Interventions for Prevention and Treatment of Tobacco Smoking in School-aged Children and Adolescents: Protocol for Updating a Systematic Review and Meta-analysis

This systematic review protocol was registered with the
International Prospective Register of Systematic Reviews (PROSPERO)
(Registration #CRD42015019051)

Date: March 31, 2015

Suggested citation:
Peirson L,[1] Kenny M,[2] Ali MU,[3] Rice, M,[4] Raina P,[5] Sherifali D.[6] (2015) Interventions for Prevention and Treatment of Tobacco Smoking in School-aged Children and Adolescents: Protocol for Updating a Systematic Review and Meta-analysis. McMaster University: Hamilton, Ontario.

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Author Contributions

PR and DS are the guarantors. LP, MK and MUA drafted the protocol. LP, MK and MUA contributed to the development of the selection criteria, the risk of bias assessment strategy and data extraction criteria. MUA provided statistical expertise. MR peer reviewed the search strategy developed by the United States Preventive Services Task Force. All authors read, provided feedback and approved the final protocol.

Acknowledgements

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Funding

Funding for this protocol and systematic review is provided by the Public Health Agency of Canada. This funding will support the collection of the data, data management, analyses and writing of the protocol and the upcoming systematic review technical report and manuscript.

The funder will have no input on the interpretation or publication of the study results.

Section I. Purpose and Background

In Health Canada's 2012-2013 Youth Smoking Survey, 24% of youth in grades 6 to 12 reported that they had tried a cigarette at least once, with the prevalence ranging from 3% among 6th graders to 43% among 12th graders. Among survey participants, 4% had smoked in the last 30 days and half of these youth reported they had smoked at least one cigarette daily. The average age for smoking a whole cigarette for the first time was 13.6 years. Prevalence of ever trying cigarette smoking by province ranged from 19% in British Columbia to 33% in Saskatchewan.[1] The majority of adult smokers began smoking in their teenage years.[2]

Our aim is to systematically review published research evidence on the benefits and harms of interventions relevant to Canadian primary care that are designed to prevent school-aged children and youth from trying or taking up tobacco smoking and to help school-aged children and adolescents who currently smoke tobacco to stop ongoing smoking. The review products will be used by the Canadian Task Force on Preventive Health Care (CTFPHC) to inform development of clinical practice guidelines on tobacco smoking prevention and treatment for children and youth.

Section II. Previous CTFPHC Recommendations and Other Guidelines

The CTFPHC has not yet published recommendations on prevention or treatment of tobacco smoking for school-aged children and youth.

In 2003 the United States Preventive Services Task Force (USPSTF) determined that there was insufficient evidence to recommend for or against the use of interventions to prevent and treat tobacco use in children and youth.[3] In 2013 the USPSTF released an updated B-grade recommendation encouraging primary care clinicians to provide interventions, such as education or brief counseling, to prevent tobacco use by school-aged children and adolescents;[4] recommendations were not made for or against treatment.

Building from recommendations and supporting evidence found in high quality pre-existing clinical guidelines (e.g.,[5-7]), in 2011 the Canadian Action Network for the Advancement, Dissemination and Adoption of Practice-informed Tobacco Treatment (CAN-ADAPTT) published a guideline that included summary statements specifically related to children and adolescents.[8] Canadian health care providers who work with young people are encouraged to routinely ask them about their tobacco use (strong recommendation based on high quality evidence) and to provide counseling to prevent children and adolescents from trying or taking up tobacco or to help them stop using tobacco products (weak recommendation based on low quality evidence).

Section III. Scan of Clinical Practice

In the absence of national or provincial/territorial guidelines or programs, current practice for prevention and treatment of child and adolescent tobacco smoking in Canada is left to the discretion of individual practitioners.

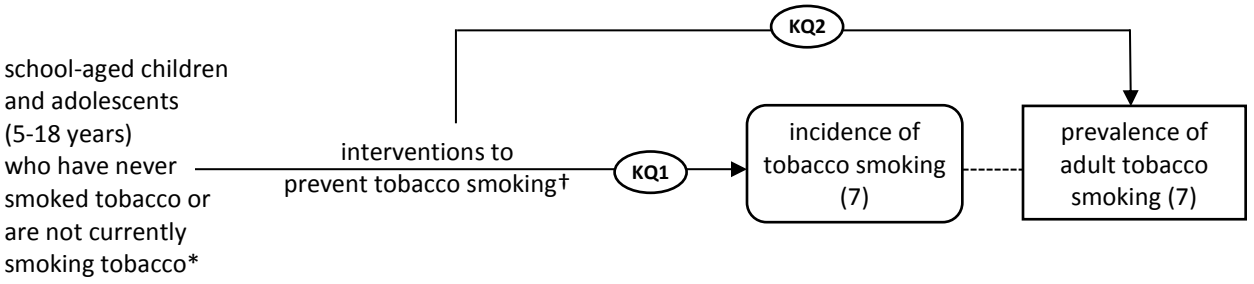
Section IV. Methods

The Evidence Review and Synthesis Centre (ERSC) at McMaster University will conduct a systematic literature search on the benefits and harms of interventions relevant to Canadian primary care that are designed to prevent school-aged children and youth from trying or taking up tobacco smoking and to help school-aged children and adolescents who currently smoke tobacco to stop ongoing smoking. The recent USPSTF review[9] on this same topic was ranked by the ERSC as a high quality review with an AMSTAR[10] assessment rating of 10/11 (Appendix A). To conduct our review we will update the USPSTF's search and adapt the USPSTF's outcome list and inclusion/exclusion criteria. Specific methods are outlined below. This systematic review protocol was prepared in accordance with the PRISMA-P guidelines,[11] and was registered with the International Prospective Register of Systematic Reviews.

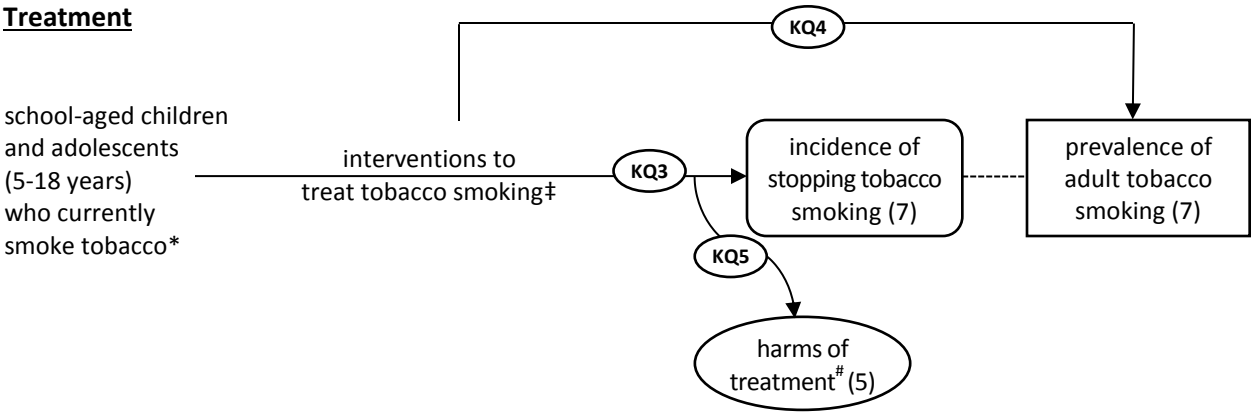
Analytic Framework

The analytic framework, presented below, includes both prevention and treatment of child and youth tobacco smoking. The numbers in brackets indicate the CTFPHC's Grading of Recommendations Assessment, Development and Evaluation (GRADE) rankings for each outcome (7-9=critical; 4-6=important; 1-3 not important and therefore not included here).[12]

Prevention



Treatment



***** Current tobacco smoking: generally defined in literature pertaining to smoking by children and youth[1, 9] as any smoking of tobacco products within the last 30 days; some studies may use other timeframes (e.g., within the last 7, 60 or 90 days); includes both regular (e.g., daily or weekly) and occasional smoking

† Interventions to prevent tobacco smoking: behaviourally-based programs (e.g., education, counseling), relevant to Canadian primary care, that are intended to prevent children and youth who have never tried smoking tobacco from initiating this behaviour or to prevent children and youth who have smoked tobacco in the past but who are not currently smoking from re-initiating this behaviour

‡ Interventions to treat tobacco smoking: behaviourally-based programs (e.g., education, counseling) and non-pharmacological alternative or complementary strategies (e.g., acupuncture, acupressure, laser therapy, hypnosis), relevant to Canadian primary care, that are intended to help children and youth who currently smoke tobacco to stop this behaviour

Harms of treatment: any adverse effects or events experienced as a result of participation in behavioural, alternative or complementary interventions designed to help children and youth stop smoking tobacco (e.g., anxiety, pain, discomfort, infection)

Key Questions

The key questions (KQ) that will be addressed by the review are as follows:

Prevention

KQ 1. Are behaviourally-based interventions relevant to the Canadian primary care setting that are designed to prevent tobacco smoking effective in preventing school-aged children and youth from trying or taking up tobacco smoking?

a. Are there differences in the incidence of tobacco smoking across subgroups, as defined by: (i) baseline age (5-12 years, 13-18 years), (ii) baseline tobacco smoking status [never, former (e.g., have tried smoking tobacco in past but not in last 30 days)], (iii) intervention intensity [high (e.g., ≥2 meetings/interactions with a health professional of any length or one long session, such as a ½ day or entire day workshop), low (≤1 brief meeting or encounter with a health professional or provision of written materials such as a pamphlet)], and (iv) study risk of bias rating (low, unclear, high)?

b. What are the elements of efficacious interventions designed for preventing tobacco smoking in school-aged children and youth?

KQ 2. Are behaviourally-based interventions relevant to Canadian primary care that are designed to prevent tobacco smoking in school-aged children and youth effective in reducing future tobacco smoking during adulthood?

Treatment

KQ 3. Are behaviourally-based and non-pharmacological alternative and complementary interventions relevant to the Canadian primary care setting that are designed to help school-aged children and youth stop ongoing tobacco smoking effective in achieving smoking cessation?

a. Are there differences in the incidence of stopping smoking across subgroups, as defined by: (i) baseline age (5-12 years, 13-18 years), (ii) baseline tobacco smoking status [current regular (daily or weekly), current occasional], (iii) intervention intensity [high (e.g., ≥2 meetings/interactions with a health professional of any length or one long session, such as a ½ day or entire day workshop), low (≤1 brief meeting or encounter with a health professional or provision of written materials such as a pamphlet)], and (iv) study risk of bias rating (low, unclear, high)?

b. What are the elements of efficacious interventions designed to help school-aged children and youth stop ongoing tobacco smoking?

KQ 4. Are behaviourally-based and non-pharmacological alternative and complementary interventions relevant to the Canadian primary care setting that are designed to help school-aged children and youth stop ongoing tobacco smoking effective in reducing future tobacco smoking in adulthood?

KQ 5. What if any, adverse effects are associated with behaviourally-based and non-pharmacological alternative and complementary interventions designed to help school-aged children and youth stop ongoing tobacco smoking?

Contextual Questions

The contextual questions (CQ) that will be addressed in this review are as follows:

CQ 1. What are school-aged children's and youth's preferences and values regarding how and under what conditions they are asked about their personal tobacco smoking history?

CQ 2. What are participants' (children, adolescents, parents) preferences and values regarding interventions designed to prevent or treat tobacco smoking by children and youth?

Review Approach

Literature Search

The literature search will update the search done for the 2013 USPSTF review on primary care relevant interventions for tobacco use prevention and cessation in children and adolescents.[9] Peer review of a draft of this protocol detected a gap in the search strategy for identifying harms studies with controlled observational designs. The ERSC's librarian peer reviewed the USPSTF's search using the Peer Review Electronic Search Strategies (PRESS) methodology and checklist[13] and aside from adding our requirements

for French language citations and including Embase, she found no further problems (Appendix B). As noted below, the limitation regarding the harms studies has been addressed in our search strategy.

For the key questions on benefits of interventions for preventing tobacco smoking and benefits and harms of interventions for treating tobacco smoking among school-aged children and youth we will update the search done for the 2013 USPSTF review on this same topic.[9] The USPSTF evaluated trials considered and included in three previous reviews[14-16] that covered the tobacco prevention literature up to July 2002 and the tobacco cessation literature up to August 2009. The USPSTF then searched for English citations in MEDLINE, PsycINFO, the Cochrane Central Register of Controlled Trials, the Cochrane Database of Systematic Reviews, PubMed and the Database of Abstracts of Reviews of Effects from January 2002 to September 2012 for smoking prevention and from January 2009 to September 2012 for smoking cessation. We will use the same strategies (same databases and search terms) to update the search for the period from January 30, 2012 to the present, and we will also include an additional database (Embase) and allow for citations in both English and French. In addition, since no pharmaceuticals or nicotine replacement therapies are currently approved in Canada for use by children and adolescents for smoking cessation, our review will not consider these interventions; therefore we will not update the USPSTF's search for smoking cessation pharmacotherapy. The USPSTF's search for studies of behavioural or other non-pharmacological interventions was limited to randomized controlled trials. As we are including controlled observational studies of harms of treatment interventions, we will be doing a separate harms search that will not be limited by study type (except for the exclusion of case reports, comments, editorials, letters, and news reports). This search will be undertaken in the same databases and with the same dates as the other treatment searches. Appendix C provides our search strategy for the key questions. We will also conduct a manual search of recent on-topic systematic reviews to look for relevant primary studies not captured by our electronic database search.

A separate search will be performed to look for evidence to answer the contextual questions. This strategy will include three databases (MEDLINE, Embase and PsycINFO) to seek relevant citations in English and French from 2005 to March 2015. Appendix D provides our search strategy for the contextual questions. A focused web-based grey literature search will also be undertaken using the Canadian section of the Canadian Agency for Drugs and Technologies in Health (CADTH) Grey Matters search tool[17] and Google advanced search (limited to Canada) to look for recent on-topic sources that provide Canadian specific information to help inform the contextual questions.

Citations will be managed through the web-based systematic review platform Distiller SR.[18]

Other Sources of Potential Evidence

In addition to potentially eligible citations we identify through database searches, we will evaluate the 19 studies included in the 2013 USPSTF review[9] as well as the 5 studies the USPSTF excluded due to study quality issues for eligibility based on our inclusion criteria.

Study Selection

For the key questions and the contextual questions, title and abstract screening will be done independently by two raters. Any citation selected for inclusion by either team member will move to full text review. Full-text screening will also be done by two independent raters with consensus required for inclusion. Conflicts at this level will be discussed by reviewers; a third team member will be consulted to resolve any continued disagreements.

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria that will be used to select studies to answer the key questions of this review are summarized separately for prevention and treatment in the tables below. These criteria are generally consistent with the conditions set forth in the USPSTF's 2013 review[9] but in some cases have been narrowed.

Table 1: Inclusion and Exclusion Criteria for KQ1 and KQ2 - Prevention of Tobacco Smoking

	Inclusion	Exclusion
Product	Tobacco products that are smoked or are combustible (e.g., cigarettes, cigarillos)	Smokeless or non-combustible tobacco products (e.g., chewing tobacco, snuff, e-cigarettes)
Population	School-aged children (5-12 years) and adolescents (13-18 years) ≥80% of sample must be ≤18 years at baseline or study must report separate results for analyses on a subsample of participants ≤18 years; if % is not reported then mean age of sample plus 1.5 SD must be ≤18 years at baseline Have never smoked tobacco or are not currently smoking tobacco (e.g., no smoking within last 30 days); if study authors do not explicitly specify participants' smoking status as never or former but they do explicitly identify the intervention as a preventive strategy we will accept this as an appropriate population Interventions may be delivered to parents and/or children but the target population for tobacco smoking prevention must be school-aged children and adolescents	Sample comprised only of adults aged ≥19 years at baseline or sample includes any adults ≥25 years >20% of sample is aged ≥19 years at baseline or there is no sub-group analysis for participants ≤18 years Participants are all current tobacco smokers (e.g., have smoked in last 30 days) or current smokers are included in the sample and the intervention is not tailored to smoking status Sample is limited to pregnant adolescents Sample is limited to children or adolescents with cognitive deficits, mental or physical health issues and/or substance abuse

	Inclusion	Exclusion
Interventions	Primary care relevant [i.e., offered through or could be reasonably/feasibly conducted within primary care and (could be) delivered by health care professionals such as primary care physicians, other physicians, nurse practitioners, nurses, physician assistants, pharmacists, health educators, health counselors, dentists, dental assistants or hygienists] behaviourally-based interventions (e.g., education, counseling) for preventing tobacco smoking Interventions that combine non-smokers with current smokers and cover prevention and treatment will be included only if the delivery of messages/contents/components is tailored to each individual's baseline smoking status and if outcomes are reported separately for non-smokers and current smokers Multi-component interventions that cover a range of substances (alcohol, tobacco, drugs) will be included if the majority of the intervention content focuses on preventing tobacco smoking Intervention may be delivered to individuals or to groups; groups must be formed for the purpose of intervention delivery only. Delivery of intervention content may be via real-time personal contact (e.g., in-person, phone), technology-based messaging (e.g., website, email, text), or print media (e.g., pamphlets, newsletters, workbooks) Interventions of any duration or intensity	Treatment oriented interventions for helping children and youth stop ongoing tobacco smoking Interventions that include non-smokers and current smokers and provide the same messages/contents/components to all participants regardless of smoking status/history Multi-component interventions that include a major emphasis on topics or behaviours besides substance use (e.g., a healthy lifestyle choices intervention that considers alcohol and tobacco use as well as sex, nutrition, exercise); tobacco smoking is covered among many other topics and is not a central focus of the intervention Interventions that involve peer counseling by a known peer Interventions delivered to pre-existing groups (e.g., team, class, club, peer group) or where there is increased likelihood that some or all participants already know each other and interaction is likely as part of the intervention Broad public health or policy interventions or media campaigns or community-based interventions that increase awareness or restrict product access/consumption or decrease environmental tobacco exposure (e.g., product pricing and placement; legal age to purchase cigarettes; laws regarding smoke-free vehicles, recreation, restaurants and other settings; restrictions on product advertising; health consequences advertising)
Comparators	No intervention, usual care that does not involve a specifically designed smoking prevention component, attention control (with no tobacco related content) or wait list	Any type or intensity of intervention specifically designed or intended to prevent tobacco smoking in school-aged children and youth
Outcomes	Benefits • incidence of tobacco smoking • prevalence of adult tobacco smoking	Outcomes not specified for inclusion (e.g., change in attitudes or knowledge regarding cigarette smoking or general tobacco use)

	Inclusion	Exclusion
Outcome Assessment (Type and Timing)	Self-report If biochemically verified data is reported for incidence of smoking this biomarker data will be extracted for possible sensitivity analysis compared to self-report Outcomes must be reported at ≥6 months (≥24 weeks) post baseline follow-up	Population-based data (i.e., not based on study sample) <6 months (<24 weeks) follow-up post baseline assessment
Study Design	Randomized controlled trials (RCTs) that have a minimum of 30 participants per arm/group of interest for baseline measures	Study designs other than RCT or RCTs that include an arm of interest that has <30 participants with baseline measures
Study Quality	All studies that meet inclusion criteria regardless of methodological quality	No exclusions based on study quality
Time Period	Published between 1980 and 2012 AND included in the 2013 USPSTF review or excluded from that review for study quality Published from February 2012 to present	Published prior to 1980
Settings	Primary care and other health-care related settings such as dental offices, research clinics, school-based health clinics Location may vary as long as the intervention is linked to primary care or is primary care referable (e.g., health care office appointment, on-line/virtual exchange, hosted in a community setting such as a church, library, youth centre or school)	Schools (interventions may be hosted/located in a school setting or be provided by a school nurse as part of primary care services to individual students but they may not be curriculum based, class based, teacher delivered, etc.) Hospital (e.g., inpatient programs) Institutional or residential (e.g., correctional centres, group homes)
Country	The USPSTF included studies (pre-2012) had to be conducted in countries, rated "very high" using Human Development Index 2010 (http://hdr.undp.org/en/statistics/) Update search (2012 to present) will use the 2014 list http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components	Studies conducted in all other countries
Language	Published results available in English or French (French studies considered in update only; 2012 to present)	Published results available only in languages other than English or French (French language studies were excluded by USPSTF)

Table 2: Inclusion and Exclusion Criteria for KQ3, KQ4 and KQ5 – Treatment of Tobacco Smoking

	Inclusion	Exclusion
Product	Tobacco products that are smoked (e.g., cigarettes, cigarillos)	Smokeless tobacco products (e.g., chewing tobacco, snuff)
Population	School-aged children (5-12 years) and adolescents (13-18 years) ≥80% of sample must be ≤18 years at baseline or study must report separate results for analyses on a subsample of participants ≤18 years; if % is not reported then mean age of sample plus 1.5 SD must be ≤18 years at baseline Current tobacco smokers (e.g., smoked in last 30 days); if study authors explicitly identify the intervention as a treatment, cessation or "stop smoking" strategy we will accept this as an appropriate population Interventions may be delivered to parents and/or children but the target population for tobacco smoking cessation must be school-aged children and adolescents	Sample comprised only of adults aged ≥19 years at baseline or sample includes any adults ≥25 years >20% of sample is aged ≥19 years at baseline or there is no sub-group analysis for participants ≤18 years Never smoked tobacco or are not currently smoking tobacco (e.g., no smoking within last 30 days) Sample is limited to pregnant adolescents Sample is limited to children or adolescents with cognitive deficits, mental or physical health issues and/or substance abuse

	Inclusion	Exclusion
Interventions	Primary care relevant [i.e., offered through or could be reasonably/feasibly conducted within primary care and (could be) delivered by health care professionals such as primary care physicians, other physicians, nurse practitioners, nurses, physician assistants, pharmacists, health educators, health counselors, dentists, dental assistants or hygienists] behavioural, alternative or complimentary interventions (e.g., counseling, education, acupuncture, acupressure, hypnosis, laser therapy) for treating/stopping tobacco smoking Interventions that combine non-smokers with current smokers and cover prevention and treatment will be included only if the delivery of messages/contents/components is tailored to each individual's baseline smoking history/status and if outcomes are reported separately for non-smokers and current smokers Multi-component interventions that cover a range of substances (alcohol, tobacco, drugs) will be included if the majority of the intervention content focuses on helping children/youth stop ongoing tobacco smoking; at least 80% of the participants must be identified as current tobacco users at baseline Intervention may be delivered to individuals or to groups; groups must be formed for the purpose of intervention delivery only Delivery of intervention content may be via real-time personal contact (e.g., in-person, phone), technology-based messaging (e.g., website, email, text), or print media (e.g., pamphlets, newsletters, workbooks) Interventions of any duration or intensity	Interventions for preventing children and youth from smoking tobacco Interventions that include non-smokers and current smokers and provide the same messages/contents/components to all participants regardless of smoking status/history Trials that use drugs such as buproprion (Zyban) or varenicline tartrate (Chanix/Champix) or any other pharmaceutical treatments for smoking cessation Trials that incorporate nicotine replacement therapies (NRTs, e.g., patches, sprays, gums) solely or adjunctively as part of the intervention Multi-component interventions that include a major emphasis on topics or behaviours besides substance use (e.g., a healthy lifestyle choices intervention that considers alcohol and tobacco use as well as sex, nutrition, exercise); tobacco smoking is covered among many other topics and is not a central focus of the intervention. Interventions that involve peer counseling by a known peer Interventions delivered to pre-existing groups (e.g., team, class, club, peer group) or where there is increased likelihood that some or all participants already know each other and interaction is likely as part of the intervention Broad public health or policy interventions or media campaigns or community-based interventions that increase awareness or restrict product access/consumption or decrease environmental tobacco exposure (e.g., product pricing and placement; legal age to purchase cigarettes; laws regarding smoke-free vehicles, recreation, restaurants and other settings; restrictions on product advertising; health consequences advertising)
Comparators	No intervention, usual care without a specifically designed smoking cessation component, attention control (with no tobacco related content) or wait list	Any type or intensity of intervention specifically designed or intended to stop ongoing tobacco smoking in school-aged children and youth

	Inclusion	Exclusion
Outcomes	Benefits • incidence of stopping tobacco smoking • prevalence of adult tobacco smoking Harms • adverse effects of interventions (e.g., anxiety, pain, discomfort, infection)	Outcomes not specified for inclusion (e.g., change in quantity of cigarettes smoked, intention to quit, stage of change)
Outcome Assessment (Type and Timing)	Self-report If biochemically verified data is reported for incidence of stopping smoking this biomarker data will be extracted for possible sensitivity analysis compared to self-report Benefit outcomes must be reported at ≥6 months (≥24 weeks) post baseline follow-up No minimum follow-up required for harms	Population-based data (i.e., not based on study sample) <6 months (<24 weeks) follow-up post baseline assessment (for benefit outcomes)
Study Design	For benefits include only randomized controlled trials (RCTs) that have a minimum of 30 participants per arm/group of interest for baseline measures Studies reporting harms may use RCT or comparative observational designs and there are no conditions regarding sample size	For benefits, study designs other than RCT or RCTs that include an arm of interest that has <30 participants with baseline measures If study only reports harms exclude if the design is uncontrolled observational
Study Quality	All studies that meet inclusion criteria regardless of methodological quality	No exclusions based on study quality
Time Period	Published between 1980 and 2012 AND included in the 2013 USPSTF review or excluded from that review for study quality Published from February 2012 to present	Published prior to 1980
Settings	Primary care and other health-care related settings such as dental offices, research clinics, school-based health clinics Location may vary as long as the intervention is linked to primary care or is primary care referable (e.g., health care office appointment, on-line/virtual exchange, meeting hosted in a community setting such as a church, library, youth centre or school)	Schools (interventions may be hosted/located in a school setting or be provided by a school nurse as part of primary care services to individual students but they may not be curriculum based, class based, teacher delivered, etc.) Hospital (e.g., inpatient programs) Institutional or residential (e.g., correctional centres, group homes)

	Inclusion	Exclusion
Country	The USPSTF included studies (pre-2012) had to be conducted in countries, rated "very high" using Human Development Index 2010 (http://hdr.undp.org/en/statistics/) The update search (2012 to present) will use the very high index country list for 2014 http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components	Studies conducted in all other countries
Language	Published results available in English or French (French studies considered in update only; 2012 to present)	Published results available only in languages other than English or French (French language studies were excluded by USPSTF)

Data Abstraction and Quality Assessments

For each study used to answer the key questions, review team members will extract data about the population, the study design, the intervention, the analysis and the results for outcomes of interest. We will assess all randomized controlled trials using the Cochrane Risk of Bias Tool.[19] If controlled observational studies are included as evidence of harms we will use the Newcastle Ottawa Scale[20] to assess for risk of bias. For each study, one team member will complete full abstraction (study characteristics, risk of bias assessment, outcome data) using standardized forms located on the DistillerSR platform[18] and a second team member will verify all extracted data and ratings; disagreements will be resolved through discussion and/or third party consultation if consensus cannot be reached. Study authors may be contacted for missing or questionable data.

The GRADE system[21] (and GRADEPro software[22]) will be used to assess the strength and quality of the evidence for all outcomes ranked by the CTFPHC working group members as critical or important. The GRADE system rates the quality of a body of evidence as high, moderate, low or very low; each of the four levels reflects a different assessment of the likelihood that further research will impact the estimate of effect (i.e., high quality=further research is unlikely to change confidence in the estimate of effect; moderate quality=further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate; low quality=further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate; very low quality=the estimate of effect is very uncertain). A GRADE quality rating is based on an assessment of five conditions: (1) risk of bias (limitations in study designs), (2) inconsistency (statistical heterogeneity) in the direction and/or size of the estimates of effect, (3) indirectness of the body of evidence to the populations, interventions, comparators and/or outcomes of interest, (4) imprecision of results (few participants, events or observations; wide confidence intervals or including null value), and (5) indications of reporting or publication bias. Grouped studies begin with a high quality rating which may be downgraded if there are serious or very serious concerns across the evidence related to one or more of the five conditions.

Data extraction for the articles selected to address the contextual questions will be performed by one team member. There will be no assessment of the methodological quality of the studies used to answer the contextual questions.

Analysis Plan

KQ1, KQ2, KQ3, KQ4. Benefits of interventions to prevent or treat tobacco smoking

We will present benefits of interventions for the outcomes of incidence of tobacco smoking, incidence of stopping tobacco smoking and prevalence of adult tobacco smoking (intervention vs control group). Extracted data will be meta-analyzed when appropriate (i.e., sufficient number of methodologically homogenous studies reporting the required data for pooling). If data for particular outcomes are inconsistently reported across studies or if studies do not provide data necessary for pooling (e.g., report only a P-value, do not report values for the control group) the results will be described narratively. Risk of bias will be assessed using the Cochrane tool.[19] GRADE[21] assessments will be conducted and GRADE tables will be produced for all outcomes rated critical or important.

KQ1a, KQ3a. Differences in benefits across subgroups

Information will be extracted on potential factors such as baseline age (5-12 years, 13-18 years), baseline tobacco smoking status [never, former, current regular (daily or weekly), current occasional], intervention intensity [high (e.g., ≥2 meetings/interactions with a health professional of any length or one long session, such as a ½ day or entire day workshop), low (≤1 brief meeting or encounter with a health professional or provision of written materials such as a pamphlet)], and study risk of bias rating (high, unclear, low) and subgroup analyses will be conducted when possible to evaluate potential differences in outcomes across these subgroups.

KQ1b, KQ3b. Elements of efficacious interventions

We will qualitatively examine common elements and components of efficacious interventions to help identify possible patterns across studies showing significant benefit. We will identify efficacious interventions from studies included in the incidence of smoking and incidence of stopping smoking meta-analyses that showed statistically significant effect sizes in favour of the intervention group. Examples of elements we may examine in these interventions include: intervention location/setting, intervention duration, estimated number of sessions/frequency of sessions, intervention target (age, gender, race), parental involvement, role of primary care setting/providers, mode of intervention, inclusion of multiple behaviours, and delivery through group sessions.

KQ5. Harms of interventions to treat tobacco smoking

For harms outcomes of interventions to treat tobacco smoking we will conduct risk of bias (Cochrane Risk of Bias Tool[19] or Newcastle Ottawa Scale[20]), extract data and meta-analyze when appropriate (i.e.,

sufficient number of methodologically homogenous studies reporting the required data for pooling). If data for particular outcomes are inconsistently reported across studies or if studies do not provide data necessary for pooling (e.g., report only a P-value, do not report values for the control group) the results will be described narratively.

Data Analysis

For the binary outcomes of benefit (incidence of smoking, incidence of stopping smoking, prevalence of adult smoking), and the binary outcomes of harms, we will utilize the number of events, proportion or percentage data to generate the summary measures of effect in the form of risk ratio (RR) using DerSimonian and Laird random effects models with inverse variance method.[23] The estimates of absolute risk reduction (ARR), absolute risk increase (ARI) and number needed to treat (NNT) will be added. The NNTs will be calculated using the absolute numbers presented in the GRADE tables estimated using the control group event rate (ACR) and risk ratio with the 95% confidence interval obtained from the meta-analysis [see Chapter 12 (Section 12. 5.4.2) in the *Cochrane Handbook for Systematic Reviews of Interventions*].[24]

For any continuous outcomes of harms such as anxiety, we will utilize immediate post-treatment data (means, standard deviations). The DerSimonian and Laird random effects models with inverse variance method[23] will be utilized to generate the summary measures of effect in the form of mean difference (MD). MD will be calculated using change from baseline data [i.e., mean difference between pre-treatment (baseline) and post-treatment (final/end-point) values along with the standard deviation (SD) for both intervention and control groups]. For studies that do not report SD, we will calculate this value from the reported standard error (SE) of the mean, or from the 95% confidence intervals (CI) using equations provided in Chapter 9 of the *Cochrane Handbook for Systematic Reviews of Interventions*.[25] For studies that provide neither SD nor SE for the follow-up data, we will impute the SD from either the baseline values or other included studies using recommended methods provided in Chapter 16 (Section 16.1.3.1) of the *Cochrane Handbook for Systematic Reviews of Interventions*.[8]

For outcomes of benefit further sub-group analyses based on potential factors such as baseline age (5-12 years, 13–18 years), baseline tobacco smoking status [never, former, current regular (daily or weekly), current occasional], intervention intensity [high (e.g., ≥2 meetings/interactions with a health professional of any length or one long session, such as a ½ day or entire day workshop), low (≤1 brief meeting or encounter with a health professional or provision of written materials such as a pamphlet)], and study risk of bias rating (high, unclear, low) will be conducted where possible to evaluate statistical stability and effect on statistical heterogeneity. The Cochran's Q (α=0.05) will be employed to detect statistical heterogeneity and the I^2 statistic will be used to quantify the magnitude of statistical heterogeneity between studies where I^2 >50% represents moderate and I^2 >75% represents substantial heterogeneity across studies.[25, 26]

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Appendix A: Completed AMSTAR Checklist

1. Was an 'a priori' design provided? The research question and inclusion criteria should be established before the conduct of the review.	✓ Yes ☐ No ☐ Can't answer ☐ Not applicable
2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.	✓ Yes ☐ No ☐ Can't answer ☐Not applicable
3. Was a comprehensive literature search performed? At least two electronic sources should be searched. The report must include years and databases used (e.g. Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.	✓Yes ☐ No ☐ Can't answer ☐ Not applicable
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion? The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.	✓ Yes ☐ No ☐ Can't answer ☐Not applicable
5. Was a list of studies (included and excluded) provided? A list of included and excluded studies should be provided.	✓ Yes ☐ No ☐ Can't answer ☐ Not applicable
6. Were the characteristics of the included studies provided? In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g. age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.	✓ Yes ☐ No ☐ Can't answer ☐ Not applicable

7. Was the scientific quality of the included studies assessed and documented? 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.	✓ Yes ☐ No ☐ Can't answer ☐ Not applicable
8. Was the scientific quality of the included studies used appropriately in formulating conclusions? The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.	✓ Yes ☐ No ☐ Can't answer ☐ Not applicable
9. Were the methods used to combine the findings of studies appropriate? For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e. Chi-squared test for homogeneity, I^2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e. is it sensible to combine?).	✓ Yes ☐ No ☐ Can't answer ☐ Not applicable
10. Was the likelihood of publication bias assessed? An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test).	✓ Yes ☐ No ☐ Can't answer ☐ Not applicable
11. Was the conflict of interest stated? Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.	☐ Yes ✓ No ☐ Can't answer ☐Not applicable

Appendix B: Completed PRESS Checklist

Peer Review of Electronic Search Strategies (PRESS)

The following document is a peer review of the search strategy used by the USPSTF in their review, Primary care relevant interventions for tobacco use prevention and cessation in children and adolescents. A systematic evidence review for the U.S. Preventive Services Task Force.[9] The assessment of this strategy is to evaluate whether or not it is suitable for the purposes of our update. As such, the detailed search strategy on the form is the relevant part of the strategy used by the USPSTF in their review while the key questions are those from our update. The evaluation on page 3 of the form is what changes/adaptations, if any, are necessary for the search to find the literature needed/required address our questions.

Prevention

PRESS EBC Search Submission

Searcher's Name: ***USPSTF-Prevention***	**E-mail:**
Date submitted:	**Date needed by:**
Note to peer reviewers – please enter your information in the Peer Review Assessment area	

Remember: this peer review only pertains to your MEDLINE search strategy.

Search question (Describe the purpose of the search)

KQ 1. Are behaviourally-based interventions relevant to the Canadian primary care setting that are designed to prevent tobacco smoking effective in preventing school-aged children and youth from trying or taking up tobacco smoking?

a. Are there differences in the incidence of tobacco smoking across subgroups, as defined by: (i) baseline age (5-12 years, 13-18 years), (ii) baseline tobacco smoking status [never, former (e.g., have tried smoking tobacco in past but not in last 30 days), (iii) intervention intensity [high (e.g., ≥2 meetings/interactions with a health professional of any length or one long session, such as a ½ day or entire day workshop), low (≤1 brief meeting or encounter with a health professional or provision of written materials such as a pamphlet)], and (iv) study risk of bias rating (low, unclear, high)?

b. What are the elements of efficacious interventions designed for preventing tobacco smoking in school-aged children and youth?

KQ 2. Are behaviourally-based interventions relevant to Canadian primary care that are designed to prevent tobacco smoking in school-aged children and youth effective in reducing future tobacco smoking during adulthood

PICO format (Outline the PICO for your question, i.e., Patient, Intervention, Comparison, Outcome)

P: School-aged children and youth (5-18)

I: behaviourally-based interventions

C: No intervention, usual care that does not involve a specifically designed smoking prevention component, attention control (with no tobacco related content) or wait list

O: incidence of tobacco smoking, prevalence of adult tobacco smoking

Inclusion criteria (List criteria such as age groups, study designs, to be included)
-5-18 years of age
- Randomized controlled trials

Exclusion criteria (List criteria such as study designs, to be excluded)
-all other populations
-non-rcts

Was a search filter applied? (Remember this pertains only to the MEDLINE strategy)

Yes ☐ *No* *X*

If yes, which one?

Cochrane hedge: PUBMED clinical query:
Haynes/McKibbon et al: SIGN (Scottish):
CRD (UK): Robinson and Dickerson:
Other:

MEDLINE search interface used

EBSCO ☐ *OVID* X *PubMED* ☐ *Other* _____

Has the search strategy been adapted (i.e., subject heading and terms reviewed) for other databases? Please check all that apply.

Ageline	☐
AMED	☐
C2-SPCTRE	☐
CINAHL	☐
Cochrane Database of Systematic Reviews (CDSR; Cochrane Reviews)	X
Cochrane Central Register of Controlled Trials (CENTRAL; Clinical Trials)	X

Cochrane Methodology Register (CMR; Methods Studies)	☐
Cochrane Library (all databases)	☐
Database of Abstracts of Reviews of Effects (DARE; Other Reviews)	X
Embase	☐
ERIC	☐
ICTRP (International Clinical Trials Registry Platform)	☐

LILACS (Latin American and Caribbean Health Sciences Literature)	☐
MEDLINE	☐
PreMEDLINE	☐
PsycINFO	X
Other PubMed	X
Other	☐

Other notes or comments that you feel would be useful for the peer reviewer?

Please paste your MEDLINE strategy here:

1. Smoking Cessation/
2. "Tobacco Use Disorder"/
3. tobacco.ti,ab.
4. smoking.ti,ab.
5. cigarette*.ti,ab.
6. 1 or 2 or 3 or 4 or 5
7. prevention & control.fs.
8. prevent*.ti,ab.
9. initiat*.ti,ab.
10. (start* adj3 smok*).ti,ab.
11. behavio?r* change*.ti,ab.
12. behavio?r* intervention*.ti,ab.
13. 7 or 8 or 9 or 10 or 11 or 12
14. 6 and 13
15. adolescent/ or child/
16. children.ti,ab.
17. adolescen*.ti,ab.
18. child.ti,ab.
19. childhood.ti,ab.
20. teen*.ti,ab.
21. youth*.ti,ab.
22. 15 or 16 or 17 or 18 or 19 or 20 or 21
23. (clinical trial or controlled clinical trial or meta analysis or randomized controlled trial).pt.
24. clinical trials as topic/ or controlled clinical trials as topic/ or randomized controlled trials as topic/
25. clinical trial*.ti,ab.
26. (control* adj3 trial*).ti,ab.
27. random*.ti,ab.
28. 23 or 24 or 25 or 26 or 27
29. 14 and 22
30. 28 and 29
31. limit 30 to english language
32. limit 31 to yr=2002-Current

Peer Review Assessment [For peer reviewers only]
Peer reviewer's name: Maureen Rice—(MERSC librarian) **E-mail:** **Date completed:** March 10, 2015

Please select the one most appropriate answer for each element

	Adequate	Adequate with revisions*	Needs revision*
1. Translation of the research question	x		
2. Boolean and proximity operators	x		
3. Subject headings	x		
4. Natural language / free-text	x		
5. Spelling, syntax and line numbers	x		
6. Limits and filters		x	
7. Search strategy adaptations	x		

* Provide an explanation or example for "Adequate with revisions" and "needs revision":

We will be expanding the language restriction to include French for our search

Other Comments (please limit to 3-5 sentences):

As per our methods manual, we will also be searching EMBASE from the end of the USPSTF search forward.

Treatment and Harms

PRESS EBC Search Submission

Searcher's Name: ***USPSTF-Treatment/Harms***
E-mail: **Date submitted:** **Date needed by:**
Note to peer reviewers – please enter your information in the Peer Review Assessment area

Remember: this peer review only pertains to your MEDLINE search strategy.

Search question (Describe the purpose of the search)

KQ 3. Are behaviourally-based and non-pharmacological alternative and complementary interventions relevant to the Canadian primary care setting that are designed to help school-aged children and youth stop ongoing tobacco smoking effective in achieving smoking cessation?

a. Are there differences in the incidence of stopping smoking across subgroups, as defined by: (i) baseline age (5-12 years, 13-18 years), (ii) baseline tobacco smoking pattern [current regular (daily or weekly), current occasional], (iii) intervention intensity [high (e.g., ≥2 meetings or interactions with a health professional of any length or one long session, such as a ½ day or entire day workshop), low (≤1 brief meeting or encounter with a health professional or provision of written materials such as a pamphlet)], and (iv) study risk of bias rating (low, unclear, high)?
b. What are the elements of efficacious interventions designed to help school-aged children and youth stop ongoing tobacco smoking?

KQ 4. Are behaviourally-based and non-pharmacological alternative and complementary interventions relevant to the Canadian primary care setting that are designed to help school-aged children and youth stop ongoing tobacco smoking effective in reducing future tobacco smoking in adulthood?

KQ 5. What if any, adverse effects are associated with behaviourally-based and non-pharmacological alternative and complementary interventions designed to help school-aged children and youth stop ongoing tobacco smoking?

PICO format (Outline the PICO for your question, i.e., Patient, Intervention, Comparison and Outcome)
P: School-aged children and youth (5-18)
I: behaviourally-based interventions
C: No intervention, usual care without a specifically designed smoking cessation component, attention control (with no tobacco related content) or wait list
O: Benefits

- incidence of stopping tobacco smoking
- prevalence of adult tobacco smoking

Harms

- adverse effects of interventions (e.g., anxiety, pain, discomfort, infection)

Inclusion criteria (List criteria such as age groups, study designs, to be included)
-5-18 years of age
- Randomized controlled trials for benefits
- RCT or comparative observational designs for harms

Exclusion criteria (List criteria such as study designs, to be excluded)
-all other populations
-non-rcts for treatment benefits
-pharmacological treatments

Was a search filter applied? (Remember this pertains only to the MEDLINE strategy)

Yes ☐ *No* X

If yes, which one?

Cochrane hedge: PUBMED clinical query:
Haynes/McKibbon et al: SIGN (Scottish):
CRD (UK): Robinson and Dickerson:
Other:

MEDLINE search interface used

EBSCO ☐ *OVID* X *PubMED* ☐ *Other* _____

Has the search strategy been adapted (i.e., subject heading and terms reviewed) for other databases? Please check all that apply.

Ageline	☐
AMED	☐
C2-SPCTRE	☐
CINAHL	☐
Cochrane Database of Systematic Reviews (CDSR; Cochrane Reviews)	X
Cochrane Central Register of Controlled Trials (CENTRAL; Clinical Trials)	X
Cochrane Methodology Register (CMR; Methods Studies)	☐
Cochrane Library (all databases)	☐
Database of Abstracts of Reviews of Effects (DARE; Other Reviews)	X

Embase	☐
ERIC	☐
ICTRP (International Clinical Trials Registry Platform)	☐
LILACS (Latin American and Caribbean Health Sciences Literature)	☐
MEDLINE	☐
PreMEDLINE	☐
PsycINFO	X
Other PubMed	X
Other	☐

Other notes or comments that you feel would be useful for the peer reviewer?

Please paste your MEDLINE strategy here:

1 smoking cessation/
2 "Tobacco Use Disorder"/
3 tobacco.ti,ab.
4 smoking.ti,ab.
5 cigarette*.ti,ab.
6 3 or 4 or 5
7 cessation.ti,ab.
8 quit*.ti,ab.
9 "stop*".ti,ab.
10 7 or 8 or 9
11 6 and 10
12 1 or 2 or 11
13 adolescent/ or child/
14 children.ti,ab.
15 adolescen*.ti,ab.
16 child.ti,ab.
17 childhood.ti,ab.
18 teen*.ti,ab.
19 youth*.ti,ab.
20 13 or 14 or 15 or 16 or 17 or 18 or 19
21 12 and 20
22 (clinical trial or controlled clinical trial or meta analysis or randomized controlled trial).pt.
23 clinical trials as topic/ or controlled clinical trials as topic/ or randomized controlled trials as topic/
24 clinical trial*.ti,ab.
25 (control* adj3 trial*).ti,ab.
26 random*.ti,ab.
27 placebo*.ti,ab.
28 22 or 23 or 24 or 25 or 26 or 27
29 21 and 28
30 limit 29 to english language
31 limit 30 to yr=2009-Current

Peer Review Assessment
[For peer reviewers only]

Peer reviewer's name: Maureen Rice—(MERSC librarian)

E-mail:

Date completed: March 10, 2015

Please select the one most appropriate answer for each element

	Adequate	Adequate with revisions*	Needs revision*
1. Translation of the research question		x	
2. Boolean and proximity operators	x		
3. Subject headings	x		
4. Natural language / free-text	x		
5. Spelling, syntax and line numbers	x		
6. Limits and filters		x	
7. Search strategy adaptations		x	

* Provide an explanation or example for "Adequate with revisions" and "needs revision":

- *Limitations on study type are not compatible with our inclusion criteria for harms of treatment*

Other Comments (please limit to 3-5 sentences):

- *We will be doing a separate search for harms that isn't limited to RCTs (see Appendix A for search details)*
- *As per our methods manual, we will also be searching EMBASE from the end of the USPSTF search forward*
- *We will be expanding the language restriction to include French for our search*

Appendix C: Key Questions Search Strategies

Prevention

Medline-OVID
1. Smoking Cessation/
2. "Tobacco Use Disorder"/
3. tobacco.ti,ab.
4. smoking.ti,ab.
5. cigarette*.ti,ab.
6. 3 or 4 or 5
7. prevention & control.fs.
8. prevent*.ti,ab.
9. initiat*.ti,ab.
10. (start* adj3 smok*).ti,ab.
11. behavio?r* change*.ti,ab.
12. behavio?r* intervention*.ti,ab.
13. 7 or 8 or 9 or 10 or 11 or 12
14. 6 and 13
15. adolescent/ or child/
16. children.ti,ab.
17. adolescen*.ti,ab.
18. child.ti,ab.
19. childhood.ti,ab.
20. teen*.ti,ab.
21. youth*.ti,ab.
22. 15 or 16 or 17 or 18 or 19 or 20 or 21
23. (clinical trial or controlled clinical trial or meta analysis or randomized controlled trial).pt.
24. clinical trials as topic/ or controlled clinical trials as topic/ or randomized controlled trials as topic/
25. clinical trial*.ti,ab.
26. (control* adj3 trial*).ti,ab.
27. random*.ti,ab.
28. 23 or 24 or 25 or 26 or 27
29. 14 and 22
30. 28 and 29
31. limit 30 to (english or french)
32. limit 31 to ed=20120130-20141103

Smoking Cessation in General

Medline-OVID
1. Smoking Cessation/

2. "Tobacco Use Disorder"/
3. tobacco.ti,ab.
4. smoking.ti,ab.
5. cigarette*.ti,ab.
6. 3 or 4 or 5
7. cessation.ti,ab.
8. quit*.ti,ab.
9. "stop*".ti,ab.
10. 7 or 8 or 9
11. 6 and 10
12. 1 or 2 or 11
13. adolescent/ or child/
14. children.ti,ab.
15. adolescen*.ti,ab.
16. child.ti,ab.
17. childhood.ti,ab.
18. teen*.ti,ab.
19. youth*.ti,ab.
20. 13 or 14 or 15 or 16 or 17 or 18 or 19
21. 12 and 20
22. (clinical trial or controlled clinical trial or meta analysis or randomized controlled trial).pt.
23. clinical trials as topic/ or controlled clinical trials as topic/ or randomized controlled trials as topic/
24. clinical trial*.ti,ab.
25. (control* adj3 trial*).ti,ab.
26. random*.ti,ab.
27. placebo*.ti,ab.
28. 22 or 23 or 24 or 25 or 26 or 27
29. 21 and 28
30. limit 29 to (english or french)
31. limit 30 to ed=20120130-20141103

Tobacco Cessation Harms

Medline-OVID
1. Smoking Cessation/
2. "Tobacco Use Disorder"/
3. tobacco.ti,ab.
4. smoking.ti,ab.
5. cigarette*.ti,ab.
6. 3 or 4 or 5
7. cessation.ti,ab.
8. quit*.ti,ab.

9. "stop*".ti,ab.
10. 7 or 8 or 9
11. 6 and 10
12. 1 or 2 or 11
13. adolescent/ or child/
14. children.ti,ab.
15. adolescen*.ti,ab.
16. child.ti,ab.
17. childhood.ti,ab.
18. teen*.ti,ab.
19. youth*.ti,ab.
20. 13 or 14 or 15 or 16 or 17 or 18 or 19
21. 12 and 20
22. (ae or co or de or mo).fs.
23. (adverse and (effect* or event*)).mp.
24. (safe* or harm* or side effect*).mp.
25. Anxiety/
26. Depression/
27. Pain/
28. Infection/
29. or/22-28
30. 21 and 29
31. limit 30 to (english or french)
32. limit 31 to ed=20120130-current
33. limit 32 to (case reports or comment or editorial or letter or news)
34. 32 not 33

Appendix D: Contextual Questions Search Strategy

Medline-OVID
1. "patient acceptance of health care"/
2. patient compliance/
3. exp patient participation/
4. patient satisfaction/
5. patient preference/
6. "treatment refusal"/
7. consumer satisfaction/
8. ((parent? or guardian*) adj3 (acceptance or preference? or satisfaction or experience?)).tw.
9. (consumer? adj3 (acceptance or preference? or satisfaction or experience?)).tw.
10. (patient? adj3 (acceptance or perference? or satisfaction or experience?)).tw.
11. willingness to pay.tw.
12. ((conjoint or contingent) adj3 (valuation or analysis)).tw.
13. Choice Behavior/
14. standard gamble.ti.
15. standard gamble.tw.
16. time trade off.tw.
17. choice model?ing.mp.
18. survey preferences.mp.
19. preference?.tw.
20. or/1-19
21. Smoking Cessation/
22. "Tobacco Use Disorder"/
23. tobacco.ti,ab.
24. smoking.ti,ab.
25. cigarette*.ti,ab.
26. 23 or 24 or 25
27. cessation.ti,ab.
28. quit*.ti,ab.
29. "stop*".ti,ab.
30. 27 or 28 or 29
31. prevention & control.fs.
32. prevent*.ti,ab.
33. initiat*.ti,ab.
34. (start* adj3 smok*).ti,ab.
35. behavio?r* change*.ti,ab.
36. behavio?r* intervention*.ti,ab.
37. 31 or 32 or 33 or 34 or 35 or 36
38. adolescent/ or child/
39. children.ti,ab.

40. adolescen*.ti,ab.
41. child.ti,ab.
42. childhood.ti,ab.
43. teen*.ti,ab.
44. youth*.ti,ab.
45. 38 or 39 or 40 or 41 or 42 or 43 or 44
46. 30 or 37
47. 26 and 46
48. 45 and 47
49. 20 and 48
50. limit 49 to (english or french)
51. limit 50 to yr="2005 - 2015"