

Interventions to Reduce the Impact of Smoking in the Movies on the Smoking Behaviours of Youth: A Rapid Review

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Key Messages

- Exposure to smoking in movies causes tobacco use among children and adolescents.
- There are current international, national, provincial, and regional efforts aimed at raising awareness of the impact smoking in movies has on children and adolescents.
- High quality evidence suggests that parental restrictions on the viewing of R-rated movies translate into lower risk for children and adolescent smoking.
- One high quality study shows that an R-rating for movies with smoking could reduce the risk of children and adolescents starting smoking.
- There is moderate quality evidence that placing anti-smoking ads before movies depicting smoking reduces the persuasive effect movie smoking can have on the attitudes towards smoking and intentions to smoke of children, adolescents, and adults.

Executive Summary

Research Question

What interventions will reduce the impact that smoking in the movies has on the smoking behaviours of youth?

Context

Adolescents are the most frequent movie-goers, and are exposed to billions of tobacco impressions annually. According to one study in the US Surgeon General's Report, this equates to an average of 665 gross smoking impressions per US adolescent aged 10-14 years.¹ This exposure has been shown to cause tobacco use among this age group.^{1,2} Many organizations are currently advocating for increased awareness of the impact smoking in movies has on children and adolescents, as well as policies and interventions aimed at reducing tobacco exposure in films. Peel Public Health is assessing its role in supporting local and provincial advocacy efforts.

Methods and Results

- A systematic search was used to identify 88 papers relevant to the research question.
- After applying inclusion and exclusion criteria, seven papers were independently assessed for quality by two reviewers. These included two guidelines, two literature reviews, and three single studies.
- The final studies in this review include one guideline and one longitudinal cohort study that were quality assessed as strong, and one case-control study that was quality assessed as moderate.

Synthesis of Findings

- Five studies found that parental restrictions on viewing R-rated movies and videos lowered the risk of smoking in children and adolescents.
- Two studies from the guideline and the single case-control study found that showing an anti-smoking ad before a movie depicting smoking is an effective strategy for reducing the persuasive effect that smoking in movies has on the attitudes toward smoking and the intentions to smoke of children, adolescents, and adults.
- The single longitudinal cohort study examining smoking onset amongst children and adolescents in relation to movie smoking exposure in G/PG, PG-13, and R-rated films found that assigning R-ratings to movies with smoking imagery could reduce smoking initiation among children and adolescents.

Recommendations

- Peel Public Health should support policies or interventions that recommend parental restrictions on R-rated movies, as well as other movies with smoking imagery in order to reduce the exposure of children and adolescents to movie smoking.
- Peel Public Health should endorse the policy recommendation of the Ontario Coalition for Smoke-Free Movies that showing anti-smoking ads prior to movies with smoking is an effective intervention for preventing smoking among children and adolescents.
- Peel Public Health should endorse the policy recommendation of the Ontario Coalition for Smoke-Free Movies for placing an R-rating on movies with smoking imagery.

1 Issue

National and international organizations are advocating for measures to limit smoking in movies as part of a comprehensive tobacco control strategy.

The entertainment industry has a profound impact on attitudes and behaviours, particularly among young people.² Tobacco companies have used movies as a platform for advertising from as early as the 1920s,¹ using product placement and false imagery to establish the prototype of the rebellious smoker, which continues to attract adolescents to smoking today.² Additionally, as a result of legislative changes related to tobacco product access and advertising, images of smoking in movies and on television today may be some of the more potent media-delivered smoking images seen by children and adolescents.¹ The 2012 US Surgeon General's Report concludes that exposure to smoking in movies causes tobacco use among children and adolescents.¹

The Ontario Coalition for Smoke-Free Movies focuses on awareness-raising of the issue of smoking in movies and its impact on youth smoking behaviours, education for parents, and advocacy for specific policies aimed at reducing the impact of smoking in the movies on youth smoking behaviours.⁴ The Coalition is encouraging Tobacco Control Area Networks to participate in a delegation process on the issue of smoking in movies in order to increase awareness among local Members of Provincial Parliament (MPPs) of the negative impact smoking and tobacco product imagery in movies has on children and adolescents. Delegations will begin in October 2012 and will continue until participants have had the opportunity to meet with their MPP.

This review focuses on the effectiveness of interventions to reduce the impact of movie smoking on youth smoking behaviours. Based on the research evidence presented in this review, Peel Public Health will determine whether it will participate in the work of the Ontario Coalition for Smoke-Free Movies, and develop an overall strategy to address the issue of smoking in the movies.

2 Context

Within the Region of Peel in 2011, approximately 19% of youth between grades 7 and 12 reported ever trying a cigarette; this increases from 2% in grade 9, to 36% by grade 12.⁵ The majority of youth (29%) report trying their first cigarette before grade 9, and by grade 12, 6% of youth are smoking daily.⁵

Exposure

Adolescents are the most frequent movie-goers. In 2010 in the US and Canada, adolescents aged 12 to 17 years saw an average of eight movies per year in theatres, and those aged 18 to 24 years saw an average of seven movies per year.⁶ Adolescents comprise nearly 17% of the audience for G/PG rated movies, more than 20% of the audience for PG-13 rated movies, and more than 10% of the audience for R-rated movies.⁶

Despite agreements that prohibit payments for branded-product placement in motion pictures, enforced policies among three major motion picture companies to limit smoking imagery, and film rating systems aimed at restricting admission to films with hazardous content for younger viewers, movies continue to deliver billions of tobacco impressions to adolescents.¹ According to

one 2003 study from the 2012 US Surgeon General's Report, this equates to an average of 665 gross smoking impressions* per US adolescent aged 10-14 years.¹

Between 2002 and 2010, 62% of the top grossing films in the US featured tobacco imagery.⁴ One study in the 2012 US Surgeon General's Report found that a sample of youth-rated movies (G, PG, and PG-13) contained 40% of the smoking occurrences in movies, but delivered 61% of smoking impressions to youth aged 10 to 14 years because of that group's higher viewership of movies.¹

Research conducted by the Ontario Coalition for Smoke-Free Movies indicates that in 2009, Canadian theatres delivered over one billion tobacco impressions[†] in youth-rated films alone.³ Although most movies viewed in Canada are produced by US companies, the number of youth-rated films with tobacco depictions is higher in Canada than the US because provincial film boards classify some movies that are rated R in the US as 14A or PG.⁴ In 2009, 125 of the 145 movies released in Canadian theatres that showed tobacco use were youth-rated films (G, PG, 14A), delivering more than two-thirds (68%) of all in-theatre tobacco exposures.⁴ These numbers are likely an underestimate of the true reach of movies because of Internet downloads, DVD's, movie rentals, and other forms of access.⁴

The Ontario Film Review Board (OFRB) has the authority to review and classify films; these ratings are used to provide the general public advanced information about the nature of the

* Gross impressions are the total number of exposures delivered by a media schedule, such as all showings of a given film

[†] Calculated by multiplying the number of tobacco incidents per film by the number of paid admissions per film

content of the film, as well as restrict admission to films whose content is inappropriate, unsuitable or hazardous for younger viewers.⁴ A variety of factors including sexual content, inappropriate language, and as of 2008, tobacco use, are listed under Content Advisories, which informs the public of the major factors that led to the film's classification.⁷

Link to Adolescent Smoking

The 2012 US Surgeon General's Report found that adolescents exposed to smoking in movies were 1.93 times more likely to smoke.¹ Based on population studies conducted between 2003 to 2009, exposure to on-screen smoking accounts for 44% of new adolescent smokers in the US.⁶

Movies use techniques to make smoking appealing to youth. The characters depicted as smokers are typically those with aspirational traits such as maturity, affluence, attractiveness, or power. These traits do not reflect the social reality of smoking.^{1,2} Additionally, the health consequences of smoking are rarely shown.² Smoking in films influences young people's beliefs about social norms for smoking, beliefs about the function and consequences of smoking, and their personal intention to smoke.⁶

Efforts to Raise Awareness

There is a world-wide movement aimed at reducing the exposure of children and youth to smoking in the movies.

Various international agencies such as the Office on Smoking and Health at the Centers for Disease Control and Prevention in the US, the World Health Organization (WHO) Framework

Convention on Tobacco Control (FCTC), and country-specific responses in the US, China, India, the UK, Malaysia, and Africa have developed actions to reduce tobacco imagery in movies.⁶

In Canada, national and some provincial-level health non-governmental organizations have forwarded their endorsement to policy makers concerned with film classification and tax policy, and embarked on public opinion polling and public education campaigns to support policy change to reduce smoking in the movies.⁶

Ontario

The Ontario Coalition for Smoke-Free Movies was formed in 2010 with the goal of taking collective action toward the harmful impact of smoking in movies. The coalition supports five

WHO FCTC recommendations to reduce the exposure of children and youth to smoking in movies:

- Classify films with tobacco use as adult-rated (R).
- Require all distribution channels to show strong anti-smoking ads prior to movies depicting tobacco use.
- Certify no payment for displaying tobacco[‡]
- Prohibit tobacco brand displays.
- Make youth-rated films that show tobacco imagery ineligible for government film subsidies.^{4,6}

Membership of the Ontario Coalition for Smoke-Free Movies

Tobacco Control Area Networks (TCANs)
Non-Smokers' Right Association
Smoking and Health Action Foundation
Heart & Stroke Foundation
Ontario Lung Association Youth Advocacy Training Institute (YATI)
The Ontario Tobacco Research Unit
The Program Training and Consultation Centre – Media Network
The Canadian Cancer Society

[‡] Films showing tobacco use should include a declaration in the closing credits that no persons involved with the production of the movie received anything of value in exchange for using or displaying tobacco products in the film.

Central East Tobacco Co-ordination Area Network (TCAN)

The Central East TCAN, of which Peel Public Health is a member, has included smoke-free movies in its 2012 Regional Action Plan, with objectives aimed at 1) educating parents, community members, and youth about the impact of smoking and tobacco product imagery on children and youth, 2) exposing tobacco industry propaganda, and 3) gathering public and stakeholder support for the five recommended policy changes endorsed by the WHO and the Ontario Coalition for Smoke-Free Movies.⁸

3 Conceptual Framework

The conceptual model outlines the source of exposure for smoking in the movies, the target audience, how movies portray smoking, and the subsequent decision-making and behavioural outcomes. The model recognizes environmental, social, and genetic factors outside of smoking in the movies that impact youth smoking behaviours. The conceptual model is presented in Appendix A.

4 Literature Review Question

The research question for the literature review was “What interventions will reduce the impact that smoking in the movies has on the smoking behaviours of youth?”

The research question can be described in the PICO format:

P (Population)	Youth
I (Intervention)	Any interventions related to smoking in movies
C (Comparison)	No intervention
O (Outcome)	Youth smoking behaviours

5 Literature Search

The initial phase of the literature search took place in July 2012 with known summary and grey literature sources, including the World Health Organization, the Centers for Disease Control and Prevention, and the National Institute for Clinical Excellence. In August 2012, a search was conducted on health-evidence.ca and the following databases: EBM Reviews, Cochrane Database of Systematic Reviews, Global Health, Ovid Medline, and PsycINFO. Search limits included studies published in the English language in the last ten years. In July and August 2012, expert opinion, Google Scholar, and the reference list of the 2012 US Surgeon General's Report were sought or reviewed to identify additional articles. The final search identified 88 articles. The complete search strategy including search terms used is presented in Appendix B.

Two reviewers independently reviewed titles and abstracts to determine relevance. Discrepancies were discussed and a mutually agreed decision was made. Studies were considered relevant if they met the following criteria:

Inclusion criteria: English language, published in the last ten years, had a focus on adolescents/youth/children, focused on interventions that address smoking in the movies, and addressed smoking behavioural pre-cursors or behaviours in the outcome.

Exclusion Criteria: duplicates, not published within the last ten years or in the English language, not focused on adolescents, youth, or children, or did not address interventions specific to smoking in the movies.

Following relevance assessment, a total of eight papers remained, including two guidelines, two systematic reviews, and four single studies, although one study was discussed in a guideline and subsequently excluded, resulting in a total of seven relevant papers. The search results flowchart is presented in Appendix C.

6 Critical Appraisal

In total, seven papers were appraised. The two guidelines were appraised using the AGREEII tool; the two literature reviews were appraised using the Health Evidence Validity Tool for Review articles; and the three single studies were appraised using the Critical Appraisal Skills Program (CASP) critical appraisal tools. All seven studies were appraised independently by two reviewers and discrepancies were resolved by discussion.

One guideline received a strong quality rating, and one weak due to a lack of clear methodology. Both literature reviews received a low quality rating due to a poor description of methods. Among the single studies, one case-control study received a weak rating due to poor scoring in questions related to the study's validity and was eliminated; one case-control study received a moderate rating, and the cohort study received a strong rating.

As a result, studies included in this review are the 2012 US Surgeon General's Report, which was quality rated as strong, one strong quality rated cohort study by Sargent et al. (2012), and one moderate quality rated case-control study by Hanewinkel et al. (2010). Single studies were included because they either examined interventions that were not covered in the guideline, corroborated findings from the guideline by providing additional detail, or were more recent.

7 Description of Included Studies

2012 US Surgeon General's Report

The 2012 US Surgeon General's Report "Preventing Tobacco Use among Youth and Young Adults" reviewed the association between "Images of Smoking in Movies and Adolescent Smoking". It includes research on the impact of smoking in movies on youth smoking behaviours. Seven studies on either parental controls or anti-smoking ads as interventions to reduce the impact of movie smoking were reviewed.

Three cross-sectional and two longitudinal cohort studies examined parental controls. All measured the exposure of children and adolescents (sample size range N = 1,687 to 4,544; age range 9-15 years) to R-rated movies and/or videos using either a self-reported school- or telephone-based survey. The studies controlled for variables including personality characteristics, parental style and parental oversight of smoking behaviour, socio-demographics, school attachment and function, and other social influences such as family and friend smoking behaviours. Adjusted odds ratios or adjusted relative risks were used to assess the risk between parental controls and prevalence of tried smoking (the number of youth who have tried smoking), susceptibility to smoking (an individual's inability to rule out smoking in the future or to rule out smoking if a peer offers them cigarettes), incidence of tried smoking (the number of new cases of youth who have tried smoking compared to baseline measure), and smoking and binge drinking.¹

One randomized controlled trial and one case-control study used a post-movie survey to examine the impact of anti-smoking advertisements (ads) shown before movies with smoking. Both

compared adolescents [n = 232 (US); n= 2038 (Australia)] exposed to a pre-film anti-smoking ad to those not exposed to the ad on beliefs about smokers, opinions of smoking in the movies, arousal evoked by smoking scenes, and personal intentions to smoke. Additional details on the methods for both of these studies were not provided.^{1,2}

Hanewinkel, Isensee, Sargent, & Morgenstern (2010)

The case-control study by Hanewinkel et al. (2010) examined the effectiveness of an anti-smoking ad on opinion towards smoking and intentions to smoke. Over four weeks 4,073 patrons aged ten to 90 years who were exiting theatres in Kiel, Germany were randomly recruited to anonymously complete a one-page questionnaire. During weeks one and three, an anti-smoking ad was shown before all movies (intervention); during weeks two and four, no anti-smoking ad was shown (control). The ad used showed the health-damaging effects of smoking and promoted cessation.

Research assistants classified the amount of smoking content for each movie rating. Participants were asked what movie they had seen, whether there was any smoking in the movie, their smoking status, their level of approval of smoking in the movie, their opinion of smoking in general, their intention to smoke, and their desire to smoke based on 11-point Likert scales. Smokers' level of addiction was determined using the Heaviness of Smoking Index and smokers were asked when they had smoked their last cigarette prior to entering the theatre.⁹

Sargent, Tanski, & Stoolmiller (2012)

The longitudinal cohort study by Sargent et al. (2012)'s examined the association between movie smoking exposure according to movie ratings and smoking onset amongst 6,522 US children and

adolescents aged ten to 14 years. Participants were recruited using random digit dial methods and were surveyed by telephone every eight months for two years. Media exposures, tobacco and alcohol use, socio-demographic characteristics, and other risk factors were surveyed.

Exposure to smoking in movies was estimated by examining the top 100 movies with the highest US gross revenues each year for the five years preceding the survey (1998-2002), and 32 high-earning movies during the first four months of 2003, which included a selection of older movies. Of these 532 movies in total, a random selection of 50 titles was chosen for each adolescent interview. Movie selection was stratified according to the Motion Picture Association of America rating so that the survey reflected a distribution of G/PG, PG-13, and R-rated movies. Respondents were asked whether they had seen each movie title on their unique list.

Trained coders counted the number of smoking occurrences in each of the 532 movies, defined as whenever a major or minor character handled or used tobacco in a scene or when tobacco use was depicted in the background. The number of smoking occurrences was summed for each adolescent's list of 50 movies, and then stratified according to rating block. Movie smoking exposure was classified as high or low based on the number of smoking occurrences, with high representing occurrences in the 95th percentile and low representing occurrences in the 5th percentile.

Smoking initiation was assessed by asking "Have you ever tried smoking a cigarette, even just a puff?" Covariates, including age, gender, race, parent education, and household income were gathered.¹⁰

8 Synthesis of Findings

Table 1 describes a summary of relative effectiveness for each type of intervention.

Table 1: Relative Effectiveness and Description of Results based on Intervention

Intervention	Outcomes	Effect	Summary
Parental control over R-rated movie/video watching (3 cross-sectional & 2 longitudinal cohort studies)	Prevalence of tried smoking <i>(number of youth who have tried smoking in their lifetime)</i>	Never: * RR 0.29 (95% CI 0.19-0.45) Once in awhile: * RR 0.74 (95% CI 0.65-0.85)	Children who are never allowed to watch R-rated movies are 71% less likely to have tried smoking compared to children who watch R-rated movies all the time; children who are allowed to watch R-rated movies once in awhile are 26% less likely to have tried smoking.
	Susceptibility to smoking <i>(an individual's inability to rule out smoking in the future or to rule out smoking if a peer offers them a cigarette)</i>	Watching with co-viewing: * RR 0.72 (95% CI 0.54-0.96) Prohibited: * RR 0.54 (95% CI 0.41-0.70)	Children who co-view R-rated movies with their parents are 28% less susceptible to smoking compared to children who watch R-rated movies with no parents; children who are prohibited from watching R-rated movies are 46% less susceptible to smoking.
	a) Smoking susceptibility b) Tried smoking prevalence	a) Partial restriction: * OR 2.1 (95% CI 1.5-2.8) No restriction: * OR 3.3 (95% CI 2.3-4.6) b) Partial restriction: * OR 1.5 (95% CI 1.0-2.8) No restriction: * OR 2.5 (95% CI 1.7-3.7)	Among children who have partial restrictions from watching R-rated movies, the odds of smoking susceptibility are 2.1 times greater and the odds of having tried smoking are 1.5 times greater than children who have full restrictions from watching R-rated movies. Among children who have no restrictions from watching R-rated movies, the odds of smoking susceptibility are 3.3 times greater and the odds of having tried smoking are 2.5 times greater than children who have full restrictions from watching R-rated movies.
	Incidence of tried smoking <i>(compared to baseline, the number of new smokers within a defined time period)</i>	Once in awhile: * RR 1.8 (95% CI 1.1-3.1) Sometimes/all the time: * RR 2.8 (95% CI 1.6-4.7)	Children who are allowed to watch R-rated movies once in awhile are 1.8 times more likely to try smoking compared to children who are never allowed to watch R-rated movies; children who are allowed to watch R-rated movies sometimes/all the time are 2.8 times more likely to try smoking.
	a) Tried smoking incidence b) Smoking and binge drinking <i>(youth who smoke and consume 5+ alcoholic drinks in one sitting)</i>	a) Once in awhile: RR 1.19 <i>(95% CI 0.85-1.67)</i> Sometimes: * RR 1.71 (95% CI 1.33-2.20) All the time: * RR 1.85 (95% CI 1.27-2.69) b) Once in awhile: * RR 1.64 (95% CI 1.05-2.58) Sometimes: * RR 2.30 (95% CI 1.53-3.45)	Children who are allowed to watch R-rated movies once in awhile are no more likely to try smoking compared to children who are never allowed to watch R-rated movies. Children who are allowed to watch R-rated movies once in awhile are 1.6 times more likely to smoke and binge drink compared to children who are never allowed to watch R-rated movies. Children who are sometimes allowed to watch R-rated movies are 1.7 times more likely to try smoking and 2.3 times more likely to smoke and binge drink compared to children who are never allowed to watch R-rated movies. Children who are allowed to watch R-rated movies all the time are 1.9 times more likely to try smoking

Intervention	Outcomes	Effect	Summary
		All the time: * RR 2.92 (95% CI 1.83-4.67)	and 2.9 times more likely to smoke and binge drink compared to children who are never allowed to watch R-rated movies.
Anti-smoking advertisement (ad) prior to movie with smoking (1 randomized controlled trial; 2 case-control studies)	Arousal from smoking scenes (<i>to what extent the scene was happy, sad, boring, or exciting</i>)	* t= 2.19, p<0.05	Smoking scenes in the movies generated positive arousal among adolescents who did not see the anti-smoking ad, but not among those who did see the anti-smoking ad.
	Beliefs about a smokers' stature (<i>"How does a teenager who smokes cigarettes look to you?"</i>)	* t=2.33, p<0.05	Adolescents not exposed to the anti-smoking ad had more favourable beliefs about a smokers' stature compared to adolescents who saw the anti-smoking ad.
	Beliefs about how smokers perceive their stature (<i>"If you were to smoke cigarettes, how do you think it would make you feel?"</i>)	* t=2.32, p<0.05	Adolescents not exposed to the anti-smoking ad had more favourable beliefs about how smokers perceive their own stature compared to adolescents who saw the anti-smoking ad.
	Intention to smoke (<i>"Do you think you will smoke at any time during the next year?"</i>)	* t= 1.88, p<0.05	Adolescents not exposed to the anti-smoking ad had greater intentions to smoke in the future compared to adolescents who saw the anti-smoking ad.
	Thoughts about movie characters who smoke	* t=2.70, p <0.01	Adolescents who saw the anti-smoking ad had more negative thoughts about movie characters that smoke compared to those who did not see the anti-smoking ad.
	Opinion of smoking in the movie	Overall effect: * $\chi^2=82.95, df = 2, p<0.0001$ Non-smokers: * $\chi^2=83.11, df = 3, p <0.0001$ Smokers: $\chi^2=2.52, df=2, p = 0.28$	Overall, adolescents who saw the anti-smoking ad had a more negative opinion of smoking in the movie compared to those who did not see the anti-smoking ad. This was also significant for non-smoking adolescents but not for smokers.
	Intention to smoke	Overall effect: $\chi^2=3.26, df = 2, p = 0.196$ Non-smokers: $\chi^2=0.97, df =2, p= 0.62$ Smokers: * $\chi^2=9.03, df =2, p = 0.01$	There was no significance difference in intention to smoke between those who saw the ad compared to those who did not. When this was broken down by smoking status, smokers who saw the anti-smoking ad had reduced intentions to smoke in the future compared to those who did not see the ad.
	Awareness of smoking in movies (<i>Did you notice smoking in the movie?</i>)	Whole sample: * OR 1.22 (95% CI 1.02-1.47)	Among individuals who saw the anti-smoking ad, the odds of being aware of smoking in the movies were 22% greater compared to individuals who did not see the ad.
	Approval of smoking in movies	Whole sample: * F=5.67, p=0.017 Main effect age: F=2.35 p=0.126 Main effect smoking status: * F=42.67, p = 0.000	Individuals who saw the anti-smoking ad had significantly lower levels of approval of smoking in the movies compared to individuals who did not see the ad; this was also significant regardless of an individual's smoking status (smoker, non- and ex-smoker).

Intervention	Outcomes	Effect	Summary
	Opinion towards smoking	Whole sample: *F=5.37, p=0.021 Main effect age: * F=95.36, p = 0.000 Main effect smoking status: *F=1927.92, p = 0.000	Individuals who saw the ad had a more negative opinion of smoking in general compared to those who did not see the ad. This was also significant across all ages (10-17, 18-90 years), and across smoking status (smokers and non-and ex-smokers).
	Intention to smoke	Whole sample: F=3.01, p = 0.083 Main effect age: *F=105.60, p = 0.000 Main effect smoking status: *F = 6313.32, p = 0.000	Individuals who saw the ad did not differ significantly from individuals who did see the ad with respect to their intention to smoke. When this was broken down by age and smoking status, Individuals of all ages who saw the anti-smoking ad showed less intention to smoke in the future compared to individuals of all ages who did not see the ad. Both smokers and non- and ex-smokers who saw the ad also showed reduced intentions to smoke compared to those who did not see the ad.
	Urge to Smoke (smokers only) <i>("How much do you want to smoke a cigarette now?")</i>	Main effect: F=0.33, p = 0.564 Main effect movie smoking: * F = 8.42, p = 0.004	Smoking in movies prompts the urge to smoke among smokers, and the anti-smoking ad does not change this effect.
R-ratings for movies with smoking (1 longitudinal cohort study)	Increased risk of trying smoking for high vs. low movie smoking exposure	PG-13 films: *OR 1.49 (95% CI 1.23-1.81) *R-rated films: *OR 1.33 (95% CI 1.13-1.57) G/PG films: OR 0.49 (95% CI 0.22-1.09)	Among adolescents who had high movie smoking exposure in PG-13 and R-rated rated films, the odds of initiating smoking sooner were 49% and 33% greater than adolescents who had low movie smoking exposure in PG-13 and R-rated films. There was no difference in smoking initiation among high vs. low movie smoking exposure in G/PG rated films.
	G/PG versus R and PG-13	*Wald test 6.53 (2), p = 0.038	The relation between movie smoking exposure and youth smoking is significantly higher in R and PG-13 rated films compared to G/PG rated films.
	G/PG versus PG-13	*Wald test -2.55 (1) p= 0.011	The relation between movie smoking exposure and youth smoking is significantly higher in PG-13 rated films compared to G/PG rated films.
	G/PG versus R	*Wald test -2.37 (1) p = 0.018	The relation between movie smoking exposure and youth smoking is significantly higher in R-rated films compared G/PG rated films.
	PG-13 versus R	Wald test 0.74 (1) p = 0.458	There is no significant difference between PG-13 and R-rated films in movie smoking exposure and youth smoking.

* + **BOLD** = statistical significance

Parental Control over R-rated Movie Exposure

Five studies from the 2012 US Surgeon General's Report provide strong evidence that parental restrictions on the viewing of R-rated movies and videos by children and adolescents is an effective intervention for reducing the risk of smoking.

These five studies found a clear dose-response relationship between viewing R-rated movies and smoking outcomes. Specifically, children and adolescents who had more restrictions on viewing R-rated movies or videos were less likely to smoke, less susceptible to smoking, or less likely to smoke and binge drink compared to children and adolescents who were able to watch R-rated movies occasionally or all the time.¹ Strengths and limitations of the studies are presented in Appendix D.

Anti-smoking Advertisements before Movies with Smoking

The 2012 US Surgeon General's Report and the 2010 study by Hanewinkel et al. provide moderate quality evidence that showing anti-smoking advertisements before movies depicting smoking is an effective strategy for reducing the impact smoking in movies can have on attitudes toward smoking and intentions to smoke among children, adolescents, and adults.^{3,8}

Two studies reported in the 2012 US Surgeon General's Report compared the attitudes toward smoking and the intention to smoke of adolescents who were exposed to an anti-smoking ad prior to a movie with those who were not exposed. One study (Pechman et al. 1999) found that adolescents who did not see the anti-smoking ad were more likely to be positively aroused by smoking scenes, have favourable beliefs about smokers, and enhanced intentions to smoke compared to those who saw the ad.¹¹

Edwards et al. (2004) found that adolescent females who viewed an anti-smoking ad prior to a movie were more likely to say smoking was “not ok” in the movie and among smokers, showed significantly reduced intentions to smoke in the future compared to adolescents who did not see the ad.¹²

Hanewinkel, Isensee, Sargent, & Morgenstern (2010)

Hanewinkel et al. (2010) found that anti-smoking ads shown prior to movies resulted in greater awareness and lower levels of approval of smoking in movies, and a more negative opinion toward smoking in general. The study also found that among all ages (youth aged 10-17 years, adults aged 18-90 years), and across smoking status (smokers, and non- and ex-smokers), intentions to smoke in the future were reduced if individuals were exposed to the anti-smoking ad compared to individuals who were not exposed to the ad. There was no difference in urge to smoke between smokers who were exposed to the ad and those were not.⁸ A summary of results is presented in Table 1, and strengths and limitations of the studies are presented in Appendix D.

R-ratings for Movies Depicting Smoking

Sargent and et al. (2012) concluded that assigning an R-rating to movies with smoking imagery could reduce smoking onset among children and adolescents.

The authors found that adolescents who had high movie smoking exposure in PG-13 and R-rated films were likely to initiate smoking sooner than adolescents who had low movie smoking exposure in PG-13 and R-rated films. For G/PG rated films, there was no difference in smoking initiation between high and low movie smoking exposure.

The authors also found that the relation between movie smoking exposure and youth smoking is significantly greater in PG-13 and R-rated films compared to G/PG rated films, but is no different between PG-13 and R-rated films. This means that movie smoking exposure in PG-13 and R-rated films pose similar risks to youth smoking.

The authors estimated that reducing the amount of smoking in PG-13 and R-rated movies would yield a 26% reduction in smoking onset among youth. Furthermore, by setting PG-13 movie smoking exposure alone to low exposure levels (which approximates the impact of an R-rating for movies with smoking), there would be an estimated 18% reduction in smoking onset among youth.⁹ A summary of results is presented in Table 1, and strengths and limitations to the study are presented in Appendix D.

9 Applicability and Transferability

Region of Peel staff involved in tobacco-related activities met on September 20 2012 for a facilitated discussion. The purpose of the meeting was to discuss the feasibility and generalizability of this report.

Applicability

Political Acceptability or Leverage

- There is current provincial, national, and international support from various NGO's for policies to address smoking in movies, as well as media attention surrounding the issue; any strategies Peel Public Health develops or participates in would be timely and supported.

- Tobacco is a Region of Peel Term of Council priority; therefore council will be concerned with youth smoking rates and the issue of movie smoking exposure.
- Peel Public Health will need to examine the background of local MPP parties to see if there is any connection of the issue to a party platform.
- Other public health units and health practitioners will support policies; parents may also support them provided they are made aware of the issue and educated on its impact on youth smoking behaviours. Youth and movie and tobacco industries will likely be opposed to these policies as they may be perceived as taking away individual choice, hindering artistic expression and limiting access. This backlash may be a political deterrent for MPP's, and as a result may not support the issue.

Social Acceptability

- Parental restrictions for watching movies with R-ratings may be supported by parents and the general public because the intervention is based on individual choice and not a population-level policy. Parents may find it challenging to monitor their children's movie/video viewing behaviours unless smoking is explicitly stated as being in the movie.
- Anti-smoking ads prior to movies with smoking will be supported by the parents and likely youth; however the tobacco industry may oppose this. This intervention would likely be perceived as least intrusive to individual choice.
- Placing an R-rating on movies with smoking may be supported by parents and the general adult population, but likely not youth or the tobacco/movie industries. The movie industry may perceive the R-rating as reducing a large movie viewing market and thus revenue generated from movies that would otherwise be accessible to youth.

- It was recognized that Peel Public Health must be accountable to members of the public; with the research evidence presented demonstrating health benefits to Peel’s youth it may be unethical not to act.

Available Essential Resources

- The Ontario Coalition for Smoke-Free Movies has some resources that are available for use. In addition, other health units may be participating in similar initiatives and thus networking and resource/information sharing will be available.
- For local implementation of parental restrictions for movies with R-ratings and/or placing anti-smoking ads prior to movies with smoking, education and social marketing will be imperative. Costs may include staff time, vendors for a campaign, and media buys.
- Advocating for an R-rating on movies with smoking imagery and creating a delegation to an MPP will require staff advocacy training as well as political acuity.
- Any strategy will require collaboration from internal and external partnerships including the Tobacco Transition Years Strategy, School Health Teams, Family Health, as well as other youth-and tobacco-focused organizations.

Organizational Expertise and Capacity

- Peel Public Health will need to rely on the expertise of the Office of Strategic Innovation and Policy for the delegation process as well as general advocacy work to ensure efforts are keeping with the BPSAA.

Transferability

Magnitude of Health Issue in Local Setting

- 15.5% of the population in Peel aged 12 years and older currently smokes, with the highest prevalence occurring among young adult males and females aged 19-29 years,

whom are likely affected by smoking in movies. Primary prevention is imperative to reduce the prevalence of smoking in Peel overall.

Magnitude of Reach and Cost Effectiveness of Interventions

- All interventions would reach their intended target of children and youth, as well as additional targets of parents and the general population; advocacy efforts will potentially have an expanded reach provincially.
- Parental controls for R-rated movies and anti-smoking ads prior to movies may require a five to ten year plan with reinforcers; R-ratings for movies with smoking imagery will require a long-term commitment.

Target Population Characteristics

- Members agreed that many studies in this review primarily focused on Caucasian youth, which may not be representative of the cultural diversity found in Peel.
- It is unknown if cultural movies have higher viewership in Peel (i.e. Bollywood), which may be subject to different film ratings and contain diverse types of smoking imagery. Despite this, Caucasian smokers in Peel are most prevalent and socio-demographic variables included in the studies may be similar to Peel.

10 Recommendations and Next Steps

Recommendations

- Peel Public Health should support policies or interventions that recommend parental restrictions on R-rated movies, as well as other movies with smoking imagery in order to reduce the exposure of children and adolescents to movie smoking.

- Peel Public Health should endorse the policy recommendation of the Ontario Coalition for Smoke-Free Movies that showing anti-smoking ads prior to movies with smoking is an effective intervention for preventing smoking among children and adolescents.
- Peel Public Health should endorse the policy recommendation of the Ontario Coalition for Smoke-Free Movies for placing an R-rating on movies with smoking imagery.

Next Steps

- Continue to collaborate and communicate with regional and provincial organizations working in area of smoking in movies.
- Keep abreast of emerging research on effective interventions to reduce the impact of movie smoking exposure on youth smoking behaviours.
- Develop a workplan outlining resources available, key partners, and specific activities required for each intervention recommended in this review.
- Work with the Office of Strategic Innovation and Policy to determine logistics of the delegation process, legalities involved with advocacy, and Peel's overall advocacy platform.

11 References

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Appendices

Appendix A: Conceptual Model

Appendix B: Search Strategy

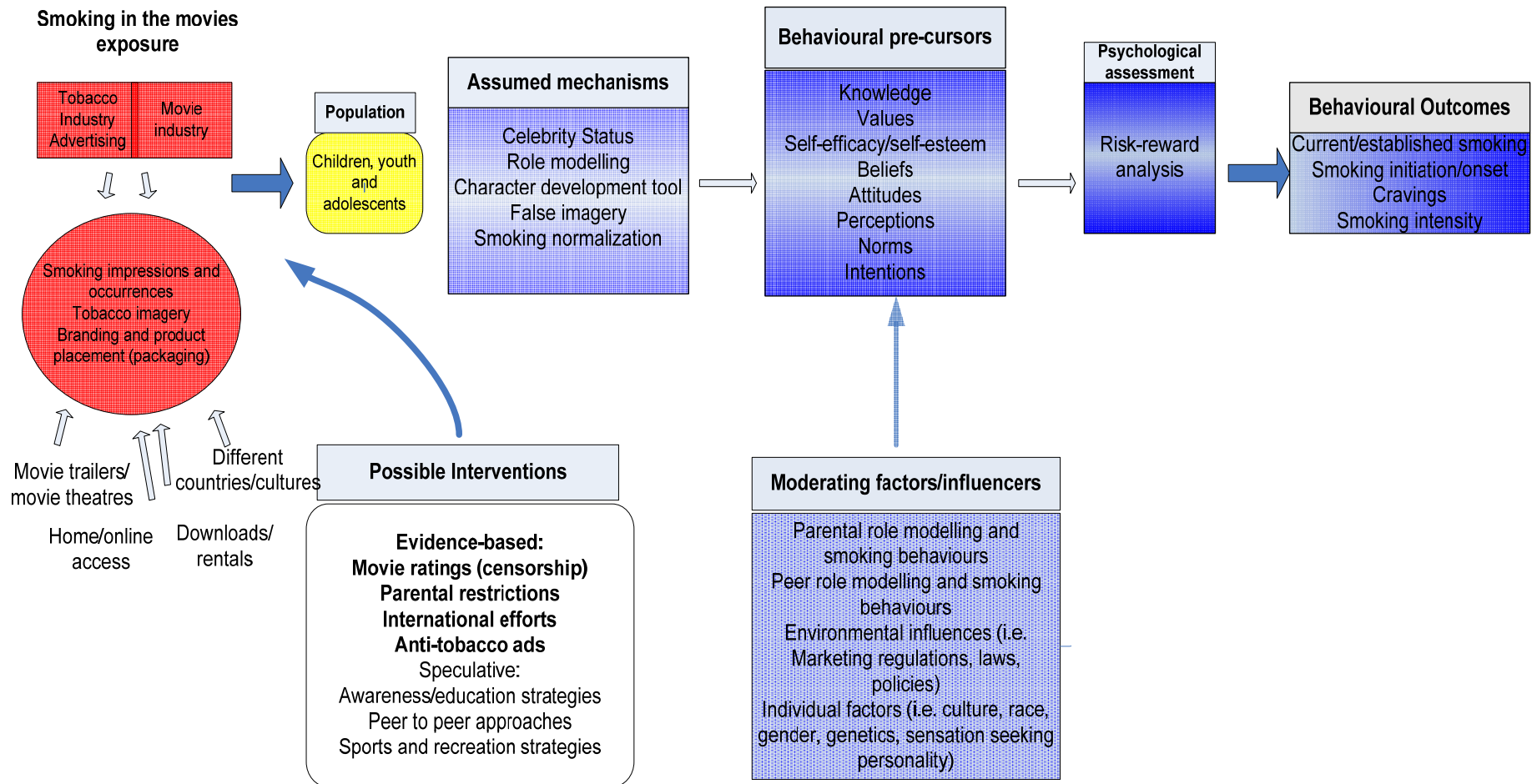
Appendix C: Literature Search Flowchart

Appendix D: Data Extraction Tables

Appendix E: Applicability & Transferability Worksheet

APPENDIX A: CONCEPTUAL MODEL

Impact of Smoking Imagery in Movies



APPENDIX B: SEARCH STRATEGY

PICO question

P (Population)	Youth
I (Intervention)	Any related to smoking in movies
C (Comparison)	No Intervention
O (Outcome)	Youth smoking behaviours

Search terms/ MeSH headings

	Population	Intervention or Exposure	Comparisons	Outcomes
Terms	Youth	Any related to smoking in movies	No intervention	Youth smoking behaviours
MeSH headings	Children Adolescents	Policy Education Advocacy Anti-smoking ads Censorship Restrictions Other		Smoking intentions Smoking initiation Smoking prevalence Smoking duration Smoking intensity

Search findings

Database/source	Date	Terms Used/limits	# of findings
Known sources – summaries and grey literature	July 26 th	None	4
Health Evidence	August 13 th	Smoking and movies	0
		Smoking and media – strong to moderate rating, last 10 years	20
		Smoking and youth – strong to moderate rating, last 10 years	6
EBM Reviews – Cochrane Database of Systematic Reviews, 2005 to July 2012; Global Health 1973 to July 2012; Ovid Medline 1946 to August 2 2012; Ovid Medline in-process and other non-indexed citations August 15 2012	August 15 th was requested; unknown when specific search took place. Results provided August 16 th .	1 exp motion pictures as topic/ (6487) 2 (cinema\$ or film\$ or movie\$).ti,ab. (101278) 3 exp smoking/ (112313) 4 smok*.ti,ab. (208850) 5 tobacco.ti,ab. (72224) 6 1 or 2 (105061) 7 3 or 4 or 5 (273190) 8 6 and 7 (904)	13

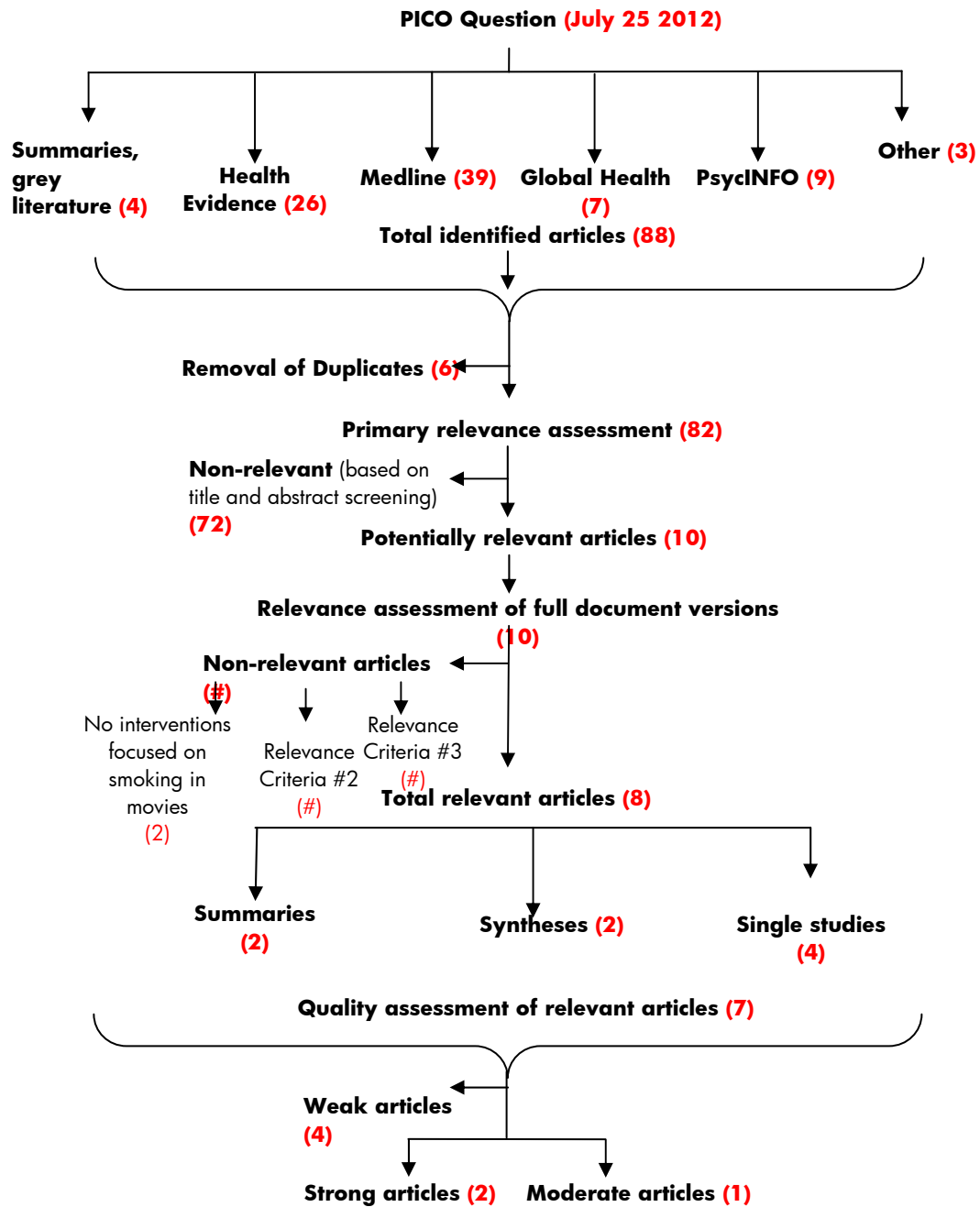
Database/source	Date	Terms Used/limits	# of findings
		9 meta-analysis.mp,pt. (71619) 10 systematic review.tw. (43175) 11 cochrane database of systematic reviews.jn. (16410) 12 9 or 10 or 11 (101835) 13 exp guideline/ (37197) 14 (practice guideline or guideline).pt. (22860) 15 13 or 14 (37197) 16 12 or 15 (138354) 17 (comment or letter or editorial or note or erratum or short survey or news or newspaper article or patient education handout or case report or historical article).pt. (1628474) 18 16 not 17 (132673) 19 8 and 18 (16) 20 remove duplicates from 19 (13) 21 intervention\$.ti,ab. (535236) 22 8 and 21 (41) 23 remove duplicates from 22 (33)	
EBM Reviews - Cochrane Database of Systematic Reviews <2005 to July 2012>, Global Health <1973 to July 2012>, Ovid MEDLINE(R) <1946 to August Week 2 2012>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <August 15, 2012>	August 15 th was requested; unknown when specific search took place. Results provided August 16 th .	1 exp motion pictures as topic/ (6487) 2 (cinema\$ or film\$ or movie\$).ti,ab. (101278) 3 exp smoking/ (112313) 4 smok*.ti,ab.	33

Database/source	Date	Terms Used/limits	# of findings
		(208850) 5 tobacco.ti,ab. (72224) 6 1 or 2 (105061) 7 3 or 4 or 5 (273190) 8 6 and 7 (904) 9 meta- analysis.mp,pt. (71619) 10 systematic review.tw. (43175) 11 cochrane database of systematic reviews.jn. (16410) 12 9 or 10 or 11 (101835) 13 exp guideline/ (37197) 14 (practice guideline or guideline).pt. (22860) 15 13 or 14 (37197) 16 12 or 15 (138354) 17 (comment or letter or editorial or note or erratum or short survey or news or newspaper article or patient education handout or case report or historical article).pt. (1628474) 18 16 not 17 (132673) 19 8 and 18 (16) 20 remove duplicates from 19 (13) 21 intervention\$.ti,ab. (535236) 22 8 and 21 (41) 23 remove duplicates from 22 (33)	
Database: EBM Reviews - Cochrane Database of	Requested August 15 th ; unknown when actual	1 exp motion pictures as topic/	9

Database/source	Date	Terms Used/limits	# of findings
Systematic Reviews <2005 to July 2012>, Global Health <1973 to July 2012>, Ovid MEDLINE(R) <1946 to August Week 3 2012>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <August 24, 2012>, PsycINFO <2002 to August Week 3 2012>	search took place. Results provided August 27 th .	(6489) 2 (cinema\$ or film\$ or movie\$).ti,ab. (109070) 3 exp smoking/ (112449) 4 smok*.ti,ab. (230030) 5 tobacco.ti,ab. (81009) 6 1 or 2 (112853) 7 3 or 4 or 5 (297369) 8 6 and 7 (1072) 9 meta-analysis.mp,pt. (79922) 10 systematic review.tw. (49354) 11 cochrane database of systematic reviews.jn. (16568) 12 9 or 10 or 11 (115145) 13 exp guideline/ (37236) 14 (practice guideline or guideline).pt. (22899) 15 13 or 14 (37236) 16 12 or 15 (151702) 17 (comment or letter or editorial or note or erratum or short survey or news or newspaper article or patient education handout or case report or historical article).pt. (1630822) 18 16 not 17 (145998) 19 8 and 18 (17) 20 remove duplicates from 19 (13) 21 intervention\$.ti,ab. (663517) 22 8 and 21 (50)	

Database/source	Date	Terms Used/limits	# of findings
		23 remove duplicates from 22 (37) 24 from 20 keep 1-13 (13) 25 from 20 keep 13 (1) 26 from 23 keep 30-37 (8) 27 25 or 26 (9) 28 remove duplicates from 27 (9)	
Expert	July 13 th	N/A	1
Google Scholar	August 17 th	Interventions AND smoking in the movies	21, 300
Hand-searching of Surgeon General Report Reference List	August 29 th	N/A	0

APPENDIX C: SEARCH RESULTS FLOWCHART



Source: Health-evidence.ca. *Keeping Track of Search Results: A Flowchart*. [Retrieved January 13, 2010]

APPENDIX D: DATA EXTRACTION TABLES

GUIDELINE

Guideline Title	Preventing Tobacco Use Among Youth and Young Adults – A Report of the Surgeon General <i>*Note: The evidence presented in this guideline is an update of the research found in the 2008 National Cancer Institute’s Monograph #19 – The role of the Media in Promoting and Reducing Tobacco Use</i>						
Organization	U.S. Department of Health and Human Services - Centers for Disease Control and Prevention - National Center for Chronic Disease Prevention and Health Promotion - Office on Smoking and Health						
Date	2012						
Country	United States						
AGREEII Rating	Scope and Purpose – 21 Stakeholder involvement – 12 Rigor of development – 37 Clarity of presentation – 15 Applicability – 4 Editorial independence – 5 Overall quality – 6/7						
Focus of guideline and relevant sections related to topic	Focus: Epidemiological data, determinants, and interventions of youth and young adult tobacco use Relevant section: Chapter 5 - The Tobacco Industry’s Influences on the Use of Tobacco Among Youth; section on “images of smoking in movies and adolescent smoking”						
Intervention	Parental controls on R-rated movies/videos					Anti-smoking ads prior to movies	
# of studies	5 studies					2 studies <i>* details acquired from primary studies</i>	
Author(s)	Dalton MA., Ahrens MB., Sargent JD., Mott LA., Beach ML., Tickle JJ., Heatherton TF.	Dalton MA., Adachi-Mejia AM., Longacre MR., Titus- Ernstoff LT., Gibson JJ., Martin SK., Sargent JD., Beach ML.	Thompson EM., Gunther, AC.	Sargent JD., Beach ML., Dalton MA., Ernstoff LT., Gibson JJ., Tickle JJ., Heatherton TF.	Hanewinkel R., Morgenstern M., Tanski SE., Sargent JD.	Pechmann C., Shih CF.	Edwards, C.A., Harris, WC., Cook, DR., Bedford, KF., Zuo, Y.
Date	2002	2006	2007	2004	2008	1999	2004

Country	US	US	US	US	Germany	US	Australia
Design	Cross-sectional, survey	Cross-sectional, survey	Cross-sectional, survey	Longitudinal cohort, survey Baseline; 18 month follow-up	Longitudinal cohort, survey Baseline; 1 year follow-up	Experimental, Survey	Quasi-experimental, survey
Population	N= 4,544 White Ages 10-15	N= 2,606 Ages 9-12	N = 1,687 Grade 6, 7, 8	N= 2,596 White Ages 10-14 Never smokers	N=2,110 White Ages 10-15 Never smokers	N= 232 50% Hispanic or Asian Grade 9 (Ages 14-15) Non-smokers	N = 2,038 females Ages 12-17
Setting	School	School	School	School with telephone follow-up	School	Classroom	Movie cinema
Details of interventions Measure(s) of Exposure (E) and Outcome (O)	E: “How often do your parents let you watch movies or videos that are rated R? (never, once in awhile, sometimes, all the time) O: Prevalence of tried smoking	E: Parental restrictions on R-rated movie viewing combined with whether they co-viewed the movie O: Susceptibility to smoking	E: “How often do your parents let you watch movies or videos that are rated R? (1- never to 5 – all the time) O: a) Smoking susceptibility among never smokers b) Tried smoking prevalence	E: “How often do your parents allow you to watch movies or videos that are rated R? (Never, once in awhile, sometimes, all the time) O: Incidence of tried smoking	E: “How often do your parents allow you to watch movies that are rated for 16-year olds? (Never, once in awhile, sometimes, all the time) O: a) Tried smoking incidence b) Smoking and binge drinking	E: anti-smoking ad vs. control ad immediately before movie with smoking and movie with no smoking (2x2 design) O: arousal, beliefs about smokers, intention to smoke, opinion about characters	E: pre-film anti-smoking advertisement compared with no advertisement O: opinion of smoking in the movie, personal intentions to smoke
Results	Allowed to watch R-rated movies: Never (16%) - RR 0.29 (95% CI 0.19 – 0.45)* Once in awhile/	Permits watching, no parent – Reference Permits	a) R-rated movie restriction: Full – reference Partial – OR 2.1 (95% CI 1.5-2.8)* None –	Allowed to watch R-rated movies: Never (19%) – Reference Once in awhile	a) Never (41%) – Reference Once in awhile	Anti-smoking ad inoculated against pro-smoking influence of movie footage. Smoking scenes	Overall, an anti-smoking ad before movies with smoking impacts attitudes towards smoking and future intentions to smoke.

	<p>sometimes (53%) - RR 0.74 (95% CI 0.65-0.85)*</p> <p>All the time (31%) – Reference.</p> <p>* Children who are never allowed to watch R-rated movies have a 71% decreased risk of having tried smoking; those who are allowed to watch R-rated movies once in awhile have a 26% decreased risk of having tried smoking compared to those who watch R-rated movies all the time.</p>	<p>watching, co-views- RR 0.72 (95% CI 0.54-0.96)*</p> <p>Prohibits child from watching – RR 0.54 (95% CI 0.41-0.70) *</p> <p>*Children who are allowed to watch R-rated movies via co-viewing are 28% less susceptible to smoking; children who are prohibited from watching R-rated movies are 46% less susceptible to smoking compared to children who are permitted to watch R-rated movies with no parent.</p>	<p>OR 3.3 (95% CI 2.3 – 4.6)*</p> <p>b) R-rated movie restriction:</p> <p>Full – reference</p> <p>Partial – OR 1.5 (95% CI 1.0-2.8)*</p> <p>None – OR 2.5 (95% CI 1.7-3.7)*</p> <p>In children who have partial restrictions to watching R-rated movies, the odds of smoking susceptibility are 2.1 times greater compared to those who have full restrictions to R-rated movies. In children who have no restrictions, the odds of smoking susceptibility are 3.3 times greater.</p> <p>In children who</p>	<p>(29%) – RR 1.8 (95% CI 1.1-3.1)*</p> <p>Sometimes/all the time (52%) – RR 2.8 (95% CI 1.6-4.7)*</p> <p>Children who are allowed to watch R-rated movies once in awhile are 1.8 times more likely to try smoking; those who are allowed to watch R-rated movies sometimes or all the time are 2.8 times more likely to try smoking compared to children who are never allowed to watch R-rated movies.</p>	<p>(28%) – RR 1.19 (95% CI 0.85-1.67)</p> <p>Sometimes (22%) – RR 1.71 (95% CI 1.33-2.20)*</p> <p>All the time (9%) –RR 1.85 (95% CI 1.27-2.69)*</p> <p>b) Never – reference</p> <p>Once in awhile – RR 1.64 (95% CI 1.05-2.58)*</p> <p>Sometimes – RR 2.30 (95% CI 1.53-3.45)*</p> <p>All the time – RR 2.92 (95% CI 2.83-4.67)*</p> <p>*Children who are allowed to watch R-rated once in awhile are not any more likely to try smoking than children who never watch R-</p>	<p>in the control ad condition generated positive arousal (t=2.19, p<0.05) but not in the intervention-ad condition.</p> <p>Those exposed to the control ad and smoking scenes had more favourable beliefs about a smokers stature (t=2.33, p<0.05); as well as more favourable beliefs of how smokers perceive their own stature (t=2.32, p <0.05)</p> <p>Those who saw the control ad had enhanced intentions to smoke (t=1.88, p <0.05) compared to those who saw the anti-smoking ad.</p> <p>Those who saw the anti-smoking ad had more negative</p>	<p>Those who saw anti-smoking ad were more likely to say smoking was not ok (negative opinion) in the movie compared to those who did not see the ad: $X^2 = 82.95 (2)$, p<0.0001.</p> <p>Among non-smokers, those who saw the anti-smoking ad were more likely to have a negative opinion of smoking in the movie compared to those who did not see the ad. $X^2 = 83.11 (3)$ p <0.0001.</p> <p>Among smokers, there was no significant difference in opinion of smoking in the movie among those in the intervention vs. control group.</p>
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			<p>have partial restrictions on watching R-rated movies, the odds of having tried smoking are 1.5 times greater than children who have full restrictions to R-rated movie watching. In children with no restrictions, the odds of having tried smoking are 2.5 times greater.</p>		<p>rated movies; however they are 1.6 times more likely to smoke and binge drink compared to children who are never allowed to watch R-rated movies.</p> <p>Children who are sometimes allowed to watch R-rated movies are 1.7 times more likely to try smoking and 2.3 times more likely to smoke and binge drink compared to children who are never allowed to watch R-rated movies.</p> <p>Children who are always allowed to watch R-rated movies are 1.9 times more likely to try smoking and 2.9 times more likely to smoke and binge drink compared to children who</p>	<p>thoughts about lead characters who were smoking vs. non-smoking (t=2.70, p <0.01) compared to those who saw the control ad.</p>	<p>$\chi^2 = 2.52 (2), p = 0.28.$</p> <p>There was no overall significant effect of the anti-smoking ad on intention to smoke: $\chi^2 = 3.26 (2) p = 0.196.$ When this was analyzed by smoking status, among viewers who were current smokers, those who saw anti-smoking ad showed significantly reduced intentions for future smoking $\chi^2 = 9.03 (2) p = 0.01.$ There were no differences in intentions to smoke between non-smokers in the intervention and control group $\chi^2 = 0.97 (2), p = 0.62$</p>
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					are never allowed to watch R-rated movies.		
Strengths/limitations	<p>Strengths:</p> <ul style="list-style-type: none"> - Studies take into account covariates such as personality characteristics, parenting style, media and advertising influences, extracurricular activities, school attachment and function, parenting style/parental oversight of smoking behaviour, socio-demographics, and other social influences i.e. friend and family smoking - Large sample sizes <p>Limitations:</p> <ul style="list-style-type: none"> - Potential recall bias - Parental restrictions don't reduce exposure to smoking in movies rated G, PG, PG-13 				<p>Strengths:</p> <ul style="list-style-type: none"> - Randomization can help control for known and unknown confounders (Pechmann study) - Pechmann study rooted in theory - Assessed naturalistic exposure (Edwards) - Edwards study had large sample size <p>Limitations:</p> <ul style="list-style-type: none"> - Unknown details on primary studies provided in guideline such as methodology, statistical outcomes; therefore primary studies were read. - Non-naturalistic setting (Pechmann) - Pechmann study did not publish standard deviations - Self-report creates bias - Generally feasible to assess only short-term responses to relatively brief media exposure - Edwards study had no randomization or baseline measures 		
Recommendations	Parental restrictions on the viewing of R-rated movies/videos translate into lower risk of smoking among children.				Screening anti-smoking ads before movies depicting smoking is an effective strategy for reducing the pro-smoking persuasive effect of on-screen tobacco use by movie stars.		

SINGLE STUDIES

Title of study	Effect of an antismoking advertisement on cinema patrons' perception of smoking and intention to smoke: a quasi-experimental study
Authors	Hanewinkel, R., Isensee, B., Sargent, J.D., & Morgenstern, M.
Date	2010
Country	Germany
Quality Rating	Moderate
Design	Quasi-experimental (case-control) study; survey
Sample	N = 4005 Ages 10-90 n=2125 intervention; n=1840 control Age 10-17: intervention n = 654; control n=494 Age 18-90: intervention n = 1471; control n=1346 Female: intervention n=1326; control n=1008 Male: intervention n=811; control n=848
Setting	Multiplex cinema – Kiel Germany
Time period	4-week period from October 30 2008 to November 27 2008
Intervention	30-second advertisement accentuating long-term health consequences of smoking and promoting cessation before movies
Measures	Exposure measures: - Anti-smoking ad shown in movies in week 1 or 3; no ad for movies shown in weeks 2 or 4 Outcome measures: - Awareness of smoking in the movie - Approval of smoking - Intention to smoke - Urge to smoke (smokers only) Covariates: - Age - Gender - Smoking status
Results	<u>Awareness of smoking in movies:</u> Whole sample main effect intervention: OR 1.22 (95% CI 1.02-1.47)* *Individuals who saw the anti-smoking ad had 22% increased odds of being more aware of smoking in the movies compared to individuals who did not see the anti-smoking ad

Approval of smoking:

Whole sample: **F=5.67 (1, 1050), p=0.017***

Main effect age group: F=2.35 (1,1036), p=0.126

Main effect smoking status: **F=42.67 (1, 1041), p = 0.000***

*Those exposed to the anti-smoking ad had significantly lower levels of approval of smoking in the movies compared to those not exposed to the anti-smoking ad ($\bar{x}_{\text{intervention}} = 6.78$; $\bar{x}_{\text{control}} = 7.24$)

*Both smokers and non- and ex-smokers who saw the anti-smoking ad had lower levels of approval of smoking in the movies compared to smokers and non- and ex-smokers who did not see the ad. ($\bar{x}_{\text{intervention for smokers}} = 8.05$; $\bar{x}_{\text{control for smokers}} = 8.65$; $\bar{x}_{\text{intervention for non- and ex-smokers}} = 6.56$; $\bar{x}_{\text{control for non- and ex-smokers}} = 6.85$)

General opinion towards smoking

Whole sample: **F = 5.37 (1, 3946), p=0.021***

Main effect ages age group: **F = 95.36 (1, 3907), p = 0.000***

Main effect smoking status: **F = 1927.92 (1,3909) p = 0.000***

*Those exposed to the anti-smoking ad had a more negative opinion of smoking in general compared to those not exposed to anti-smoking ad ($\bar{x}_{\text{intervention}} = 1.80$; $\bar{x}_{\text{control}} = 2.0$)

* Youth aged 10-17 and adults aged 18-90 exposed to the anti-smoking ad had a more negative opinion of smoking in general compared to youth and adults who were not exposed to the anti-smoking ad ($\bar{x}_{\text{intervention for ages 10-17}} = 1.22$; $\bar{x}_{\text{control for ages 10-17}} = 1.24$; $\bar{x}_{\text{intervention for ages 18-90}} = 2.04$; $\bar{x}_{\text{control for ages 18-90}} = 2.28$)

*Both smokers and non-and ex-smokers exposed to the anti-smoking ad had more negative opinions towards smoking in general compared to smokers and non- and ex-smokers not exposed to the ad. ($\bar{x}_{\text{intervention for smokers}} = 5.28$; $\bar{x}_{\text{control for smokers}} = 5.60$; $\bar{x}_{\text{intervention for non- and ex-smokers}} = 1.15$; $\bar{x}_{\text{control for non- and ex-smokers}} = 1.24$)

Intention to smoke in the future

Whole sample: F=3.01 (1, 3950) p = 0.083

Main effect age group: **F = 105.60 (1,3912) p = 0.000***

Main effect smoking status: **F = 6313.32 (1, 3918), p = 0.000***

* Youth aged 10-17 and adults aged 18-90 exposed to the anti-smoking ad had less intention to smoke compared to youth and adults who were not exposed to the anti-smoking ad. ($\bar{x}_{\text{intervention for ages 10-17}} = 1.17$; $\bar{x}_{\text{control for ages 10-17}} = 1.20$; $\bar{x}_{\text{intervention for ages 18-90}} = 2.41$; $\bar{x}_{\text{control for ages 18-90}} = 2.64$)

*Smokers and non- and ex-smokers who were exposed to the anti-smoking ad had less intention to smoke compared to non- and ex-smokers not exposed to the ad ($\bar{x}_{\text{intervention for smokers}} = 8.67$; $\bar{x}_{\text{control for smokers}} = 8.83$; $\bar{x}_{\text{intervention for non- and ex-smokers}} = 0.80$; $\bar{x}_{\text{control for non- and ex-smokers}} = 0.87$)

	<p><u>Urge to smoke (level of smoking addiction) – smokers only</u> Ad: $F = 0.33 (1,589)$, $p = 0.564$ Movie smoking: $F=8.42 (1,589)$, $p=0.004^*$ Interaction: $F = 0.54 (1,589)$, $p=0.461$ *Movie smoking prompts the urge to smoke among smokers and the intervention did not alter this effect.</p>
Strengths/limitations	<p>Strengths:</p> <ul style="list-style-type: none"> - Examines effect on all ages (adolescents and adults) - Large sample - Study conducted under naturalistic conditions - Intention-to-treat analysis - Considered certain covariates <p>Limitations:</p> <ul style="list-style-type: none"> - Design of study – no randomization - Low power in study (found significant interaction effects for some outcomes) - Low response rate (selection-bias) - Subjective measures - Confusing presentation of results - Ad focused on long-term health effects which are shown to be less effective amongst youth and only moderately effective amongst adults; focus on industry manipulation and de-normalization more effective. - Awareness of smoking alone not sufficient for attitudinal or behavioural change - No cultural differences considered
Recommendations	Placing an anti-smoking ad before movies can affect attitudes towards smoking and intentions to smoke.

Title of study	Influence of Motion Picture Rating on Adolescent Response to Movie Smoking.
Authors	Sargent, J.D., Tanski, S., Stoolmiller, M.
Date	2012
Country	US
Quality Rating	Strong
Design	Longitudinal cohort, survey
Sample	N= 6522 adolescents (baseline) 62% White Ages 10-14
Setting	Telephone
Time period	2003 Measured at baseline, 8 months, 16 months, 24 months
Intervention	N/A
Measures	<p>Exposure:</p> <ul style="list-style-type: none"> - High or low movie smoking exposure via pre-coded number of smoking occurrences <p>Outcome:</p> <ul style="list-style-type: none"> - Smoking initiation “have you ever tried smoking a cigarette, even just a puff” <p>Covariates:</p> <ul style="list-style-type: none"> - Age, gender, race, parent education, household income, school performance, involvement in extracurricular activities, weekly spending money, television watching (hours per day), personality characteristics (rebelliousness, sensation-seeking propensity), parent/sibling/peer smoking, cigarette availability at home, adolescent-reported parenting practices
Results	<p><u>Risk of smoking (adjusted)</u> G/PG-rated movie smoking exposure OR 0.49 (95% CI 0.22-1.09) PG 13-rated movie smoking exposure OR 1.49 (95% CI 1.23-1.81)* R-rated movie smoking exposure OR 1.33 (95% CI 1.13-1.57)* * For adolescents with high exposure of movie smoking in PG-13 rated films, the odds of initiating smoking sooner are 49% greater than those who had low exposure of movie smoking in PG-13 rated films. * For adolescents with high exposure of movie smoking in R-rated films, the odds of initiating smoking sooner are 33% greater than those who had low exposure of movie smoking in R-rated films.</p> <p><u>Association between movie smoking exposure and rating</u> G/PG vs. R and PG-13: Wald test 6.53 (2) p = 0.038* G/PG vs. PG-13: Wald test -2.55 (1) p=0.011* G/PG vs. R: Wald test -2.37 (1) p= 0.018* PG-13 vs. R: Wald test 0.74 (1) p=0.458</p>

	<p>*The relation between movie smoking exposure and youth smoking is not significantly different between PG-13 and R rated movies but the relation between movie smoking exposure and youth smoking in PG-13 and R-rated movies are both significantly different than that in G/PG-rated movies.</p> <p><u>Attributable fraction estimate</u> If all PG-13 and R-rated movie smoking exposure was set to 5th percentile = 0.26 (95% CI 0.23-0.29). If all PG-13 movie smoking exposure was set to 5th percentile = 0.18 (95% CI 0.14-0.21) Authoritative parenting set to the highest level = 0.16 (95% CI 0.19-0.12) Sensation seeking set to the lowest level = 0.30 (95% CI 0.35-0.25).</p> <p>*There would be a 26% reduction in smoking in all PG-13 and R-rated movie smoking exposure was reduced; 18% if only PG-13 movie smoking exposure was reduced (approximates the probable impact of an R-rating for movies with smoking); 16% if authoritative parenting was high, and 30% if sensation seeking behaviours were low.</p>
Strengths/limitations	<p>Strengths:</p> <ul style="list-style-type: none"> - Conducted attrition analysis (intention to treat) - Use of validated measures to assess movie smoking exposure <p>Limitations:</p> <ul style="list-style-type: none"> - Potential recall bias - Not powered to detect small effect - Cannot tell what contextual situations are most problematic
Recommendations	<p>Reduce exposure to smoking imagery by placing an R-rating on films, which can reduce youth smoking by 1/5th Assist parents in restricting access to movies with smoking</p>

DATA EXTRACTION TABLE – EXCLUDED STUDIES

General information about study (author, date, country, type of study, quality rating)	Rationale for exclusion
<p>Smoke-Free movies: from evidence to action World health Organization 2011</p> <p>Guideline: AGREEII – Overall score: Domain 1: scope and purpose – 20 Domain 2: stakeholder involvement – 17 Domain 3: rigour of development – 21 Domain 4: Clarity of presentation – 21 Domain 5 – applicability – 15 Domain 6 – editorial independence – 6</p>	<ul style="list-style-type: none"> - no search strategy - no criteria mentioned for selecting evidence - no strengths or limitations of body of evidence clearly described - poor methods for formulating recommendations - no procedure mentioned for updating guideline - no facilitators/barriers to application described - no monitoring or auditing criteria mentioned - no mention of competing interests amongst guideline development group
<p>Smoking in movies increases adolescent smoking: A review Charlesworth, A., Glantz, C. 2005 US Review: Health Evidence Validity Tool: 3/10</p>	<ul style="list-style-type: none"> - no inclusion criteria - unknown number of years for search criteria - no assessment of methodological quality of primary studies - lack of transparency for results - unknown combination of findings across studies
<p>Smoking in movies: Impact on adolescent smoking Sargent, J.D. 2005 US Review: Health Evidence Validity Tool: 1/10</p>	<ul style="list-style-type: none"> - no inclusion criteria - unknown search strategy - unknown number of years for search criteria - no level of evidence described - no assessment of methodological quality of primary studies - lack of transparency for results - unknown combination of findings across studies
<p>Out of the smokescreen: does an anti-smoking advertisement affect young women’s perception of smoking in movies and their intention to smoke? Edwards, C.A., Harris, W.C., Cook, D.R., Bedford, K.F., Zuo, Y. 2004 Australia</p>	<ul style="list-style-type: none"> - not appraised as is included and assessed in Surgeon General Report
<p>Out of the smokescreen II: will an advertisement targeting the tobacco industry affect young people’s perception of smoking in movies and their intention to smoke? Edwards, C.A., Oakes, W., Bull, D. 2007 Australia Quasi-experimental: poor rating</p>	<ul style="list-style-type: none"> - unknown if cases and control were selected in an acceptable way - unknown if exposure was accurately measured to minimize bias - unknown if authors took into account potential confounding variables

APPENDIX E: APPLICABILITY AND TRANSFERABILITY

Factors	Questions	Notes
Applicability (feasibility)		
Political acceptability or leverage	<ul style="list-style-type: none"> • Will the intervention be allowed or supported in current political climate? • What will the public relations impact be for local government? • Will this program enhance the stature of the organization? <ul style="list-style-type: none"> ○ <i>For example, are there reasons to do the program that relate to increasing the profile and/or create a positive image of public health?</i> • Will the public and target groups accept and support the intervention in its current format? 	<ul style="list-style-type: none"> • World wide movement on rating system – California in particular • Region of Peel term of council priority • NGO’s support – OTN, OCAT, OCSFM, PFASFC • Movie industry opposition • Awareness will be supported but education needs to correspond for maximum effect • Great opportunity for Peel health to support initiative/advocate for youth • Target group may not support if they do not understand what we are doing; may see this as taking away their right to see a movie and parents may not understand the harm of smoking imagery • Advocacy position – minority liberal government • No a specific government priority • Need to see if there’s any connection to a party platform of any parties • Need background on local MPP parties and platforms • Provincial advocacy movement offers local support. • In the news at present – locally, provincially, internationally • PR – ok if messages are kept simple • Advocacy work at local level

		<ul style="list-style-type: none"> • Knowledge/awareness of SFM by parents/general public • Enhance by showing our advocacy is based on evidence • Demonstrates role of PH in the issue • Yes – will be supported by PH groups • Must ensure local government has info as may be pushback from film industry. • Action: to support R rating for movies with smoking will be contentious; this would limit the audience that could legally see films; may be an outcry that policy is interfering with artistic expression; public may not support this change, particularly youth are most frequent movie goers • This may or may not impact calls to councilors depending on nature/intensity of advocacy efforts by staff/partners • Issue of encouraging parents to restrict R rated movie viewing is more realistic but may not be very effective if smoking continues to be viewed in PG13/G movies • Possibly warning and de-normalization message, not r rating though • Supportive of initiative • Hard to say if program will enhance stature of organization • Public yes. Target group will resist (FRB). • Intervention will be supported in climate, will create positive public relations for government, will enhance stature of organization, and will be accepted and supported.
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<p>Social acceptability</p>	<ul style="list-style-type: none"> • Will the target population find the intervention socially acceptable? Is it ethical? <ul style="list-style-type: none"> ○ <i>Consider how the program would be perceived by the population.</i> ○ <i>Consider the language and tone of the key messages.</i> ○ <i>Consider any assumptions you might have made about the population. Are they supported by the literature?</i> ○ <i>Consider the impact of your program and key messages on non-target groups.</i> 	<ul style="list-style-type: none"> • US Surgeon General’s report – smoking in movies causal • Parents likely to support movement • Recommendations supported by literature • Reducing youth exposure to movie smoking has shown an impact on initiation of tobacco use and the target population has addressed their own concerns for this issue • If recommendations are transferred into action it would need to be suited for youth and young adults in terms of how its implemented • For peel health to support SFM demonstrates to youth and young adults we want to prevent smoking initiation • Tobacco is a term of council priority • Movie industry distributors may resist R ratings for movies with tobacco exposures • Parents likely to support and appreciate • NGO’s and other institutions may support i.e. heart and stroke, cancer, lung association, school board • Is it ethical not to act?? • Yes – socially acceptable • Issue may be in communicating the relationship of SFM and tobacco use so intervention is not seen as useless • Action: r rating for smoking movies may be most effective intervention by difficult to sell with OFRB; youth/young adults are largest audience; this would limit access to films likely angering them – film makers would be outraged
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		<ul style="list-style-type: none"> • Action: advocating to parents not to expose children to R rated movies – likely no opposition but impact would be limited as children will continue to be exposed to images in G and PG films • Target population may or may not find intervention socially acceptable – depends – may be a backlash.
<p>Available essential resources (personnel and financial)</p>	<ul style="list-style-type: none"> • Who/what is available/essential for the local implementation? • Are they adequately trained? If not, is training available and affordable? • What is needed to tailor the intervention locally? • What are the full costs? <ul style="list-style-type: none"> ○ <i>Consider: in-kind staffing, supplies, systems, space requirements for staff, training, and technology/administrative supports.</i> • Are the incremental health benefits worth the costs of the intervention? <ul style="list-style-type: none"> ○ <i>Consider any available cost-benefit analyses that could help gauge the health benefits of the intervention.</i> ○ <i>Consider the cost of the program relative to the number of people that benefit/receive the intervention.</i> 	<ul style="list-style-type: none"> • SFM Coalition has resources developed • TCAN's and other health units particularly in Toronto • Data from health status report • Public health staff, Mpp's, other Public health units and regions. • Awareness will need key partners and a campaign tailored to educate youth and the public • More needs to be done before deciding to implement an intervention/program. • Strategically aligned with transitions workgroup priorities – prevention focus • Advocacy takes less than resources than other choices • R-rating not in our control – rating system is provincially mandated • Advocacy with parents clearly PPH role for both nurturing the next generation and tobacco strategies • Costs are staff time for advocacy and potentially social marketing for parents components • Resources/support from province for SFM • Need advocacy training

		<ul style="list-style-type: none"> • Ensure follow appropriate procedures • Do we have any evidence of incremental health benefits i.e. decrease in tobacco use by youth by X%? • Is advocacy therefore resources costs are limited and controlled • What is the intervention? Advocacy for rating on movies containing smoking imagery – creation of a campaign educating parents about risks; anti smoking ads priority o movies, all – parents can be partners in advocacy efforts to influence OFRB • Campaigns are costly – unsure about resource availability, staff resources can be assigned if its deemed a priority • Uncertain if training is required • Message should be specific to Peel/Ontario population • Don't know the cost • Health benefits depend on rate of prevention i.e. less than 2% of children and youth under 18 smoke
Organizational expertise and capacity	<ul style="list-style-type: none"> • Is the intervention to be offered in line with Peel Public Health's 10-Year Strategic Plan (i.e., 2009-2019, 'Staying Ahead of the Curve')? • Does the intervention conform to existing legislation or regulations (either local or provincial)? • Does the intervention overlap with existing programs or is it symbiotic (i.e., both internally and externally)? • Does the intervention lend itself to cross-departmental/divisional collaboration? • Any organizational barriers/structural issues or approval processes to be addressed? 	<ul style="list-style-type: none"> • Expertise of the Office of Strategic innovation, policy and planning • In order to determine effectiveness of an intervention, more research is generally required to see what has been done and what could be done; this does support strategic plan ; being supportive of policies and interventions that are effective will help this process. • Direct alignment with Living tobacco free and Tof C priority

	<ul style="list-style-type: none"> • Is the organization motivated (learning organization)? <ul style="list-style-type: none"> ○ <i>Consider organizational capacity/readiness and internal supports for staff learning.</i> 	<ul style="list-style-type: none"> • Advocacy portion first with provincial film rating system • Fits well with potential tobacco and parenting programming however would need to be developed • CDIP/Family Health partnership • Staff development and change management for building advocacy position required – workforce development strategy • Yes – living tobacco free • Advocacy re. movie ratings, SFM coalition, can affect all 3 pillars • Must work through process with corporate office (David Arbuckle’s group) • May be opportunity for collaboration with other teams i.e. school team or divisions i.e. family health • Currently provincial coalition that is actively using a variety of methods to raise awareness of the issue • Opportunity to utilize this as educating body and leverage province wide expertise in this area. • Youth prevention aligns with organization plan • OFRB deals with ratings/messaging before movies • Program could align with other advocacy programs • Organization is motivated

Transferability (generalizability)		
<p>Magnitude of health issue in local setting</p>	<ul style="list-style-type: none"> • What is the baseline prevalence of the health issue locally? • What is the difference in prevalence of the health issue (risk status) between study and local settings? <ul style="list-style-type: none"> • <i>Consider the Comprehensive Health Status Report, and related epidemiological reports.</i> 	<ul style="list-style-type: none"> • 60% of smoking impressions occur in PG rated films; advocating changing the rating system to include an R-rating and advocating for parental control should limit smoking impressions on target population • Since 15.5% of people aged 12 and older are smokers in region it is important to look at • Adolescents between 12-17 are most frequent movie goers and part of target population starting smoking, increases as they age • Studies recognize this and see smoking in movies as a way to attract this population to smoking • 167 600 smokers in Peel • High rates among males 20-50, likely affected by smoking in movies • Transferability from US and Europe studies probably fairly good • Youth and young adults are priority population – this would impact prevention and cessation. • Less than 2% of youth smoke • Negligible difference
<p>Magnitude of the “reach” and cost effectiveness of the intervention above</p>	<ul style="list-style-type: none"> • Will the intervention appropriately reach the priority population(s)? <ul style="list-style-type: none"> • What will be the coverage of the priority population(s)? 	<ul style="list-style-type: none"> • Advocacy to target parents to control viewing of R rated movies • Recommendation to support interventions would only reach target population if an intervention is available for us to support • Priority populations – film rating board

		<p>long term commitment, parental control 5-10 year plan with reinforcers</p> <ul style="list-style-type: none"> • Advocacy with ratings • Knowledge with parents re. ratings and smoking relationship • Reach could potentially be great if advocacy efforts are successful • Will reach priority populations
Target population characteristics	<ul style="list-style-type: none"> • Are they comparable to the study population? • Will any difference in characteristics (e.g., ethnicity, socio-demographic variables, number of persons affected) impact intervention effectiveness locally? <ul style="list-style-type: none"> • <i>Consider if there are any important differences between the studies and the population in Peel (i.e., consider demographic, behavioural and other contextual factors).</i> 	<ul style="list-style-type: none"> • Yes – youth • Parents are also key in relating parental control, education, awareness. • Diversity in Peel may help as strong family orientation in south Asian community • Interesting to review S. Asian movies for smoking • Not sure about Caribbean families • White smokers in peel more prevalent • Assume all movies in theatres rated by same body • How are ratings applied to movies on demand? • This would impact all populations and not just specified group • Yes, peel is more ethnically diverse and has a lower prevalence of smokers
<p>Proposed Direction (after considering the above factors):</p> <ul style="list-style-type: none"> • Continue with recommendation of more research on screening anti-smoking ads prior to movies • Go ahead with support of policies or interventions that recommend more strict ratings of movies that have smoking imagery in them • Start step by step process of working up to strong intervention in future • Develop advocacy position after assessing resources available – needs to fit within total tobacco resources • Rapid review an asset to development of a position 		