Literature Review for Young Adult Cessation/Protection Interventions

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Prepared for The LEARN project:
A Collaboration of Program Training and Consultation Centre
and
The Ontario Tobacco Research Unit

February 2009
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EXECUTIVE SUMMARY

This literature review was commissioned to extract lessons on young adult smoking behaviour from scientific and grey literature to assist in the development of cessation, prevention and protection interventions by the LEARN (Learning through Evidence, Action, and Reflection Networks) project. The LEARN project is a joint undertaking between the Program Training and Consultation Centre and Ontario Tobacco Research Unit. The focus of this review and synthesis was to identify theories of becoming a regular user and addiction in young adults; differences between those aged 19-24 and those aged 25-30; differences between those who attend post-secondary school vs. those who enter the work force; and smoking interventions for young adults being trained, or working, in the trades.

Young adults have the highest rate of smoking of any age group in Canada. Yet, there is little research being done in this age group and very few effective cessation and protection interventions. The research that is being done focuses on college/university students and studies of interventions usually draw from these campuses for their samples. Those in the workforce, particularly blue-collar environments, trade or technical schools, and those with low SES, while being the most vulnerable, are virtually ignored by the research community. What makes this even more alarming is that these are the very groups targeted by the tobacco industry.

In order to determine what literature exists on these issues, electronic databases of published literature, key journals, citations of relevant literature, and selected grey literature sources were searched. Inclusion criteria were scaled back, in consultation with the investigators, to manage the initial results found for this small-scale review. A search of health interventions focused on other health risk factors and conducted in this age group was also performed in order to find information or innovations that would be relevant to smoking prevention, cessation and protection interventions.

In this report a summary was prepared which outlines the literature for young adults related to: smoking addiction and the transitional nature of smoking behaviour including quitting, risk perceptions around smoking, other risk taking behaviour, differences between those in the workforce and those in post-secondary education, the tobacco industry, and effective interventions. The information compiled here highlights what is unique about young adults and what is currently being done to reduce smoking in this population. What is clear is that there needs to be more research done in this area, not only with respect to understanding the heterogeneity of this age group but also designing and evaluating interventions specific to young adults, particularly in the most vulnerable sub-populations.
Highlights

- Young adults continue to report the highest smoking prevalence compared to all other age groups so further examination is required to understand the factors associated with initiation rates, and the transition from non-daily or occasional smoking to established daily smoking patterns.

- Young adults in trade/technical schools and in blue collar workplaces are at higher risk for smoking. Since there is limited information on young adults in these populations, further intervention research and evaluation into effective cessation programming needs to be done in order to determine what methods will be most effective with both of these sub-populations.

- Young adults are a heterogeneous group so there is a need to create and evaluate cessation interventions in multiple settings including: college/university; trade/technical college; workplace; and for the unemployed; and for a variety of smokers: occasional vs. daily smokers; dependent vs. non-dependent smokers; and social smokers.

- Young adults are interested in quitting but prefer to quit on their own. Intervention research needs to explore the reasons why young adults choose not to participate in cessation programs and what factors would motivate them to access available resources and interventions.

- Drinking is often linked to tobacco use and smoking in social situations. Well-evaluated interventions which are designed to impact both alcohol use as well as smoking; specifically geared toward social environment (i.e. at parties and on the weekends) and with young adults who identify as ‘social smokers’ is needed.

- Prevention programming for young adults is lacking. Targeted prevention efforts need to be developed, and evidence shows that what has been developed to date for adults in general may not be the best approach.

- Interventions should also examine the impact in the social environment of young adult smokers. In particular, implementing tobacco control policies that support the prevention and cessation efforts of young adults.

- Telephone quitlines may be promising interventions for young adults. All three of the quitline interventions identified indicated positive results.

- The tobacco industry continues to aggressively target young adults while the tobacco control community has paid little attention to this population. This includes learning from, and counteracting the work that has already been done by the tobacco industry to establish young adult smokers as a priority group.
1. INTRODUCTION
The purpose of this review was to provide a succinct overview of the current state of the literature regarding young adults and smoking behaviour. Specifically, the two main objectives of the review were:

I. To identify:
   a) the major theories related to the onset of regular tobacco use and addiction among young adults aged 19-24, and 25-30 to discover if there is a difference between these cohorts;
   b) any differences between those who attend post-secondary schools and those who enter the workforce;
   c) effective cessation, prevention and protection interventions for young adults in these age groups, including learnings from other health-related interventions

II. To identify, in particular, evidence for effective prevention, protection or cessation interventions (including recommendations and innovations from other health-related interventions) for young adults with lower SES, especially those working, or being trained in trades.

1.1. Relevance
Young adults continue to report the highest smoking prevalence compared to all other age groups. While among young adults aged 20-24 smoking prevalence rates was reported at 27% in 2006, compared to 26% in 2005 (Health Canada, 2006). Among young adults 18% were daily smokers and 9% were occasional smokers (Health Canada, 2006). In 2006 19% were daily smokers and 7% were occasional smokers (Health Canada, 2006). Young adult males also represent a greater proportion of current smokers (30%) compared to young adult females (24%) (Health Canada, 2006). However, youth aged 15-19 reported a more significant decrease in smoking rates in 2006 with 15% of youth reporting smoking, down from 18% in 2005 (Health Canada, 2006). In 2006, nine percent of youth reported smoking daily and six percent reported smoking occasionally (Health Canada, 2006). This was down from 11% for daily smoking and occasional smoking among youth remained steady at 6% (Health Canada, 2006). While results from the 2006 Canadian Tobacco Use Monitoring Survey (CTUMS) indicate that between 1985 and 2006, smoking rates for the Canadian population aged 15 years and older, fell by almost one-half, from 35% to 19%, young adult smokers aged 20-24 years are still experiencing high prevalence rates for smoking (Health Canada, 2006). This trend in smoking prevalence among Canadian young adults is consistent with prevalence rates in the United States, where the young adult population, both college-educated and non-college educated individuals, have seen higher smoking rates in the last decade (Solberg et al., 2007; Adlaf et al., 2003; Backinger et al., 2003; Lantz, 2003). What is interesting is that while the overall Canadian daily smoking rate was an average of 15.5 cigarettes per day, the number of cigarettes per day for young adults was only 12.9. So while young adults have the highest smoking prevalence they smoke fewer cigarettes than any of the older age groups (Health Canada, 2006). These data are also consistent with young adults in the U.S. (Messer et al., 2008; Solberg et al., 2007; Thompson et al., 2007b).
This alludes to the transitional nature of smoking behaviour in this age group and the fact that smoking initiation doesn’t always happen before the age of 18. According to a recent study by Hammond (2005), approximately one fifth of current young adult smokers in Canada tried their first cigarette after the age of 18; and the majority of young adults became regular smokers after the age of 18. In addition, the proportion of daily smokers increased from 8% among youth to 22% among young adults (18-29 years of age). According to findings from the American Campus Alcohol Survey (CAS) in 1997, 11% of students reported smoking their first cigarette while in college and 28% starting to smoke regularly while in college (Wechsler et. al., 1998). Since it hasn’t yet become a deeply invested behaviour there may be opportunities to intervene with this age group who may have yet to establish regular smoking patterns, which can begin to take hold in young adulthood.

What is also interesting and deserves attention is the fact that despite having the highest smoking rate in Canada, young adults have literally been ignored in the literature with little research into effective prevention and cessation interventions for this age group. According to a systematic literature review conducted by Bader et al (2006), they have been largely overlooked in research, practice, and policy regarding effective programs for smoking cessation. According to Backinger et al (2003), this situation reflects the traditional emphasis on adult smoking cessation and adolescent prevention programs.

Of particular concern is that, while the tobacco control community has largely ignored this key age group, the tobacco industry has made them a target of their marketing (Belstock, Connolly, Carpenter & Tucker, 2008; Biener & Albers, 2004, ), zeroing in on vulnerable populations specifically, such as “working class” young adults (Barbeau, Leavy-Sperounis & Balbach, 2004). Blue-collar workers have also been a target of tobacco industry marketing for decades (Leonard, 2004).

The other relevant piece to this puzzle is the heterogeneity within this age group reflected in the divergent characteristics of college/university educated versus non-college/university educated young adults. Research indicates that non-college/university educated young adults have much higher smoking rates than their college/university-educated counterparts (Green et al., 2007; Solberg et al., 2007; Lantz, 2003; Walque, 2006). Orlando et al (2004) found that at age 23, trajectory classes of smoking differed most according to graduation from college; nonsmokers and triers were more likely to have graduated from college than other groups. This discrepancy may be indicative of the fact that the research that has been done on the young adult population has largely focused on the college/university population with little or no research targeting the employed and unemployed young adult population; two groups at particular risk for tobacco use (Bader, Travis & Skinner, 2007). In addition, while there have been few effective prevention and cessation interventions for this age group, those that do exist, focus on the college/university-educated population – perhaps because of the easy access to this group on campuses across North America.

It is also important to point out that there has been almost no focused research, to date, on young adults in trade or technical schools. In addition, there is a dearth of literature focused
specifically on both the adult and young adult population working in blue-collar occupations. So, the question to ask is why are there few appropriate interventions for the employed/unemployed or non-college/university educated young adult, when the majority of surveillance research indicates that young adults in the workforce, especially in blue collar or service industry jobs, typically have higher smoking rates and are at greater risk for increased smoking than college/university-educated young adults (Backinger et al., 2003)?
1.2. Implications for Research
Several promising opportunities for additional research exist in this area:

1. **Intervention research:** With little or no literature on effective prevention and cessation interventions for young adults, there is opportunity to conduct timely research on developing potential interventions targeting this age group.

2. **Descriptive research into sub-populations within the young adult demographic:** With almost no focused research on young adults in trade or technical schools or young adults working in blue-collar occupations, there is opportunity to explore these sub-populations given that most research indicates young adults in the workforce, especially in blue collar or service industry jobs, typically have higher smoking rates and are at greater risk for increased smoking.

1.3. Implications for Policy/Practice
The fact that the majority of young adults become regular smokers after the age of 18 has huge implications for those who are developing and implementing protection, prevention and cessation interventions. Several areas deserve particular attention:

1. **Early intervention:** The present review yielded little evidence of effective interventions for this age group. This is consistent with the findings of previous reviews (i.e. Bader, et al., 2007). What we know about young adult smoking patterns suggests that there are some smokers who initiate and progress to regular smoking after the age of 18. Accordingly, there is huge opportunity to intervene early with this age group to prevent smoking onset and the establishment of regular smoking patterns.

2. **Targeted interventions:** There is the opportunity to target young adults; specifically focusing on the heterogeneity within this age group; determining what, if any, targeted interventions are necessary (i.e. college/university educated versus non-college/university educated; the unemployed; social smokers; daily versus occasional smokers, etc). Designing multiple interventions will be required in order to make an impact with this age group.

3. **Tobacco industry:** Given the tobacco industry has made young adults a target of their marketing there is opportunity to focus on harm reduction interventions with young adults; specifically creating tobacco industry denormalization programs and intervening with tobacco control policies that limit the promotion of tobacco industry products in places where young adults gather (i.e. bars).

4. **The Social Environment:** Because young adult smokers smoke in social situations like at bars, clubs or parties or even at work there is a need to change the social environment of young adult smokers by implementing tobacco control policies that support the protection, prevention and cessation efforts of young adults; restricting smoking on
college/university campuses; and, restricting smoking in workplaces, including regulating outdoor workplaces (i.e. to support construction trades).

5. **Discount brands**: Tobacco companies have changed the cigarette market by introducing discount brands as a way to appeal to the young adult population. Bringing cheaper cigarettes to the market would be an effective way to recruit new young smokers to replace those in their market who have succumbed to their addiction.

The issues and implications discussed in the previous sections will form the focus for the following review with more in-depth discussion not only around these issues/implications but also with a focus towards any relevant health-related interventions (including smoking, nutrition, physical activity, drug use, etc.) that may contribute to the knowledge around successful protection, prevention and cessation interventions for young adults.

**1.4. Approach**

The approach taken for this literature review was to examine both the scientific and applied literature for relevant items describing smoking behaviour among young adults. A description of the methodology used for the literature review, including both the scientific and applied literature search strategies is provided as well as an overview of the findings in the literature according to relevant themes, and an analysis and summary of our findings.
2. SEARCH METHODOLOGY AND SEARCH OUTCOMES

2.1. Literature Search of Scientific Evidence
To capture literature relevant to the above objectives, we searched electronic data sources for published literature. We also conducted a hand search of key journals, and citation searching of key works.

We started our search with the intention of being as inclusive as possible. The initial inclusion and exclusion criteria were as follows:

- Published in 1998 or later (10 years),
- Published in the English language,
- Include developed nations (specifically North America, Europe, Australia and New Zealand).

In consultation with the investigators, articles were also included that were related to:

- tobacco industry marketing to young adults,
- age-specific food service workers,
- co-morbid conditions (i.e. anxiety/depression, schizophrenia, ADHD, sexuality, obesity, etc.) where they describe an effective intervention related to our sub-question

Due to the overwhelming number of articles found during our search (i.e. well over 300 articles for review), scaling back was necessary in order to meet both budgetary and time constraints. Again, in consultation with the investigators, the following changes were made to the inclusion and exclusion criteria:

- Published in 2003 or later (the last 5 years),
- Including alternate forms of tobacco use (i.e. snuff, chewing tobacco, etc.),
- Focus on the Canadian context (i.e. and on sub-population literature from other jurisdictions which are relevant to Ontario),
- Include co-morbid conditions as long as they are specific to the young adult age group.

2.1.1. Search Strategy

2.1.1.1. Databases
Relevant data sources were examined for usefulness in this search. The following databases were chosen:

- CDC – Smoking and Health Database
- Cochrane Library
- CINAHL
- DARE (Database of Abstracts of Reviews of Effects)
- ERIC
- ISI Web of Science
- Medline (PubMed)
- PsychInfo
2.1.1.2. **Search Terms**

The objective was analyzed to identify concepts of interest; terms were then identified from each relevant concept. Terms were adapted to each individual database as needed, using a combination of controlled vocabulary and free-text terms (e.g. searches in PubMed will include both MeSH terms such as, Smoking[MeSH] and keywords like smoking - searched either in any field or restricted to certain fields such as title and abstract).

**Population:**
- young adults
- college
- university
- trade schools
- technical schools
- apprentice
- vocational schools
- socioeconomic factors

**Behaviour/interventions of interest:**
- smoking
- smoking addiction
- smoking habituation
- smoking cessation
- smoking programs
- smoking interventions
- protection from smoke
- smoking policies

**Settings:**
- community
- workplace (i.e. trades, blue-collar settings)
- colleges/universities/trade schools
- media

**Other health-related interventions:**
- nutrition/diet
- physical activity
- alcohol abuse
- illicit drug use
- substance abuse
- marijuana
- risk taking behaviour
- sun behaviour
- health promotion programs
- workplace programs
2.1.1.3. **Hand Searching of key journals**

In order to ensure the comprehensiveness of our search strategy, the tables of contents from the last five years of the following journals was also searched by hand:
- Canadian Journal of Public Health
- American Journal of Public Health
- Tobacco Control
- Nicotine and Tobacco Research

Initially it was intended that another four journals would be searched, however, it was found that the hand search of journals was not producing any unique results and proving quite time consuming for no return, so it was abandoned in order to efficiently work within the timelines of this project.

2.1.1.4. **Citation searching**

Citation searching was conducted with identified key articles. The reference lists of each key article were examined for relevant citations, and any articles that have cited these key articles were located. This proved to be a good crosscheck as a number of articles cited in key works were found in our original search.

2.1.2. **Reference Management**

All references yielded in the academic literature search were imported into a Refworks online database for reference management.

2.1.3. **Initial Screening for Relevance**

Due to the large number of items yielded from the scientific searches, an initial screening was conducted to determine the relevance of the item. A research team member read through each abstract from the scientific database searches. If abstracts were not provided, decisions were made based on title. Articles thought to be relevant were retrieved and included for reading/analysis.

2.2. **Literature Search of Grey Literature**

Grey literature was located by searching the websites of relevant organizations (e.g. OTRU, Public Health Agency of Canada, CTCRI), and by conducting searches on the internet. The resource centre at the Population Health Research Group was searched for published and unpublished literature, and personal files were accessed for relevant literature.

2.2.1. **Search Strategy**

The Ontario Tobacco Research Unit (OTRU), Public Health Agency of Canada (PHAC), and Canadian Tobacco Control Research Initiative (CTCRI) websites were all searched for published and unpublished literature for relevant publications. Nothing new was found on these sites.

Specific searches were conducted in Google. Because of the paucity of literature on young adult interventions in trade or technical schools and blue-collar workplaces, this was the focus of
online searching. Search terms were limited to smoking interventions, programs, etc., and trade schools and blue-collar occupations. The Google search did not yield many more programs than were found in the published literature.

The resource centre at the Population Health Research Group was also searched for relevant published and unpublished literature. While there were a handful of relevant items found, they did not meet our inclusion criteria (i.e. not within the time frame we were looking at).

2.3. Search Outcomes
The majority of articles yielded from our search strategy focused on smoking patterns and predictors (tobacco use and cessation) of young adults, both overall and with a specific focus on college/university-educated individuals. There were also several articles describing the transitional nature of smoking behaviour among young adults; the transition from adolescence to adulthood as well as the transition from occasional to regular smoking among young adults. There were no articles specifically describing differences in smoking behaviour among young adults between the age groups, 18-24 years old and 25-30 years old. Most articles described the young adult population as either between the ages of 18 and 24 or between the ages of 18 and 30.

There were very few articles on non-college/university educated young adults, including the employed, unemployed or blue-collar worker. The most discouraging finding was the lack of information on individuals in trade and/or technical school (including apprenticeships) – both overall and with respect to young adults. Specifically, there was only one article describing smoking and cessation behaviour in trade and technical school students (Loukas, Murphy & Gottlieb, 2008). There were 5 articles describing tobacco use and cessation behaviour among the employed/unemployed and/or blue collar worker. Only one article was specific to young adults (Bader et al., 2007) and described cessation among the employed/unemployed. The other four were general articles describing: 1) smoking and quitting behaviour among unemployed adults in the US (Fagan et al., 2007); 2) smoking rate trends among US occupational groups (Lee et al., 2007); 3) using trade unions as a new channel for health promotion (Barbeau et al., 2005); and, 4) social disparities in tobacco use among blue collar workers (Sorensen et al., 2003).

Finally, there was a mediocre amount of literature on targeted interventions for young adults, again mostly geared towards college/university-educated individuals. This encompassed not only smoking cessation interventions but also other health-related interventions (i.e. alcohol, physical activity, nutrition, etc.) including those using innovative technologies (i.e. internet, cell phone, etc.). There were four articles describing cessation interventions specific to our high risk population: blue collar workers (Sorensen et al., 2007; Ringen et al., 2002); apprentices (Barbeau et al., 2006); and, a two-year technical college (Rooney et al., 2005). A description of these interventions is provided in Section 3.2.7.

Figure 1 provides a general overview of our findings with regard to the number of articles that were found and either accepted and analyzed, or rejected, based on our search strategy and
inclusion/exclusion criteria. Articles were initially placed into broad categories based on information contained in the abstract; categories were created with the intention of helping to organize the review. While the categories do provide a fairly accurate picture of the context of most of the articles, there were circumstances where the specific details of the article, once read, no longer reflected the category in which it was placed. Articles were weeded further upon reading and not all articles included in the categories were relevant to the focus of this review.
528 articles found in all searches

181 rejected (not relevant)

108 older than 2003

239 articles distributed in the following categories:
blue-collar; media; other health interventions; policy-ETS policy; quit behaviour; smoking patterns; smoking predictors/initiation; theory/models; tobacco industry; worksite health promotion interventions; young adult cessation interventions
3. RESULTS

3.1 Tobacco Use among Young Adults

The increase in smoking prevalence of young adults that began in the early 1990s still persists today. According to Lantz (2003), there appears to be two schools of thought as to why the increase exists. One explanation is that there has been a compositional change in the college student population. That is, more young adults are attending college/university creating a change in the types of young students attending, thereby creating a change in smoking behaviours. The other, more commonly held explanation is that the increase in the young adult smoking rate is due to an increase in the smoking rate among the high school smoking cohort, and that eventually, the decrease in adolescent smoking rates seen in this decade will translate to the young adult population.

According to the literature, young adult smokers are a heterogeneous group; they represent many types of smokers and it is necessary to focus on their various characteristics in order to understand what predicts cessation. The various types of young adult smokers include: daily vs. occasional smokers; addicted vs. not addicted smokers; social vs. non-social smokers; college/university vs. non-college/university educated smokers; the unemployed versus employed smokers; and, the blue collar vs. white collar smokers.

So while the young adult smoking rate continues to remain high, few studies have directly examined smoking behaviour among young adults or even analyzed young adults separately in population-based studies (Hammond, 2005). The following sections will attempt to shed some light on smoking behaviour among young adults, including the heterogeneity that exists within this age group, and the reasons why the rates continue to remain high, despite global decreases across all other age groups.

3.1.1. Smoking Habituation & Transition Behaviour

Although smoking initiation does remain primarily an adolescent activity, it is necessary to look at whether there have been changes in age specific smoking patterns associated with the observed increase in cigarette use among young adults (Lantz, 2003). According to Backinger et al (2003), during the early 1990s, smoking among US young adults started to fluctuate after almost 16 years of sustained decline. Recent survey data indicate that first use rates for 18-25 year old increased from 1993 to 1995 and first daily use fluctuated for the same years (Backinger et al., 2003).

According to Hammond (2005), smoking behaviour may be more variable among young adults than generally thought. Recent survey data indicate that approximately one fifth of smokers said they started smoking after the age of 18, which is a sizeable increase over the historical average. This finding is echoed by data from the cross-sectional 2000 National Health Interview Survey (NHIS) which suggest that a significant number of smokers become regular or habitual smokers as young adults (Lantz, 2003); and specifically once they enter college (Staten et al., 2007; Thompson et al., 2007)
It does appear that young adulthood is a time of transition when it comes to smoking behaviour. “During young adulthood nonsmokers may be initiating smoking, smokers may be transitioning from experimentation to regular smoking, and they may be transitioning from non-dependent smokers to dependent smokers” (Backinger et al., 2003, p.iv46). This sentiment is echoed in the college/university population, where cigarette smoking among undergrads continues to be a transitional behaviour for many (Adlaf et al., 2003).

One element of that transitional behaviour is that young adults are more likely to be occasional smokers than daily smokers, including those who are lighter smokers, those who smoke infrequently and those who do not smoke every day (Solberg et al., 2007; Hammond, 2005; Moran, Wechsler & Rigotti, 2004; Lantz, 2003). This finding is supported by NHIS data indicating the proportion of current non-daily smokers has increased significantly among younger birth cohorts (Lantz, 2003). This is also the case with college-educated young adults, with non-daily smoking common among this population as well (Levinson et al., 2007; Thompson et al., 2007b).

In addition to the non-daily smoking habits of young adults, there is the issue of “social smoking” which some describe as occasional smoking. In a cross-sectional survey of a random sample of college students, “social smokers were more likely to be occasional smokers or, if daily smokers, to be lighter smokers. They were also less likely to be nicotine dependent and more likely to spend time socializing with friends” (Moran, Wechsler & Rigotti, 2004, p.1032). Many young adults, especially college/university students, will only smoke at parties or when they are out with their friends. One-on-one interviews with college students found two types of low-level smokers: students who smoked mostly at parties and sometimes outside their residence halls; and, students who smoked at parties and during the week, often when they were feeling stressed and bored (Stromberg, Nichter, & Nichter, 2007). The assumption was that transitioning from party smoking to smoking in other circumstances (i.e. stress and boredom), is a typical pattern for college students (Stromberg, Nichter & Nichter, 2007). It is these “extrastructural situations” (i.e. social situations that are not part of the everyday routine - parties) that are an especially significant trigger for tobacco use among young adults who smoke occasionally but have not yet developed regular smoking patterns. Parties and social gatherings are an important part of college life, and for many, it is where most smoking occurs. (Stromberg, Nichter, & Nichter, 2007). Freshman smokers also make a clear distinction between weekday and weekend smoking; weekends are a time for parties, where smoking and drinking often take place (Colder et al., 2006). This suggests that social factors may play a major role in smoking among college/university students. Not surprisingly, smokers indicated they did smoke more on weekends (Colder et al., 2006).

It is important to recognize that many young adults who are non-daily or occasional smokers will convert to daily smoking. Gilpin, White & Pierce (2005) found, using California Tobacco Survey data, that approximately half of experimenters are at risk of becoming established smokers in young adulthood.. In a cohort study by Kenford et al (2005), over half who smoked at low levels in their freshman year were still smoking when they were seniors and of those, 20% converted to daily smoking. Further, a baseline survey of college students indicated that
39% had increased the amount they smoked since starting college (Harris, Schwartz & Thompson, 2008). In a recent study by Riggs et al (2007), it was found that it is possible to transition from low levels of smoking in emerging adulthood (ages 12-24) to addictive smoking behaviour in early adulthood (ages 26-28). Smoking only 2-4 cigarettes per week puts an emerging adult at risk of becoming addicted by early adulthood (Riggs et al., 2007). Another study of trajectories found that by age 23 (individuals followed from age 13-23) the five trajectory classes originally found converged into two groups: high level smoking or rarely smoking (Orlando et al., 2004). By age 23 smokers who had been stable highs (smoking at least weekly throughout the study), early increasers (starting low at age 13 but increasing sharply to almost weekly by age 14) and late increasers (starting low but steadily increasing with the sharpest rise between 18 and 23), were all high level smokers, while decreasers and triers rarely smoked by age 23, suggesting that all but the lightest smokers in adolescence eventually become regular smokers in young adulthood (Orlando et al., 2004).

### 3.1.2 Smoking among College/University Students

In order to understand why young adults take up smoking or become regular smokers, we must explore potential risk factors. For college/university students, the social aspects of smoking seem to facilitate smoking behaviour (Thompson et al., 2007a). Smokers recognized the majority of their friends as smokers and reported increasing their smoking habit since coming to college. In addition, “36% said the lack of outdoor smoking restrictions made it easier to smoke” (Thompson et al., 2007a, p.25). According to Stockdale, Dawson-Owens & Sagrestano (2005), for those who initiated smoking in college, being exposed to smoking influences like being in a car with smokers, having someone smoke in their home, and having friends who smoke, significantly distinguished between students who became regular smokers and those who did not. In addition, these social influences were greater for students who reported they began to increase their smoking since coming to school than among students who maintained or lowered their smoking level (Stockdale, Dawson-Owens & Sagrestano, 2005). Further, “college-aged initiators who were current smokers tended to have less positive nonsmoking attitudes than those of non- or ex-smoker college-aged initiators” (Stockdale, Dawson-Owens & Sagrestano, 2005, p.318). According to Kenford et al (2005, p. 291), “the occasional smoker who had already transitioned from smoking only at parties, to smoking while at home, alone or while talking quietly with friends was much more likely to be smoking 4 years later”. In a longitudinal follow-up study with adolescents who were now in college, both students’ attitudes and peer influence contributed to increased smoking behaviour. Students were more likely to take up smoking if they were Caucasian, disliked school, and were more rebellious. Also, students who thought their friends approved of smoking and believed that it was safe to experiment with smoking, were more likely to progress to a higher level of smoking (Choi et al., 2003). Finally, students who are enrolled in trade or technical schools may also be at greater risk for smoking than students who are enrolled in traditional 4-year universities (Loukas, Murphy & Gottlieb, 2008).

The college/university campus environment does appear to have an effect on a student’s decision to smoke. When students were aware of policies prohibiting smoking, they saw this as a barrier to smoking and a facilitator for cessation; however, when they were unaware of the
college’s position on smoking, or saw it as lenient, smokers perceived it as a barrier to cessation (Thompson et al., 2007a). According to baseline survey data from students at 30 colleges/universities, smoking prevalence was highest for those who lived in fraternities or sororities and among those who lived off campus, where campus regulations may not apply or where the ‘party image’ of fraternities/sororities increases a student’s risk (Thompson et al., 2007b). This is consistent with findings from Staten et al. (2007), who found that ‘late initiators’ (those who start smoking after age 18) were more likely than never smokers to be in social organizations, mostly fraternities or sororities. An increase in smoking once coming to school may also be attributed to the fact that students experience increased freedom and liberty when coming to college/university (Thompson et al., 2007b). So, if college students have no obstacles to prevent them from smoking and they have weak non-smoking attitudes and strong social influences, they will likely become smokers (Kenford et al., 2005).

Colleges and universities that place controls or obstacles for students to begin or increase smoking will have a significant edge in their tobacco control efforts over those who do not (Stockdale et al., 2005). This means instituting smoke-free campus policies that include restrictions on both outdoor spaces and indoor residences and common areas (Colder et al., 2006; Kenford et al., 2005; Choi et al., 2003). According to Kenford et al (2005), campus-wide institutional bans should be implemented and smoke-free residences enforced, as any reduction in tobacco use will likely reduce the risk of smoking progression. In addition, policies that support campus organizations to sponsor substance-free activities as alternatives to traditional social events may soften the impact of party weekends (Colder et al., 2006).  

3.1.3 Risk Perceptions of Smoking & Quitting among students

Many young adults who engage in occasional or “social smoking” do not consider themselves smokers or believe they are addicted to cigarettes. In addition, they believe that if they needed to stop smoking they could. In a mailed survey of a random selection of college students, 56.3% of those surveyed, denied (“deniers”) being smokers despite current smoking behaviour. In addition, half of “deniers” also called themselves social smokers (Levinson et al., 2007). The denial of being a smoker may represent a common dissonance among college students who smoke; and this may be closely linked with the optimistic bias regarding addiction (i.e. I’m not addicted) or the feeling that bad things only happen to other people (Levinson et al., 2007). Qualitative interview data from 40 students who were current smokers indicated that many of them thought quitting would be easy and that they could do it at any time (Thompson et al., 2007a). They were also hesitant to admit being addicted and chose not to seek support for quitting, although most of them had made quit attempts (69%). Further, many did not consider themselves smokers; they considered themselves social smokers and only smoked at certain times, such as when drinking (Thompson et al., 2007a). In one-on-one qualitative interviews with freshman college students, it was common for many low-level smokers to say they did not want to become ‘regular’ smokers (Stromberg, Nichter, & Nichter, 2007). In addition, semi-structured interviews with 21 student smokers from various backgrounds (i.e. university students, apprentice hairdressers and electrical industry apprentices) found that, despite showing evidence of addiction, smokers described their smoking practices not as addiction but as being in control and ‘doing it for pleasure’ (Scheffels & Schou, 2007).
Young adults often don’t see the risks or consequences of smoking. The perception of this age group is that the long-term consequences of smoking (e.g., cancer, heart disease, stroke, etc.) only happen to “older” smokers and that nothing will happen to them. This sentiment is echoed by Stromberg, Nichter & Nichter (2007), who indicate that college students start smoking despite knowing the risks because they have little understanding of the long term consequences and they see themselves as invulnerable. In a cross-sectional survey by Staten et al. (2007), late initiator students (those who started smoking after age 18), were more likely to ascribe positive images to smoking and less likely to perceive risk than never smokers. And, in qualitative interviews with student smokers, they identified themselves as controlled and informed of the health risks but not yet affected by them or in danger of them, believing that they currently do not need to quit smoking (Scheffels & Schou, 2007).

There is definitely a need to sway the decisional balance by highlighting the positives of quitting and the negatives of continuing to smoke. Interventions need to look specifically at targeting risk perception behaviours. According to Scheffels & Schou (2007), in terms of important intervention strategies, we need to position quitting as positive and as a gain rather than a loss; quitting early needs to be better communicated; and, the importance of implementing changes in young smokers’ social environment that support prevention and cessation like restrictions on smoking in bars, restaurants and workplaces. In addition, because young adults deny being addicted, they may feel that cessation messages do not apply to them, even though many of them may be developing dependence; so more persuasive education is needed on the nature of early-stage tobacco dependence and recognizing emerging dependence (Levinson et al., 2007).

3.1.4 Other Risk Taking Behaviour

When talking about smoking habituation and addiction with young adults, it is important to look at the relationship between smoking and alcohol use; especially in the context of social situations. According to Lantz (2003), the increase in cigarette smoking has taken place along with an increase in other risk-taking behaviours, like binge drinking, and using marijuana and other illicit drugs. In several of the articles collected, drinking was often linked to tobacco use and smoking in social situations. In a cross-sectional survey analysis by Moran, Wechsler & Rigotti (2004), social smoking was strongly associated with drinking alcohol. When comparing never smokers to ‘late initiators’ (smoking after age 18), late initiators were more likely to be current drinkers, drink in high risk ways, and were more likely to be in social organizations like fraternities or sororities, whose members tend to be the heaviest drinkers on campus (Staten et al., 2007). In a qualitative study with 35 lighter and heavier smokers, lighter smokers consumed significantly more cigarettes during the evening and when drinking alcohol, compared to heavier smokers (Krukowski, Solomon & Naud, 2005). In qualitative interviews with 35 college students, they suggested that cigarettes serve a variety of useful functions in the party setting and they indicated that cigarette smoking is strongly associated with alcohol consumption (Stromberg, Nichter & Nichter, 2007). Some students said tobacco enhanced the effects of alcohol while other students felt smoking was “useful” because it provided a break from drinking. For those who smoke “once in a while”, drinking lowered inhibitions enough to let them smoke without feeling self-conscious (Stromberg, Nichter & Nichter, 2007). Finally, in a
cross-sectional survey, social smokers admitted wanting to smoke more when drinking alcohol (Levinson et al., 2007).

In addition to the link between smoking and alcohol use, there is a need to explore multiple forms of tobacco use in this population. Although young adults predominantly use cigarettes, they also use bidis, kretek, cigars and smokeless tobacco (James, Chen & Sheu, 2007; Thompson et al., 2007b; Backinger et al., 2003). One study found that 51.3% of college students who were current smokers had used more than one tobacco product in the past year (Backinger et al., 2003). NHIS results from 2000 demonstrated that young adult males were significantly more likely to use other tobacco products than females and the use of cigars and bidis among males appeared to increase somewhat across birth cohorts reaching age 21 between the years of 1991 and 1998 and a significant proportion of males (over 25%) report having used smokeless tobacco products (Lantz, 2003). This is consistent with findings from Thompson et al (2007b) where male students were more likely than female students to use cigars, cigarillos, pipe tobacco and chewing tobacco. So there may also be a need to explore gender differences among young adults regarding other forms of tobacco. Therefore, while not the focus of this review, when designing prevention and cessation programs, it is important to consider multiple forms of tobacco use (James, Chen & Sheu, 2007).

3.1.5 Quitting Behaviour

“The greatest benefits of quitting can be seen among those who have smoked for relatively few years, smoked only a few cigarettes per day, or who have an absence of disease at the time of quitting” (Fagan et al., 2007, p.1412). Quitting by age 30 eliminates most tobacco-related mortality (Fagan et al., 2007). It is therefore important to focus research efforts on the smoking behaviour of young adults because they represent one of the groups that could benefit most from quitting.

It is interesting to note that young adults, both college/university-educated and non-college/university-educated, are interested in quitting (Tucker et al., 2005) and are more likely to report quit attempts (Messer et al., 2008; Solberg et al., 2007b) but are much less likely to use any resources to help them quit (Solberg et al., 2007b), preferring to quit on their own (Loukas, Murphy & Gottlieb, 2008). Findings from a survey of trade/technical college students indicate that almost half of students who were currently smoking reported wanting to quit on their own without using quit aids (Loukas, Murphy & Gottlieb, 2008). Cross-sectional survey results comparing 18-24 year old young adults with 25-64 year olds found that young adults were as interested in quitting and more likely to make quit attempts. However, quit attempts were more likely to be made without medications and/or counseling assistance and without help from medical sources (Solberg et al., 2007a). According to survey results from the 2003 Tobacco Use Supplement to the Current Population Survey (TUS-CPS), the proportion of recent dependent smokers who reported that they had seriously tried to quit in past year was highest among 18-24 year olds (84%) and decreased with each older age group - to 64% among 50-64 year olds (Messer et al., 2008). And, in a longitudinal study, 76% of young adult smokers (aged 23-29) attempted to quit during the study period (Tucker et al., 2005).
Unfortunately, the consensus is that young adults generally may not have as much success with quitting compared to older smokers. In a study by Tucker et al (2005), only 1/3 of young adult smokers (ages 23-29) were successful in refraining from smoking for ≥ 6 months. Young adults may be less successful because they are less likely to use resources to help them quit, perhaps because they typically possess negative attitudes toward traditional cessation approaches (Macy et al, 2007). However, there are some data to support the notion that young adults do have success quitting. Messer et al (2008) found that increases in cessation rates in the 1990s were greatest among young adults aged 20-34. In addition, two other studies also saw the same or higher quit rates in young adults. In one study, 18-24 year olds were as likely to have quit 1 year later compared to 25-64 year olds (Solberg et al., 2007b), and in another study, the proportion of recent dependent smokers who reported that they had quit for at least 6 months in the past year was significantly higher among 18-24 year olds than the 35-64 year old age group (8.5% versus 5.0%) (Messer et al., 2008). The caveat with this study is that the younger smokers’ success rate was higher in part because a much higher proportion of them reported having seriously tried to quit in the past year than did older smokers; they also had a higher prevalence of smoke-free homes, and lower levels of dependence - both cessation predictors from the literature and found in the current study (Messer et al., 2008).

Potentially the most important question for this group, since it does not appear that they are interested in using cessation resources, is: what will make them more likely to quit smoking? Unfortunately, there is a lack of consensus about what predicts cessation in this age group (Macy et al., 2007). Some studies found that social environment factors were predictive of quitting. In a study by Macy et al (2007), the number of biological parents who smoked, spouse smoking status, extent of access to smoking at a workplace, and number of lifetime quit attempts were independent predictors of smoking relapse versus long-term abstinence. According to Bricker et al (2005), parental early cessation (when children were in 3rd grade) was associated with substantially higher odds of young adult children’s 30-day cessation and smoking reduction.

In addition to parents’ smoking status, peer smoking has also been found to be a predictor of cessation behaviour among young adults. According to Tucker et al (2005), the peer environment stood out as one of the strongest and most consistent correlates of smoking behaviour. Smokers are less likely to quit if they have greater exposure to peers who smoke, receive more cigarette offers, and perceive a higher prevalence of smoking. In addition, less exposure to other smokers during quit attempts is likely a key to success in quitting since it was associated with 6–month cessation in this study (Tucker et al., 2005). What was interesting in this study was that transitioning to parenthood and living with a non-smoking partner both contributed to the increased likelihood of making a quit attempt but neither were associated with 6-month abstinence.

In addition to social environmental factors, there are also psychosocial variables to consider when thinking about predictors of cessation—specifically learned resourcefulness. Survey data from Kennett, Morris & Bangs (2006) indicated that smokers were significantly less resourceful than ex-smokers. Even though successful and unsuccessful quitters were equally addicted,
smoked the same daily rate and started smoking at the same age, “successful quitters were more intrinsically motivated to quit, more efficacious about resisting smoking in high-risk situations and used more self-regulatory strategies to refrain from smoking compared to unsuccessful quitters” (Kennett, Morris & Bangs, 2006; p.210).

Finally, other predictors of smoking and quitting behaviour found in the literature included gender, race (Fagan et al., 2007), heavy smoking, nicotine dependence, (Fagan et al., 2007; Macy et al., 2007) level of education (Soerg et al., 2007), deviant behaviour, physical and mental health status, (Orlando et al., 2004) and perceived health status (i.e. placing higher value on adopting healthier lifestyle or believing more strongly that quitting has health benefits) (Tucker et al., 2005). Specifically, with regard to the influence of gender on quitting behaviour, Ellis et al (2008) found that women are more responsive to tobacco control activities, while men require more intensive strategies.

Based on the literature, we know the young adult population is a heterogeneous group. So it is important to consider the following with regard to their quitting behaviour: while young adults are interested in quitting and more likely to make quit attempts, they are less likely to use cessation resources; and, there are a variety of predictors, including social, environmental, and psychological factors, that contribute to young adult cessation, and each should be explored when designing cessation interventions.

3.1.6 Workforce versus Post-Secondary Education Differences

The majority of literature that does exist on young adults focuses on the college/university group of young adults where opportunities to study the smoking behaviour in this population are readily available. Colleges and universities provide a great opportunity to reach young adults, because approximately 1/3 of young adults in the United States attend college (James, Chen & Sheu, 2007; other references). Similarly in Canada, 45% of the population aged 25 to 64 had either a college or university education and 22% aged 25 to 64 had a university education (Health Canada, 2007).

When examining individuals in the workforce, it is important to note that the number of registered apprentices increased 64% in Canada from 1994 to 2004 (all ages) and the number of completed apprenticeships rose 17% from 1994 to 2004 (Health Canada, 2007). In addition, in 2004, half of the 267,800 registered apprentices in Canada were in their twenties (Health Canada, 2007). Although apprentices under age 20 represented only 7% of all registered apprentices in 2004, the number of registered apprentices in this age group was four times higher than in 1994 (Health Canada, 2007). In the United States, there are also growing numbers of high school students enrolling in trade and/or technical programs (Loukas, Murphy & Gottlieb, 2008).

Between 1994 and 2004 the proportion of Canadian female registered apprentices in all trades increased from 6% to 9%; however, women were only substantially represented in the food and service trades and the ‘other’ trades field (Health Canada, 2007). Even though there was an increase in the number of women in registered trades overall, they still represent a very small
number of the overall percentage of adults in the trade industry (Health Canada, 2007). This is interesting given that the increase in the rate of habitual smoking initiation was much stronger among males during the 1990s (Lantz, 2003). The proportion of males who reported becoming a regular smoker at ages 19-21 increased 75% comparing the 1970 birth cohort with the 1977 birth cohort (1989/91 to 1996/98) while the proportion of females across this same time period increased by only 5.5% (Lantz, 2003).

Little research was found exploring the differences between young adults who move into the workforce compared to young adults who attend college/university. In addition, there is inadequate literature on unemployed young adults and young adults in trade or technical schools. What is known is that college/university educated individuals smoke at lower rates than their non-college/university-educated counterparts (Green et al., 2007; Staten et al., 2007; Lantz, 2003; OTRU, 2006) despite the fact that college student smoking rates have risen in the last decade (Solberg et al., 2007; Moran et al., 2004; Lantz, 2003). In Ontario, 23% of adults over the age of 18 who had a high school education (or less) were current smokers in 2005, while 17% of those with some post secondary, and 8% of those with a university degree were current smokers (OTRU, 2006). Lantz (2003) found that young adults 1-4 years beyond high school, but not in college, had a higher prevalence of smoking and had significantly higher rates of heavy smoking compared to those in college. In the year 2000, 23.7% of non-college young adults reported smoking half a pack or more per day compared with 10.1% of full time college students. In a study by Green et al (2007), the current smoking prevalence among non-college-educated young adults was twice that among college-educated adults (30% vs 14.2% respectively). In addition, the daily smoking prevalence of non-college (24.4%) was more than double that of the college-educated (9.0%) young adults. Something interesting to note is that it appears Canadian college students smoke less than their US counter parts. Past month daily smoking of Canadian college students in 1999 was 17.1% versus 19.3% in US college students (Adlaf et al., 2003).

It is also important to recognize differences between the trade and technical college student versus the four-year university student. Unfortunately there is a paucity of literature in this area; only one article specifically examined smoking behaviour among trade/technical college students (Loukas, Murphy & Gottlieb, 2008). As mentioned earlier, there is evidence that suggests trade or technical school students are at greater risk for smoking and smoke at higher rates than traditional four-year university students. This may be due to several reasons, including, but not limited to the fact that students who enroll in trade or technical schools are more likely to be older, have lower socio-economic status including low income, do poorly in high school, enter the blue-collar workforce, and are often the target of tobacco companies. All of which are linked to a higher risk for smoking (Loukas, Murphy & Gottlieb, 2008). Higher smoking rates were found in a recruited sample of students enrolled in two trade/technical colleges. According to survey data, 34% reported past 30-day smoking compared with a representative sample of four-year college students (Loukas, Murphy & Gottlieb, 2008). This rate was also higher than the state’s adult smoking rate of 20.6%.
Differences in smoking behaviour exist not only between college-educated and non-college educated young adults but also between individuals in white collar versus blue collar jobs. According to Backinger et al (2003), youth that join the labour force may be at increased risk for smoking. About one third of youth reported that they first started smoking at work. In addition, data from adult studies indicate that service and blue collar workers are at greater risk for smoking than white collar workers (Lawrence et al., 2007; Backinger et al., 2003) and the unemployed are at greater risk for smoking than the employed (Lawrence et al., 2007).

Differences in rates in white-collar versus blue-collar workers remain strikingly large with blue collar workers having typically higher smoking rates (Lawrence et al., 2007; Lee et al., 2007; Barbeau et al., 2004). Pooled smoking rates exceeded 35% for construction, extractive trade, forestry, fishing, food service, construction labor, and material moving equipment operator workers (10% of the US workforce); five and a half times greater than rates reported for health diagnosing workers (those with the lowest smoking rates) (Lee et al., 2007). Findings from a study by Hammond (2005) demonstrated considerable heterogeneity in smoking among young adults. Smoking among students, professionals, and admin/clerical workers was much lower than in the primary industries and trades. In Ontario, 33% of adults aged 18 and older who work in trades and farming were current smokers in 2005, while only 19% of clerical and sales workers, and 14% of those in professional and managerial positions were smokers (OTRU, 2006).

In addition to blue collar occupations, individuals with low education and low income are also at increased risk for smoking. A recent analysis of the 2000 NHIS data found that smoking prevalence was highest among people with working-class jobs, low education, and low income and that each of these indicators of socio-economic level was independently and positively associated with smoking prevalence (Sorenson et al., 2004). This is consistent with findings from Fagan et al (2007) indicating that those with incomes of less than $25,000 were more likely than those with incomes of $50,000 or more to currently smoke; and findings from Green et al (2007) where, among 18-24 year olds, those who earned less than $20,000, worked in service and blue-collar jobs, and were unemployed had the highest smoking rates, regardless of their education level.

Finally, it is also necessary to examine the smoking behaviour of young adults who are employed versus unemployed. As expected, the unemployed have a higher number of smokers and lower quit rates. According to Fagan et al (2007), among the unemployed, 35% were current smokers and 13% were former smokers. When it comes to quitting, young adults who are unemployed or working in blue collar jobs have less success quitting (Barbeau et al., 2004). According to Fagan et al (2007), service workers and blue-collar workers were less likely than white-collar workers to report former smoking. However, unemployed blue-collar workers had a greater odds ratio of successfully quitting than white-collar workers; a finding that is not supported in previous studies. It may be that they have fewer social influences to use tobacco since leaving the workforce (Fagan et al., 2007). Current results from a study by Hammond (2005) suggesting that smokers may not be quitting at the same rate in different occupations, may help explain this. It may reflect an interaction between socio-demographic variables and
tobacco control policies: young adults in lower income occupations may be more likely to quit when cigarette prices are high or in occupational settings where smoking is either impractical or more likely to be restricted by workplace legislation. This may also be the case with blue collar workers who find themselves unemployed and unable to afford the purchase of cigarettes.

Findings from a survey by Green et al (2007) indicate that the majority of young adults 18-24 do not have a college education, work in service and blue-collar jobs, and earn low annual incomes. Therefore, there is a need to develop interventions designed specifically for this population. When it comes to developing intervention programs for young adults, studies should consider these socio-demographic factors and specifically tailor interventions for those at high risk, including blue collar workers and the unemployed (Backinger et al., 2003) to help address the expanding inequalities among class (Barbeau et al., 2004). In addition, employment and unemployment rates indicate that it may be important to explore both worksite and community settings to reach young adults at risk for smoking. We also need to determine the association between smoking among young adults and social factors in the work environment.

Even with the paucity of literature on young adults in blue collar jobs or technical/trade schools, one study did show some success with apprenticeship iron workers. In a pre-post study design of a cessation trial, among smokers with a baseline smoking rate of 41%, there was a 19.4% post-intervention quit rate (Barbeau et al., 2004). There were also significant positive changes pre- and post-intervention in intention to quit, self-efficacy to quit, and a reduction in the number of days smoked. Participation in pro-active intervention components was associated with a three-fold increase in the likelihood of quitting. One caveat was that participation in intervention components was low. These findings suggest that labour union apprenticeship programs represent a promising venue for cessation interventions particularly those that draw upon a health promotion-health protection model (Barbeau et al., 2004).

3.1.7 Tobacco Industry
One factor that makes this age group particularly vulnerable to smoking addiction is that long before public health researchers began to discuss the issue of tobacco use among young adults, the tobacco industry had recognized them as a target market (Backinger et al., 2003). Working class young adults, specifically, and blue-collar workers are considered an important segment of the market (Barbeau, Leavy-Sperounis & Balbach, 2004; Leonard, 2004). Recognizing that young adulthood is a critical time, the tobacco industry has identified how best to market to this demographic; and it appears that this marketing is having an effect.

Reviews of tobacco industry documents reveal that the industry has recognized that young adulthood is a critical time in the progression to established smoking behaviour (Ling & Glanz, 2002; Sepe & Glanz, 2002; Sepe, Ling & Glanz, 2002; Rigotti, Moran & Wechsler, 2005). The industry promotes their products in bars, restaurants, and on university campuses, as well as sponsoring promotional events (Ling & Glanz, 2002; Sepe & Glanz, 2002; Sepe, Ling & Glanz, 2002; Rigotti, Moran & Wechsler, 2005). Young adults are more likely to frequent bars and clubs where cigarette advertising is prominent (Biener & Albers, 2004), and the tobacco industry, aware of the popularity of alcohol in the young adult population, use it in their
advertising (Belstock et al., 2008). Tobacco companies are even able to generate a brand look at night club events using colour and elements of their brand (Physicians for a Smoke-Free Canada, 2003a), as well as re-decorate a club’s interior in brand colours and sell a specific brand using ‘cigarette girls’ (Thompson, 2003). In addition to promoting their products in places young adults frequent, the industry also focuses on the transition behaviours of young adults in their marketing (i.e. moving on to college or work; getting married; leisure and social activities, etc.) (Lantz 2003). The industry also targets young adults with promotional offers on cigarettes (which are the largest share of industry marketing expenditures) (White et al, 2006).

While the tobacco industry has a focused plan when it comes to promoting tobacco to young people, unfortunately, the same cannot be said for the Canadian government when it comes to protecting young people from this targeted tobacco advertising. In Canada, tobacco advertising is NOT banned. Instead, there are only restrictions, which are unclear and can often be seen as contradictory in their intent (Physicians for a Smoke-Free Canada, 2003b). For example, Federal regulations in the Tobacco Act allow for certain advertising exceptions; specifically that subject to the regulations, a person may advertise a tobacco product by means of information advertising or brand-preference advertising that is in:

a. a publication that is provided by mail and addressed to an adult who is identified by name;
b. a publication that has an adult readership of not less than eighty-five per cent; or
c. signs in a place where young persons are not permitted by law (i.e. bars and nightclubs).

These regulations create loopholes for the tobacco industry that allow them to specifically target young adults by allowing tobacco promotions via signs in places were young people (i.e. adolescents) are not allowed by law, but young adults do frequent (i.e. bars and nightclubs) (Physicians for a Smoke-Free Canada, 2003b). In addition, publications with an adult readership of not less than 85% include most newspapers and magazines in Canada, however, many youth are still exposed. This has huge implications for young adults because they are considered part of the adult population and are not protected by these restrictions; therefore they are exposed to tobacco advertising in not only bars and nightclubs, but magazines and newspapers. This creates opportunities for the tobacco industry to market to this age group, influencing new smokers and solidifying the behaviour of those who have yet to become regular smokers.

Industry target marketing is getting through and having an effect on young adult smoking behaviour. During this period of dramatic changes in social networks, living arrangements, and school and work settings, young adults may be more susceptible to tobacco industry marketing (Hammond, 2005). Young adult males (aged 18-24) have a higher recall of tobacco product advertising than other groups (Hrywna, Deneve & Lewis, 2007). Changes in industry promotional tactics correspond with the increase in smoking among young adults (Lanz, 2003). Gilpin et al (2007), found that tobacco marketing has an influence on whether young adolescents become established smokers in young adulthood, and Ling & Glantz (2002) found that tobacco marketing solidifies addiction to smoking in young adults. Attendance at a tobacco industry-sponsored event is associated with a higher smoking prevalence among students, and
may be encouraging the initiation or progression of tobacco use among students who are not smoking regularly when they enter college (Rigotti, Moran & Wechsler, 2005).

Another way the tobacco industry has been able to get young adults to start smoking and keep them smoking is through the introduction of discount brands (“cheap cigarettes”). In 2001, smaller Canadian tobacco companies started manufacturing discount brands (Health Canada, 2006). By mid-2002 to mid-2003, the market share of these discount brands increased approximately 57%. The ‘big three’ (Imperial Tobacco, JTI Macdonald and Rothmans, Benson and Hedges) quickly followed suit; doubling their share of the market during the same period (Physicians for a Smoke-Free Canada, 2003c). In addition to discount brands, roll-your-own and sticks are also cheaper ways of getting cigarettes as they are taxed at a lower rate (Physicians for a Smoke-Free Canada, 2003c). By 2006, 38% of Canadian smokers were purchasing discount brands (Health Canada, 2006). American tobacco industry documents reveal that companies felt that introducing cheaper cigarette brands to the market would be an effective way of increasing the number of young smokers (Physicians for a Smoke-Free Canada, 2003c). So they are recruiting new smokers with cheaper cigarettes to replace those in their market who have succumbed to their addiction.

What is encouraging is that Ling, Neilands & Glanz (2007) found that support for anti-tobacco industry action protects against smoking and is associated with intentions to quit among young adults. It may be possible to decrease smoking among young adults by encouraging their involvement in tobacco control and against the tobacco industry (Ling, Neilands & Glanz, 2007). It is important to acknowledge that young adults have become targets of the industry; the tobacco control community must focus on this population just as aggressively and can learn from how this age group is targeted.

3.1.8 Effective Community and Setting Specific Prevention, Cessation and Protection Interventions

There appears to be little formal research and evaluation on effective smoking prevention, cessation and protection strategies for young adults. Where evidence-based interventions exists, they are underutilized by young adults (Curry et al., 2007). The literature makes several recommendations. First, in an extensive literature review, Escoffery, McCormick & Bateman (2004) found that smoking cessation interventions should help smokers in the young adult population to identify reasons for smoking, understand immediate benefits of quitting, set realistic goals, involve social support for quitting, and incorporate strategies to remain smoke free.

Second, interventions should be tailored to those who are at high risk for initiating smoking; including blue collar workers and the unemployed (Backinger et al., 2003). For example, to more effectively target socially disadvantaged young adults, strategies used by the tobacco industry might be considered. Venues like bars, nightclubs and sporting events are places where the tobacco industry targets young adults (Green et al., 2007). These key locations could be used to implement programs and policies to reduce second-hand smoke, establish social support for cessation and distribute cessation aids like NRT to non-college-educated young
adults. In addition for service and blue-collar workers, worksites could also serve as another venue for tobacco control efforts targeted to non-college young adults (Green et al., 2007)

Third, researchers should determine if there is a need for distinct interventions for less than daily smokers and smokers who are not yet dependent on nicotine, versus more intensive interventions for heavier smokers (Backinger et al., 2003). In a cohort study by Kenford et al (2005), the key element to long-term outcome for college students was total nicotine exposure at baseline. There was a direct, linear increase in risk for each level of baseline smoking (i.e. the higher the amount smoked, the higher the risk). So these results support limiting nicotine exposure as much as possible (Kenford et al., 2005).

Fourth, according to Lantz (2003), not all existing interventions for adults in general may be appropriate for younger adults. Young adults may be more like adolescents in their perceptions of risk, their perceptions of themselves as regular smokers and their level of addiction, their attitudes and preferences around cessation messages and behavioural activities/interventions. Some believe that it is time to increase prevention efforts for young adults; given the lack of success of traditional school-based adolescent prevention programming and that one and five of smokers initiate after age of 18 (Hammond, 2005). Currently, prevention programming for young adults is sorely lacking.

Fifth, according to Cunningham and Selby (2007), the normative fallacy (i.e. the overestimation of the smoking rate) has been identified as a predictor of smoking and as a method for intervention. In a random digit dial survey by Cunningham & Selby (2007), more than half of the smokers (53%) regardless of their age, overestimated by 20% or more the proportion of people their own age and gender who smoked compared with the actual prevalence rates determined by CTUMS. In addition, younger smokers were more likely to overestimate the smoking prevalence of their peers. “Materials incorporating normative feedback directed at correcting perceptions of the prevalence of smoking have been found to promote tobacco cessation” (Cunningham & Selby, 2007; p.1399).

Finally, campus-wide smoking restrictions will help to reduce or limit the number of students who take up smoking or who establish regular smoking patterns. According to Kenford et al (2005), they recommended implementing campus wide bans and enforcing smoke-free residences as any reduction in tobacco use will likely reduce the risk of smoking progression; that is, the bans may serve as a sufficient barrier to those not yet addicted (Kenford et al., 2005).

The following is a description of the prevention, protection and cessation interventions that were identified in the literature geared toward young adults; specifically, college, technical and/or trade school, blue collar workers, and general young adult cessation.

The majority of interventions were based on the transtheoretical model or ‘stages of change’ model. For example, the ‘Leave the Pack Behind’ program for college campuses and a blue collar telephone counseling program used the ‘stages of change’ model. In addition, several
other interventions based their programs on social learning and social cognitive theories. These included a program for blue collar workers, a program for young adults in general, as well as the X-Pack program designed for college/university students. Other individual interventions were based on behavioural self-regulation theory, cognitive dissonance theory and the health belief model. Some of the interventions were based on more than one theory. For example, the Leave the Pack behind program base their self-help booklets, self-help e-web program, and medical professional-delivered interventions on the stages of change while their interventions aimed at community-level change are based on social ecological models (e.g., McLeroy; Goodman; Green) and the diffusion of innovation theory guides the communication campaigns (Kelli-an Lawrance email communication – July 2008).

Three of the five interventions for technical/trade school students – the California BUILT program (Building Trades Unions Ignite Less Tobacco), the Minnesota WorkSHIFTs program (Stop Harmful Impact From Tobacco Smoking) and the British Columbia Institute of Technology (BCIT) strategy - are based on influencing the social norms of blue-collar workers to assist them in quitting smoking. MassBUILT, which is based on the original BUILT program, is based on a social contextual model and the health promotion-health protection model. Finally, while the college-based Quit and Win contest described by Rooney et al (2005) did not indicate it was based on any theory in particular, many quit and win contests are based on theories of community organization, behaviour change, diffusion of social innovation and communication, and social support (Korhonen et al., 1999).

3.1.8.1. College
As has been mentioned, the majority of research done on young adult smoking is done with college/university students in campus settings. The majority of prevention, protection and cessation interventions found in this literature review took place on college campuses. Ten of the interventions found are highlighted in Appendix A. Approaches used included: text messaging, web-based programming, individual counseling, physician counseling, peer support/education, and contingency management. One of the interventions included in this review took place at a 2-year community college; the other 9 were implemented on university campuses.

Use of newer technologies is becoming a popular way to reach this age group. Interventions on university campuses made use of the web, text messaging, and e-mail to implement or support cessation messages and activities. One of the advantages to these technologies is the opportunity to provide personal, tailored, individualized feedback which appears to be meaningful to this age group (Prokhorov et al., 2008; Escoffery, McCormick & Bateman, 2004). Web-based programs that offered tailored feedback showed positive outcomes and were well received (Abroms, Windsor & Simons-Morton, 2008; Prokhorov et al., 2008; Escoffery, McCormick & Bateman, 2004; Obermayer et al., 2004). Feedback on tailored programs suggested even more tailoring of messages (Escoffery, McCormick & Bateman, 2004; Obermayer et al., 2004).
The text messaging program, which also included a web-based component, was also well received (Obermayer et al., 2004). Participants rated this program highly on acceptability, satisfaction and subjective ratings of success (Obermayer et al., 2004). The website component of the text messaging program had participants return to the web daily to input the number of cigarettes smoked each day, which was then graphed for the participant to see his or her progress over the course of the program. Participants found returning to the web to enter this data cumbersome (Obermayer et al., 2004).

E-mail is another useful medium for reaching young adults. An evaluation of the X-Pack program found that a series of counseling emails might be helpful in prolonging the effects of smoking cessation interventions (Abroms, Windsor & Simons-Morton, 2008). The X-Pack program was rated more favourably over the control program which did not have counseling emails (Abroms, Windsor & Simons-Morton, 2008).

While web-based programs may show promise, it is important to note that in a study of internet use among community college students, it was found that students were least interested in searching for smoking information online (Hanauer et al., 2004). Of 125 students surveyed about use of the internet to retrieve health information, only one nonsmoking male searched for information related to smoking (Hanauer et al., 2004). However, recruitment to an online smoking cessation intervention using internet health screening may be viable (An et al., 2007).

Peer support or education was used in two of the programs highlighted. A cessation and relapse prevention program trained student facilitators who led small group sessions and offered support following cessation through emails and phone conversations (Ramsay & Hoffman, 2004). Participants felt that being in the group was the single most powerful contributor to cessation (Ramsay & Hoffman, 2004). Lack of face-to-face contact was highlighted as a limitation of web-based programming (Escoffery, McCormick & Bateman, 2004). It appears that social/peer support in in-person settings may be significant to this age group. Peer facilitators were able to adapt the language of the program implemented to meet the specific social and lifestyle realities of those in the group (Ramsay & Hoffman, 2004). Incentives and resources in this program were not highly used; the true strength lay in the group sessions.

TRUCE, one of the more unique interventions included in this review, was a peer advocacy and education program for tobacco prevention (Morrison & Talbot, 2005). Peer educators hosted sessions and discussions in club meetings, dorms, with student organizations and during health-related courses (Morrison & Talbot, 2005). Students appreciated the friendly manner in which these discussions were conducted (Morrison & Talbot, 2005).

One of the leading tobacco control programs in Canada is the Leave the Pack Behind (LTPB) initiative managed through Brock University. Leave The Pack Behind is a peer-to-peer tobacco control program being implemented on college/university campuses across Ontario (Leave the Pack Behind, 2006). LTPB educates students about the health consequences of tobacco use,
provides access to age-specific cessation interventions, protects non-smokers from second-hand smoke, and exposes tobacco industry tactics that target this age group. Under the guidance of university health care professionals, student teams disseminate self-help cessation interventions and other resources to students as well as host display centres all across campuses. According to their website, LTPB is a provincial best practice program for tobacco control in the young adult population. Among smokers who used the LTPB self-help program, 13% quit smoking. (Leave the Pack Behind, 2006). The presence of Leave the Pack Behind on campuses may also have a positive effect on implementation of cessation counseling by campus health professionals (Lawrance & Lawler, 2008).

3.1.8.2. Trade/Technical Schools

Five interventions targeting trade/technical school students were found. Two programs were identified in an environmental scan conducted by Dahlstrom & Ney (2005); one of which was also found by our literature review. In the scan, they identified two American programs that were developed for blue-collar apprentices/workers: the BUILT program and the WorkSHIFTS program. The third program, called MassBUILT, was conducted with apprentice iron workers in Boston and was an adaptation of the BUILT program. We were unable to find much information on the fourth program, which appears to still be in the development phase. It was created by the authors of the environmental scan, through the BC Institute of Technology. The fifth program was a Quit & Win contest at 3 post-secondary facilities: a two-year technical college (including apprenticeship programs), a private four-year college and a state university.

BUILT is a statewide outreach program for workers and their unions that develops, delivers, and disseminates tobacco prevention/cessation resources for building trades apprenticeship programs. It does not offer cessation programs but provides general information about tobacco use and smoking cessation as well as the hazards of smoking in combination with other toxic substances they may confront on the job. All resources encourage smokers to contact the California Smokers’ Helpline and there are separate resources for each of the various trades. As of June 30, 2007, funding for the BUILT program ended. The funding was originally made possible by a grant funded by the Tobacco Tax Health Protection Act of 1988 - Proposition 99, through the California Department of Health Services. Resources available on their website continue to be maintained (http://www.sbctc.org/BUILT/) (Dahlstrom and Ney 2005).

Barbeau et al (2006), report on MassBUILT which is based on the original BUILT program developed in California. The conceptual framework for the intervention used the social contextual model for smoking cessation among blue-collar workers, which focused on concerns around workplace safety and health hazards. The intervention is based on the health promotion-health protection model, the BUILT program, the US Public Health Service clinical guideline for smoking cessation, and input from union/apprenticeship leaders and iron worker apprentices. It includes 6 components: 1) an in-class, one-hour toxics and tobacco educational module; 2) eight weekly tobacco use cessation group sessions; 3) free nicotine replacement therapy; 4) posters in the union hall and apprenticeship classrooms; 5) articles in the monthly union newsletter; and 6) A do-it-yourself quit kit for those who did not want to participate in
the group sessions. The study was designed to evaluate the feasibility and effect size of the intervention.

There was a 19.4% post-intervention quit rate among baseline smokers enrolled in the study, with significant positive changes both before and after the intervention in intention to quit, self-efficacy to quit and fewer days having smoked. Even though participating in the intervention components was associated with a three-fold increase in the likelihood of quitting, overall participation in the activities were quite low. Results suggest that trade school/apprenticeship programs may be a promising setting for smoking cessation interventions, given the preliminary success with this population; however, since this is the only study that looks specifically at trade/technical school apprentices we must be cautious in our recommendations. More research in this area is needed in order to determine if these quit rates sustain over time and if these findings can be replicated.

WorkSHIFTS works closely with labor unions and public health communities to provide education, training and assistance to workers and labour management about the health risks and economic consequences associated with exposure to tobacco smoke in the workplace. The only drawback is that these resources have been developed for trade workers and not for apprentices at worksites (http://workshifts.org/).

Dahlstrom and Ney (2007) have developed a smoking cessation strategy for trade school students, teaming with the British Columbia Institute of Technology (BCIT), and includes a two-pronged strategy to shift the thinking of trade workers when it comes to smoking. Part one of the strategy includes introducing prevention messages into the curricula of trades workers/students. Part two creates tobacco control awareness and policies for construction sites. Municipalities in BC do not address tobacco use at outdoor worksites. This strategy aims to work together with BC and Yukon Territory Building and Construction Trades Council, WorkSafe BC and specific trade unions to build awareness and adopt voluntary joint tobacco control policies at construction sites that aren't covered by municipal or provincial law. Further information on this program could not be found, based on the literature available, the assumption is that it is still being developed (Dahlstrom, K., & Ney, T. (2007).

Rooney et al, (2005), compared a quit and win contest among 18-24 year old students enrolled at three post-secondary facilities in Wisconsin: a two-year technical college (including apprenticeship programs); a private 4-year college and a state university. Two percent of the estimated smoking population participated in the Q&W contests (114 students in the spring and 38 in the fall). Thirty-two participants were excluded from study because they were either younger than 18 or older than 24 and were more likely to be from the 2-year institution and more likely to be daily smokers or heavy smokers.

Findings indicated that two-year college participants were more likely to be lost to follow-up. In addition, participants at the 4-year college were more likely to be lighter smokers than those at the 2-year college. Outcome data indicate that despite a 36% quit rate at the end of the contest (either by validation or self-report), only 12% remained smoke-free at the 6-month follow-up.
and these results were not significant. With regard to the type of college attended, at the short-term quit (immediate follow-up), it was found that light smokers were much more likely to quit than heavy smokers at the two-year college (p=0.046); however, this relationship was not significant at the four-year colleges (p=0.283). Heavier smokers were more likely to quit if they were from a four-year college. At the long-term quit (six-month follow-up), the trend remained but was not significant. One drawback of this study was that they were not able to reach students at the two-year college who were heavy smokers (i.e. they were either younger than 18 or older than 24).

3.1.8.3 Blue Collar/Workplace

Using the search criteria outlined earlier, only two programs were identified that tailored specifically to blue collar workers and/or their employers. None of the programs are specific to young adults or trade/technical school students but given that many young adults end up in blue collar jobs, it is important to highlight these programs to identify potentially useful prevention, protection, and cessation activities.

Sorensen et al, 2006 designed a randomized controlled trial to test the efficacy of a tailored telephone-delivered and mailed intervention to promote cessation and increase fruit and vegetable consumption among American construction labourers. The intervention included: 1) one-to-one motivational interviewing counseling sessions by phone - up to four calls within a three-month period; 2) a mailed tailored feedback report; and 3) six separate mailings of written educational materials, targeted to specific needs and work experiences of construction labourers. Once the baseline and final efficacy surveys were completed, the control condition received a packet of all targeted written materials by mail.

They used a social contextual framework to structure the intervention strategies and materials to assure that messages were embedded within the social context of workers’ lives and on-the-job experiences. Results indicated that at baseline, 40% of control group participants and 45% of intervention group participants reported using any tobacco in last 7 days. At the final six-month efficacy survey, 19% of smokers in the intervention group had quit compared to only 8% in the control group (p=0.03). At baseline, both groups were consuming over 5 servings per day of fruits and vegetables. At the final efficacy survey, the intervention group increased their consumption by 11/2 servings compared to a slight decrease in consumption by the control group (p<.001). Using the ‘intention to treat’ analysis, the differences between the intervention and control groups were still significant but smaller.

According to the authors, this study provides evidence that a telephone-delivered, tailored tobacco intervention that incorporates the social contextual framework for health behaviour change can be efficacious in promoting behaviour change among high-risk groups (i.e. blue collar workers like construction labourers) and that collaborating with the union is an important way to engage workers with restricted access to traditional worksite health promotion programs.
Limitations of this study were that participants self-reported their smoking status with no validation and they only used 7-day abstinence as their smoking outcome measure.

A second cessation pilot program was designed and implemented in a pilot study with union carpenters in Western Washington (Ringen et al, 2002). The Carpenters Fund (responsible for the health care coverage of union carpenter workers) contracted the Free & Clear program, to create a brochure that was sent by the Carpenters Fund with a cover letter to participants’ home by mail in advance of the start of the program. In addition, the Carpenter Fund administrator attended local union meetings to speak about the program.

Participants who enrolled in the program chose a one-call (39%) or five-call (61%) cessation behavioral counseling plan provided by Free & Clear which was based on the stages of change. A toll-free 1-800 number was provided. Medications were limited to the nicotine patch or gum and bupropion. There were six and twelve-month follow-up assessments through a phone survey; seven-day point prevalence was used as the outcome measure. Of the blue collar carpenters who had enrolled (n=944), 325 were included in the outcome evaluation since they had been involved in the program for at least one year since enrollment. Of the 325, 75% were male with an average age of 41.4, with 63% reporting having smoked one pack/day for >20 yrs.

Seventy-five percent of all participants used some form of medication: gum, 4%; patch, 32%; bupropion 21.5%; and patch plus bupropion, 15.7%. Participants who selected five-call counseling were more likely to use medications (79.3%) than one-call participants (70.1%), and women were more likely to use medications (78%) than men (74.6%). Of the medications available to use, the nicotine patch was most likely to be used (4.15%); bupropion next (28.5%); and then a combination of the patch and bupropion (20.7%).

The seven-day point prevalence rates were: overall, 27.5%; one-call, 25.5%; five-call, 28.9% and the adjusted seven-day point prevalence rates (i.e. where non-responders were treated as non-quitters - intention-to-treat) were: overall: 21.8%; 1-call, 18.9%; 5-call, 24.8%. As expected, adjusted point prevalence rates were lower. Of those who selected one-call counseling, men were more likely to quit (28%) than women (19.2%) and of those who selected 5-call counseling, quit rates were similar among men (29.1%) and women (28.4%).

The rate of participation was similar to other smoking cessation program directed at an employment-based population. The satisfaction rate was also extremely high (90%) suggesting that blue collar populations are not “hard to reach”. The quit rates are consistent with findings from previous studies of cessation in non-blue-collar populations. The cost per quitter ($1,025.28) is one quarter of the previously reported costs of $3,779 per quitter in programs applying the Clinical Guidelines for Smoking Cessation. Results also suggest that cessation programs can even be effective in hard-to-reach populations like itinerant building trades workers, provided that the program is evidence-based and designed to the needs and environment of the target population.
This study did not collect information on the characteristics of each participant, such as the intention to quit or level of addiction. In addition, participation was voluntary so the study may have been biased toward highly motivated smokers already willing to quit smoking.

In addition to the two research programs identified, focus group data with employed and unemployed young adults also identified some interesting and innovative ideas for cessation programming for this sub-population (Bader, Skinner & Travis, 2006). Similar to what was found in the literature, these young adults held negative perceptions of traditional cessation programs and believed that the most effective cessation method was to quit on your own. While very few had any experience with cessation interventions, most felt that providers of cessation programs and services should be ex-smokers and that the program settings should be easily accessible, free, with no appointments (Bader, Skinner & Travis, 2006). In addition, participants felt the only incentive to quit; neither media campaigns nor smoke-free environments would promote quit behaviour.

Focus group participants came up with two innovative ideas of effective strategies for ex-smokers and smokers who want to quit smoking: 1) Intramural sports leagues; which would create a positive, non-smoking social environment; and, 2) a low/no cost quit smoking fitness facility with fitness instructors who help design exercise programs and counselors to help deal with the stress of quitting smoking (Bader, Skinner & Travis, 2006).

According to Bader, Skinner and Travis (2006), the literature lacks intervention data on employed and unemployed young adults. The research, expert panelists and focus group participants all agree that the involvement of young adults in the creation of new and innovative cessation interventions for this age group is vitally important. While not many of the focus group participants had used cessation interventions (more had tried pharmacotherapy than any other intervention), they preferred group over individual counseling (Bader, Skinner & Travis, 2006). While new technology (i.e. internet, cell phone) was supported by the expert panelists as an innovative approach, focus group participants had little experience with these methods. This is because the lack of access to these technologies and the time and effort involved are big barriers. Focus group participants were very interested in exercise-based approaches. They felt that interventions designed around exercise could help with stress, self-esteem, cravings, weight control and filling time that would normally have been spent smoking (Bader, Skinner & Travis, 2006).

Health Canada has also created a smoking cessation guide for workplaces and employers who want to help their employees quit smoking (Health Canada, 2007). It can also be used by workplace leaders like union representatives, workplace health promotion or occupational health representatives, human resource managers, and employee assistance program representatives who promote health in the workplace. It includes practical, relevant cessation material including smoking cessation activities, handouts, tools and a list of resources and references.
Since there are few studies in the literature on cessation interventions for unemployed and employed young adults, more research needs to be done on designing and evaluating effective strategies for this group. Feedback provided by the focus group participants, including their innovative intervention ideas, as well as the smoking cessation workplace guide serve as evidence-informed support for those who may be thinking of designing interventions for this sub-population.

### 3.1.8.4. General Young Adult Cessation

#### 1) Telephone Quitlines

Three studies addressed smoking cessation with young adults using telephone helplines/quitlines. The first study (Maher et al, 2007) involved a state quitline that offered a free NRT service enhancement targeted at young adults. As a result, young adults between the ages of 18 and 29 who were willing to set a quit date within the next 30 days or needed help staying quit were eligible. Calls increased dramatically among this age group during the enhancement period and then returned to previous levels once the offer of free NRT stopped. In addition to call volume, quit rates also increased during the enhancement period. Data from a three-month follow-up survey compared 18-29 year olds who called before (n=114) and during the enhancement period (n=218). The 7-day quit rate increased significantly from 21% before to 38% after the enhancement. So there is potential for quitlines who are interested in increasing call volume among young adult smokers, to consider providing free NRT.

The second study compared California state quitline data from 1992-2006 with population survey data from the California Tobacco Survey (CTS) to assess use by young adults aged 18 to 24 (Cummins et al 2007). Among current smokers, young adult quitline callers were under-represented. The young adults who did call the quitline were mostly daily smokers and heavier smokers, compared to the average young adult smoker. Based on the data from this study, young adult smokers do call quitlines and this presents a reasonable venue for reaching this age group.

The third study (Rabius et al 2004) examined the effects of phone counseling on cessation among smokers, 18-25 years old and smokers over age 25. Smokers who called the American Cancer Society’s (ACS) toll free number to inquire about cessation services and who were daily smokers willing to make a quit attempt in the next two weeks were eligible. Eligible smokers were randomized to either receive three ACS booklets or three ACS booklets plus an offer of telephone counseling (using motivational interviewing techniques). The prevalence of reported abstinence during the last 48 hours at three months was significantly higher among young adults who received telephone counseling (19.6%) compared to young adults who received self-help booklets only (9.3%). This difference was also significant with more younger smokers in the counseling group reporting abstinence at both three months and six months compared to the booklet only group (9.8% versus 3.2%) as well as the six-month prolonged abstinence rates (8.8% in the counseling group compared to 1.9% in the booklet only group; p<.005). Interestingly, younger smokers were significantly less likely to use medication compared to older smokers, including NRT (7.4% versus 17.4%) and zyban (3.8% versus 13.3%). Counseling, however, did increase recommended medication use among the younger age group. Overall,
telephone counseling did significantly increase cessation rates among young adults aged 18-25 suggesting that this age group could benefit from this type of intervention.

2) Using Text Messaging as a Smoking Cessation Service
Rodgers et al (2005) conducted a large randomized control trial examining telephone text messaging as a smoking cessation program for smokers. Smokers were eligible if they were older than 15, English speaking, willing to quit within the next month, and owned a cell phone that could receive and send text messages. Eligible participants who provided consent were randomized to: an intervention group that received regular, personalized text messages with cessation advice and support that was centred around setting a quit date within 30 days; or to a control group which received one non-cessation related text message every two weeks. After six weeks, the text messages for the intervention group became less intensive until the end of the 26 week (six-month) follow-up.

At six weeks, more intervention participants had quit (28%) compared to the control group (13%); a finding that was consistent across subgroups defined by age, sex, income level or geographic location. While reported quit rates remained high at six months, there was some ambiguity about differences between intervention and control groups because of incomplete follow-up. There was also some over-reporting of quit rates (confirmed by salivary cotinine analysis) but this was consistent across the groups. While this study included smokers of all ages the mean age of participants was 25 suggesting text messaging could present a new cessation opportunity for young adults. More research needs to be done in this area; especially given the new cell phone technology that continues to emerge.

3) A real-world self-help cessation program including a Quit & Win
In another study, adolescent and young adult participants, aged 14-25, could register for the self-help program on-line or via a pre-paid postcard (Hanewinkel & Wiborg, 2006). Registered participants then received a self-help manual with three parts: general information on smoking and health-related effects; behaviour modification techniques, decisional balance, and withdrawal symptoms; and a section for supporters including advice on how to motivate/support the smoker during quitting and relapse. A quit and win contest was also held with participants who were contacted via email/mail regarding smoking status. Quit status was assessed using salivary cotinine testing and confirmed quitters were entered into prize draws held every three months.

To evaluate the intervention a pre-post study design with two post-tests were conducted. The sample was recruited from registered participants during April 2002 to March 2003 with the post-tests taking place in March 2003 and March 2004. Of 1417 participants, 1265 were included in the baseline sample. Those who were not interested in quitting and did not provide smoking status were excluded. In the first post-test, 46.1% reported quitting smoking with an intention-to-treat quit rate of 14.9%. In the second post-test, 40.8% reported quitting with an intention-to-treat quit rate of only 8.5%. Predictors for successful cessation were occasional smoking and older age.
While the program was assessed positively by participants, study results must be interpreted with caution given the low response rate from participants (20.7%; n=262). Also, participants could register continuously during the one year prior to the first post-test but all participants were assessed at the same time during the post-test intervals.

4) **Expressive writing intervention for young adult smokers**

One other study (Ames et al 2007) used expressive writing. Expressive writing is seen as an alternative approach to managing stress and no studies have evaluated expressive writing as a cessation intervention or evaluated its effect on perceived stress in people trying to quit. The current study builds on previous work by Ames et al (2005) that examined expressive writing as an adjunct to brief office cessation for young adults, but was found to be ineffective. The present study expanded the intervention which evaluated the efficacy of expressive writing as a treatment adjunct to a brief office smoking cessation intervention but adding nicotine replacement therapy.

Study participants were recruited via ads on college campuses and in citywide publications targeted to young adults. Participants were also paid $95 for the involvement. At baseline, participants were randomized to either: (a) a brief office intervention (n=99); or, (b) expressive writing plus brief office intervention (n=97). The brief office intervention was conducted with a research counselor and based on the *Clinical Practice Guidelines for Treating Tobacco Use and Dependence*. It included one month of weekly sessions with a controlled writing assignment and six weeks of NRT. Those in the brief office intervention only received a control writing treatment component (i.e. writing about objects and events around time management) while the expressive writing group received an expressive writing treatment component (i.e. writing about their thoughts and feelings related to smoking or quitting and how smoking relates to conflicts in their life).

The point prevalence abstinence rate for those in the expressive writing component was significantly higher than those in the control group (33% vs. 20%, p=.043, OR=2.0). However, this treatment effect did not remain beyond the end-of-treatment assessment point (8 weeks) and the 24-and 52-week follow-up point prevalence rates (12% vs. 11% and 11% vs 11%) were similar between the two groups.

Despite results indicating this type of program has promise as a potential cessation intervention for young adults, there are some limitations to the study. Study participants were not enthusiastic about the expressive writing component which may be a barrier for implementing this type of program. In addition, there was no control condition that delivered cessation as it would in a ‘real-world’ setting (i.e. without the inclusion of a writing assignment). The control writing assignment could have also prompted some thoughts about cessation making the current findings weaker (Ames et al., 2007). Finally, the sample size was relatively small—in total, there were only 196 participants; 99 in the control group and 97 in the intervention, making findings difficult to generalize.
3.1.9. Other Health Behaviour-Related Interventions (including Innovative Technologies)

A search of other health-related interventions was conducted in PubMed (using the search terms found in the Methods section above). Of the results, 31 articles were chosen for their relevance to this review. Three of these articles were reviews; all other articles described single interventions. As was found in the smoking literature, the vast majority of these interventions (24) were conducted on college/university campuses and/or with college/university students. Two interventions took place in workplaces. The majority of the interventions address alcohol (22). Other topics included physical activity, nutrition, drugs and STD/HIV and pregnancy prevention. A list of all 31 articles can be found in Appendix B.

Thirteen of the articles described computer-based technologies as a means to reach young adults. The majority of these were website based interventions; however, handheld computers, e-mail messages, and computer programs were also used. One of the advantages of using computer-based technologies is the opportunity for tailored feedback; this tool was used in the majority of the computer-based technologies found. Based on a scan of this literature, these technologies do hold promise for promoting health behaviours in young adults, and intervening in alcohol abuse, diet, physical activity and smoking. Most of the literature found pointed to positive results, however, this may not be due entirely to use of these technologies. Two of the articles found compared online materials with print materials (Moore, Soderquist & Werch, 2005; Marshall et al, 2003). There were no significant differences between the groups using the print materials and the groups with access to the online components (Moore, Soderquist & Werch, 2005; Marshall et al, 2003).

One of the most innovative interventions was an alcohol intervention that used live, interactive, group-specific feedback to highlight misperceptions of alcohol-related group norms (LaBrie, Hummer, & Neighbors, 2008). Recruiting through the leaders of each, students from fraternities, sororities and service organizations, were invited to participate in the study. Each participant was e-mailed a link to a survey to gather baseline data, 1-month, and 2-month follow-up data (LaBrie, Hummer, & Neighbors, 2008). At a regular meeting of each organization in the intervention condition, participants were given a handheld keypad that recorded their responses to questions that assessed their perceptions of group behaviour as well as actual individual behaviour live and then immediately presented the data in graphical form for the group to see (LaBrie, Hummer, & Neighbors, 2008). The results indicated that those in the intervention group reduced both their misperceptions of group norms as well as their drinking behaviour at both the 1-month and 2-month follow-ups (LaBrie, Hummer, & Neighbors, 2008).

Another popular approach in the other health-related interventions was the use of motivational interviewing. Eight of the articles found looked at motivational interviewing only one of which did not have positive outcomes (LaBrie et al., 2008; LaBrie et al., 2007; Carey et al., 2007; Grenard et al., 2006; LaBrie et al., 2006; Juarez et al., 2006; Carey et al., 2006; McNally, Palfai & Kahler, 2005). Seven of the eight were alcohol interventions and one was a review that looked at motivational interviewing for drug-related problems (Grenard et al., 2006). This review found that motivational interviewing might be effective but that key components need further study.
(Grenard et al., 2006). One of the studies did identify, however, that decisional balance plays an important role in motivational interviewing (LaBrie et al., 2006).
4. SUMMARY OF KEY FINDINGS
From our brief review of the literature, the following main points emerged:

- Because young adults continue to report the highest smoking prevalence compared to all other age groups, further examination is required in order to understand: the factors associated with initiation and the transition from non-daily or occasional smoking to established daily smoking patterns amongst young adult smokers.

- Young adults in trade/technical schools and in blue collar workplaces are at higher risk for smoking. Because of the paucity of literature on both of these populations, there is a need for further intervention research and evaluation into effective cessation programming to determine what methods will be most effective for these sub-populations.

- Young adults are a heterogeneous group so there is a need to create and evaluate cessation interventions in multiple settings:
  - college/university,
  - trade/technical college,
  - workplace, and
  - unemployed as well as for a variety of smokers:
    - occasional vs. daily smokers,
    - dependent vs. non-dependent smokers,
    - social smokers (“I’m not addicted” smokers)

- The majority of interventions reviewed were theory-based. The theories most commonly used for young adult interventions were: stages of change theory, social learning and social cognitive theories, as well as the social influences model. While these are the most frequently cited theories in the literature, they may not be the most appropriate. Given the dearth of literature relating to cessation interventions in the blue collar and technical/trade school settings, future research should be conducted to determine the effectiveness of theory-based interventions for these sub-populations.

- Young adults are interested in quitting smoking and are more likely to report quit attempts but are much less likely to use resources to help them quit smoking; preferring to quit on their own. Prior to developing interventions, program planners should explore with young adult smokers the reasons why they choose not to participate in cessation programs and what factors would motivate them to access available resources and interventions. An example of this pre-intervention development work is found in Bader et al (2006).
• According to the literature, drinking is often linked to tobacco use and smoking in social situations. Well-evaluated interventions which are designed to impact both alcohol use as well as smoking; specifically geared toward social environment (i.e. at parties and on the weekends) and with young adults who identify as ‘social smokers’ is needed.

• Interventions also need to be developed for multiple forms of tobacco use with young adult males, as they seem to be more likely to use other types of tobacco (i.e. cigars, chewing tobacco, snuff, etc.).

• Prevention programming for young adults is lacking. Targeted prevention efforts need to be developed, since evidence shows that what has been developed to date for adults in general may not be applicable to young adults. Young adults may behave more like adolescents in their risk perceptions, their perception of being a “smoker” or being addicted and their reactions towards interventions. However, interventions should also take into account the transitional nature of young adulthood (i.e. leaving home, entering the workforce or attending college/university).

• Interventions should also include changing the risk perceptions of young adults who often don’t see the risks or the consequences associated with smoking. They believe that long-term effects of smoking will not affect them and that they do not need to quit smoking. When designing interventions targeted to this age group, there is a need to position quitting as positive and as a gain rather than a loss; highlighting the negatives of continuing to smoke; and, the importance of quitting early.

• Interventions should also examine the impact in young adult smoker’s social environment. In particular, implementing tobacco control policies that support the prevention and cessation efforts of young adults. For example, restricting smoking on college/university campuses with a specific focus on fraternities/sororities and off campus housing, as well as workplaces, including regulating outdoor workplaces, to support those involved with the construction trades.

• There were few prevention, protection, or cessation interventions identified in the literature directed toward young adult smokers. Findings based on the literature indicate the following:
  o some innovative technologies were identified as promising (i.e. web-based programs, text messaging); however, more research is needed in this area as effectiveness, use of, and response to these technologies has been mixed.
  o telephone quitlines may also be promising interventions for young adults. All three of the quitline interventions identified, indicated positive results.

• The tobacco industry continues to aggressively target young adults while the tobacco control community has paid little attention to this population. It is imperative to learn
from, and counteract the work that has already been done by the tobacco industry, to establish young adult smokers as a priority group.

- While the Smoke-Free Ontario strategy recognizes that young adults are an important population, as seen in their investment in the Leave the Pack Behind college/university campus program, there needs to be more investment in the young adult population as a whole, also targeting those who are unemployed or working in blue collar jobs. There is also an opportunity to intervene early by not only creating programs that prevent young adults from ever taking up smoking but by introducing harm reduction interventions, including tobacco industry denormalization programs and policies limiting tobacco industry product promotion to young adults. Investment in this age group now will minimize health care costs later on when they are older.
5. REFERENCES


### 6. APPENDICES

**Appendix A: Young Adult Smoking Interventions – College/University Setting**

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<tr>
<th>Title, Authors &amp; Date</th>
<th>Participants</th>
<th>Study Design/Intervention Description</th>
<th>Theory/Model</th>
<th>Outcome</th>
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<tr>
<td>Campus physicians’ tobacco interventions with university students: A descriptive study of 16 Ontario university clinics</td>
<td>Convenience sample of 16 universities; 228 physicians from these schools; 125/228 responded (55%); 70 were from Leave The Pack Behind initiative</td>
<td>To examine whether and to what degree physicians who work in campus health clinics at Ontario universities assist post-secondary smokers to quit smoking. QQ packages made available to all physicians who worked in the clinic – instruction page, 2 copies of consent form, confidential qq, 2 envelopes. 125/228 QQs returned; 42/125 doctors completed tobacco-related continuing medical education.</td>
<td>The self-help Smoke</td>
<td>Quit booklets, self-help e-Smoke</td>
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| "Look at Your Health": Outcomes associated with a computer-assisted smoking cessation counseling intervention for community college students | Recruited 426 community college student smokers, smoked at least 1 cig/day 58.5% female; mean age, 22.8 yrs 12.5 cigs/day 15-pair-matched campuses (by size) | Group randomized controlled trial  
Hypothesis: students randomly assigned to the LAYH group would experience higher rates of cessation and movement through stages of readiness to quit compared to students assigned to SC condition  
Both conditions required participants to meet one-one with counselors at baseline, 2, 4, and 10 months after baseline  
1) Standard care: brief counseling (5-10 min), were strongly advised to quit and received ‘Clearing the Air’ self-help manual  
2) LAYH: computer-assisted, tailored to student’s personal smoking-related characteristics and stage of readiness to quit using motivational interviewing. It included: 1) motivational counseling intervention; 2) feedback about lung function, based on computer-generated software program. It provided real-time, on-screen feedback & quitting strategies based on participant answers  
Counselors received intensive training  
Measures: socio-demographic characteristics at baseline, smoking-related beliefs and behaviors, and health status with validated salivary cotinine levels at baseline and 10 months  
Dep. Variable: 7-day point prevalence, and progression through stages, determinants of smoking, # of quit attempts | Stage of change  
Health Belief Model – incorporating constructs of perceived risks and benefits, with goal of heightening perceived benefits of quitting and increasing students perceptions of risks | - No differences between 2 groups in terms of socio-demographic characteristics, nicotine dependence, smoking profile, or key stage constructs  
- No group differences on any of variables found in sub sample who completed final 10-month survey  
Validated quit rates: 25 (16.6%) in LAYH group & 17 (10.1%) in SC (p=.068)  
- higher quit rates were observed among women than men in both SC and LAYH groups  
- among students in preparation stage, quit rates were signific. higher for those in LAYH group than in SC group (31.7% vs. 10.8%, p<.05)  
- for students in preparation, 48% of LAYH group progressed to action compared to only 28% of SC group (p=.01)  
- compared to SC group, LAYH group displayed signific. stronger anti-smoking beliefs and perceptions of benefits of quitting; decreased temptations to smoke; fewer withdrawal symptoms; and milder respiratory symptoms  
- among self-reported nonquitters at 10-month FU, no signific. differences between LAYH and SC in mean # of quit attempts  
- findings suggest this intervention may reduce smoking prevalence among community college students  
- tailored, personalized, and individual feedback about negative consequences of smoking appear to be especially meaningful to this group  
- to our knowledge, it is only cessation intervention for this population that brought positive outcomes – increased # of quitters at 10-month FU  
- although differences in validated quit rates approached but did not achieve significance, we believe our results show promise  
- intervention appears to exhibit similar efficacy as current ‘best practices’ reported by US Dept. of Health & Human Services (2000); moreover, when stage of change is taken into account, our intervention yielded abstinence rates for those in preparation stage that were almost 3x greater than aforementioned ‘no format’ condition in clinical practice guidelines and nearly twice as high as their individual cessation counseling  
LIMITS: low sample size; replacement of one of the colleges
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<td>Getting young adults to quit smoking: A formative evaluation of the X-Pack Program. Abroms, L.C.; Windsor, R.; Simons-Morton, B. (2008). Nicotine Tob Res, 10, 1, 27-33.</td>
<td>-83 smokers aged 18-23 years old who were undergraduate students at a university in Washington, D.C.</td>
<td>-participants were enrolled in either the X-Pack Program, a moderately intensive, young-adult oriented program, or Clearing the Air, a less-intensive program aimed at a general adult audience. -participants were randomly assigned to counselors and were assessed in-person at baseline and over the phone at 3- and 6-months. <strong>X-Pack Program</strong> consisted of an in-person counseling session, a self-help kit (the X-Pack) and a series of 10-12 counseling e-mails. The counseling session provided key information about smoking cessation and encouraged students to set a quit date. -the kit included a smoking cessation guidebook, wallet-sized quitting cards, a motivating slide rule, and various products for use as a substitute to cigarettes. It was developed specifically for young adults and was based on a year of formative research. -counseling emails were sent weekly for the first month and then monthly for the five months following. The emails were written by staff counselors and were based on a set of templates developed from the content of the X-Pack guidebook. They were tailored to each participant (reasons for smoking, smoking triggers, chosen quit date, and other information collected at baseline). Participants were encouraged to reply by email with questions or comments and to keep their counselors updated on their cessation progress. -The <strong>Clearing the Air Program</strong> (CTA) consisted of an in-person counseling session that was similar to the counseling session in the X-Pack Program (introduce participant to materials, go over key information about cessation, encouragement to set a quit date). Participants were given self-help materials but not provided with additional assistance in quitting. -primary smoking outcome was self-reported 7-day abstinence from smoking at 6-months which was verified by salivary cotinine analysis. Secondary outcomes included reductions in the quantity and frequency smoked. A process evaluation was also conducted.</td>
<td><strong>X-Pack</strong> is based on social-cognitive theory -components promoted a five-step cognitive-behavioural program for quitting: -increasing positive outcome expectations -enlisting a QuitPal (support person) -setting a quit date -developing skills for overcoming cravings -quitting and preventing relapse.</td>
<td>-no significant differences found between two groups at baseline. <strong>Overall the smoking cessation outcomes</strong> favoured the X-Pack Program, however, only some of the results were significantly different. -at 3-months 31.3% of the X-Pack group had 10.2% of the X-Pack group had quit, and 5.7% of the CTA group had quit (based on biochemical verification and assuming those lost to follow-up were smoking). -at 3-months the X-Pack group had quit for twice as many consecutive days; at 6-months they had quit for almost three times as many consecutive days. -the X-Pack group reported three times as many days (at 3-months) and nearly three times as many days (at 6-months) since their last cigarette and a greater decline in cigarettes smoked but these differences did not reach statistically significance. -program participation was higher in the X-Pack program and while both groups reported a high rate of quit attempts, the X-Pack group were more likely to report having made a quit attempt and more likely to use a range of cognitive-behavioural techniques, to have called a friend or family member to deal with a craving, to have used certain techniques for dealing with a craving, and to have read over their own reasons for quitting smoking. No significant difference was found for setting a quit date, use of nicotine replacement therapy, or readership of the guidebook. -vast majority of participants (91.6%) indicated reading most or all of the e-mails from their counselor; almost half had replied three or more times. Participants used the components of the X-Pack kit regularly – gum was the most popular, the slide rule the least. -X-Pack was rated more favourably.</td>
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<td>Secondary Smoking Prevention in a University Setting: A Randomized comparison of an experiential, theory-based intervention and a standard didactic intervention for increasing cessation motivation. Simmons, V.N. &amp; Brandon, T.H. (2007). Health Psychology; 26(3): 268-277</td>
<td>Smoking students at South Florida college 18-24, read and speak English, smoking ≥5 cigs/wk 215 (136 female &amp; 79 male)</td>
<td>3-arm randomized design to examine the efficacy of an: 1) experiential secondary prevention intervention - create a series of health videos for HS seniors on smoking 2) control groups included a traditional didactic smoking intervention and, 3) experiential nutrition intervention – videos for HS students 3-arm randomized design to examine the efficacy of an: 1) experiential secondary prevention intervention - create a series of health videos for HS seniors on smoking 2) control groups included a traditional didactic smoking intervention and, 3) experiential nutrition intervention – videos for HS students</td>
<td>Cognitive dissonance theory</td>
<td>- as hypothesized, the experiential smoking intervention was more effective than either control group in increasing immediate motivation to quit, but the effect was found only among female participants (studies have found that women are more likely to self-disclose; social aspects of group discussion may have also been more relevant to women who are more interpersonally and socially oriented) - at 1-month follow-up both smoking interventions produced higher rates of smoking cessation and reduction than did the nutrition control condition - studies on gender differences and smoking further support idea that gender specific interventions may be needed – males are more motivated by nicotine effects and women are more motivated by contextual social smoking cues - exp-smoke intervention apparently produced no greater dissonance than standard didactic intervention is surprising, as is the relatively low level of dissonance reported - self-perception theory offers an alternative to dissonance theory for explaining change as a result of behaviours such as the videotaped testimonials in this study. Future studies should broaden the search for mediators and explore alternative ways of measuring key theoretical mediators</td>
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| The use of contingency management to reduce cigarette smoking among college students Correia, C.J. & Benson, T.A. (2006). Experimental and Clinical Psychopharmacology, 14, 2, 171-179. | -88 undergraduate students who were current smokers (at least 15 cigarettes per day) | -participants recruited through newspaper announcements, flyers posted on and around campus, announcements made in undergraduate psychology courses, and word of mouth. Those responding were screened by phone to ensure they met the inclusion criteria  
- during the first week of the study baseline data was obtained. Students were asked to visit a lab twice daily Monday-Friday where they gave CO samples and reported on their use of tobacco products in the last 24 hours. Students were paid $4 for attending each session.  
- in the second week of the intervention twice daily visits to the lab continued. Students received payment only if their CO levels were less than or equal to 8 ppm, which would indicate abstinence.  
- the amount of payment varied based on assigned conditions. Students in the low-magnitude reinforcement condition received $1 for the first CO reading of less than 8 ppm, and an additional $.50 for each consecutive reading of less than 8 ppm (i.e. the next payment would be $1.50, then $2 and so on). Bonuses were given for 5 consecutive low readings, readings greater than 8 ppm or failure to submit a reading reset the value back to $1. High-magnitude reinforcement participants were paid on the same schedule, with all values doubled. Following this schedule, the maximum earnings for the high-magnitude participant was $80.  
- the third week of study (baseline 2) was the same as the first week. Participants also earned bonuses for attendance - $25 for attending every session throughout the baseline and assessment phases and $15 for attending at least 80% of the scheduled sessions. | -Contingency Management | - both low-magnitude and high-magnitude smokers had lower CO readings during the intervention week than the baseline weeks.  
- readings in the high-magnitude group were lower than those in the low-magnitude group. |
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<td>College students’ perspective on smoking cessation: “If the message doesn’t speak to me, I don’t hear it”</td>
<td>3 groups of 18-24 year-old college students – smokers with no desire to quit (n=5), former smokers (n=7), smokers struggling to quit (n=7)</td>
<td>Descriptive study using focus group methodology 3 focus groups: 1) former smokers 2) current smokers who tried to quit but have been unsuccessful 3) current smokers with no desire to quit Inclusion criteria: 18-24 year old college student Currently smoking ½ pack cigs/day OR had smoked ½ pack cigs/day and had been a non-smoker for at least 3 months</td>
<td></td>
<td>- all former smokers quit ‘cold turkey’  - smokers from all groups thought patch or other NRT was for someone who had been smoking a long time  - general thought about quitting was to “just quit”  - former smokers saw little need for any program to help smokers quit and did not believe that pharm. agents would be necessary  - struggling smokers unsuccessfully used willpower, distraction and substitution  - active smokers stated that smoking was too much a part of their social environment and self-image to consider quitting  - reason that former smokers and struggling smokers chose to become nonsmokers fell into 3 themes: physiological impact, cost and aesthetics - while all 3 groups note aesthetic consequences, active smokers did not raise physiological impact or cost-related consequences  - activities assoc. with smoking included drinking, partying, studying, talking with friends, and driving  - addiction and withdrawal were terms and experiences assoc. with older, more long-term smokers, not young, healthy, relatively new smokers – attributed these images to the media and public health campaigns and experiences with family members</td>
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- **Target** goals were to increase the awareness of tobacco and its harmful effects and increase student involvement in tobacco prevention activities.  
- **Resource Identification** occurred through an inventory of campus programs and expertise identifying student stakeholders and resources in wellness programming.  
- **Unification** attempted to minimize competition for audiences and venues and encouraging collaboration by contacting stakeholders and resource representatives about unifying STRIKE components with their preexisting agendas.  
- **College Peer Education** occurred with trained peer educators who hosted education sessions and discussions in club meetings, dorms, with student organizations and during health-related courses. Sessions presented information on health effects of nicotine addiction, social triggers of tobacco use, healthy alternatives to smoking, and cessation strategies. | -Peer education | -Attendance rates and survey responses indicate that close to 13,500 students received information about health effects of tobacco use, prevention and cessation at least once during the STRIKE program.  
-343 students filled out a survey at a wellness expo. Of these 72% had heard about STRIKE before the expo, 33% heard about the event through a flyer, 52% wanted additional information about tobacco prevention and control, and 49% indicated interest in becoming a student advocate.  
-Students liked the STRIKE posters, the friendly manner in which the peer education was conducted, refreshments and free key chains and t-shirts.  
-Attendance at one of the events was below that which was hoped and only 12 of the expected 15 peer-education presentations on tobacco control occurred. Researchers state that to ensure better outcomes in the future, a closer collaboration with the school is recommended to ensure efficient scheduling within the university calendar. |
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<td>Smoking cessation and relapse prevention among undergraduate students: A pilot demonstration project</td>
<td>60 students completing a cessation program at the University of Wisconsin-Stevens Point.</td>
<td>- Study participants solicited through email, posters, postcards and an open informal meeting; - Cessation tool used was the American Lung Association’s Freedom From Smoking (FFS) program. - Participants were promised access to a number of resources: membership in a campus fitness center, use of a quitline, continued use of the FFS written and online support materials, 1 academic credit toward a 3-credit wellness graduation requirement, and regular face-to-face contact with their small-group peer facilitator. - Researchers and student facilitators were trained by an ALA representative. Cessation program involved 8 small group sessions over a 7-week period. Participants were given extensive handouts, a relaxation tape and brochures. A ‘quit date’ was set for halfway through the 8-session program. The first four sessions are dedicated to issues of smoking cessation; the last four are focused on preventing relapse. - After completing the cessation component, students met at least monthly to discuss issues and engage in group exercises related to a smoke-free lifestyle. - Topics of discussion included: coping with social situations, managing the home environment, engaging in and developing exercise programs, adopting healthy eating habits, practicing stress-management techniques, and using the Wisconsin Tobacco Quit Line. - Participants were supported by facilitators through biweekly e-mails and telephone conversations. Qualitative data about cessation and relapse-prevention issues and efficacy were also gathered over email and phone. - Assessment data was gathered after the cessation part of the program (baseline data), and then twice more (in four month intervals).</td>
<td>- Published literature used as a starting point for relapse-prevention activities. Literature addressed: nicotine replacement therapy, individual counseling sessions, self-help behavioural interventions, exercise, and relapse prevention.</td>
<td>- 60 students completed the cessation program. - Quit rate was 88.2%. - After participation in the relapse prevention program, 63.3% of initial quitters remained smoke free. - Most participants felt that belonging to a group throughout the cessation process enhanced their feeling of connectedness which contributed to their ability to quit and stay smoke-free. - Student facilitators were able to adapt the language of the FFS program based on the needs of the participants. - Although not widely used, incentives were mentioned by the participants as being useful in helping them decide to sign up for the cessation program.</td>
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Limitations: performed on a single college campus; no control group; conducted over 2 semesters, some participants were lost over the semester break; the campus was serving as a control campus for another smoking-cessation project which prevented the use of social norms and marketing strategies; could not train facilitators to perform identically.
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<td>College smoking-cessation using cell phone text messaging</td>
<td>46 college students aged 18-25 from campuses in greater Washington D.C. area who were current smokers</td>
<td>-developed and tested the feasibility of an integrated Web and text-messaging program for smoking cessation Registration-users register for the program, providing contact information and answering assessment questions on a website Text messages-smoking cessation messages are sent to participant’s cell phone by text message and are individually tailored to each participant based on answers to assessment questions. Initial text messages are followed by messages sent in increasing frequency during the preparation stage followed by messages sent at times when the user is most likely to smoke on quit day. Messages relevant to quit maintenance and relapse prevention follow. Website-going feedback is also provided on the website. Participants are encouraged to visit the website daily to input the number of cigarettes they have smoked and view a graph indicating how many cigarettes they have smoked since the beginning of the program. Users could also view a log of all text messages, and receive messages from personal support people on the website. Support person-Users can create a user name and password for a support person who is able to log on and view the user’s progress and is prompted by email to leave messages to encourage the user. Tips are available in educational modules. -participants completed a number of self-report smoking measures at pretest and 6 weeks later at posttest. Measures included 7-day smoking reconstructions, the Nicotine-Dependence Syndrome Scale (NDSS), and a program-use questionnaire.</td>
<td>Behavioural self-regulation theory</td>
<td>-of the 46 initial participants, full data was only available for 31 students. -at 3-weeks 33% of those contacted, 17% of the total sample reported they had quit smoking. The majority of those who had not quit indicated they were actively trying to quit, or planning to quit in the remaining three weeks of the program. Two participants indicated they had no intention to quit. -29 of the 46 participants registered on the website during the 6-week period. Those who did not register were followed up with to inquire about nonregistration. Nonregistrants indicated that they would have initialized their program on the website when they signed up for the program. It may also reflect ambivalence about quitting among this age group and lack of convenient internet access. -at the end of 6-weeks 20 participants (65% of those contacted, 43% of total participants) had made a 24-hour quit attempt, 12 of these reported a relapse. Of the 12 fewer than 5 attempted another 24-hour quit, 2 of them had quit at the end of the treatment, 2 had stopped smoking but did not meet the 7-day criterion -10 of the participants met the 7-day criterion (22%) for quitting; among the participants who had not quit 78% substantially reduced their smoking and were actively trying to quit. -scores on ease of using the different programs, comfort in using the program and overall satisfaction with the program were moderately high. Participants who quit gave higher scores. -participants were positive about the novelty and helpfulness of the program and suggested even further tailoring of the text messages; opinions on the frequency of the messages were mixed; users found it inconvenient to return to the website to record their daily cigarette use. -results are promising and suggest that a behavioural smoking-cessation program can be delivered using text messaging. The program was highly rated on acceptability, satisfaction, and subjective ratings of success.</td>
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<td>Development and process evaluation of a web-based smoking cessation program for college smokers: Innovative tool for education. Escoffery, C.; McCormick, L.; Bateman, K. (2004). Patient Education and Counseling, 53, 217-225.</td>
<td>35 college students (20 women; 15 men) -mainly juniors and seniors – avg age 21.</td>
<td>-paper reports on the development process and process evaluation of a web-based smoking cessation program – Kick It!. -program was developed after formative research was done: focus groups with college students conducted, web-based program informed by health experts and other smoking cessation materials. -web sessions consisted of 2-7 screens of smoking cessation information and was available for 2 weeks. Smokers received stage-matched messages based on a staging question at each session. -personal smoking information could be entered through an interactive, personalized assessment. Smokers could enter pros and cons of smoking, reasons for quitting smoking, goals related to quitting, and individuals who could support them in their decision to quit. -immediate feedback was given in a web-based form and e-mailed to them. -links to authoritative health sites with smoking cessation information were also provided. -social support components included: Ask-the-Expert, opportunities to share stories in a Personal Story area, and stage-matched discussion boards. -after the website was developed tobacco control professionals reviewed the content, the reading level was assessed, and usability was tested with smokers. -participants attended web sessions over a 2-month period. They completed an online posttest survey that evaluated their participation, usage of the program and the usefulness, interest, value and personal relevance of the program (17 participated in the survey). -user activities were also tracked using an embedded tracking system. In-depth interviews were also conducted with six smokers (all 35 invited to participate in interviews).</td>
<td>-Transtheoretical model; Social support  -Instructional design theory and usability principles for the web architecture</td>
<td>-at the end of the intervention, 14.3% reported quitting (5 participants); at 6-month follow-up, 25.7% (9 participants) reported quitting.  -of participants completing the survey, 94% reported participating in the four sessions (range 2-4 sessions); reading 86.3% of the web session content. Reading the text, taking quizzes and using the quitting resources link page were the top web activities. The activity used the least was the Ask-the-Expert; use of other social support components was also low.  -Kick It! was generally rated positively on factors of utility, interest, value and personal relevance. Participants indicated the program was easy to use, informative, relevant and useful in reminding them to act on quitting.  -repetition of content, technical issues, and unavailability of previous sessions were highlighted as what was disliked about the program.  -majority indicated they would consider participating in more web-based programs (94.1%).  -in-depth interviews highlighted more positive feedback. Interviewees liked the private nature, consciousness-raising, interactive components, length and number of sessions of the program. Only a few comments were made about the social support components. One respondent felt that offering opportunities to meet others in the program in person might be helpful.  -recommendations from the interviews included in-person social support, a more individualized program, and changes to format and content.  -limitations: small sample size that is not representative of all smokers – results may not be generalizable; High attrition rate; may be a bias in the in-depth interviews.</td>
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Appendix B: Other Health Related Interventions


