

Teen Tobacco Use Cessation

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Youth Development

Dynamic developmental transitions in brain structures and neural systems occur

Relative to adults:

- More active reward-related system
- Less active harm avoidance-related system
- More susceptible to social influence
- Less able to cognitively control, self-monitor, or regulate behavior

At least 70% of teen tobacco users *do* want to quit using.....

- Teens don't keep daily calendars, at least not well
- Programming has to be more "fun" or "engaging" for youth
- Homework, extensive record keeping are not fun
- Youth see consequences as being far away
- Motivation to quit and sustain a quit effort is paramount

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Previous Reviews

At least 14 reviews have been completed.

I will focus on Sussman & Sun (2009) review of 64 studies, supplemented with more recent work.

Notes on newest reviews:

- Fanshawe et al (2017)-only RCTs and C-RCTs, at least 6 month follow-up; suggests more inconsistent effects.
- Mannocci et al's (2019) review of reviews with restrictive inclusion criteria, but heterogenous modalities, looked at 13 reviews.

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Preliminary Analysis

In Sussman & Sun (and all others, in general):

- Youngest to oldest age at baseline to last follow-up: average of 14 and 19 years.
- Baseline smoking averaged approximately 10 cigarettes/day (cpd).
- The average sample size, at least in Sussman & Sun, was a mean of 414, but with a very wide variation (range 12 to 3,800; sd=588).
- An average of 51% of subjects was female (about half).

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Recruitment Strategies

Direct interpersonal contact of treatment agent with potential participants & recruitment in contexts that include most of its members as potential participants = relatively high reach (over 35%).

- Word of mouth (n=24 studies)
- Public announcements (n=17)
- Screening (n=17)
- Money, movie tickets, gift certificates (n=14)
- Class release time (n=12)
- Use of posters (n=12)
- Media campaigns/newspaper ads (n=9)
- Policies such as mandatory attendance (n=8)
- Referrals (n=7)
- Flyers (n=6)
- Part of a classroom program (n=6)
- Presentation to a group (n=5)
- Gatekeepers' support (n=5)
- Use of class credit (n=4)
- Use of contests (n=3)
- Use of a display table (n=2)
- Social influence (n=2)
- Peer supporters to recruit (n=2)
- Use of community or school events (n=1)

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Overall Effect

Overall absolute risk reduction effect:

Program advantage of 4.26% across 64 studies.

(57% reduction in continued smoking)

- Effect size not large ($d=.33$) but meaningful (11.79% versus 7.53% cessation)
 - Generally standard care control condition as comparison

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Treatment Means: Analysis Stratified by Follow-up Duration

<u>Follow-up Duration</u>	<u>2009 Estimate</u>
0-3 month (38)	4.17
4-12 month (29)	4.06
> 12 month (8)	6.78

Note: The information in parentheses indicates the number of studies (Sussman & Sun, 2009). There was no decay of treatment effects across most studies; all effects are significant. The Cochrane review (Fanshawe et al., 2017) limited studies to at least 6-month follow-up.

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“Theories”

- Social influence-oriented:** Refusal assertion, tobacco-industry promotions, media & peer social influences, correction of social informational inaccuracies, advocacy (activism) techniques.
- Cognitive-behavioral:** Self-monitoring & coping skills, topography of one’s tobacco use, seek out social support, relaxation, wait out urges, self-management, problem solving.
- Motivation enhancement:** Clarify desire for change & reduce ambivalence toward change. This may include strategies such as motivational interviewing or response-contingent reinforcement, the latter of which reinforces quit behavior with the chance for extrinsic rewards such as money or prizes.
- Medical:** Ease physical effects of withdrawal, or emphasis on recovery from addiction.
- “Other”** Supply reduction and affect-clarification approaches.
 - Supply reduction: Change physical environment to make tobacco more difficult to obtain or use (e.g., price increases or restricted access).
 - Affect clarification: Techniques to clarify and remove conflicted affect and thereby permit pursuit of health.

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Treatment Means: Analysis Stratified by Theory

<u>Theory</u>	<u>2009 Estimate</u>
Social influence (11)	4.34
Cognitive-behavior (22)	5.32
Motivation (22)	3.97
Medical (3)	15.86
Other (6)	-0.17

Note: The information in parentheses indicates the number of studies; significant results for social influence, cognitive-behavior, motivation. Too few studies for medical still to infer consistent effects though large estimate. Fanshawe et al. (2017) supports complex approaches (SI + CB + M).

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Treatment Means: Analysis Stratified by Modality

<u>Modality</u>	<u>2009 Estimate</u>
Classroom (11)	4.21
School Clinics (29)	6.30
Medical Clinics (9)	4.62
Family (1)	19.10
System-Wide (6)	0.81
Computer (3)	5.40
Other Public Settings (5)	3.92

Note: The information in parentheses indicates the number of studies; significant results for classroom and school clinics, and medical setting. Too few studies for computer or other public settings, and not yet significant effects. Fanshawe et al. (2017) supports group approaches.

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Treatment Means: Stratified by Number of Sessions

<u>Number of sessions</u>	<u>2009 Estimate</u>
1-4 (26)	3.20
5-8 (20)	6.24
9+ (18)	4.20

Note: The information in parentheses indicates the number of studies; statistically significant equal to or greater than 5 sessions.

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Other Youth Cessation Examinations

Pharmacological adjuncts—in 11 of 14 studies we reviewed, not significant; please see Dr. McCrae and Tanski’s talk for updated, comprehensive information.

Electronic media- in six studies; telephone modality promising; txt messaging promising but high relapse rates; mass media campaign (Solomon et al., 2009, promising for prevalence), interactive personal contact seems important.

Policy

Contingency management

EX International

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Policy Effects

A 10% increase in the real **price** of cigarettes will increase the probability of smoking cessation by approximately 11% and 12% for young men and women, respectively.

- Tauras & Chaloupka (1999) MTF H.S. seniors data:
 - Price elasticity of male cessation ranges from 1.07 to 1.17 (average elasticity of 1.12).
 - Price elasticity of female cessation ranges from 1.17 to 1.21 (average elasticity of 1.19).
- Maybe for teens reduces prevalence 6-7% (Chaloupka, personal communication, 2007)

Limiting retail **access** to tobacco products, Chen & Forster (2006) 2-group experimental study, cross-sectional surveys of 8th, 9th, and 10th graders from 14 communities, effect on reducing prevalence of daily smoking. Effect was found up to a 5-year follow-up; cessation of tobacco use not accessed.

Mannocci et al. (2019) concluded that increasing taxes was most promising among the 13 reviews reviewed for teen cessation.

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Contingency Management (CM)

Only pilot work at present; some promise.

- Krishnan-Sarin et al., 2006 to present:
 - 30 teen smokers, RCT, CBT vs CM+CBT, 4 week period; 10/16 CM+CBT abstinent at 4 weeks, 1/14 CBT.
 - 34 teen smokers, RCT, CM+CBT once/wk vs CM+CBT more frequent; 25% abstinence at 2 months across conditions.
- Harvanko et al. (2018, 2019): CM can reduce smoking levels, but with poor treatment adherence

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EX-International

Medium effect sizes in all studies, up to a 2-year follow-up (8 countries including US)

- | | |
|---------------------|--|
| • US | Sun et al., 2007; Sussman et al., 2001, 2004, 2005, 2007, 2010 |
| • China | Zheng et al., 2004 |
| • Israel & partners | 3-session, no control, Isralowitz et al., 2016 |
| • Russia-BR | Idrisov et al., 2013, recreational camps |
| • Spain | Espada et al., 2015a&b; Gonzalez et al., 2015, 2016, 2018 |
| • Thailand | Chansatitporn et al, 2016 |
| • India | Sidhu et al., 2016 |
| • Korea | Yu et al., 2018 |
| • Project SUN | ongoing |

Note: While quitting in general at least doubled compared to SCC, sample sizes generally were about 100 per condition, nested within a school unit; most were considered novel pilot studies. Very few changes in content across countries.... While addressing different tobacco products

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Practice: Programming Steps

1. The larger social environment needs to be "ready".
 - Confront misleading industry tactics
 - Emphasize dangers of tobacco use among teens (e.g., passive smoking, addiction)
 - Motivate importance of quitting tobacco use while one is young
 - Emphasize importance of providing cessation programming rather than (or only) punishment to youth.
2. Key content is likely motivation-enhancement plus cognitive behavioral strategies, provided in a format engaging to teens, at least 5 sessions long.
3. Resources to assist in teen programming
 - e.g., https://www.cdc.gov/tobacco/quit_smoking/cessation/pdfs/youth_tobacco.pdf; <https://teen.smokefree.gov/>.
4. Consider settings with maximum public support. Consider participant needs.

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Programming Implementation & Evaluation

Program Implementation

- Implementation setting must be carefully considered
- Maximizing reach, recruitment, and retention
 - Consider population migration, trust of program environment

Evaluation

- Change in tobacco use from baseline, just prior to provision of cessation material, immediately after program, at follow-up (e.g., 3, 6, 12 months)
- Both point-prevalence tobacco use cessation (e.g., use in last 7 days or use in last 30 days, or both), and continual tobacco use cessation (cessation assessed across multiple time-points)
- Reduction in tobacco use
- Intention to quit tobacco use in the near future
- Get a comparison group
- Consider various intent-to-treat formulas

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Project EX Changes in New 3rd Edition

Project EX changes include the following:

Defining tobacco: "Throughout this program, we define tobacco as any product derived from the tobacco leaf. This includes products like cigarettes, cigars, smokeless tobacco, pipe tobacco, and electronic cigarettes (including liquid e-juice)."

Updating wording to including e-cigarettes (e.g., "Let's talk about some reasons why you have been smoking, vaping, or chewing tobacco.")

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Changes in Project EX (cont.)

Health Dangers of Tobacco Use: Added effects of e-cigarette use (not water vapor, but toxic chemicals in aerosol form on California's Prop 65 list)

Updated stat sheets and updated game questions with newer tobacco statistics

Updated quit card template to include vaping

Session 8 Talk Show – Started vaping at 12 years old, smoked at 13, pack-a-day smoker at age 15

Updated appendices to include info on e-cigarettes and more recent EX data

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Appendix

Previous reviews of teen tobacco use cessation include:

- Sussman, Lichtman, Ritt, and Pallonen (2001) evaluated 34 programs, 17 smoking-cessation trials and 17 smoking-prevention trials for their impact on cessation of cigarette smoking.
- Sussman (2002) provided an enlarged review of 66 cessation trials.
- McDonald et al. (2003) provided a re-review of the Sussman (2002) study.
- Garrison et al. (2003) reviewed 6 studies of relatively rigorous designs.
- Backinger et al. (2003) did a qualitative review of prevention and cessation programs.
- ****Sussman, Sun, & Dent meta-analysis of 48 studies [97 in appendix] (Health Psychology, 2006)**
- Grimshaw & Stanton Cochrane meta-analysis of 15 studies (2006)
- Curry, Mermelstein, & Sporer (2009) did a qualitative review of smoking etiology and cessation.
- Sussman & Sun (2009) review of 64 trials (also see SGR, 2012)
- Fanshawe et al., 2017 Cochrane Review-41 C-RCTs or RCTs with some evidence for group but not individual programming.
- Mannocci et al., 2019-13 reviews but none of Sussman; restricted inclusion.

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