mentors received 1 day of training and a structured plan. In the study of Bodin et al,²⁵ the mentors received 2 days of training about mentoring principles (empathy, responsiveness, building trust, respect for youth values, active listening, open-ended questioning, goal setting, teenager characteristics) and suggestions for activities, and meetings with parents and mentees. In the study of Campbell and colleagues,^{13,14} peer mentors received 2 days of instruction about smoking, communication skills (verbal and nonverbal communication, listening skills, expressing feelings and ideas, group work, team building, cooperation and negotiation, and empathy and sensitivity to others), and personal development (confidence, self-esteem, assertiveness, decision making, prioritizing,

attitudes to risk taking, exploration of personal values, and problem solving).

Limitations of the studies are the failure to achieve desired sample sizes (3 of the included RCTs were underpowered), randomize using strong methods (only Bodin et al²⁵ and Campbell and colleagues^{13,14} described a strong method), conceal allocation (only Campbell and colleagues^{13,14} concealed allocation), and perform attrition analyses to ensure there are no differential losses from intervention and control groups (no study performed an attrition analysis). However, none selectively reported study results. The adequacy of mentor training was not measured, and mentors and mentees were not debriefed to discover what worked well during mentoring sessions. Campbell and colleagues noted the peer facilitators talked mostly with their friends and other peer facilitators and focused their activity toward the beginning of the intervention.

For the future of mentoring, one issue is whether there are enough mentors to make mentoring feasible. In a US Midwestern city, 770 first-year high schoolers were surveyed regarding their mentoring relationships. Of those who reported having a mentor, 36% stated their mentors were extended family members, 10% reported mentors from organizations, and 7% identified a godparent as a significant mentor.²⁶ A 1998 national US telephone survey found that a third of US adults considered that they had mentored a youth.²⁷

A second issue is whether adolescents are receptive to mentoring. When 965 adolescents in 4 US cities were asked about quitting smoking, 86% of nonsmokers and 33% of smokers agreed very strongly/strongly that it would be helpful to talk to a trusted adult or adolescent about quitting.²⁸

A third issue is the focus of the mentoring relationship in regard to tobacco. A study of 1689 Ontario grade 8 students found 93% of male and 84% of female smokers said their best friend had tried smoking, and 72% male and 83% female smokers had “many” best friends who smoked.²⁹ However, 69% of male and 61% of female nonsmokers said their best friend had not tried smoking, and only 14% male and 20% female nonsmokers had many best friends who smoked.²⁹ A study of 353 junior high school students in Wisconsin found 15% of the sample comprised 56% of the smokers, and smoking behavior was the best discriminator of which of 4 social groups in the school the students affiliated with.³⁰ A feasible goal for mentors is reflecting on peer influences and with which social groups the mentee associates.

A fourth issue is how large an effect can be expected from mentoring. A systematic review identified 55 mentoring programs for youth during 1970–1998.³¹ The average standardized (fixed effects) effect size was $d = 0.14$ (95% CI 0.10–0.18) and random effects, $d = 0.18$ (95% CI 0.11–0.25). When 48 moderators were tested, effect sizes (fixed effects) were significantly larger for studies with ongoing training of mentors, monitoring of implementation, mentor from a profession, structured activities for mentors (all $P < .05$), parental support, fewer than 65

youths (both $P < .01$), and 6 or more theory-based or 4 or more empirically based best practices (both $P < .001$). However, there were no significant differences in effect sizes between the 5 outcomes of interest: problem/high risk behaviors ($d = 0.21$), career/employment ($d = 0.22$), social competence ($d = 0.15$), academic/educational ($d = 0.11$), and emotional/psychological ($d = 0.10$). Within the 15 studies of high-risk behaviors, the results for tobacco were not presented separately.

Thus, modest effects at best may be expected from mentoring programs that train and monitor mentors and have carefully structured interventions. Further research incorporating adequate sample sizes, minimizing attrition, and reporting on mentoring content and achievements from mentor and mentee perspectives is needed.

ACKNOWLEDGMENTS

Supported in part by a grant from the Canadian Tobacco Control Research Initiative.

REFERENCES

- Warren CW, Lea V, Lee J, et al. Change in tobacco use among 13–15 year olds between 1999 and 2008: findings from the Global Youth Tobacco Survey. *Glob Health Promot*. 2009;16:38.
- Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med*. 2006;3:e442.
- Thomas R, McLellan J. School-based programmes for preventing smoking. *Cochrane Database Syst Rev*. 2002;(4):CD001293.
- Thomas RE. Smoking in children and adolescents. In: Sturmey P, Hersen M, eds. *Handbook of Evidence-Based Practice in Clinical Psychology*. Vol. 1. Hoboken, NJ: John Wiley & Sons; 2012:493–520.
- Cahill K, Perera R. Quit and Win contests for smoking cessation. *Cochrane Database Syst Rev*. 2008;(4):CD004986.
- Thomas RE, Baker P, Lorenzetti D. Family-based programmes for preventing smoking by children and adolescents. *Cochrane Database Syst Rev*. 2007;(1):CD004493.
- Carson KV, Brinn MP, Labiszewski NA, et al. Interventions for tobacco use prevention in Indigenous youth. *Cochrane Database Syst Rev*. 2012;(8):CD009325.
- Kuklinski MR, Briney JS, Hawkins JD, et al. Cost–benefit analysis of communities that care outcomes at eighth grade. *Prev Sci*. 2012;13:150–161.
- Hormigo Amaro J, Garcia-Altes A, Lopez MJ, et al. [Cost–benefit analysis of a school-based smoking prevention program]. *Gac Sanit*. 2009;23:311–314.
- Dijkstra M, Mesters I, De Vries H, et al. Effectiveness of a social influence approach and boosters to smoking prevention. *Health Educ Res*. 1999;14:791–802.
- Vijgen SM, van Baal PH, Hoogenveen RT, et al. Cost-effectiveness analyses of health promotion programs: a case study of smoking prevention and cessation among Dutch students. *Health Educ Res*. 2008;23:310–318.
- Wang LY, Crosssett LS, Lowry R, et al. Cost-effectiveness of a school-based tobacco-use prevention program. *Arch Pediatr Adolesc Med*. 2001;155:1043–1050.
- Campbell R, Starkey F, Holliday J, et al. An informal school-based peer-led intervention for smoking prevention in adolescence (ASSIST): a cluster randomised trial. *Lancet*. 2008;371:1595–1602.
- Starkey F, Moore L, Campbell R, et al. ASSIST. Rationale, design and conduct of a comprehensive evaluation of a school-based peer-led anti-smoking intervention in the UK: the ASSIST cluster randomised trial. *BMC Public Health*. 2005;5:43.
- Hollingworth W, Cohen D, Hawkins J, et al. Reducing smoking in adolescents: cost-effectiveness results from the cluster randomized ASSIST (A Stop Smoking In Schools Trial). *Nicotine Tob Res*. 2012;14:161–168.
- Pierce JP, Gilpin E. How long will today's new adolescent smoker be addicted to cigarettes? *Am J Public Health*. 1996;86:253–256.
- DCC. Current Trends Reasons for Tobacco Use and Symptoms of Nicotine Withdrawal Among Adolescent and Young Adult Tobacco Users—United States, 1993. *MMWR*. October 21, 1994;43(41):745–750.
- Keller TE. Youth mentoring: theoretical and methodological issues. In: Allen TD, Eby LT, eds. *The Blackwell Handbook of Mentoring: A Multiple Perspectives Approach*. Oxford, UK: Blackwell Publishing; 2007:23–47.
- Eby LT, Rhodes JE, Allen TD. Definition and evolution of mentoring. In: Allen TD, Eby LT, eds. *The Blackwell Handbook of Mentoring: A Multiple Perspectives Approach*. Oxford, UK: Blackwell Publishing; 2007:7–20.
- Morrow KV, Styles MB. *Building Relationships With Youth in Program Settings: A Study of Big Brothers Big Sisters*. Philadelphia: Public/Private Ventures; 1995.
- Hamilton SF, Hamilton MA. *Final Report on a Mentoring Program for Youth*. Ithaca, NY: Cornell University Department of Human Development & Family Studies; 1990.
- Higgins J, Green S. *Cochrane Handbook for Systematic Reviews of Interventions*. Ver 5.1.0. Cochrane Collaboration; 2011.
- Albrecht SA, Caruthers D, Patrick T, et al. A randomized controlled trial of a smoking cessation intervention for pregnant adolescents. *Nurs Res*. 2006;55:402–410.
- Bartle-Haring S, Slesnick N, Collins J, et al. The utility of mentoring homeless adolescents: a pilot study. *Am J Drug Alcohol Abuse*. 2012;38:350–358.
- Bodin M, Leifman H. A randomized effectiveness trial of an adult-to-youth mentoring program in Sweden. *Addict Res Theory*. 2011;19:438–447.
- Zimmerman MA, Bingenheimer JB, Notaro PC. Natural mentors and adolescent resiliency: a study with urban youth. *Am J Community Psychol*. 2002;30:221–243.
- Commonwealth Fund. *Mentoring Makes a Difference: Findings from the Commonwealth Fund 1998 Survey of Adults Mentoring Young People*. New York, NY: Commonwealth Fund; 1998.
- Patten CA, Lopez K, Thomas JL, et al. Reported willingness among adolescent nonsmokers to help parents, peers, and others to stop smoking. *Prev Med*. 2004;39:1099–1106.
- van Roosmalen EH, McDaniel SA. Peer group influence as a factor in smoking behavior of adolescents. *Adolescence*. 1989;24:801–816.
- Mosbach P, Leventhal H. Peer group identification and smoking: implications for intervention. *J Abnorm Psychol*. 1988;97:238–245.
- DuBois DL, Holloway BE, Valentine JC, et al. Effectiveness of mentoring programs for youth: a meta-analytic review. *Am J Community Psychol*. 2002;30:157–197.