

Contraband Tobacco on Post-Secondary Campuses in Ontario

Meagan Barkans, BHSc

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Supervisor: Kelli-an Lawrance, PhD

Faculty of Applied Health Sciences, Brock University  
St. Catharines, Ontario

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## **Abstract**

In Ontario 27% of young adults smoke, and annual surveillance data suggests tobacco use is plateauing after years of decline. The availability of inexpensive contraband tobacco products maybe contributing to this situation. Limited research has been conducted on the use of contraband tobacco and despite the increasing availability of contraband 'Native cigarettes', no studies to date have examined their use among young adults. Accordingly, this study examines: (a) what proportion of cigarette butts discarded on post-secondary campuses are contraband; and (b) whether the proportion of contraband butts varies between colleges and universities, across seven geographical regions in the province and based on proximity First Nations reserves. In March and April 2009, discarded cigarette butts were collected from the grounds of 25 post-secondary institutions across Ontario. At each school, cigarette butts were collected on a single day from four locations. The collected cigarette butts were reliably sorted into five categories according to their filter-tip logos: legal, contraband First Nations/Native cigarettes, international and suspected counterfeit cigarettes, unidentifiable and unknown. Contraband use was apparent on all campuses, but varied considerably from school to school. Data suggest that contraband Native cigarettes account for as little as 1% to as much as 38 % of the total cigarette consumption at a particular school. The highest proportion of contraband was found on campuses in the Northern part of the province. Consumption of Native contraband was generally higher on colleges compared to universities. The presence of contraband tobacco on all campuses suggests that strategies to reduce smoking among young adults must respond to this cohort's use of these products.

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## **Chapter I: Introduction**

Following the publication of the Royal College of Physicians & Surgeons' report on Smoking & Health in 1962, Canada began its first tobacco control and public education campaign in an attempt to decrease smoking rates and tobacco related illness and deaths (Health Canada, 2008a). In 1986, multi-year federal strategies were implemented, leading to the creation of the National Tobacco Control Strategy (NTCS) in 1999. The NTCS, which was supported and enforced by both the federal and provincial/territorial levels of government, emphasized smoking prevention, smoking cessation, protection from environmental tobacco smoke, and denormalization of tobacco products and tobacco industry practices. The NTCS further set forth five strategic directions which included: policy and legislation; public education; industry accountability and product control; research; and, building and supporting capacity for action (Health Canada, 2007a).

Tobacco control advocates, health professionals, policy makers, researchers, and stakeholders generally agree that a number of initiatives set out by the NTCS have been particularly effective. These include education programs; provincial and national legislation restricting tobacco sales to youth; control of second-hand smoke through workplace and public area smoking restrictions; graphic warning labels on cigarette packages; and the introduction of provincial telephone help lines (Public Health Agency of Canada, 2004). Since the initiation of the NTCS, Canada has successfully decreased the population prevalence of tobacco use in those 15 years of age and older from 25% in

1999 to 18% in 2008 (Health Canada, 2009a). In Ontario, smoking prevalence for the same age group has decreased from 23% in 1999 to 17% in 2008 (Health Canada, 2009a)

Despite this success, numerous tobacco control issues remain. In 2007, Health Canada introduced new goals in the Federal Tobacco Control Strategy (FTCS) announcing a greater emphasis on decreasing smoking rates among youth, young adults, First Nations, Inuit, and other Aboriginal groups (Health Canada, 2008b). Additionally, contraband tobacco became an area of focus with monitoring contraband activities becoming one of six objectives outlined in the FTCS.

Currently, the Canadian and Ontario governments continue to focus on young adult smoking rates, and both levels of government are busily working toward immediate action strategies for this population. Contraband tobacco also remains under close scrutiny as tobacco control advocates, law enforcement officers, and politicians draw attention to the growing availability of inexpensive contraband tobacco products, particularly in the provinces of Ontario and Quebec. However, despite government attention to young adults and contraband tobacco, large gaps remain in our understanding of the prevalence of contraband tobacco use by young adults.

In an attempt to better understand the issue of contraband tobacco, this study examined to what extent contraband tobacco was used by young adults attending post-secondary schools in Ontario.

## Chapter II: Literature Review

### Legal Tobacco

#### **Federal regulation of tobacco growing, manufacturing, transportation and sales in Canada**

***Growing tobacco.*** In 2008 the Canadian federal government announced a Tobacco Transition Program (TTP) designed to financially assist farmers wishing to leave the tobacco industry. Prior to the TTP farmers were not required to have a license to grow tobacco (Canada Revenue Agency, 2003a), but were required to keep records of the amount of tobacco they grew, received and disposed of, as well as the type and source of their tobacco manufacturing equipment (Department of Justice Canada, 2009a). New regulations now state that farmers who do not participate in the TTP must apply for a license if they wish to continue producing tobacco (Agriculture and Agri-Food Canada, 2009). Further regulations state that tobacco farmers can only sell their raw tobacco to licensed tobacco packers and/or manufacturers (Canada Revenue Agency, 2003a).

***Manufacturing Tobacco Products.*** Canadian tobacco packers and manufacturers must be licensed. The Canadian Revenue Agency (CRA) is responsible for issuing this license. The license covers all steps associated with preparing tobacco for sale, including packing, stemming, converting and packaging (Department of Justice Canada, 2009a; Canada Revenue Agency, 2003b). To comply with regulations of this license, manufacturers must mark packaged tobacco products with either a tear tape (used on packaged cigarettes) or a rectangular stamp (used on other tobacco products) to indicate that Excise Duty has been paid (Canada Revenue Agency, 2005). All regulations pertaining to packaging and stamping of tobacco products by tobacco manufacturers are

contained in the Excise Act and the Stamping and Marking of Tobacco Regulations (Department of Justice Canada, 2009a; Canada Revenue Agency, 2005). In 2008, the Canada Revenue Agency announced a new excise stamping regime for tobacco products, due to be implemented in 2010 (Canada Revenue Agency, 2008).

***Selling Tobacco Products.*** The Federal Tobacco Act (FTA), which is administered and enforced by the Health Canada Tobacco Control Programme, “regulate[s] the manufacture, sale, labelling and promotion of tobacco products” (Health Canada, 2008c). The FTA regulates substances in tobacco products, their emissions, information displayed on tobacco packaging, signage required in tobacco retail space and several other aspects of product design and sale (Department of Justice Canada, 2009b). FTA regulations also require that any person and/or organization wishing to purchase bulk tobacco intended for resale must apply for a Wholesalers Permit, which is obtained through the individual’s provincial government (Ministry of Revenue, 2009).

### **Provincial Regulation of Tobacco Sales in Ontario**

***Tobacco Product Sales and Taxes.*** In Ontario, the Tobacco Tax Act (TTA) outlines regulations associated with the sale and tax of all tobacco products including cigarettes, cigars, loose tobacco, chewing tobacco, leaf tobacco and blunt wraps (Ministry of Revenue, 2008a). Ontario retailers wishing to sell tobacco must apply for and be granted a valid Retail Sales Tax Vendor Permit, which is distributed by the Ontario Ministry of Revenue (Ministry of Revenue, 2008b). This vendor permit allows retailers to sell tobacco that has been purchased from an Ontario-registered tobacco wholesaler (i.e., individuals or organizations holding a valid Wholesalers Permit). It is the responsibility of the retailer to ensure that the wholesaler is in fact registered.

In Ontario, tobacco which meets the legal regulations of the Tobacco Tax Act can be identified by the presence of a yellow tear strip on the packaging (see Figure 1) (Ministry of Revenue, 2008a). Tobacco packaging with a peach coloured tear strip is intended for sale in some duty free stores to the general public or on reserves to First Nations people. Any tobacco without the yellow tear strip on the packaging (or peach in duty free stores or on reserves), or with any other colour of tear strip on the package is illegal. Cigarettes sold in clear plastic bags with no tear strip are also illegal (Ministry of Revenue, 2008a).

## **Contraband Tobacco**

### **Definition and Examples of Contraband Tobacco**

**Definition.** Contraband tobacco can be defined as “any tobacco product that does not comply with the provisions of all applicable federal and provincial statutes” (RCMP, 2008). This non-compliance can occur any time during the importation, stamping, marking, manufacturing, distributing and payment of duties and taxes (RCMP, 2008).

There are a variety of ways that contraband tobacco is produced, enters the market and is purchased by consumers. These are described below.

### ***Smuggling.***

***Large scale/wholesale cigarette smuggling.*** Large scale or wholesale cigarette smuggling “involves the illegal transportation, distribution, and sale of large consignments of cigarettes and other tobacco products, generally avoiding all taxes” (Joossens, Chaloupka, Merriman & Yurekli, 2000). This illegal activity is commonly run by large organized crime networks allowing cigarettes to be smuggled over large distances and distributed widely (Joossens et al., 2000; Luk, Cohen & Ferrence, 2007).

ONTARIO – CANADA DUTY PAID – DROIT ACQUITTÉ – ONTARIO – CANADA DUTY PAID – DROIT ACQUITTÉ

*Figure 1.* Yellow tear strip found on cigarette packages in Ontario, indicating Excise Duty paid.

Adapted from “Summary of Tobacco Tax Rules for Retail Dealers”. Ontario Ministry of Revenue. Retrieved July 22<sup>nd</sup>, 2009 from [http://www.rev.gov.on.ca/english/bulletins/tt/1\\_2008.html](http://www.rev.gov.on.ca/english/bulletins/tt/1_2008.html)

In Canada during the early 1990s, availability of contraband tobacco was largely a result of wholesale smuggling (Luk et. al, 2007). During this time an increase in the excise tax assigned to domestic cigarettes, and the lack of taxes assigned to tobacco destined for foreign countries, prompted Canadian tobacco manufacturers to export billions of domestic cigarettes to United States wholesalers (Cunningham, 1996). Through the use of organized crime networks, these Canadian cigarettes were then smuggled back into Canada through First Nations Reservations along the Canada-U.S. border from where they were then distributed to wholesalers, retailers, street vendors and ultimately, to consumers (Luk et al, 2007, Schneider, 2000).

Officials report that contraband tobacco is still being smuggled through First Nations Reservations, however the tobacco is no longer mainly Canadian-manufactured. Instead, American First Nations manufacturers supply the majority of Canada's contraband tobacco. In Ontario this supply of contraband tobacco comes mostly from the Akwesasne Reserve (which straddles the borders of Ontario, Quebec and the U.S.) and the Tyendinaga and Six Nations reserves. In Quebec the supply emanates from the Kahnawake reserve. (Figure 2 and figure 3 show the locations of these reserves). The U.S. side of the reserves act as the major point of entry for smuggling these illegal products into Canada (Health Canada, 2007b).

***Bootlegging.*** Bootlegging occurs when cigarettes are smuggled from a low-tax jurisdiction to higher tax jurisdiction and typically involves areas within close proximity to each other such as neighbouring jurisdictions or countries (Joossens et al., 2000). Due to the small scale and low investment requirements of bootlegging, it is commonly organized by small groups of individuals (Joossens et al., 2000).

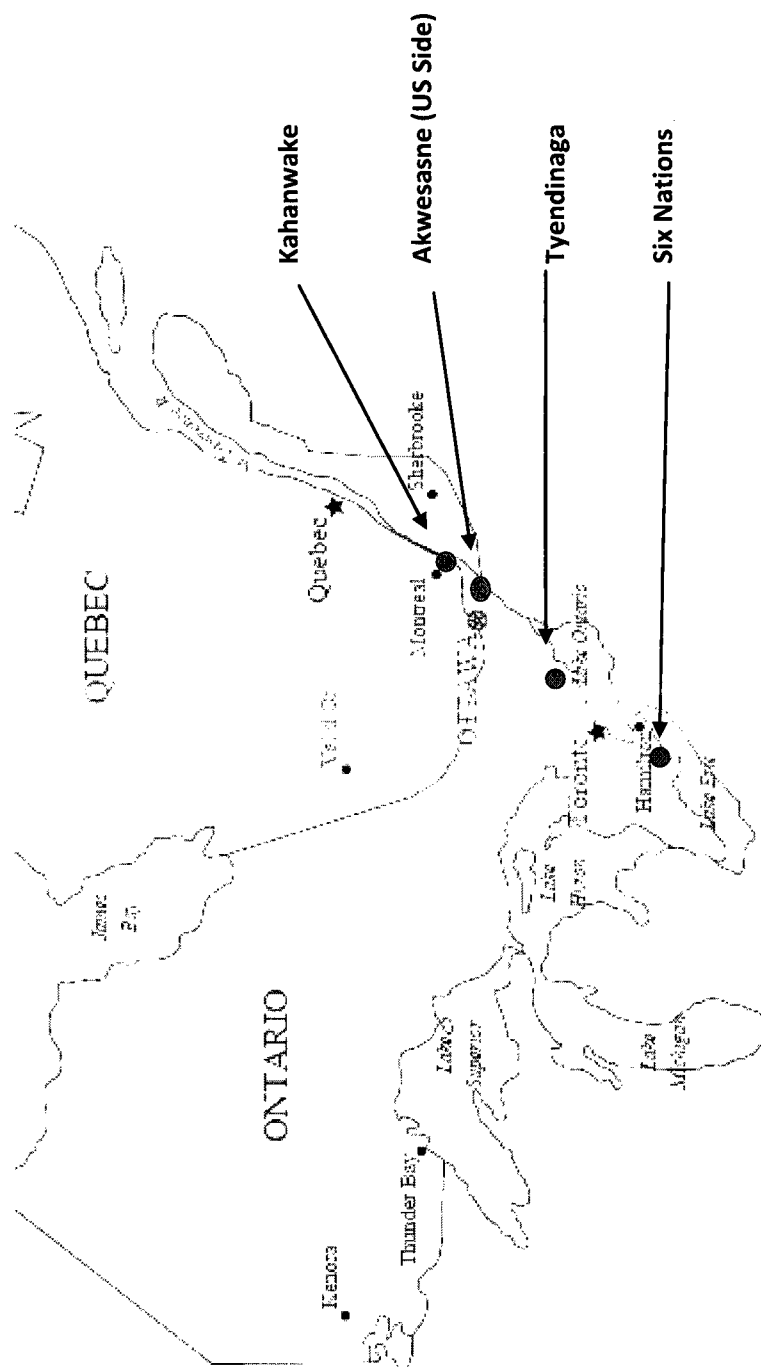


Figure 2. Locations of First Nations reserves identified as largest sources of illegal tobacco in Canada

Adapted from Central Canada: Brock University Map Library. Available: Brock University Map Library Controlled Access [http://www.brocku.ca/maplibrary/maps/outline/North\\_America/CCANADA.pdf](http://www.brocku.ca/maplibrary/maps/outline/North_America/CCANADA.pdf) (Accessed August 23, 2009).



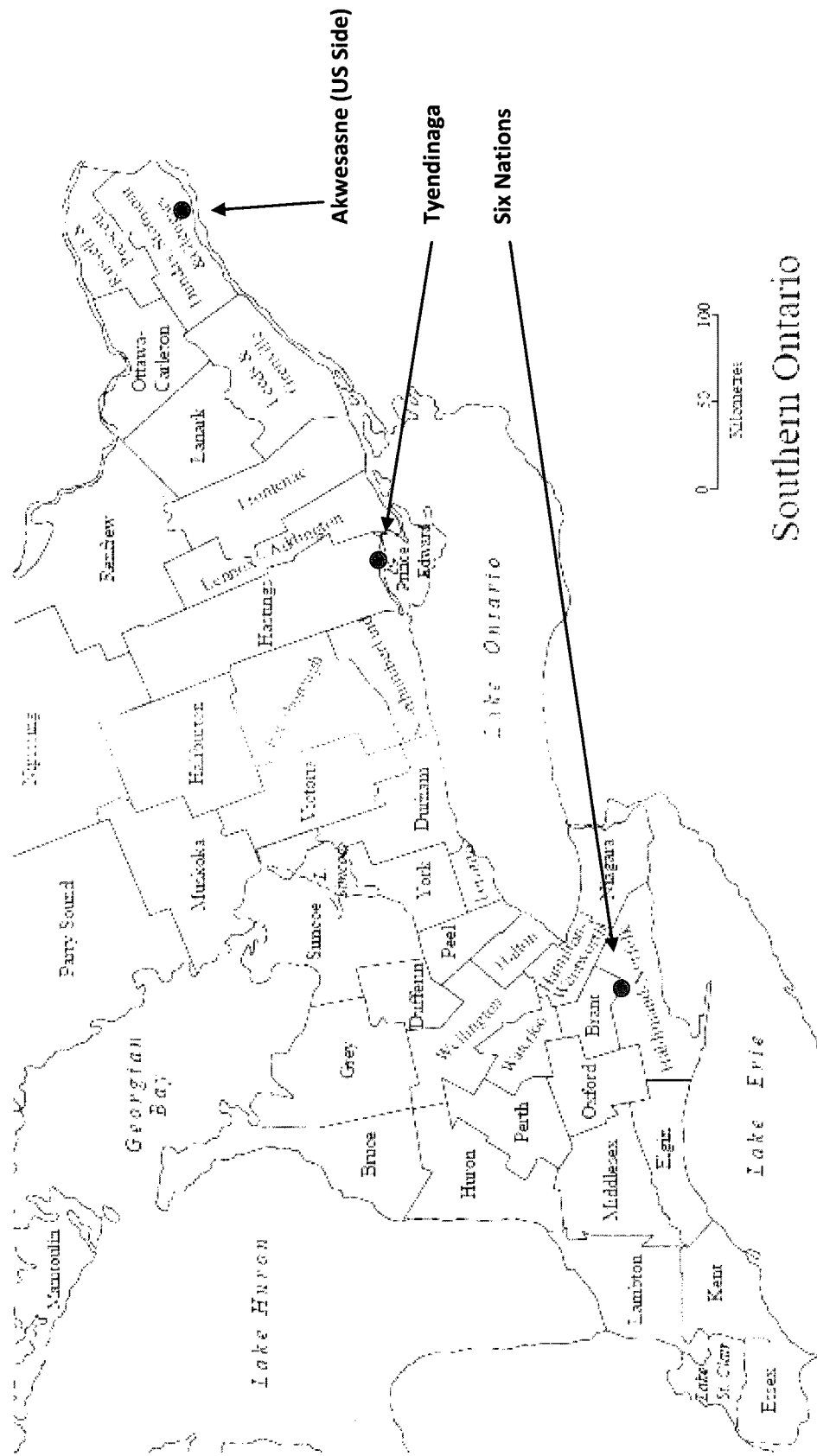


Figure 3. Locations of Akwesasne, Tyendinaga and Six Nations reserves  
 Adapted from Southern Ontario: Brock University Map Library. Available: Brock University Map Library Controlled Access  
[http://www.brocku.ca/maplibrary/maps/outline/North\\_America/CCANADA.pdf](http://www.brocku.ca/maplibrary/maps/outline/North_America/CCANADA.pdf) (Accessed August 23, 2009).

Like wholesale smuggling, bootlegging also occurred in Canada during the early 1990s. In some cases cigarettes exported from Canada to the U.S. retail outlets were purchased by individuals and small gangs who took advantage of the low U.S. tax rate. These individuals then smuggled the cigarettes back into Canada where they sold them for profit (Luk et al., 2007). Cross provincial smuggling also occurred in Canada throughout the 1990s when the price of tobacco varied greatly across provinces (Square, 1998).

To avoid discovery, bootleggers sometimes use counterfeit tax stamps, allowing contraband cigarettes to be sold alongside legal tobacco in the higher-tax locales (Thursby & Thursby, 2000).

***Casual smuggling.*** Casual smuggling occurs when individuals either travel to or use the internet to purchase cigarettes for personal use from a low-tax state or province (Joossens et. al, 2000; Luk et al., 2007). For example, during the early 1990s individuals living in Windsor, Ontario crossed into Detroit, Michigan and purchased cigarettes that included all applicable state and U.S. taxes but were still cheaper than cigarettes in Ontario (Joossens et. al, 2000).

***Illegal purchase and manufacture.***

*GST/HST relieved and provincial tax exempt tobacco.* Currently in Canada, status Natives are exempt from paying provincial taxes and the federal GST/HST on tobacco purchased on a First Nations Reserve. Non-native Canadians are not exempt, no matter where or from whom they purchase tobacco. Nevertheless many non-native individuals are now getting illegally sold tax-exempt cigarettes from smoke-shops on reserves

(Canadian Cancer Society, 2008; RCMP, 2008). These cigarettes are purchased for personal use as well as for resale (Luk et al., 2007).

*Illegal tobacco manufacturing plants.* The majority of contraband tobacco entering the Canadian market is coming from American First Nations manufacturing sites on the U.S. side of Akwesasne reserve as well as from illicit and licit manufacturers on reserves in Canada, including the Kahnawake reserve in Quebec and the Tyendinaga and Six Nations reserves in Ontario (RCMP, 2008). These manufacturing sites range “from small ad-hoc operations to fully equipped manufacturing plants” (RCMP, 2008).

***Counterfeit, international and criminally-obtained.***

*Counterfeit and international tobacco.* In Canada, both counterfeit and international tobacco products are being smuggled into the country through sea containers. Counterfeit products involve both domestic and international brands. The majority of these counterfeit and international products are coming from China though some specialty tobacco products such as water-pipe tobacco are being imported from United Arab Emirates, Jordan, Egypt, and Saudi Arabia (RCMP, 2008).

*Criminally obtained tobacco.* Some of the contraband tobacco in the Canadian market is also being acquired through illegal activity such as convenience store and cargo thefts (RCMP, 2008). For example in Vaughan, Ontario a truck driver was shot and the \$200,000 worth of cigarettes he was transporting were stolen (RCMP, 2008).

**Tobacco Taxes and Contraband**

***Patterns of availability of contraband tobacco.***

*History of contraband tobacco in Canada.* In 1951, the federal government of Canada increased tobacco taxes by three cents (Cunningham, 1996). This increase,

combined with an additional two cent increase from manufacturers, resulted in a large difference in cigarette prices between Canada and the United States. The significantly higher price of Canadian cigarettes led to an increase in the smuggling of lower-priced tobacco from the United States into Canada. The flow of contraband tobacco into Ontario and Quebec during this time marked the first real surge in Canada's contraband tobacco market (Cunningham, 1996). Ultimately, it led to the Finance Minister's decision to roll back tobacco taxes in 1952, and again in 1953 in hopes of bringing an end to the cross border smuggling (Cunningham, 1996). Reducing taxes on Canadian cigarettes did produce the desired consequences of eradicating the cross-border smuggling. The higher prevalence of cigarette smoking during the 1960s and 1970s suggest that the low cost of cigarettes also contributed to the widespread use of tobacco by Canadians (Cunningham, 1996).

As the years progressed, the incomes of Canadians grew, but tobacco prices (i.e., taxes) were not equivalently maintained. As a result of this situation, the Canadian tax rate prior to the 1980s was the lowest among wealthy countries (Sweanor, 1994) making cigarettes in Canada relatively inexpensive. Health and medical organizations responded to this situation by persistently and loudly pointing to the relationship between cost and consumption of cigarettes, and by calling on Canadian governments to raise the price of cigarettes. Through a combination of federal and provincial tax increases, cigarette prices were raised by a total of 170% during the ten years spanning from 1982 to 1992 (Sweanor, 1994). The higher taxes were associated with decreased tobacco consumption, particularly among youth (Cunningham, 1996; Sweanor, 1994), and also increased government revenues.

Despite these positive consequences, however, the availability and use of contraband tobacco also increased during this time (Kelton & Givel, 2008). It is now known that, to avoid the increased taxes being charged to cigarettes intended for the domestic market, Canadian tobacco manufacturers began taking advantage of low export taxes assigned to cigarettes destined for foreign countries. They did so by legally exporting their cigarettes to the United States and then illegally smuggling them back into Canada (Breton, Richard, Gagnon, Jacques & Bergeron, 2006; Schneider, 2000; Kelton & Givel, 2008; Cunningham, 1996). The large majority (80%) of this contraband tobacco entered Canada through the Akwesasne reserve (which straddles the United States-Canada border) and was then distributed to major Canadian cities for sale (Cunningham, 1996). Other points of entry included the Kahnawake reserve located in Quebec and the Six Nations reserve in Ontario (Cunningham, 1996).

In response to the increasing exportation and smuggling of Canadian tobacco, the federal government imposed an export tax of \$8 per carton of cigarettes in February of 1992. This increase in the export tax effectively decreased Canadian export shipments by 67% (Sweanor, 1994). After strong protests by the tobacco industry and threats of moving their manufacturing to the United States, the Canadian government conceded to the industry's pressure and removed the tax, a mere two months after its implementation (Cunningham, 1996).

This wave of tobacco smuggling into Canada peaked in 1993- a year after the government backed down from its initial stance against smuggling (Cunningham, 1996). According to Sweanor (1994) a combination of factors contributed to the relative ease of smuggling tobacco into Canada during the late 1980s and early 1990s. For example,

tobacco smuggling was facilitated by the high volume of the Canadian population living within a two hour drive of the Canada-U.S. border and the frequency of border crossings between the two countries. This situation afforded Canadians many opportunities to engage in casual smuggling and bootlegging. The unique Canada-U.S. border, which is the longest undefended border in the world, may have contributed to larger scale, organized smuggling. Along these lines, there is no doubt that the Akweasne Indian Reservation which includes parts of Ontario, Quebec and New York State became a prime location for large-scale movement of contraband tobacco from the USA into Canada (Sweanor, 1994). By 1994, it was estimated that 25% of the Canadian market share was held by contraband tobacco (Sweanor, 1994).

Due to the criminal element of smuggling, and the deceptive practices of the tobacco industry, the government sought to reduce cross-border smuggling of tobacco (Cunningham, 1996). In an attempt to stem the flow of contraband tobacco, in 1994 the federal government reduced federal taxes on tobacco by five dollars a carton immediately and promised to match provincial-reductions to a maximum of five dollars (Cunningham, 1996, Sweanor, 1994). In the provinces of Ontario and Quebec, the retail costs of cigarettes decreased by more than half (Cunningham, 1996). This tax rollback decreased smuggling from the United States into Canada as the legal price for cigarettes in Canadian provinces such as Ontario and Quebec was lower than in neighbouring states (Cunningham, 1996). Of interest, not all provinces reduced their taxes though, and this led to further smuggling, this time interprovincial, as lower priced cigarettes from Ontario and Quebec were exported and sold in provinces that had maintained higher taxes (Square, 1998).

Despite the desired effect on smuggling, a significant health price was paid for the decrease in tobacco taxes. Tobacco consumption increased across the country, particularly in the youth population (Joossens & Raw 2000). Provinces with greater tax cuts had higher proportions of smoking initiation among young adults (Zhang, Cohen, Ferrence, Rehm, 2006). On top of the health burden created by increased tobacco use, 1.2 billion in taxation revenue was lost by the government (Joossens & Raw 2000). These issues led to an agreement between the federal and provincial governments to gradually and simultaneously increase tobacco taxes until they reached levels that existed prior to the rollback (Canadian Coalition for Action on Tobacco, 2007). By 2002, the excise taxes and duties on tobacco had returned to the levels they were prior to the 1994 decrease. While federal taxes have not changed since 2001, provincial tax increases have continued since then (RCMP, 2008).

Not unexpectedly, given the historical pattern of rising tobacco prices triggering more smuggling activity, Canada is once again experiencing growth in the contraband tobacco market. In the 1990s, smuggled tobacco represented the majority of contraband product. Smuggling operations were supported and orchestrated by the tobacco industry. Today the majority of contraband tobacco in Canada is still being smuggled through the Akwesasne First Nations Reserve from the United States (Health Canada, 2007b), the Kahnawake reserve in Quebec, and the Six Nations reserve in Ontario. This time, however, the tobacco industry does not seem to be involved. The 2008 Contraband Enforcement Strategy issued by the RCMP states that “the current trend of manufacturing, distributing and selling contraband tobacco products, which has developed exponentially over the last six years, involves organized crime networks

exploiting Aboriginal communities.” Despite the change in suppliers of contraband tobacco, it is clear that growing availability of contraband tobacco is associated with higher prices of legal cigarettes.

***Criminal aspects of contraband tobacco.*** According to the RCMP (2008), there are four main sources of contraband tobacco in Canada at this time. First, the largest source of illegal tobacco in Canada is manufacturing operations on the U.S. side of Akwesasne reserve, the Kahnawake reserve, the Tyendinaga reserve, and the Six Nations reserve. These operations supply the largest portion of contraband tobacco in Canada. Second, counterfeit products (mainly from China) and international tobacco products are being smuggled into Canada via sea containers. Third, tax exempt tobacco products meant for sale on First Nations Reserves to status Natives are being illegally purchased on reserves by non-natives and illegally diverted for sale in cities. Fourth, a portion of the current contraband tobacco on the market is being obtained through criminal activity such as convenience store and cargo theft.

***Arrests, confiscation.*** Health Canada (2007b) states that the most commonly confiscated illicit tobacco product in Canada is bags of cigarettes in quantities of 200, which originate from a variety of manufacturing locations found on First Nations reserves. This information is repeated in the 2008 Imperial Tobacco report which found that 63.3% of the illegal tobacco examined in their study was loose cigarettes (GfK Dynamics, 2008).

According to the report “Health Concerns: Report to the Conference of the Parties on the Implementation of the Framework Convention on Tobacco Control.” (Health Canada, 2007b) in 2005, a total of 135,895 cartons of cigarettes were seized at marine ports of



entry by the Canada Border Services Agency (CBSA). The majority of these cartons were either counterfeit or Chinese brand cigarettes. A total of 71 postal/courier seizures, 75% of which originated from China, were also made in 2005. Additionally, 105 seizures of Egyptian water type tobacco were made in 2005. Between ports of entry, 233,376 cartons were also seized by the RCMP in 2005. In the first 9 months of 2006 the number of counterfeit and Chinese brand cigarettes entering marine ports had already doubled what was seized in 2005. Overall, 6% of RCMP seizures made in 2006 were foreign tobacco products (RCMP, 2008).

Recently, stories of arrests and seizures of contraband tobacco have flooded the news. In May, 2009 alone Ontario RCMP officers reported the following seizures of contraband cigarettes: 23,750 bags from a tractor trailer in Cornwall Ontario (RCMP, 2009a); 1,000 bags from a driver in Cornwall, Ontario; 1000 bags from a driver in South Glengarry, Ontario (RCMP, 2009b); 14,250 bags from a van in South Stormont Ontario (RCMP, 2009c); and 65,700 cartons or resealable bags from a tractor trailer in South Stormont, ON (RCMP, 2009d).

“We believe we intercept about 15 contraband cigarette crossings per week, while there is an average of 110 per day, seven days a week” says RCMP officer Sgt. Michael Harvey when discussing contraband tobacco crossing from the US side of the Akwesasne Mohawk reserve into Cornwall, Ontario (Doucet, 2009).

Beyond just illegal tobacco, there is a growing concern surrounding the amount of other criminal activity associated with contraband smuggling. The 2008 *Contraband Tobacco Enforcement Strategy* put out by the RCMP stated that there has been an

increasing amount of multi-commodity seizures linking those responsible for tobacco smuggling with drugs, weapons, and counterfeit money.

**Summary.** Empirical, anecdotal and historical data show a strong relationship between tobacco prices and contraband tobacco: as the price of legal tobacco increases, contraband tobacco increases its share of the market. As has been demonstrated throughout Canada's history, finding the appropriate tax level for cigarettes is difficult. Although the RCMP and other agencies such as Finance Canada continuously review tobacco tax levels across the country in order to determine their effectiveness in addressing both smoking consumption and the illicit tobacco market (RCMP, 2008), it appears that Canada has not yet found the price point that will lead to reduced smoking consumption without encouraging expansion of the contraband market and its related criminal tobacco market (RCMP, 2008).

## **Understanding the Impact of the Contraband Tobacco Market on Public Health**

### **The relationship between tobacco use and price**

The empirical data, historical analysis, government documentation and investigative news reports examined in the previous section revealed that the price of legal tobacco influences the availability of contraband tobacco. Not surprisingly, the price of legal tobacco also influences patterns of tobacco use and consumption.

In Canada and other countries, increased taxes on tobacco have been found to decrease cigarette consumption rates, encourage smokers to quit or cut down and make cigarettes less accessible to young age groups (Ontario Tobacco Research Unit, 2008).

***Tobacco price and use: adults.*** Numerous studies have examined the relationship between price of cigarettes and tobacco purchasing patterns of adults. For example

Gruber, Sen and Stabile (2003) used Statistics Canada data (for average prices of cigarettes), the National Clearinghouse Tobacco and Health Program data (for statistics on legal sales of cigarettes) and The Canadian Survey of Family Expenditure data to calculate price coefficients, price elasticity rates and tobacco consumption in all ten provinces. Using this data Gruber et al. (2003) found an estimated price elasticity<sup>1</sup> for cigarettes in the range of -0.45 to -0.47.

Stephens, Pederson, Koval and Macnab (2001) also determined that when the price of cigarettes increases, the odds of Canadians being non-smokers increases. Using Canada's National Population Health Survey data and statistics on tobacco prices, the authors determined price elasticity to be -0.5 for men and -0.3 for women. Data from the year 1994, when there was a significant decrease in taxes in some provinces (including Ontario), revealed that men and women living in provinces that had decreased tobacco taxes smoked more than their counterparts living in provinces that did not experience this tax decrease (Stephens et. al., 2001).

***Tobacco price and use: adolescents.*** In a review of research examining the impact of price on adolescents' tobacco consumption, Leverett, Ashe, Gerard, Jensen and Woolery (2002) concluded that youth are more likely to initiate smoking when tobacco is available at a low cost. Leverett et al. (2002) further noted that teens are less likely to quit when low-cost tobacco is available.

Using Youth Risk Behaviour Survey data collected from 1991 to 2005 in the United States, Carpenter and Cook (2008) attempted to determine tobacco price

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<sup>1</sup> Price elasticity is a measure of how much the demand for a product changes when the price of the product is changed. It is "calculated by dividing the proportionate change in quantity demanded by the proportionate change in price. Proportionate (or percentage) changes are used so that the elasticity is a unit-less value and does not depend on the types of measures used (e.g. kilograms, pounds, etc)" (NetMBA, 2007). A price elasticity of 0 would mean that the product is perfectly inelastic.

responsiveness of high school aged youth. This analysis, which included both national and state data, concluded that an increase in cigarette taxes reduced the probability of high school aged youth reporting past 30 day smoking and frequent smoking. They also estimated that a one dollar increase in cost of tobacco would reduce smoking among United States youth by 23.6% (based on national data). These statistics point to the continued use of taxes as an effective policy strategy to increase the price of cigarettes and thus reduce smoking rates and frequency in youth.

Studies of adolescents' price sensitivity are not without limitations. For example surveys are usually administered in school settings. Youth who do not attend school on the day the survey is conducted, and youth of high school age who have dropped out of school are not represented. While this may lead to an underrepresentation of the smoking rates for this group, the strength and consistency of findings showing youth's sensitivity to tobacco price suggests the relationship is valid.

***Tobacco price and use: young adults.*** Price sensitivity of the young adult population has been investigated, usually in the form of studies examining samples of college and university students. Two such studies found that an increase in cigarette prices decreased not only consumption levels (i.e. the number of cigarettes smoked per day), but also the prevalence of U.S. college students who smoked (Czart, Pacula, Chaloupka & Wechsler 2001; Chaloupka & Wechsler, 1997). Using the 1997 Harvard College Alcohol Study which surveyed 15,699 students from 130 colleges across the United States, Czart et al. (2001) estimated that a 10% increase in cigarette prices would reduce smoking participation by 2.6% and reduce consumption among those who still smoked by 6.2%.

## **Consequences of Price Sensitivity**

Research with youth, adults and young adults indicates that all age groups are sensitive to tobacco prices: increasing the price of tobacco is associated with reductions in smoking prevalence and consumption. Thus, imposing higher taxes on tobacco products has the positive consequences of reducing tobacco use (and its related health and economic burdens), and increasing tax revenues for government (Cunningham, 1996). Unfortunately, higher taxes on tobacco often triggers a shadow market of much lower-priced contraband tobacco products.

The availability of inexpensive (including contraband) cigarettes has detrimental effects on public health efforts to reduce smoking prevalence and rates. For example, research suggests that people who purchase contraband tobacco tend to smoke more and have lower intentions to quit. When looking at the demographic characteristics of smokers who did and did not purchase reserve cigarettes, Luk, Cohen, Ferrence, McDonald, Schwartz and Bondy (2009) reported that “current smokers who smoked more cigarettes per day, did not plan to quit smoking, had not completed high school, and resided in Northern Ontario were significantly more likely to report usual purchasing of cigarettes on reserves.” Furthermore, a 2006 Canadian study done by Imperial Tobacco found that of those individuals possessing illicit cigarettes in their home, 61.7% smoked more than 20 cigarettes a day on average (GfK Dynamics, 2006).

Studies in the United States have found similar patterns. In a study reviewing the purchasing patterns of U.S. smokers, Hyland et al. (2005) found that higher daily cigarette consumption was a predictor of purchasing less expensive cigarettes (e.g. low/untaxed, discount/generic brands or cigarettes purchased with the use of discount

coupons). A study comparing quit rates of individuals who smoked discount/generic cigarettes and those who smoked premium cigarettes found that discount/generic brand smokers were less likely to quit compared to smokers of the premium brand (Cummings, Hyland, Lewit and Shopland, 1997). Hyland, Hastings, Ross, Chaloupka, Fong & Cummings (2006) also found that the likelihood of making a quit attempt is decreased in those smokers who report purchasing cigarettes that are either untaxed or have a low tax.

### **Patterns of Contraband Tobacco Use**

Estimating the market share of contraband tobacco is difficult due to the lack of sales data and the probable reluctance of some smokers to admit their participation in illegal purchases. Prevalence of contraband use in Canada has been examined through a variety of methods.

#### **Contraband Tobacco Market Share**

In 2007, a report titled “Estimating the volume of Contraband Sales of Tobacco in Canada” was released by the group “Physicians for a Smoke Free Canada”. Using the Canadian Tobacco Use Monitoring Survey data and federal/provincial data for legal tobacco sales they estimated the size of the contraband market. The group determined that 27% of total cigarette sales in Canada (40% in Ontario and 39% in Quebec) were contraband (Physicians for a Smoke Free Canada, 2008).

Figures released by the RCMP similarly suggest that contraband tobacco is prevalent in the market. In 2006, RCMP seizures of contraband tobacco reached an all time high in Canada and were said to have increased by 1700% since 2001 (McLaughlin, 2007; RCMP, 2008).

## **Smokers' Use of Contraband Tobacco**

The 2009 report, "Prevalence and correlates of purchasing contraband cigarettes on First Nations reserves in Ontario, Canada", provided evidence of the prevalence of contraband use in Ontario. The researchers used the 2005-2006 data from the Ontario Tobacco Survey (OTS) (Luk et al., 2009) to analyze the prevalence of contraband use as well as characteristics of Ontarians who use contraband tobacco and how they access it. The data were generated from a cross-sectional telephone survey of Ontario residents, 18 years of age and older. The final sample included 1,382 smokers.

Defining contraband tobacco strictly as cigarettes purchased on a Native reserve, the researchers found that that 25.8% of smokers surveyed indicated they had purchased cigarettes on a reserve in the previous six months while 11.5% revealed they *usually* purchased their cigarettes on reserves. The researchers estimated that 14% of the total cigarettes consumed by current smokers in Ontario between January 2005 and June 2006 were purchased on reserves.

Although Native reserves are one of the more popular places for contraband purchase (GfK Dynamics, 2008), there are other sources of contraband tobacco (RCMP, 2008). The researchers acknowledge this and speculate that their definition of contraband could lead to a conservative estimate of contraband use in Ontario. Additionally, Luk et al. (2009) note that the OTS data is based purely on self reports leading to the possibility that figures are an under-representation of actual amounts of tobacco being purchased on reserves given that people may not want to disclose their participation in an illegal activity. Finally, information on ethnicity was not collected so researchers were unable to

determine if some of the reported purchases of reserve cigarettes were by First Nations people buying the product legally (Luk et. al., 2009).

Other national studies reviewing Canadian smokers' cigarette purchases from First Nations reserves have found varying prevalence. Using 2002 data from the International Tobacco Control Four Country Survey (ITC-4) Hyland et al. (2005) found that approximately 2% of current adult smokers had made their last cigarette purchase from a First Nations reserve. In comparison, more recent data from the 2008 CTUMS survey found that less than 20% of current Canadian smokers had purchased cigarettes from a First Nations reserve in the past 6 months (Reid & Hammond, 2009). As Luk et al. (2009) note, the difference in prevalence of reserve purchases found in these two studies may be a result of the different reference and survey periods used.

Use of contraband by smokers in Quebec reflects similar patterns. A study commissioned by the Quebec Ministries of Finance and Health and Social Services found that in 2006, 14% of smokers had either bought or smoked contraband cigarettes within the three months prior to the November telephone survey (Luk et al., 2007). It was further noted by 45% of these smokers that their contraband consumption was at least half of their total cigarette consumption (Luk et al., 2007).

In an extensive review of contraband use, Imperial Tobacco Canada commissioned the GfK Research Dynamics group to conduct a national survey on the use of illicit Tailor-Made cigarettes in Canada. (Tailor-Made is a brand of contraband cigarettes.) A Canadian sample representative of age, gender and household income was selected. Beginning in 2006, adults (19 years of age or older) who smoked more than five cigarettes a day were recruited by random digit dial to do a 30 minute in-home interview.



Researchers concluded the interview by asking participants for permission to take their current pack of cigarettes. In total 2,300 smokers from across Canada participated in the study. Analysis of the collected cigarettes showed that 16.5% were illegal – defined as cigarettes sold without appropriate payment of taxes (GfK Dynamics, 2006). Of those cigarettes branded as illicit, 95% were found to be manufactured on reserves (GfK Dynamics, 2006).

Significant differences in prevalence of contraband use existed between the provinces. Of particular note, Ontario and Quebec were found to have the highest proportions of smokers using contraband tobacco (GfK Dynamics, 2006). In both provinces illegal tobacco was determined to be the second leading “brand” of cigarettes (GfK Dynamics, 2006).

Imperial Tobacco Canada conducted follow up studies in 2007 and 2008. In each consecutive year the prevalence of contraband tobacco in Canadian homes increased. In 2007, 22% of the past seven day purchase volume was found to be illegal and this number increased to 32.7% in 2008 (GfK Dynamics, 2008). Ontario continued to show the highest past seven day purchasing volume of illegal tobacco with 31.6% of tobacco in 2007, and 48.6% in 2008 being classified as illegal (GfK Dynamics, 2008).

Limited details about the methodology used in this study demand that results are interpreted with some caution. For example, the pack-swap design could allow for a more reliable review of the cigarettes and their make in comparison to self-report contraband use, but only if all participants agreed to swap all cigarettes. If participants chose not to swap their contraband cigarettes then the results would be an under-representation of the amount of contraband tobacco in homes.

Most recent data on contraband tobacco use in the province of Ontario come from a small scale cigarette butt study conducted by NIRIC (2010a) on behalf of the Canadian Convenience Stores Association. Government buildings and public locations (such as the train station) in the city of Ottawa were surveyed and results showed that 15%-32% of cigarettes at the sites were classified as illegal (NIRIC, 2010a). The demographics of the individuals who discarded the surveyed butts is entirely speculative, however it could likely be presumed that butts collected from public places like the train station would be from a heterogeneous group of smokers; likely mainly adults. Limited details of the methodology used for this study makes it difficult for comparisons to be made to other studies that have reviewed illegal tobacco use in Ontario such as those done by Luk et al. (2009) and GfK Dynamics (2008).

### **Young Adult Smokers and Contraband Tobacco**

According to the most recent data from the Canadian Tobacco Use Monitoring Survey (CTUMS), 16% of Ontario adults and 13% of Ontario youth (aged 15-19) are smokers. The percentage of Ontario young adults (aged 20-24) who are current smokers is 27%, the highest across all age groups (Health Canada, 2009a). Furthermore, while there has been a sustained downward trend in the prevalence of smoking for all age groups, the decline among young adults, has been less steep and is beginning to flatten. In light of these data, the growing availability of inexpensive contraband tobacco, the price sensitivity of youth and young adult smokers, and the already high prevalence of smoking in the young adult cohort raise concerns about how the current contraband tobacco market might influence the prevalence and rates of tobacco consumption among older youth and young adults. There is some speculation that the availability of contraband

tobacco has contributed to this situation, as noted by Rob Cunningham of the Canadian Cancer Society (personal communication, January 19, 2009). This speculation is partially supported by research showing that contraband tobacco use is not limited to adults.

Using data from Canada's 2006/2007 Youth Smoking Survey, Callaghan, Veldhuizen, Leatherdale, Murnaghan and Manske (2009) reported the prevalence of First Nations/ Native brand tobacco use among 41,886 high school students in grades 9 through 12. Students from all 10 provinces in Canada were involved in the in-class study, which included questions about smoking behaviours and usual cigarette brand. Only students who were identified as daily smokers (5.2% of the students surveyed) were included in the researchers' analysis. The study found contraband tobacco use to vary significantly across the provinces, with a total of 13.1% of Canadian students reporting First Nations/Native brand cigarettes as their usual cigarette brand. The highest prevalence was found in Quebec and Ontario students, with 22.4% and 21.8% respectively, claiming their usual brand of cigarettes to be First Nations/Native brand tobacco. Prairie provinces had the lowest prevalence of First Nations tobacco use at <2.5%. Of particular importance was the finding that students who used First Nations/Native brands as their usual cigarette brand reported significantly higher consumption rates compared to other daily smokers. Based on these higher consumption rates, the researchers estimated that 17.5% of all cigarettes smoked by Canadian adolescent daily smokers are First Nations/Native brand.

A study initiated by the Canadian Convenience Stores Association sought to assess contraband use in high school populations. In 2007, the group performed anonymous cigarette butt collections around high schools in Ontario and Quebec. A total

of 55 high schools from the Greater Toronto and Hamilton area and 50 in the Greater Montreal and Quebec City area were included in study. The researchers collected butts from smoking locations around the high schools and sorted them into three categories: legal, illegal and unknown. Illegal butts were defined as those that were counterfeit or suspected international brands, those without branding as well as foreign or native brands. Results showed that 22% of butts collected in Ontario and 32% of those collected in Quebec were illegal in nature (Arcus, 2007).

In 2008 the butt study was repeated with increased collection sites expanding beyond urban centres compared to the previous year. The proportion of illegal butts was greater in both provinces: 36% of butts collected in Quebec and 26% of those collected in Ontario were classified as illegal (Canadian Convenience Stores Association, 2008).

On behalf of the Canadian Convenience Stores Association, the research group NIRIC conducted further butt studies between March and May 2010 at a few select locations in the province. Collection from six Ottawa high schools found that illegal cigarettes accounted for as little as 13% to as much as 39% of the tobacco collected (NIRIC, 2010a). In Cornwall, illegal cigarettes represented as little as 20% to as much as 39% of the tobacco collected at four local high schools (NIRIC, 2010b).

The possibility that contraband tobacco is contributing to the relatively high prevalence of smoking among young adults speaks to the need to learn more about contraband tobacco use, its effects on consumption levels in the young adult population and ultimately, how to counteract this. Until this time, tobacco control strategies have often been directed at the youth population, but more recent research is noting the importance of a focus on young adults. One reason is that a significant number of young

adult smokers are trying their first cigarette in their late teens (Health Canada, 2007c). For example, Hammond (2005) reports that approximately 20% of young adults who smoke try their first cigarette after the age of 18. It has also been shown that young adults tend to be in the process of confirming their smoking behaviours. Although experimentation with smoking may begin in adolescence, many smokers do not become established, regular smokers until after the age of 18 (Chaloupka & Weschler, 1997; Hammond, 2005).

As noted earlier, there is clear evidence that adolescents' and young adults' tobacco consumption is price sensitive (Czart et al., 2001; Chaloupka & Wechsler, 1997; Leverett et al., 2002; Carpenter & Cook, 2008). When price is no longer an impediment to smoking it allows for easy initiation and increased tobacco consumption levels among teens and young adults. Perversely, the inexpensive contraband tobacco available in Ontario also decreases the likelihood of tobacco tax prices being increased to deter teens and young adults from initiating or escalating their tobacco use. This Catch-22 situation clearly has negative implications for public health in terms of young adults' tobacco use.

## **Purpose, Objectives and Research Questions**

### **Purpose**

Despite strong efforts to reduce smoking in the young adult population, 27% of Ontario young adults (aged 20-24) remain as current smokers (Health Canada, 2009a). One tobacco control strategy that has been shown to effectively decrease smoking rates in this population is tobacco price increases (Czart et al., 2001; Chaloupka & Wechsler, 1997). However it is likely that the positive impact of higher tobacco taxes is being undermined given the wide availability of contraband tobacco products in Ontario.

There is very limited research on Ontarians' use of contraband tobacco, and no published studies of the prevalence of contraband use in the young adult population. Therefore, the purpose of this study is to determine whether and how much contraband tobacco is being used across colleges and universities in Ontario.

### **Objectives and Research Questions**

**Objectives.** To collect discarded cigarette butts from 25 post-secondary campuses across Ontario over a two month period.

The objectives of this study are to:

1. Estimate what proportion of tobacco (i.e., cigarettes) consumed on Ontario post-secondary campuses is contraband
2. Determine whether consumption of contraband cigarettes differs between college and university campuses, between specific collection sites on campuses and across geographical regions of the province

3. Examine whether proximity to those First Nations reserves identified by RCMP as major suppliers of contraband tobacco is related to proportion of contraband tobacco on campus

***Research questions.*** Consistent with the objectives of the study, the following research questions were answered:

1. Among the discarded cigarette butts collected for this study, what proportion is contraband tobacco:
  - a. overall
  - b. per campus
  - c. on university campuses
  - d. on college campuses
  - e. at each of four researcher-designated collection sites (bus stop, student centre, residence and pub)?
  - f. on campuses within each of seven geographic regions (defined by census divisions: North, East, Central East, Toronto, Central West, Central South, South West)?
2. Does the proportion of contraband represented in the discarded cigarette butts differ:
  - a. between college and university campuses?
  - b. between researcher-designated collection sites (bus stop, student centre, residence and pub)?
  - c. across geographical regions (North, East, Central East, Toronto, Central West, Central South, South West)?

3. Is the proportion of contraband represented in the discarded cigarette butts on post-secondary campuses related to proximity to any of the four First Nations reserves identified by RCMP as major suppliers of Native contraband tobacco?



## Chapter III: Methods

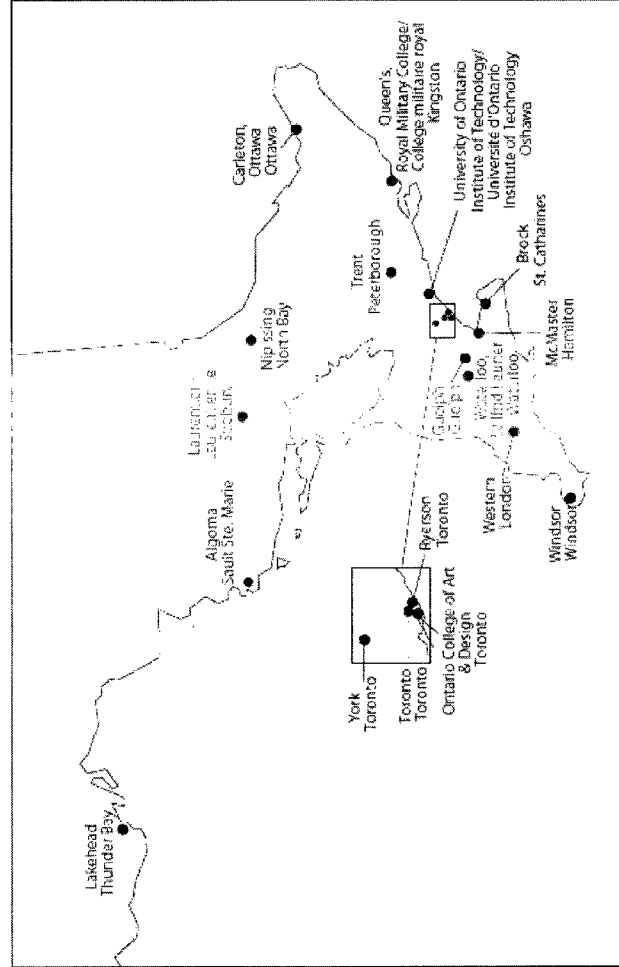
### Collection and Classification of Cigarette Butts

#### Sampling Frame

***Institution selection.*** The Ontario Ministry of Training, Colleges and Universities names 22 public universities (Ministry of Training Colleges and Universities, 2009a) and 26 public colleges (Ministry of Training Colleges and Universities, 2009b) in Ontario. Locations of these institutions are shown in Figures 4 and 5 respectively. (Where an institution has more than one campus, the main campus is shown). To generate a sample of institutions for this study, the following exclusion criterion was established. First, universities or colleges offering exceptionally narrowly focused, specialized programs were excluded. This resulted in the removal of the Royal Military College, Dominican University College, Kemptville College, Ridgetown College, and Alfred College. Second, schools that are exclusively French language were excluded. This resulted in the removal of Collège Boréal and La Cité collégiale. Finally, schools with student populations under 1,500 were not considered eligible for inclusion. This resulted in the removal of Northern College.

From the final population of 20 universities and 20 colleges, a purposive sample of universities and colleges was selected to represent the seven geographical census regions in the province: Central East, Central South, Central West, East, North, South West and Toronto (Association of Public Health Epidemiologists in Ontario, 2006). Where possible, a minimum of two universities and two colleges were chosen from each of the seven regions. Table 1 identifies the 12 universities and 13 colleges that were involved in the study.

Pour connaître l'emplacement des campus affiliés, veuillez communiquer avec le campus principal.



Adapted from “Postsecondary Overview”. Ontario Ministry of Training, Colleges and Universities. Retrieved August 23<sup>rd</sup>, 2009 from <http://www.edu.gov.on.ca/eng/general/postsec/unimap.pdf>

The map displays the geographical distribution of various First Nations and Inuit communities across Ontario. Key locations marked include:

- Confederation:** Located in the northwestern part of the province.
- Sault:** Located on the northern shore of Lake Huron.
- Saugeen:** Located in the southwestern part of the province.
- Seneca:** Located in the western part of the province.
- Huron:** Located in the western part of the province.
- George Brown:** Located in the western part of the province.
- Humber:** Located in the western part of the province.
- Castanville:** Located in the western part of the province.
- Sir Sandford Fleming:** Located in the central part of the province.
- Canadore:** Located in the central part of the province.
- Algonquin:** Located in the central part of the province.
- La Cité:** Located in the central part of the province.
- Kenora:** Located in the central part of the province.
- St. Lawrence:** Located in the central part of the province.
- Loyalist:** Located in the central part of the province.
- Durham:** Located in the central part of the province.
- Sheridan:** Located in the central part of the province.
- Niagara:** Located in the central part of the province.
- Mohawk:** Located in the central part of the province.
- Hamilton:** Located in the central part of the province.
- Ridgeway:** Located in the central part of the province.
- St. Clair:** Located in the central part of the province.
- Windsor:** Located in the central part of the province.

Adapted from “Postsecondary Overview”. Ontario Ministry of Training, Colleges and Universities. Retrieved August 23<sup>rd</sup>, 2009 from <http://www.edu.gov.on.ca/eng/general/postsec/colmap.pdf>

Table 1

*Post-Secondary Institutions Selected as Cigarette Butt Collection Sites*

Universities	Colleges
Lakehead University	Sault College
Nipissing University	Canadore
Ottawa University	Algonquin College
Queens University	Loyalist College
York University	Humber College
University of Toronto	George Brown College
Brock University	Niagara College
McMaster University	Conestoga College
Sir. Wilfrid Laurier University	Lambton College
University of Western Ontario	St. Clair College
Windsor University	Mohawk College
Trent University	Confederation College
	Fleming College

***Selection of butt collection sites on campus.*** Four on-campus sites for butt collection were identified for each school. Each site had to meet the following criteria. First, the site had to be a high-traffic smoking location. Second, the site had to be primarily used by students (rather than staff members or visitors). To meet these criteria and maximize the likelihood that the selected butt collection sites shared similar characteristics across diverse campuses, the following four locations were chosen: 1) near the student building/university centre; 2) on the grounds of the campus pub; 3) at an on-campus, high-traffic bus stop; and 4) near a campus residence. If a campus lacked any of the four designated sites, or smoking did not occur (e.g., is not permitted) at a selected site, or if a single smoking area represents more than one of the selected collection locations (for example the high traffic bus stop is in front of the student building) then an alternative site that met the inclusion criteria was selected. With the assistance of grounds staff, the next most popular smoking site that met the inclusion criteria was used for collection. If multiple residences, pubs or bus stops existed on the campus, the busiest site was selected.

Grounds staffs on each campus were also asked to confirm that the collection sites were in fact smoking locations used by students and identified alternative collection sites if necessary.

### **Data Collection**

***Materials.*** Necessary supplies for the collection included: four 2-litre plastic containers, a marker to mark the top of each container indicating the collection site and a dustpan and broom to assist with the ground collection. Additionally, for the protection of the data collector, safety gear included a full cover suit, gloves and a mask.

### ***Procedures.***

*Data collection schedule.* Collection of the cigarette butts took place during the normal working hours of the university or college between March 20, 2009 and April 10, 2009. Collection during this time guaranteed that students were still on all campus prior to the summer holiday.

The day and time of data collection varied from school to school based on the recommendations/schedule of grounds staff. When possible, dates and times for butt collection were chosen based on the cleaning schedule of the grounds staff in order to ensure butts were not collected immediately after a scheduled clean-up. Permission to access the butt receptacles was obtained via a telephone conversation with the campus grounds manager, prior to the data collection.

*Research personnel.* Cigarette butts were collected by the researcher, or a research assistant trained by the researcher, or members of Leave The Pack Behind student-staff whose training included extensive written and verbal instructions (see Appendix A). Data collectors worked in pairs for their safety and comfort.

*Collecting cigarette butts.* On the day of collection research assistants obtained keys for cigarette butt receptacles from the campus grounds staff, donned their protective clothing, then proceeded to the first collection site. The butt receptacle in the smoking area was emptied into one of the four plastic containers. If there were more butts in the receptacle than the plastic container could hold, only enough butts to fill the container were collected. Left over butts were left in the receptacle. All attempts were made to avoid placing large debris (such as cups, bottles, branches, stones, etc.) into the plastic containers.

If the plastic container for the site was not full after emptying the receptacle, then butts were collected from the ground around the receptacle where the concentration of cigarette butts was heaviest.

The lid was then placed on the container, even if it was not full. Using the marker, the container was labelled by writing the name of site where the butts were collected (e.g., “Student Centre [Name of building]”). These steps were repeated for the other three butt collection sites on the campus.

After collection was completed from all four sites, the key was returned to grounds-keeping staff. All protective clothing was discarded at this time.

*Shipping cigarette butts.* At schools where the principle investigator was unable to collect data due to distance or time constraints, the research assistant who collected the cigarette butts followed these procedures to ship the cigarette butts to Brock University. First, using the packing tape provided, all lids were securely taped to the plastic containers (to ensure the plastic containers stayed sealed during shipping). The four plastic containers were placed in the provided box and the box was taped shut. Using Purolator Courier the box was then shipped to the Leave The Pack Behind head office at Brock University. Upon receipt of these boxes the principle investigator ensured that all four containers were fully and accurately labelled to ensure fidelity of data collection procedures.

### **Identifying Cigarette Butts**

***Brand Identification.*** Prior to the sorting process, pictures of legal and illegal cigarettes and cigarette logos were retrieved in order to assist the researcher in the

accurate identification of the butts. The internet and information from the RCMP were utilized as sources for this information.

The cigarette butts were sorted as legal, suspected international and counterfeit brands, illegal, unknown or unidentifiable. The decision trees used for classification are described below.

*Legal brands.* Legal cigarettes were those with identifiable names and/or logos on the filter representing brands that are approved for sale in Canada. To avoid categorizing a suspected counterfeit butt as a legal brand, only those butts with the precise markings of legal brands were included in this category. For example, legal *Peter Jackson* cigarettes can be identified by the presence of their horse head logo. The absence of this logo or a variation of this logo would suggest that the cigarette is not a legal Peter Jackson cigarette.

*Suspected international brands.* Suspected international brands were those which have identifiable names and/or logos on the filter representing brands that are not approved for sale in Canada but appear to be for legal sale in other countries based on the best available information.

*Suspected counterfeit brands.* Suspected counterfeit cigarettes were identified as those which have names and/or logos that are similar to but not an exact match with legal brands. For example, cigarettes were only be classified as legal *Benson and Hedges* cigarettes if the words “*Benson and Hedges*” were found on the cigarette filter or if they had the *Benson and Hedges* official logo on the filter. If a cigarette only had “*B & H*” on the filter, this was classified as suspected counterfeit.



*First Nations/Native brands.* Native or contraband butts were defined as those cigarettes which have not been subject to all of the appropriate government taxes. This included known native brands such as *Putters*, *DK's* and *SAGO*, as well as First Nations-produced unbranded cigarettes. Identification of illegal cigarettes was done in a variety of ways. In some cases, illegal brands are well known with recognizable names and logos. Butts with these names or logos were categorized as illegal. In some cases, illegal cigarettes have no visible branding. These unbranded illegal cigarettes can be recognized in two ways. According to the RCMP (Personal Communication, April 27, 2009) some of these unbranded cigarettes have white filters with gold or other coloured rings, while others have just plain brown filters. Plain white filter cigarettes as well as cigarettes that only have coloured rings on them were also classified as contraband as the vast majority of legal cigarette brands have visible brand names or symbols on their filter-tips. Thus it was assumed that any cigarette without a brand name or logo on its filter is most likely contraband. When identifying logo-free, brown filter cigarettes suspected to be contraband, a *du Maurier* brown filter cigarette was used as a comparison. The suspected contraband cigarette was lined up against a *du Maurier*, brown filter cigarette to ensure that the filter was long enough to see a logo should one have existed. This ensured that a *du Maurier* cigarette that has simply burnt past the logo was not identified as a contraband cigarette. Cigarettes that had full brand names that could not be identified as either legal or international were also classified as Native.

*Unidentifiable.* Unknown cigarettes were those which were burned past the logo, dirty, squished or otherwise completely unidentifiable.

*Unknown.* Unknown cigarettes were those which had incomplete (partially unidentifiable) brand names or unknown symbols on the filter tip logo. Because incomplete brand names or symbols could not be reliably searched to determine their legal status, these cigarettes could not be classified into the legal, international or native cigarette categories. However, because some semblance of a brand name or symbol is visible, they could not be considered unidentifiable.

*Removed.* Any cigars, cigarillos or roll your own cigarettes were identified as such and removed from the sample before statistical analyses began.

***Sorting Process.*** Cigarettes butts were sorted according to all visible cues. During sorting, each butt was picked up, visually examined and then categorized using the protocols described here. If identification was questionable a second opinion was sought. If the second opinion concurred then the cigarette was classified in the appropriate category, otherwise the cigarette was classified as unknown.

Where possible, the brand name and distinguishing features of each cigarette were identified and recorded. For example: *du Maurier*, white filter with a silver band, word “special” written on the filter. Another example is a DK, brown filter, two red bands. Where there was no brand name other identifying features were recorded. This included the colour of the filter, any lines or stripes on the cigarette filter including the colour of the lines, as well as any other pictures or words on the filters.

When new or unique brands or logos were identified as much information as is visible on the filter was recorded.

***Disposal.*** Upon completion of the sorting, all butts were properly disposed of with the assistance of the Brock University grounds staff.

## Data Analyses

### Analyses to Address Research Questions

*Research Question 1: Descriptive Analyses.* To answer Research Question 1, descriptive analyses were run. The proportion of potentially illegal cigarette butts was calculated in three ways described below. Of note, the first calculation is labelled “suspected-illegal estimate”. Whether this is a suitable label can be debated on several counts. First, while any counterfeit cigarette is actually illegal, counterfeit cigarettes can be difficult to identify. Accordingly, certain cigarettes are **suspected** to be counterfeit. Second, international cigarettes have the **potential** to be illegal; this is the case when they are smuggled into Canada. Third, according to the RCMP the “largest source of illegal tobacco in Canada is manufacturing operations on Aboriginal Territory based on the US side of Akwesasne and Kahnawake in Quebec and Tyendinaga and Six Nations in Ontario” (RCMP, 2008). Additionally, large quantities of tax-exempt cigarettes intended for sale only to First Nations individuals are being purchased by non-status individuals, rendering those cigarettes illegal (RCMP, 2008). Thus any Native tobacco butts collected in this sample **probably** represent illegal (i.e., contraband) tobacco. It is important to note that none of the terms—suspected-, potentially- or probably-illegal—represent a completely satisfactory label given the mix of cigarette products found in this sample. “Suspected-illegal” was chosen based on the weight of evidence leading one to suspect that butts described here fall into the illegal category. The term “suspected-illegal” applies only to the cigarettes in this sample and does not apply to any individuals, groups or organizations. It should be clearly understood that not all First Nations tobacco/Native tobacco brands are being manufactured, sold, purchased or used illegally. Likewise, not

all First Nations people in Ontario are involved in or condone this potentially illegal activity.

*Suspected-illegal estimate.* A suspected-illegal estimate was made by including all suspected-illegal cigarettes (suspected international, suspected counterfeit and First Nations/Native brands) in the numerator, and all cigarettes in the denominator.

$$\frac{\Sigma (\text{suspected international; suspected counterfeit; First Nations/Native brands})}{\Sigma (\text{legal; suspected international; suspected counterfeit; First Nations/Native brands; unidentifiable; unknown})}$$

*Conservative Native-only estimate.* The possibility did exist that the international brands found in the sample were purchased outside of Canada and brought into the country legally by individuals following the rules outlined by the Canada Border Service Agency (Canada Border Service Agency, 2007). The current study did not allow for a distinction to be made between cigarettes entering legally and those either entering illegally or being sold and purchased in Canada illegally. Additionally, there was no definitive way to determine if the suspected counterfeit cigarettes were in fact counterfeit. Therefore, the proportion of contraband tobacco was recalculated in order to ensure a more conservative estimate of the use of illegal tobacco. The conservative estimate was made by including Native tobacco in the numerator and all cigarettes in the denominator.

$$\frac{N (\text{definitively identified First Nations/Native brands})}{\Sigma (\text{legal; suspected international; suspected counterfeit; First Nations/Native brands; unidentifiable; unknown})}$$

*Corrected Native-only estimate.* To account for the cigarettes in the sample that were unidentifiable (smoked past the filter tip logo, burnt, squished, dirty) a proportion of

Native contraband tobacco, likely present among the unidentifiable cigarettes, was calculated. The calculation was based on the assumption that the proportion of Native contraband cigarettes among the unidentifiable butts matched the proportion of Native contraband cigarettes that was conservatively calculated for the sample collected at that school. If, for example 10% of the butts at a school were conservatively calculated as Native contraband, it was assumed in the current calculation that 10% of the unidentifiable butts would also be Native contraband. Thus, the numerator of the corrected calculation includes butts that are visually identified as First Nations/Native contraband, as well as a number of butts imputed to be Native contraband.

$$\frac{\Sigma (\text{definitively identified First Nations/Native brands; imputed First Nations/Native brands (among unidentifiable)})}{\Sigma (\text{legal; suspected international; suspected counterfeit; First Nations/Native brands; unidentifiable; unknown})}$$

All three calculations were used to generate estimates of the *overall* proportion of contraband tobacco across the 25 post-secondary campuses surveyed here. Based on the assumption that the final equation yielded the most valid, reliable estimate of Native contraband tobacco, all remaining analyses for *Research Question 1* used the Corrected, Native-only estimate. To determine the proportion of Native contraband tobacco across multiple institutions (e.g., to determine the proportion of contraband use across university campuses), averages were calculated by summing the estimates for each institution then dividing by the number of institutions included in that particular calculation.

***Research Question 2: Comparisons.*** The Corrected, Native-only estimate was used for analyses related to Research Question 2. To determine whether the proportion of

contraband cigarette butts differs between college and university campuses, a t-test was used with “school” (college vs. university) as the grouping variable and proportion of Native tobacco per campus as the test (i.e., dependent) variable.

To determine whether the proportion of contraband cigarette butts differs across researcher designated collection sites, a *f*-test was used with “site type” as the grouping variable and proportion of Native tobacco per site as the test (i.e., dependent) variable.

To determine whether the proportion of contraband cigarette butts differ across geographical regions, a *f*-test was used with “region” as the grouping variable and proportion of contraband tobacco per campus as the test (i.e., dependent) variable.

***Research Question 3: Correlation Analyses.*** To determine whether the proportion of Native cigarette butts is related to proximity to a First Nations reserves, a correlation analysis was conducted with the school-level variables: proportion of contraband and proximity to the nearest of the four identified First Nations reserves.

## Chapter IV: Results

From the 13 colleges and 12 universities, a total sample of 36,368 cigarettes butts was collected. (Also collected were 605 cigars, cigarillos or roll-your-owns which were removed from the sample before analysis began). Classification of the cigarette butts into legal, suspected illegal and unknown led to the identification of 130 different cigarette brands. The complete list of brands identified in the sample is shown in Table 2.

### **Proportion of Contraband Tobacco on Post-Secondary Campuses**

The proportion of contraband cigarette butts comprising the sample was calculated in three separate ways detailed in the methodology: suspected-illegal estimate (which included all potentially illegal cigarettes in the numerator, and all cigarettes in the denominator); conservative Native-only estimate (which included only First Nations/Native tobacco in the numerator and all cigarettes in the denominator); and corrected, Native-only estimate (which included definitively identified First Nations/Native tobacco as well as an imputed proportion of First Nations/Native tobacco in the numerator and all cigarettes in the denominator). The proportion of contraband tobacco found overall, on university and college campuses and in each of the seven geographical regions using these three separate calculations is shown in Appendix B. Based on the **suspected-illegal estimate**, 12.59% of butts discarded at the 25 institutions sampled here were categorized as contraband tobacco. Based on the **conservative** Native-only and the **corrected** Native-only calculations, the proportion of Native tobacco consumed on campuses was estimated to be 11.22% or 13.57%, respectively. The proportion of contraband tobacco overall, on university and college campuses and in each of the seven geographical regions in the province, was determined using these three

Table 2

## Classification of Cigarettes Brands Found in Sample

Legal Canadian	International	Native	Suspected Counterfeit	Unknown
Accord <sup>e, n</sup>	5 (Finland) <sup>f</sup>	<i>Brown filter, no markings<sup>a</sup></i>	B + H	__ond
Belmont <sup>e, n</sup>	777 (US, Brazil) <sup>f</sup>	BWE	Canadian Classic ( <i>unlike any others seen</i> )	_aison_leu
Belvedere <sup>e, n</sup>	Agenda Slim (Greece, Denmark, Poland, Hungary) <sup>f</sup>	CANADIAN	Peter Jackson ( <i>stallion facing opposite way</i> )	<i>Stylized "P"</i>
Benson & Hedges <sup>e, n</sup>	Asian symbols	DK's <sup>a, c</sup>		B __
Camel <sup>e, n</sup>	Baisha (China) <sup>f</sup>	<i>Double gold lines</i>		<i>Letters that appeared to spell Buck Jaack</i>
Cameo <sup>e, m, n</sup>	Balance (Germany, Austria) <sup>f</sup>	<i>Double silver lines</i>		<i>Letters that appeared to spell Canceo</i>
Canadian Classic <sup>e, n</sup>	BLACK (Armania) <sup>f</sup>	<i>Gold band (thick)</i>		Da __
Craven A <sup>e, n</sup>	Capri (US, Japan, Germany, Brazil, Mexico, Italy, Israel) <sup>f</sup>	<i>Green band (thick)</i>		<i>Diamonds</i>

(continued)



Legal Canadian	International	Native	Suspected Counterfeit	Unknown
Craven <sup>e, n</sup>	Carlton (US) <sup>f</sup>	KMT <sup>a</sup>		<i>Double silver band with perforations</i>
Davidoff <sup>d</sup>	Caster Mild (USA, Japan) <sup>f</sup>	Laurel		<i>A stylized "R"</i>
DuMaurier <sup>e, m, n</sup>	Chang Baishan (China) <sup>f</sup>	Menage <sup>g</sup>		<i>Gold band with design</i>
Dunhill <sup>e, n</sup>	Chunghwa (China) <sup>f</sup>	NF		<i>Green flower</i>
Export A <sup>e, n</sup>	Dahongying (China) <sup>f</sup>	<i>Pink Stripes</i>		<i>Heart symbol</i>
Export <sup>d, f, n</sup>	Dihao (China) <sup>f</sup>	Play Fares <sup>a</sup>		P _nom
John Player <sup>e, m</sup>	Eight (Parguary) <sup>f</sup>	Putters <sup>a</sup>		<i>Letters that appeared to spell Pinto</i>
Kool <sup>e, m</sup>	Esse (South Korea, Paraguay) <sup>f</sup>	Raison Detre		<i>A stylized "S"</i>
Legend <sup>e</sup>	General (China, France, England) <sup>f</sup>	RYG		<i>Silver band with indistinguishable text</i>
MacDonald [ <i>including Fleur De Lis</i> ] <sup>e, n</sup>	Gentle (Taiwan) <sup>i</sup>	Sago <sup>b, c, h</sup>		
Legal Canadian	International	Native	Suspected Counterfeit	Unknown
(continued)				

Mark Ten <sup>n</sup>	Hollywood (lights) (Australia, Brazil, Cuba, Dominican Republic) <sup>f</sup>	<i>White filter, blue stripe<sup>a</sup></i>
Marlboro <sup>e,m</sup>	Honghe (China) <sup>f</sup>	<i>White filter, gold stripe<sup>a</sup></i>
Matinee <sup>e,m, n</sup>	Huang Shan (China) <sup>f</sup>	<i>White filter, green stripe<sup>a</sup></i>
Medallion <sup>e,m, n</sup>	Huanghelou (China) <sup>f</sup>	<i>White filter, no markings</i>
Naturals <sup>d</sup>	Karelia Slim (Greece, Thailand) <sup>f</sup>	<i>White filter, red stripe</i>
Number 7 <sup>e, n</sup>	Kent (USA) <sup>f</sup>	
Pall Mall <sup>e,m, n</sup>	Kent Nanotek (USA) <sup>f</sup>	
Peter Jackson <sup>e,m, n</sup>	Lan Zhou (China) <sup>f</sup>	
Players <sup>e,m, n</sup>	Lesser Panda (China) <sup>f</sup>	
Podium <sup>d,j</sup>	Lucky (USA) <sup>f</sup>	
Quebec Classique	Lucky Strike (USA, Germany, Spain, Japan, France) <sup>f, o</sup>	

(continued)

Legal Canadian	International	Native	Suspected Counterfeit	Unknown
Rothmans <sup>e, n</sup>	Montclair (USA) <sup>f</sup>			
Studio <sup>e</sup>	Newport (USA) <sup>f</sup>			
Vantage <sup>e, n</sup>	Parliament (USA) <sup>f</sup>			
Viceroy <sup>e, m</sup>	Raison Fresh (South Korea) <sup>f</sup>			
Viscount <sup>e, n</sup>	Seven Stars (Japan) <sup>f</sup>			
Winston <sup>e, n</sup>	Sky (England, Paraguay) <sup>f</sup>			
	Sky Blue (Australia) <sup>l</sup>			
	State Express (555) (Mandarin, Pearl) <sup>f</sup> (England, China)			
	Super (Russia, Armenia, China, Italy) <sup>f</sup>			
	Suyan (China) <sup>f</sup>			
	This (South Korea) <sup>f</sup>			

(Continued)

Legal Canadian	International	Native	Suspected Counterfeit	Unknown
	This Plus (South Korea) <sup>f</sup>			
	Time (USA, Germany, South Korea, Israel) <sup>f</sup>			
	Vogue Lilas (USA?)			
	Voodoo (USA, Serbia) <sup>f</sup>			
	Yun Yan (China) <sup>f</sup>			

*Note.* Not included in this table is the category “unidentifiable” which included cigarettes that were smoked to the filter (leaving no discernable markings) and butts that were too dirty or too squished to reliably identify. Sources for identifying the cigarette butts are presented in the superscripted notes, below.

<sup>a</sup>Personal communication (April 28, 2009 & May 27, 2010 ) with Sgt. Michael Harvey, RCMP Officer, Cornwall, ON Detachment.

<sup>b</sup>Ontario Campaign for Action On Tobacco (2010)

<sup>c</sup>Luk et al. (2007)

<sup>d</sup>Health Canada (2009b)

<sup>e</sup>J.N. Webb & Sons (2007)

<sup>f</sup>CiagrettesPedia (2009).

<sup>g</sup>Anthony (2010)

<sup>h</sup>Pearson, M. (2010)

<sup>i</sup>AllBusiness (2008)

<sup>j</sup>Taylor, L.C. (2008)

<sup>k</sup>Physicians for a Smoke-Free Canada (2006)

<sup>l</sup>Smoking And Health Action Foundation/Non-Smokers’ Rights Association (2008)

<sup>m</sup>Imperial Tobacco Canada (2010)

<sup>n</sup>International Development Research Centre (2004)

<sup>o</sup>British American Tobacco (2010)

separate calculations (as shown in Appendix B). In all remaining analyses, the corrected, Native-only calculation was used based on the rationale that the definitive identification associated with this estimate makes it the most reliable, and the imputation process makes it the most valid.

### **Comparisons Across Schools, Regions and Collection Sites**

As shown in Table 3, First Nations/Native contraband tobacco use was apparent on all campuses, but varied considerably from school to school with contraband cigarettes accounting for as little as 1% to as much as 38% of the total cigarette consumption at a particular school<sup>2</sup>.

To calculate the average proportion of contraband tobacco across multiple sites (e.g., across all universities, all colleges, or all schools in a region), two approaches were considered. In the first approach, the mean proportion of contraband tobacco across identified campuses was calculated based on the *percent of contraband tobacco per campus*. Thus, the corrected-Native estimates per campus were summed, then divided by the number of campuses included in that calculation. In the second approach, the mean proportion of CT across identified campuses was calculated based on the *raw number of cigarette butts per campus*. Thus, the *numbers of Native cigarette butts per campus* were summed, then divided by total number of cigarette butts collected from the campuses included in that calculation. The latter calculation accounts for sample sizes across campuses, giving more weight to larger samples. While this may be a representation of

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<sup>2</sup> A comparison across individual schools was not done because: (1) schools were promised that no school-to-school comparisons would be made; and (2) the research questions did not call for school-to-school comparisons.

the school size and the proportion of smokers at the school—with greater volumes of cigarette butts occurring at larger schools and schools with more smokers—it could also be an artefact of how frequently cigarette butts were removed by grounds staff at each campus as well as the diligence of the research assistants involved in the collection. Because there is no telling whether the larger sample of butts represents school size, smoking prevalence, grounds keeping frequency, or data collector diligence, the decision was made to use calculations based on percent of contraband tobacco per campus. Calculations based on raw numbers of butts are reported in Appendix C.

As shown in Table 4, consumption of Native contraband was somewhat, but not significantly, higher on college than university campuses. Additionally, the average proportions of contraband tobacco varied significantly across the seven geographical regions such that the North region had a significantly higher proportion of contraband tobacco compared to all other regions except Central West, and none of the other regions differed significantly from one another.

The research protocol called for four specific data collection sites to be used whenever possible. As shown in Table 5, site locations used for the cigarette butt collection at each school were not completely consistent with the standard protocol. Using only data from the four researcher-specified collection locations, average proportions of contraband tobacco were not found to differ significantly across the designated sites: Student Building/University Centre ( $M = 15.74\%$  (17.16%)), Bus Stop ( $M = 14.08\%$  (12.45%)), Campus Pub ( $M = 12.34\%$  (14.32%)) and Residence ( $M = 11.45\%$  (9.54%)) ( $f(1, 3) = 0.389, p = .762$ ).

Table 3

Proportion (%) of Contraband Cigarette Butts by School (Based on Corrected Native-Only Estimate)

School	Institution Type	Geographic Region	Corrected Estimate
School 1	University	North	25.21
School 2	University	North	38.29
School 3	College	North	32.93
School 4	College	North	38.50
School 5	College	North	9.34
School 1	University	East	13.85
School 2	University	East	2.69
School 3	College	East	17.80
School 4	College	East	2.72
School 1	University	Central East	7.21
School 2	College	Central East	19.13

(continued)

School	Institution Type	Geographic Region	Corrected Estimate
School 1	University	Toronto	7.15
School 2	University	Toronto	6.10
School 3	College	Toronto	4.58
School 4	College	Toronto	5.58
School 1	University	Central West	15.77
School 2	College	Central West	22.87
School 1	University	Central South	6.44
School 2	University	Central South	4.26
School 3	College	Central South	9.98
School 4	College	Central South	19.73
School 1	University	South West	1.35
School 2	University	South West	8.92
School 3	College	South West	4.73
School 4	College	South West	16.25



Table 4

Average Proportion (%) of Contraband Cigarette Butts According to Institution Type and Region (based on Corrected Native-only Estimate)

Categories	Proportion of Contraband Tobacco		<i>Test of Differences among Means</i>
	<i>M</i>	<i>sd</i>	
Type of Institution			$t(23) = 0.12$
College ( $N = 13$ )	15.70	11.14	
University ( $N = 12$ )	11.44	10.71	
Geographic Region			$f(1,6) = 4.56^{**}$
North ( $N = 5$ )	28.85 <sup>a</sup>	12.17	
East ( $N = 4$ )	9.27 <sup>b,c</sup>	7.75	
Central East ( $N = 2$ )	13.17 <sup>b,c</sup>	8.43	
Toronto ( $N = 4$ )	5.85 <sup>b,c</sup>	1.07	
Central West ( $N = 2$ )	19.32 <sup>a,c</sup>	5.02	
Central South ( $N = 4$ )	10.10 <sup>b,c</sup>	6.84	
South West ( $N = 4$ )	6.90 <sup>b,c</sup>	4.82	

*Note.* *M* refers to the mean proportion (%) of contraband tobacco observed for schools in that category and was calculated by summing the proportion (%) of contraband per institution and dividing by the number of institutions comprising that category. *n* refers to number of institutions comprising that category.

<sup>\*\*</sup>  $p < .01$ ; means with different superscripts differ significantly (based on LSD post hoc tests).

Table 5

## Collection Site Locations Used at Each School

School	Student Building/ University Centre	Residence	Campus Pub	High Traffic Bus Stop	Other
School 1 (North/university)		✓✓	✓		✓
School 2 (North/university)	✓	✓	✓	✓	
School 3 (North/college)	✓				✓✓✓
School 4 (North/college)	✓	✓	✓	✓	
School 5 (North/college)	✓	✓			✓✓
School 1 (East/university)	✓	✓			✓✓
School 2 (East/university)	✓	✓	✓		✓
School 3 (East/college)			✓	✓	✓✓
School 4 (East/college)	✓	✓		✓	✓
School 1 (Central East/university)		✓✓	✓	✓	

(Continued)

School	Student Building/ University Centre	Residence	Campus Pub	High Traffic Bus Stop	Other
School 2 (Central East/college)		✓	✓	✓	✓
School 1 (Toronto/university)	✓	✓		✓	✓
School 2 (Toronto/university)	✓	✓	✓	✓	
School 3 (Toronto/college)	✓				✓✓✓
School 4 (Toronto/college)	✓	✓	✓	✓	
School 1 (Central West/university)	✓	✓		✓	✓
School 2 (Central West/college)	✓				✓✓✓
School 1 (Central South/university)		✓	✓	✓	✓
School 2 (Central South/university)	✓	✓	✓	✓	
School 3 (Central South/college)	✓	✓	✓	✓	
School 4 (Central South/college)	✓	✓	✓	✓	
School 1 (South West/university)	✓	✓		✓	✓
(Continued)					

School	Student Building/ University Centre	Residence	Campus Pub	High Traffic Bus Stop	Other
School 2 (South West/university)	✓	✓	✓	✓	
School 3 (South West/college)					✓✓✓
School 4 (South West/college)	✓	✓	✓	✓	

## **Relationships Between Contraband Tobacco and School Characteristics**

The distances from each school to the four First Nations reserves identified as the main sources of contraband tobacco in Canada (Akwesasne, Six Nations, Tyendinaga and Kahnawake) are shown in Table 6. Correlational analyses were used to determine whether distance to closest First Nations Reserve was related to proportion of contraband tobacco on campus. Initial correlation analysis results determined that there was a significant positive correlation ( $r = .51, p = .009$ ) indicating that the farther away a campus was from a reserve, the greater the proportion of contraband tobacco. Visual inspection of the data (shown in Figure 6) suggested that this correlation was occurring because the Northern schools had the highest proportion of contraband tobacco and were also the greatest distance from the four identified reserves. Therefore, the five schools located in the North region were removed and the correlation was run again. This produced a non-significant, negative correlation ( $r = -.13, p = .590$ ) between distance to reserve and proportion of contraband tobacco.

Although not identified in the original research questions, one additional analysis was performed to determine whether the size of the schools' student populations was related to the proportion of contraband tobacco found on campus. The correlation analysis revealed a significant negative correlation ( $r = -.47, p = .019$ ) indicating that the smaller the student population at a school, the greater the proportion of contraband tobacco found on the campus. Figure 7 depicts this relationship.

Table 6

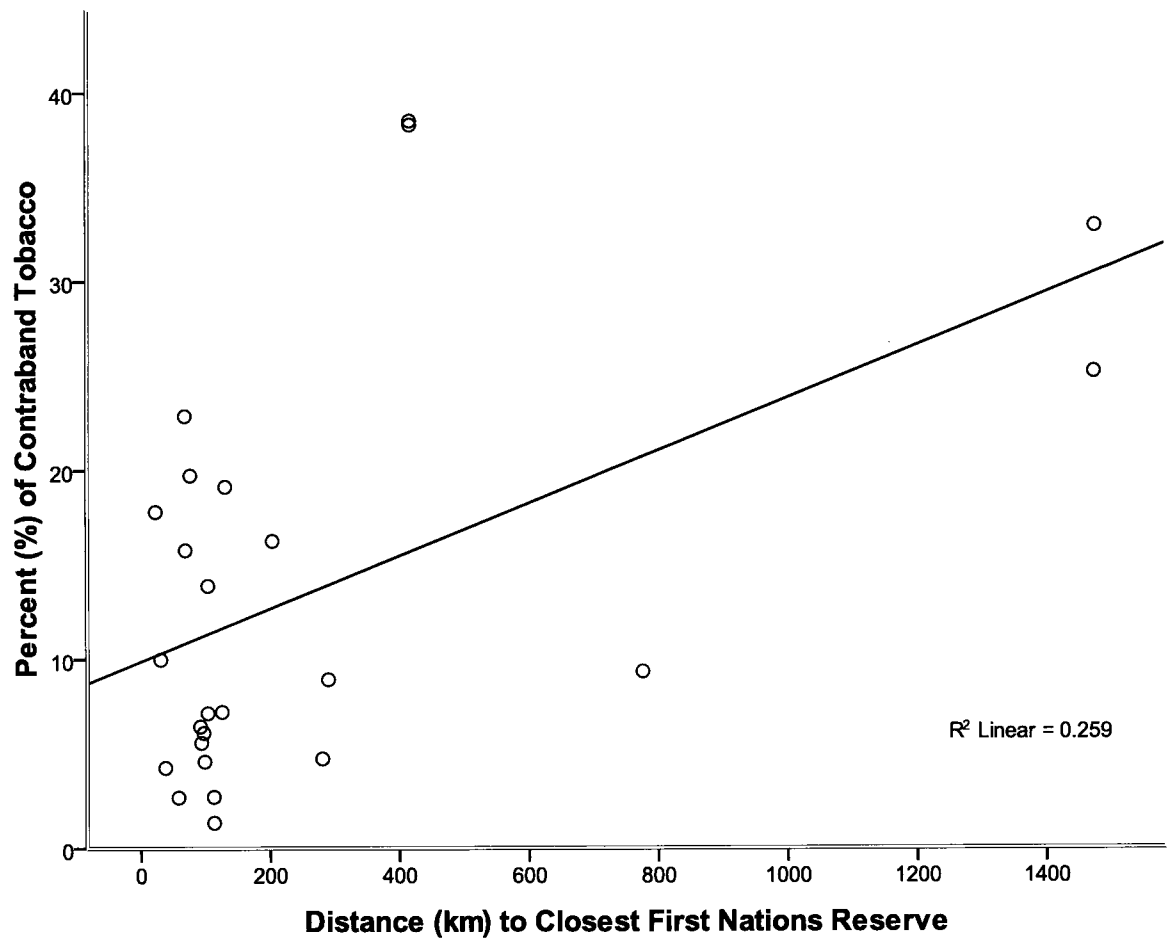
Distance (km) to Each of Four First Nations Reserves Identified as Largest Sources of Contraband Tobacco in Canada

School	Awkwesasne	Six Nations	Tyendinaga	Kahnawake
School 1 (North/university)	1591	<b>1473.11</b>	1564.25	1680.27
School 2 (North/university)	463.67	426.03	<b>415.73</b>	553.15
School 3 (North/college)	1593.27	<b>1474.19</b>	1565.86	1681.6
School 4 (North/college)	464.79	426.12	<b>415.74</b>	553.15
School 5(North/college)	892.24	<b>775.62</b>	864.62	980.38
School 1(East/university)	<b>103.77</b>	544.94	246.62	192.12
School 2(East/university)	182.55	356.97	<b>58.35</b>	282.39
School 3(East/college)	259.54	277.27	<b>22.95</b>	359.41
School 4 (East/college)	<b>113.07</b>	532.81	234.56	222.22
School 1 (Central East/university)	362.1	273.06	<b>125.48</b>	461.96
School 2 (Central East/college)	367.43	223.04	<b>130.71</b>	467.19
School 1(Toronto/university)	437.68	<b>103.5</b>	201.02	537.55

(Continued)

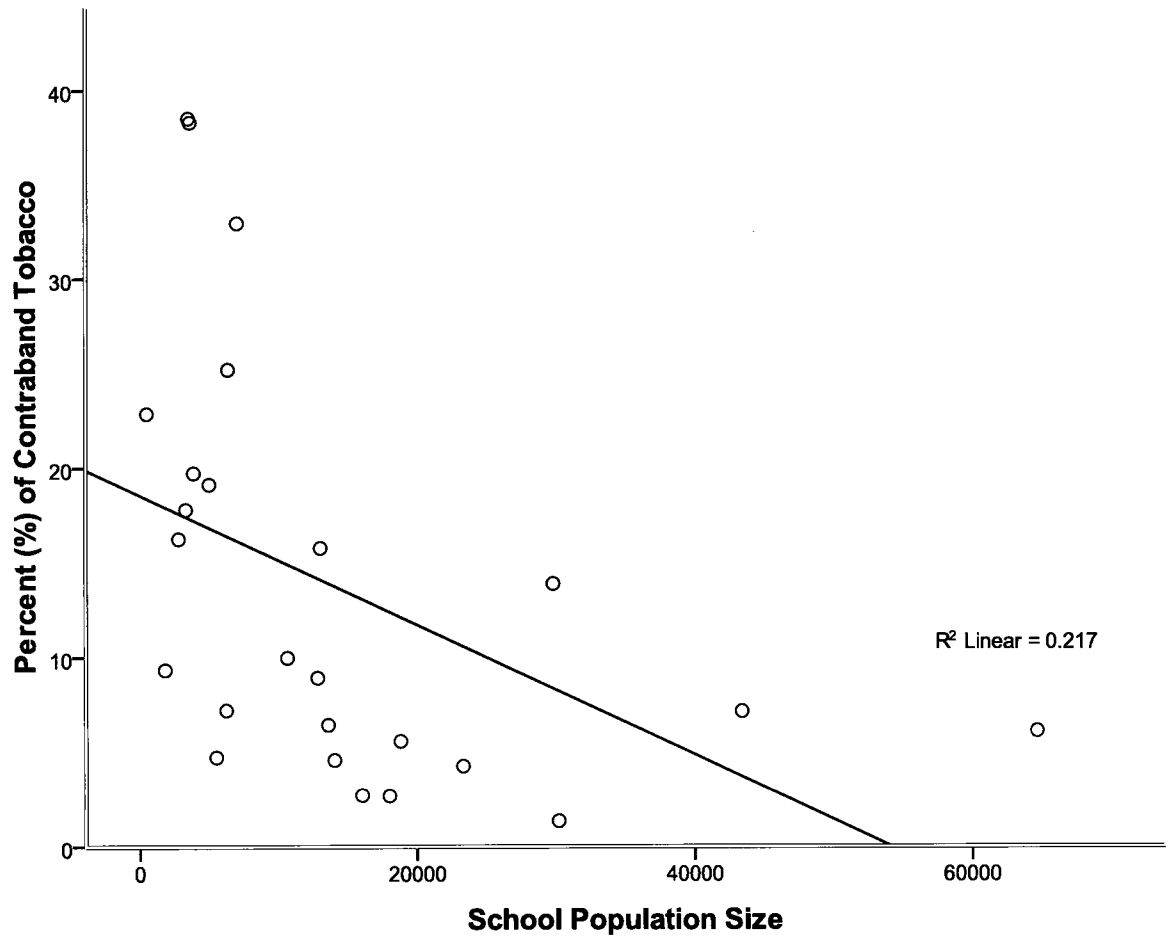
School	Awkwasasne	Six Nations	Tyendinaga	Kahnawake
School 2 (Toronto/university)	436.2	<b>97.22</b>	199.61	536.02
School 3 (Toronto/college)	437.1	<b>98.78</b>	200.49	536.99
School 4 (Toronto/college)	449.62	<b>93.71</b>	212.96	544.62
School 1 (Central West/university)	533.1	<b>69.17</b>	297.25	633.84
School 2 (Central West/college)	532.77	<b>68.22</b>	296.14	632.6
School 1 (Central South/university)	550.7	<b>91.86</b>	314.16	650.75
School 2 (Central South/university)	502.52	<b>37.9</b>	265.86	602.3
School 3 (Central South/college)	505.3	<b>30.38</b>	268.57	605.11
School 4 (Central South/college)	565.99	<b>76.64</b>	329.27	665.83
School 1 (South West/university)	618.37	<b>113.46</b>	381.69	718.3
School 2 (South West/university)	794.65	<b>289.7</b>	558.01	894.51
School 3 (South West/college)	785.71	<b>280.83</b>	548.93	885.28
School 4 (South West/college)	708.45	<b>203.63</b>	471.76	808.21

*Note.* Bolded distances are the shortest distance to the reserve, by school.



*Figure 6.* Scatterplot of Distance to Closest First Nations Reserve and Proportion of Contraband Tobacco on Campus (based on corrected, Native-only estimate)





*Figure 7.* Scatterplot of School Population Size and Proportion of Contraband Tobacco on Campus (based on corrected, Native-only estimate)

## **Chapter VI: Discussion**

### **Discussion**

Based on the wide availability and documented use of contraband tobacco by youth and adults in Ontario, there is growing concern that this inexpensive, illegal tobacco may be undermining public health strategies intended to reduce smoking prevalence in these cohorts as well as in the young adult population. This speculation, as well as the lack of data on young adults' use of contraband tobacco, led to the current study which examined how much contraband tobacco is being used on university and college campuses in Ontario.

It was determined that First Nations/Native brand cigarettes comprised 13.57% of the more than 36,000 discarded cigarette butts collected from 12 university campuses and 13 college campuses across Ontario. This compares with the 26% of contraband tobacco reported in the 2008 Canadian Convenience Stores Association (CCSA) study, which analyzed discarded cigarette butts collected from areas around Ontario high schools (CCSA, 2008).

There are a number of explanations for the large discrepancy observed between the current study and the CCSA study. First, while the methodology of the CCSA is generally similar to the current study, it is important to note that the CCSA study reflects smoking patterns of a younger cohort. Given that youth are highly price-sensitive (Carpenter & Cook, 2008; Leverett et al., 2002) it may be that the proportion of contraband tobacco smoked in an adolescent cohort is actually greater than the proportion smoked in a young adult cohort. On the other hand, the methodological discrepancies

between the two studies may be contributing to the observed difference. The CCSA included untaxed, counterfeit and foreign cigarettes in the contraband sample whereas the current study used a more conservative approach of including only reliably-identifiable Native cigarettes as contraband. Additionally, whereas the calculation in the current study included all cigarette butts in the denominator (including those that were unidentifiable) and imputed the proportion of contraband tobacco the unidentified butts would represent (in order to achieve a more accurate numerator), it is not reported whether unidentifiable cigarettes were retained or removed from the CCSA sample and whether the CCSA results are based on imputed proportions of contraband tobacco. Indeed, if all unidentified cigarettes had been removed from the current study, the overall proportion of Native tobacco would be calculated as 17.93%.

Attempting to assess the validity of the current findings by comparing them to those obtained in the CCSA study, or by Callaghan et al. (2008) or Luk et al. (2007)- who reported that 11.5% of surveyed Ontario adults self-reported usual purchase of cigarettes on reserves and 25.8% self-reported recent purchasing - is confounded by three factors. First, each of the studies examines a different age cohort: adolescents, young adults and adults. Given that smoking patterns differ across these cohorts (CTUMS, 2008), and use of contraband tobacco may be related to cigarette consumption levels (Luk et al., 2009) as well as age, the proportion of contraband used by these groups would not necessarily be similar. Second, the self-report studies provide an estimate of prevalence of contraband tobacco use over time whereas the current study on post-secondary campuses relied on a single day of collection in order to calculate the proportion of contraband tobacco in the sample. As the grounds staff at each individual school had different

collection schedules there was no common time frame between schools or individual collection sites as far as the length of time the cigarettes would account for. Ultimately this indicates that the corrected proportion of contraband tobacco found in this study would not necessarily be comparable to the more protracted usual or recent purchasing rates presented in the Luk et al. (2007) and Callaghan et al. (2009) studies. Third, because self-report studies use an individual's report of their own contraband tobacco use, whereas this study measures the total volume of contraband tobacco discarded by an unknown number of individuals, results are not completely comparable. For example, it is possible that a large amount of the contraband tobacco identified in the sample was consumed by a small number of individuals (who are heavy smokers, consuming exclusively contraband tobacco). In that case, the proportion of individual users of contraband tobacco would in fact be smaller than the proportion of contraband tobacco observed in the ground sample.

Ultimately, the results of the current study must be used only as a first 'best estimate' of the volume of contraband tobacco being consumed by smokers on college and university campuses in Ontario. The numerous steps taken to ensure accuracy when categorizing discarded butts, and estimating the proportion of contraband in the sample, support the validity of the current results. For example, cigarettes were carefully identified paying close attention to all details on the cigarette filters. Only cigarettes definitively identified as Native tobacco brands were categorized as contraband. Additionally, unidentifiable cigarettes were placed in the denominator when calculating the proportion of contraband tobacco and the corrected Native-only estimate was used in all analysis to ensure the most conservative estimate of contraband tobacco use.

While contraband Native tobacco use was apparent on all campuses, it varied considerably from school to school ranging from approximately 1% to 38% on individual campuses. The highest proportion of contraband was observed for institutions in the Northern region of Ontario ( $M = 28.85\%$ ), while the lowest proportion was observed for campuses in the Toronto region ( $M = 5.85\%$ ). The observation that the volume of contraband tobacco was significantly higher in the Northern region compared to all other regions except the Central West region ( $M = 19.32\%$ ) is similar to the results of Luk et al. (2009) who noted that individuals residing in Northern Ontario were significantly more likely than those residing in central Ontario to report usual and recent purchasing of tobacco on First Nations reserves.

This relationship between contraband tobacco use and geographic location may be a reflection of the population distribution of First Nations Canadians. Despite only 2% of the Ontario population being First Nations (Statistics Canada, 2009) a far greater proportion of reserves are found in the northern and western regions of the province indicating that more First Nations are likely residing in this area (Luk et al., 2007). Given the high prevalence of smoking among Canada's aboriginal people, the relatively large proportion of First Nations individuals residing in the northern (and western) region of Ontario, and aboriginal Canadians' access to Native tobacco, it may be that the higher proportion of contraband tobacco observed in these northern regions is a reflection of this population distribution. Were this the case, the fact that First Nations individuals can legally purchase Native tobacco would indicate that a portion of the Native cigarettes classified as contraband tobacco in the current study would need to be re-categorized as legal rather than contraband. Without knowing the proportion of Native Canadians

represented among the smokers discarding the cigarette butts on campus, this adjustment is virtually impossible to do. Whether it is even necessary may be unlikely for several reasons. Firstly, because post-secondary students do not necessarily reside in, or originate from the geographical region in which their institution is located there is no strong basis to assume that schools in the North (and Central West) region have a higher proportion of First Nations students than schools in other regions of Ontario<sup>3</sup>. Additionally, far fewer First Nations individuals in Canada attend post-secondary schools compared to non First Nations individuals (Forbes, Brown & Ahulwalia, 2005; Mendelson, 2006). Thus, without compelling evidence that aboriginal students primarily attend schools in the North (Central West), and primarily smoke native cigarettes, it is difficult to justify the conclusion that a meaningful proportion of the First Nations/Native cigarettes in this study are actually being smoked legally.

Price sensitivity of young adult smokers (Czart et al. 2001; Chaloupka & Wechsler, 1997) and the generally lower socioeconomic status of individuals residing in the northern part of the province is another possible explanation for increased contraband tobacco use in this region. According to 2001 census data, the median income of individuals residing in the northern part of the province was 15.6% less than the provincial average (Southcott, 2003). Consequently, the possibility exists that post-secondary students residing in northern Ontario are more price-sensitive than students in other parts of the province and thus are more inclined to purchase inexpensive contraband tobacco. However, this theory is based on the assumption that students attending colleges

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<sup>3</sup> The number of Native Canadians in the student population is not available for many of the schools included in this study; therefore it is not possible to determine if Northern schools have a higher proportion of First nations students

and universities in the North region reside permanently in the north and come from families with lower household incomes. As the current study has no measures of the socioeconomic status of the smokers discarding the cigarette butts on campus, this explanation of increased use in this area of the province is entirely speculative and additional research in this area would be required in order to verify this conjecture. Furthermore, this speculation that contraband tobacco use may be associated with the socioeconomic status of the region is inconsistent with current results showing that the second-highest volume of contraband tobacco occurred on campuses in the Central West region of the province where incomes are slightly higher than the provincial average (Bains et al., no date).

A more likely explanation for the high volume of contraband tobacco on Northern (and Central Western) campuses is that reserves tend to be concentrated in the north and west of the province. Some of these reserves likely produce and sell their own cigarettes; others likely serve as distribution points for tobacco produced on the four larger reserves identified as key suppliers of Native contraband tobacco. The higher presence of reserves in these regions would provide easier access to inexpensive contraband tobacco for students attending college or university in Northern and Central Western Ontario.

The possibility that smaller, local reserves contribute to the higher volumes of contraband tobacco on Northern and Western campuses aligns with results showing that distance to the four reserves (identified as major contraband tobacco suppliers in Canada) was not correlated with higher contraband tobacco use. This suggests that while the four reserves might be the original source of the illegal tobacco, they are not necessarily the only place where their contraband is being sold/purchased. If it were the case that these

reserves directly supplied contraband tobacco to consumers, not only would there be an inverse relationship between distance to reserve and proportion of contraband tobacco, but regions closer to these four reserves would have higher rates of contraband tobacco use than regions further from these four reserves. Neither of these patterns of results emerged. This indicates that the distribution networks likely spread to other smaller reserves across the province as well as convenience stores in the city centres or individual dealers.

Indeed, current results showing that smaller schools had greater use of Native contraband tobacco may suggest that distribution networks are idiosyncratic and supported by word of mouth. On smaller campuses, it would be easier for students to communicate with each other about sources of contraband tobacco. This interpersonal communication would increase collective knowledge of how to access contraband tobacco, and result in the greater use of contraband tobacco observed in this study

The proportion of Native contraband tobacco was found to be slightly, but not significantly, higher on college campuses ( $M = 15.53\%$ ) compared to university campuses ( $M = 11.30\%$ ). This trend toward higher volumes of contraband tobacco on college campuses may reflect differences in the socioenvironmental characteristics of college and university campuses, as well as the demographics of college and university populations (Horn & Neville, 2006). For example, compared to university students, college students typically come from families of a lower income status (Horn & Neville, 2006). In their study of adults, Luk et al. (2009) found that lower education was associated with recent purchasing on a reserve. While the relationship between lower SES and greater contraband tobacco use was less pronounced in the current study (with results



showing a trend but not reaching significance), this may have been the case because the process of paying for tuition and living expenses on minimal income puts both university and college students in a low SES bracket and diminishes pre-existing differences in their SES.

The trend toward greater use of contraband on college campuses could also be related to college students' higher smoking prevalence and consumption rates compared to their university counterparts (Sanem, Berg., An, Kirch, Matthias & Lust, 2009). Given that heavier consumption rates are related to greater likelihood of purchasing cheaper cigarettes (including contraband tobacco), it is not surprising that college campuses would have a higher proportion of Native tobacco compared to university campuses.

In the current study, butts were collected from four locations on each campus in an attempt to explore and make some very loose inferences about the individuals who were likely discarding cigarette butts in the various locations on each campus. The sites selected were: a residence, a high-traffic bus stop, a campus pub and the student centre/main building. It was assumed that the cigarette butts obtained from the residence locations would have been discarded almost exclusively by younger, first year students who, by definition, live on campus. Cigarettes discarded at high-traffic bus stops on the other hand, would likely have been consumed by older, upper-year students living off campus. (Students residing at home with parents possibly rely more heavily on private-not public- transportation, thus would not be discarding cigarettes at bus stops as frequently). Cigarettes discarded at designated smoking areas outside of a campus pub would likely have been consumed by older (i.e., age of majority) students who were in at least their second year of post-secondary education. Finally, butts obtained at the student

centre would likely have been discarded by smokers representing a heterogeneous sample of students from across campus as most students at some point in their day would visit the main building at their institution.

Surprisingly similar proportions of contraband tobacco were found across the four collection sites: 11.45% near the residences, 14.08% at the bus stop, 15.74% near the student building/University Centre and 12.34% near the campus pub.

Assuming the above inferences about the types of individuals using each of these collection sites are true, this result seems to indicate that contraband tobacco is being used by post-secondary students in all years of study representing a range of demographic characteristics.

### **Implications**

The availability of cheap contraband tobacco, particularly in the province of Ontario, has important public health implications. Until recently, smoking rates among Canadians, including young adults, had been steadily declining. In the past decade, however, results from the annual CTUMS suggest that smoking rates among young adults have reached a plateau. It is possible that contraband tobacco is one factor contributing to the relatively sustained smoking prevalence seen in this age group (and potentially even creating the risk of increased smoking rates among young adults). Previous research with youth, adults and young adults has shown that all age groups are sensitive to tobacco prices, such that lower tobacco prices are associated with higher smoking prevalence and rates of consumption. Among U.S. college students, increases in cigarette prices were related to decreases in both the overall prevalence of smoking and levels of tobacco consumption among current smokers (Czart, Pacula, Chaloupka &

Wechsler 2001; Chaloupka & Wechsler, 1997). Research has also shown that individuals who smoke cheaper (i.e., untaxed, discount, or generic) cigarettes smoke more and are less likely to (try to) quit compared to those who smoke premium, brand-name cigarettes (Cummings et al., 1997; Hyland et al., 2006; Hyland et al., 2005; Luk et al., 2009). Thus, the availability of inexpensive contraband tobacco quite likely undermines public health efforts to reduce smoking prevalence and rates. Among young adults in Ontario, there are likely some who would not be smoking at all, or as much, if only fully taxed cigarettes were available.

Reducing the availability and use of contraband tobacco defies conventional taxation strategies. In the traditional, regulated tobacco market, governments could raise tobacco taxes with the knowledge that smokers' price sensitivity would lead at least some to avoid, quit or reduce smoking.

**Taxation** and other government **regulation** are among potential strategies for reducing contraband tobacco use across Canada. Tobacco taxation in a market that includes contraband tobacco, however, is a difficult issue. For example, increased tobacco taxes on regulated tobacco may encourage individuals to seek out cheap contraband tobacco, thus increasing the demand for contraband tobacco. Lowering the taxes can have the result of drawing smokers away from contraband tobacco and back to regulated tobacco, but does little to reduce smoking prevalence or rates. In Ontario and Quebec where contraband tobacco use is the highest and tobacco taxes are the lowest of all Canadian provinces, it seems very likely that a further decrease in taxes would not hamper the use of contraband tobacco, and could increase smoking uptake and consumption, especially among youth and young adults.

The ineffectiveness of taxation strategies in the current market indicates the need for other regulation strategies, including law enforcement. This is of particular importance in the province of Ontario given the evidence that meaningful proportions of Ontario young adults, youth and adults use contraband tobacco. Unfortunately, options available to the provincial government are limited because law enforcement in this area generally falls to the Federal government. Further complicating law enforcement strategies is the fact that First Nations reserves in Canada have their own policing systems. This means comprehensive enforcement strategies would need to include both the RCMP and provincial and local police forces working cooperatively. Federal initiatives to promote this three-way collaboration already exist. For example, Public Safety Canada (PSC) established the First Nations Organized Crime Initiative, involving First Nations police in multi-agency task forces in Ontario and Quebec. Additionally a collaborative Task Force which includes the RCMP, CBSA, Canada Revenue Agency, Finance Canada, Agriculture and Agri-Food Canada, Health Canada and Indian and Northern Affairs Canada has been created in order to identify appropriate approaches that can be used to combat the illegal aspects of Native tobacco production and distribution. Nevertheless, the availability of provincial options is limited.

At the national level, the Canadian Federal government has been under growing pressure to address Native contraband tobacco (Stone, 2010; CNW, 2010). It recently announced three new initiatives, aimed at combating contraband tobacco. These initiatives include a multimedia awareness campaign to be developed by the Canada Revenue Agency, Detector Dog Service for use by the Canada Border Service Agency in Montreal and Vancouver, and the creation of the Combined Forces Special Enforcement

Unit Contraband Tobacco Team, led by the RCMP. This positive action is tempered by evidence from studies such as the current one that the use of contraband tobacco appears to be unevenly distributed. In Ontario, for example, higher levels of use are found in the north and central west areas of the province. Therefore Federal initiatives such as the ones mentioned above should pay particular attention to these regions of the province when implementing the multi-media campaign or deploying the Special Enforcement Team. Furthermore, while enforcement should be higher at the major supplying reserves (Akwesasne, Six Nations, Tyendenaga, Kahnawake), results from the current study and related research underscore the need for strategies to stem the flow of contraband tobacco in the northern part of the province. This might include attention to sale regulation on reserves or convenience stores in the north. However, the cultural sensitivities of First Nations individuals and their unique governing bodies should always be considered when devising these targeted strategies.

In addition to taxation and regulation strategies, public education is also needed to reduce the impact of contraband tobacco on smoking prevalence and rates among young adults, youth and adults. One such strategy would be campaigns specifically addressing contraband tobacco. The task of developing coherent, action-oriented messages aimed to motivate and support young adult smokers to avoid contraband tobacco use has proven very difficult for several reasons. First is the concern that any campaign addressing contraband tobacco is potentially increasing individuals' awareness of this cheap tobacco supply, thus further promoting its use. Among price-sensitive college and university smokers, this could be a very detrimental unintended consequence. Second, attempts to discuss contraband tobacco as unlawful based on tax evasion would likely prove futile as

it is presumed that very few people would not appreciate the “tax cuts” this tobacco provides. Additionally, many individuals feel that the purchasing of contraband tobacco is a victimless crime. Third, many important anti-contraband messages do not resonate with young adults. In a broader context, for example, it might be effective to remind the public that decreases in government revenues from tobacco taxes translates into less funding for the health care system and could lead to negative consequences in the future, when smokers themselves or their family members are in need of care. It is very likely that youth and young adult contraband-users would not appreciate these outcomes because they are typically not concerned with their long term health and are likely not experiencing health consequences of smoking that would make the message meaningful to them. Fourth, efforts to inform the public that this inexpensive contraband tobacco is unregulated and thus does not necessarily adhere to the government guidelines for health and safety in production and content, risks giving the impression that legal/brand name cigarettes are healthier or safer. This impression belies the fact that no cigarettes are good for health. Fifth, broadcasting the message that Native contraband tobacco is being made and sold illegally could lead to negative stereotypes of First Nations/Native Canadians. Lastly, messages aimed to increase awareness that cheap tobacco increases smoking uptake and escalation among youth and young adults is an important and convincing one for adults - especially those with children - but unlikely to spur young adults to reduce consumption of contraband tobacco.

Potential difficulties reaching young adults with anti-contraband messages are apparent, but probably not insurmountable. As educational and social marketing campaigns addressing young adult’s contraband tobacco use are developed, results of this

study that point to some important public health and policy implications should be noted for this population.

First, the similarity in proportion of Native tobacco on college and university campuses underscores the importance of reaching both university and college students with strategies aimed at reducing its use. Though colleges did have a slightly higher proportion of contraband tobacco than universities, the fact contraband tobacco was evident on all campuses indicates that it would be serious oversight to only direct programming at one type of institution. All post-secondary students would benefit from anti-contraband strategies.

Second, post-secondary campuses may wish to support federal, provincial and local initiatives that reduce the availability of contraband tobacco on or near campus. To this end, campuses could work toward implementing their own anti-contraband education campaigns and campus policies. In this way, messaging and interventions could specifically deal with issues important to students (such as lack of income) while avoiding less persuasive issues (such as long terms health outcomes).

Health professionals working in campus clinics (as well as those in community-based clinics serving students) need to be aware of the use of contraband tobacco by young adult smokers, particularly those attending schools in the Northern region of the province. Given that use of cheap tobacco (including contraband tobacco) is associated with higher smoking rates (Luk et al., 2009) as well as decreased quitting intentions (Hyland et al., 2006, Cummings et al., 1997) it is vital for health professionals to account for this when designing and implementing cessation interventions for young adult students. For example, when counseling students on their tobacco use, doctors and nurses

should be cognizant of the fact that cost may no longer be a motivating factor for cessation when cheap contraband tobacco is readily available. Patients using illegal tobacco might need added counseling in order to increase their motivation to quit. Likewise, because contraband tobacco-users are potentially heavier smokers, information on cessation aids might be of particular importance to them.

### **Limitations and Strengths**

The process of estimating the proportion of contraband tobacco on post-secondary campuses posed some unique challenges, representing both strengths and weaknesses in the study. First, rather than soliciting self-report information from students regarding their use of contraband tobacco (which has the advantage of providing data about the proportion of individuals who use contraband tobacco, and ensuring that only students are sampled), the study used the unobtrusive method of collecting discarded cigarette butts from campuses. Unobtrusive observation had the advantage of overcoming any systematic biases that may occur as a result of asking participants to self-report their participation in an illegal behaviour (e.g., under-estimation of contraband tobacco prevalence). Thus, a strength of this study is a potentially more accurate estimation of the proportion of tobacco that is contraband.

While the approach to data collection used in this study overcame self-report bias, there are still potential limitations that must be acknowledged, including: uncertainty about who smoked the cigarettes collected, assumption that contraband smokers attend collection sites, third-party identification of contraband (versus asking users if the tobacco is contraband), and potentially faulty assumptions in decision-models for identifying contraband. Below, each of these limitations is examined in turn.



The possibility exists that some of the collected cigarette butts were discarded by individuals who were not young adult post-secondary students. School faculty members, campus staff and visitors may have discarded cigarette butts which were then collected in the sample. To protect against this possibility every effort was made to collect from campus sites that were largely used by students. This was done by outlining four collection sites commonly used by students while also confirming (when possible) with grounds staff and current students which sites were best for the collection.

Popular belief suggests that contraband tobacco users (individuals who are presumably comfortable with the illegal nature of their tobacco purchases) may not adhere to campus smoking policies requiring them to smoke in the designated smoking areas and dispose of their cigarette butts properly. In order to overcome this potential limitation associated with the methodology used in this study, cigarette butts were collected from four collection sites that were popular smoking locations but not necessarily designated smoking areas. Collection took place from butt receptacles when these were available at a site, but ground collection was also utilized. Thus it is presumed that the butts collected in this study were not just from “law-abiding” smokers.

While self-report studies have the benefit of obtaining cigarette brand information directly from the user, identification of cigarette brands based on their filter-tip logos required that a precise decision model be created. Every effort was made to ensure that this model was as accurate as possible. Information obtained from the RCMP about the physical features of popular Native contraband tobacco brands directed the decision model. Information about legal versus international brands, obtained through internet sources used by other contraband tobacco researchers, was also used. All distinguishing

features on the cigarette butts including words, symbols, and colours, were recorded and used to categorize the butts. If identification of a specific butt was questionable, a second opinion was sought amongst research assistants in order to ensure reliability of categorization. Thus it is presumed that a relatively accurate identification process was used in order to estimate the proportion of contraband tobacco in the sample.

Additionally, by removing suspected counterfeit and international brands from the contraband sample, and instead using only Native tobacco, a more conservative estimate of contraband tobacco was found. Overall, the ways in which the potential limitations of unobtrusive data collection were addressed may be considered strengths of this study.

Presuming mainly students were using the campus sites where collection took place, this study was limited to a student population. Young adults who are not in school may have different smoking rates and/or contraband use rates compared to their in-school counterparts. As previously mentioned, other studies have found that lower education is related to increased contraband use (Luk et al., 2009). A study done by Green et al. (2007) found that 30% of young adults who did not have a college degree or were not enrolled in college were smokers compared to 14% of college educated young adults. Thus the potential exists that post-secondary students represent a sector of young adults with a decreased smoking rate, potentially leading to decreased contraband consumption rates. However, the reverse might also be true. If young adults who are not in school are instead gainfully employed they may not feel the need to purchase inexpensive tobacco. Therefore, generalizing these results to the broad young adult population should be done with caution.

Finally, it is very important to note that, despite being labelled as “contraband,”

the cigarette butts themselves are not necessarily contraband. For example, international cigarettes can be legal if all duties and taxes have been paid and if the tobacco has been brought into the country according to the rules outlined by the Canada Border Service Agency (Canada Border Service Agency, 2007). Likewise, First Nations tobacco can be legal if production, packaging and sales of the cigarettes comply with all government regulations and the cigarettes are purchased and smoked by individuals with First Nations status. The methodology used for this study made it impossible to determine whether the cigarette butts collected were smoked under legal or illegal conditions. As a result, the label “contraband tobacco” may be inaccurate in some cases. However, the exact number of cases where this label would be erroneous can not be determined from the data in this study or from pre-existing literature.

It is equally important to note that the decision to exclusively use First Nations/Native tobacco in the calculation of the proportion of contraband tobacco on campuses was based purely on principles of sound, scientific research. Specifically, because First Nations cigarettes can be most reliably identified, the overall reliability of the findings in this study was enhanced. Furthermore, because empirical evidence indicates that the majority of contraband tobacco seized by RCMP in Ontario is First Nations tobacco, the validity of the results and of the label “contraband tobacco” was enhanced. The exclusive use of First Nations tobacco in the calculation of proportion of contraband tobacco should not be seen as a judgement of First Nations people. It should be clearly understood that not all First Nations tobacco/Native tobacco brands are being manufactured, sold, purchased or used illegally. Likewise, not all First Nations people in Ontario are involved in or condone this potentially illegal activity.

## **Future Research**

To better understand and more effectively address contraband tobacco use among young adults in Ontario, further research is required into the environmental factors that influence its use (e.g., sources and accessibility of contraband tobacco), as well as the demographic and psychosocial characteristics of individuals who use it. Research on both levels is important because knowing whether contraband tobacco increases consumption and decreases intention to quit is meaningful only in the context of supply. Essentially, a limited supply of contraband tobacco would mean that its availability is affecting the smoking behaviours of only a few people, and thus is not of major concern. If however, the supply of contraband is substantial, then the link between contraband tobacco use and smoking participation is of much greater concern. Future research needs to explore environmental-level variables such as availability, distribution of and access to contraband tobacco, as well as individual-level relationships between contraband tobacco use and smoking/quitting behaviours and intentions. The current study, which primarily addressed environmental factors, represents an essential first step in determining whether, and to what extent, contraband tobacco is present on post-secondary campuses. It revealed highly variable, but substantial levels of contraband tobacco use among post-secondary students, indicating that more effective regulation of tobacco production and distribution is required in order to stem the flow of contraband tobacco and reduce its potentially detrimental influence on prevalence and rates of tobacco use among the young adult cohort. It also identifies a number of areas requiring further research.

The current study indicates a need for research into the distribution networks that are leading to the use of contraband tobacco by young adults, as results indicate there are

large differences in the amount of contraband tobacco used at each institution. These variations could be due to either differences in the characteristics of the student population or differences in the characteristics of the school. The current study contained no measures of student population characteristics, but available data shows that certain school characteristics are related to the proportion of contraband purportedly consumed there. Specifically, the geographic location of the school (eg. North or Central West versus other regions), but not its proximity to one of the four major reserves, is associated with the proportion of contraband tobacco found on campus. Additionally, the size (i.e., student population) of the school was found to be inversely related to the proportion of contraband tobacco found in the sample. Thus, it is hypothesized that the specific reserves known as major producers of Native tobacco are not necessarily direct distributors of contraband tobacco. Rather, it seems more likely that students in geographic areas like the North or Central West are purchasing contraband tobacco from other easily accessible points such as smaller reserves, convenience stores or individuals. Additionally, the inverse relationship between contraband tobacco use and school size suggests that contraband tobacco use may be influenced by word of mouth, with students at smaller schools (in particular geographic regions) having greater communication with peers about cheap sources of tobacco. Thus, studies are needed in order to clarify whether channels of contraband tobacco access are related to psychodemographics of students and/or socioenvironmental characteristics of the school. Determining where young adults are purchasing Native tobacco would also allow for more focused policy initiatives as well as legal actions aimed at reducing the sale of illegal tobacco to all persons.

Research with individual users of contraband tobacco is needed to determine who

uses Native tobacco, why they are using it, and whether its use (relative to legal tobacco use) is associated with higher consumption rates and lower intentions to quit in this population. Answers to these questions would further address whether the presence of contraband is indeed undermining efforts to reduce smoking prevalence among post-secondary students and could lead to the initiation of prevention and cessation programs targeting these specific indicators of use. For example, by being aware of gender, age or socioeconomic associations with contraband tobacco use, as well as knowing common purchasing motivation, health care professionals could direct informed anti-contraband prevention messages to a clearly-defined target audience. By knowing if young adult contraband tobacco users are in fact heavier smokers with decreased intentions to quit, cessation efforts could be enhanced. For instance, clinicians could provide additional counselling and perhaps even pharmaceutical cessation options to these patients.

### **Conclusion**

The current study examined the extent to which contraband tobacco is used by young adults attending post-secondary institutions in Ontario. Highly variable but substantial amounts of Native tobacco were found on campuses across the province, with environmental characteristics (e.g., geographic location and school size) being indicative of the proportion of contraband found at each school. Based on these results tobacco control advocates should be aware that inexpensive contraband tobacco may be contributing to the relatively sustained young-adult smoking rates seen in the province of Ontario over the past decade.

Tobacco control initiatives including education programs, youth sales restrictions, package warning labels and taxation strategies have been successful in reducing smoking

prevalence rates across Canada. However, the emergence of Native contraband tobacco and its apparent use among Ontario youth, adult and young adult populations (as found in the current study) may be impeding the effectiveness of these traditional tobacco control strategies. This indicates a need for the creation and implementation of new approaches aimed to reduce smoking prevalence and consumption rates among Ontarians, in particular young adults - the cohort with the highest smoking prevalence. Specifically, anti-tobacco education, taxation and regulation strategies may need to be modified in order to address individuals' use of this inexpensive tobacco.

Successful modifications to these initiatives will be further enhanced by continued research into the environmental factors that influence contraband tobacco use (e.g., sources and accessibility of contraband tobacco, in particular in the Northern region of the province), as well as the demographic and psychosocial characteristics of individuals who use contraband tobacco. Additional research is needed in order to determine who uses contraband tobacco, why they are using it, and whether its use is associated with higher consumption rates and lower intentions to quit in the young adult population. This information, gathered from individual users of contraband tobacco, can inform prevention and cessation programs targeting these indicators of use.

Of key importance to the resolution of this issue is finding a more effective way to stop the supply of contraband tobacco. Presently, the entry of Native contraband tobacco into Canada far outweighs the seizures that RCMP officers are able to make due to limited funding, man power and difficulties associated with the unique characteristics of the Canada-U.S. border. The issue of supply is even further complicated as it brings into play sensitive issues related to First Nations rights, freedoms, and cultures. Therefore, it

is quite likely that stemming the flow of contraband tobacco will require an entirely new approach, potentially representing a fourth wave in tobacco control.

The strong desire to stop the use of contraband tobacco is not held by tobacco control advocates alone. Uniquely, contraband tobacco represents a threat not only to tobacco control efforts, but also to the profits of Big Tobacco and smaller retailers. Individuals representing these businesses are now fighting alongside tobacco advocates and health professionals against contraband tobacco, making for a rather uncomfortable situation.

Native contraband tobacco has emerged as a growing issue over the past decade and its use by young adults, as found in this study, is of great concern. Tobacco control advocates, health professionals and policy makers need to acknowledge the availability and use of contraband tobacco in the province of Ontario and work to evolve their prevention, cessation and regulation strategies accordingly.



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## **Appendix A**

### **Written Instructions for Research Assistants**

## **KEEP THIS BOX!**

You will need to use it to return the  
filled containers to the LTPB head  
office



# **Cigarette Butt Collection**

## **Overview**

Thank you for agreeing to help with LTPB's investigation of the extent of contraband tobacco use on post-secondary campuses.

To help with this study, you and another member of your team will collect cigarette butts collection on a *single* occasion, some time between March 30<sup>th</sup> and April 10<sup>th</sup>. The exact day will depend on what the facilities manager of your campus says to us when we call.

You will go to 4 sites on campus to collect the contents from inside and around cigarette butt receptacles. (*Full instructions are provided below*).

When Brock did a "trial run" of the procedures, it took less than 1 hour to collect cigarette butts from the 4 designated sites. Depending on the size of your campus, it will likely take you about the same amount of time.

## **Important!**

Please read all of the information below, and **follow the instructions carefully**.

To ensure that you receive your **\$25 honorarium**, be sure to email Pam Bradley at LTPBoffice@brocku.ca. Provide your **name**, **social insurance number**, and **school**.

Please contact Lindsay Taylor (905-688-5550 ext 5838; lindsay.taylor@brocku.ca) if you have **any questions** at all!

## **Materials**

Brock has mailed you all the materials you need. Please ensure that you received these materials.

### **Materials for Collection of Cigarette Butts**

- 4 plastic containers with labels affixed to lids
- 1 dustpan and whisk
- 1 marker
- 2 dust masks
- 3 pairs of latex gloves (2 pairs medium; 1 pair large)
- 3 sets of disposable coveralls (2 mediums; 1 large)

### **Materials to Courier Cigarette Butts to Brock**

- 1 box for return shipping (*it's the same box the materials arrived in!*)
- 1 roll of packing tape
- 1 address label (for Brock University)
- courier account number

## **Procedures**

## **1. Preparing to Collect Cigarette Butts**

Brock has contacted the facilities manager for approval to collect cigarette butts, but you may have to meet a staff member to obtain a key to access the butt receptacles. Be sure to schedule this if necessary.

Plan to collect cigarette butts from these 4 sites:

- the student building / university centre
- a residence
- a campus pub
- a high traffic bus stop

*NOTE:* If there are multiple residences, pubs or bus stops, plan to collect cigarette butts from the *busiest* site. Likewise, if there are multiple smoking areas at any of the sites, plan to collect cigarette butts from the *busiest* smoking area.

If any of these places 'overlap' (e.g., the pub is in the student building, so these two places use the same smoking area), simply choose another busy smoking area and collect cigarette butts there.

P.S. Later in the day seems to be the best time to collect cigarette butts.

## **2. Collecting Cigarette Butts**

**Collect cigarette butts from 4 separate sites; *use one plastic container per site.***

### **Step 1:**

Gather together all necessary supplies: 4 plastic containers; 1 marker; dustpan & whisk.

*NOTE:* You will definitely want to wear the gloves and mask when collecting the cigarette butts, so be sure to have these with you.

### **Step 2:**

Go to the first site of collection. (It is your choice where to go first).

Find the butt receptacle, and empty the contents of the receptacle into ONE plastic container. (If there are more butts in the receptacle than the plastic container can hold, just stop when the container is full. Leave the left over butts in the receptacle.) Please try to avoid placing large debris (such as cups, bottles, branches, stones, etc.) into the plastic containers.

*If the plastic container for this site is not full, follow Step 2a OR Step 2b...*

**Step 2a:** collect butts from the ground around the receptacle (10 foot radius)

OR

**Step 2b:** if there is a heavy concentration of cigarette butts on the ground away from the receptacle, collect those butts (in a 10 foot radius) instead of collecting near the receptacle)

**Step 3:**

Place the lid on the container (even if it is not full).

**Step 4:**

Label the container by writing the name of site where you collected these butts. For example, if you have just collected butts at your student centre, you would write on the label, "Student Centre [Name of building]."

**Step 5:**

Repeat steps 2-4 for the remaining 3 sites. Again, be sure to use only one plastic container per site, and to clearly label the plastic container with the location.

**Step 6:**

Once you have completed butt collection at the 4 sites, return the key to your grounds-keeping staff (if necessary), discard your protective clothing, and take the butts back to the office to pack and ship them.

**3. Shipping Cigarette Butts back to Brock via PUROLATOR COURIER**

Using the packing tape provided, securely tape the lids to the plastic containers (to ensure the plastic containers stay sealed during shipping). Place *just* the 4 plastic containers back into the box they came in and tape the box shut.

LTPB has an account with **Purolator Courier**. To avoid courier charges to *your* campus, you must use Purolator (not another courier company)

Please contact your mailroom or shipping/receiving department to determine exactly how Purolator operates on your campus, or ask your health professional to assist you.

When completing the Purolator shipping form, use this account number:

**0134021**

and this address:

**Brock University  
Leave The Pack Behind  
500 Glenridge Avenue, PL 514  
St. Catharines, ON  
L2S 3A1**

If you have *any* questions about shipping, please contact Pam Bradley at 905-688-5550 x4992 or x 5144. THANKS!

## Appendix B

Proportion (%) of Contraband Tobacco Using Three Separate Calculations

	Suspected-illegal		Conservative		Corrected	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
All post-secondary campuses	12.59		11.22		13.57	
Type of Institution						
College	13.53	9.64	12.75	9.95	15.70	11.14
University	11.72	8.90	9.67	9.18	11.44	10.71
Geographic Region						
North	25.30	11.74	24.81	11.53	28.85	12.17
East	8.98	6.44	7.29	6.20	9.27	7.75
Central East	11.51	5.77	10.81	6.62	13.17	8.43
Toronto	8.18	2.93	5.14	1.43	5.85	1.07
Central West	16.04	3.46	15.26	3.56	19.32	5.02
Central South	9.68	4.57	7.93	5.34	10.10	6.84
South West	6.90	4.82	6.05	4.55	7.82	6.42

## Appendix C

Proportion (%) of Contraband Cigarette Butts According to Institution Type and Region  
(based on Corrected Native-only Estimate)

Categories	Proportion of Contraband Tobacco
	<i>M</i>
<b>Type of Institution</b>	
College ( <i>N</i> = 13)	14.68
University ( <i>N</i> = 12)	12.35
<b>Geographic Region</b>	
North ( <i>N</i> = 5)	25.86
East ( <i>N</i> = 4)	8.34
Central East ( <i>N</i> = 2)	13.59
Toronto ( <i>N</i> = 4)	5.64
Central West ( <i>N</i> = 2)	17.14
Central South ( <i>N</i> = 4)	8.64
South West ( <i>N</i> = 4)	7.13

*Note.* *M* refers to the proportion (%) of contraband tobacco observed for schools in that category and was calculated by summing the number of corrected-Native cigarette butts per institution and dividing by the total number of cigarettes collected at the institutions comprising that category. *n* refers to number of institutions comprising that category.