

**Running Head:** Other Tobacco Product Harmfulness

**Smokers' beliefs about relative safety of other tobacco products:**

**Findings from the ITC Collaboration**

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**Abstract**

Most tobacco control efforts in Western countries focus on the factory-made, mass produced cigarette (FM cigarette), whereas other tobacco products receive relatively little attention. Non-combusted tobacco products (i.e., referred to as smokeless tobacco [SLT]), particularly Swedish style snus, lower disease risks compared to combusted tobacco products such as cigarettes. In this context it is important to know what tobacco users believe about the relative harmfulness of various types of tobacco products. Random-digit dialled telephone surveys of current smokers aged 18 and over in the United States, Canada, United Kingdom, and Australia were the data source. Three waves of data, totalling 13,322 individuals, were assessed. Items assessed use of and beliefs about the relative harms of cigars, pipes, smokeless tobacco, FM and roll-your-own cigarettes, as well as sociodemographics and smoking behaviors. We found that cigars (2.8-12.7%) were the most commonly used other tobacco products by current cigarette smokers, followed by pipes (0.3-2.1%) and smokeless tobacco (0.0-2.3%). A significant minority of smokers (12-21%) used roll-your-own cigarettes at least some of the time. About one quarter of smokers incorrectly believed that pipes, cigars, or roll your own cigarettes were safer than FM cigarettes, while only about 13% responded correctly that smokeless tobacco was less hazardous than cigarettes. Multivariate analyses showed that use of other tobacco products was most strongly related to beliefs about the reduced harm of these other products. Use of other tobacco products was low but may be growing among smokers in the four countries studied. Smokers are confused about the relative harms of tobacco products. Health education efforts are needed to correct smoker misperceptions.

## **Smokers' beliefs about relative safety of other tobacco products: Findings from the ITC Collaboration**

Most tobacco control efforts in Western countries focus on the factory-made (FM) cigarette, whereas other tobacco products receive relatively little attention. These other forms of tobacco include roll-your-own (RYO) cigarettes, pipes, cigars, and smokeless tobacco (SLT--dry snuff, moist snuff, and chewing tobacco). Prior to the mid 20<sup>th</sup> century, such products accounted for the vast majority of tobacco use in Europe and North America, but currently they account for a much smaller proportion of tobacco use (Euromonitor, 2006; Capehart, 2005; Tobacco Advisory Group, 2000). Population-based surveys bear out this observation--as shown in Table 1, prevalence of non-cigarette tobacco product use is less than 6% in all countries (Substance Abuse and Mental Health Services Administration, 2005; Office of National Statistics, 2005; Australian Institute of Health and Welfare, 2005; Health Canada, 2004). The prevalence of other tobacco use is based partly on cultural preferences. For example, South Asians in the UK have high prevalence of SLT use (27-98%; Bedi & Gilthorpe, 1995). In some cases legal restrictions determine product use, as with the ban on moist snuff in Australia and the European Union (excluding Sweden).

<<Insert Table 1 about here>>

*Concurrent* use of tobacco products is also often not considered. Between 2.5 – 5.0% of US cigarette smokers also use SLT, and 3-4% concurrently smoke cigarettes and cigars (Wetter, McClure, de Moor, et al., 2002; National Cancer Institute, 1998). In Great Britain in 2004, 7% of male cigarette smokers concurrently used cigars or pipes (Office of National Statistics, 2005). Among Australian cigarette smokers, 7.9% smoked cigars and pipes at least occasionally (Australian Institute of Health and Welfare, 2005).

Other tobacco products have varying health risks, and these can differ depending on whether the person in question is a smoker or nonsmoker. RYO cigarettes, filtered and unfiltered, present similar health risks to factory-made (FM) cigarettes (Kaiserman & Rickert, 1992; Benhamou, Benhamou, Tirmarche, & Flamant, 1985; Tuyns & Esteve, 1983; Hawthorne & Fry, 1978). Cigar use is linked to lung, lip, oral cavity, stomach, and pancreatic cancers, and to COPD and heart disease (National Cancer Institute, 1997, 1998), whereas pipe use is related to cancers of the lung, oral cavity, and colon (Henley, Thun, Chao, & Calle, 2004; National Cancer Institute, 1997). Primary (i.e., exclusive, never used cigarettes) cigar and pipe users rarely inhale and appear to have lower health risks compared to current cigarette smokers, whereas secondary cigar and pipe users (ie those who use pipes or cigars with cigarettes concurrently, or former cigarette smokers who switch to pipes or cigars) typically inhale to a greater extent (National Cancer Institute, 1998). Dual users of cigarettes and cigars appear to be at particularly high risk of cancers (National Cancer Institute, 1997, 1998). Thus, cigars and pipes are not likely to be reduced-harm alternatives for cigarette smokers.

Most forms of SLT use carries health risks markedly lower than those of combusted forms of tobacco (Foulds, Ramstrom, Burke, et al, 2003; Tobacco Advisory Group, 2002). The magnitude of the risk is still controversial, but a recent expert panel estimated SLT was 90% less harmful than cigarettes (Levy, Mumford, Cummings, et al., 2004). The extent of harm reduction is particularly true for Swedish “snus” where levels of toxicants have been reduced in recent years (Osterdahl, Jansson, & Paccou, 2004). However, as recently as 2003, the US Surgeon General claimed that “no significant scientific evidence ... suggests smokeless tobacco is a safer alternative to cigarettes” (Carmona, 2003).

There is no such thing as a completely safe tobacco product. However, compared to conventional FM cigarettes, switching to some types of tobacco products provide little or no reduction in risk for current smokers (e.g., cigars, pipe tobacco, RYO, bidi, kretek), while switching to other types of products (e.g., smokeless tobacco products) may lower risk of disease. In this context, knowing what tobacco users believe about the relative harmfulness of various products becomes important. In the US, at least, the predominant public health message is that “No tobacco product is safe.” However, believing tobacco is harmful overall does not preclude one believing that various forms of tobacco use (low-tar cigarettes, roll-your-own, cigars, pipes, SLT) might have different levels of risk (Kozlowski & Edwards, 2005). If cigarette smokers perceive some other tobacco products to be less hazardous, they may consider switching as a harm reduction measure, which may or may not be true depending on the product they perceive as less hazardous.

In the current paper we examine cigarette smokers’ use of and beliefs about the harmfulness of factory made (FM) cigarettes, RYO cigarettes, pipes, cigars, and SLT in four countries (US, UK, Canada, and Australia) across three waves of data collection (2002-2004) from the International Tobacco Control (ITC) Four Country study. The ITC Four Country Survey (ITC-4) includes nationally representative cohorts of adult smokers drawn from the US, UK, Canada, and Australia using parallel survey designs and measures. The ITC-4 provides a comprehensive assessment of product use and beliefs about different tobacco products. Furthermore, it allows for the evaluation of tobacco control policies that are implemented in each country during the length of the eight-year study.

## **Methods**

The ITC-4 survey is a prospective study conducted yearly in Canada, US, UK and Australia, with 2,000 longitudinal respondents per country with yearly replenishments; see Figure 1 for details. A total of 13,322 eligible adult (i.e., 18 years of age and older) smokers (defined as having smoked at least 100 cigarettes lifetime and who currently smoked at least once a month) have agreed to be interviewed in the first three waves (2002-4). The survey field work was conducted using computer-assisted telephone interview (CATI) techniques, with households sampled using stratified random-digit dialling, and adult smokers within each household selected via the “Next Birthday” method. These participants were asked to respond to questions related to tobacco control policies, smoking behaviour and psychosocial correlates of smoking behaviour and policy beliefs. Further details about the conceptual framework, survey methodology, response, cooperation and attrition rates, sampling plan, and protocols are available elsewhere (Fong, Cummings, Borland, et al., 2006; Thompson, Fong, Hammond, et al., 2006).

<<Insert Figure 1 about here>>

### *Measures*

Sociodemographics: For all participants, data were available on country of residence, age, sex, race/ethnicity (dichotomized as White/Not White), income, and level of education.

Use of tobacco products. To determine RYO use, smokers were asked, “Do you smoke factory-made cigarettes, roll-your-own cigarettes, or both.” Smokers were categorized as exclusive RYO, exclusive FM, or ‘mixed’ users. Use of additional tobacco products was assessed by one item: “In the past month, have you used any other kind of tobacco product besides cigarettes? Please don’t include products intended to help you quit smoking.” Participants could respond cigars, cigarillos, bidis, pipes, chewing tobacco, snuff, or other

products, and could nominate multiple products. We report results for cigarettes (both RYO and FM), cigars, pipes, and SLT (snuff and/or chewing tobacco).

Dependence. We examined participants' nicotine dependence using the Heaviness of Smoking Index -- the sum of categorized cigarettes smoked per day (<10[0], 11-20[1], 21-30[2], 31+[3]) and time in minutes to the first cigarette of the day (<5[3], 6-30[2], 31-60[1], 61+[0]; Heatherton, Kozlowski, Frecker, et al., 1989).

Beliefs about products. All participants were asked: "Thinking about different types of tobacco products that are smoked—that is, factory-made cigarettes, roll your own cigarettes, pipes, and cigars—are any of these less harmful than the others or are they all equally harmful?" Note that we did not try to distinguish between primary or secondary use, nor dual use of products. Those who replied that some products were less harmful than others were asked two questions: "What kind of tobacco product do you think is least harmful?" and "What kind of tobacco product do you think is most harmful?" For each product, a three-level classification was created: [FM/RYO/Pipe/Cigar] is least harmful; [FM/RYO/Pipe/Cigar] is most harmful; No difference among smoked products. If a participant nominated the same product as both least and most harmful, he/she was reclassified as believing no difference existed.

Beliefs about SLT were assessed as follows: "Are you aware of any smokeless tobacco products, such as snuff or chewing tobacco, which are not burned or smoked, but instead are usually put in the mouth?" Those who stated they were aware of SLT were then asked: "As far as you know, are any smokeless tobacco products less harmful than ordinary cigarettes?"

#### *Data analysis*

We assessed the prevalence of use of FM and RYO cigarettes, cigars, pipes, and SLT among participants at each wave of the survey. Similarly, we assessed the prevalence of beliefs

about the relative harms of these products. We report prevalences weighted to each country's smoker population (Thompson et al., 2006). Changes across the three waves for each country were computed on unweighted data using Generalized Estimating Equations (GEE) in SAS 9.1 (SAS Institute, Cary, NC). GEE models are useful for analysis of longitudinal data, to account for the correlation of repeated observations of the same individuals over time. They also allow all data to be used, including subjects lost to follow-up, rather than simply complete cases (Liang and Zeger, 1986). P-values for change over time are derived from the two degree of freedom Wald test. We examined relationships between beliefs about which product was least harmful and sociodemographic and smoking behaviour variables across all three survey waves using GEE. Here, we report odds ratios (OR) estimates and their 95% confidence intervals. For GEE models featuring dichotomous outcomes, we used binomial distributions, logit link functions, and autoregressive working correlation matrices. For multinomial responses, we used multinomial distributions, cumulative logit link functions, and independent working correlation matrices. Multivariate models controlled for time effects and recruitment wave.

<<Insert Table 2 about here>>

## **Results**

### *Prevalence of tobacco product use among current smokers*

Table 2 shows the prevalence of use of FM and RYO cigarettes, cigars, pipes, and SLT by wave and country. Among smokers in this sample, use of RYO cigarettes varies by country, with the US having the lowest prevalence. Canadian (OR=4.6,  $p<.001$ ), UK (OR=10.6,  $p<.001$ ), and Australian (OR=6.1,  $p<.001$ ) smokers were all significantly more likely to report RYO use. Analysis of changes in the distribution of FM-RYO cigarette use showed that RYO use is

increasing in the UK ( $p < .01$ ), whereas no significant changes over time were noted in the US, Canada, or Australia.

Concurrent use of cigars was relatively high (e.g., 2.8 to 11.4% in USA across the three waves) among smokers in this sample, compared to pipes or SLT products. Compared to US smokers, Canadians were 1.3 times more likely to report cigar use ( $p < .01$ ), whereas smokers from the UK (OR=0.6,  $p < .001$ ) and Australia (OR=0.7,  $p < .01$ ) were both less likely to report cigar use. Cigar use increased significantly in both Canada and the US from Wave 1 to Wave 3 ( $p < .001$ ), and also increased somewhat in Australia ( $p < .05$ ), but showed no significant change in the UK. Concurrent use of pipes, on the other hand, was lower than that of cigars (highest estimate= 4.1% in US in 2004) and showed no significant difference between countries nor significant change across time within countries.

Concurrent SLT use was quite rare, being highest in the US where it was highest in W1 at 2.3% but dropped to 0.7% at W3. Prevalence in Canada, the UK, and Australia was less than 0.6% of smokers in each country (ORs  $< 0.3$ , all  $p < .001$ ). Use of SLT among US smokers dropped significantly across time ( $p < .001$ ), and also showed some fluctuation in the UK ( $p = .02$ ), though this may be an artifact attributable to a few individuals.

### *Beliefs about Tobacco Products*

<<Insert Table 3 about here>>

Table 3 shows the prevalence of believing that some tobacco products are less harmful than others by country and wave. Overall (that is, collapsing across waves), one quarter of smokers believe that some smoked tobacco products are less harmful, but there were significant differences between countries, with US smokers least likely to believe that some smoked products are less harmful than others, Canadian smokers showing no overall difference from US

smokers (OR=1.1,  $p=.28$ ), and UK (OR=1.7,  $p<.001$ ) and Australian (OR=2.5,  $p<.001$ ) smokers more likely to believe that some smoked products are less harmful than others. Over time, there were significant increases in these beliefs in Canada ( $p=.009$ ) and the US ( $p<.001$ ), and a decrease in the UK ( $p<.001$ ), with no significant change in Australia. It is notable that the higher rates of Australian smokers believing FM cigarettes to be most harmful, comes from beliefs that RYO and to a lesser extent pipes are less harmful.

There were overall differences between countries in awareness of SLT, with Canadian (OR=0.5,  $p<.001$ ), UK (OR = 0.2,  $p<.001$ ), and Australian (OR = 0.03,  $p<.001$ ) smokers all less likely than US smokers to report awareness of SLT. Only around 13% of those aware of smokeless products thought they were less harmful than cigarettes. Among those who were aware, we examined relative-risk beliefs for SLT compared to cigarettes. Here, compared to US smokers, Canadian (OR=1.3,  $p<.001$ ), UK (OR=3.2,  $p<.001$ ), and Australian (OR=3.2,  $p<.001$ ) smokers were all *more* likely to believe SLT to be less harmful than cigarettes. Within countries, there were significant decreases in reports of such beliefs across waves (all  $p <.02$ ).

In order to assess correlates of these relative risk beliefs across products, we ran GEE models for 5 possible beliefs: 1) FM cigarettes are least harmful; 2) RYO cigarettes are least harmful; 3) Pipes are least harmful; 4) Cigars are least harmful; and 5) SLT is less harmful than cigarettes. These are shown in Table 4. The following factors were found to increase the odds of believing that FM cigarettes are least harmful among smoked products: being less than 25 years old, white (OR=1.4, 95% CI: 1.1-1.7), male (OR=1.3, 95% CI: 1.2-1.5), residing in the UK, having a high income, medium or high education, and smoking only FM cigarettes. For RYO, young (<25) White male smokers in the UK and Australia, with high education, using RYO sometimes or exclusively were most likely to see RYO as the least harmful. For pipes,

older ( $\geq 25$ ) White male smokers in the UK or Australia with high income, medium or high education, using FM cigarettes, and using pipes concurrently were likely to believe pipes were the least harmful smoked product. For cigars, male smokers aged 40 or older living outside the US, with high education, who used cigars in the last month, were more likely to believe cigars were least harmful. Finally, for SLT relative risks, young male smokers living outside the US with high income, or who used SLT in the last month were likely to believe SLT was less harmful than cigarettes. Nicotine dependence, as assessed with the HSI, was not consistently related to risk beliefs for any of the products.

<<Insert Table 4 about here>>

## **Discussion**

Three waves of data collected on representative samples of cigarette smokers in four countries indicate low but significant concurrent use of other tobacco products (cigars, pipes, SLT) and cigarettes. Significant minorities of cigarette smokers used RYO cigarettes exclusively, while an additional percentage in each country concurrently used FM and RYO cigarettes. There is some evidence of increases over time of RYO use in the UK, perhaps in response to differential taxation, as RYO is substantially less expensive than FM cigarettes (Office of National Statistics, 2005). Although some tobacco control advocates may have written cigars off as a fad of the 1990s, our data indicate that, among smokers, concurrent cigar use appears substantial and growing in three of the four countries examined. Given the known health risks of dual use of cigarettes and cigars, this use should be alarming to health authorities.

The vast majority of smokers in all four countries reported that factory made cigarettes and other forms of smoked tobacco were equally harmful. By contrast, relatively few smokers, among those aware of SLT products, viewed them as less harmful than smoking. Given that

there are no clear differences in harmfulness among smoked products for current smokers, but clear differences in harmfulness between smoked and smokeless, we focus our discussion on the minority who believe, without a strong scientific base, that some forms of smoked tobacco are less harmful, and particularly on the very low levels of awareness that some smokeless products can be less harmful.

Beliefs about the relative harmfulness of some smoked products appear to depend significantly on whether one uses those products. For example, those who currently used cigars were 2.5 times more likely to rate cigars as the least harmful smoked tobacco product compared to those who did not use cigars. Similarly, those who used FM cigarettes exclusively were likelier to rate FM cigarettes as least harmful, RYO users were 1.8-2.9 times more likely to rate RYO as least harmful, pipe users 1.9 times more likely to rate pipes least harmful. These links were product specific; use of pipes was not associated with beliefs about RYO, for example. This might be seen as a class of self-exempting belief, but one cannot be sure whether smokers choose to use some smoked tobacco products they perceive to be safer, or they perceive the products as safer because they use them.

An interesting age divide is seen in product harmfulness beliefs—younger smokers are more likely to believe cigarettes (both FM and RYO) and smokeless to be the safer form of tobacco, while older smokers were more likely to nominate pipes and cigars. This age difference may relate to advice provided by physicians in the past for cigarette smokers to switch to pipes or cigars if they were unwilling to quit (Stuttaford, 2005; Anonymous, 1967). Country of residence appears to relate to both use of other tobacco products and to beliefs about the relative harms of those products. In the US, smokers were less likely overall to hold beliefs that some tobacco products might be less harmful, perhaps due to strong public communications to this

effect from some public health agencies (e.g., Carmona, 2003). More needs to be done, especially in Australia and the UK to inform smokers that all forms of smoked tobacco are similarly harmful. Some of this effort needs to be targeted at young smokers, as they tended to believe RYO and cigars to be less dangerous.

We now turn to the extremely low levels of awareness that some forms of SLT are less harmful than cigarettes. Here we focus our analysis on the situation in the US and to a lesser extent Canada, as in Australia and the UK most SLT is banned and in this context lack of public understanding is less concerning. (However, it is worth noting that such public ignorance will work against efforts to lift bans on the less harmful forms of SLT in those countries.) Current SLT users were 2.7 times more likely to report SLT was less harmful than cigarette smoking. US smokers were least likely to believe that some SLT is less harmful, even though it is an available option for them. Why do US smokers hold such beliefs, given the product is available? In our opinion, it demonstrates a major failing of public education about the relative harms of tobacco products.

Current public health messages, particularly in the US, stress that no tobacco product is safe (e.g., <http://www.cdc.gov/tobacco>). Although this message is literally true, easily communicated, and may account for why US smokers are more likely to see all products as equally harmful, it is misleading insofar as it implies that all products *are* equally harmful. It is notable that this message has been adopted by the cigarette industry (Kozlowski & Edwards, 2005). Given the low proportion of smokers who understand the real risk profiles of the various products, this approach has resulted in the systematic mis-education of smokers. Smokers are interested in relative risks, as the experience with filtered and Light cigarettes has shown, even if the perceived risk reductions cannot be confirmed by epidemiological data (Kozlowski and

Edwards, 2005). Often, personal experience is enough to “confirm” the difference in products—Light cigarette smokers, for example, may believe Light cigarettes are safer because they ‘feel’ lighter on their chest (Kozlowski, Goldberg, Yost, et al., 1998). We can see this personal experience effect in the rankings of harmfulness in the current data, where use of the product made one more likely to nominate it as less hazardous. Yet many smokers are likely to be deterred from trying SLT given the lack of accurate information about relative risks (and in other countries are unable to try SLT because it is banned). Hence, smokers are systematically being prevented making informed choices because they lack key information. This holds independent of whether they could or would make such choices if they were adequately informed. This could operate via several mechanisms. Alternatively, this could represent a self-serving bias toward products that the participant has used. Other possible interpretations of this finding might be that smokers

Public health officials might consider moving to a more nuanced message wherein the particularly high risks of combusted products are stressed. Nuanced health messages are difficult to construct and deliver and may be difficult for the public to comprehend, but smokers have a right to be informed about health effects of products (Kozlowski & O’Connor, 2003; Kozlowski, 2002), and that some tobacco products are less hazardous than others (e.g., smokeless versus combusted), while others are effectively equally hazardous to them (e.g., FM and RYO cigarettes, pipes, cigars). This might involve explicit acknowledgement that SLT is less harmful than cigarettes, but still carries risks and is not a product to choose unless one is already a smoker.

This agenda will be threatening to some in public health who are rightly concerned that such efforts could be interpreted as approval of SLT use in general. Of course, health educators will need to ensure that their messages are not interpreted as meaning that some tobacco products

are safe, or that nonusers of tobacco should feel safe in adopting SLT use. From a public health point of view, there is no doubt that zero tobacco use would be best (Stratton, Shetty, Wallace, and Bondurant, 2001; Levy, Mumford, Cummings, et al., in press). However, we believe that the current inaction is actually supporting the interests of the cigarette industry, and the risk of encouraging SLT use needs to be viewed in the light of the (to us) far greater risk of continued smoking. There is now strong epidemiological evidence from Sweden that snus use is associated with a reduced risk of becoming a daily smoker and an increased likelihood of stopping smoking (Furberg, Bulik, Lerman, et al., 2005; Rodu, Nasic, & Cole, 2005; Ramstrom & Foulds, 2006), as well as evidence that concurrent SLT use is not increased with the implementation of workplace smoking bans (Mumford, Levy, Gitchell, & Blackman, 2005). As we noted above, getting the message right may be a challenge, but if for no other reason than the right of all citizens to know the truth about issues that concern their health (Kozlowski, 2002), we believe there is no alternative but to try. This is especially true as novel products are introduced that may also foster misperceptions of safety (O'Connor, Hyland, Giovino, et al., 2005; Stratton et al., 2001).

Our findings are subject to certain limitations. The data are a compilation of three waves collected over 3 years among both cohort and replenishment participants, which could introduce some bias in terms of representativeness (i.e., some respondents answered the items multiple times, others only once). While we made statistical efforts to correct for this, care should be taken in using the prevalence estimates as exact figures for the respective populations. Second, we need to remember the study was restricted to people who smoked cigarettes (of some form) at recruitment, so we cannot address the views held by exclusive users of other tobacco products. Third, with respect to SLT, we asked whether some forms were less harmful--we do not know

about beliefs concerning the relative risks of different forms of smokeless. We also do not know if the amount of use of some products relates to beliefs, as we only assessed last month use of cigars, pipes, and SLT, and do not have estimates of the quantities or frequency with which these smokers were using these products. However, given the lack of association between beliefs and dependence, we doubt level of use is an important feature. The wording of the question related to harmfulness in general, and did not probe about harm to the respondent themselves, nor hypotheticals about switching or dual use of these other product, which may conceivably have led to different responses. This would be a fruitful area of future investigation, however. We also have no knowledge of the strength with which smokers hold the beliefs they do, nor whether they believe that their beliefs are supported by scientific evidence. Finally, we have not tested whether beliefs actually lead to changes in type of tobacco used. Future work will examine whether smokers holding beliefs about reduced risks of products they do not currently use are more likely to switch to use of those products and how this effects quitting.

In conclusion, a small minority of smokers in these four countries concurrently use other tobacco products such as pipes, cigars, and SLT, and that use of RYO cigarettes is increasing in the UK. Some smokers believe there are differences in the health risks of various smoked tobacco products, while a smaller percentage see differences in health risk between cigarettes and SLT. These beliefs were related to sociodemographics (age, sex, education, and income) and product use, but not to nicotine dependence. Health education efforts are needed to correct smokers' incorrect beliefs about consequential risk differences among smoked tobacco products, and lack of risk difference between cigarettes and SLT.

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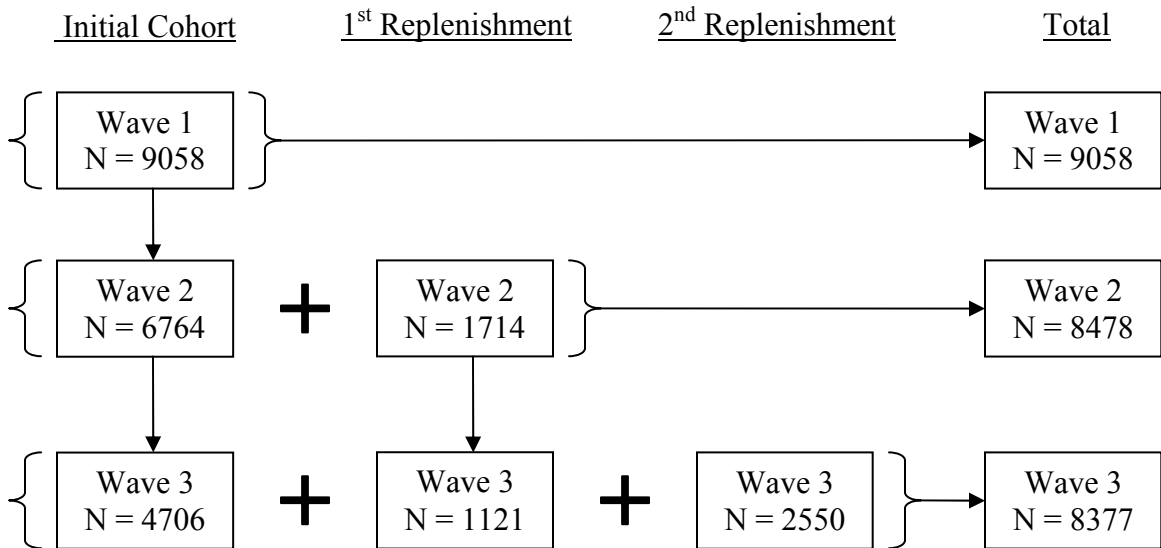
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**Figure 1.** Flowchart of International Tobacco Control 4 Country survey recruitment, 2002-2004.



**Table 1.** Prevalence of other tobacco product use from national surveys, US, Canada, UK, and Australia, 2003-2004.

	<b>Prevalence (%)</b>		
	SLT	Cigars	Pipes
US <sup>a</sup>	3.1	5.8	<1
Canada <sup>b</sup>	<1	3.0	<1
UK <sup>c</sup>	-- <sup>e</sup>	4.0	1.0
Australia <sup>d</sup>	-- <sup>e</sup>	1.5	

a. Data from 2004 National Survey on Drug Use and Health, age 18 and over

b. Data from 2003 Canadian Tobacco Use Monitoring Survey, age 15 and over

c. Data from 2004 General Household Survey, age 18 and over, males only

d. Data from 2004 National Drug Strategy Household Survey, age 18 and over

e. Data not available

**Table 2.** Prevalence of tobacco product use among smokers, ITC Surveys Waves 1-3.  
Percentages are weighted to respective national smoker populations.

	Canada			US			UK			Australia		
	W1	W2	W3	W1	W2	W3	W1	W2	W3	W1	W2	W3
Cigarettes												
FM only	84.8	85.5	86.7	96.3	96.3	96.3	72.7	70.6	71.0	79.5	80.1	81.3
Mixed	7.6	6.3	6.7	2.5	2.1	2.3	8.9	9.6	8.0	10.1	8.7	7.9
RYO only	7.5	8.2	6.7	1.2	1.6	1.5	18.3	19.9	21.0	10.4	11.2	10.8
Cigars	3.5	9.4	12.7	2.8	6.1	11.4	2.9	3.2	7.3	3.0	4.6	6.0
Pipes	0.6	1.1	2.0	0.5	1.0	4.1	0.4	0.3	3.7	0.4	0.7	1.5
Smokeless Tobacco	0.5	0.1	0.4	2.3	0.9	0.7	0.6	<0.1	0.2	0.3	<0.1	0.1

FM = factory made cigarettes; RYO – roll-your-own cigarettes

**Table 3.** Beliefs about harm from various tobacco products among current cigarette smokers, by country, ITC Survey Waves 1-3 cross sectional prevalences (includes cohort and replenishment participants). Percentages are weighted to respective national smoker populations.

	Canada			US			UK			Australia		
	W1	W2	W3	W1	W2	W3	W1	W2	W3	W1	W2	W3
Thinking about different types of tobacco products that are smoked—that is, factory-made cigarettes, roll your own cigarettes, pipes, and cigars—are any of these less harmful than the others or are they all equally harmful? (% saying some less harmful than others)	18.7	18.4	21.0	16.8	16.0	22.2	29.1	27.8	25.5	33.1	34.6	35.5
Factory-Made Cigarettes												
Least Harmful	6.6	6.2	9.5	5.8	6.2	9.1	7.9	9.0	9.5	6.2	7.0	8.8
Most Harmful	6.5	6.9	6.3	5.8	4.7	6.5	11.9	11.2	9.3	19.4	20.5	20.2
Neither Least nor Most Harmful	86.9	86.9	84.3	88.4	89.1	84.4	80.2	79.8	81.2	74.4	72.6	71.1
Roll-your-Own Cigarettes												
Least Harmful	2.6	2.2	3.0	2.8	2.4	4.7	9.3	9.4	8.4	16.2	15.6	17.1
Most Harmful	5.9	5.1	6.3	5.9	5.9	8.9	9.8	7.9	6.7	5.2	5.7	7.1
Neither Least nor Most Harmful	91.4	92.7	90.7	91.3	91.7	86.4	80.9	82.7	84.9	78.6	78.7	75.8
Pipes												
Least Harmful	5.6	6.5	5.4	5.0	4.5	6.7	8.8	8.5	5.4	7.2	9.8	10.2
Most Harmful	2.4	2.7	3.3	1.3	1.8	2.6	3.6	3.7	4.4	4.4	5.3	5.5
Neither Least nor Most Harmful	92.0	90.8	91.3	93.8	93.7	90.7	87.7	87.9	90.2	88.4	84.9	84.3
Cigars												
Least Harmful	5.0	4.1	4.8	3.6	3.1	4.2	6.3	4.4	5.3	8.1	8.3	7.6
Most Harmful	4.6	4.5	6.2	4.1	3.7	6.3	6.5	8.2	8.5	7.3	7.3	9.1
Neither Least nor Most Harmful	90.4	91.4	88.9	92.4	93.2	89.5	87.2	87.4	86.2	84.6	84.5	83.3
Are you aware of any smokeless tobacco products, such as snuff or chewing tobacco, which are not burned or smoked but instead are usually put in the mouth? (% aware)	67.9	70.7	77.2	85.2	81.7	82.8	57.3	51.1	49.5	60.3	62.8	56.3
As far as you know, are any smokeless tobacco products less harmful than ordinary cigarettes? (% Yes, of those aware)	13.7	10.7	9.7	12.9	9.2	7.6	20.7	15.6	11.7	19.7	16.7	11.6

NOTE: Due to rounding, percentages may not sum to 100%

**Table 4.** Covariates related to belief in relative harmfulness of various tobacco products among current cigarette smokers. Odds ratios are adjusted for factors shown in table, as well as survey wave and recruitment cohort.

	FM cigs least harmful		RYO cigs least harmful		Pipes least harmful		Cigars least harmful		SLT less harmful than cigs	
<i>N observations used in GEE</i>	20506		19564		18740		18911		13613	
	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
Country (ref = USA)	$\chi^2(3) = 18.2, p < .001$		$\chi^2(3) = 353.7, p < .001$		$\chi^2(3) = 82.7, p < .001$		$\chi^2(3) = 91.4, p < .001$		$\chi^2(3) = 461.7, p < .001$	
Canada	1.1	1.0, 1.3	0.8	0.6, 1.0	1.2	0.9, 1.4	1.3	1.0, 1.6	<b>1.3</b>	1.2, 1.5
UK	<b>1.5</b>	1.2, 1.7	<b>2.3</b>	1.8, 2.8	<b>1.8</b>	1.5, 2.2	<b>1.7</b>	1.3, 2.1	<b>3.6</b>	3.1, 4.2
Australia	1.2	1.0, 1.4	<b>4.5</b>	3.6, 5.5	<b>2.3</b>	1.9, 2.9	<b>2.8</b>	2.2, 3.5	<b>3.5</b>	3.0, 4.0
Sex (ref = Female)	$\chi^2(1) = 19.5, p < .001$		$\chi^2(1) = 6.3, p < .01$		$\chi^2(1) = 30.4, p < .001$		$\chi^2(1) = 19.9, p < .001$		$\chi^2(1) = 19.7, p < .001$	
Male	<b>1.3</b>	1.2, 1.5	1.2	1.0, 1.4	<b>1.5</b>	1.3, 1.7	<b>1.4</b>	1.2, 1.7	<b>1.3</b>	1.1, 1.4
Age Group (ref=18-24)	$\chi^2(3) = 20.3, p < .001$		$\chi^2(3) = 42.9, p < .001$		$\chi^2(3) = 73.0, p < .001$		$\chi^2(3) = 31.8, p < .001$		$\chi^2(3) = 7.8, p = 0.05$	
25-39	<b>0.8</b>	0.6, 0.9	0.8	0.7, 1.0	<b>1.4</b>	1.0, 1.9	1.1	0.8, 1.4	0.8	0.7, 1.0
40-54	<b>0.7</b>	0.6, 0.8	<b>0.6</b>	0.5, 0.7	<b>2.4</b>	1.8, 3.2	<b>1.5</b>	1.1, 1.9	0.8	0.7, 1.0
55+	<b>0.6</b>	0.5, 0.8	<b>0.6</b>	0.4, 0.7	<b>2.4</b>	1.8, 3.2	<b>1.8</b>	1.4, 2.5	0.9	0.7, 1.0
Race/Ethnicity (ref = White)	$\chi^2(1) = 10.2, p < .001$		$\chi^2(1) = 0.17, p = 0.68$		$\chi^2(1) = 10.8, p < .001$		$\chi^2(1) = 0.6, p = 0.46$		$\chi^2(1) = 0.7, p = 0.40$	
nonWhite	<b>0.7</b>	0.6, 0.9	1.0	0.8, 1.2	<b>0.7</b>	0.5, 0.9	0.9	0.7, 1.2	1.1	0.9, 1.2
Income (ref=Low)	$\chi^2(3) = 10.6, p < .01$		$\chi^2(3) = 7.9, p < .05$		$\chi^2(3) = 12.1, p < .01$		$\chi^2(3) = 14.1, p < .01$		$\chi^2(3) = 2.9, p = 0.40$	
Medium	1.1	1.0, 1.3	0.9	0.8, 1.1	1.1	0.9, 1.3	1.2	1.0, 1.5	0.9	0.8, 1.0
High	<b>1.3</b>	1.1, 1.5	1.1	1.0, 1.4	<b>1.3</b>	1.1, 1.6	<b>1.4</b>	1.2, 1.7	1.0	1.0, 1.1
Refused	1.3	1.0, 1.6	1.1	0.9, 1.4	0.9	0.7, 1.3	0.9	0.6, 1.2	0.9	0.8, 1.2
Education (ref = Low)	$\chi^2(2) = 21.8, p < .001$		$\chi^2(2) = 9.0, p < .01$		$\chi^2(2) = 96.9, p < .001$		$\chi^2(2) = 43.2, p < .001$		$\chi^2(2) = 20.6, p < .001$	
Medium	<b>1.3</b>	1.1, 1.4	1.1	1.0, 1.3	<b>1.7</b>	1.5, 2.0	<b>1.4</b>	1.2, 1.7	1.1	1.0, 1.2
High	<b>1.6</b>	1.4, 2.0	<b>1.3</b>	1.1, 1.6	<b>2.5</b>	2.0, 3.0	<b>2.0</b>	1.6, 2.4	<b>1.5</b>	1.3, 1.7
Heaviness of Smoking Index (ref = 0)	$\chi^2(6) = 7.0, p = 0.32$		$\chi^2(6) = 13.0, p < .05$		$\chi^2(6) = 11.9, p = 0.06$		$\chi^2(6) = 13.9, p < .05$		$\chi^2(6) = 4.2, p = 0.65$	
6	0.9	0.7, 1.3	0.9	0.6, 1.3	1.4	1.0, 2.0	1.2	0.8, 1.7	1.1	0.8, 1.5
5	1.0	0.8, 1.3	0.9	0.7, 1.2	1.1	0.8, 1.4	0.9	0.7, 1.2	0.9	0.7, 1.1
4	0.8	0.7, 1.0	<b>0.7</b>	0.6, 0.9	1.1	0.9, 1.4	0.8	0.7, 1.1	1.0	0.9, 1.2
3	0.9	0.8, 1.1	0.8	0.7, 1.0	1.1	0.9, 1.3	0.9	0.7, 1.1	0.9	0.8, 1.1
2	0.8	0.7, 1.0	0.8	0.7, 1.0	0.9	0.7, 1.1	0.8	0.6, 1.0	1.0	0.8, 1.1
1	0.9	0.7, 1.1	0.8	0.7, 1.0	1.0	0.8, 1.2	<b>0.7</b>	0.5, 0.9	1.0	0.8, 1.2

FM/RYO use (ref=FM only)	$\chi^2(2) = 53.4, p < .001$		$\chi^2(2) = 142.6, p < .001$		$\chi^2(2) = 11.4, p < .01$		$\chi^2(2) = 4.0, p = 0.13$		$\chi^2(2) = 0.4, p = 0.84$	
Mixed	<b>0.6</b>	0.4, 0.7	<b>1.8</b>	1.4, 2.2	<b>0.6</b>	0.4, 0.8	1.0	0.7, 1.3	1.0	0.9, 1.2
RYO only	<b>0.4</b>	0.3, 0.6	<b>2.9</b>	2.4, 3.4	1.0	0.8, 1.3	1.3	1.0, 1.6	1.1	0.9, 1.2
Cigars	$\chi^2(1) = 0.03, p = 0.86$		$\chi^2(1) = 3.1, p = 0.08$		$\chi^2(1) = 1.3, p < .001$		$\chi^2(1) = 55.7, p < .001$		$\chi^2(1) = 0.3, p = 0.59$	
Used in last month	1.0	0.8, 1.3	1.3	1.0, 1.7	1.2	0.9, 1.6	<b>2.5</b>	1.9, 3.1	1.0	0.8, 1.2
Pipes	$\chi^2(1) = 0.7, p = 0.40$		$\chi^2(1) = 1.7, p = 0.19$		$\chi^2(1) = 5.0, p < .05$		$\chi^2(1) = 0.6, p = 0.43$		$\chi^2(1) = 1.4, p = 0.24$	
Used in last month	0.7	0.4, 1.5	1.6	0.8, 3.1	<b>1.9</b>	1.1, 3.4	0.7	0.3, 1.7	1.4	0.8, 2.3
SLT	$\chi^2(1) = 0.6, p = 0.44$		$\chi^2(1) = 1.6, p = 0.20$		$\chi^2(1) = 0.3, p = 0.60$		$\chi^2(1) = 0.1, p = 0.75$		$\chi^2(1) = 16.7, p < .001$	
Used in last month	1.3	0.7, 2.5	1.6	0.8, 3.3	1.3	0.5, 3.2	0.8	0.3, 2.6	<b>2.7</b>	1.7, 4.3

\*Survey wave and recruitment cohort were entered as covariates.

FM = factory made cigarettes; RYO – roll-your-own cigarettes

Bolded OR values are statistically significant ( $p < .05$ )