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Canadians' Understanding of the Chemistry Behind Cigarette Smoking and its Impact on Health:

Report on Qualitative and Quantitative Research

May 2006

Submitted to Health Canada

(HC-POR-05-54 – Contract: H4133-051206/001/CY)

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EXECUTIVE SUMMARY

Health Canada commissioned Phoenix SPI to conduct public opinion research to explore Canadians' understanding of the chemistry behind smoking and its impact on health.

Research Purpose & Objectives

Accordingly, the main purpose of this research was to explore awareness, perceptions, beliefs, attitudes, knowledge and behaviour related to Canadians' basic understanding of chemistry, how this relates to cigarette smoking, and how it impacts on human health. More specifically, the research was designed to meet the following objectives:

- Explore Canadians' basic understanding of chemistry.
- Explore their knowledge of harmless versus toxic chemicals.
- Explore their understanding of the chemistry involved in cigarette smoking, including their understanding of the source of toxic compounds in unburned tobacco and tobacco smoke.
- Explore their understanding that toxic chemicals in tobacco smoke are responsible for the health hazards associated with tobacco use and exposure. This includes their knowledge of the particular chemicals in tobacco smoke that cause harm and the type of adverse health effects.
- Explore how best to educate Canadians on these issues.

The research included qualitative and quantitative phases. The qualitative phase consisted of a set of 14 focus groups conducted in five locations across Canada: Halifax, Montreal (French), Toronto, Winnipeg and Calgary. Participants included current, former and never smokers, youth, and adults. For the purposes of this study, 'current smokers' included anyone who currently smokes (either on a daily basis or occasionally). 'Former smokers' included anyone who has smoked at least 100 cigarettes in their life, but who does not currently smoke. Finally, 'never smokers' included those who have never smoked or have smoked fewer than 100 cigarettes in their life.

The quantitative phase consisted of a telephone survey of 1,822 Canadian residents, 18 years of age and older. The telephone survey included an oversample of current and former smokers, and the final data were weighted to reflect that actual distribution of Canadians by age, gender, region and smoking status. Based on a sample of this size, the overall results can be considered to be accurate to within +/- 2.3%, 19 times out of 20. The results of the qualitative research provide an indication of participants' views about the issues explored, but cannot be generalized to the full population of any of the target groups included in the research.

<u>Basic Understanding of Chemistry</u>

Most Canadians believe they have little if any understanding of basic chemistry. Using a 7-point scale (7 = very knowledgeable; 1 = not knowledgeable at all), over half (57%) of survey participants rated their knowledge in this area below the mid-point on the scale, suggesting a very limited level of understanding. By contrast, only one-quarter view themselves as at least moderately knowledgeable, and few (10%) consider themselves to

be very knowledgeable (scores of 6-7). The qualitative findings were consistent with this, where self-assessments generally pointed to very modest knowledge of basic chemistry. As will become evident, respondents' self-assessments were largely consistent with their exhibited knowledge (at least with respect to the issues explored through this research).

Following this self-assessment of knowledge of basic chemistry, respondents were asked a series of questions to try to gauge this in a more objective manner. Relatively strong majorities (70% each) correctly indicated that chemicals are made of atoms and have unique molecular make-ups. As well, a smaller majority, 58%, correctly noted that it is not true that only substances that are added together are chemicals; that said, 28% believe incorrectly that this is the case, while 12% were uncertain. In terms of misconceptions, 74% incorrectly believe that a key characteristic of chemicals is that they react with one another (while many chemicals do, this is not a defining characteristic). Moreover, almost identical majorities (56-57%) believe, incorrectly, that most chemicals are man-made or harmful. Focus group participants tended to hold these same misperceptions, often defining a chemical as something artificial (i.e. man-made) or harmful. In fact, the hardest part of the exercise on basic chemistry that focus group participants were asked to complete, identified by large numbers in all groups, was describing what a chemical is.

The majority of Canadians appear to have a clear understanding of the meaning of the terms 'concentration' and 'carcinogen'. In total, 56% of survey respondents correctly defined 'concentration,' and 64% linked the term 'carcinogen' to cancer. That said, a substantial minority (44%) could not correctly define 'concentration', and almost one-quarter (22%) did not even try to provide a meaning for 'carcinogen'. This same pattern was reflected in the focus groups: while most understood these terms, many did not.

Almost all respondents (93-96%) appear to know the meaning of 'toxic', that smoke is a source of pollution, and that it is *exposure* to the chemicals in pollution that is responsible for its harmful health effects. There was also widespread understanding (84-87%) that combustion is a chemical reaction, and that pollution and cigarette smoke are mixtures of chemicals. However, much smaller majorities (64-66%) know that a microgram is smaller than a milligram, that all pollution is harmful, and that smoke from a fireplace is a complex mixture of chemicals. More than half know that the difference between man-made and natural chemicals does not coincide with the difference between good and harmful ones, and that smoke does not consist of a small number of chemicals. Respondents were divided over whether or not combustion changes the *type* of chemicals or just their *form*, with virtually identical numbers (43-44%) holding correct perceptions or incorrect ones. Despite majorities responding correctly to all but one of these items, the proportion who were wrong or uncertain for half of them ranged from 34% to 56%.

Clearly, many Canadians hold incorrect views, or are simply unsure, regarding many of the areas explored that pertain to basic chemistry. The table below presents this information in another form, where a 'knowledge index' was created that included 20 factual questions related to basic chemistry. As can be seen, slightly more than one-third (36%) answered at least three-quarters of the questions correctly. It is worth noting, however, that this number falls to 28% for current smokers. At the other end of the spectrum, almost one in five (17%) answered less than half of the questions correctly.

Knowledge of Basic Chemistry	
Number of questions	% who answered correctly
0-9	17%
10-14	48%
15-20	36%

The vast majority of respondents are able to establish some connection between chemicals and day-to-day life. Car exhaust was identified most often as an example from daily life where exposure to chemicals has a negative impact (39%), although nearly half identified cigarette-related exposure in the form of smoking (27%) or second-hand smoke (19%). Also identified frequently (23-24%) were cleaning supplies and pollution in general.

Repetitive exposure to chemicals was seen as the most important factor in terms of the negative impact chemicals can have on health, followed closely by the *concentration* and *type* of chemical. Using a 7-point scale (1 = not important at all; 7 = very important), the vast majority (85-91%) rated each of these factors as important, with over two-thirds ascribing strong importance to each. Comparatively speaking, the *number* of chemicals and the fact that people react differently to different chemicals were considered less important, but still important (73-74% rated each of these as important).

In the focus groups, when participants discussed the impact of chemicals on human health in daily life situations (e.g. car exhaust, chlorine in swimming pools, fresh paint in houses), many spoke about the impacts in coherent and accurate ways (i.e. pointed to things like the concentration or type of chemicals). However, participants appeared to have a much easier time talking about the health effects of the chemicals (e.g. sore throat, irritated skin/eyes) than identifying the way(s) that chemicals bring them about. That is, they had an easier time seeing the impacts than explaining how chemicals cause them. Taken together, the quantitative and qualitative research suggests that, when prompted, Canadians see the link between things like the type and concentration of chemicals, repetitive exposure, etc., and the impact on health. However, in the absence of prompting, they are less likely to identify chemicals as being the cause of the negative health effects, and less able to point to how this actually occurs.

Knowledge of Chemistry of Smoking and Health Impact

Canadians are much more likely to think they know about the health impact of smoking than the basic chemistry behind it. Using a 7-point scale (7 = very knowledgeable; 1 = not knowledgeable at all), 65% of survey respondents rated themselves as at least moderately knowledgeable about the former, while less than half that number (31%) said the same about the latter. Looked at another way, respondents are far more likely to think they know little-to-nothing about the basic chemistry of smoking compared to the health impacts of smoking (49% vs. 18%). The focus groups suggest that these self-assessments are largely correct – most participants were readily able to identify many health effects of smoking, but had significantly greater difficulty with issues related to the chemistry behind smoking.

When asked to identify what is responsible for the harmful health effects associated with smoking, respondents were most likely to point to chemicals: 31% identified chemicals in general, 14% identified the chemicals in tobacco smoke, and 5% cited chemicals added to tobacco. As well, two specific chemicals were often identified: nicotine (27%) and tar (20%) - a composition of chemicals.

Lung cancer (55%) and cancer in general (43%) were the diseases most often identified as caused by smoking. Smaller numbers identified oral cancer (14%) and breast cancer (3%). Two-thirds identified respiratory system illnesses, including emphysema (29%), asthma (14%), lung disease (13%), respiratory problems in general (7%), and bronchitis (4%). Nearly one-third identified heart-related diseases, including heart attacks/angina (28%) and strokes (4%). Similar findings emerged through the focus groups. When identifying parts of the body negatively affected by cigarette smoke, participants pointed most often to the lungs/respiratory system and the heart. Moreover, specific diseases routinely linked to smoking included lung cancer, bronchitis, emphysema, breathing problems, and heart attacks/strokes. That said, there were typically 2-3 people in each focus group that said the entire body is affected by smoking, including not only the things identified above, but also the skin, hair, teeth, gums, blood, the brain, and many other parts of the body.

Most survey respondents (60%) believe that the health effects of smoking occur over a timeframe ranging from the immediate to the longer term (i.e. 20-25 years or more), as do most focus group participants. Moreover, many of the latter either associated specific health impacts or illnesses with specific timeframes, or thought of certain specific conditions as developing in stages. This was most evident among current and former smokers who tended to base this on their own experience (i.e. they experienced certain health-related effects during specific time periods or have observed them in others). However, current smokers were the most likely to believe the health effects associated with smoking occur over the longer-term only (30% vs. 20-24% of others).

Nearly two-thirds of respondents think there are more chemicals in tobacco smoke than in unlit tobacco, but fewer than half (47%) correctly identified tobacco smoke as having *many* more chemicals than unlit tobacco as opposed to a *few* more (16%). Almost equal numbers (14-15%) think unlit tobacco and tobacco smoke contain the exact same chemicals or the same number of chemicals but different types. Regardless of the relationship they perceive between the number of chemicals in cigarette tobacco and tobacco smoke, the overwhelming majority vastly underestimated the number of chemicals in either or refused to even hazard a guess (even after being pressed for an estimate). Only 2-4% estimated either number correctly. The focus group results were similar, where a large proportion of participants thought there were many more chemicals in tobacco smoke than in unlit tobacco, but most did not think this was the case or simply did not know. Moreover, participants' degree of certainty tended to be quite low (i.e. they expressed their view on this, but were unsure about it). The reasons offered to explain their view, both in the focus groups and survey, were varied and often displayed a lack of understanding of the combustion process.

In the focus groups, virtually everyone struggled when asked to identify chemicals in unlit cigarette tobacco and tobacco smoke. Typically, participants, whether current, former or

never smokers, were only able to identify two or three chemicals in total, some of which were often wrong. Moreover, they were almost totally unable to identify which chemicals were in unlit tobacco versus tobacco smoke. While smokers were generally better able to do this, even they had extreme difficulty recalling more than a few chemicals and could not identify with accuracy which ones were in unlit versus burned tobacco (although some were able to correctly identify that carbon monoxide was in tobacco smoke, but not in unlit tobacco). It was evident that the identification of chemicals on cigarette packages is information that is retained by very few.

Nearly all survey respondents knew that chemicals that are breathed in are absorbed and transferred to the blood (96%) and that it is exposure to the chemicals in tobacco smoke that is responsible for the health hazards (93%). Noticeably fewer (72% each) knew that there is no significant difference in the number of chemicals in cigarette brands with "light" or "mild" on the package versus regular cigarette brands, or that the chemicals in tobacco smoke are more harmful than the chemicals in unlit tobacco. Just over half (54%) were aware that most of the harmful chemicals in tobacco smoke are formed during the burning process. However, almost three-quarters (73%) believe, incorrectly, that most of the chemicals found in cigarettes have been added by tobacco manufacturers. Once again, while many respondents offered correct responses for these issues, the proportion that were incorrect or unsure for four of six items ranged from 28% to 84%.

When asked where the toxic chemicals in tobacco smoke come from, more than one-third (37%) correctly identified the combustion or burning process in one way or another, while 11% identified a chemical reaction and 7% simply pointed to tobacco smoke. However, one-third did not provide any response, while most of the other explanations point to an inability to clearly distinguish between the nature of unlit tobacco and tobacco smoke. Feedback from focus group participants also revealed an inability to clearly distinguish between the nature of unlit tobacco and tobacco smoke.

Another knowledge index was created to identify the number of respondents who correctly answered questions regarding the chemistry behind smoking (13 questions included). Almost two-thirds (65%) answered more than half of these questions correctly. That said, relatively few (16%) answered over three-quarters of the questions correctly, and more than one-third (36%) answered fewer than half of the questions correctly. Current and former smokers were more likely to answer a majority of these questions correctly (67-71% vs. 59% of never smokers).

Information on Basic Chemistry Behind Smoking

In terms of *new* information for survey respondents, there was widespread prior awareness that exposure to the chemicals in tobacco smoke is responsible for the health hazards associated with smoking (85%). A smaller but still sizeable majority (71%) said they already knew that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco. However, while a majority (55%) said they knew that there is a significant difference between the chemical composition of unlit tobacco and tobacco smoke, 43% said this was new information to them. As well, fully 84% did not know that cigarette tobacco smoke contains over 4,000 chemicals, and 79% did not know that harmful chemicals in cigarettes are not added by tobacco manufacturers.

The large majority of respondents (87%) think it is important to provide Canadians with information on the chemistry behind smoking and its impacts on health to help them make an informed choice about smoking (71% attribute the highest importance possible to this). Such information was considered to be less important to respondents themselves. Just over two-thirds (68%) attributed personal importance to this information. There was widespread agreement among focus group participants as well that it is useful to understand the chemistry behind smoking and its health impacts. However, focus group participants tended to have difficulty explaining why this information is useful – most tended to answer in a general way that being informed is better than not being informed.

Health professionals lead the way in terms of groups that people would trust for relevant information about the chemistry behind smoking (39%). This was followed by government in general (30%), Health Canada in particular (17%), and national non-profit organizations and chemists/scientists (13% each). The same main sources were identified, in the same order, as being trustworthy to provide information on the health impacts of chemicals in tobacco smoke.

In terms of important information to convey, focus group participants routinely identified information on other uses of chemicals present in tobacco smoke as most important or relevant to them. They were virtually unanimous in explaining that this gave them a concrete frame of reference for understanding what people ingest when they inhale smoke from a cigarette. While the names of most of the chemicals mean little or nothing even though some are known to be toxic, the point is driven home when they realize they are ingesting ingredients used in such things as paint stripper, gasoline, and car batteries. Participants were reacting to a draft document on tobacco smoke and its impact on health which provided this type of information. Survey respondents pointed to the health effects of specific chemicals (19%), the negative health effects of smoking (10%), and the most harmful chemicals (7%). Substantial numbers also identified the number (15%) and type (13%) of chemicals in tobacco smoke.

By a wide margin, television ads are the preferred method for receiving information about the chemistry behind smoking and its impact on health. Half (51%) identified television advertisements, followed by written materials (30%), mail/direct mail (23%), websites (18%), and radio advertisements (17%). Television was also routinely identified in the focus groups, where suggestions often focused on visually highlighting the toxic nature of the chemicals in tobacco smoke. When asked specifically, over three-quarters (79%) of survey respondents said that this type of information should be included on or in cigarette packaging, something also suggested by many focus group participants.

Demographic Variations

Differences in education and household income were most likely to follow a pattern and tended to mirror one another, primarily on knowledge-related issues. The likelihood of scoring high on all three knowledge indices increased with income and education (or was higher among those with more formal education). While knowledge of various issues increased with education/income, however, the perceived importance of such knowledge decreased as education and income increased. It may be that the more people know about such issues, the less importance they attribute to the sharing of related information.

Age and gender differences also tended to follow a pattern on knowledge-related issues, but the pattern was not as consistent as it was for education and income. Younger respondents (46 or younger) were more likely to be knowledgeable about basic chemistry and the health impacts of smoking, but not about the chemistry behind smoking. In terms of gender, men were more likely to know about basic chemistry and the chemistry behind smoking, but women were more likely to know about the health effects of smoking. Women were also more likely to attribute importance to information on the chemistry behind smoking and its impact on health. Regionally, respondents in the West were most likely to be knowledgeable about chemistry and the chemistry behind smoking. Beyond this there was no consistent pattern except that Quebec residents stood out in a few areas: they were least likely to know about basic chemistry and the health impacts of smoking, but most likely to regard such information as important to them personally.

Conclusions and Implications

A key finding to emerge from this research, in both its qualitative and quantitative phases, was the discontinuity in participants' knowledge of basic chemistry, how this relates to cigarette smoking, and how the latter impacts on human health. This discontinuity tended to manifest itself in two ways. First, participants were much more likely to know about the health-related impacts of smoking than about basic chemistry and how it relates to smoking. Second, their understanding of the latter (i.e. basic chemistry and how it relates to smoking) tends to be limited and includes a mix of correct and incorrect perceptions.

Participants had little difficulty identifying health effects of smoking. This is not surprising in light of the frequent public awareness campaigns about the health impacts of smoking. In the survey, very few respondents were unable to identify any health effects of smoking. Similarly, focus group participants had little difficulty identifying parts of the human body affected by cigarette smoke or diseases caused by cigarette smoke. People also tend to be attuned to timelines when thinking about the health effects of tobacco smoke. The majority of survey respondents and most focus group participants believe, correctly, that the health effects from smoking manifest themselves over the full scope of time (i.e. from immediate to the long-term). Moreover, focus group participants were readily able to point to tangible evidence to support this view – that is, health effects that manifest themselves over differing time periods.

However, Canadians' knowledge or awareness of the health effects of smoking is clearly not grounded in an understanding of basic chemistry or the chemistry behind smoking, and many have difficulty making this link in anything more than a general way. Here are some examples of the disconnect between knowledge of the health impact of smoking and knowledge of basic chemistry and the chemistry behind smoking:

- In their own self-assessments, survey respondents were more than twice as likely to consider themselves knowledgeable about the health impacts of smoking than about basic chemistry and the chemistry behind smoking. For their part, focus group participants found it much easier to answer health-related questions about smoking than questions about basic chemistry or the chemistry behind smoking. For

In short, many do not understand the fundamental significance of the combustion process.

- *The number of chemicals in tobacco smoke*: Fewer than half knew that there are many more chemicals in tobacco smoke than in unlit tobacco, and almost everyone who thought there were many more chemicals in tobacco smoke nonetheless vastly underestimated the number.
- *Whether or not harmful chemicals are added to cigarettes by manufacturers:* Most participants thought that manufacturers add chemicals to cigarettes. This may be related, in part, to another relatively widespread misperception: the belief that natural chemicals are good and man-made ones are bad. The latter may lead some to believe that natural tobacco is harmless so that anything bad or harmful in it must have been added (i.e. is man-made/added by manufacturers).

The two latter information items (i.e. the number of chemicals in tobacco smoke and the fact that chemicals are not added by manufacturers) were the only information items identified as new information by a majority of survey respondents. That said, the extent to which Canadians clearly understand other information should be viewed cautiously. While majorities said they knew that exposure to the chemicals in tobacco smoke is responsible for the health hazards associated with smoking, that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco, and that there is a significant difference between the chemical composition of unlit tobacco and tobacco smoke, the qualitative research revealed that some of those who hold these views are simply making a distinction between an unlit and a lit cigarette (assuming that only when a cigarette is lit can it harm someone), as opposed to a distinction between the actual chemical composition in lit versus unlit cigarettes.

In short, Canadians know less than it appears about these issues than one might assume based on a literal interpretation of the survey findings. In terms of how to best educate them on these issues, a general guiding principle should be to frame the issues in such a way as to make them meaningful. Recall that fewer than one-third of survey respondents consider themselves knowledgeable in basic chemistry or the chemistry behind smoking. Recall as well that focus group participants were virtually unanimous in reacting positively to information on other uses of chemicals present in tobacco smoke, explaining that this gave them a concrete frame of reference for understanding what people ingest when they inhale smoke from a cigarette. Moreover, the primary target group for such information (i.e. current smokers) are the most likely to lack knowledge of basic chemistry and the health impact of smoking.

Finally, Canadians seem receptive to receiving this type of information, with the vast majority viewing it as important to Canadians and over two-thirds viewing it as important to themselves personally. That said, in terms of sources of information, it is worth noting that both government in general and Health Canada in particular were least likely to be identified as trusted sources of information by current smokers (i.e. the primary target group for this information). Current smokers are less likely to support placing such information on/in cigarette packs, although it seems clear that information on the chemistry behind smoking would be more meaningful than simply identifying the chemicals

contained in cigarettes/cigarette smoke (which lack meaning for smokers, and is information that is not retained by them).

SOMMAIRE

Santé Canada a confié à Phoenix SPI le soin de réaliser une recherche sur l'opinion publique afin de évaluer la compréhension des Canadiens de la chimie du tabac et ses effets sur la santé.

But et objectifs de la recherche

La présente recherche avait principalement pour but d'étudier la sensibilisation, les perceptions, les croyances, les attitudes, les connaissances et les comportements qui concernent les notions de base en chimie des Canadiens, les liens entre la chimie et le tabagisme ainsi que les effets de ce dernier sur la santé. Plus précisément, cette recherche devait répondre aux objectifs ci-dessous :

- Étudier les notions de base des Canadiens en chimie.
- Étudier leur connaissance des substances chimiques inoffensives par opposition aux toxiques.
- Étudier leur compréhension de la chimie du tabac, y compris leur compréhension de la source des composés toxiques dans les produits du tabac non allumés et la fumée du tabac.
- Étudier leur compréhension de la responsabilité des substances chimiques toxiques dans la fumée du tabac des risques pour la santé associés au tabagisme et à l'exposition au tabac. Il s'agit, entre autres, de leur capacité à nommer des substances chimiques nocives dans la fumée du tabac et de leurs effets sur la santé.
- Étudier quelle est la meilleure façon de sensibiliser les Canadiens à ces questions.

Une phase qualitative et une phase quantitative composaient cette étude. La phase qualitative était constituée de 14 groupes de discussion tenus dans cinq villes canadiennes : Halifax, Montréal (en français), Toronto, Winnipeg et Calgary. Les participants étaient des fumeurs, d'anciens fumeurs, des personnes n'ayant jamais fumé, des jeunes et des adultes. Aux fins de l'étude, le terme « fumeur » désigne toute personne qui fumait la cigarette (tous les jours ou à l'occasion) au moment de l'étude. Par « ancien fumeur », on entend toute personne ayant fumé au moins 100 cigarettes au cours de sa vie, mais qui ne fumait pas au moment de l'étude. Il y a enfin les personnes n'ayant « jamais fumé », c'est-à-dire n'ayant fumé aucune cigarette ou ayant fumé moins de 100 cigarettes au cours de leur vie.

La phase quantitative s'est déroulée au moyen d'un sondage téléphonique auprès de 1822 résidents canadiens de 18 ans et plus. Le sondage comportait un suréchantillon de fumeurs et d'anciens fumeurs et les données finales ont été pondérées en fonction de la répartition réelle de la population canadienne selon l'âge, le sexe, la région et l'état de fumeur ou de non-fumeur. Pour un échantillon de cette taille, les résultats globaux sont exacts à +/- 2,3 %, 19 fois sur 20. Les résultats de la recherche qualitative offrent une indication des points de vue des participants sur les sujets à l'étude, mais ne peuvent pas être généralisés à la population entière d'un groupe cible donné faisant partie de la recherche.

Notions de base en chimie

La plupart des Canadiens estiment que leurs notions de base en chimie sont faibles, voire inexistantes. À l'aide d'une échelle de 7 points (où 7 = connaissances solides et 1 = connaissances faibles), plus de la moitié (57 %) des répondants au sondage évaluent leurs notions de base dans ce domaine inférieures au point milieu de l'échelle, laissant sous-entendre un très faible niveau de compréhension. Par contre, ils ne sont que le quart à qualifier leurs notions de base de moyennes tout au moins et très peu (10 %) se croient très bien renseignés (notes de 6-7). Les observations qualitatives confirment cette tendance. En général, les autoévaluations indiquent des notions de base très moyennes en chimie. Les autoévaluations des répondants correspondent assez bien aux connaissances qu'ils ont pu démontrer (du moins en ce qui concerne les questions à l'étude dans le cadre de la présente recherche).

Après avoir autoévalué leurs notions de base en chimie, une série de questions a été posée aux répondants, visant à évaluer leurs connaissances de manière plus objective. Avec des majorités relativement fortes (70 % dans chaque cas), ils ont indiqué, avec raison, que les substances chimiques sont composées d'atomes et qu'elles ont une composition moléculaire unique. De même, mais avec une plus petite majorité, 58 %, ont répondu avec raison qu'il n'est pas vrai que seules les combinaisons de produits forment des substances chimiques; néanmoins, 28 % ont une opinion erronée à ce sujet et 12 % sont incertains. Soixante quatorze pour cent croient à tort que l'une des principales caractéristiques des substances chimiques est qu'elles réagissent entre elles (si beaucoup de substances chimiques le font, cette caractéristique n'est pas déterminante). En outre, avec des majorités presque identiques (56-57 %), les répondants se trompent en affirmant que la plupart des substances chimiques sont fabriquées par l'homme ou qu'elles ont des effets néfastes sur la santé. Les participants groupes de discussion tendent à avoir les mêmes idées fausses et définissent souvent une substance chimique comme artificielle (fabriquée par l'homme) ou nocive. En effet, d'après les participants aux groupes de discussion, l'exercice le plus difficile sur les notions de base en chimie a été celui consistant à définir ce qu'est une substance chimique.

La majorité des Canadiens semblent connaître le sens des mots « concentration » et « cancérogène » (*carcinogen* en anglais). En tout, 56 % des répondants au sondage ont bien défini « concentration » et 64 % ont associé le mot « cancérogène » au cancer. Il n'en reste pas moins qu'une minorité importante (44 %) n'a pas pu définir correctement une concentration et près du quart (22 %) des répondants n'ont même pas essayé de donner le sens de cancérogène (*carcinogen* en anglais). La même tendance se dégage des groupes de discussion : si la plupart comprenaient ces termes, beaucoup ne les comprenaient pas.

Presque tous les répondants (93-96 %) semblent connaître le sens du mot « toxique », savoir que la fumée est une source de pollution et que c'est *l'exposition* aux substances chimiques de la pollution qui est responsable des effets nocifs de cette dernière sur la santé. Il est également assez bien compris (84-87 %) que la combustion est un type de réaction chimique et que la pollution ainsi que la fumée de cigarette sont des mélanges complexes de substances chimiques. Cependant, des majorités beaucoup plus faibles de répondants (64-66 %) savent qu'un microgramme est plus petit qu'un milligramme, que toute forme de pollution a des effets nocifs et que la fumée dégagée par un foyer est un mélange

complexe de substances chimiques. Plus de la moitié savent que la différence entre les substances chimiques artificielles et naturelles ne fait pas en sorte que les unes sont bonnes pour la santé et les autres mauvaises et que la fumée n'est pas composée d'un petit nombre de substances chimiques. Quant à savoir si la combustion transforme le *type* de substance chimique ou si elle ne transforme que l'*état* de cette substance, les répondants étaient partagés (43-44 %) à avoir la bonne ou la mauvaise réponse. Bien qu'ils soient majoritaires à avoir répondu correctement à toutes ces questions sauf une, la proportion de ceux qui ont donné une mauvaise réponse ou qui étaient incertains dans la moitié des cas varie de 34 à 56 %.

De toute évidence, beaucoup de Canadiens se trompent ou demeurent simplement incertains en ce qui concerne bon nombre des notions de base en chimie à l'étude. Le tableau ci-dessous présente les résultats sous une autre forme, en fonction d'un « indice de la connaissance » créé en compilant le nombre de bonnes réponses aux 20 questions sur les notions de base en chimie. Comme on peut le constater, un peu plus du tiers (36 %) ont répondu correctement à au moins trois quarts des questions. Par contre, ce taux tombe à 28 % chez les fumeurs. À l'autre bout de l'échelle, près d'un répondant sur cinq (17 %) a donné la bonne réponse à moins de la moitié des questions.

Notions de base en chimie	
Nombre de questions	% de bonnes réponses
0-9	17 %
10-14	48 %
15-20	36 %

La vaste majorité des répondants sont capables de nommer quelques substances chimiques rencontrées dans leurs vies quotidiennes. Parmi les exemples de la vie courante où l'exposition à des substances chimiques peut avoir des effets néfastes, les gaz d'échappement des voitures ont été identifiés le plus fréquemment (39 %), alors que près de la moitié des répondants ont mentionné la fumée de cigarette, le tabagisme (27 %) ou l'exposition à la fumée secondaire (19 %). Beaucoup ont mentionné (23-24 %) les produits nettoyants et la pollution en général.

L'exposition répétitive aux substances chimiques a été perçu comme le facteur le plus important responsable des effets néfastes que ces substances peuvent avoir sur la santé, suivie de près par la *concentration* de substances chimiques et le *type* de substance chimique. À l'aide d'une échelle de 7 points (où 1 = un facteur pas du tout néfaste et 7 = un facteur très néfaste), la grande majorité des répondants (85-91 %) qualifient chacun de ces facteurs de néfaste et de l'avis de plus des deux tiers, ils sont très néfastes. À titre de comparaison, le *nombre* de substances chimiques et les réactions et sensibilité différentes des gens aux diverses substances chimiques sont jugés moins importants, quoique néfastes (73-74 % qualifient ces deux aspects de néfastes).

Au moment d'aborder les effets sur la santé des substances chimiques dans des situations de la vie courante (p. ex., les gaz d'échappement des voitures, le chlore des piscines, la peinture fraîche dans les maisons), beaucoup de participants aux groupes de discussion ont

exprimé leurs opinions avec cohérence et précision (se référant par exemple, à la concentration de substances chimiques ou à leur type). Cependant, ils semblaient beaucoup plus à l'aise de parler des effets que les substances chimiques peuvent avoir sur la santé (maux de gorge, irritations cutanées ou oculaires) que d'identifier la ou les façons dont les substances chimiques produisent ces effets. Autrement dit, nommer les effets était plus facile que d'en expliquer les causes. Il ressort tant de la phase quantitative que qualitative qu'avec un peu d'aide, les Canadiens sont en mesure d'associer le type, la concentration et l'exposition répétée aux substances chimiques à leurs effets sur la santé. Toutefois, laissés à eux-mêmes, ils sont moins susceptibles d'identifier les substances chimiques en tant que causes des problèmes de santé et moins en mesure de trouver comment cela peut se produire.

Connaissance de la chimie du tabac et de ses effets sur la santé

Les Canadiens sont beaucoup plus enclins à penser qu'ils connaissent les effets du tabagisme sur la santé que la chimie du tabac elle-même. À l'aide d'une échelle de 7 points (où 7 = connaissances solides et 1 = connaissances fables), 65 % des répondants au sondage affirment connaître assez bien les effets sur la santé du tabagisme alors que ce taux est réduit de plus de la moitié (31 %) en ce qui concerne la chimie du tabac. Exprimé différement, les répondants sont beaucoup plus susceptibles de croire qu'ils n'ont pas ou presque pas de connaissance de base en chimie du tabac que sur les effets sur la santé du tabagisme (49 % par opposition à 18 %). Les groupes de discussion ont permis de constater que les autoévaluations sont assez justes : la plupart des participants ont pu facilement nommer de nombreux effets du tabagisme sur la santé, mais la chimie du tabac leur a posé beaucoup plus de difficulté.

Invités à préciser les facteurs responsables des problèmes de santé liés au tabagisme, les répondants étaient surtout susceptibles de mentionner les substances chimiques : 31 % ont répondu les substances chimiques en général, 14 %, les substances chimiques dans la fumée du tabac et 5 %, les substances chimiques ajoutées au tabac. Beaucoup ont identifié deux substances chimiques en particulier, la nicotine (27 %) et le goudron (20 %).

Le cancer du poumon (55 %) et le cancer en général (43 %) sont les maladies causées par le tabagisme citées le plus souvent. Un petit nombre de répondants ont mentionné le cancer buccal (14 %) et le cancer du sein (3 %). Les deux tiers ont cité des maladies du système respiratoire dont l'emphysème (29 %), l'asthme (14 %), les maladies pulmonaires (13 %), les troubles respiratoires en général (7 %) et la bronchite (4 %). Près du tiers ont mentionné les maladies cardiaques, notamment les crises cardiaques ou l'angine de poitrine (28 %) et les accidents vasculaires cérébraux (4 %). Des observations semblables se dégagent des groupes de discussion. Selon les participants, les parties du corps les plus affectées par le tabagisme sont les poumons, le système respiratoire et le cœur. Le cancer du poumon, la bronchite, l'emphysème, les troubles respiratoires ainsi que les crises cardiaques et les accidents vasculaires cérébraux sont les maladies normalement associées au tabagisme les plus souvent mentionnées. Cela dit, il y avait normalement dans chaque groupe deux ou trois personnes pour dire que le tabagisme affecte le corps tout entier, c'est-à-dire non seulement les parties mentionnées ci-dessus, mais aussi la peau, les cheveux, les dents, les gencives, le sang, le cerveau et bien d'autres parties du corps.

La plupart des répondants du sondage (60 %) et la plupart des participants aux groupes de discussion croient que les problèmes de santé liés au tabagisme peuvent survenir à tout moment, aussi bien dans l'immédiat qu'à long terme (c.-à-d. 20-25 ans ou plus). En outre, bon nombre de participants aux groupes de discussion pouvaient donner une approximation du délai avant l'apparition de maladies ou d'effets spécifiques sur la santé. Plusieurs estiment que certaines affections se développent par étape. Les fumeurs et les anciens fumeurs, qui fondent leur opinion sur leur propre expérience (ils ont connu certains problèmes de santé à une période précise de leur vie ou en ont été témoins chez d'autres personnes) avaient plus d'aisance à décrire les effets sur la santé et le délai avant leurs apparitions. Toutefois, les fumeurs actuels sont les plus portés à croire que les effets sur la santé du tabagisme ne surviennent qu'à long terme (30 % contre 20 à 24 % des autres personnes).

Près des deux tiers des répondants croient qu'il y a davantage de substances chimiques dans la fumée du tabac que dans un produit du tabac non allumé, mais ils sont moins de la moitié (47 %) à répondre, avec raison, qu'il y a *beaucoup* plus de substances chimiques dans la fumée du tabac que dans un produit du tabac non allumé, par opposition à *un peu* plus (16 %). Ils sont à peu près le même nombre (14-15 %) à penser qu'un produit du tabac non allumé et la fumée du tabac renferment exactement les mêmes substances chimiques ou le même nombre de substances chimiques mais de type (nature) différent. Sans égard à leur opinion sur le nombre de substances chimiques dans un produit de tabac non-allumé et la fumée du tabac, une majorité écrasante de répondants sous-estiment grandement le nombre de substances chimiques contenues dans l'une et l'autre ou n'osent même pas (invités à le faire) avancer une estimation. Ils ne sont que 2 à 4 % à estimer correctement le nombre de substances chimiques dans un produit de tabac non-allumé et la fumée du tabac. Les groupes de discussion confirment ces résultats. Une forte proportion de participants croient que la fumée du tabac contient beaucoup plus de substances chimiques qu'un produit du tabac non allumé, mais la plupart ne sont pas de cet avis ou n'osent pas se prononcer. En outre, le degré de certitude des participants tend à être très faible (ils donnent leur opinion à ce sujet, mais montrent peu d'assurance). Aussi bien dans les groupes de discussion que lors du sondage, les justification de leurs réponses varient et témoignent souvent d'une méconnaissance du phénomène de combustion.

Au cours des groupes de discussion, presque tous les participants ont eu de la difficulté à nommer les substances chimiques contenues dans le tabac de cigarette et la fumée du tabac. De façon générale, les fumeurs, anciens fumeurs et personnes n'ayant jamais fumé n'ont pu identifier que deux ou trois substances chimiques dont certaines n'étaient même pas exactes. De plus, ils ont presque tous été incapables d'établir quelles substances chimiques se trouvent dans un produit du tabac non allumé et lesquelles se trouvent dans la fumée du tabac. De façon générale, bien que mieux renseignés à cet égard, les fumeurs ont eu extrêmement de difficulté à nommer plus de quelques substances chimiques et ne pouvaient préciser avec exactitude lesquelles sont présentes dans un produit du tabac allumé ou non allumé (quoique certains ont été en mesure de répondre correctement que le monoxyde de carbone se trouve dans la fumée du tabac, mais non dans un produit du tabac non allumé). De toute évidence, peu de gens retiennent les informations sur les substances chimiques figurant sur les paquets de cigarettes.

Presque tous les répondants au sondage savaient que les substances chimiques inhalées sont absorbées et envoyées dans le sang (96 %) et que l'exposition aux substances chimiques dans la fumée du tabac est responsable des problèmes de santé (93 %). Ils étaient sensiblement moins nombreux (72 % dans chaque cas) à savoir qu'il n'y a pas de différence notable entre le nombre de substances chimiques dans les cigarettes « légères » ou « douces » et celui dans les cigarettes régulières et que les substances chimiques dans la fumée du tabac sont plus nocives que celles contenues dans les produits du tabac non allumés. Un peu plus de la moitié (54 %) savaient que la plupart des substances chimiques nocives contenues dans la fumée du tabac sont formées lors de la combustion du tabac. Cependant, près des trois quarts (73 %) sont persuadés, à tort, que la plupart des substances chimiques contenues dans la cigarette sont ajoutées par les fabricants de tabac. Ici encore, bien que de nombreux répondants aient bien répondu à ces questions, la proportion de ceux ayant mal répondu ou n'ayant pas de réponse à quatre des six questions à l'étude se situe entre 28 et 84 %.

Lorqu'interrogés sur l'origine des substances chimiques toxiques dans la fumée du tabac, plus du tiers (37 %) des répondants ont mentionné avec raison la combustion sous une forme ou une autre, tandis que 11 % ont mentionné une réaction chimique et que 7 % ont simplement dit la fumée du tabac. Par contre, le tiers n'ont pas pu répondre et la plupart des autres explications données montrent une inaptitude à distinguer entre la nature d'un produit du tabac non allumé et celle de la fumée du tabac. Les participants aux groupes de discussion ont rencontré la même difficulté.

Un autre indice de la connaissance a été créé afin de connaître le nombre de personnes ayant répondu correctement aux treize questions portant sur la chimie du tabac. Près des deux tiers (65 %) ont bien répondu à plus de la moitié de ces questions. Cela dit, assez peu de répondants (16 %) ont bien répondu à plus des trois quarts des questions et plus du tiers (36 %) ont répondu correctement à moins de la moitié des questions. Les fumeurs et les anciens fumeurs étaient plus susceptibles de répondre correctement à la majorité des questions (67 et 71 % contre 59 % des personnes n'ayant jamais fumé).

Renseignements sur la chimie du tabac

Lorsque les répondants devaient indiquer les faits nouveaux, 85% d'entre eux ont répondu savoir que l'exposition aux substances chimiques contenues dans la fumée du tabac est responsable des problèmes de santé liés au tabagisme. Une majorité plus faible, mais importante (71 %) savait déjà que la plupart des substances chimiques nocives contenues dans la fumée du tabac sont formées lors de la combustion du tabac. Bien que la majorité (55 %) les répondants ait dit savoir qu'il existe une différence notable entre la composition chimique des produits du tabac non allumés et la fumée du tabac, 43 % ont affirmé qu'il s'agissait pour eux d'un fait nouveau. De même, ils étaient 84 % à ignorer que la fumée du tabac contient plus de 4000 substances chimiques et 79 % à ne pas savoir que les substances chimiques nocives contenues dans la cigarette ne sont pas ajoutées par les fabricants de tabac.

De façon très majoritaire (87 %), les répondants jugent important de fournir aux Canadiens des renseignements sur la chimie du tabac et ses effets sur la santé pour les aider à faire un choix éclairé en matière de tabagisme (71 % y attribuent la plus haute importance). De l'avis des répondants, ce genre de renseignements est moins important pour eux-mêmes (un peu plus deux tiers (68 %) estiment que c'est important pour eux, personnellement). Les participants aux groupes de discussion étaient généralement d'accord sur l'utilité de connaître la chimie du tabac et ses effets sur la santé. Ils avaient toutefois de la difficulté à expliquer en quoi cette information peut être utile : la plupart des participants répondaient de façon générale, disant qu'il vaut mieux être informé que de rester dans l'ignorance.

Les professionnels de la santé arrivent en tête des groupes à qui l'on peut faire confiance pour obtenir des renseignements pertinents sur la chimie du tabac (39 %). Viennent ensuite le gouvernement, en général (30 %), Santé Canada, en particulier (17 %) puis les organisations nationales sans but lucratif et les chimistes et scientifiques (13 % dans chaque cas). Les mêmes groupes sont identifiés dans le même ordre comme dignes de confiance pour fournir de l'information sur les effets sur la santé des substances chimiques contenues dans la fumée du tabac.

Les participants aux groupes de discussion affirment spontanément que les applications (utilisation dans la vie de tous les jours) des substances chimiques présentes dans la fumée du tabac est l'information la plus importante ou pertinente. Presqu'à l'unanimité, ils ont expliqué que cette information donne un cadre de référence bien concret pour comprendre ce qui est absorbé lorsque la fumée d'une cigarette est inhalée. Le nom de la plupart des substances chimiques signifie peu ou rien pour eux, mais savoir qu'on absorbe des substances utilisées dans des produits comme les diluants, l'essence et les batteries d'automobile est très convaincant; la toxicité des ces produits étant connue. Les participants réagissaient alors à un document de travail sur la fumée du tabac et ses effets sur la santé, renfermant ce genre de renseignements. Les répondants au sondage ont identifié comme information importante les effets sur la santé causés par des substances chimiques précises (19 %), les effets néfastes du tabagisme sur la santé (10 %) et les substances chimiques les plus nocives (7 %). Ils étaient assez nombreux à indiquer le nombre (15 %) et le type (13 %) de substances chimiques contenues dans la fumée du tabac.

La publicité à la télévision constitue de loin la méthode préférée pour recevoir de l'information sur la chimie du tabac et ses effets sur la santé. Ils sont la moitié (51%) à faire ce premier choix, après quoi viennent la documentation écrite (30 %), le courrier ou le publipostage (23 %), les sites Web (18 %) et la publicité à la radio (17 %). La télévision est aussi mentionnée spontanément dans les groupes de discussion et les participants suggèrent souvent de faire ressortir visuellement la nature toxique des substances chimiques contenues dans la fumée du tabac. Plus des trois quarts (79 %) des répondants du sondage affirment qu'il faudrait ajouter ce genre de renseignement sur les paquets de cigarettes. De nombreux participants aux groupes de discussion partagent également cet avis.

Variations démographiques

Les différences de scolarité et de revenu du ménage, caractéristiques reliées, sont les plus susceptibles de constituer un modèle de réponse aux questions touchant les connaissances. La probabilité de se situer dans le haut des trois indices de la connaissance augmente avec le revenu et le niveau de scolarité (ou est plus forte parmi les personnes les plus scolarisées). Bien que les connaissances sur diverses questions augmentent avec la scolarité et le revenu, l'importance accordée à la possession de ces connaissances diminue à mesure qu'augmentent le niveau de scolarité et le revenu. Il est possible que plus on est renseigné dans ces domaines, moins on attribue d'importance à la diffusion de ces renseignements.

Les différences relatives à l'âge et au sexe tendent aussi à constituer un modèle du niveau de connaissance qui n'est pas aussi fiable que celui de la scolarité et du revenu. Les répondants les plus jeunes (46 ans ou moins) sont plus susceptibles de posséder des notions de base touchant à la chimie et aux effets du tabagisme sur la santé, mais non à la chimie du tabac. Du point de vue des différences de sexe, les hommes sont plus susceptibles d'avoir des notions de base en chimie et chimie du tabac, mais les femmes sont plus susceptibles d'être renseignées sur les problèmes de santé liés au tabagisme. Elles sont aussi plus susceptibles d'attribuer de l'importance à de l'information sur la chimie du tabac et ses effets sur la santé. Du point de vue des différences régionales, les répondants de l'Ouest sont plus susceptibles d'avoir des connaissances en chimie de base et chimie du tabac. Aucun autre modèle ne se dessine avec précision, si ce n'est que les résidents du Québec se démarquent à certains égards : ils sont moins susceptibles d'avoir des notions de base en chimie et sur les problèmes de santé liés au tabagisme, mais plus susceptibles de juger importante pour eux-mêmes l'information dans ces domaines.

Conclusion et implications

Une observation majeure obtenue tant de la phase qualitative que quantitative de cette recherche suggère une dichotomie entre les notions de base en chimie des participants, le rapport entre la chimie et le tabagisme et ses effets sur la santé. Cette dichotomie se manifeste de deux manières. D'abord, les participants sont beaucoup plus susceptibles d'être renseignés sur les problèmes de santé liés au tabagisme que d'avoir des notions de base en chimie et de pouvoir les relier au tabagisme. Ensuite, leur compréhension de la relation entre la chimie de base et le tabagisme est assez restreinte et est composée d'impressions aussi bien exactes qu'inexactes.

Les participants ont pu identifier sans trop de peine les effets du tabagisme sur la santé. Cela n'a rien d'étonnant compte tenu des fréquentes campagnes de sensibilisation du public aux effets du tabagisme sur la santé. Très peu de répondants au sondage ont été incapables de nommer un seul problème de santé lié au tabagisme. Les participants aux groupes de discussion n'ont pas eu beaucoup de difficulté à identifier les parties du corps affectées ou les maladies causées par le tabagisme. Les gens ont tendance à être au courant du moment où se produisent les problèmes de santé associés à la fumée du tabac. La majorité des répondants au sondage et la plupart des participants aux groupes de discussion croient, avec raison, que les problèmes de santé liés au tabagisme peuvent survenir à tout moment (aussi bien dans l'immédiat qu'à plus long terme). En outre, les participants des

groupes de discussion pouvaient facilement donner des exemples concrets, c'est-à-dire mentionner des effets sur la santé se manifestant à des moments différents au cours de la vie.

Cependant, les connaissances des Canadiens à propos des problèmes de santé liés au tabagisme ou leur sensibilisation à cet égard ne sont vraiment pas fondées sur une compréhension de notions de base en chimie générale ou chimie du tabac. Beaucoup ont de la difficulté à établir des liens autrement que de nature générale. Voici quelques exemples de rupture entre les connaissances concernant les effets du tabagisme sur la santé et les notions de base en chimie et chimie du tabac :

- Dans l'autoévaluation de leurs connaissances, les répondants au sondage sont deux fois plus susceptibles de se dire bien renseignés sur les problèmes de santé liés au tabagisme que sur la chimie de base et la chimie du tabac. Les participants aux groupes de discussion ont trouvé plus facile de répondre aux questions sur la santé et la consommation de tabac qu'à celles sur la chimie de base ou la chimie du tabac. Ainsi, les questions demandant de définir une substance chimique et de nommer des substances chimiques qui se trouvent dans le tabac de cigarette et dans la fumée du tabac leur sont apparues les plus difficiles.
- Lorsque les répondants au sondage devaient identifier des problèmes de santé causés par l'usage du tabac, plusieurs types de cancer ont été énumérés, mais près du quart ont été incapables de définir le mot « cancérogène » (*carcinogen* en anglais) et moins des deux tiers l'ont associé au cancer (les fumeurs étant les moins nombreux à faire ce lien).
- La vaste majorité des répondants au sondage ont dit savoir que l'exposition aux substances chimiques contenues dans la fumée du tabac est responsable des problèmes de santé liés au tabagisme. Par contre seulement deux substances ou composés chimiques (la nicotine et le goudron) ont été identifiés avec une certaine fréquence comme responsables des effets néfastes du tabagisme sur la santé. De plus, ils ont été relativement peu nombreux à pouvoir nommer correctement les effets sur la santé du monoxyde de carbone et de la nicotine (quoique plusieurs la savaient responsable de la dépendance au tabac). La plupart des participants aux groupes de discussion savaient également que l'exposition aux substances chimiques contenues dans la fumée du tabac est responsable des problèmes de santé liés au tabagisme, mais peu d'entre eux ont pu énumérer correctement plus de deux ou trois des substances chimiques contenues dans la fumée du tabac.

Même si il est connu de manière générale que les substances chimiques contenues dans la fumée du tabac sont responsables des effets néfastes du tabagisme sur la santé, peu peuvent identifier les substances chimiques nocives dans la fumée du tabac ou les problèmes de santé spécifiques causés par ces substances. D'après la phase qualitative de la recherche, les participants n'ont pas le cadre conceptuel voulu pour pouvoir exprimer comment les substances chimiques (concentration, type ou nombre de substances chimiques) provoquent des problèmes de santé, ni quel est le processus impliqué.

Non seulement les connaissances des participants sur les effets du tabagisme sur la santé ne reposent pas sur des notions de base en chimie générale ou chimie du tabac, mais leur compréhension de cette dernière est très limitée et fabriquée de fausses impressions. En particulier, la différence entre un produit du tabac allumé et non-allumé est une perception erronée très répandue qui devrait être corriger dans le cadre de toute initiative visant à informer les Canadiens en matière de chimie du tabac et de ses effets sur la santé. Ces perceptions erronées de la différence entre un produit du tabac allumé et non-allumé se manifestent de diverses façons :

- *Le processus de combustion* : près de la moitié des répondants au sondage pensent que la combustion ne modifie que l'*état* et non le *type* des substances chimiques contenues dans le tabac de cigarette. De plus, le tiers d'entre eux disent ne pas savoir d'où proviennent les substances chimiques toxiques de la fumée du tabac. Alors que ceux qui ont émis une opinion à ce sujet étaient surtout susceptibles d'évoquer d'une façon ou d'une autre le processus de combustion, les autres explications témoignent d'une incapacité à diférencier la nature d'un produit du tabac non allumé et celle de la fumée du tabac (sous-entendant que les substances chimiques sont présentes d'une façon ou d'une autre dans un produit du tabac non allumé). Bien que de nombreux participants aux groupes de discussion aient affirmé faire la distinction dans la vie courante entre la composition d'un produit du tabac non allumé et celle de la fumée du tabac, il ressort de leurs propos et des éclaircissements qu'on leur a demandés qu'ils sont très nombreux, en fait, à confondre nature (composition chimique) et état physique, c'est-à-dire à faire la différence entre une cigarette allumée et non-allumée selon leurs différents états physiques (p. ex., solide par opposition à gazeux) plutôt que leurs différentes compositions chimiques. Bref, beaucoup ne saisissent pas fondamentalement la nature du processus de combustion.
- *Le nombre de substances chimiques contenues dans la fumée du tabac* : moins de la moitié des répondants savent que la fumée du tabac contient beaucoup plus de substances chimiques qu'un produit du tabac non allumé, mais la plupart de ceux qui le savent ont néanmoins largement sous-estimé le nombre de substances chimiques dans la fumée du tabac.
- *L'ajout ou non de substances chimiques nocives dans les cigarettes par les fabricants :* la plupart des participants sont d'avis que les fabricants de tabac ajoutent des substances chimiques aux cigarettes. Cette fausse impression pourrait découler de la conviction que les substances chimiques naturelles sont bonnes alors que celles artificielles sont mauvaises,. Selon cette perception, les substances chimiques nocives dans le produits du tabac ont certainement été ajoutées (de façon artificielle, par les fabricants) puisque le tabac est naturel et donc non nocif.

Les deux derniers faits (soit le nombre de substances chimiques contenues dans la fumée du tabac et les substances chimiques n'étant pas ajoutées par les fabricants) ont été qualifiés de nouvelle information par les répondants au sondage. Néanmoins, la prudence est de rigueur pour juger de la compréhension des Canadiens des autres éléments d'information. Bien que les personnes interrogées aient affirmé savoir que l'exposition aux substances chimiques contenues dans la fumée du tabac est responsable des problèmes de

santé associés au tabagisme, que la plupart des substances chimiques nocives dans la fumée du tabac se forment lorsque le tabac brûle et qu'il existe une différence notable dans la composition chimique d'un produit du tabac non-allumé et celle de la fumée du tabac, la phase qualitative de la recherche révèle que parmi ceux qui soutiennent ces points de vue, certains ne font que faire la distinction entre une cigarette allumée et une autre qui ne l'est pas (en supposant qu'elle n'est dangereuse que lorsqu'elle est allumée) et non une distinction entre la composition chimique d'une cigarette allumée et celle d'une cigarette non allumée.

En somme, les connaissances des Canadiens sur ces questions sont moins grandes que l'interprétation à la lettre des résultats du sondage pourrait laisser supposer. Quant à la meilleure façon de les sensibiliser en cette matière, il faudrait présenter ces questions de façon concrète. Rappelons que le tiers des répondants du sondage se croient renseignés sur la chimie de base ou la chimie du tabac. Rappelons également que les participants des groupes de discussion ont réagi positivement à l'unanimité à de l'information sur les autres utilisations des substances chimiques présentes dans la fumée du tabac, leur donnant un cadre de référence bien concret pour comprendre ce qui est absorbé lorsque la fumée d'une cigarette est inhalée. En outre, le principal groupe cible de ce genre d'information (c'est-à-dire les fumeurs) est le plus susceptible d'être dépourvu de notions de base en chimie et de renseignements touchant les effets du tabagisme sur la santé.

Enfin, les Canadiens semblent réceptifs à l'idée de recevoir ce genre d'information : la vaste majorité l'ayant jugé importante pour la population en général et plus des deux tiers l'ayant jugé importante pour eux personnellement. Cela dit, il convient de souligner que le gouvernement, en général, et Santé Canada, en particulier, sont les moins susceptibles d'être reconnus comme sources d'information dignes de confiance par les fumeurs actuels (qui forment le principal groupe cible de cette information). Les fumeurs sont moins portés à être en faveur de placer des renseignements de ce genre sur ou dans les paquets de cigarettes, même s'il paraît évident que des éléments sur la chimie du tabac seraient plus utiles que la simple mention des substances chimiques contenues dans les cigarettes ou la fumée de cigarette (information qui n'impressionne d'ailleurs pas les fumeurs et qu'ils ne retiennent pas).

INTRODUCTION

Health Canada commissioned Phoenix Strategic Perspectives Inc. to conduct public opinion research to assess Canadians' understanding of the chemistry behind cigarette smoking and its impact on health. The research study consisted of both qualitative and quantitative phases.

Background

In Canada, tobacco use is by far the greatest cause of preventable, premature death and disability, contributing to over 37,000 deaths in 2002. Smoking tobacco remains the leading cause of preventable death and has negative health impacts on people of all ages. There is strong medical evidence that smoking tobacco is related to more than two dozen diseases and conditions.

The Government of Canada's Federal Tobacco Control Strategy is championed by many parties working collaboratively towards reducing, possibly eliminating, tobacco use. Health Canada's Tobacco Control Programme (TCP) plays a leadership role in implementing the Strategy.

The TCP is responsible for the administration and enforcement of the *Tobacco Act* (1997), as well as developing the policies and programs needed to support the objectives of the FTCS. The TCP includes the Office of Research, Surveillance and Evaluation (ORSE), which surveys, monitors and analyzes tobacco use, its impacts upon the health of Canadians, the knowledge, attitudes and behaviour of Canadians, the economics of tobacco and tobacco smoke chemistry. In addition, the ORSE directs research on biomarkers of tobacco use and toxicology of tobacco.

To support the TCP's strategy of protection, prevention, cessation, and harm reduction/ product modification, among other goals, the ORSE is responsible for increasing knowledge of the health effects of tobacco use. Currently there is lack of information about Canadians' basic understanding of chemistry, how this relates to cigarette smoking, and how it impacts on human health.

Research Purpose & Objectives

Accordingly, the main purpose of this research was to explore awareness, perceptions, beliefs, attitudes, knowledge and behaviour related to Canadians' basic understanding of chemistry, how this relates to cigarette smoking, and how it impacts on human health. More specifically, the research was designed to meet the following objectives:

- Explore Canadians' basic understanding of chemistry.
- Explore their knowledge of harmless versus toxic chemicals.
- Explore their understanding of the chemistry involved in cigarette smoking, including their understanding of the source of toxic compounds in unburned tobacco and tobacco smoke.

- Explore their understanding that toxic chemicals in tobacco smoke are responsible for the health hazards associated with tobacco use and exposure. This includes their knowledge of the particular chemicals in tobacco smoke that cause harm and the type of adverse health effects.
- Explore how best to educate Canadians on these issues.

Information collected from this current study will help the TCP better understand how to best educate smokers on this topic and support one of its goals of increasing knowledge of the health effects of tobacco use.

Research Design

To address the research objectives, both qualitative and quantitative research were undertaken. This report presents the findings from both phases of the research process. The qualitative phase included a set of 14 focus groups conducted February 27 to March 2, 2006. The quantitative phase consisted of a random digit dialing (RDD) telephone survey of the general public. A total of 1,822 interviews were completed with a random sample of Canadian residents, 18 years of age and older. Based on a sample of this size, the overall results can be considered to be accurate to within +/- 2.3%, 19 times out of 20. The fieldwork for this survey was conducted from March 15-31, 2006.

Target Audience

The main target audience for this research was the general population of Canadian residents, aged 18 years and over. Of special interest, however, were three subgroups based on smoking behaviour: 1) Current Smokers, 2) Former Smokers, and 3) Never Smokers*. The topics under investigation were explored for each of these sub-samples to better understand their perceptions and behaviours with respect to the chemistry behind cigarette smoking and its impact on health.

In light of the focus of this research on science-related issues, it was also important to assess comprehension levels of Canadians by level of education. In the qualitative phase of the research (i.e. the focus groups) this was done by exploring the issues separately with participants based on their level of formal education. The population was divided into two groups based on education level: 1) Canadians with high school education or less, and 2) Canadians with at least some post-secondary education. In the quantitative phase of the research (i.e. the survey), subgroup analyses of key issues were conducted based on level of formal education (i.e. comparing high school, college, and university-educated respondents) along with other demographic variables.

Presented below are the specifications which applied to each phase of the research process.

* In this study, "Never smokers" were defined as those who were not smoking at the time of the interview and answered "No" to the question "Have you smoked at least 100 cigarettes in your life?"

Qualitative Research:

The following specifications applied to the qualitative phase of the research:

- A set of 14 focus groups were conducted in five urban centres across Canada: Halifax, Montreal (French), Toronto, Winnipeg and Calgary. Four groups were conducted in each of Toronto and Montreal, and two groups in each of the other cities. This set of focus groups was preceded by two focus groups in Ottawa that served as a pre-test of the methodology and research instruments (see below).
- The Current Smoker groups included a mix of participants based on the length of time smoking and type of smoker (i.e. Daily Smoker versus Occasional Smoker), although most were Daily Smokers.
- The Former Smoker groups included a mix of participants based on how long they had previously smoked, how much they smoked, and how long since they had quit smoking.
- With respect to education, there was a mix of participants within each of the two main categories (i.e. a mix of those who attended elementary school only, completed some high school, and graduated from high school in one group; a mix of those who completed some college or university, and graduated from college or university in the other group).
- In all groups, there was an approximate gender split and a mix of participants based on age. For the non-youth groups, this included a mix of participants 26-60 years of age.
- Based on the distribution of the focus groups, the following was achieved:
  - Eight focus groups conducted with Current Smokers, four with Former Smokers, and two with Never Smokers (youth only).
  - Five focus groups conducted with participants with high school education or less (three with Current Smokers, two with Former Smokers), and five with post-secondary participants (three with Current smokers, two with Former Smokers).
  - Four focus groups conducted with youth, two with Current Smokers, two with Never Smokers, and in both French and English. Given the special importance of youth as a sub-group of Canadians that is targeted to reduce levels of smoking in Canada, it was important to explore related issues with this group on its own.
- People with degrees in chemistry, or who work for any of the following were excluded: health care organizations, chemical, biochemical, pharmaceutical, or tobacco companies.
- A total of 12 participants were recruited for 8-10 to show per group. Turnout was excellent, with at least 8 participants taking part in all but one of the groups.
- All participants were paid $50 to participate.
- The groups lasted two hours in length and were conducted in regular focus group facilities in all locations.

The following design features were included in light of the abstract nature and complexity of this research:

- At an early part of the discussion, participants were asked to complete a short exercise to assess their basic understanding of chemistry and the orientation or conceptual framework used in this area. The exercise focused on chemistry-related issues relevant to smoking, and was designed to be non-intimidating in approach. The purpose of this exercise was to determine participants' basic understanding of chemistry in general (in areas relevant to smoking-specific chemistry).
- Later on in the discussion, there was a second short exercise done by participants on their understanding of the chemistry behind smoking and its impact on health. This included asking participants to identify the main chemicals in cigarette tobacco and cigarette tobacco smoke, and their health impacts, among other things. The purpose of this design feature was to identify participants' levels of knowledge of the chemistry behind smoking and its health impacts.
- Finally, participants were asked to read a brief summary document that presents information on the chemistry behind smoking and its health impacts. This document focused on important messages/information that Health Canada would like to communicate to Canadians in this area. The purpose of this design feature was to gauge how participants relate to the information provided, including their ability to understand it.*

There were group discussions before and after each of these 'interventions' to explore the issues identified above with respect to the research objectives. The issues explored in the focus groups were also used to support the design of the questionnaire that was used for the quantitative phase of the research (i.e. the telephone survey).

As a final design element to address the abstract, complex nature of this research, a set of two focus groups was conducted in Ottawa to pre-test the entire focus group methodology, and in particular the three interventions identified above (i.e. the two brief exercises and the summary document). The groups were conducted in English – one with former smokers with high school education or less, the other with smokers with post-secondary education. All of the research design elements were carefully explored in the focus groups, and small adjustments made afterwards based on the feedback received and the performance of the interventions.

* In some groups, participants were also asked to review an interactive tool developed to inform people about the concentration and health impact from exposure to various chemicals through smoking. For the purposes of this research, this tool was referred to as the *Smoking Wheel*. The latter instrument was not tested in every group, although it was tested with representatives of each target audience included in this research (i.e. Current Smokers, Former Smokers, Never Smokers, youth, adults, individuals with a high school education or less, and individuals with post-secondary education).

Quantitative Research:

The following specifications applied to the quantitative phase of the research:

- The survey was administered by telephone to 1,822 Canadian residents, 18 years of age and older, with a considerable oversample of smokers. The sample consisted of the following:
    - 800 interviews with current smokers (+/- 3.5%, 19 times out of 20)
    - 511 interviews with former smokers (+/- 4.3%, 19 times out of 20), and
    - 511 interviews with never smokers (+/- 4.3%, 19 times out of 20).
- In terms of questionnaire content, the survey was designed in close consultation with Health Canada officials to ensure that it addressed the objectives identified above. The survey was designed to quantify awareness, perceptions, beliefs, attitudes, knowledge and behaviour of Canadians' basic understanding of chemistry, how this relates to cigarette smoking, and how it impacts on human health, and was finalized based on the results of the focus groups.
- The average interview was approximately 21 minutes in length.
- A pre-test was conducted in both official languages (15 in English, 15 in French). The data from the pre-tests was retained and included in the final dataset.
- Up to eight callbacks were attempted, and calling was conducted during the evenings and on weekends.
- Sponsorship of the study was revealed (i.e. Health Canada/Government of Canada).
- The final data were weighted to ensure that they are representative of the Canadian adult population by age, region, gender, and smoking status. To do this, 2005 Canadian Tobacco Use Monitoring Survey (CTUM) data was used.
- The results were analyzed by key demographic variables (e.g. age, gender, education) and by smoking status (i.e. current smoker, former smoker, never smoker). Segmentation analysis in the form of cluster analyses was also conducted to group Canadians according to their attitudes, knowledge, and perceived knowledge with respect to related issues.

Structure of Report:

This report is divided into two parts. Part 1 presents the results of the qualitative research, and Part 2 presents the results of the quantitative research.

Note to Reader Regarding Part 1

When interpreting the findings in Part 1, it is important to keep in mind that this research was qualitative in nature, not quantitative. As such, the results provide an indication of participants' views about the issues explored, but cannot be generalized to the full population of any of the audiences included in this research.

Participants' comments are provided in italics, and are either actual verbatim comments or have been paraphrased to reflect the intent of the remark.

The findings from this phase of the research tended to be consistent across all groups. This applied both to the results of the exercises completed by participants and to the feedback surrounding these exercises and the other materials reviewed in the groups. Any differences of note based on region, smoking status, education, language, or age (i.e. youth versus older Canadians) have been identified at the appropriate places.

Note to Reader Regarding Part 2

The total number of respondents for each question from the survey is 1,822 unless specified differently in the graphs or text. At times, the number of respondents (i.e. not the percentage) who answered certain questions or answered in a certain way is provided. The following method is used to denote this: n = 774, which means the number of respondents, in this instance, is 774.

The survey question corresponding to a graph is indicated in the lower right-hand corner of the graph (e.g. Q.1). In some instances, a graph presents results to more than one question. Where this is the case, the range of questions included are indicated in the graph (e.g. Qs. 16-27). If a question number does not appear in a graph, this indicates that the graph presents findings not directly linked to a specific question (e.g. a comparison of results). Finally, the wording of each question in the survey is included in a footnote identified by an asterisk (*) on the page where the graph to which it corresponds appears.

The following table presents call disposition information for the survey, including the calculation of the response rate (using the standard industry formula):

A (1-14)	**Total Attempted**	**35401**
1	Not in service (disp 4,44,47)	4976
2	Fax (disp 10,46)	1514
3	Invalid #/Wrong# (disp 9,12,13,43,77,88)	1286
B (4-14)	**Total Eligible**	**27625**
4	Busy (disp 2,42)	247
5	Answering machine (disp 3,8,45)	3793
6	No answer (disp 1,41,48)	2807
7	Language barrier (disp 11)	736
8	Ill/Incapable (disp 14)	149
9	Eligible not available/Callback (disp 6,7)	1151
C (10-14)	**Total Asked**	**18742**
10	Household/Company Refusal (disp 15,21)	6061
11	Respondent Refusal (disp 22,23,26,27,89)	8640
12	Qualified Termination (disp 24,28,29)	318
D (13-14)	**Co-operative Contact**	**3723**
13	Not Qualified (disp 3X,25)	1901
14	Completed Interview (disp 20)	1822
	REFUSAL RATE	**80.14**
	(10+11+12) / C	
	RESPONSE RATE	**13.48**
	D (13-14) / B (4-14)	

Appended to this report are copies of the following in both English and French:

- Recruitment screener
- Moderator's guide
- In-group exercises
- Survey questionnaire

PART 1 – QUALITATIVE RESEARCH

CONTEXTUAL INFORMATION

This section provides summary background information on the smoking-related behaviour of participants.

Current Smokers

Nearly all of the Current Smokers involved in this study were *Daily Smokers*, i.e., said they smoked cigarettes on a daily basis. However, the number of cigarettes these participants smoked each day varied. Most were able to quantify the number of cigarettes they smoked per day, with numbers ranging from a low of approximately 2-3 per day to a high of 25-30 per day. The number of participants at the extremes of this range (i.e. low and high end) tended to be smaller, with the bulk of daily smokers saying they smoke between 10-15 cigarettes a day. Some daily smokers did not quantify the number of cigarettes they smoke each day, noting that this varies depending on circumstances (i.e. where they are, what they are doing, how they feel, and who they are with).

The small number of *Occasional Smokers* who participated in the focus groups were more likely to identify circumstances than numbers when describing how often they smoke. For example, they said they tended to smoke when they are with their friends who smoke, when drinking, if offered a cigarette, when nervous or anxious, or depending on how they feel in general.

On the whole, the Current Smokers involved in this research had been smoking for quite some time. Nearly everyone had been smoking for at least five years. Most had been smoking for 10 years or more, with many having smoked for over 20 years. Nearly all of them had tried to quit smoking, with many having tried to do so on numerous occasions. While most resumed smoking after a few months (usually between 2-6 months), many said they quit smoking for a few years (i.e. 2-6 years). At the other end of the spectrum, some said they resumed smoking after only a few weeks (some said a few days).

Former Smokers

The Former Smokers involved in this study included both relatively recent quitters and people who had not smoked for quite a while. Most said they had not smoked for at least one year, and many had stopped smoking a few years ago (i.e. 3-5 years). However, some had only recently stopped (i.e. a few weeks or a few months before), while some said they had not smoked for 10 years or more.

Almost all of the Former Smokers had smoked for a considerable length of time before they finally quit. Most said they smoked for at least 10 years before quitting for good, and many had smoked for 15 years or more. Only a few had smoked for less than five years.

The number of cigarettes they smoked before quitting ranged from as few as 2-3 per day to as many as 20-30 per day.

Most of the Former Smokers said they stopped smoking for health-related reasons. In many instances, the Former Smokers referred to actual health-related conditions they were experiencing that made them aware of the health-related hazards associated with smoking. These conditions included shortness of breath, coughing, asthma, emphysema, and sore throats. Some said they developed a bad physical feeling or malaise in general, while a few others said smoking made it difficult for them to do certain physical activities, such as walking, hiking, and yoga. A few female participants said they stopped smoking when they became pregnant. Some people referred to health-related conditions that their friends or family members had contracted, and which they associated with smoking, including emphysema, heart attacks, and cancer.

Non-health-related reasons why people stopped smoking included the price of cigarettes, the smell impregnating their clothes, and the termination of activities or situations that made them want to smoke (e.g. drinking, going to night clubs, staying up late).

Never Smokers

Most participants who never smoked (only youth were recruited for these groups) provided health-related reasons to explain why, both in general and more specific reasons. Many of the Never Smokers said they have friends or family members who smoke, and some specified that they have seen the health-related effects of smoking on some of their acquaintances. Many (including some of those who identified health-related reasons) identified the effects of smoking on physical appearance to explain why they do not smoke (e.g. the smell, yellow teeth and fingers, grayish skin color).

BASIC UNDERSTANDING OF CHEMISTRY

This section reports on participants' basic understanding of chemistry. In order to help assess this, participants were asked to complete a brief exercise designed to explore some basic issues in chemistry. A discussion followed which focused on participants' perceptions of the exercise, their answers to key questions, and the reasons underlying their answers. One of the main objectives of the discussion was to understand the conceptual framework or frame of reference that participants apply when thinking about the issues.

Many Took Chemistry in School; Divided Over Whether They Have 'Basic Understanding'

Most participants – half or more in almost all groups – said they had taken at least some chemistry in school, usually in high school. Approximately half of all participants (i.e. both those who had and those who had not taken chemistry in school) think they have at least a basic understanding of chemistry, although some added that they are not sure what constitutes a 'basic understanding'. The remaining participants tended to be divided between those who felt they do not have a basic understanding of chemistry and those who were unsure. Participants with post-secondary education and youth were more likely to think they have a basic understanding of chemistry, the latter, most likely due to the limited amount of time that had elapsed since they had studied chemistry in school.

Daily Life Provides Primary Framework for Understanding of Basic Chemistry

The results of the first exercise that participants were asked to complete and the discussion surrounding it revealed that participants' primary frame of reference for understanding chemistry is 'day-to-day life'. Despite the fact that most participants did take at least some chemistry in school, it is not theoretical or text book knowledge that provides their main frame of reference for discussing issues related to chemistry. Rather, the general tendency is to understand chemistry through a practical rather than a theoretical framework. This tendency is reflected in a variety of ways, which will be identified and discussed below.

Mixed Perceptions of Difficulty of Exercise

Participants tended to have mixed perceptions of the overall difficulty of the exercise they were asked to complete. While many described it as moderately easy, many others described it as difficult or at least moderately difficult. Youth and participants with some post-secondary education were more likely to describe the exercise as easy or relatively easy. However, regardless of the overall assessment of the difficulty of the exercise, there was widespread agreement that some questions were easier to answer than others. Moreover, there was also widespread agreement about which questions were easier and which were more difficult to answer.

Participants were most likely to have difficulty defining a 'chemical' – great difficulty doing this – and assessing the impact of various chemicals on people's health. By contrast, they had a relatively easier time with the multiple choice questions, including the meaning

of expressions such as 'concentration', 'range', 'vapour', 'dilution', and 'absorption'. There were mixed perceptions of the difficulty of the 'true or false' questions, although on the whole these questions were generally not viewed as being particularly difficult.

Participants More Likely to Overestimate Knowledge of Chemistry

Generally speaking, participants were more likely to overestimate than underestimate their knowledge of basic chemistry. Those who previously said they did not think they had a basic understanding of chemistry, or who were uncertain about this, tended to have their assessments confirmed through the exercise they completed (i.e. they were, in fact, likely to have limited knowledge of chemistry). On the other hand, while many of those who felt that they do have a basic understanding of chemistry had this confirmed through the exercise, some knew less than they thought they did, with a few expressing surprise at what they did not know.

Knowledge of Basic Chemistry Tends to be Discontinuous

The fact that participants experienced more difficulty with some questions than others suggests that their understanding of basic chemistry tends to be discontinuous. In other words, there is no overall coherence or continuity in their knowledge of chemistry. There are some things they are more likely to know and others they are less likely to know. In addition to being discontinuous, it does not tend to be grounded in a solid way. This was revealed most clearly in the difficulty that participants had defining a chemical, one of the foundational or most basic elements in the subject matter of chemistry.

In the course of discussing the exercise, it became clear that the relative ease or difficulty that participants experienced in answering various questions was linked to their frame of reference for understanding these things. As noted, participants' knowledge of chemistry tends to be day-to-day life or situations where chemistry intersects with ordinary life. As a result, there is no necessary logic or consistency to what they know. Those things they were more likely to know or more confident about knowing tended to be things they were familiar with or encountered through daily life, while those they had more difficulty with tended to be more remote from ordinary experience.

Chemicals Tend to be Seen as Harmful and Artificial

As mentioned, participants experienced considerable difficulty defining a 'chemical'. This was revealed most palpably in the fact that approximately one-quarter of participants left this question blank on the exercise sheet (i.e. did not provide any response/definition). In short, a substantial number of participants had no meaningful feedback to provide on this question. Some of those who did not provide a definition explained that they know what a chemical is but cannot define it.

Just as significant, however, as the inability to define a chemical were the definitions or descriptions that were provided. These were revealing because they pointed to participants' frames of reference for understanding a chemical. As discussion and probing revealed, this frame of reference did not tend to be the subject matter of chemistry itself, but rather the

everyday context within which chemistry acquires some relevance and meaning in their lives. While this emerged clearly in the course of discussion, it is already suggested in the definitions provided most often.

Definitions of a chemical tended to fall into six categories, three of which predominated.

- *Chemicals as harmful or dangerous*: One of the definitions provided most often suggested or emphasized that a chemical is something that is or can be (or usually is) dangerous or harmful. Representative definitions included:
  - *Something that is harmful.*
  - *Something that can potentially harm you.*
  - *A liquid or matter that may be hazardous.*
  - *A substance that is toxic and poisonous.*
  - *A toxin.*
  - *Toxic.*
  - *Quelque chose de dangereux.*
  - *Dangereux.*
  - *Toxique.*
  - *Poison.*
  - *Quelque chose qui est manipulé avec soin parce que c'est dangereux.*
  - *Quelque chose de nocif.*

  This perception of chemicals as dangerous or harmful was corroborated through a subsequent question. When asked whether the statement *All chemicals have harmful health effects* is true or false, many participants answered that it is true.

- *Chemicals as artificial or man-made*: Almost as many participants defined a chemical as something artificial, man-made, or added to something (i.e. an ingredient as opposed to a natural substance). Representative definitions included:
  - *A man-made substance.*
  - *Artificial.*
  - *A man-made by-product.*
  - *Something not normally found in a substance. Something added.*
  - *Something added to something else.*
  - *A gas or solid artificial substance.*
  - *Une matière non-naturelle.*
  - *Quelque chose de pas naturel*
  - *Items non-naturels.*
  - *Quelque chose créé en laboratoire.*
  - *Ingrédient non-naturel.*

- *Chemicals as elements that react when combined*: Provided less often, but still relatively frequently, was the definition of a chemical as an element or a substance that reacts with another when they are combined or mixed together. In other words, these participants seemed to focus on the idea of a chemical reaction. Definitions included the following:
  - *The reaction between different elements.*
  - *A mixture of two or more elements that can create a reaction.*
  - *Substances that when combined with other substances cause some sort of reaction.*
  - *Compounds which cause a reaction when combined.*
  - *A substance which may cause a reaction when in contact with anything.*
  - *Something added to some other property that can cause an effect.*
  - *Something that has some sort of effect if added to something else.*
  - *A combination of two or more substances that causes a reaction when added together.*
  - *Une substance incluant plusieurs composants ayant des effets si on les associe.*

While distinct from one another, it became clear through discussion and probing that these three definitions tend to be linked at a fundamental level. The fundamental assumption underlying these definitions of a chemical is the tendency to think of chemicals as man-made or artificial, as 'products' or ingredients instead of natural substances. Indeed, in the course of discussing the nature of a chemical, many participants referred specifically to chemical *products* instead of chemical *substances*, thereby alluding to human activity or human agency.

The perception that chemicals are man-made or artificial tends to be an assumption underlying the two other definitions – that chemicals are harmful and that chemicals react when combined. The perception that chemicals are harmful tended to be based on the assumption that they are products or by-products of human activity (e.g. pollution, industrial activity). Similarly, the perception that chemicals are elements that react when combined tended to be based on the assumption that human agency is responsible for the act of combining.

This perception of chemicals as artificial and/or harmful is not entirely surprising in light of participants' primary frame of reference for understanding such issues (i.e. their day-to-day life). As revealed in the course of discussion, when individuals think about chemicals they are likely to think of them in terms of how they encounter or hear about them in their daily lives, such as through warnings on products, reports of chemical spills/disasters, chemical pollution, ozone depletion, production of chemical weapons, preservatives, and things of this nature. Such reference points are most likely to be top-of-mind for many participants when they think about chemicals.

The above notwithstanding, numerous participants provided definitions of a chemical that stress or emphasize its basic composition as opposed to its effect (i.e. harmful) or it's origin (i.e. human activity). These definitions tended to take three forms:

- *Chemicals as compounds or mixtures*: Some participants defined a chemical as a combination of 'elements', 'atoms', or 'molecules' that create a compound of some sort. Definitions included the following:
  - *A combination of various elements.*
  - *A compound made up of two or more components.*
  - *Something made up of atoms.*
  - *A compound of molecules.*
  - *A complex grouping of elements.*
  - *A mix of molecules.*
  - *A compound which may or may not be toxic.*
  - *Something consisting of elements.*
  - *A substance containing elements from the periodic table.*
  - *Une composition de molécules.*
  - *Des éléments mis ensemble.*
  - *Une substance composée d'éléments.*

- *Chemicals as elements*: By contrast with the previous definition, some participants defined a chemical as something simple, not complex. Here, however, the emphasis was still on basic composition:
  - *A basic unit.*
  - *The most basic element of something.*
  - *A particle.*
  - *A basic particle.*
  - *The smallest unit in a substance.*
  - *Un élément primaire.*
  - *Quelque chose d'élémentaire et nécéssaire pour la vie.*

- *Chemicals as substances with a distinct composition or character*: A few people defined a chemical as something (e.g. a substance or element) with a distinct composition or character:
  - *Something with distinct characteristics*
  - *A particular substance with unique characteristics.*
  - *Un élément composé de variables spécifiques.*

In summary, while participants collectively identified a number of key attributes of a chemical, from their perspective, relatively few identified anything close to the correct definition of a chemical, even broadly defined.

Definitions of 'Toxic' and 'Carcinogen' More Uniform and Correct

There was much more uniformity in the definitions that participants provided for the expressions 'toxic' and 'carcinogen' than for 'chemical'. In discussing their definitions of these terms, participants routinely noted that these are more commonly-used expressions and therefore easier to define. That said, participants were more likely to correctly define 'toxic' than 'carcinogen'. Virtually, everyone was able to correctly state what toxic meant. However, approximately one-quarter did not provide a definition for 'carcinogen'. Of those who did, nearly everyone linked it to cancer, although some defined it as something that is damaging or harmful to human health in general. Some participants who did not provide a definition for carcinogen said they were not familiar with the word, while others noted that they thought it had a negative connotation.

Familiarity With Terms Aids Identification, But Many Wrong About 'Concentration' and 'Vapour'

Many participants said they had a relatively easy time answering the multiple choice questions. These focused on identifying the meaning of terms such as 'concentration', 'range', 'vapour', 'dilution', and 'absorption'. In fact, a substantial majority of participants did correctly identify these terms. As was the case with the expressions 'toxic' and 'carcinogen', many stated that this was easier because these terms are more often used in daily life. Nevertheless, significant numbers did not correctly identify some of these terms even when the correct response was provided as one of the response options.

Many participants had considerable difficulty correctly defining 'concentration'. Here, approximately one-third did not correctly identify its definition (including those who said they did not know). Interestingly, there were fewer incorrect answers when participants were asked to select an *example* of a concentration instead of the *definition* of 'concentration'. This may be another example of the importance of context for participants' understanding of basic chemistry. Participants seem more likely to understand that expressions like '*I bought 2% milk*' and '*There is 6.4g of sugar per granola bar*' refer to a concentration than to know the definition of a concentration (i.e. a quantity per unit.). Interesting as well is the fact that participants were much more likely to identify the statement '*There is 6.4g of sugar per granola bar*' as an example of a concentration than '*I bought 2% milk*'. The words '*... per granola bar*' might have made this easier. That said, there were some participants who could not identify a concentration, either by definition or by way of an example.

Another term that many participants were unable to correctly define was 'vapour', where only two-thirds correctly identified it as a gas. Almost all the rest defined it as water, primarily because of their familiarity with the term 'water vapour'.

Approximately one-quarter incorrectly selected an incorrect example of a 'range' or indicated that they were not sure what a range is. Participants had least difficulty correctly defining 'dilution' and 'absorption'.

Considerable Confusion Over Relationship Between Atoms, Molecules and Chemicals

As noted, there seems to be no overall coherence in participants' knowledge of basic chemistry, with the result that their ability to answer a question correctly is not a reliable indication of their ability to correctly answer a related question. This was evident in the apparent confusion of many participants surrounding the relationship between atoms, molecules, and chemicals. While a substantial majority of participants indicated correctly that a molecule is made of atoms, they were divided when asked if arsenic, mercury, carbon, and copper are chemical elements, also called atoms.

Probing of this issue revealed that many participants do not think of chemicals as atoms or elements. On the contrary, as some of the definitions of a chemical already suggest, a number of participants tend to think of chemicals as compounds or complex entities. This was echoed in subsequent discussion, with a number of participants explaining that while they think of chemicals as made up of atoms or molecules, they do not think of them as atoms themselves. Many seemed to be thinking in terms of size, with a chemical understood as being larger than either an atom or a molecule, or as a third entity over and above these.

In a similar vein, some participants explained that when they think of substances like arsenic, mercury, carbon, and copper, they do not think of them as chemical elements. Rather, they tend to think of them as more palpable entities, not to say products. This was especially the case for arsenic and mercury. The former, for example, was described as a poison, while the latter was described as something used in thermometers. This, again, may be related to the fact that people tend to think of chemicals through the lens of ordinary life, where they are often encountered as ingredients, mixtures, or compounds.

Another result of the exercise seemed to corroborate the importance of participants' frame of reference. A majority of participants noted correctly that the statement *a quantity of one microgram is more than one milligram* is false. Through discussion, however, it emerged that relatively few people actually knew what size one microgram was (i.e. 1,000 times smaller than one milligram). Many said they answered the question based on their belief that the prefix *micro* indicated a smaller amount. Here again it seems that many people answered on the basis of a frame of reference that is non-scientific.

Limited Understanding of Link Between Smoke and Chemicals

In responding to the series of true or false questions in the first exercise, most participants indicated that they regard combustion as a chemical reaction, that smoke consists of a variety of chemicals, and that smoked formed by combustion is a source of pollution. On a certain level, therefore, participants appear to understand that smoke generates toxic substances.

However, in the course of the discussion about the links between smoke, chemicals, and pollution, it became evident that many participants distinguish between the toxic character of smoke based on its source or origin. Specifically, they tend to believe that some forms of combustion generate toxic chemicals while others do not. For example, some think that

burning wood in a chimney fire or burning leaves does not produce chemicals or that the chemicals produced are not toxic because these are natural, organic substances. On the other hand, smoke produced through a factory chimney, a tailpipe or burning tires is considered toxic. There appears to be a relatively widespread assumption that combustion of natural or organic matter does not produce toxic substances. That said, it is important to note that many other participants appeared to view smoke, whatever its source, as toxic or harmful, and as consisting of numerous chemicals.

Through probing, it also became evident that participants tend to use their senses of sight and smell when making these distinctions between harmful and harmless smoke. The importance of sight is implicit in the significance participants attribute to the source or origin of smoke. One participant put it in a way that encapsulated the impression of many: "I think there's a big difference between smoke belching out of a factory chimney or coming out of a tailpipe and smoke produced by burning wood in my chimney".

Smell was also important for some, not only in relation to smoke but also as a gauge of the hazards posed by chemicals in general. It appeared that numerous participants associate a strong or bad odour with a health hazard, and the presence of a greater concentration or number of chemicals. From this perspective, smoke emerging from a tailpipe would be likely to be considered hazardous while smoke emerging from a chimney fire would not.

Interface Between Chemistry and Daily Life

Participants were able to discuss issues related to the interface between chemistry and day-to-day life, and identify examples of where chemistry might have an impact on health. However, these issues did not tend to be top of mind. Despite the fact that participants' primary frame of reference for discussing issues related to chemistry seems to be their everyday life, a considerable amount of probing was sometimes needed to generate discussion on issues related to the impact of chemicals in day-to-day life.

This discussion centered around a multi-part question in the exercise asking participants to rate the impact on health (i.e. none, small, moderate, big) of the following items*:

- Pollution and smog
- Antiperspirant
- Chlorine in swimming pools
- Second-hand smoke from cigarette smoking
- Car exhaust
- Dry cleaning
- Food additives
- Freshly-painted house
- Calcium in milk

* Note that while participants were asked to rate the impact on health of all these items, the discussion surrounding the exercise focused on the following items: pollution and smog, chlorine in swimming pools, car exhaust, dry cleaning, food additives, and freshly painted house. Second-hand smoke was excluded altogether from discussion because cigarette smoke was the main focus of the subsequent exercise.

Participants were asked to identify the impact on each item on human health, but not including environmental or disposal issues (although it was clear that some did include the latter in their thinking).

Some Items More Likely to Be Viewed as Exposure to Chemicals

Participants were more likely to view exposure to some items as exposure to chemicals compared to others. The following were most likely to be viewed in terms of exposure to chemicals: pollution and smog, second-hand smoke, chlorine in swimming pools, car exhaust, and a freshly-painted house. Participants tended to be divided when it came to antiperspirant, dry cleaning, and food additives. While many did tend to think of these in terms of exposure to chemicals, many did not or were less likely to think of them in this way.

In probing the reasons underlying participants' thinking on this issue and their criteria for making this determination, two main factors emerged as explanations for their assessments: the reaction caused by these items and their sense of smell:

- *Reaction caused by item*: Most participants tended to link exposure to chemicals with the effect or reaction produced by various items. In other words, those items producing a reaction or effect were more likely to be understood as exposing people to chemicals. Participants routinely provided the following examples:
  - Pollution and smog affect breathing and irritate the eyes.
  - Chlorine irritates the eyes and skin and dries out hair and skin.
  - Fresh paint makes one dizzy and/or nauseous or cause headaches.
  - Dry cleaning can cause itchiness or a rash.

  Such reactions or effects tended to be understood as palpable reactions to chemicals present in these items.

- *Smell*: As was the case regarding the distinction between harmless and harmful smoke, peoples' sense of smell was often identified as a 'detector' of exposure to chemicals. Strong or bad smells or odours tended to be seen by many as an indication of exposure to chemicals. This was especially the case regarding pollution and smog, chlorine, car exhaust, and a freshly-painted house. Generally speaking, the stronger the smell, the greater the perception of being exposed to chemicals. In this sense, the sense of smell is not only a gauge for assessing exposure to chemicals but also a gauge for assessing the *degree* of exposure.

The importance attributed to these two factors (i.e. the reaction caused by the item and smell/odour) helps explain why certain items were less likely to be viewed as exposure to chemicals than others.

Participants tended to be divided over the extent to which they thought of antiperspirant and dry cleaning as exposure to chemicals. In the case of antiperspirant, smell/odour seems

to be a primary factor. Indeed, a number of participants said specifically that they do not think of antiperspirant as exposing them to chemicals because it smells good. Impact or reaction was also noted, though less often. Specifically, some participants described the effect or impact of antiperspirant as positive as opposed to negative (i.e. personal hygiene) and therefore they are less likely to think of it as exposure to chemicals. Interestingly, *form* tended to be an important factor among those who think of antiperspirant as exposure to chemicals. Many noted that they are more likely to think of antiperspirant in spray form (i.e. aerosol can) as opposed to solid as exposure to chemicals. This appears to be related to aerosol being harmful to the ozone layer.

In the case of dry cleaning, smell/odour also seemed to be an important factor. Both those who did and those who did not tend to think of dry cleaning as exposure to chemicals referred to smell/odour as a factor. Many of those who do think of it as exposure to chemicals referred to the strong smell they sometimes encounter when entering a dry cleaning store. Conversely, those who do not emphasized lack of any palpable evidence, including odour and/or effect to suggest exposure to chemicals.

Perhaps not surprisingly, smell/odour and immediate reaction were not factors when it came to how participants think about food additives. Those who said they think of food additives as exposure to chemicals tended to associate additives with foreign or non-natural ingredients, including growth hormones leading to genetic modification. These were seen as having a longer-term impact on health, particularly cancer but not only. Those who did not tend to think of food additives as exposure to chemicals tended to associate them with such things as preservatives or dies used to enhance the color of food (e.g. apples). These did not tend to be seen as detrimental substances. Some also said that the impact depends on individuals (i.e. people might react differently to different additives based on such things as allergies).

Health Impact of Items Tend to be Associated with Immediate Impact

Although there were some exceptions, participants tended to associate the health impact of these items with the immediate reactions or effects caused by them. In other words, the impact on health of these items tended to be associated with the immediate effects they have (e.g. dizziness, throat irritation, irritated eyes, headaches, nausea) as opposed to long-term effects. The main exception was food additives, generally seen as having a long-term impact on health. In addition, some participants viewed pollution and smog, as well as car exhaust, as having more long-term health effects, including chronic breathing problems and even cancer. Some also felt that people working in the dry cleaning industry might suffer long-term breathing problems or other problems through repeated exposure to chemicals. Beyond that, however, participants tended to view the health-related impacts of these items as more immediate.

Concentration Seen as Main Factor in Negative Impact of Chemicals

Participants tended to link the health impacts of these items to the chemicals in them, but primarily as a result of discussion of the issue and prompting. In other words, it does not appear to be top-of-mind when discussing these issues. While not the only determinant of the impact of chemicals, *concentration* tended to be the first or the main one identified for most items. Other factors identified, depending on the specific item, included the type of chemical, the number of chemicals, and the length of exposure.

Summary feedback provided by participants for specific items is provided below:

- *Pollution and smog*: The concentration of chemicals was seen as a key determinant in the impact of pollution and smog. In fact, some described a smog alert as an indication of a high concentration of chemicals in the air. Since the concentration of chemicals was seen to be important, pollution and smog tended to be seen as more dangerous in a big city than in the country. The number and types of chemicals were also routinely identified as important factors in the impact of pollution and smog on health. The latter tended to be understood as a complex mixture of various types of chemicals. Virtually all participants attributed a moderate or large impact on health to this item.

- *Chlorine in swimming pools*: Concentration tended to be seen as the main factor in the health impact of this item, perhaps in part because it is seen as an additive (i.e. added to water). Some noted that an appropriate concentration is good because it kills germs in the water. In other words, chlorine can have a positive impact and some noted that the water we drink is chlorinated. However, when the concentration is too high, there can be negative impacts on health. Many participants attributed a moderate or high impact on health to this item, primarily in light of the reactions it can cause (i.e. irritation of eyes and skin, dry hair). Some noted that the type of chlorine used also has an impact on health.

- *Car exhaust*: Many participants tended to think of car exhaust in a way similar to pollution and smog. In fact, some expressly identified it as a contributing factor to pollution and smog. Concentration was seen as a key factor in its impact on health. In this sense, for example, people were seen to be more at risk during rush hour or during periods of heavy traffic. That said, the type of chemical was also seen to be very important, with many participants identifying carbon monoxide by name. Some drew attention to the combined impact of concentration and type of chemical by noting that exposure to carbon monoxide in a closed environment will cause death. As was the case with pollution and smog, virtually all participants attributed a moderate or large impact on health to this item.

- *Dry cleaning*: Concentration, type of chemical, and degree of exposure tended to be seen as key factors here. Many suggested that the health risk is primarily to those who work in a dry cleaning environment, day after day for a number of years. Some thought that the chemicals used would affect people differently (i.e. some might have a reaction, like itching, and some might not). Participants tended to hold different opinions about the impact on health of this item. Approximately

one-third felt that it has no impact on health, explaining that they have no palpable evidence of this. Almost as many indicated that they do not know the health impact. Most of the rest attributed a small or moderate impact to this item (except, perhaps, on those who work in the industry).

- *Freshly-painted house*: Most participants attributed a low or moderate impact on health to this item. The key factors seemed to be both concentration and type of chemicals. For example, participants routinely noted that the impact on health is reduced if the fumes have had a chance to dissipate (i.e. by keeping windows open). Many also noted that lead-based paints (i.e. type of chemical) are a greater threat to health.

- *Food additives*: Participants were most likely to attribute a small or moderate impact to this item. Length of exposure, understood as constant or regular consumption of foods containing additives, as well as type of additive were seen as the main factors accounting for the impact on health of this item.

Most Can Identify Additional Examples of Impact of Chemicals on Health

Most participants were able to identify additional examples of exposure to chemicals in daily life (volunteered before the detailed discussion of the items just discussed above). However, the number of examples identified in each group tended to be quite limited. Those identified most often included medicine/prescriptions and cleaning products and detergents. Smaller numbers identified asbestos in walls, perfume, hair spray, tooth paste, drinking water, dust, fertilizer, and re-circulated/stale air.

UNDERSTANDING OF CHEMISTRY AS IT RELATES TO TOBACCO

This section reports on participants' understanding of chemistry as it relates to cigarette tobacco and cigarette tobacco smoke. In order to help assess this, participants were once again asked to complete a brief exercise designed to explore some basic issues related to the chemistry of cigarettes. As with the first exercise, a discussion followed that focused on participants' perceptions of the exercise and their answers to key questions, with a focus on understanding their frame of reference for thinking about these issues.

Perceptions of Exercise

There was virtual unanimity among participants that this exercise was more difficult than the first one. In addition, as was the case for the first exercise, there was widespread agreement about which questions were easier and which were more difficult to answer. Questions asking participants to identify chemicals present in tobacco and tobacco smoke were deemed the most difficult, while questions related to the health impact of tobacco smoke were deemed to be relatively easy.

Results of the exercise confirmed participants' perceptions of the relative difficulty and ease of various questions. Participants were much more likely to have difficulty with questions related to the chemical content of cigarette tobacco and tobacco smoke, and greater facility with questions related to the health effects of smoking. In the course of the discussion, it became very clear that participants are much more used to framing issues related to cigarettes from the perspective of their health impact than from the perspective of their chemical content.

Limited Awareness of Chemicals in Unlit Tobacco and Tobacco Smoke

There is relatively low top-of-mind awareness among participants of chemicals in **unlit cigarette tobacco.** Most participants were able to identify nicotine, but it was the only chemical in unlit cigarette tobacco identified by a majority of participants. This was followed, at a distance by arsenic, identified by approximately one-in-five. What follows is a list of all chemicals identified by participants as present in cigarette tobacco. The list proceeds in descending order, from those chemicals identified most often to those identified least often. The order proceeds across columns on this page (i.e. from left to right) and then down to the next page (and again from left to right). Note that the list identifies all chemicals identified by participants, whether actually present in cigarette tobacco or not. Note that most participants were only able to identify two or three items, some of which were incorrect. This issue will be discussed below:

- Nicotine
- Tar
- Arsenic
- Formaldehyde
- Carbon monoxide
- Cyanide
- Benzene
- Carcinogens
- Lead
- Carbon
- Carbon dioxide
- Mercury

- Chlorine
- Hydrogen cyanide
- Preservatives
- Ammonia
- Phosphates
- Magnesium
- Nitric oxide
- Saltpeter
- Acid
- Iodine
- Sulphur
- Caffeine
- Benzoate
- Nitrogen
- Bleach
- Nitrates
- Fertilizer
- Glue.

There was even less awareness of the chemicals in **cigarette tobacco smoke**. Approximately one-quarter of participants were unable to identify any chemical present in cigarette tobacco smoke. Approximately one-third correctly identified nicotine and carbon monoxide, but few were able to identify any other chemicals. Moreover, participants who identified chemicals in cigarette tobacco smoke tended to identify the same ones they identified in unlit cigarette tobacco (i.e. relatively few identified any different or additional chemicals). The only chemical noticeably more likely to be identified in cigarette tobacco smoke was carbon monoxide.

Widespread Uncertainty About Chemical Content of Unlit Tobacco versus Tobacco Smoke

Related to the limited awareness of chemicals in **unlit cigarette tobacco** versus **cigarette tobacco smoke** is confusion and uncertainty about which chemicals are present in either or both. As noted, many participants indicated that they identified the same chemicals in both unlit cigarette tobacco and cigarette tobacco smoke.

As part of the exercise they were asked to complete, participants were presented with a list of 16 chemicals and asked whether they are present in cigarette tobacco, cigarette tobacco smoke, both, or neither. For most of these chemicals (12 out of 16), the largest proportion of participants indicated that they did not know the answer. In only three instances were participants more likely to be correct than unsure or incorrect, and for only two chemicals, nicotine and carbon monoxide, were most participants correct. The most glaring case of confusion was the belief of well over half the participants that tar is present in both cigarette tobacco and tobacco smoke.

In short, very few participants have any clear idea as to what chemicals are present in either form of tobacco (i.e. unlit versus tobacco smoke) or about how the one (unlit tobacco) relates to the other (tobacco smoke). The latter is expanded on below.

Mixed Views on Relationship of Unlit Tobacco and Tobacco Smoke

The relatively widespread uncertainty and confusion about the chemical *composition* of **unlit cigarette tobacco** and **cigarette tobacco smoke** is also reflected in participants' views regarding the number of chemicals in unlit cigarette tobacco versus cigarette tobacco smoke. While a large proportion believe that there are many more chemicals in cigarette

tobacco smoke than in unlit cigarette tobacco, most participants do not think this is the case or simply don't know. Moreover, the degree of certainty with which some hold the belief that there are many more chemicals in tobacco smoke than in unlit tobacco tends to be quite moderate (i.e. they are not certain about this).

Participants who believe there are many more chemicals in tobacco smoke than in unlit tobacco correctly focused on combustion as the key factor in explaining the difference. They understand, albeit in a relatively basic or rudimentary way, that the lighting of a cigarette sets off a chemical reaction resulting either in the creation of new chemicals or the activation of chemicals described as dormant in the cigarette tobacco. Some referred to the interplay between the heat and the air or oxygen as well to explain the process.

Those who think there are only a few more chemicals in tobacco smoke than in unlit tobacco also focused on the process of combustion or the lighting of the cigarette but felt that the chemical reaction produced only a few more chemicals. Some felt that the few more chemicals produced through combustion were produced specifically through the burning of the cigarette paper, not through the burning of the tobacco, or even the sulphur in the match. These participants (i.e. those who think there are a few more chemicals in tobacco smoke) were more likely to think that the chemicals produced by lighting a cigarette were 'dormant' in the cigarette tobacco as opposed to totally new.

Participants who see no difference between the number of chemicals present in unlit tobacco and tobacco smoke tend to understand the chemicals as substances with essential properties that remain the same despite the difference in physical state between unlit tobacco and tobacco smoke. One participant used the example of water and ice to make an analogy. Water and ice differ in form (i.e. one is solid and the other is liquid), but not in terms of composition or essential properties.

Participants who feel that unlit cigarette tobacco and tobacco smoke have the same number of chemicals but different ones tended to have more difficulty articulating themselves in explaining why they think this. They tended to believe that when lighting a cigarette, new chemicals were formed but others disappeared or changed, and that this somehow balanced out in terms of the number of chemicals.

Most Do Not Distinguish Between Composition of Unlit Tobacco and Tobacco Smoke

Most participants indicated that they do not tend to distinguish between **unlit cigarette tobacco** and **cigarette tobacco smoke** because they are not used to thinking about smoking from this perspective. While many participants said they do tend to distinguish between the composition of unlit tobacco and tobacco smoke in daily life, discussion and probing revealed that a substantial number actually tend to make two other distinctions, neither of which relates specifically to the chemical composition of unlit tobacco and tobacco smoke:

- *Lit versus unlit cigarettes*: Probing on this issue revealed that a number of participants who said they distinguish between the composition of unlit tobacco and tobacco smoke actually distinguish between an unlit and a lit cigarette. These

participants routinely explained that cigarette tobacco and tobacco smoke differ because an unlit cigarette causes no harm to anyone, while a lit cigarette does. However, when probed as to whether they ordinarily tend to distinguish between the actual chemical *composition* of lit and unlit tobacco, most of these people said they do not.

- *Solid versus gas*: A number of participants tended to focus on physical state instead of chemical *composition* when thinking about this issue. In other words, while they said they distinguish between the *composition* of **unlit cigarette tobacco** and **cigarette tobacco smoke**, it became clear that they actually distinguish between the *physical state* of an unlit and a lit cigarette (i.e. solid versus gas).

Much Better Understanding of Health Impact of Smoking Than Chemical Content

As noted at the beginning of this section, participants had a much easier time identifying the health-related impacts or effects of smoking than answering questions about the chemicals contained in **unlit cigarette tobacco** and **cigarette tobacco smoke**. A summary indication of this was revealed through the true or false questions participants were asked to complete as part of the second exercise. Nearly everyone answered all health-related questions correctly. By comparison, fewer than half identified the statement *Cigarette tobacco smoke contains over 4,000 chemicals* as correct. Most of the rest said they did not know, but approximately one-quarter said the statement was false.

Numerous Parts of the Body Seen to be Affected by Cigarette Smoke

As part of the second exercise, participants were presented with a diagram of the human body and asked to identify the parts that they thought were negatively affected by cigarette smoke. Participants had no difficulty identifying parts of the human body affected by cigarette smoke, and they routinely identified numerous areas. Moreover, at least a few participants in all groups felt that the impact on health was pervasive, indicating that the body as whole is affected by cigarette smoke.

While most parts of the body were identified by at least some participants in each group, the following were routinely identified as being negatively affected by smoking cigarettes:

- *Lungs/respiratory system*: Nearly all participants identified the lungs in particular, or the respiratory system in general, including the throat, as affected by cigarette smoke. Moreover, the lungs were often the first part of the body identified by participants. The health condition caused by cigarette smoke most often identified was lung cancer, but the following were also routinely identified: bronchitis, emphysema, and breathing problems in general.
- *Heart*: Identified almost as frequently as the lungs was the heart. Heart attacks and strokes were routinely identified as the impact of cigarette smoke on this organ.
- *Stomach/digestive tract*: Mentioned less often than the lungs and heart, but still identified regularly were the stomach and the digestive tract. Health problems seen

to be caused by cigarette smoke included stomach cancer, problems digesting food, difficulty swallowing, and loss of appetite.

- *Head and parts of the head*: At least a few participants in each group identified the head in general or parts of it as affected by cigarette smoke. This regularly included the eyes, the nose and nasal passages, hair, the mouth, and teeth. Mentioned less often, but still relatively frequently was the brain. Conditions linked to cigarette smoke included red/irritated eyes, loss of capacity to smell, loss of taste, dry hair, and gum disease. Participants had more difficulty describing the impact of cigarette smoke on the brain, although some did not the 'rush' that one can get from inhaling cigarette smoke.

The following parts of the body were mentioned less often, but still relatively frequently:

- *Liver, pancreas, bladder, intestines*: These internal organs were mentioned less often than the stomach, but still relatively frequently. That said, participants had more difficultly identifying specific health conditions caused by cigarette smoke. They tended to identify cancer in general as the impact of smoking on these organs.
- *Reproductive organs*: Reproductive organs, and more specifically male reproductive organs, were identified by many as affected by cigarette smoke. Erectile dysfunction was commonly identified as the effect of cigarette smoke.
- *Skin*: Many participants felt that the skin in general was affected by cigarette smoke. Conditions linked to smoking include a greying/yellowing of the skin, wrinkles, dryness, and skin cancer.
- *Blood/blood system*: The blood and blood system were also identified by many as affected by cigarette smoke. Conditions linked to cigarette smoke included high blood pressure, blood poisoning, poor circulation, and hardening of the arteries.
- *Hands/fingers*: Many also saw an impact of cigarette smoke on the hands and fingers, specifically a yellowing of the fingertips. This condition tended to be associated specifically with smokers as opposed to people affected by second-hand smoke. A few also linked arthritis to cigarette smoke.

Parts of the body identified less often included the bones, legs and feet. Moreover, participants had difficulty identifying specific impacts or effects caused to these parts by smoking. Brittleness was mentioned in relation to bones, while poor circulation tended to be identified in relation to legs and feet.

Health-Related Effects Extend Beyond Areas Directly Touched by Smoke

On a certain level, most participants seem to associate the health hazards of smoking with the chemicals in the smoke as opposed to the smoke itself. This is suggested by the fact that most participants associate a broad range of health impacts with smoking. As the list of body parts presented above reveals, the perceived health impact of cigarette smoke extends beyond parts of the body directly touched by cigarette smoke for most (e.g. mouth, throat, lungs, skin, hands). Some clearly make this link between the health hazards and the

chemicals in cigarette smoke, noting that the chemicals in cigarette smoke are carried through the blood system to all parts of the body.

It is worth noting that the minority of participants that did not attribute many health hazards to smoking, typically smokers, were more likely to focus on the parts of the body physically touched by the smoke as being, such as the throat and lungs. That is, it appeared that there was a consensus that the parts of the body in direct contact with the smoke were negatively affected health-wise, but there was no consensus on the parts of the body that were not in direct contact with the smoke (e.g. blood, brain).

Participants Have Difficulty Articulating Causes of Health Impacts

While participants had little difficulty identifying parts of the body affected by **cigarette tobacco smoke** and seem to understand that it is the *smoke itself* and the *chemicals it contains* that causes the harmful health effects, they tend to lack the framework to articulate the actual *process* through which the body is affected (i.e. what specifically causes the health impact?). While they tend to link the harmful health effects to the chemicals in tobacco smoke, they have more difficulty explaining the actual process of how this happens.

That said, some participants in most groups used expressions like 'absorption', 'build-up' and 'accumulation' to describe how chemicals in smoke affect the body over time. There was a sense that the body's immune system gradually breaks down and cannot get rid of these chemicals that gradually build up and 'contaminate' or 'poison' parts of the body. Tar in particular was identified by some as a chemical that builds up or accumulates in various organs of the body and clogs arteries.

Some Uncertainty Regarding Extent of Health Impacts of Cigarette Tobacco Smoke

While participants seem to make the link between health conditions and **cigarette tobacco smoke**, discussion of this issue revealed that they tend to make the link because they have been informed of it (i.e. through public awareness campaigns about the impact of smoking), not because they understand the chemistry behind smoking and its impact on health. In other words, they know that exposure to tobacco smoke is responsible for harmful health effects, but they do not know this through an understanding of the chemistry behind smoking.

This tended to be corroborated by results to a question in the exercise asking participants to indicate whether or not certain health effects were caused by cigarette tobacco smoke. A majority of participants, usually a large one, correctly identified all the health conditions caused by cigarette tobacco smoke. Having said that, at least one quarter of participants expressed uncertainty about those health conditions not caused by cigarette smoke (i.e. they were uncertain whether they were caused by cigarette tobacco smoke or not), and some felt that they were. This included cystic fibrosis, multiple sclerosis, hepatitis, and arthritis.

In other words, because participants tend to understand that there are broad-based health effects associated with tobacco smoke, but do not clearly understand how cigarette tobacco smoke causes certain diseases (e.g. heart attacks, lung cancer), they have no real way of knowing whether or not it causes other diseases as well (e.g. cystic fibrosis, multiple sclerosis).

Most View Health Impacts as Occurring Over Short, Medium and Longer Term

Participants tend to be attuned to timelines when they think about the health effects of tobacco smoke. A substantial majority believe that the health effects of tobacco smoke manifest themselves over the full scope of time (i.e. from immediate to long-term impacts). Moreover, many either associate specific health impacts or illnesses with specific timeframes, or think of certain specific conditions as developing in stages. This was most evident among current and former smokers who tended to base this on their own experience (i.e. they experienced certain health-related effects over time or observed them in others).

Perhaps not surprisingly, the more immediate and short-term effects tended to be associated with those surface areas or parts of the body touched directly by smoke. This included the hair, eyes, skin, and hands. Impacts on the respiratory system tended to linked to the short and medium-term (i.e. sore throat, coughing, shortness of breath). The impact on internal organs, primarily various forms of cancer and heart conditions, tended to be linked to the longer-term and the gradual build up of toxic chemicals

That said, there was also a tendency to view certain specific conditions as developing over time. Respiratory problems, for example, while often linked to the short and medium-term, were also described as developing over time and progressing from an itchy throat, to coughing, to shortness of breath/difficulty breathing, to lung cancer. Similarly, heart attacks were sometimes associated with a gradual hardening of the arteries manifesting itself over time in conditions such as angina and chest pains.

Participants who did not think that the health impacts manifested themselves during each of the various timeframes tended to link them to the short/medium term or the longer term.

INFORMING CANADIANS – REACTIONS & FEEDBACK

One of the study's objectives was to gain a better understanding of how to best educate and inform Canadians, including smokers, on the topic of chemistry behind cigarette smoking and its health impacts. This section reports on participant reaction to and feedback on two items designed to provide information on the chemistry of cigarette smoking and its health impacts. The two items differed in format. The first was a two-page written document entitled *Exposure to Tobacco Smoke and the Impact on Health*. This draft document focused on important information that Health Canada would like to communicate to Canadians.

The second was an interactive tool developed to inform people about the concentration and health impact from exposure to various chemicals through smoking. For the purposes of this research, this tool is referred to as the *Smoking Wheel*. This mock-up was not tested in every group, although it was tested among representatives of each target audience (i.e. Current Smokers, Former Smokers, Never Smokers, youth, adults, individuals with a high school education or less, and individuals with post-secondary education).

Overview

Overall, participants reacted positively to the written document. It tended to be viewed as clear, concise, and to the point. There was also widespread agreement that it provided new information that was both important and relevant. Feedback on the *Smoking Wheel* tended to be more critical than positive. While participants understood the purpose of this tool and liked the interactive dimension, it was not immediately clear to most how it worked. Moreover, its usefulness tended to be viewed as limited due a perceived lack of relevance of the information provided (i.e. concentrations of chemicals presented numerically without a meaningful frame of reference).

Participants were much more likely to prefer the written document to the *Smoking Wheel* as a way of presenting information on the chemistry of cigarette smoking and its health impacts. Participants explained their preference by noting that the document presents information on the chemistry of cigarette smoking and its health impacts in a more meaningful and understandable way. In fact, one of the main perceived strengths of the document was identified as the main weakness of the smoking wheel: the ability to present information about chemicals through a meaningful and relevant frame of reference.

Summary Document: *Exposure to Tobacco Smoke and the Impact on Health*

Overall Positive Reaction to Document

Participants tended to react positively to the summary document. As part of their overall reaction, some expressed surprise and even shock at some of the information contained in the document. Others noted that they had never thought of smoking-related issues in these terms before (i.e. through a focus on the chemistry behind smoking). The following

reasons were routinely provided to explain participants' overall positive reaction to the document:

- *New information*: Many participants explained their positive impression of the document by referring to the fact that it presented them with new information (i.e. information they did not know prior to the focus group). As noted, some were surprised, not to say alarmed, by some of the new information they learned through the document. The information described by participants as new is identified below.
- *Important information*: Many participants felt that the information presented in the document is important and relevant. Participants routinely linked the importance of the information to its newness (i.e. it was important because it was information they did not know before). The information identified by participants as most important and relevant is identified below.
- *Clarity/conciseness*: In addition to providing new and important information, the document tended to be described as clear, concise, and to the point. There was widespread agreement that the document does a good job informing people about the chemistry of smoking and its health impacts in an easy-to-understand manner. Specifically, most participants felt that the document makes it clear that new chemicals are formed when cigarette tobacco is lit (i.e. through the act of combustion) and that it is the chemicals in cigarette tobacco smoke that are responsible for the health hazards associated with smoking.

Some participants felt the information, while mainly clear, could be presented even more clearly, primarily on the first page. Some noted that the information on the first page does not flow very well, saying they did not clearly understand the links between the various boxes of information and the order in which they should be read. Others noted that the presentation of information on the combustion process relies too much on graphics and that a line or two of accompanying text would increase clarity about this. A few said the document does not provide enough information on the process of formation of new chemicals. Finally, some felt that it is not entirely clear that it is the chemicals in the smoke that are responsible for the health hazards associated with smoking. While it was noted that this is mentioned in a bullet, it was described as not very prominently featured.

As part of their initial reaction, many participants, particularly current smokers, noted that this document would probably not have much impact on deterring people from smoking. That said, there was virtually unanimous agreement that such information was important to provide to people in order to help them make an informed choice about smoking.

Most Describe at Least Some Information in Document as New

As noted above, many participants said they liked the document because it provided them with new information. While participants differed about the proportion of information that was new to them, most said they learned at least something they did not know before and many said they learned a number of things. The following information was routinely identified as new information:

- *Tobacco smoke contains over 4,000 chemicals*: Most participants did not know that tobacco smoke contains over 4,000 chemicals. Among these were some participants who believed that tobacco smoke contains many more chemicals than cigarette tobacco, but who never imagined that the number of chemicals was this high.
- *Most chemicals are formed during the burning of tobacco*: In addition to not knowing that tobacco smoke contains over 4,000 chemicals, most participants said they did not know that most of these chemicals are formed during the burning of tobacco.
- *Uses of chemicals present in tobacco smoke*: In addition to being new to most participants, the information about uses of chemicals present in tobacco smoke (e.g. insecticides, chemical weapons) tended to have the biggest impact on participants.
- *Difference in chemicals present in unlit tobacco and tobacco smoke:* Many participants said they did not know that there was a difference between the chemicals in cigarette tobacco and cigarette tobacco smoke.

The following were identified less often as new information:

- *Chemical transfer through blood stream*: Some participants said they knew that cigarette smoke goes into a person's lungs when inhaled, but did not know that chemicals are transferred to the blood stream.
- *Chemicals are not added by manufacturers*: While many participants identified this as new information, only some did so in an unprompted manner. However, when prompted by pointing out to them that the sentence stating that chemicals are not added to cigarette tobacco, most participants said this was new information to them. That said, some added that they do not believe it.
- *Temperature during combustion*: Some said they did not know that the temperature of burning tobacco could reach as high as 900 degrees Celsius. This was likely new information for everyone, but was only commented upon by some participants.
- *Chemical content of cigarette tobacco*: A few said they did not know that cigarette tobacco contains proteins, carbohydrates, sugars, and vegetable oil.
- *Exposure through breastfeeding*: A few participants noted that they were aware that a foetus could be exposed to tobacco smoke, and that this could be harmful, but were not aware of post-natal exposure through breastfeeding.

While a few participants said that they did not learn anything new through the document, they noted that it served as a good reminder.

Most Important Information Tends to be New Information

Virtually all participants felt that the document provides them with important and relevant information. Not surprisingly, the information identified as most important or relevant tended to be the information most often described as new. This included:

- The uses of chemicals found in cigarette tobacco smoke. This was routinely identified as the most important information in the document.
- The number of chemicals in cigarette tobacco smoke.
- The fact that most chemicals in cigarette tobacco smoke are formed during the burning of tobacco.

Participants had little difficulty explaining why the information on the uses of various chemicals present in tobacco smoke is important or relevant to them. They were virtually unanimous in explaining that this gave them a concrete frame of reference for understanding what people ingest when they inhale smoke from a cigarette. In other words, the names of most of the chemicals themselves mean little or nothing even though some know these are toxic. However, this is driven home when they realize they are ingesting ingredients used in such things as paint stripper, gasoline, and car batteries.

Participants also tended to have no difficultly explaining why they consider it important to know the number of chemicals in cigarette tobacco smoke. They tended to explain that this was important because they had no idea about the sheer number of chemicals they ingest through cigarette tobacco smoke. Some added that while they knew there were many chemicals, they never would have guessed that there were so many.

Participants who said it was important to know that most chemicals in cigarette tobacco smoke are formed during the burning of tobacco tended to suggest that this was important because it meant that the danger caused by smoking has its source in nature (i.e. it is in the tobacco itself and not a result of additives). As noted, some participants are reluctant to admit this and some simply refuse to believe it. Some described this information as important because if the combustion process is what creates most chemicals, this suggests that the type of cigarette one smokes makes no difference (i.e. smoking light cigarettes is no less a health hazard).

Types of information identified less often as being important or relevant included:

- *Health hazards*: Some participants identified the health hazards included in the document as important information. It was noted that this type of information (i.e. health-related hazards) is already known but it is good to re-enforce it.
- *Chemical transfer through blood stream*: Some participants considered this important information because it indicates that the whole body is affected by the chemicals in tobacco smoke and not only those parts of the body touched directly by the smoke (e.g. the lungs).

- *Post-natal exposure to tobacco smoke*: Related to the latter, a few identified post-natal exposure through breastfeeding as important information because it shows how the chemicals in smoking can affect the whole body.

A few participants said they do not think the document provides important information because they tend to view the health-related impacts as most important and this is information they already know.

Additional Information Considered Important

Most participants indicated that the document does a good job informing them about the chemistry of smoking and its health impacts. That said, small numbers of participants did identify additional information they think would be important or helpful to include in this document:

- *Toxic versus non-toxic chemicals*: Some participants were interested in knowing how many of the over 4,000 chemicals in tobacco smoke are toxic (i.e. some, many, most, all).
- *Number of chemicals in unburned tobacco*: Some want to know how many chemicals there are unburned cigarette tobacco.
- *Effect of filters or light cigarettes*: Some said it would be important to know if the types of filters or light cigarettes make a difference in terms of the ingestion of chemicals through tobacco smoke.
- *Ingredients added by manufacturers*: It was noted that manufacturers do add some ingredients to cigarettes, and it would be important to know what they are and what their effect, if any, is on health.
- *Effect/impact of cigarette ash*: A few participants inquired about the impact of cigarette ash on health. They noted that the document refers to tobacco smoke and ash and wondered whether the ash is as hazardous as the smoke. It was noted that this could be important information in terms of exposure since simply being around an ashtray filled with ashes might involve a health risk.

One participant was interested in knowing how long cigarette smoke can linger in the air before it completely dissipates.

Most Think it is Useful to Understand Chemistry Behind Smoking

There was widespread agreement that it is useful to understand the chemistry behind smoking and its health impacts (i.e. as opposed to focusing only on the effects). That said, participants tended to have more difficulty explaining why this information is useful and explanations tended to emerge only on the basis of probing. This is not surprising since participants are not used to thinking about smoking from this perspective.

Most tended to answer in a general way that being informed is better than not being informed and that it is better to know than not know these things. That said, other reasons emerged through probing:

- *Deterrence*: While many participants felt that this document would not deter people from smoking, others felt it could. Consequently, they felt it was important to focus on the chemistry behind smoking because such information could act as a deterrent. In particular, the information on uses of some of the chemicals present in tobacco smoke was seen as a possible deterrent. Some felt that this would be particularly effective in preventing people from starting to smoke (i.e. young people).
- *Revelation that chemicals are not added by manufacturers*: Once again, while many did not draw this implication without prompting and some did not believe it, it was noted that the focus on the chemistry behind smoking is important for this reason. At the risk of letting tobacco manufacturers off the hook, it was suggested that the focus on chemistry shows where the danger truly lies in nature (i.e. in the tobacco itself, not additives).
- *Reinforces danger to others*: Some participants noted that understanding the chemistry behind smoking is important because it emphasizes the sheer number of chemicals people expose others to when they smoke, through second-hand smoke.
- *Link to concern with environment*: Some noted that an emphasis on the chemistry behind smoking links up with a more general concern about chemicals in the environment (e.g. ozone depletion, global warming). In other words, the emphasis on the chemistry behind smoking could help link concerns with health and concerns with the environment in a common frame of reference.

Suggestions to Improve Document

While numerous suggestions were made to improve key messages in this document, most were offered by small numbers of participants. The only suggestions made routinely, by participants in all groups, was to add a more fulsome, not to say complete list of the chemicals in cigarette tobacco smoke. While the individual names would not have much meaning to people, the sheer number of chemicals listed (e.g. on the back page of the document, or as a faint watermark under the other text) would serve a valuable purpose in visually reinforcing the large number of chemicals that people would be ingesting.

Most suggestions focused on the content of the document:

<u>Content-Related Suggestions</u>

- *Add a sentence to explain the combustion process:* Some participants felt that the image depicting the combustion process was a little too succinct and needed some text added to help clarify it.
- *Add a sentence to explain the formation of new chemicals*: Some noted that there is no explanation of the process through which over 4,000 chemicals are produced, and that it would be useful to include this if it could be done simply and clearly.

- *Link health hazards to specific chemicals*: Some suggested linking the various health hazards identified in the document to specific chemicals.
- *Emphasize that chemicals are not added to cigarettes*: Some participants suggested adding emphasis to the statement that chemicals are not added to cigarettes in order to reinforce this information. This could include underlining it or placing it in a more prominent location.
- *Re-order list of health hazards to include reference to 'death' last*: Some suggested that death should appear at the end of the list of health hazards associated with smoking, noting that the reference to many more health hazards looks odd following a reference to death, which is the ultimate health hazard.
- *Include better graphics*: Some suggested using real pictures instead of cartoon-like images or at least using better images. It was suggested that the image of the smoker in particular needs to be improved.
- *Add explanatory term in parentheses for 'emphysema'*: It was suggested that like bronchitis, there should be a term in parentheses explaining emphysema.
- Include a reference to the number of people who die each year of smoking-related diseases.

The following suggestions were made by no more than a few participants:

- Explain the chemical dependency aspect of smoking.
- Explain how chemicals actually create health hazards (if a simple explanation is possible).
- Add a sentence on whether or not 'light' cigarettes are less dangerous.
- Remove references to constituents of cigarette tobacco that appear to be healthy (i.e. proteins and carbohydrates). This might be counterproductive by making cigarette tobacco looking healthy.
- Add information on the volume of chemicals inhaled when smoking a cigarette (i.e. the concentration).
- Add pregnancy-related risks to list of health hazards.
- Include more impact-related information (e.g. include references to the quantity of chemicals consumed in one year by someone smoking 20 cigarettes a day). This could take the following form: "Someone who smokes 20 cigarettes a day for one year consumes the equivalent of X cups of …". This would provide additional context that would make the chemistry more meaningful.

Format and Visual Suggestions

A smaller number of format and graphic suggestions were made for improving the document:

- *Improve format of first page*: Some participants felt that the information on the first page of the document did not flow very well. They suggested that the link between the various boxes on the page be clarified (i.e. what order to follow when reading the boxes).
- *Devote less space to depiction of combustion process*: It was felt that the depiction of the combustion process takes up a lot of place on the first page and could be made smaller.
- Increase size of boxes referring to chemicals in cigarette tobacco and tobacco smoke.
- Add a picture of a tombstone beside the picture of the ambulance. It felt that this would reinforce the danger of the health hazards associated with smoking.
- Add a time chart/series to health hazards to identify short, medium, and long-term health impacts.
- Add a picture of the human body to help convey health impacts graphically.

Suggestions for Broadcasting Information

Participants identified a number of ways they themselves would like to receive this information or ways they thought it should be disseminated in general:

- *Place information on cigarette package*: Many felt that this information should be included in cigarette packages themselves in order to target smokers in particular (in simplified form). It was noted that while all the chemicals in tobacco smoke could not be listed on a pack of cigarettes, it could at least be noted that there are over 4,000 chemicals in cigarette tobacco smoke. Some suggested handing out pamphlets with purchased packs of cigarettes identifying the information contained in this document.
- *Television ads*: Participants also routinely suggested providing this information through television ads, and many emphasized that the ads should be graphic. Many noted that there were already such ads showing people drinking a toxic brew and that more along the same line should be produced. One suggestion was to show someone smoking a cigarette and having the names of the chemicals produced streaming out of the end of the cigarette. Another suggestion was to show someone asking to borrow a cigarette and having the person asked hand them hydrogen cyanide.
- *Radio ads*: Many felt that this information could be conveyed through a radio. One participant suggested that a voice in the background continuously list chemicals in cigarette tobacco smoke while a voice in the foreground provide the more basic

information from the document (e.g. tobacco smoke contains over 4,000 chemicals).

The following were also suggested as vehicles for broadcasting this information:

- Place document in community/youth centers
- Send out pamphlets through direct mail
- Advertise on billboards, bus shelters, and subways
- Give presentations at school assemblies/go through schools.

Some suggested sending out this information with tax returns. It was also suggested that a spokesperson or champion be used to promote this information. Many felt that young people in particular should be targeted with this information in order to focus on preventing them from beginning to smoke in the first place.

Smoking Wheel

Smoking Wheel Described as Interesting but of Limited Usefulness

Overall reaction to this tool tended to be critical rather than positive. While participants understood the purpose of the instrument and liked the interactive dimension, it was not immediately clear to most how it worked (i.e. it took time to figure this out). More importantly, the tool's usefulness tended to be viewed as limited due a perceived lack of relevance in the information it provided. Many noted that the names of the chemicals and the numbers indicating the concentration absorbed per cigarette provide no meaningful frame of reference for understanding the information given (e.g. what does it mean that someone has absorbed 150 mg/cig of hydrogen cyanide? Is this a lot or a little and compared to what?).

The limited usefulness of the tool was also linked by some to a perceived lack of practicality. Specifically, it was noted that people were unlikely to have this tool on hand when smoking or would be unlikely to take the time to use it after smoking a cigarette if they did have it. A few even thought that this tool could encourage people to smoke out of curiosity in order to measure the concentration of various chemicals consumed.

Provide Meaningful Context for Numbers – Main Suggestion for Improving Tool

The suggestion offered most often for improving this tool and making it more useful was to somehow make the numbers more relevant to users by providing a context for understanding their meaning. For example, it was suggested that the back side of the wheel be used to provide some sort of equivalence table which would translate various concentrations of chemicals into more meaningful (i.e. mundane) measurements.

A number of participants also suggested adding instructions on how to use the wheel (right now, they are harder to understand because they are in different parts of the wheel). This would include specifying that the color of the filter is to be matched after, not before

smoking the cigarette. It was also suggested that color be used to draw attention to the place on the wheel where the cigarette filter is to be placed.

Document Preferred to Smoking Wheel

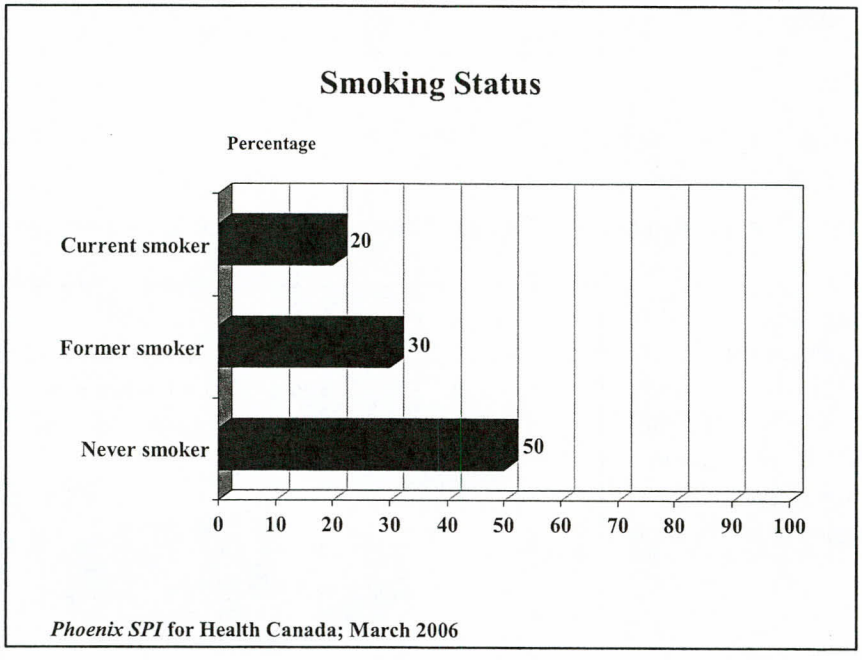
Participants were much more likely to prefer the written document to the *Smoking Wheel* as a way of presenting information on the chemistry of cigarette smoking and its health impacts. Participants explained their preference by noting that the document presents information on the chemistry of cigarette smoking and its health impacts in a more meaningful and understandable way. In fact, one of the main perceived strengths of the document was identified as the main weakness of the smoking wheel: the ability to present information about chemicals through a meaningful and relevant frame of reference. Specifically, it was noted that the information on uses of chemicals present in cigarette tobacco smoke was the type of relevant and meaningful information missing in the smoking wheel.

PART 2 – QUANTITATIVE RESEARCH

SMOKING BEHAVIOUR

This section provides background information on the smoking behaviour of respondents. It also reports on respondents' initial perceptions of the health-related impacts of smoking.

For the purposes of this study and throughout the rest of this report, respondents who currently smoke (either on a daily basis or occasionally) will be referred to as 'current smokers'. Respondents who have smoked at least 100 cigarettes in their life, but who do not currently smoke, will be referred to as 'former smokers'. Finally, those who have never smoked or have smoked fewer than 100 cigarettes in their life will be referred to as 'never smokers'. The following graph presents the proportion of respondents in each category.

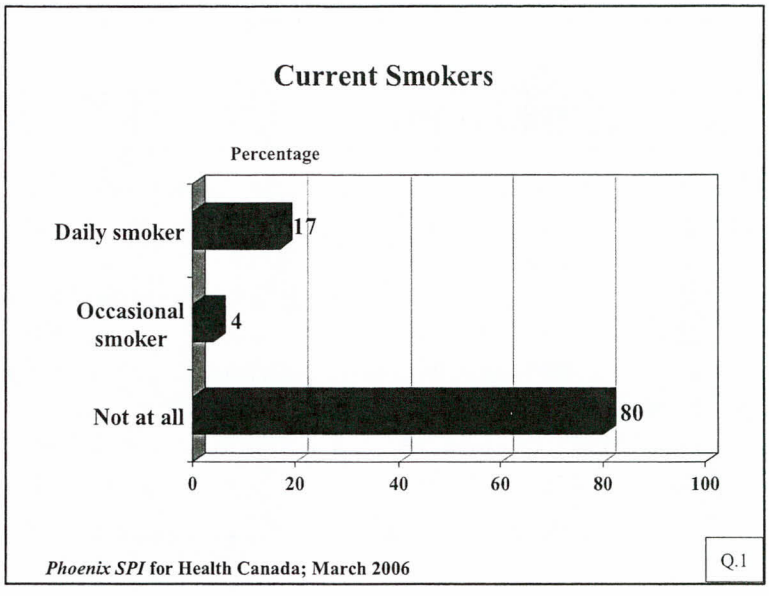


A substantial majority of respondents (80%) said they currently do not smoke manufactured or roll-your-own cigarettes[1].

[1] Recall that this report presents data that is weighted to reflect the actual distribution of Canadians by age, region, gender, and smoking status (CTUMS 2005 Wave 1 data were used for this). So, while the survey sample included a significant oversample of current smokers (i.e. 800 of 1,800 respondents), the weighted data brings the proportion of smokers back in line with the national average when aggregate results are presented (i.e. 20%).

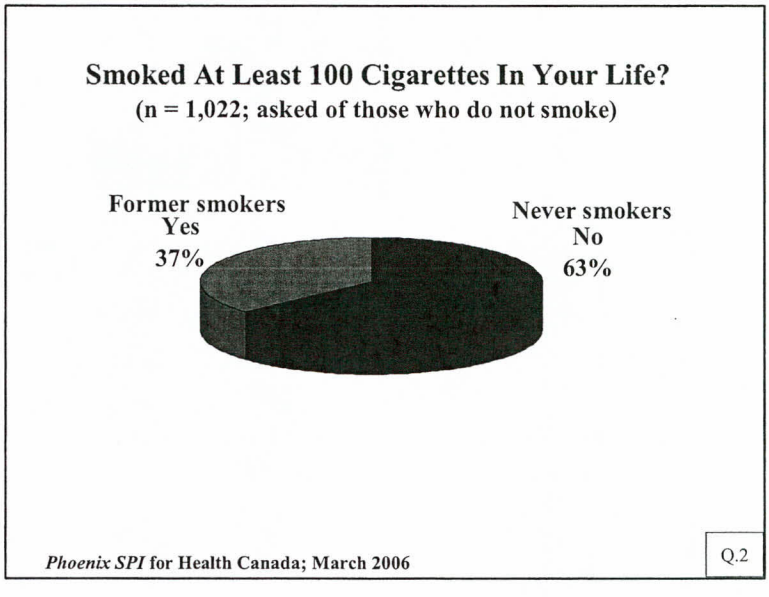
Current Smokers – Approximately One in Five Currently Smoke

Approximately one in five said they do currently smoke. Most of these current smokers are daily smokers (17%) as opposed to occasional smokers, smokers who smoke less than every day, (4%).



Former versus Never Smokers – Many Current Non-Smokers Did Smoke at One Time

Although the large majority of respondents currently do not smoke cigarettes, over one-third were former smokers (37%), respondents who said they have smoked at least 100 cigarettes in their life.

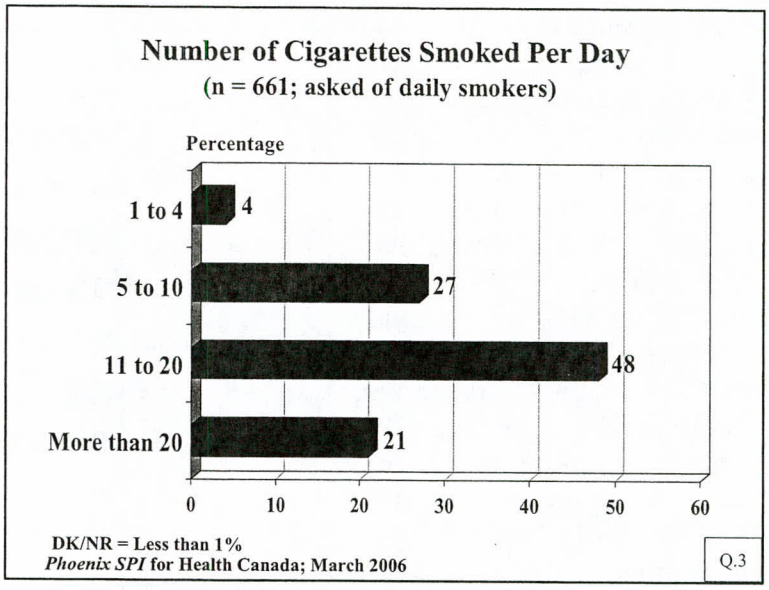


[*] Q.1: *At the present time, do you smoke cigarettes every day, occasionally or not at all?*

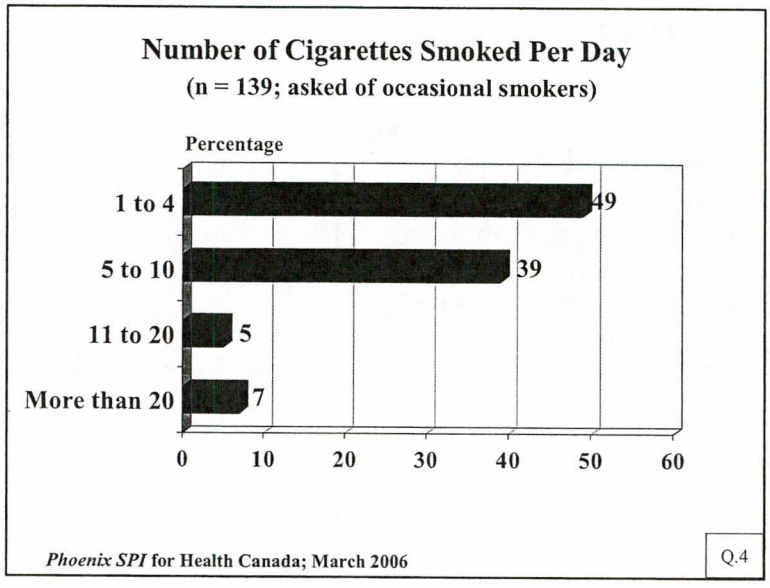
Q.2: *Have you smoked at least 100 cigarettes in your life?*

Most Daily Smokers Tend to be Relatively Heavy Smokers

Over two-thirds of daily smokers tend to be relatively heavy smokers. Nearly half (48%) smoke between 11-20 cigarettes a day, while one in five (21%) smoke over 20 cigarettes a day. Most of the rest, just over one-quarter, smoke between 5-10 cigarettes a day.



Not surprisingly, when they do smoke, occasional smokers are much more likely to consume fewer cigarettes than daily smokers. On those days they smoke, nearly half the occasional smokers (49%) consume four cigarettes or less. Most of the rest (39%) consume between 5-10 cigarettes on days they smoke. Relatively few smoke more heavily – 5% consume 11-20 cigarettes and 7% consume over 20 cigarettes on days that they smoke.

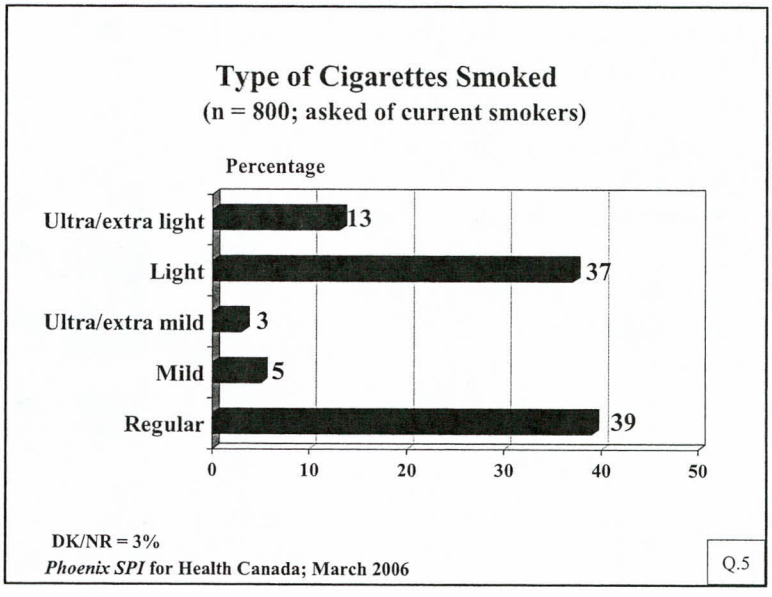


* Q.3: *On average, how many cigarettes do you smoke per day?* PROBE FOR PRECISE NUMBER. IF RESPONDENT SAYS ONE PACK PER DAY, PROBE FOR NUMBER OF CIGARETTES IN A PACK..

Q.4: *On the days that you do smoke, about how many cigarettes do you smoke?*

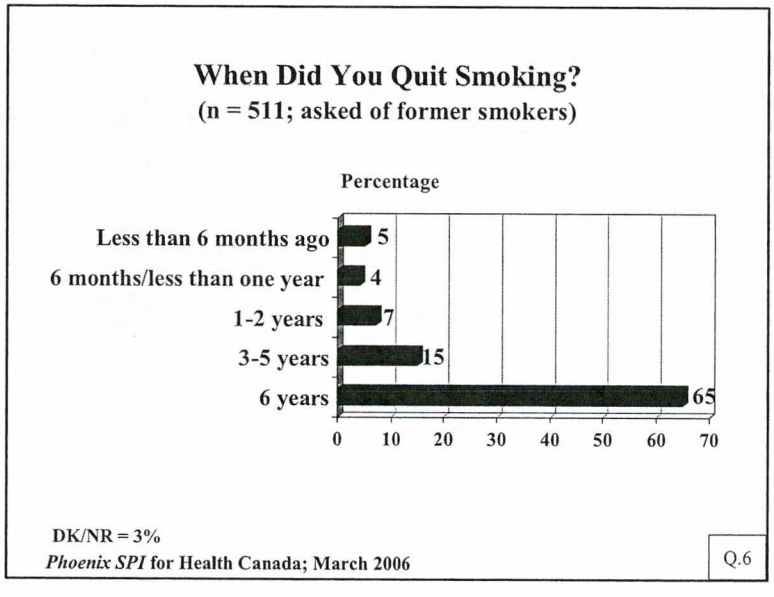
Most Current Smokers Smoke Cigarette Brands with "Light" or "Mild" Descriptors

Most current smokers (i.e. both daily and occasional smokers) smoke cigarette brands with descriptors on the package such as "light" or "mild". More than half said they smoke "ultra" or "extra light" (13%), "light" (37%), "ultra" or "extra mild" (3%), or "mild" cigarettes (5%). All of the rest, well over one-third (39%), smoke regular cigarette brands. Regular cigarette brands are those that do not contain "light" or "mild" type descriptors on the cigarette package.



Over Three-Quarters of Former Smokers Quit Some Time Ago

The large majority of former smokers (80%) have not smoked for at least three years, and two-thirds (65%) said they quit smoking six or more years ago. At the other end of the spectrum, nearly one in ten are recent quitters (i.e. stopped smoking within the past year).

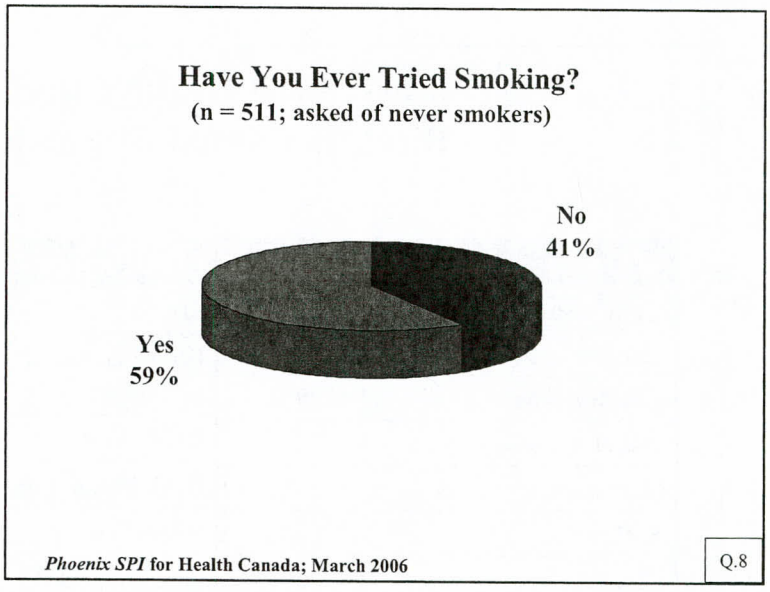


* Q.5: *What strength of cigarettes do you usually smoke?* (READ LIST; ACCEPT ONE RESPONSE – FOCUS ON TYPE OF CIGARETTE SMOKED 'MOST OFTEN' IF RESPONDENT WANTS TO IDENTIFY MORE THAN ONE TYPE).

Q.6: *When did you quit smoking? Was it...?* (READ LIST).

Majority of Never Smokers Have Tried Smoking

Although they have not smoked at least 100 cigarettes in their life, a majority of never smokers (59%) said that they have tried smoking cigarettes, even if only a puff. On the other hand, 41% said they have never tried a cigarette.



Cancer, Respiratory Problems, Heart Disease – Illnesses Most Linked to Smoking

As the accompanying tables show, the health effects or diseases that respondents are most likely to link to smoking are cancer, respiratory system illnesses, and heart disease. Cancer, however, leads the way by a wide margin. The two diseases most often identified as caused by smoking were lung cancer (55%) and cancer in general (43%). Smaller numbers identified oral cancer (14%) and breast cancer (3%) (multiple responses accepted).

Respiratory system illnesses of various types were also frequently identified by respondents. Indeed, two-thirds identified such diseases. Leading the way was emphysema (29%), followed at a distance by asthma (14%) and lung disease (13%). Smaller number identified respiratory problems in general (7%) and bronchitis (4%).

Nearly one-third identified heart-related diseases as a health effect of smoking, with most (28%) identifying heart attacks/angina, and small numbers identifying strokes (4%).

Conditions identified by small numbers (2-4%) included blood circulation problems, high blood pressure, and gum/mouth disease (without specifically mentioning cancer). Included in the 'other' category are a host of conditions, including dizziness and nausea, hardening of the arteries, sexual dysfunction, COPD, diabetes, coughing, premature births and reduced growth of babies during pregnancy, brain damage, headaches, and effects on appearance (i.e. yellow teeth and fingers, wrinkles).

* Q.8: *Have you ever tried smoking cigarettes, even just a puff?*

Note that very few respondents (3%) were unable to identify any health impacts or effects of smoking.

Perceived Health Effects/ Diseases Caused By Smoking

Effect/Disease	%	Effect/Disease	%
Lung cancer	55%	Stroke	4%
Cancer in general	43%	Blood circulation problems	4%
Emphysema	29%	Bronchitis	4%
Heart disease/angina	28%	High blood pressure	3%
Oral cancer	14%	Breast cancer	3%
Asthma	14%	Gum/mouth disease	3%
Lung disease	13%	Other	27%
Respiratory problems	7%		

Multiple responses accepted
DK/NR = 3%
***Phoenix SPI* for Health Canada; March 2006**

Q.10

* Q.10: *What specific human health effects or diseases, if any, can you think of that can be caused by smoking cigarettes containing tobacco? Are there any others?* (DO NOT READ LIST; PROBE/ACCEPT MULTIPLE RESPONSES).

Never smokers and current smokers were more likely to rate themselves as knowledgeable in basic chemistry (25-27% versus 20% of former smokers). Current and former smokers were more likely to see themselves as lacking knowledge in the area (59-63% versus 53% of never smokers).

Perceived Knowledge of Basic Chemistry			
	Current smokers %	**Former smokers** %	**Never smokers** %
Knowledgeable (scores of 5-7)	25	20	27
Neutral (score of 4)	14	16	19
Not knowledgeable (scores of 1-3)	59	63	53

Following this self-assessment of their level of knowledge of basic chemistry, respondents were asked some basic questions to try to gauge this more objectively.

Mix of Correct & Incorrect Perceptions of What Constitutes a 'Chemical'

Respondents were asked to identify which of the following statements/characteristics accurately describe a 'chemical':

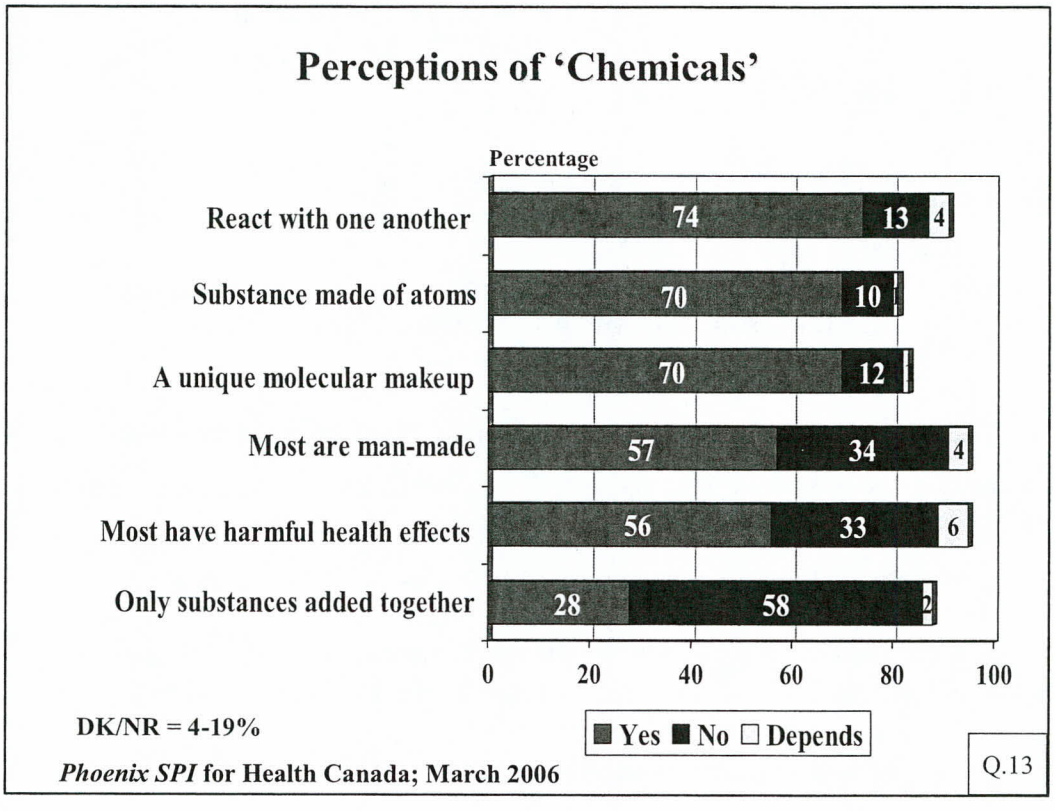
- Most chemicals are man-made
- Most chemicals have harmful health effects
- Only substances that are added together are chemicals
- A key characteristic of chemicals is that they react with one another
- A chemical is a substance made of "atoms"
- A chemical is a substance with a unique molecular make-up

Respondents' understanding of what constitutes a chemical includes a mix of correct and incorrect perceptions. More specifically, majorities hold correct perceptions regarding three characteristics, and misperceptions regarding three others.

Relatively strong and identical majorities (70% each) correctly indicated that a chemical is made of atoms and has a unique molecular make-up. That said, a substantial number, over one-quarter, were either wrong (10-12%) or unsure about these basic characteristics of chemicals (16-19%). A smaller majority (58%) correctly noted that the statement 'only substances that are added together are chemicals' is false. However, over one-quarter (28%) believed this to be true, with most of the rest (12%) expressing uncertainty.

Between half and three-quarters of respondents hold misperceptions regarding the remaining characteristics of chemicals. Almost identical majorities believe that most chemicals are man-made (57%) or harmful (56%), while approximately one-third noted (correctly) that this is not so. Small numbers (9-10%) said it depends or expressed uncertainty about this.

Respondents were most likely to be mistaken about whether or not a *key* characteristic of chemicals is that they react with one another. Nearly three-quarters (74%) felt that this is a key characteristic of chemicals, 13% said that it is not, and 9% did not know. While a substantial majority were wrong about this, the significance of this misperception is mitigated by the fact that chemicals do tend to react with one another even though this is not one of their key or defining characteristics.



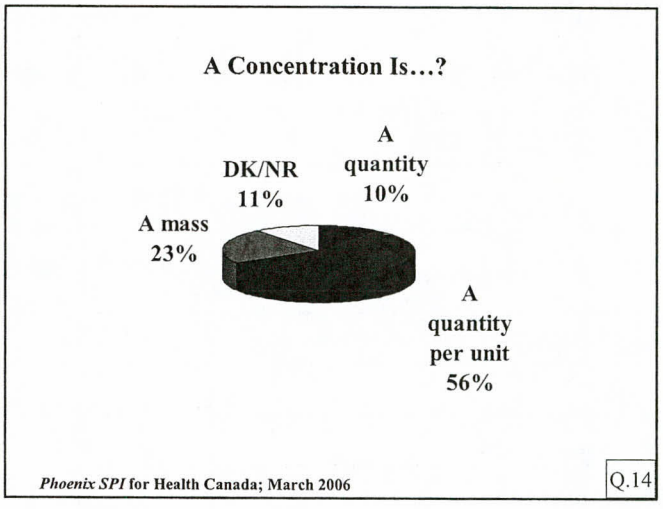
* Q.13: *Which of the following accurately describe* ***chemicals****?* (READ BUT DO NOT ROTATE LIST; ACCEPT ALL THAT APPLY; PROBE FOR 'YES' OR 'NO' BUT ACCEPT 'DEPENDS' IF VOLUNTEERED).

Current smokers and/or former smokers were more likely to hold misperceptions and less likely to hold correct perceptions regarding all characteristics of chemicals. Conversely, never smokers were always the least likely to hold misperceptions and most likely to hold correct perceptions.

Perceptions of 'Chemicals' (% saying yes to each statement)			
	Current smokers %	**Former smokers** %	**Never smokers** %
Most chemicals are man-made	63	60	52
Most chemicals have harmful health effects	69	56	51
Only substances added together are chemicals	31	32	24
A key characteristic of chemicals is that they react with one another	79	74	72
A chemical is a substance made of "atoms"	64	69	74
A chemical is a substance with a unique molecular make-up	66	67	74

Most Can Define 'Concentration', But Many Cannot

While a majority of respondents (56%) were able to correctly identify a 'concentration' as a 'quantity per unit', a substantial minority (44%) could not. Of these, one-third defined it incorrectly, either as a mass (23%) or a quantity (10%), while the rest (11%) were unsure.

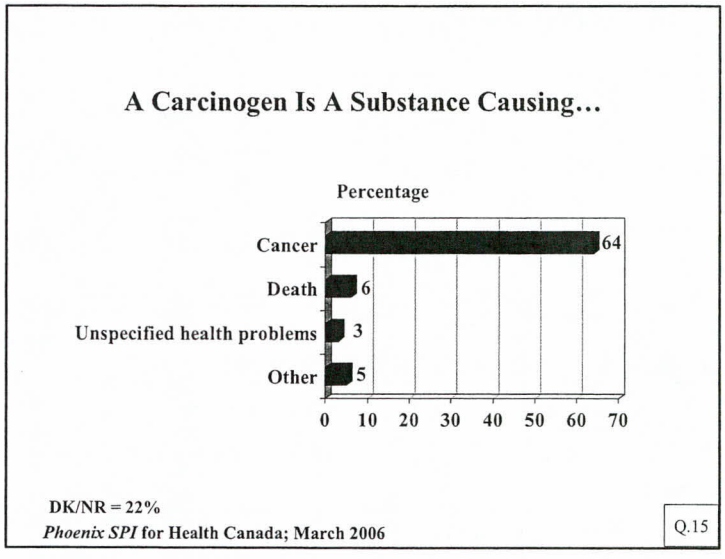


It is worth noting that in the focus groups, a number of participants volunteered examples where 'concentration' has been used in real-life situations to denote something similar to a 'mass' or 'quantity'. For instance, a concentration of people in a crowd being similar to a mass or large quantity of people. As such, it may be that there are more nuanced views that could be held for this and other 'fact-based' issues explored in this questionnaire, rather than simply the right or wrong answers from a definitional perspective.

* Q.14: *How would you define a **concentration**? Would you say it is...?* (READ LIST; ACCEPT ONE RESPONSE).

Many Unfamiliar with Meaning of 'Carcinogen'

Most respondents appear to have a clear understanding of the meaning of the term 'carcinogen'. Asked to complete the sentence 'A carcinogen is a substance that can cause ...', nearly two-thirds (64%) identified 'cancer'. Approximately one in ten know that the term has negative connotations, associating it with death (6%) or health problems (3%), even if they were unable to correctly or more precisely link it to cancer.



Despite this, almost one-quarter of respondents (22%) indicated that they did not know the meaning of the term.

Included in the 'other' category are the following responses: damage, disease, bad stuff, irritation, illness, a reaction, and fire. Those indicating the latter may have confused the expression 'carcinogen' with 'combustible'.

Current smokers were the least likely to link the expression 'carcinogen' directly to cancer, and were the most likely to express uncertainty about its meaning.

Definition of Carcinogen			
	Current smokers %	**Former smokers** %	**Never smokers** %
Cancer	58	69	64
Death	8	7	4
Health problems	3	2	4
DK/NR	26	19	23

* Q.15: *Please complete the following sentence – a* ***carcinogen*** *is a substance that can cause* _____. (DO NOT READ LIST; ACCEPT ONE RESPONSE).

Some Widespread Misperceptions About Smoke & Combustion

To further assess Canadians' level of understanding about chemistry, respondents were asked to identify whether each of the following statements was true or false:

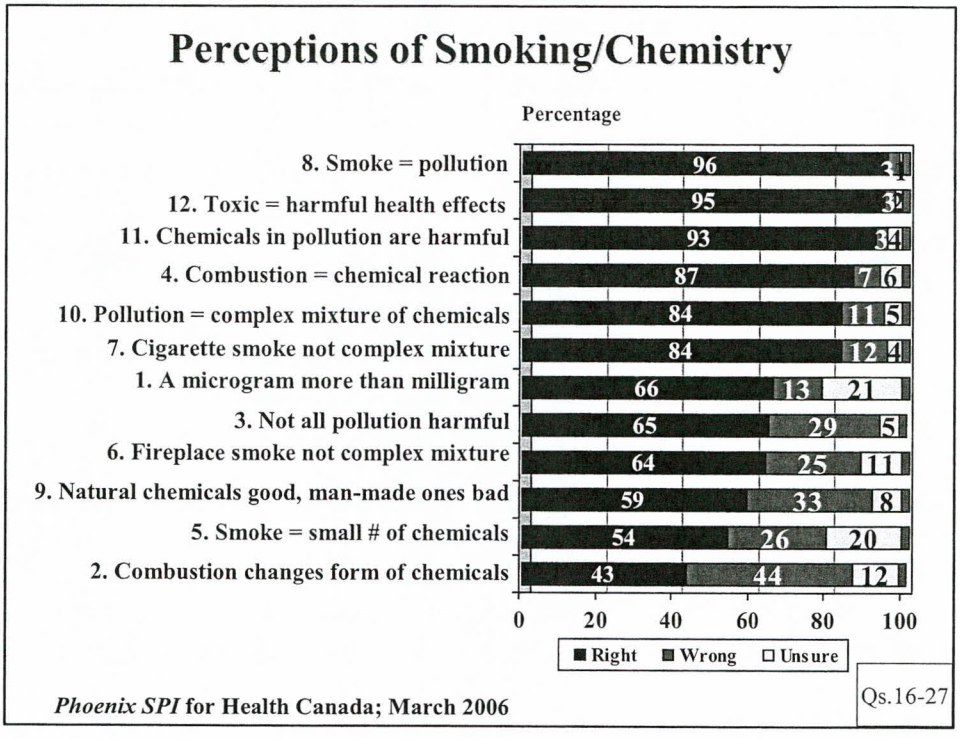
1. A quantity of one microgram is more than one milligram.
2. Combustion, the act of burning, does not change the type of chemicals, it just changes their form from solid to a gas.
3. Not all pollution is harmful to human health.
4. Combustion is a type of chemical reaction.
5. Smoke consists of a relatively small number of chemicals, 10-20 chemicals or less.
6. Smoke from fireplaces is not a complex mixture of chemicals.
7. Smoke from cigarettes is not a complex mixture of chemicals.
8. Smoke is a source of pollution.
9. Chemicals found in nature are good, while man-made or artificial chemicals are harmful.
10. Pollution is a complex mixture of chemicals.
11. Exposure to the chemicals in pollution is responsible for harmful health effects.
12. Toxic refers to a substance that can cause harmful health effects.

With one exception, majorities of respondents answered each of the statements correctly, although the size of the majority varied considerably. Almost all respondents (93-96%) correctly knew that smoke is a source of pollution, the meaning of 'toxic', and that it is exposure to the chemicals in pollution that is responsible for its harmful health effects. There was also widespread understanding (84-87%) that combustion is a chemical reaction, and that pollution and cigarette smoke are mixtures of chemicals. Misperceptions in these areas ranged from 3-12%, and were highest regarding the composition of pollution and cigarette smoke (11-12%).

Much smaller majorities (approximately two-thirds of respondents) knew that a microgram is smaller than a milligram, that all pollution is harmful, and that smoke from a fireplace is a complex mixture of chemicals. In addition, over half knew that the difference between man-made and natural chemicals does not coincide with the difference between good and harmful ones, and that smoke does not consist of a small number of chemicals. That said, with one exception (perceptions of a microgram), a sizeable minority (between one-quarter and one-third) held misperceptions on these issues.

Respondents were divided over whether or not combustion changes the *type* of chemicals or just their *form*. Virtually identical numbers (43-44%) held correct perceptions or misperceptions, with the rest expressing uncertainty.

Uncertainty regarding these issues ranged from 1-21% and was highest regarding the size of a microgram and the number of chemicals in cigarette smoke (20-21%).



Since one of the objectives of this research is to better understand the level of knowledge that Canadians have about basic chemistry and the chemistry behind smoking, a number of knowledge indices were created. These indices identify the number of respondents that answered questions correctly (regardless of the specific questions). The first of these is presented below and focuses on knowledge of basic chemistry. A total of 20 questions about basic chemistry could be answered correctly or incorrectly in the questionnaire[2].

As can be seen in the table below, the large majority of respondents (84%) answered half or more of these questions correctly. The largest proportion, nearly half, answered between half and three-quarters of the questions correctly. Just over one-third (36%) answered three-quarters or more of the questions correctly. At the opposite extreme, 17% answered fewer than half the questions correctly.

Knowledge of Basic Chemistry	
Number of questions	% who answered correctly
0-9	17%
10-14	48%
15-20	36%

[2] **General chemistry knowledge index:** This measure indicates the knowledge base of general chemistry among Canadians. Variables included in this are: the correct description of chemicals (Q13); the correct definition of a concentration (Q14); the correct definition of carcinogen (Q15); and a series of true/false statements concerning chemistry knowledge (Q16 through to Q27).

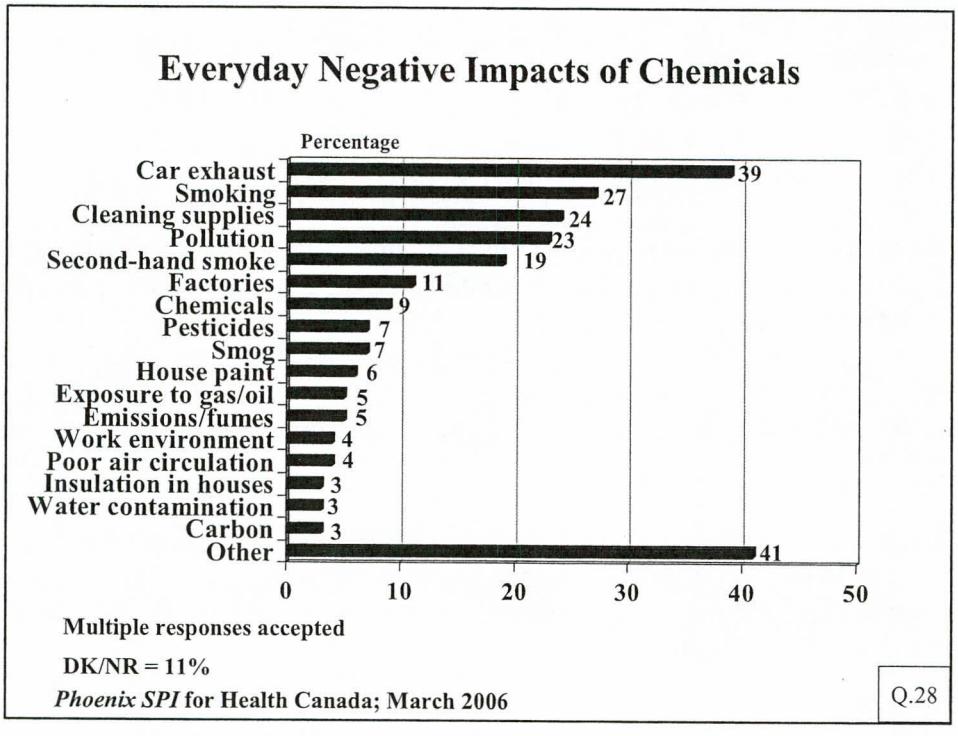
* Qs. 16-27: *Please tell me whether you think the following statements are true or false. If you are unsure about something, please just say so.* (READ QUESTIONS; DO NOT ROTATE).

Never smokers were the most likely to answer a substantial number (three-quarters or more) of the questions correctly (41%), followed by former smokers (34%). Current smokers were the least likely to answer this proportion of questions correctly (28%).

Many Examples Identified Where Exposure to Chemicals Has Negative Impact

The vast majority of respondents are able to establish some connection between chemicals and their day-to-day life. When asked in an open-ended manner to identify examples from everyday life where exposure to chemicals can have a negative impact on people's health, only one in ten (11%) were unable to identify anything.

The single example identified most often by respondents was car exhaust (39%), although nearly half identified cigarette-related exposure in the form of smoking (27%) or second-hand smoke (19%) (multiple responses accepted). Also identified frequently, and by nearly identical numbers (23-24%) were cleaning supplies and pollution (in general).



Examples identified much less often but by substantial numbers nonetheless included factories (11%) and chemicals (9%). The latter included chemicals that people work with or breathe in every day. This was followed by pesticides and smog (7% each), house paint (6%), exposure to gas, oil, and fuels in general and emissions/fumes (5% each).

* Q.28: *Can you identify any examples or situations from* ***everyday life*** *where exposure to chemicals can have a negative impact on people's health? Anything else?* (DO NOT READ LIST; PROBE FOR AND ACCEPT MULTIPLE RESPONSES)

Small numbers (4% or less) identified work environments, poor air circulation, insulation in houses, water contamination, and carbon. The 'other' category (41%) includes numerous examples identified by 2% or fewer respondents. This includes food additives, garbage, spills/leaks, unspecified toxins, asbestos, dust, mould, acids, radiation, aerosol cans, ammonia, plastics, medication, glue/adhesives, alcohol, and PCBs.

The high number of responses identified by small numbers of respondents speaks to the multiplicity of examples, as well as their diversity, that Canadians associate with negative health-related impacts caused by exposure to chemicals in their everyday life.

Negative Impact of Chemicals Linked to Variety of Factors

Respondents were asked about the extent to which certain factors can have a negative impact on health. Using a 7-point scale (1 = not important at all; 7 = very important), they were asked to rate the importance of each of the following factors in terms of its impact on human health:

- The type of the chemicals.
- The concentration of the chemicals.
- The number of different chemicals.
- Repetitive exposure to the chemicals.
- Different people react differently to chemicals.

Each of these factors was seen to be important by a strong majority of respondents. Moreover, people were much more likely to rate each one as *very* important as opposed to *moderately* important. Repetitive exposure to chemicals, followed by the *concentration* and *type* of chemical led the way in terms of perceived importance. The vast majority (85-91%) rated each of these factors as important, with over two-thirds ascribing strong importance to each one (i.e. scores of 6-7), and over half providing the highest rating possible.

Comparatively speaking, the *number* of chemicals and the fact that people react differently to different chemicals were considered less important. Nevertheless, nearly three-quarters (73-74%) rated each of these as important. Perceptions that these factors were not important were relatively limited (3-12%).

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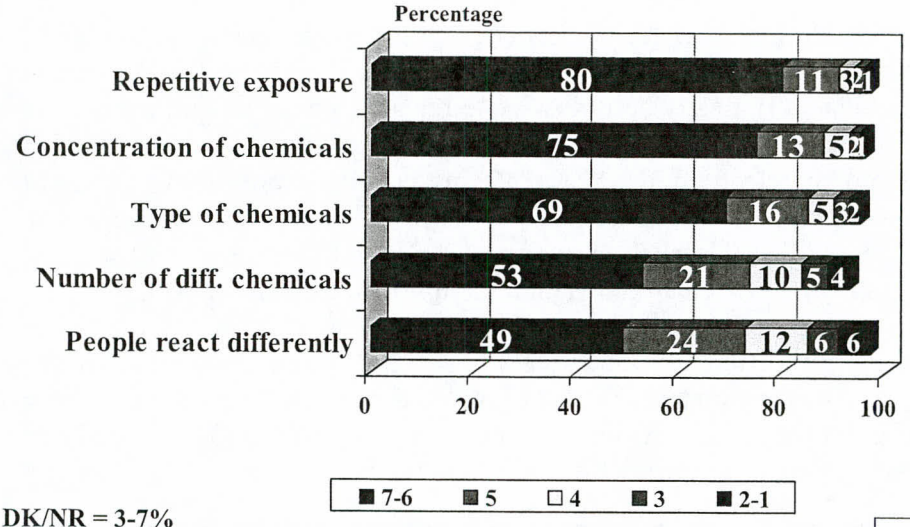
* Qs.29-33: *Exposure to chemicals in everyday life can have different impacts on people's health depending on the type of chemicals, the number or concentration of chemicals, and the degree of exposure to them. For example, exposure to car exhaust in a closed space can be fatal because of the* ***high concentration*** *of carbon monoxide. For each of the following, please tell me the extent to which you think that specific factor can have a negative impact on health, using a 7-point scale, where '1' means not important at all, and '7' means very important. How about...?*

Perceived Impact of Chemical Factors to Negatively Impact Health

(7-point scale; 7 = very important, 1 = not important at all)



DK/NR = 3-7%

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Qs.29-33

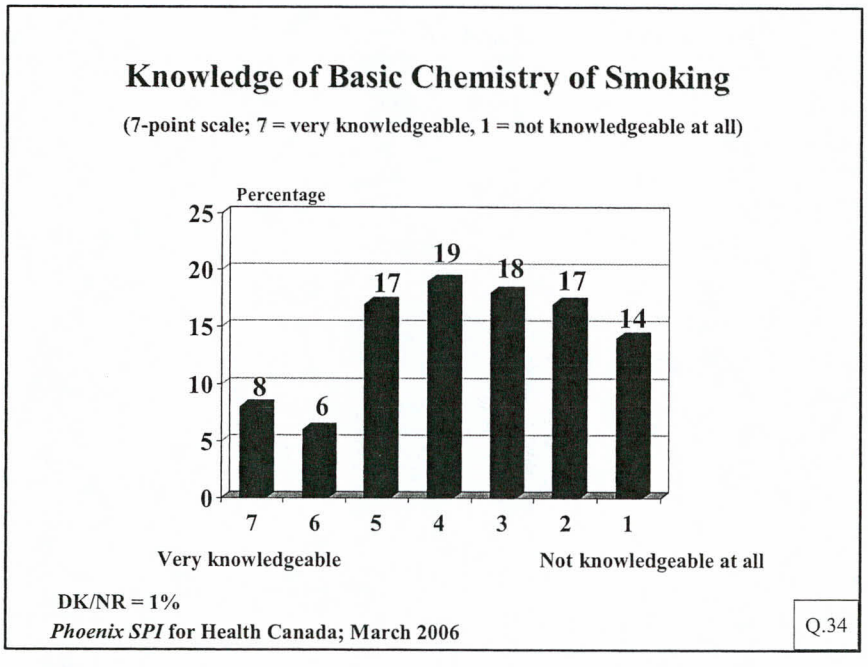
KNOWLEDGE OF CHEMISTRY OF SMOKING AND HEALTH IMPACT

This section reports on respondents' understanding and perceptions of chemistry as it relates specifically to smoking, as well as the impact on health.

Limited Knowledge of Chemistry Behind Cigarettes & Smoking

Most respondents think that their knowledge of the basic chemistry involved in cigarettes and smoking is limited. Using a 7-point scale (7 = very knowledgeable; 1 = not knowledgeable at all), nearly half (49%) rated themselves as having little-to-no knowledge in this area (scores of 3 or less). By contrast, less than one-third (31%) think they have at least moderate knowledge in this area (offering positive scores above the mid-point on the scale). Furthermore, they are more likely to view themselves as *moderately* (17%) not *very* knowledgeable (14%). Nearly one in five (19%) rated themselves at the mid-point of the scale, suggesting neither clear knowledge nor ignorance of the subject.

Looked at slightly differently, but in a way that still points to limited knowledge in this area, over half the respondents (54%) provided scores clustered around the mid-point of the scale (i.e. scores of 3-5). At the extremes, nearly one-third (31%) clearly think they are not knowledgeable in this area, while only 14% think they are.



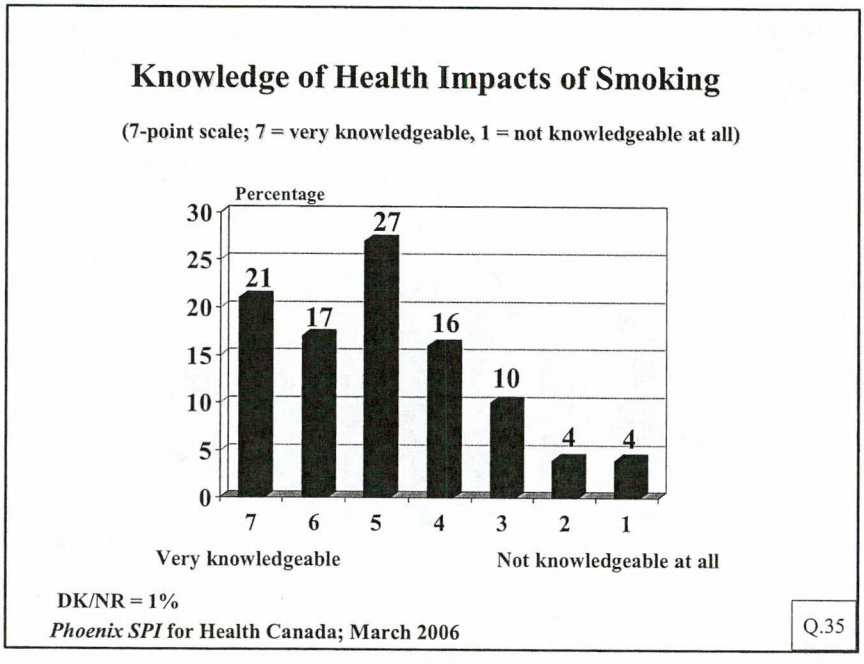
* Q.34: *How knowledgeable would you say you are about the basic chemistry involved in cigarettes and smoking? Please use a 7-point scale where '1' means not knowledgeable at all, and '7' means very knowledgeable.*

By a considerable margin, current smokers were the most likely to rate themselves as knowledgeable about the chemistry behind smoking (41% versus 32% of former smokers and 27% of never smokers). Never smokers were the most likely to see themselves as lacking knowledge in the area (52% versus 41-47% of others).

Perceived Knowledge of Chemistry Behind Cigarettes & Smoking			
	Current smokers %	**Former smokers** %	**Never smokers** %
Knowledgeable (scores of 5-7)	41	32	27
Neutral (score of 4)	17	20	20
Not knowledgeable (scores of 1-3)	41	47	52

Most Claim at Least Moderate Knowledge About Health Impacts of Smoking

Using the same scale, nearly two-thirds rated themselves as at least moderately knowledgeable about the *health impacts* of smoking. Moreover, those who consider themselves knowledgeable are more likely to think they are *very* (38%) as opposed to *moderately* knowledgeable about this (27%). The rest were almost evenly divided between those who think they are neither knowledgeable nor lacking in knowledge (16%) and those who think they know little or nothing about this (18%).



* Q.35: *How knowledgeable would you say you are about the health impacts of smoking? Please use a 7-point scale where '1' means not knowledgeable at all, and '7' means very knowledgeable.*

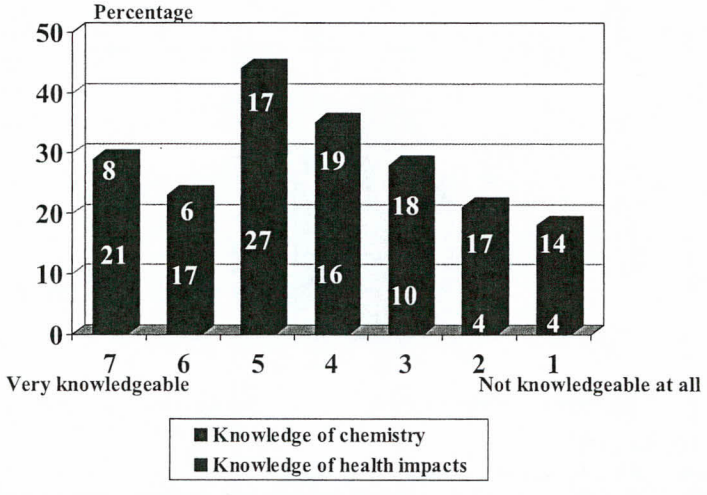
As was the case regarding knowledge of the chemistry behind cigarettes and smoking, current smokers were the most likely to rate themselves as knowledgeable about the health impacts of smoking (73% versus 67% of former smokers and 62% of never smokers). Never smokers were the most likely to rate themselves as lacking knowledge in this area (20% versus 17% of former smokers and 13% of current smokers).

Perceived Knowledge of Health Impacts of Smoking			
	Current smokers %	**Former smokers** %	**Never smokers** %
Knowledgeable (scores of 5-7)	73	67	62
Neutral (score of 4)	14	15	17
Not knowledgeable (scores of 1-3)	13	17	20

As the accompanying graph shows, respondents are much more likely to think they know about the health impacts of smoking than the basic chemistry behind it (65% versus 31%). Conversely, they are nearly three times more likely to think they know little-to-nothing about the basic chemistry involved in cigarettes and smoking (49% versus 18%) compared to the health impacts of smoking.

Knowledge of Chemistry vs. Health Impacts of Smoking

(7-point scale; 7 = very knowledgeable, 1 = not knowledgeable at all)



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Chemicals Linked to Harmful Effects of Smoking

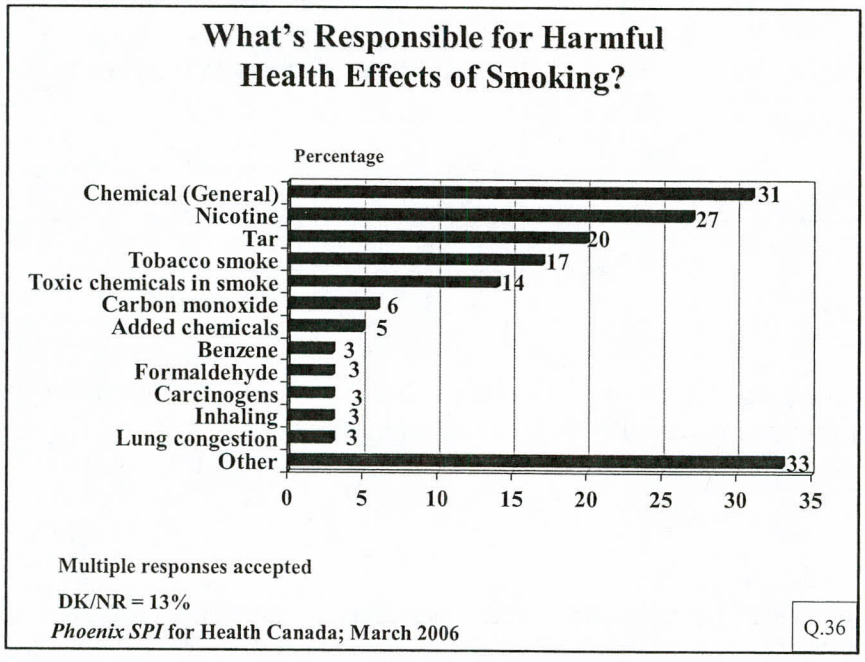
Respondents were most likely to identify chemicals as being responsible for the harmful health effects associated with smoking. Nearly one-third (31%) identified chemicals in general, followed at a distance by 14% who identified chemicals in tobacco smoke, and 5% who pointed to chemicals added to tobacco. Only two specific chemicals or chemical composites were identified frequently: nicotine (27%) and tar (20%) (multiple responses accepted). All other specific chemicals were identified by small numbers, including carbon monoxide (6%), benzene and formaldehyde (3% each). Small numbers (less than 2%) identified a number of other chemicals (see below).

The likelihood of identifying chemicals as being responsible for the harmful health effects associated with smoking was undoubtedly influenced, at least to some degree, by the focus on chemicals and chemistry in the preceding questions.

The only other source mentioned with any frequency was tobacco smoke (17%). Small numbers (3%) identified carcinogens, inhaling, and lung congestion.

Included in the 'other' category are a number of chemicals identified by 2% or less, including arsenic, hydrogen cyanide, benzo[a]pyrene, carbon dioxide, acetone, cadmium, and lead. Also included are long-term exposure, tobacco, addiction, additives, preservatives, the number of cigarettes smoked, the type of filter, and fertilizers.

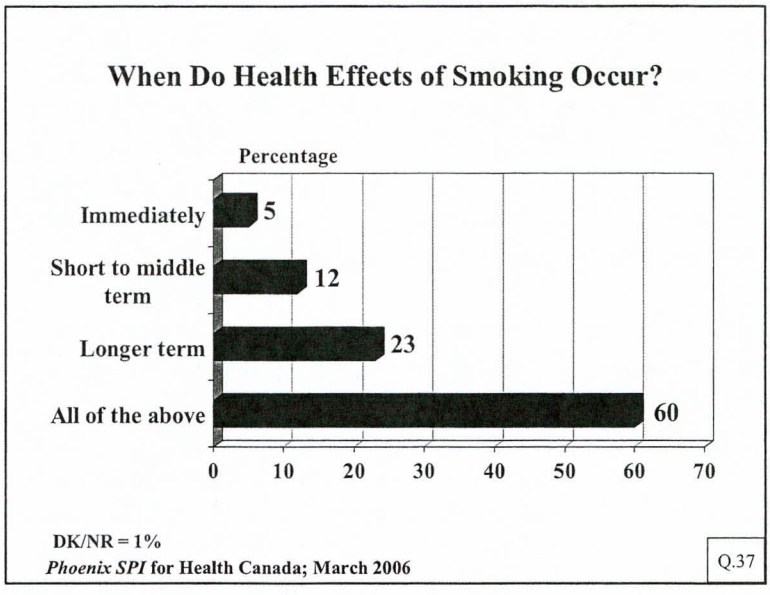
In total, 13% of respondents did not identify anything responsible for the harmful health effects associated with smoking.



* Q.36: *Smoking is associated with disease or harm to health. To the best of your knowledge,* ***what*** *is responsible for these harmful health effects associated with smoking? Anything else?* (DO NOT READ LIST; PROBE FOR AND ACCEPT MULTIPLE RESPONSES).

Most Think Harmful Health Effects of Smoking Occur Immediately to Longer Term

Most respondents (60%) believe that the health effects of smoking occur over a time frame that ranges from the immediate to the longer term (i.e. 20-25 years or more). However, almost one-quarter (23%) think the health effects occur over the longer term only, while 12% think they occur in the short-to-middle term, and 5% think they occur immediately.



Current smokers are the most likely to believe the health effects associated with smoking occur over the longer-term (30% versus 20-24% of others). For their part, former smokers and never smokers are more likely to think the health effects occur over a time frame that ranges from the immediate to the longer term (61-62% versus 53% of current smokers).

When do Health Effects of Smoking Occur?			
	Current smokers %	**Former smokers** %	**Never smokers** %
Immediately	5	3	6
Short to middle-term	9	11	13
Longer-term (20-25 years or more)	30	24	20
All of the above	53	62	61

A second knowledge index was created to identify the number of respondents who correctly/incorrectly answered questions regarding the health impacts of smoking. A total of three questions about the health impact of smoking could be answered correctly or incorrectly[3].

[3] **Health impacts of smoking knowledge index:** This measure indicates the level of knowledge concerning the health impacts of smoking. Variables included in this are: health effects/diseases caused by smoking (Q10); items responsible for the harmful health effects of smoking (Q36); and the timeframe for health effects that result from smoking (Q37).

* Q.37: *When do you think the health effects occur that result from smoking cigarettes? Is it...?* (READ LIST; ACCEPT ONE RESPONSE).

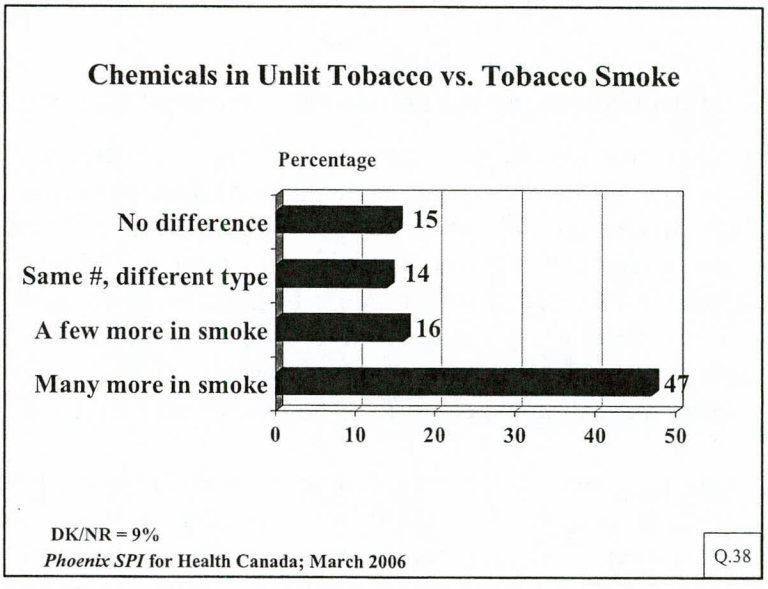
As can be seen in the table below, the vast majority of respondents (90%) answered at least two out of thee questions correctly. That said, fewer than half (49%) answered all three questions correctly.

Knowledge of Health Impacts of Smoking	
Number of questions	% who answered correctly
0	1%
1	9%
2	42%
3	49%

Never smokers and former smokers were more likely to answer all three questions correctly. A majority of each (51%) answered all three health-related questions correctly, compared to 42% of current smokers.

Most Think Tobacco Smoke Contains More Chemicals Than Unlit Tobacco

Nearly two-thirds of respondents think that there are more chemicals in tobacco smoke than in unlit tobacco. Moreover, those who think this are much more likely to think that tobacco smoke contains *many* more (47%) as opposed to a *few* more chemicals (16%). Almost equal numbers (14-15%) think unlit tobacco and tobacco smoke contain the exact same chemicals or the same number of chemicals but different types of chemicals.



* Q.38: *Is there a difference between the chemicals that are present in **unlit tobacco** and the chemicals in **tobacco smoke**? Which of the following statements comes closest to what you believe?*

There is no difference. It is the same chemicals in both.
There are the same number of chemicals, but different chemicals.
There are a few more chemicals in tobacco smoke than in unlit tobacco.
There are many more chemicals in tobacco smoke than in unlit tobacco.

Looked at another way, less than half (47%) correctly identified that tobacco smoke has many more chemicals than unlit tobacco.

With one notable exception, perceptions varied little based on smoking behaviour. However, current and former smokers were more likely to think there are many more chemicals in tobacco smoke than in unlit tobacco (52% each versus 43% of never smokers).

Number of Chemicals in Unlit Tobacco versus Tobacco Smoke			
	Current smokers %	**Former smokers** %	**Never smokers** %
No difference	13	14	16
Same number, different types	12	13	16
A few more chemicals in smoke	17	14	16
Many more chemicals in smoke	52	52	43

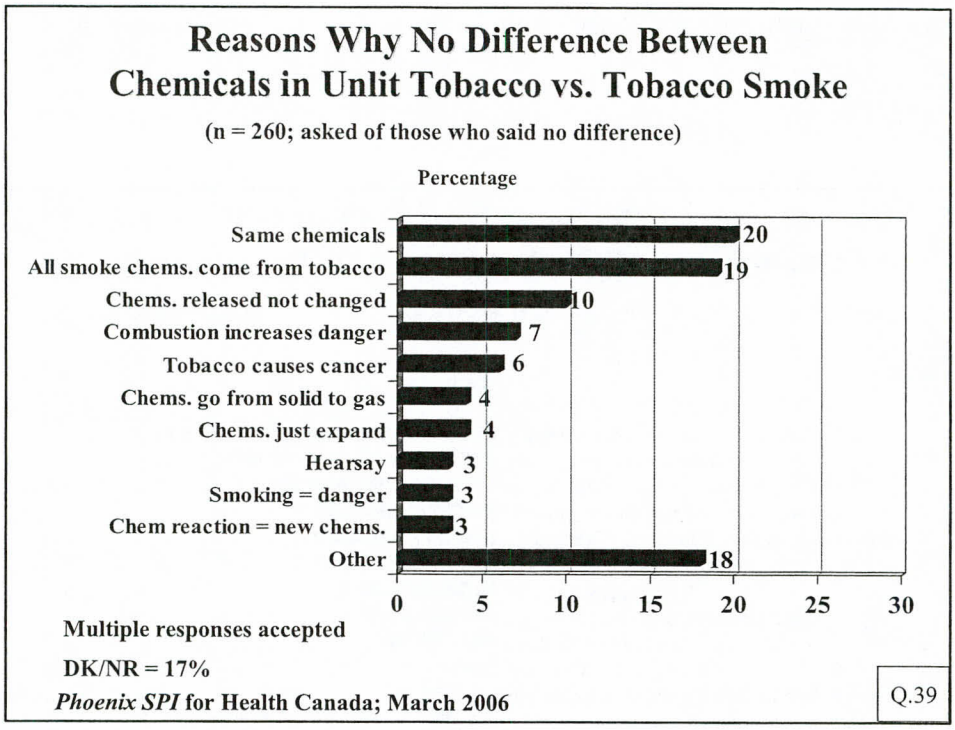
Reasons Underlying Perceptions of Number of Chemicals in Unlit versus Lit Tobacco

Respondents who believe there is no difference between the number of chemicals in unlit tobacco and tobacco smoke tended to appeal to the self-sameness of substances to explain their impression (i.e. substances cannot change their nature). One in five simply noted that it is the same chemicals in both, with almost as many (19%) simply noting that the chemicals in tobacco smoke come from cigarette tobacco (multiple responses accepted). Some were more specific, offering their views that the chemicals are released when the cigarette is lit but undergo no alteration (10%), that the only change is to physical form, passing from solid to gas (4%), or that the chemicals just expand/go up in smoke (4%).

Some suggested that a lit cigarette is more dangerous than an unlit one, although the chemicals themselves do not differ, believing that combustion increases the danger posed by cigarettes (7%), and that it is smoking the cigarette or exposure to the smoke that poses a risk (3%). Some (6%) said that tobacco itself, regardless of its form, is dangerous, noting that chewing tobacco (i.e. unlit tobacco) can also cause cancer. A small number (3%) appealed to hearsay, noting that they had heard or been told that there was no difference. A similar number (3%) seem to have been confused, suggesting that combustion does create new chemicals despite having indicated that there is no difference between the chemicals in unlit tobacco and in tobacco smoke.

Included in the 'other' category are perceptions that cigarettes cannot harm someone unless they are lit, that the chemicals are simply in higher concentration in cigarette smoke, that the danger is posed by nicotine, which is in both lit and unlit tobacco. Also included here are respondents who said they could not clearly articulate their impression.

In all, 17% said they did not know.



Respondents who believe that unlit tobacco and tobacco smoke contain the same number of chemicals but different types tended to fall into two groups. The largest proportion of these respondents, fully half, seem to have drawn attention to a difference in the *physical form* (i.e. solid versus gas) as opposed to a difference in the *type* of chemicals. In other words, the chemicals change their physical form, but do not change in number or in chemical composition. For example, it was suggested that all forms in which the chemicals in tobacco exist are dangerous (12%), that the chemicals change from solid to gas (10%), that the chemicals are released but do not change when the cigarette is lit (8%), that the chemicals in tobacco smoke merely expand or come from unlit tobacco (6% each), that it is exposure to smoke (as opposed to an unlit cigarette) that is dangerous (5%), and that the chemicals are in higher concentration in tobacco smoke (3%) (multiple responses accepted).

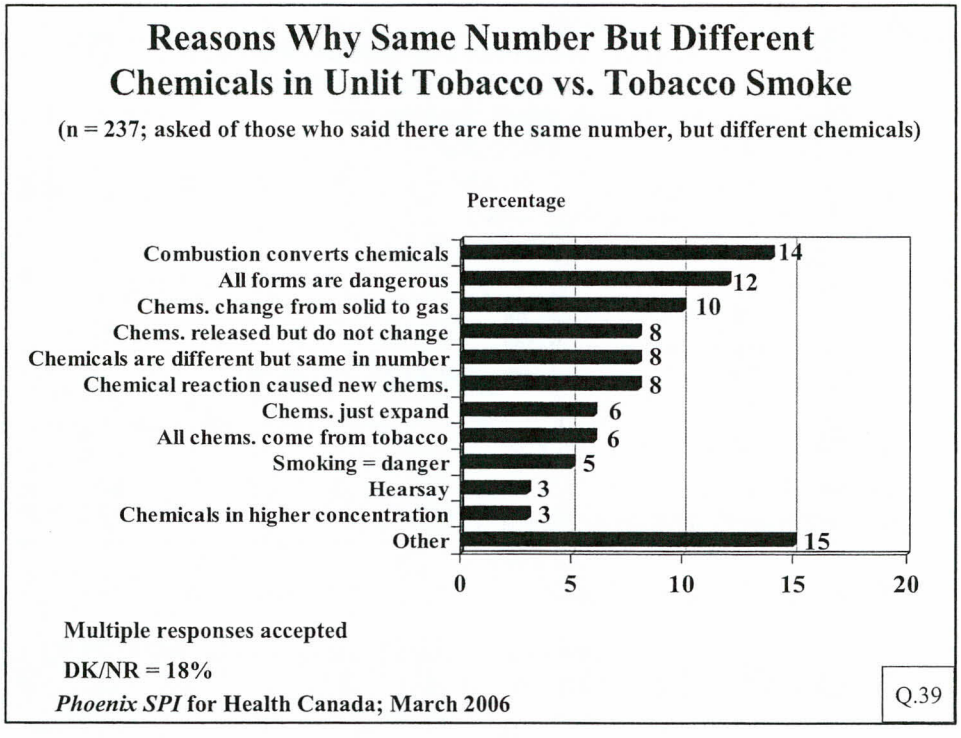
The second group, close to one-quarter, believe that the chemicals themselves (but not their number) are changed because combustion converts the chemicals (14%) or a chemical reaction causes new chemicals to form. (8%). Another 8% simply repeated, without explaining, that the chemicals are different but the same in number.

A small number (3%) appealed to hearsay to explain their impression (i.e. they had heard that cigarette smoke contains the same number of chemicals but different types than unlit tobacco). Included in the 'other' category are perceptions that cigarettes cannot harm you unless they are lit, that chewing tobacco and smoking tobacco contain the same number of

* Q.39: *Why do you think that?* (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES)

chemicals but different types, and that the mix of combustion and oxygen creates different chemicals. Also included are those who said they could not clearly articulate their impression.

In total, 18% said they did not know.

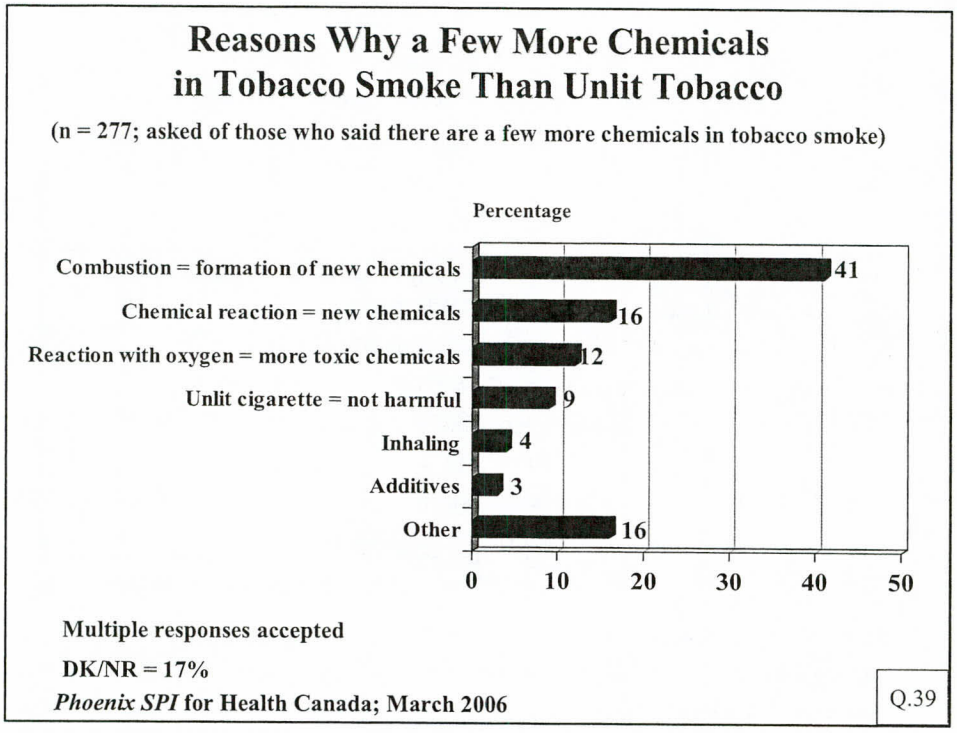


Respondents who think there are a few more chemicals in tobacco smoke than in unlit tobacco were most likely to refer to a chemical process to explain this difference. By far, the explanation offered most often was that combustion leads to the formation of new chemicals (41%). This was followed at a distance by the view that there is a formation of new chemicals through a chemical reaction (16%), and that the reaction with oxygen creates more harmful chemicals (12%) (multiple responses accepted).

Most of the rest focused on the difference in *physical form* (i.e. solid versus gas) as opposed to a difference in the *type* of chemical. For example, 9% said that an unlit cigarette is not dangerous, and 4% that inhaling smoke was what posed a threat. A few (3%) referred to additives (e.g. fertilizer, humectants) that are activated when the cigarette is lit. Included in the 'other' category are hearsay, information provided by colleagues, friends, family members, references to the type of cigarette smoked (i.e. regular versus mild), and references to filter types.

In all, 17% said they did not know.

* Q.39: *Why do you think that?* (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES).

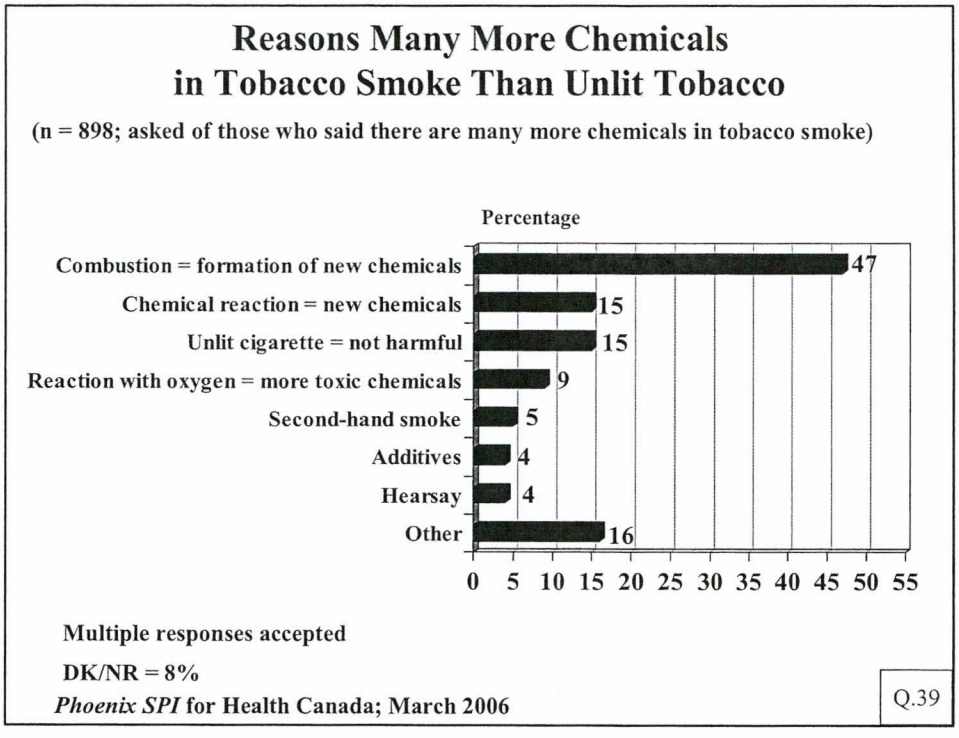


Respondents who think there are many more chemicals in tobacco smoke than in unlit tobacco focused on the same explanations as those who think there are only a few more. Once again, the most frequently-given explanation, by far, was that combustion leads to the formation of new chemicals (47%), followed at a distance by the view that there is a formation of new chemicals through a chemical reaction (15%), and that the reaction with oxygen creates more harmful chemicals (9%) (multiple responses accepted).

Most of the rest again focused on the difference in physical form (i.e. solid versus gas) as opposed to an actual difference in the type of chemical. For example, 15% said that an unlit cigarette is not harmful or dangerous, and 5% referred to second-hand smoke (with an emphasis on the fact that the chemicals in it affect many people). A few (4% each) referred to hearsay or to additives (e.g. fertilizer, humectants). Included in the 'other' category are information provided by colleagues, friends, family members, references to common sense, and perceptions that it depends on the type of cigarette smoked.

Eight percent did not provide a response.

* Q.39: *Why do you think that?* (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES).



Few Correctly Identify Number of Chemicals in Unlit Tobacco and/or Smoke

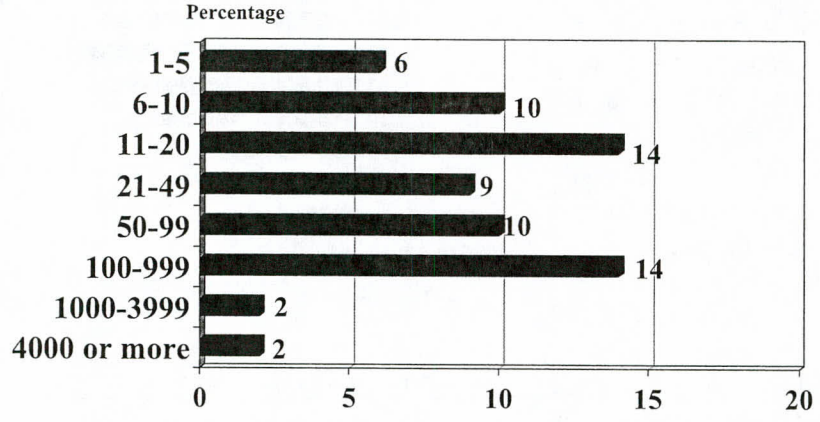
Regardless of the relationship they perceive between the number of chemicals in cigarette tobacco and cigarette tobacco smoke, the vast majority of respondents vastly underestimate or do not know the number of chemicals in either.

Respondents who think there is little or no difference in the number of chemicals in cigarette tobacco and tobacco smoke were asked how many chemicals they think there are in both (i.e. cigarette tobacco and cigarette tobacco smoke). In response, nearly one-third (32%) said they did not know. Among the two-thirds who did offer an estimate, nearly all of them (64%) offered numbers or estimates well below the correct number. As the accompanying graph shows, only 4% offered responses that fell into the correct range for the number of chemicals in cigarette tobacco (i.e. 1,000-3,999) or cigarette tobacco smoke (4,000 or more). Moreover, there is no prevailing opinion or perspective on this issue, with relatively small numbers (6-14%) spread across the various number ranges. Clearly, there was a lot of guessing taking place, and little-to-no actual understanding of the number of chemicals in either or both unlit and lit tobacco.

* Q.39: *Why do you think that?* (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES).

Number of Chemicals in Tobacco and Smoke

(n = 774; asked of those who said no difference, same number and a few more)



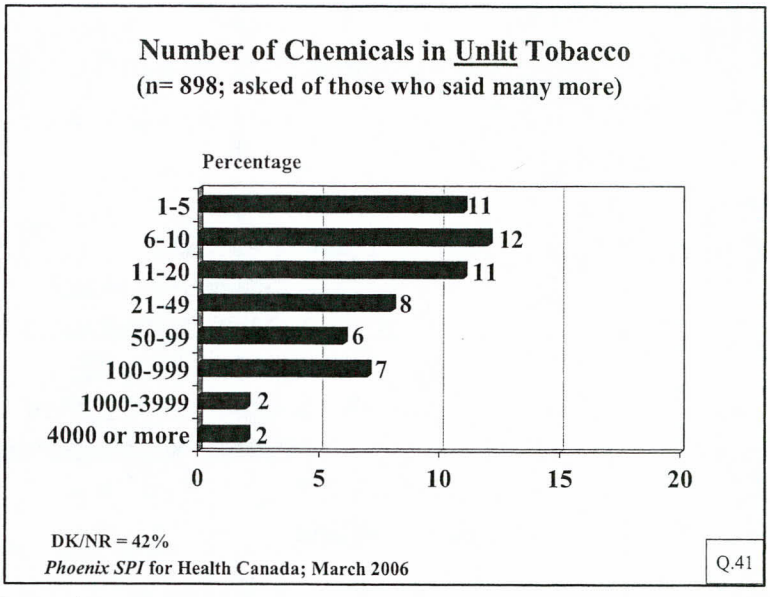
DK/NR = 32%

***Phoenix SPI* for Health Canada; March 2006**

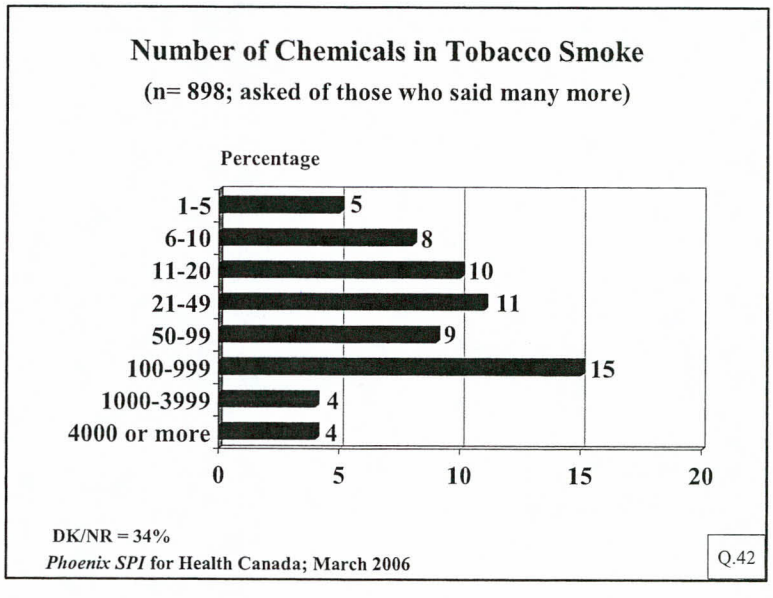
Q.40

* Q.40: *As far as you know, approximately how many chemicals are there in cigarette tobacco and cigarette tobacco smoke?* (DO NOT READ LIST; ACCEPT RANGES AND PLACE IN CLOSEST PRE-CODED CATEGORY; IF RESPONDENT SAYS 'DON'T KNOW' ENCOURAGE GUESSES: ADD *'Could you please give us your best estimate?'*).

This same pattern is evident among respondents who think that cigarette tobacco smoke contains many more chemicals than cigarette tobacco. When asked to identify the number of chemicals respectively in cigarette tobacco and tobacco smoke, the largest single proportions (34-42%) said they did not know, with most of the rest offering numbers or estimates well below the correct number. Very few (2-4%) estimated either number correctly, with relatively small numbers (5-15%) spread across the various number ranges.



The numbers who said they did not know (32-42%) take on added significance because respondents who said they did not know were encouraged to offer their best estimate. In other words, a substantial minority of respondents felt so uncertain about the number of chemicals in cigarette tobacco and/or tobacco smoke that they were unwilling even to venture a guess at the number.



* Q.41: *As far as you know, approximately how many chemicals are there in **unlit** cigarette tobacco?* (DO NOT READ LIST; ACCEPT RANGES AND PLACE IN CLOSEST PRE-CODED CATEGORIES; IF RESPONDENT SAYS 'DON'T KNOW' ENCOURAGE GUESSES: ADD *'Could you please give us your best estimate?'*).

Q.42: *And approximately how many chemicals are there in cigarette tobacco **smoke**?* (DO NOT READ LIST; ACCEPT RANGES AND PLACE IN CLOSEST PRE-CODED CATEGORIES; IF RESPONDENT SAYS 'DON'T KNOW' ENCOURAGE GUESSES: ADD *'Could you please give us your best estimate?'*).

Perceived Health Impacts of Carbon Monoxide & Nicotine

There is relatively limited awareness of the specific health impacts of carbon monoxide in cigarette smoke. Respondents were informed that carbon monoxide is a chemical in cigarette smoke and were asked in an open-ended way about its impact on health. Relatively few correctly linked its effect to reducing the delivery of oxygen to those parts of the body most in need of it (i.e. heart, brain, skeletal muscles). In total, only 9% noted (correctly) that it reduces the flow of oxygen in the body, while 4% noted that it can cause brain damage or heart disease. An additional 7% were somewhat correct in noting that it can cause blood circulation problems (multiple responses accepted).

By far, the health effect associated most often with carbon monoxide, mentioned by one-third of respondents, was death or premature death. This relatively widespread perception is no doubt linked to awareness of carbon monoxide's potentially fatal effect when inhaled in the form of automobile exhaust in a closed space. A number of respondents linked carbon monoxide to breathing-related problems, including respiratory problems in general (15%), lung disease (8%), asthma (3%), and emphysema (2%).

Approximately one in ten identified cancer, either lung cancer (5%) or cancer in general (4%) as caused by carbon monoxide. Small numbers (3% or less) identified loss of energy, air pollution, and dizziness/nausea. Some identified health impacts in general, noting that it is bad for you (9%) or that it can cause many diseases (4%). Included in the 'other' category are headaches, stroke, bronchitis, coughing, allergies, high blood pressure, gum disease, wrinkles, addiction, impotence, reduced growth of babies during pregnancy, and yellow teeth. In total, 17% were not able to identify any health impact.

Perceived Health Impacts of Carbon Monoxide

Effect/Disease	%	Effect/Disease	%
Premature death	33%	Brain damage	4%
Respiratory problems	15%	Heart disease	4%
Reduces oxygen in body	9%	Many diseases	4%
Bad for you	9%	Asthma	3%
Lung disease	8%	Loss of energy	3%
Blood circulation problems	7%	Emphysema	2%
		Air pollution	2%
Lung cancer	5%	Dizziness/nausea	2%
Cancer in general	4%	Other	17%

Multiple responses accepted
DK/NR = 17%
***Phoenix SPI* for Health Canada; March 2006**

Q.43

* Q.43: ***Carbon monoxide*** *is a chemical that is in cigarette smoke. To the best of your knowledge, what impact does carbon monoxide have on human health? Anything else?* (DO NOT READ LIST; PROBE/ACCEPT MULTIPLE RESPONSES).

By comparison, respondents were much more likely to be able to correctly identify a specific health impact of nicotine. As was the case with carbon monoxide, respondents were asked in an open-ended way about nicotine's impact on health (after being told that it is a chemical in both unlit tobacco and tobacco smoke). In response, nearly half (46%) correctly identified nicotine as being responsible for causing addiction to cigarettes.

All other specific health impacts were mentioned much less frequently (10% or less). That said, nearly one in five mentioned cancer in one form or another, including cancer in general (10%), lung cancer (7%), and oral cancer (2%) (multiple responses accepted). Almost as many linked nicotine to breathing-related problems, including lung disease (9%), respiratory problems in general (4%), emphysema (2%) and asthma (2%).

Approximately one in ten linked nicotine to problems related to the cardiovascular system, including heart disease (7%) and blood circulation problems (4%). Small numbers (5% or less) identified its effect on appearance, premature death, high blood pressure, and its effect as a stimulant. Some identified health impacts in general, noting that it is bad for you (7%) or that it can cause many diseases (4%). Included in the 'other' category are bad breath, loss of energy, mouth disease, brain damage, bronchitis, strokes, headaches, allergies, hardening of the arteries, premature birth, dizziness/nausea, and reduced growth of babies during pregnancy. In all, 15% were not able to identify any health impact.

Perceived Health Impacts of Nicotine

Effect/Disease	%
Addiction	46%
Cancer in general	10%
Lung disease	9%
Heart disease	7%
Lung cancer	7%
Bad for you	7%
Effect on appearance	5%
Premature death	5%

Effect/Disease	%
Respiratory problems	4%
Blood circulation problems	4%
Many diseases	4%
High blood pressure	3%
Emphysema	2%
Asthma	2%
Oral cancer	2%
Stimulant	2%
Other	23%

Multiple responses accepted
DK/NR = 15%
Phoenix SPI for Health Canada; March 2006

Q.44

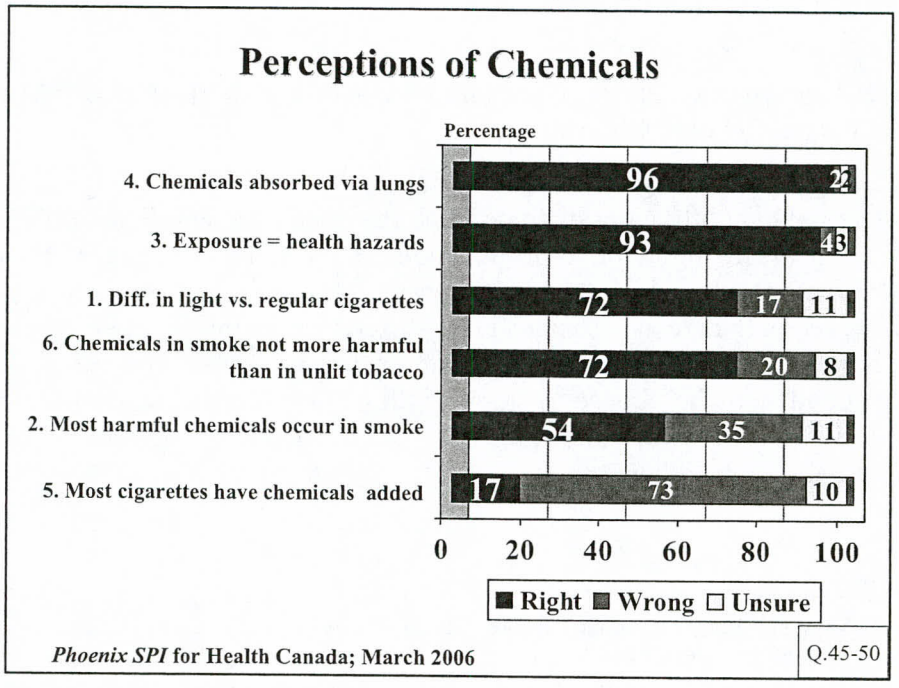
* Q.44: ***Nicotine*** *is a chemical that is in unlit tobacco and cigarette smoke. To the best of your knowledge, what impact does nicotine have on human health? Anything else?* (DO NOT READ LIST; PROBE/ACCEPT MULTIPLE RESPONSES).

Uneven Knowledge of Smoking-Related Chemistry

Consistent with other findings in this survey, respondents' knowledge of issues related to the chemistry of cigarettes and cigarette smoke tends to be uneven. They were asked to identify whether the following statements were true or false:

1. There is a significant difference in the number of chemicals in light or mild versus regular cigarettes.
2. Most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco, and are not present in unlit tobacco.
3. Exposure to the chemicals in tobacco smoke is responsible for the health hazards associated with smoking.
4. When you breathe in tobacco smoke, the smoke goes into your lungs, where some of the chemicals are absorbed and transferred to the blood.
5. Most of the chemicals found in cigarettes have been added by tobacco manufacturers.
6. The chemicals in tobacco smoke are not more harmful than the chemicals in unlit tobacco.

While majorities hold correct perceptions for all but one of these issues, the size of the majority varied considerably. Nearly all respondents knew that chemicals that are breathed in are absorbed and transferred to the blood (96%) and that it is exposure to the chemicals in tobacco smoke that is responsible for the health hazards (93%). Noticeably fewer, but a substantial number nonetheless (72% each), knew that that there is no significant difference in the number of chemicals in cigarette brands with descriptors on the package such as "light" or "mild" versus regular cigarette brands and that the chemicals in tobacco smoke are more harmful than the chemicals in unlit tobacco.



* Qs. 45-50: *Please tell me whether you think the following statements are true or false. If you are unsure about something, please just say so.* (READ AND ROTATE STATEMENTS).

Just over half (54%) knew that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco. Just over one-third (35%) said this was false and 11% did not know.

Most respondents hold misperceptions regarding whether or not tobacco manufacturers add chemicals to cigarettes. Nearly three-quarters (73%) believe that most of the chemicals found in cigarettes have been added by tobacco manufacturers. Only 17% said this is false.

A third knowledge index was created to identify the number of respondents who correctly or incorrectly answered questions regarding the chemistry behind smoking. A total of 13 questions about the chemistry behind smoking could be answered correctly or incorrectly[4].

Almost two-thirds (65%) answered more than half of these questions correctly. That said, relatively few (16%) answered over three-quarters of the questions correctly (10 or more). Over one-third (36%) answered fewer than half of the questions correctly.

Knowledge of Chemistry Behind Smoking	
Number of questions	% who answered correctly
6 or less	36%
7-9	49%
10 or more	16%

Current and former smokers were more likely to answer a majority of these questions correctly (71% of former smokers and 67% of current smokers versus 59% of never smokers).

Perceived Difference in Chemical Content of Cigarette with "Light" or "Mild" Descriptors versus Regular Cigarettes

Respondents who smoke a cigarette brands with descriptors on the package such as "light" or "mild" were only slightly more likely to think that there is a significant difference in the number of chemicals in "light" or "mild" as opposed to regular cigarettes (24% vs. 22% of those who smoke regular cigarettes). Conversely, they are only slightly less likely to correctly believe that there is no significant difference in the number of chemicals in "light" or "mild" as opposed to regular cigarettes (69% vs. 73%). This raises the question as to why respondents who choose to smoke a "light" or "mild" brand of cigarette do so since they do not appear to see any difference in the chemical composition of "light" or "mild" versus regular cigarettes brands.

[4] **Chemistry behind smoking knowledge index:** This measure indicates the level of knowledge of the chemistry behind smoking. Variables included in this are: difference between the chemicals in unlit tobacco and tobacco smoke (Q38); a series of true/false statements concerning smoking chemistry (Q45 through to Q50); where the toxic chemicals in tobacco smoke come from (Q51); and a series of awareness questions on facts about the chemistry behind smoking (Q52 through to Q56).

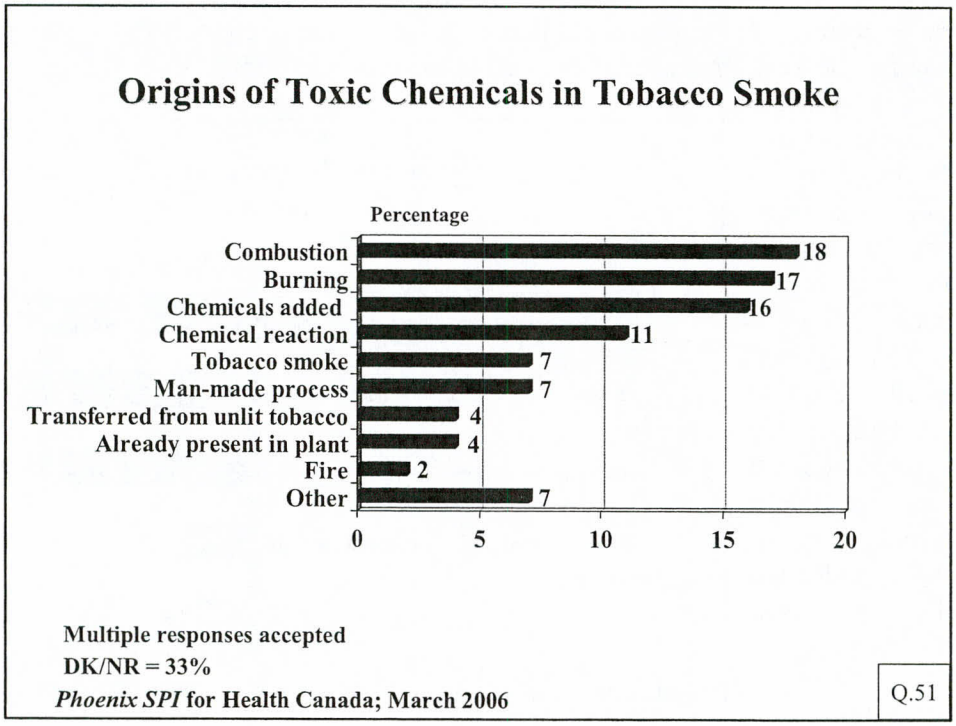
Combustion/Burning – Identified Most Often as Source of Chemicals in Smoke

After being informed that there are many more chemicals in tobacco smoke compared to unlit tobacco, respondents were asked where the toxic chemicals in tobacco smoke come from. In response, the largest single proportion (33%) said they did not kno

Those who did offer an opinion were more likely to provide a correct answer, though with various degrees of precision. For example, over one-third (37%) identified the combustion process in one way or another – almost equal numbers identified combustion specifically (18%) or burning more generally (17%), with a few identifying fire (2%). Approximately one in ten (11%) identified a chemical reaction.

Most of the other explanations point to an inability to clearly distinguish between the nature of unlit tobacco and tobacco smoke, even once this distinction has been identified. For example, nearly one-quarter indicated that the chemicals in tobacco smoke are added (16%) or man-made (7%), which suggests that they were already contained in the unlit tobacco. Smaller and equal numbers (4% each) suggested that the chemicals are transferred from the unlit tobacco or are already present in the tobacco plant.

Some simply noted that the chemicals come from the tobacco smoke (7%). Included in the 'other' category are nicotine, tar, the filter, the cigarette paper itself, and inhaling the chemicals.



* Q.51: *In fact, there are many more chemicals in tobacco* ***smoke*** *compared to* ***unlit*** *tobacco. To the best of your knowledge,* ***where*** *do the toxic chemicals in tobacco smoke come from?* (DO NOT READ LIST; PROBE FOR AND ACCEPT MULTIPLE RESPONSES)

INFORMATION ON BASIC CHEMISTRY BEHIND SMOKING

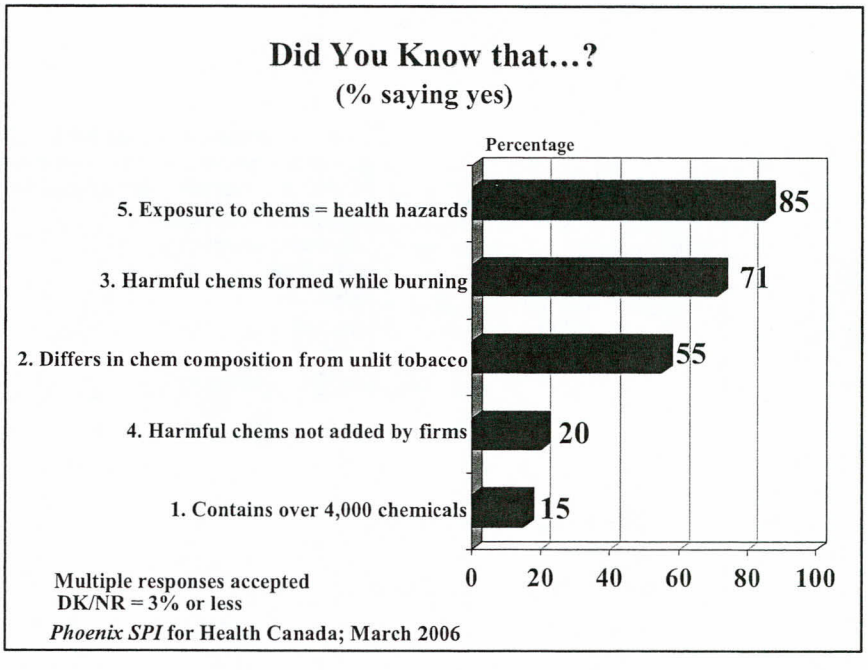
This section reports on respondents' perceptions of information on the basic chemistry behind smoking, including the sources of information they would trust the most, the most useful type of information, and their preferences for receiving this information.

Awareness of Chemistry-Related Information Varies

The extent to which respondents had prior knowledge about basic information on the chemistry behind smoking varied considerably. They were read a number of true statements and, for each one, were asked if this was new information to them or not. Note that what is being measured is awareness of the information (i.e. is it new to them?). The statements that were assessed were:

1. Cigarette tobacco smoke contains over 4,000 chemicals.
2. There is a significant difference between the chemical composition of unlit tobacco and tobacco smoke.
3. Most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco.
4. Harmful chemicals in cigarettes are not added by tobacco manufacturers.
5. It is exposure to the chemicals in tobacco smoke that is responsible for the health hazards associated with smoking.

There was widespread prior awareness that exposure to the chemicals in tobacco smoke is responsible for the health hazards associated with smoking (85%). A smaller but still large majority (71%) said they already knew that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco. While a majority (55%) said they knew that there is a significant difference between the chemical composition of unlit tobacco and tobacco smoke, 43% indicated that this was new information to them.



* Qs.52-56: *I'd like to read you a number of true statements, and would like to know whether each one is new information for you. Did you know that...?* (READ/ROTATE LIST; ACCEPT YES/NO RESPONSE FOR EACH; PROBE FOR 'YES' OR 'NO'; IF RESPONDENT SAYS 'DON'T KNOW' RECORD AS 'NO' SIGNIFYING THAT THIS IS NEW INFORMATION).

Without questioning the validity of these results, a certain amount of caution should be exercized when interpreting them. Qualitative research on these same issues revealed that some of the people who hold these views do so on the basis of a distinction between an unlit and a lit cigarette and the assumption that only when a cigarette is lit can it harm you. In other words, some of the people who claim to be aware of this basic chemistry-related information may base their knowledge on a distinction between a lit and an unlit cigarette, not between the *actual* chemicals in a lit versus an unlit cigarette. As such, it is possible that respondents' beliefs that exposure to chemicals in tobacco smoke is responsible for the health hazards, that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco, and that there is a significant difference between the chemical composition of unlit tobacco and tobacco smoke may not reflect any real understanding of the chemicals in cigarettes.

The other two information items provided to respondents constituted new information to a substantial majority of them. Fully 84% said they did not know that cigarette tobacco smoke contains over 4,000 chemicals (15% said they knew this), and 79% did not know that harmful chemicals in cigarettes are not added by tobacco manufacturers (20% said they knew this). Both results corroborate earlier findings in the survey. Recall that the vast majority of respondents did not know or vastly underestimated the number of chemicals in cigarette tobacco smoke when asked about this. Similarly, 73% had indicated earlier that they believe that most of the chemicals found in cigarettes have been added by tobacco manufacturers. While the specific numbers do not match, the overall direction of the findings in each of these areas is consistent with responses to earlier questions in the survey.

Self Assessments vs. Objective Testing

To better understand the *accuracy* of respondents' self-assessments of their knowledge levels in the various areas (i.e. basic knowledge of chemistry, knowledge of the chemistry behind smoking, and knowledge of the health impacts of smoking), their self-assessments were compared with the three knowledge indices that were developed for this study. Overall, there is a relatively good correspondence between respondents' self-assessments and their actual knowledge exhibited in the areas explored in this survey.

Perception and reality were most likely to coincide in relation to knowledge of basic chemistry. The likelihood of correctly answering a substantial number of questions (three-quarters or more) in this area increased noticeably as perceived knowledge of such issues increased, from 27% of those who rated themselves as not knowledgeable in this area to 51% of those who rated themselves as at least moderately knowledgeable. In other words, respondents' self-assessments regarding their knowledge of basic chemistry tended to be confirmed objectively.

While differences regarding perceived and real knowledge in the other two areas were much smaller, a similar pattern was evident. The likelihood of correctly answering at least 10 questions about chemistry as it relates to smoking increased slightly as perceived knowledge of such issues increased, from 13% of those who rated themselves as not knowledgeable to 19% of those who rated themselves as knowledgeable in this area.

Looked at another way, the likelihood of correctly answering few questions (six or less) was noticeably higher (42%) among those who rated themselves as not knowledgeable, compared to those who rated themselves as knowledgeable (32%).

Finally, this same pattern was evident with respect to knowledge about the health impacts of smoking. The likelihood of correctly answering all three questions about the health impacts of smoking increased with self-assessed knowledge, from 40% to 51%. As well, the likelihood of answering only one question correctly (or none) was much higher (19%) among those who rated themselves as not knowledgeable compared to those who saw themselves as knowledgeable (7%).

In short, there is a relationship or correspondence between self-assessed and actual knowledge. This relationship is strongest with respect to knowledge about basic chemistry, and is less strong in the other two areas.

Info on Smoking Chemistry Viewed as Important, Particularly for Canadians, Less So for Respondents

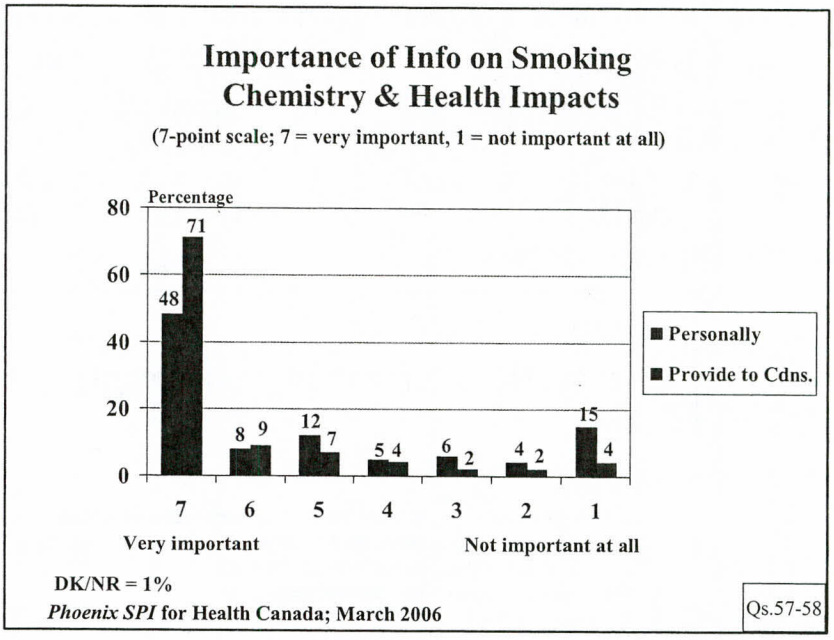
The vast majority of respondents (87%) think it is important to provide Canadians with information on the chemistry behind smoking and its impacts on health to help them make an informed choice about smoking (using a 7-point scale: 7 = very important; 1 = not important at all). Moreover, fully 71% attribute the highest importance possible to this (i.e. score of 7). Relatively few (8%) attribute little or no importance to this.

Former smokers and never smokers were more likely to consider such information to be important to Canadians (87-90% versus 81% of current smokers).

Perceived Importance to Canadians of Information on Chemistry Behind Smoking and its Health Impact

	Current smokers %	Former smokers %	Never smokers %
Important (scores of 5-7)	81	87	90
Neutral (score of 4)	6	4	3
Not important (scores of 1-3)	11	9	6

Such information was considered to be less important to respondents themselves. Using the same scale, just over two-thirds (68%) attributed personal importance to this information (48% attributed the highest importance possible to it). One-quarter attributed little or no personal importance to this information.



Perceptions of the personal importance of such information do not vary much according to smoking behaviour. Perhaps not surprisingly, never smokers are slightly less likely to consider this information as personally important to them. Because they do not smoke and never have, the information may be less relevant to them personally.

Perceived Importance to Respondent of Information on Chemistry Behind Smoking and its Health Impact

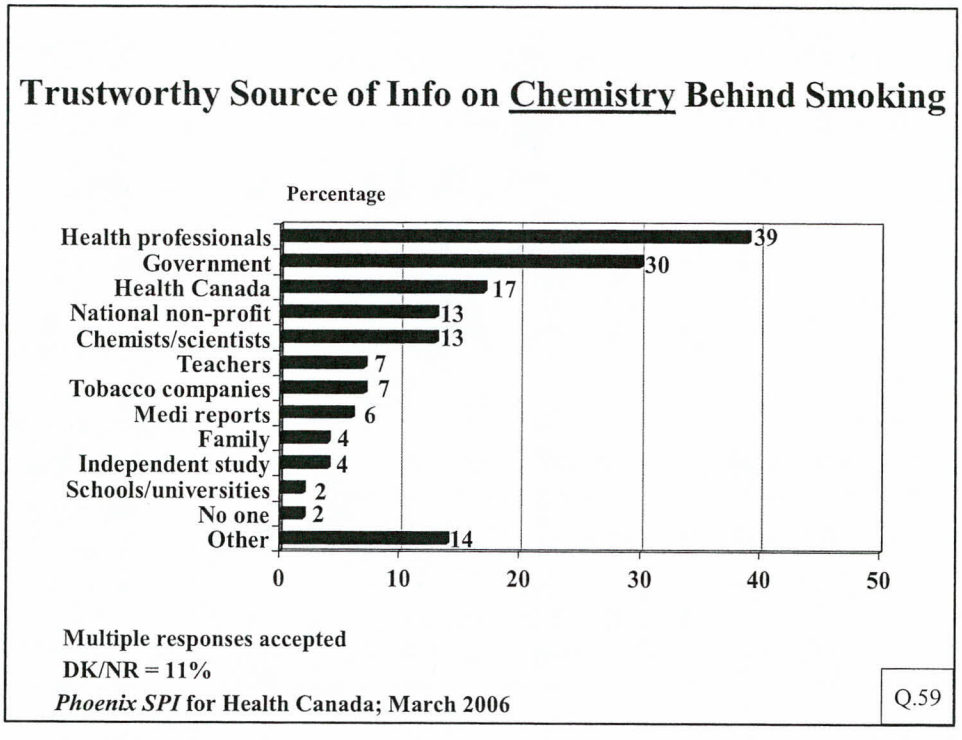
	Current smokers %	Former smokers %	Never smokers %
Important (scores of 5-7)	69	72	67
Neutral (score of 4)	8	4	5
Not important (scores of 1-3)	22	23	26

* Q.57: *Do you think it's important to provide Canadians with information on the chemistry behind smoking and its impacts on health to help people make an informed choice about smoking? Please use a 7-point scale, where '1' means you think it is not important at all, and '7' means very important.*

Q.58: *How important is this type of information to you personally? Please use the same 7-point scale, where '1' means not important at all, and '7' means very important.*

Most Trusted Sources of Information – Health Professionals & Government

Health professionals lead the way in terms of groups that respondents would trust for relevant information about the chemistry behind smoking (39%). This was followed by government in general (30%) and Health Canada in particular (17%) (multiple responses accepted). Also identified relatively frequently were national non-profit organizations and chemists/scientists (13% each). Similar numbers (6-7%) identified teachers, tobacco companies and the media.



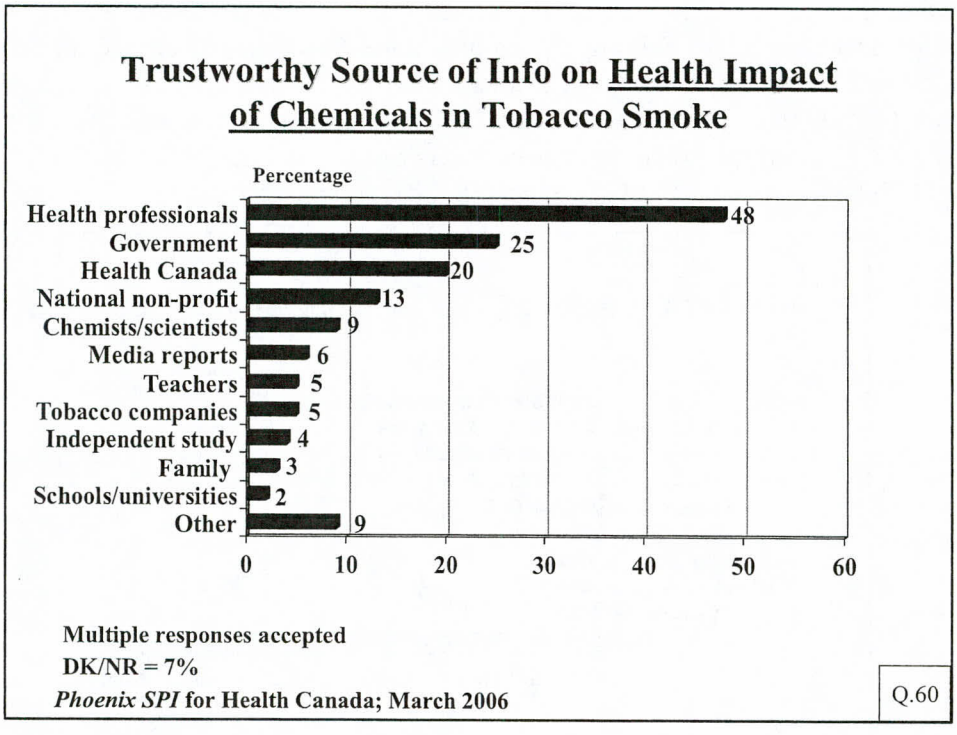
Small numbers (4% or less) identified family members, independent studies, and schools or universities. A few (2%) said they would not trust anyone. Included in the 'other' category are friends and colleagues, former smokers, anyone but tobacco companies, libraries/books, and themselves (i.e. based on their own research).

* Q.59: *Who would you trust to provide you with relevant information about the **chemistry behind smoking**?* (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES).

Former smokers and never smokers were much more likely to trust government as a source of information. They were also more likely to trust Health Canada specifically, as well as national non-profit organizations.

Most Trusted Source of Information About Chemistry Behind Smoking			
	Current smokers %	Former smokers %	Never smokers %
Health professionals	36	43	37
Government	19	33	33
Health Canada	13	18	18
National non-profit organizations	9	14	15
Chemists/scientists	11	12	14

The same main sources were identified, in the same order, as being trustworthy to provide information on the health impacts of chemicals in tobacco smoke. Leading the way were health professionals (48%), followed at a distance by government (25%), Health Canada (20%), national non-profit organizations (13%), and chemists/scientists (9%) (multiple responses accepted).



Similar numbers (5-6%) identified media reports, teachers, and tobacco companies. Small numbers (4% or less) identified independent studies, family members, and schools or universities. Included in the 'other' category are people who have experienced health-

* Q.60: *Who would you trust to provide you with information on the **health impact of chemicals in tobacco smoke**?* (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES).

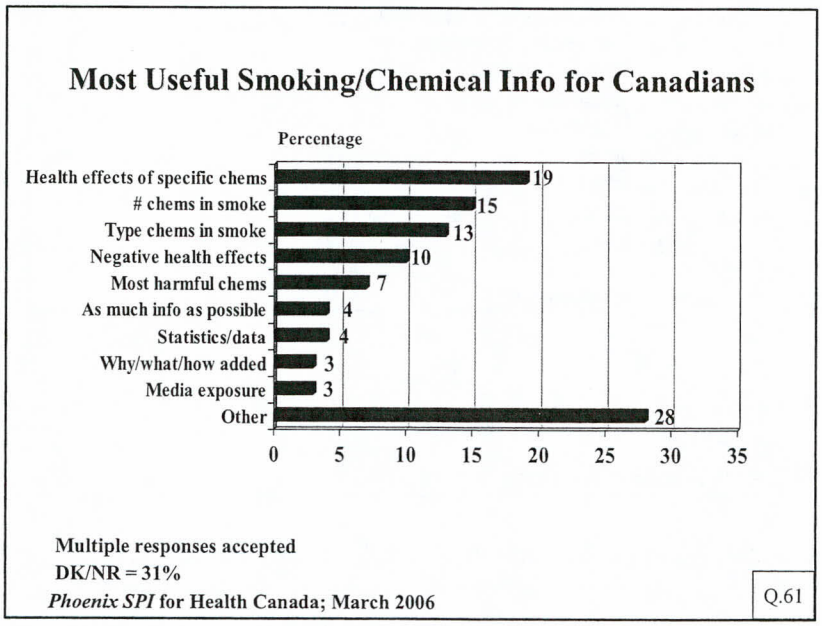
related smoking problems, books, friends and colleagues, anyone but tobacco companies, and anyone but government.

Once again, former smokers and never smokers were more likely to trust government and Health Canada as sources of information, as well as national non-profit organizations.

Most Trusted Source of Information About Health Impact of Chemicals in Smoke			
	Current smokers %	**Former smokers** %	**Never smokers** %
Health professionals	48	51	47
Government	18	26	27
Health Canada	16	21	21
National non-profit organizations	8	16	13
Chemists/scientists	9	8	11

Health Effect of Chemicals – Most Useful Info for Making Informed Choice

Information on the health impact of chemicals was identified most often as the type of information most useful in helping Canadians make an informed choice about smoking. Over one-third identified this type of information, including the health effects of specific chemicals (19%), the negative health effects of smoking (10%), and the most harmful chemicals (7%) (multiple responses accepted). Substantial numbers also identified the number (15%) and type (13%) of chemicals in tobacco smoke.



* Q.61: *What **type** of chemical information do you think would be most useful in helping Canadians make an informed choice about smoking?* (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES).

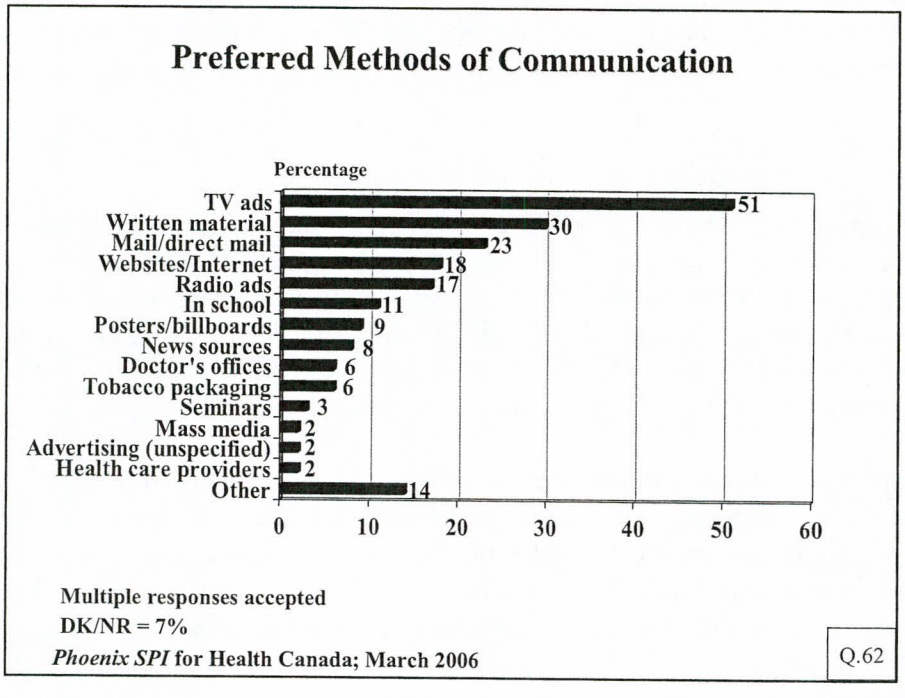
Small numbers (4% or less) identified 'any and all information', statistics and unspecified data, as well as information on how chemicals are added to tobacco. The latter was identified despite the fact that respondents had been informed earlier that harmful chemicals were not added to tobacco by manufacturers.

A few focused on how they would like to receive information (e.g. media exposure) as opposed to the type of information. Included in the 'other' category are differences between unlit and lit tobacco, how chemicals are formed, information that is simple/easy to understand, information on addictive properties, explanations that relate chemicals to known or everyday products, information on nicotine, and the various concentrations of chemicals in tobacco and tobacco smoke.

Note that a significant proportion (31%) were unable to identify any types of information as being useful to helping Canadians make an informed choice about smoking.

Television Ads – Preferred Way to Receive Information

By a wide margin, television advertisements are the preferred method for receiving information about the chemistry behind smoking and its impact on health. Half (51%) identified television advertisements as the way they would like to receive such information. Also mentioned frequently, although much less often, were written materials (30%) and mail/direct mail (23%) (multiple responses accepted). This was followed by websites (18%), radio advertisements (17%), schools (11%), posters/billboards (9%), news sources (8%), doctor's offices (6%) and tobacco packaging (6%).



* Q.62: *If Health Canada were to provide information to Canadians to help them better understand the chemistry behind smoking and its impact on health, how would you prefer to receive such information?* (DO NOT READ LIST;ACCEPT MULTIPLE RESPONSES).

The *Informed/Interested*, as the name implies, demonstrate a higher level of knowledge than the rest of the population on chemistry, the health impacts of smoking, as well as the chemistry behind smoking. This group also rates their knowledge on these subjects higher than the general population.

This segment is more likely than others to trust health professionals, the government, and national voluntary non-profit organizations on information about the chemistry behind smoking and the health impact behind these chemicals. This group is also the most likely to think that chemistry information should be included on or in cigarette packaging.

The *Informed/Interested* group is over-represented by males, has a higher education level and a higher level of income than the general public.

Interestingly, these segments of the general public did not cluster around, or become divided based on, respondents' smoking status (the *Uninformed/Interested* segment were somewhat more likely to include daily smokers, while the *Informed/Interested* segment were somewhat more likely to be former smokers). The key differentiating dimensions, rather than smoking status, were knowledge of and interest in this type of information.

Secondary Clusters: Smoking Population

All of the segments mentioned above included smokers and non-smokers, with no significant differences between the proportions of smokers within each of the clusters (only the moderate differences identified above). In order to look at the important target audience of smokers, a second cluster analysis was performed, including only smokers.

Segment One: Disinterested Smokers

This segment comprises 35% of the surveyed smokers. They demonstrate lower levels of interest in the chemistry behind smoking and its impacts on health on a personal level. They also demonstrate lower levels of interest in having Canadians informed about the chemistry behind smoking. Overall, this group shows a significantly lower level of interest in being informed on a personal level than for having the Canadian population informed on the chemistry behind smoking and its impacts on health.

This group also demonstrates a lower level of knowledge on the health impacts of smoking than the general population. The *Disinterested Smokers* are less likely to think that information about the chemistry behind smoking and its impact on health should be included on or in cigarette packaging. Similar to the *Disinterested* cluster in the general population, this group is also less interested across the board in receiving any information in regards to smoking (chemistry, health impacts) and sees little value in being presented with such information.

This group is more likely to consist of daily smokers, is over-represented in the 55 plus age category, and is more likely to be retired than *Interested smokers*.

Segment Two: Interested Smokers

This segment represents 65% of the surveyed smokers. These respondents place a higher level of importance on having the general public informed on the chemistry behind smoking. They also place a higher level of importance on this knowledge on a personal level than the other segment.

This segment also demonstrates a higher level of knowledge about the health impacts of smoking than the *Disinterested Smokers*. This segment is more likely to trust health professionals, the government, and national voluntary non-profit organizations on information about the chemistry behind smoking and the health impact behind these chemicals than the *Disinterested Smokers*. This group is also more likely to think that chemistry information should be included on or in cigarette packaging.

Interested Smokers are more likely to be occasional smokers than the *Disinterested Smokers*. This segment is over-represented in the 35 and younger age group, and is more likely to have an income of under $40K than the average smoking population.

Summary

Three groupings of the Canadian population resulted from the segmentation analysis. Two segments indicate a higher level of interest in having information provided on the chemistry behind smoking and its impacts on health to help people make an informed choice about smoking. These segments (representing 75% of the Canadian population) indicate this higher level of interest in this information for both Canadians on the whole and for themselves personally. One of these segments (*Informed/Interested)* also displays a higher level of knowledge about general chemistry, the health impacts of smoking, and the chemistry behind smoking. The other segment (*Uninformed/Interested*) displays a lower level of knowledge on all aspects of smoking, chemistry, and the health effects of smoking. Both of these groups also are more likely to think that information on the chemistry behind smoking should be included on or in cigarette packaging.

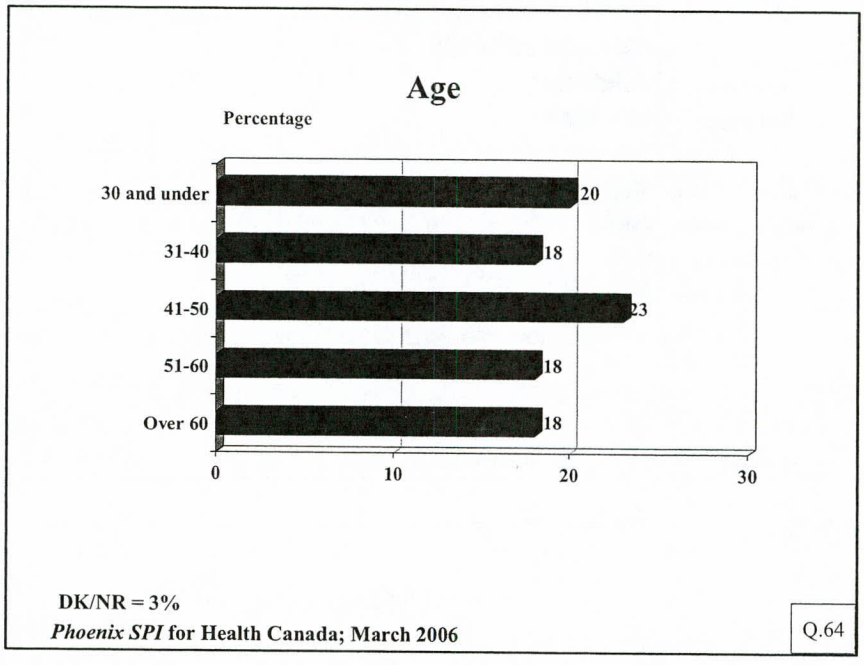
The third group of the Canadian population (*Disinterested*) shows the lowest levels of interest in having information provided on the chemistry behind smoking, on both a personal level and for all Canadians. All of these segments contain a generally even representation of smokers and non-smokers (except that the *Uninformed/Interested* segment were somewhat more likely to include daily smokers, the *Informed/Interested* segment to be former smokers). The key differentiating dimensions, rather than smoking status, were knowledge of and interest in this type of information.

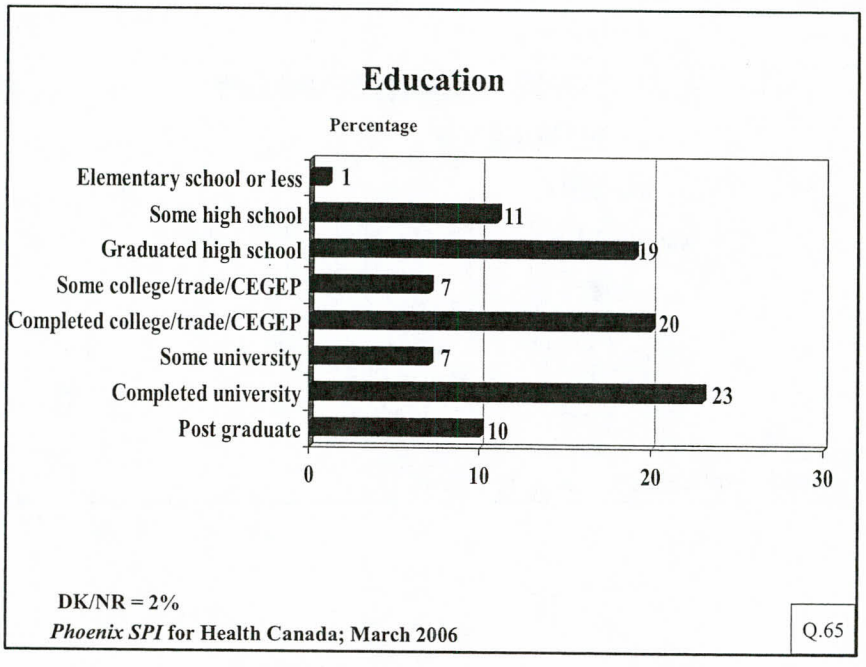
A second set of groupings, among smokers alone, reveals two "smoker" segments. *Interested Smokers*, comprising 65% of the smokers, indicate a higher level of interest in having information provided on the chemistry behind smoking and its impacts on health to help people make an informed choice about smoking. This group also displays a higher level of knowledge on the health impacts of smoking. The remaining group, *Disinterested Smokers*, indicate lower levels of interest in having information provided on the chemistry behind smoking, on both a personal level and for all Canadians. This group indicates a considerably lower level of interest in having this information provided to them personally

and is less likely to think that this information should be included on or in cigarette packaging. Note that the key differentiating dimension here is interest, less so knowledge. It is almost as if one group is saying, "we've heard it all before and aren't interested in hearing any more", while the other group is saying "it's still worth informing people about the health impacts of smoking, and the chemistry behind this, so that they can make an informed decision". The latter group, two-thirds of the smoking population, are the more likely to actually retain the information that is shared with them about smoking and its impact on health.

CHARACTERISTICS OF RESPONDENTS

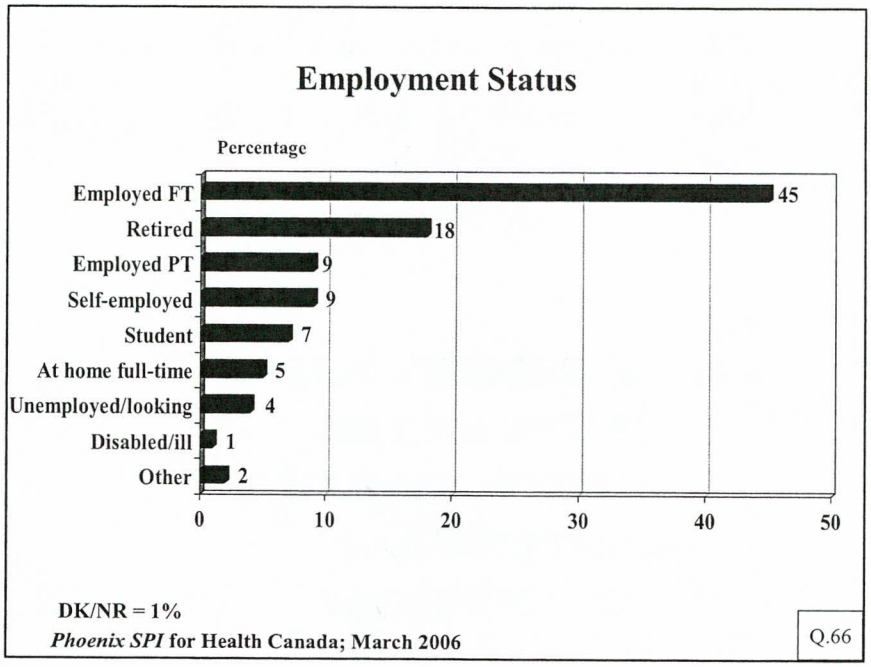
The following graphs present the characteristics of respondents by age, education, employment status, marital status, children in the household, household income, language, gender, and region. These graphs present demographic characteristics using weighted data.

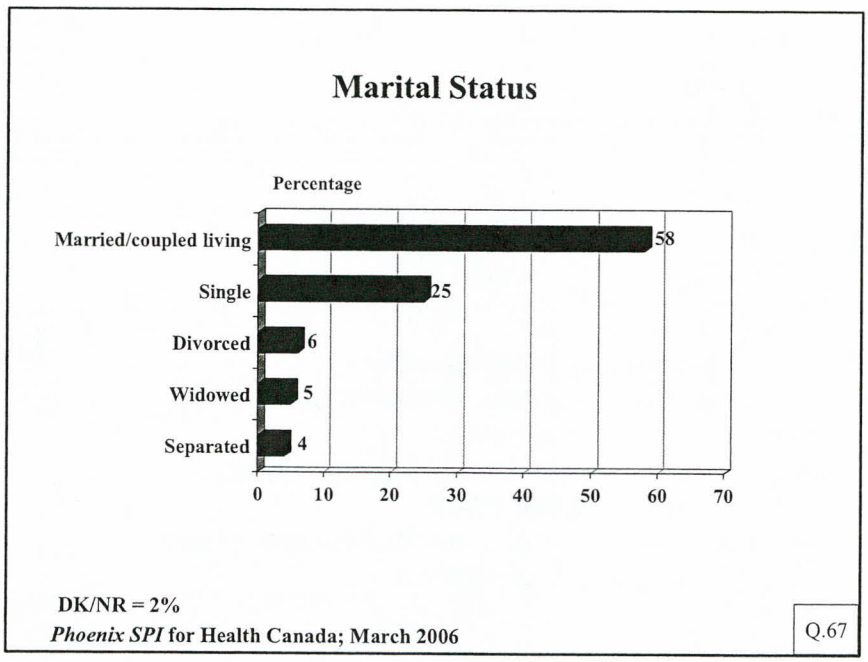




* Q.64: *In what year were you born?*

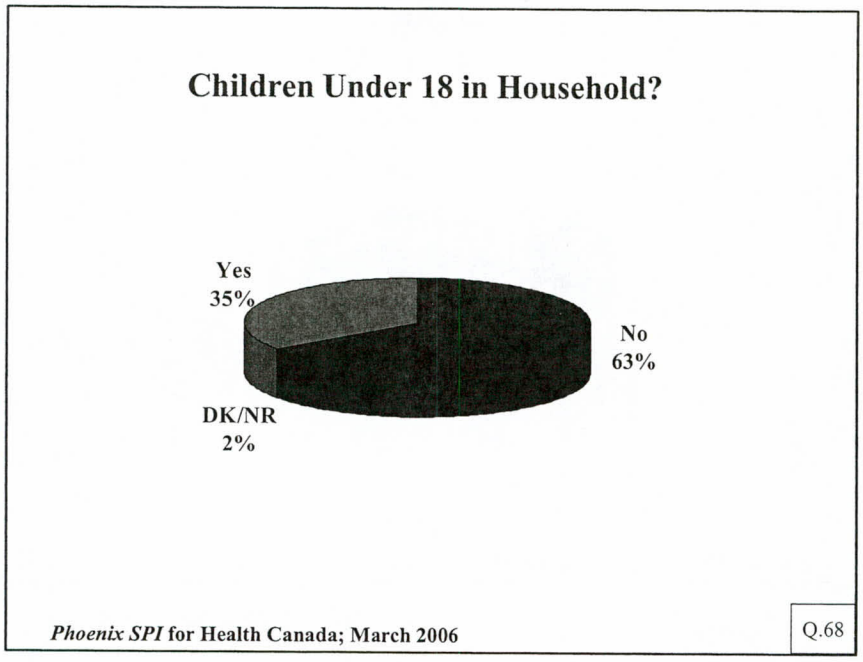
Q.65: *What is the highest level of education that you have reached?* (READ LIST IF HELPFUL).

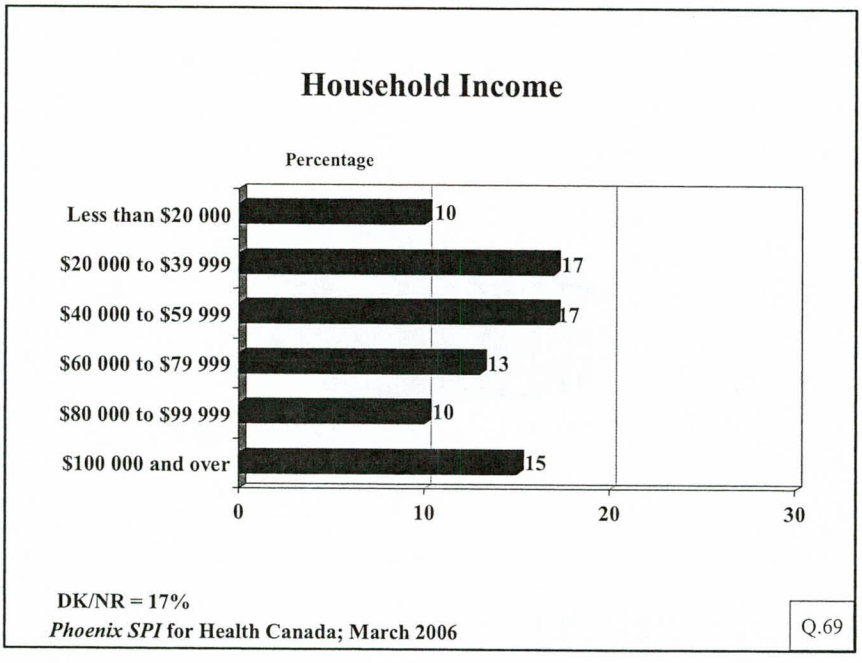




* Q.66: *Which of the following best describes your <u>current</u> employment situation? Are you...?* (READ LIST; ACCEPT ONE RESPONSE).

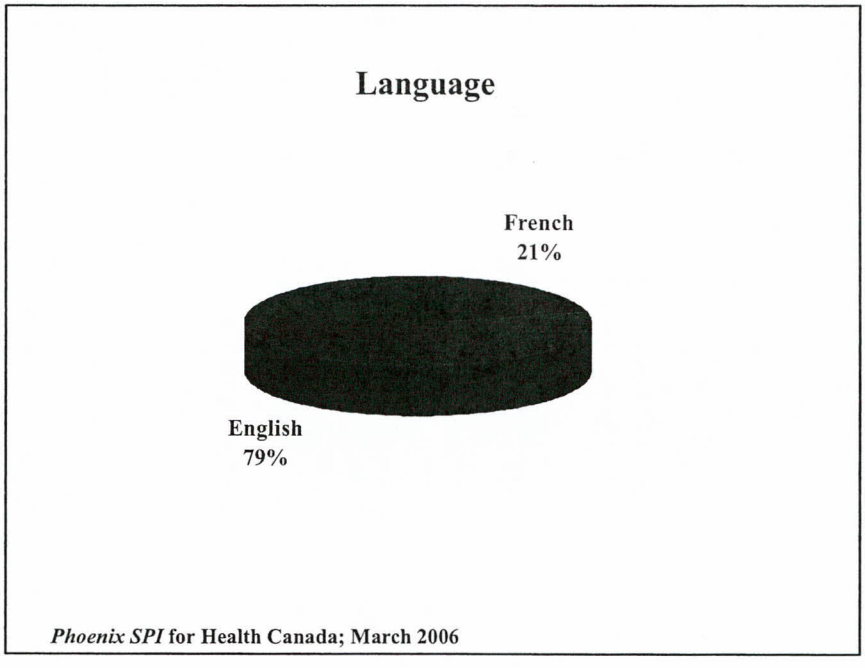
Q.67: *Are you...?* (READ LIST; ACCEPT ONE RESPONSE).

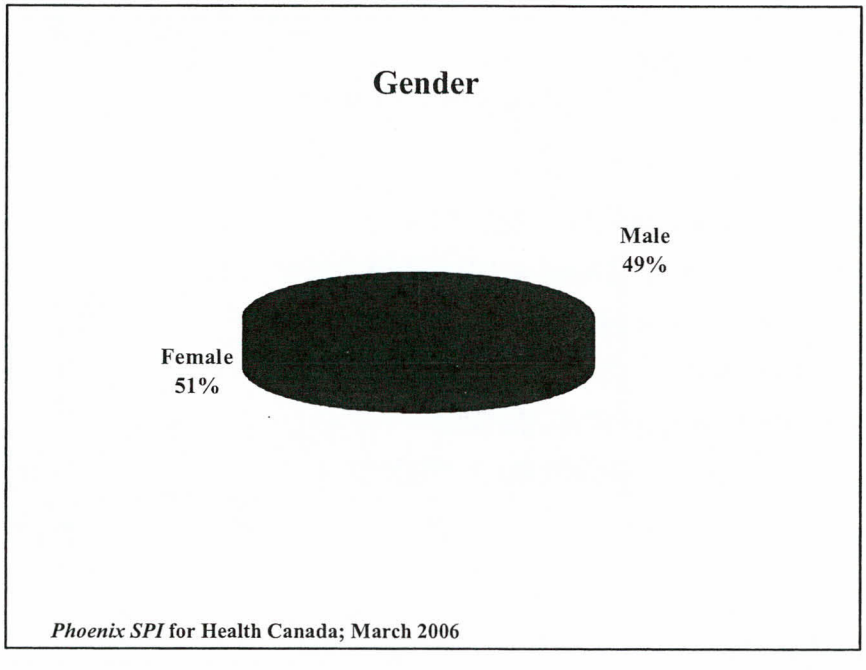


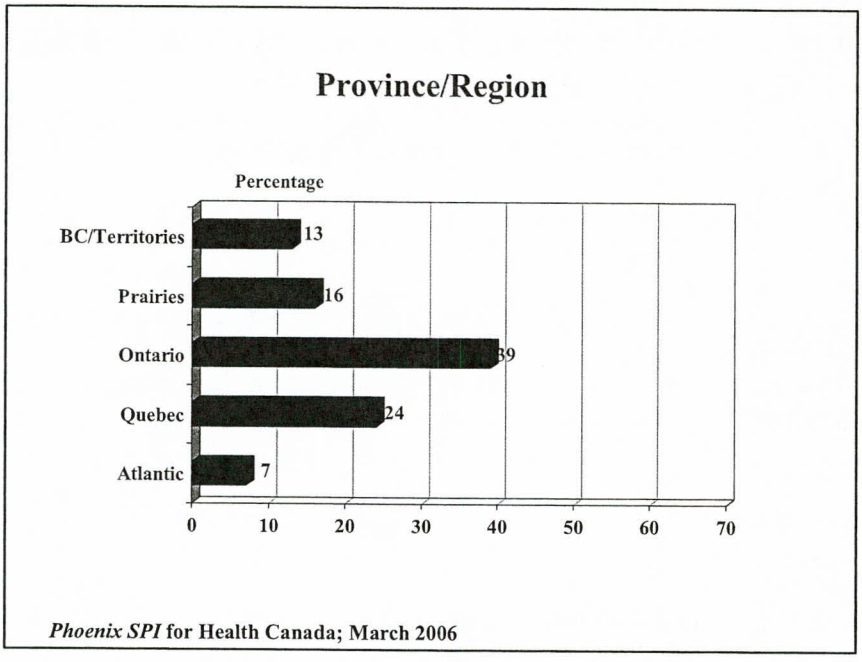


* Q.68: *Are there any children in your household under the age of 18? This includes children living there full-time or part-time as part of a shared custody arrangement.*

Q.69: *Into which of the following categories would you put the total annual income, before taxes and deductions, for 2005, of all members of your household, including yourself? Is it...?* (READ LIST).


Language
French
21%
English
79%
Phoenix SPI for Health Canada; March 2006


Gender
Male
49%
Female
51%
Phoenix SPI for Health Canada; March 2006


Province/Region
Percentage
BC/Territories
Prairies
Ontario
Quebec
Atlantic
13
16
39
24
7
0
10
20
30
40
50
60
70
Phoenix SPI for Health Canada; March 2006

DEMOGRAPHIC VARIATIONS

This section presents demographic differences for key issues explored in this survey. This includes variations based on gender, age, education, household income, and region. The findings are presented in two ways. First, we provide summary descriptions of the main patterns in each area (presented in the same order and structure as information in the main report). These summaries are textual for ease of access to the information, with few if any numbers. Second, we provide a detailed table that presents a breakdown of the findings for the various subgroups. The table is also organized by theme.

For this analysis, characteristics have been grouped as follows:

Gender

Age:

- 36 or less
- 37-46 years
- 47-56 years
- 57 years and older

Education:

- High school education or less
- Some college education/college degree
- Some university education/university degree

Household Income:

- Less than $40,000
- $40,000-$80,000
- $80,000 or more

Region:

- Atlantic
- Quebec
- Ontario
- West

Overview

Differences in education and household income were most likely to follow a pattern and tended to mirror one another, primarily on knowledge-related issues. The likelihood of scoring high on all three knowledge indices (i.e. correctly answering most or all questions) increased with income and education (or was higher among those with more formal education). While knowledge of various issues increased with education and income, however, the perceived importance of such knowledge decreased as education and income increased. It may be that the more people know about such issues, the less important sharing such information is seen to be. One issue on which differences in education and

income did not mirror each other was support for including information on the chemistry behind smoking and its impact on health on or in cigarette packaging. While support for this measure varied little by education, it decreased as income increased.

Age and gender differences also tended to follow a pattern on knowledge-related issues, though the pattern was not as consistent as it was for education and income. Younger respondents (46 or younger) were more likely to score highly on the indices related to knowledge of basic chemistry and health, but not on the index related to knowledge of chemistry behind smoking. Respondents, regardless of age, were similarly likely to consider such information as important to Canadians and to themselves personally, though the youngest were slightly more likely to support including information on the chemistry behind smoking and its impact on health on or in cigarette packaging. When it came to gender differences, men were more likely to score highly on indices related to knowledge of basic chemistry and the chemistry behind smoking, but women were more likely to score highly on the health index. Women were also more likely to regard information on the chemistry behind smoking and its impact on health as important, although men and women were almost equally likely to support including information on this on or in cigarette packaging.

Regionally, respondents in the West were most likely to score highly on the indices related to knowledge of chemistry and the chemistry behind smoking. Beyond this there was no consistent pattern to regional differences, except that Quebec residents stood out in a few areas: they were least likely to score highly on the indices related to knowledge of basic chemistry and health, but most likely to regard such information as important to them personally. They were also much less likely to trust government as a source for such information and were least likely to support including related information on or in cigarette packaging.

In terms of smoking behaviour, the likelihood of being a current smoker decreased as education, income, and age increased. Men and Quebec residents were more likely than others to be current smokers.

Gender

Smoking Behaviour

Men were more likely to be current and former smokers, while women were more likely to be never smokers.

Among current smokers and former smokers who have recently stopped smoking (i.e. within the past year), men were more likely to have tried to quit smoking three or more times in the past year.

Health Impact of Smoking

Men and women were similarly likely to identify the health effects most frequently linked to smoking (i.e. lung cancer, cancer in general, emphysema, heart attacks/angina).

Among current and former smokers, women were more likely to think they would suffer from health conditions linked to smoking.

Basic Understanding of Chemistry

Perceived Knowledge of Basic Chemistry

Men were more likely to rate themselves as knowledgeable about basic chemistry (31% versus 19% of women), while women were more likely to rate themselves as lacking such knowledge (63% versus 50% of men).

Key Characteristics of Chemicals

With one exception, men were more likely to hold correct perceptions about key characteristics of chemicals. Men and women were almost equally likely to hold correct perceptions about whether or not only substances that are added together are chemicals.

Definition of Carcinogen

Men and women were almost equally likely to define a carcinogen as a cancer-causing agent.

Perceptions of Chemicals

Men were more likely to hold correct perceptions regarding the following statements:

- Combustion changes the form, not the type of chemicals.
- Smoke contains only a small number of chemicals.
- Fireplace smoke is not a complex mixture of chemicals.
- Natural chemicals are good; man-made ones are bad.

Women were more likely to hold correct perceptions about whether or not all pollution is harmful.

Knowledge of Chemistry Index

Men were more likely to answer a substantial majority of questions about basic chemistry correctly (42% answered three-quarters or more correctly compared to 30% of women).

Knowledge of Chemistry Behind Smoking

Perceived Knowledge of Basic Chemistry of Smoking and Health Impact of Smoking

Men and women were almost equally likely to consider themselves to be knowledgeable about the basic chemistry of smoking, but women were more likely to consider themselves as knowledgeable about the health impact of smoking.

Time Frame for Appearance of Health Effects of Smoking

Men and women were almost equally likely to think that the health effects associated with smoking occur over a time frame ranging from the immediate to the long-term.

Difference Between Chemicals in Unlit versus Lit Tobacco

Perceptions about the number of chemicals in unlit versus lit tobacco were very similar and in some instances virtually identical. Men were slightly more likely to think that tobacco smoke contains many more chemicals than unlit tobacco.

Perceptions of Chemistry Behind Smoking

Men and women were almost equally likely to hold correct perceptions regarding the difference in the number of chemicals in cigarette brands with descriptors on the package such as "light" or "mild" versus regular cigarette brands and whether or not chemicals in tobacco smoke are more harmful than those in unlit tobacco. However, men were almost twice as likely to hold correct perceptions about whether or not chemicals in cigarettes have been added by manufacturers (23% versus 12%). They were also more likely to hold correct perceptions about whether or not most of the harmful chemicals occur in tobacco smoke.

Knowledge of Health Impact Index

Of the questions related to the health impact of smoking that could be answered correctly or incorrectly, women were more likely to answer all correctly (51% versus 46% of men).

Perceptions of Knowledge on Chemistry Behind Smoking

New Knowledge

Women were noticeably more likely to identify each of the following as new information to them:

- There is a significant difference between the chemical composition of unlit tobacco and tobacco smoke (49% versus 38%).
- Most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco (33% versus 23%).
- Harmful chemicals in cigarettes are not added by tobacco manufacturers (84% versus 71%).

Men and women were similarly likely to identify as new knowledge that cigarette tobacco smoke contains over 4,000 chemicals and that it is exposure to the chemicals in tobacco smoke that is responsible for the health hazards associated with smoking.

Importance of Information on Chemistry of Smoking

Women were more likely to identify information on the chemistry behind smoking and its impact on health as important to Canadians and to themselves personally.

Most Trusted Sources of Information

Women were more likely to trust health professionals as a source of information regarding both the chemistry behind smoking and the health impacts of smoking. Men were more likely to trust government in general for information on both.

Support for Including Information About Chemistry of Smoking on Cigarette Package

Men and women were almost equally likely to support including information on the chemistry behind smoking and its impact on health on or in cigarette packaging.

Knowledge of Chemistry Behind Smoking Index

Men were more likely than women to answer a substantial majority of questions about the chemistry behind smoking correctly (19% answered over three-quarters of these questions correctly compared to 12% of women).

Age

Smoking Behaviour

The likelihood of being a current smoker decreased as age increased (from 26% to 11%), while the likelihood of being a former smoker increased with age (from 16% to 43%). The youngest respondents (i.e. 36 or younger) were most likely to be never smokers (58% versus 45-50% of others).

Among current smokers and former smokers who have recently stopped smoking, the youngest were most likely to have tried to quit smoking three or more times in the past year. Older respondents (i.e. 47 or older) were more likely to have made no quit attempts during this period.

Health Impact of Smoking

Respondents, regardless of age, were similarly likely to identify lung cancer as a health effect linked to smoking. The likelihood of identifying the other health effects most frequently linked to smoking (i.e. cancer in general, emphysema, heart attacks/angina) varied relatively little across age groups (i.e. differences across age groups did not exceed 7%).

Among current and former smokers, the likelihood of thinking they would suffer from health conditions linked to smoking decreased noticeably as age increased (from 78% of those 36 or younger to 48% of those 57 or older).

Basic Understanding of Chemistry

Perceived Knowledge of Basic Chemistry

The youngest were the most likely to rate themselves as knowledgeable about basic chemistry (28% versus 21-23% of others). They were also noticeably less likely to rate themselves as lacking such knowledge (48% versus 61% of others).

Key Characteristics of Chemicals

Respondents, regardless of age, were similarly likely to think that a key characteristic of chemicals is that they have a unique molecular make-up. Beyond that, differences were evident. The oldest respondents (i.e. 57 years or older) were least likely to hold correct perceptions about whether or not most chemicals are man-made and whether or not most

chemicals have harmful health effects. Moreover, the likelihood of holding correct perceptions about the following decreased as age increased: whether only substances that are added together are chemicals (from 73% to 46%), and whether a chemical is a substance made of "atoms" (from 78% to 58%). The youngest were also the most likely to hold correct perceptions about whether or not a key characteristic of chemicals is that they react with one another.

Definition of Carcinogen

The likelihood of correctly defining a carcinogen as a cancer-causing agent decreased noticeably with age (from 73% to 56%).

Perceptions of Chemicals

Correct perceptions regarding each of the following decreased as age increased:

- Combustion changes the form, not the type of chemicals (from 51% to 32%).
- Smoke contains only a small number of chemicals (from 62% to 40%).
- Natural chemicals are good; man-made ones are bad (from 65% to 53%).

Knowledge of Chemistry Index

Younger respondents (i.e. 46 or younger) were the most likely to answer a substantial majority of questions about basic chemistry correctly (42% answered three-quarters or more correctly compared to 34% of 47-56 year olds, and 20% of those 57 or older). Conversely, the likelihood of answering fewer than half these questions correctly increased noticeably with age (from 10% to 27%).

Knowledge of Chemistry Behind Smoking

Perceived Knowledge of Basic Chemistry of Smoking and Health Impact of Smoking

The likelihood of respondents considering themselves to be knowledgeable about the basic chemistry of smoking increased with age (from 21% to 43%). The youngest were also less likely to view themselves as knowledgeable about the health impact of smoking (58% versus 67-71% of others).

Time Frame for Appearance of Health Effects of Smoking

Younger respondents were more likely to think that the health effects associated with smoking occur over a time frame ranging from the immediate to the long-term (62-64% versus 55-56% of older respondents). The oldest group were the most likely to associate the health effects of smoking with the longer term (i.e. 20-25 years or more).

Difference Between Chemicals in Unlit versus Lit Tobacco

The likelihood of believing that tobacco smoke contains *many* more chemicals than unlit tobacco decreased as age decreased (from 53% of those 57 or older to 42% of those 36 or younger). The youngest were most likely to believe that there is no difference between the chemicals in unlit and lit tobacco.

Perceptions of Chemistry Behind Smoking

Respondents, regardless of age, were almost equally likely to hold correct perceptions regarding the difference in the number of chemicals in cigarette brands with descriptors on the package such as "light" or "mild" versus regular cigarette brands. Differences across age groups also tended to be relatively small (7-8% at most) regarding correct perceptions as to whether most of the harmful chemicals occur in tobacco smoke and whether chemicals in smoke are more harmful than those in unlit tobacco. The youngest were least likely to hold correct perceptions regarding whether or not most chemicals in cigarettes have been added by manufacturers (10% versus 18-22% of others).

Knowledge of Health Impact Index

Of the questions related to the health impact of smoking that could be answered correctly or incorrectly, younger respondents (i.e. 46 or younger) were more likely to answer all correctly while the oldest were less likely to.

Perceptions of Knowledge on Chemistry Behind Smoking

New Knowledge

The likelihood of identifying as new knowledge that exposure to chemicals in smoke is responsible for the health hazards of smoking increased as age decreased (from 9% to 17%). The following information was also more likely to be identified as new by younger respondents (i.e. 46 or younger):

- There is a significant difference between the chemical composition of unlit tobacco and tobacco smoke.
- Most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco.
- Harmful chemicals in cigarettes are not added by tobacco manufacturers.

The likelihood of identifying as new knowledge that cigarette tobacco smoke contains over 4,000 chemicals did not vary much across age groups.

Importance of Information on Chemistry of Smoking

Respondents, regardless of age, were similarly likely to identify information on the chemistry behind smoking and its impact on health as important to Canadians and to themselves personally.

Most Trusted Sources of Information

The oldest respondents were most likely (and the youngest least likely) to trust health professionals as a source of information regarding the chemistry behind smoking. The likelihood of trusting health professionals as a source of information regarding the health impacts of smoking was similar across all age groups.

Support for Including Information About Chemistry of Smoking on Cigarette Package

The youngest were slightly more likely to support including information on the chemistry behind smoking and its impact on health on or in cigarette packaging (82% versus 76-79%).

Knowledge of Chemistry Behind Smoking Index

The youngest were more likely to answer fewer than half of the questions about the chemistry behind smoking correctly (41% versus 31-35% of others).

Education

Smoking Behaviour

The likelihood of being a current smoker decreased as education increased (from 27% to 13%). Those with at least some university education were much more likely to be never smokers (61% versus 43% of others).

Among current smokers and former smokers who have recently stopped smoking, those with the least amount of formal education (i.e. high school education or less) were most likely to have made no quit attempts during the past year. Conversely, the likelihood of having made three or more quit attempts increased with education (from 24% to 38%).

Health Impact of Smoking

Respondents, regardless of education, were similarly likely to identify cancer in general as a health effect linked to smoking. The likelihood of identifying lung cancer and emphysema was higher among those with at least some post-secondary education, while the likelihood of identifying heart attacks/angina increased with education.

Among current and former smokers, the likelihood of thinking they would suffer from health conditions linked to smoking did not vary much by education.

Basic Understanding of Chemistry

Perceived Knowledge of Basic Chemistry

Respondents' likelihood of rating themselves as knowledgeable about basic chemistry increased noticeably with education (from 17% to 33%).

Key Characteristics of Chemicals

When it came to key characteristics of chemicals, the likelihood of holding correct perceptions regarding each of the following increased with education, often substantially:

- Most chemicals are man-made (from 20% to 47%).
- Most chemicals have harmful health effects (from 17% to 48%).
- Only substances that are added together are chemicals (from 44% to 68%).

- A key characteristic of chemicals is that they react with one another (from 10% to16%).
- A chemical is a substance made of "atoms" (from 52% to 81%).
- A chemical is a substance with a unique molecular make-up (from 59% to 80%).

Definition of Carcinogen

The likelihood of correctly identifying a carcinogen as a cancer-causing agent also increased noticeably with education (from 48% to 75%).

Perceptions of Chemicals

The likelihood of holding correct perceptions regarding the following increased with education: combustion changes the form, not the type of chemicals (from 31% to 53%), and natural chemicals are good while man-made ones are bad (from 45% to 72%). As well, those with at least some post-secondary education were more likely to hold correct perceptions regarding the following: smoke contains only a small number of chemicals (57% versus 49% of those with high school or less), and fireplace smoke is not a complex mixture of chemicals (65-71% versus 57% of those with high school or less).

Knowledge of Chemistry Index

The likelihood of correctly answering a substantial majority (i.e. 75% or more) of questions about basic chemistry increased noticeably with education (from 14% to 50%).

Knowledge of Chemistry Behind Smoking

Perceived Knowledge of Basic Chemistry of Smoking and Health Impact of Smoking

Those with the least amount of formal education were most likely to consider themselves knowledgeable about the basic chemistry of smoking. Respondents, regardless of education, were similarly likely to consider themselves to be knowledgeable about the health impact of smoking.

Time Frame for Appearance of Health Effects of Smoking

Those with more formal education (i.e. at least some post-secondary education) were more likely to think that the health effects associated with smoking occur over a time frame ranging from the immediate to the long-term. Those with high school or less were more likely to associate the health effects of smoking with the longer term.

Difference Between Chemicals in Unlit versus Lit Tobacco

Perceptions about the number of chemicals in unit versus lit tobacco varied little by education.

Perceptions of Chemistry Behind Smoking

Respondents, regardless of education, were almost equally likely to hold correct perceptions about whether most of the harmful chemicals occur in tobacco smoke. Beyond that, the likelihood of holding correct perceptions was linked to education. The likelihood

of holding correct perceptions about whether chemicals in smoke are more harmful than those in unlit tobacco increased with education (from 66% to 78%), as did the likelihood of holding correct perceptions about whether or not chemicals in cigarettes have been added by manufacturers (from 13% to 23%). Those with at least some post-secondary education were more likely to hold correct perceptions regarding the difference in the number of chemicals in cigarette brands with descriptors such as "light" or "mild" versus regular cigarette brands (76-79% versus 63% of those with high school or less).

Knowledge of Health Impact Index

Of the questions related to the health impact of smoking that could be answered correctly or incorrectly, those with more formal education were more likely to answer all correctly (52% versus 41% of those with high school or less).

Perceptions of Knowledge on Chemistry Behind Smoking

New Knowledge

The likelihood of identifying as new knowledge that cigarette tobacco smoke contains over 4,000 chemicals varied little by education. Beyond that, however, differences were evident. The likelihood of identifying the significant difference between the chemical composition of unlit tobacco and tobacco smoke as new knowledge decreased as education increased. Those with the least amount of formal education were most likely to describe as new the knowledge that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco and knowledge that exposure to chemicals in cigarette smoke is responsible for the health hazards. Those with a college degree or less were more likely to describe as new the knowledge that harmful chemicals in cigarettes are not added by tobacco manufacturers.

Importance of Information on Chemistry of Smoking

The likelihood of identifying information on the chemistry behind smoking and its impact on health as important to Canadians and to respondents themselves decreased as education increased.

Most Trusted Sources of Information

The likelihood of identifying each of the following as a trusted source of information on the chemistry behind smoking increased with education:

- Government in general.
- Health Canada.
- National non-profit organizations
- Chemists/scientists

Those with more formal education were also more likely to identify health professionals.

When it came to trusted sources of information on the health impacts of smoking, respondents, regardless of education, were similarly likely to identify health professionals. The likelihood of identifying each of the following, however, increased with education:

- Government in general.
- Health Canada.
- National non-profit organizations.

Support for Including Information About Chemistry of Smoking on Cigarette Package

Respondents, regardless of education, were almost equally likely to support including information on the chemistry behind smoking and its impact on health on or in cigarette packaging.

Knowledge of Chemistry Behind Smoking Index

The likelihood of correctly answering a substantial majority of questions about the chemistry behind smoking (over 75% of them) increased with education (from 8% to 22%).

Household Income

Smoking Behaviour

The likelihood of being a current smoker decreased as household income increased (from 26% to 16%), while the likelihood of being a never smoker increased slightly with household income (from 46% to 51%).

Among current smokers and former smokers who have recently stopped smoking, the number of quit attempts during the past year did not vary much by household income.

Health Impact of Smoking

Respondents, regardless of household income, were almost equally likely to identify cancer in general as a health effect linked to smoking. The likelihood of identifying lung cancer, emphysema, and heart attacks/angina increased with household income.

Among current and former smokers, the likelihood of thinking they would suffer from health conditions linked to smoking decreased as household income increased (from 69% to 59%).

Basic Understanding of Chemistry

Perceived Knowledge of Basic Chemistry

Respondents' likelihood of rating themselves as knowledgeable about basic chemistry increased with household income (from 19% to 28%).

Key Characteristics of Chemicals

When it came to key characteristics about chemicals, the likelihood of holding correct perceptions regarding each of the following increased with household income:

- Most chemicals are man-made (from 28% to 42%).
- Most chemicals have harmful health effects (from 25% to 41%).

- Only substances that are added together are chemicals (from 52% to 63%).
- A chemical is a substance made of "atoms" (from 64% to 78%).
- A chemical is a substance with a unique molecular make-up (from 62% to 79%).

Definition of Carcinogen

The likelihood of correctly identifying a carcinogen as a cancer-causing agent increased noticeably with household income (from 56% to 72%).

Perceptions of Chemicals

The likelihood of holding correct perceptions regarding the following increased with household income:

- Combustion changes the form, not the type of chemicals (from 42% to 49%).
- Smoke contains only a small number of chemicals (from 51% to 61%).
- Fireplace smoke is not a complex mixture of chemicals (from 58% to 67%).
- Natural chemicals are good while man-made ones are bad (from 51% to 69%).

Those with higher household incomes (i.e. $40,000 or more) were more likely to hold correct perceptions about whether or not all pollution is harmful.

Knowledge of Chemistry Index

The likelihood of correctly answering a substantial majority (i.e. 75% or more) of questions about basic chemistry increased noticeably with income (from 25% to 50%).

Knowledge of Chemistry Behind Smoking

Perceived Knowledge of Basic Chemistry of Smoking and Health Impact of Smoking

Those with the lowest household income (i.e. under $40,000) were most likely to view themselves as knowledgeable about the basic chemistry of smoking. Respondents, regardless of household income, were similarly likely to consider themselves knowledgeable about the health impact of smoking.

Time Frame for Appearance of Health Effects of Smoking

The likelihood of thinking that the health effects associated with smoking occur over a time frame ranging from the immediate to the long-term increased with household income (from 55% to 66%).

Difference Between Chemicals in Unlit versus Lit Tobacco

With one exception, differences in perceptions about the number of chemicals in unlit versus lit tobacco tended to be small. The exception was the likelihood of thinking that tobacco smoke contains *many* more chemicals, which increased with income (from 43% to 54%).

Perceptions of Chemistry Behind Smoking

Correct perceptions regarding each of the following increased with household income:

- There is a significant difference in the number of chemicals in cigarette brands with descriptors on the package such as "light" or "mild" versus regular cigarette brands (from 69% to 79%).
- Most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco, and are not present in unlit tobacco (from 50% to 56%).
- Most of the chemicals found in cigarettes have been added by tobacco manufacturers (from 14% to 24%).

Those with higher household incomes were more likely to hold correct perceptions about whether or not chemicals in tobacco smoke are more harmful than those in unlit tobacco.

Knowledge of Health Impact Index

Of the questions related to the health impact of smoking, those with the highest household income were the most likely to answer all correctly.

Perceptions of Knowledge on Chemistry Behind Smoking

New Knowledge

The likelihood of identifying each of the following as new knowledge decreased as household income increased:

- There is a significant difference between the chemical composition of unlit tobacco and tobacco smoke (from 50% to 35%).
- Most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco (from 32% to 25%).
- Harmful chemicals in cigarettes are not added by tobacco manufacturers (from 80% to 72%).
- It is exposure to the chemicals in tobacco smoke that is responsible for the health hazards associated with smoking (from 17% to 12%).

Conversely, the likelihood of identifying as new knowledge that cigarette tobacco smoke contains over 4,000 chemicals increased slightly with household income.

Importance of Information on Chemistry of Smoking

The likelihood of identifying information on the chemistry behind smoking and its impact on health as important to Canadians and to respondents themselves decreased as household income increased.

Most Trusted Sources of Information

Those with the highest household income were the most likely to identify health professionals as a trusted source of information on the chemistry behind smoking. The likelihood of identifying government and national non-profit organizations as trusted sources of information increased with household income.

When it came to trusted sources of information on the health impacts of smoking, respondents, regardless of income, were equally likely to identify health professionals. However, the likelihood of identifying government and national non-profit organizations increased with household income, and those with higher incomes were most likely to identify Health Canada as a trusted source of information.

Support for Including Information About Chemistry of Smoking on Cigarette Package

Support for including information on the chemistry behind smoking and its impact on health on or in cigarette packaging decreased as income increased (from 83% to 73%).

Knowledge of Chemistry Behind Smoking Index

The likelihood of correctly answering a substantial majority of questions about the chemistry behind smoking (over 75%) increased with income (from 10% to 24%).

Region

Smoking Behaviour

Current smokers were most likely to be in Quebec, former smokers in the Atlantic region and Quebec, and never smokers in Ontario and the West.

Health Impact of Smoking

Lung cancer was identified as a health effect linked to smoking by a majority in all regions (57-59%), except Quebec (45%). Cancer in general was also least likely to be identified in Quebec, while emphysema was much less likely to be identified in Quebec than other regions (10% versus 32-38% elsewhere).

Among current and former smokers, those in Quebec were more likely to think they would suffer from health conditions linked to smoking (76% versus 58-65% elsewhere).

Basic Understanding of Chemistry

Perceived Knowledge of Basic Chemistry

Respondents' likelihood of rating themselves as knowledgeable about basic chemistry did not vary much across regions (21-28%). Those in the Atlantic region and Quebec were most likely to rate themselves as lacking such knowledge (61-62% versus 55% each in Ontario and the West).

Key Characteristics of Chemicals

When it came to key characteristics about chemicals, respondents in the West were most likely to hold correct perceptions regarding each of the following:

- Most chemicals are man-made.
- Most chemicals have harmful health effects.
- Chemicals react with one another.
- A chemical is a substance made of "atoms".

- A chemical is a substance with a unique molecular make-up.

That said, correct perceptions for most of these characteristics did not vary widely across regions. Respondents in Quebec were much less likely to hold correct perceptions regarding two characteristics: whether or not only substances that are added together are chemicals and whether a chemical is a substance with a unique molecular make-up.

Definition of Carcinogen

The likelihood of correctly identifying a carcinogen as a cancer-causing agent did not vary much across regions (61-68%).

Perceptions of Chemicals

Respondents, regardless of region, were almost equally likely to hold correct perceptions regarding whether or not all pollution is harmful and whether or not smoke contains only a small number of chemicals. On other issues, regional differences were evident. Only in the West did a majority hold correct perceptions about whether or not combustion changes the type of chemicals, while a majority in all regions except Quebec held correct perceptions about whether or not natural chemicals are good while man-made ones are bad. Those in the Atlantic region were most likely to hold correct perceptions about the nature of smoke from a fireplace.

Knowledge of Chemistry Index

Respondents in the West were most likely to correctly answer a substantial majority (i.e. 75% or more) of questions about basic chemistry (44%), while those in Quebec were least likely to correctly answer this proportion of questions (28%).

Knowledge of Chemistry Behind Smoking

Perceived Knowledge of Basic Chemistry of Smoking and Health Impact of Smoking

Respondents, regardless of region, were similarly likely to consider themselves to be knowledgeable about the basic chemistry of smoking (29-33%). Respondents in all regions except Quebec were similarly likely to consider themselves knowledgeable about the health impact of smoking (68-69% versus 57% in Quebec).

Time Frame for Appearance of Health Effects of Smoking

Well over half the respondents in all regions except Quebec think that the health effects associated with smoking occur over a time frame ranging from the immediate to the long-term (61-71% versus 38% in Quebec). Respondents in Quebec were much more likely to associate the health effects of smoking with the longer term (i.e. 20-25 years or more).

Difference Between Chemicals in Unlit versus Lit Tobacco

A majority of respondents in the Atlantic region and Quebec believe that tobacco smoke contains *many* more chemicals than unlit tobacco (51-55% versus 48% in Ontario and 41% in the West). Respondents in the Atlantic region and the West were more likely to think there is no difference between lit and unlit tobacco (19% each versus 10-13% elsewhere).

Perceptions of Chemistry Behind Smoking

Correct perceptions regarding the following were similar in all regions: whether or not there is a significant difference in the number of chemicals in cigarette brands with descriptors such as "light" or "mild" versus regular cigarette brands and whether or not chemicals in tobacco smoke are more harmful than chemicals in unlit tobacco. A majority of respondents in all regions except the West held correct perceptions about whether or not most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco. Respondents in all regions except Quebec were similarly likely to hold correct perceptions about whether most of the chemicals found in cigarettes have been added by tobacco manufacturers (17-20% versus 12% in Quebec).

Knowledge of Health Impact Index

Of the questions related to the health impact of smoking, respondents in the West were most likely to answer all correctly (60%). Bare majorities in Ontario and the Atlantic region also answered all questions correctly, while only one-third of respondents in Quebec did so.

Perceptions of Knowledge on Chemistry Behind Smoking

New Knowledge

The likelihood of identifying each of the following as new knowledge varied little by region:

- Cigarette tobacco smoke contains over 4,000 chemicals
- There is a significant difference between the chemical composition of unlit tobacco and tobacco smoke.
- Harmful chemicals in cigarettes are not added by tobacco manufacturers.
- It is exposure to the chemicals in tobacco smoke that is responsible for the health hazards associated with smoking.

Respondents in the West were most likely to describe as new knowledge that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco (36% versus 24-25% elsewhere).

Importance of Information on Chemistry of Smoking

Respondents in all regions were equally likely to regard information on the chemistry behind smoking and its impact on health as important to Canadians (87-88%). Those in Quebec were most likely to regard such information as important to themselves personally (76%), while those in Ontario were least likely to (64%).

Most Trusted Sources of Information

Respondents, regardless of region, were similarly likely to identify the following as trusted sources of information on both the chemistry behind smoking and the health impacts of smoking: health professionals, Health Canada, and national non-profit organizations. Respondents in Quebec were somewhat less likely to identify government as a trusted

source, but more likely to trust chemists/scientists, especially regarding the chemistry behind smoking.

Support for Including Information About Chemistry of Smoking on Cigarette Package

Support for including information on the chemistry behind smoking and its impact on health on or in cigarette packaging was similar in all regions except Quebec (79-82% versus 73% in Quebec).

Knowledge of Chemistry Behind Smoking Index

The likelihood of correctly answering a substantial majority of questions about the chemistry behind smoking (over 75%) was similar in all regions (15-17%). Majorities in the Atlantic region and Quebec were able to answer over half these questions correctly (52-53% versus 45-48% elsewhere).

Subgroup Tables (%)

	Gender		Age				Education			Income			Region			
	M	F	57+	47-56	37-46	36 or less	HS or less	Coll.	Univ.	< $40K	$40-$80K	$80K+	Atl.	Qu.	On.	West
BASIC UNDERSTANDING OF CHEMISTRY																
Perceived Knowledge of Basic Chemistry																
Knowledgeable (scores of 5-7)	31	19	23	23	21	28	17	21	33	19	23	28	28	21	26	24
Not knowledgeable (scores of 1-3)	50	63	61	61	61	48	66	60	48	61	58	54	61	62	55	55
Key Characteristics of Chemicals (% correct)																
Most are man-made	38	30	28	36	35	39	20	33	47	28	35	42	26	32	35	37
Most have harmful effects	39	28	29	35	37	35	17	32	48	25	35	41	30	32	33	36
Must be able to be added together	58	57	46	48	61	73	44	60	68	52	60	63	57	42	65	61
React with one another	16	10	11	11	12	17	10	12	16	9	17	13	11	9	13	16
Made of atoms	76	65	58	71	74	78	52	74	81	64	72	78	64	65	70	75
Unique molecular make-up	73	68	68	70	72	73	59	71	80	62	71	79	71	42	76	86
Definition of Carcinogen																
Cancer-causing agent	65	64	73	67	66	56	48	68	75	56	68	72	66	68	61	65
Perceptions of Chemicals (% correct)																
Combustion changes form, not type of chemicals	48	39	32	45	49	51	31	43	53	42	43	49	33	40	41	51
Not all pollution is harmful	63	68	60	72	72	62	65	70	63	62	70	67	68	68	64	65
Smoke contains small # of chemicals	59	50	40	57	59	62	49	57	57	51	56	61	53	58	53	55
Fireplace smoke is not complex mixture of chemicals	67	61	62	68	68	62	57	71	65	58	65	67	73	65	62	63
Natural chemicals are good; man-made ones are bad	66	53	53	60	60	65	45	59	72	51	62	69	57	47	63	65

Subgroup Tables (%)

	Gender		Age				Education			Income			Region			
	M	F	57+	47-56	37-46	36 or less	HS or less	Coll.	Univ.	< $40K	$40-$80K	$80K+	Atl.	Qu.	On.	West
Knowledge of Chemistry Index (# of questions answered correctly)																
9 or less (fewer than half)	12	21	27	14	12	10	32	12	7	25	11	8	18	20	16	14
10-14	46	49	45	52	46	48	54	46	43	50	50	42	52	52	48	43
15 or more (75% or more)	42	30	20	34	42	42	14	42	50	25	39	50	30	28	36	44
KNOWLEDGE OF CHEMISTRY BEHIND SMOKING																
Perceived Knowledge of Basic Chemistry of Smoking																
Knowledgeable (scores of 5-7)	31	32	43	33	28	21	35	27	31	37	29	27	33	32	29	32
Not knowledgeable (scores of 1-3)	47	49	38	48	50	58	46	52	48	44	51	51	51	48	49	48
Perceived Knowledge of Health Impact of Smoking																
Knowledgeable (scores of 5-7)	63	69	70	71	67	58	63	67	66	66	64	67	68	57	69	68
Not knowledgeable (scores of 1-3)	19	17	12	15	17	25	20	17	17	19	18	17	16	22	17	16
Time Frame for Appearance of Health Effects of Smoking																
Longer-term (20-25 years or more)	22	24	30	22	20	20	29	22	20	29	21	16	18	36	23	14
All (from immediate to long-term)	59	60	55	56	64	62	55	62	62	55	61	66	61	38	64	71
Difference Between Chemicals in Unlit versus Lit Tobacco																
No difference, same in both	15	15	12	14	14	18	18	11	15	14	15	14	19	10	13	19
Same #, different type	13	15	10	13	15	18	12	17	14	15	18	12	9	17	14	12
A few more chemicals in smoke	17	14	12	15	18	17	15	16	16	19	15	14	13	17	15	17
Many more chemicals in smoke	49	45	53	51	46	42	46	48	47	43	45	54	55	51	48	41

Subgroup Tables(%)

	Gender		Age				Education			Income			Region			
	M	F	57+	47-56	37-46	36 or less	HS or less	Coll.	Univ.	< $40K	$40-$80K	$80K+	Atl.	Qu.	On.	West
Perceptions of Chemistry Behind Smoking (% correct)																
Huge difference in # of chemicals in "light" or "mild" versus regular cigarette brands	73	71	73	73	74	72	63	79	76	69	74	79	72	70	71	76
Most harmful chemicals occur in tobacco smoke	56	51	56	49	55	53	56	55	51	50	53	56	54	54	58	49
Most chemicals in cigarettes are added by manufacturers	23	12	22	22	18	10	13	14	23	14	19	24	17	12	19	20
Chemicals in smoke not more harmful than those in unlit tobacco	73	72	70	78	76	70	66	74	78	67	77	77	72	76	70	72
Knowledge of Health Impact Index (# of questions answered correctly)																
One	8	10	8	10	6	11	12	7	8	11	9	8	9	10	10	7
Two	45	39	50	42	40	37	46	40	40	44	45	35	41	56	40	33
Three	46	51	41	48	53	52	41	52	52	45	46	57	51	33	50	60
PERCEPTIONS OF KNOWLEDGE ON CHEMISTRY BEHIND SMOKING																
Did you know that ... (% who did not know)																
Tobacco smoke contains over 4,000 chemicals	82	85	83	85	88	81	84	83	85	81	85	87	85	80	86	84
Chemical composition of unlit and lit tobacco differ significantly	38	49	41	38	45	47	49	43	39	50	44	35	42	39	45	46
Most of the harmful chemicals are formed during combustion	23	33	24	23	26	36	33	25	27	32	27	25	25	24	25	36
Harmful chemicals in tobacco are not added by manufacturers	71	84	71	70	80	86	79	83	72	80	79	72	77	75	78	79
Exposure to chemicals in smoke is	13	15	9	14	16	17	18	13	12	17	14	12	14	12	15	16

Subgroup Tables(%)

	Gender		Age				Education			Income			Region			
	M	F	57+	47-56	37-46	36 or less	HS or less	Coll.	Univ.	< $40K	$40-$80K	$80K+	Atl.	Qu.	On.	West
responsible for health hazards																
Importance to Canadians of Info on Chemistry of Smoking																
Important (scores of 5-7)	85	90	89	89	86	88	91	89	85	91	89	82	88	87	87	88
Not important (scores of 1-3)	9	6	6	9	9	6	6	8	9	6	7	12	10	7	8	7
Importance to Respondents of Info on Chemistry of Smoking																
Important (scores of 5-7)	65	73	67	69	69	71	73	70	65	79	70	61	72	76	64	69
Not important (scores of 1-3)	28	21	27	24	25	22	20	23	29	15	24	32	22	17	30	23
Most Trusted Source of Info on Chemistry Behind Smoking																
Health professionals	32	45	44	40	40	34	32	42	42	39	37	43	38	39	39	38
Government in general	34	26	27	31	35	29	21	30	38	28	32	36	42	19	35	31
Health Canada	18	16	16	13	18	21	14	18	20	14	20	20	21	17	19	15
National Non-Profit orgs.	14	13	13	15	15	12	7	12	20	11	13	19	12	11	15	13
Chemists/scientists	13	13	15	12	11	13	10	13	15	12	12	13	8	21	10	10
Most Trusted Source of Info on Health Impacts of Smoking																
Health professionals	42	54	48	48	49	50	48	49	49	49	49	49	48	49	49	47
Government in general	29	20	22	26	29	23	20	25	28	22	26	31	31	16	29	24
Health Canada	22	18	19	17	22	22	16	21	24	17	23	23	24	21	20	18
National Non-Profit orgs.	15	12	13	17	16	9	8	14	17	10	15	18	11	10	15	13
Chemists/scientists	11	8	11	9	11	8	9	10	10	8	11	10	9	13	8	9
Include Information on cigarette package?																
Yes	78	79	79	78	76	82	80	78	78	83	79	73	80	73	79	82
No	21	18	19	19	22	16	18	20	20	15	20	25	19	26	18	16

Subgroup Tables(%)																
	Gender		Age				Education			Income			Region			
	M	F	57+	47-56	37-46	36 or less	HS or less	Coll.	Univ.	< $40K	$40-$80K	$80K+	Atl.	Qu.	On.	West
Knowledge of Chemistry Behind Smoking Index (# of questions answered correctly)																
6 or less (fewer than half)	31	41	31	32	35	41	44	33	31	40	36	27	32	31	36	40
7-9	50	47	53	47	49	46	49	51	47	50	48	49	52	53	48	45
10 or more (over 75%)	19	12	16	21	16	13	8	16	22	10	17	24	17	16	16	15

APPENDIX

Understanding of Chemistry of Cigarette Smoking and Impact on Health Study (POR-05-54) Recruitment Screener

Profile characteristics:

— **Pre-test: 2 groups in Ottawa.**

— 14 focus groups in these locations: 4 groups in each of Montreal (French) and Toronto (English); 2 groups in each of Halifax, Winnipeg, and Calgary.

— Target audience: Canadian residents, 18 years of age or older, broken out into the following subgroups:

- 'Current' smokers: includes daily smokers and non-daily smokers (known as occasional smokers).
- 'Former' smokers: includes people who are currently not smoking but who have smoked at least 100 cigarettes in their life.
- 'Never' smoker: includes people who have never smoked or have smoked fewer than 100 cigarettes in their life.
- Lesser-educated: high school education or less.
- Higher-educated: at least some post-secondary education.
- Youth (18-24).

— The smokers groups to include a mix of participants based on length of time smoking, type of smoker (i.e. daily vs. occasional), and amount smoked (number of cigarettes smoked per day). Include 3-5 potential quitters per group.

— The former smokers groups to include a mix of participants based on how long they had previously smoked, type of smoker (i.e. daily vs. occasional), amount smoked (number of cigarettes smoked per day), and how long since they quit smoking.

— With respect to education, there would be a mix within each of the two main categories: a mix of those who attended public school only, completed some high school, and graduated from high school in less-educated groups; a mix of those who completed some college or university, and graduated from college or university in higher-educated groups.

— In all groups there would be an approximate gender split and a mix of participants by age. For the non-youth groups, this would be a mix of participants 25-60 years of age.

— Recruitment to exclude people who have degrees in chemistry and who work in health care organizations, and tobacco, pharmaceutical and chemical companies.

— A total of 12 participants to be recruited for 8-10 to show per group.

— Participants to be paid $50.

— Sponsorship of study to be revealed (i.e. Health Canada/Government of Canada).

— Note: Screen participants to ensure that they are comfortable articulating their ideas in English or French.

— Ottawa pre-test groups:

	Ottawa
	English
6:00 pm	High School Former smoker
8:00 pm	Post-Secondary Smoker

— Groups to be distributed as follows:

	Halifax	**Montreal**	**Montreal**	**Toronto**	**Toronto**	**Winnipeg**	**Calgary**
	English	**French**	**French**	**English**	**English**	**English**	**English**
6:00 pm	Youth Never smoker	High School Smoker	Youth Smoker	High School Smoker	Youth Smoker	Post-Secondary Smoker	Youth Never Smoker
8:00 pm	Post-Secondary Smoker	Post-Secondary Former Smoker	High School Former Smoker	Post-Secondary Former Smoker	High School Former Smoker	High School Smoker	Post-Secondary Smoker

Recruitment Screener

Hello, my name is _____. I'm calling on behalf of Phoenix, an independent public opinion research firm. We are conducting research on behalf of Health Canada, a department of the Government of Canada, with people in the area.

The research consists of a set of discussion groups, where each group is two hours in length. People who take part will be compensated for their time, and light refreshments will be served. Participation in the research is completely voluntary and your decision on whether or not to participate will not affect any dealings you may have with the Government of Canada. Your answers will be kept confidential and will be used for research purposes only in accordance with laws designed to protect your privacy.

May I ask you a few questions to see whether you qualify for the research?

Yes	1	CONTINUE
No	2	THANK/DISCONTINUE

1. Do you, or does any member of your household or immediate family, work in any of the following fields? (READ LIST)

   Marketing Research, Public Relations firm, or Advertising Agency
   The Media (radio, television, newspapers, magazines, etc.)
   The Health sector (doctors, nurses, dentists, hospitals, clinics)
   Federal, provincial or municipal government health department/agency
   Tobacco Industry
   Chemical, Biochemical or Pharmaceutical Company

   [ ] Yes (THANK/DISCONTINUE)
   [ ] No (CONTINUE)

2. Which of the following age groups may I place you in? (READ)

Less than 18 years of age	1	THANK/DISCONTINUE
18-24 years of age	2	YOUTH
25-34 years of age	3	
35-44 years of age	4	
45-54 years of age	5	
55-60 years of age	6	
Over 60 years of age	7	THANK/DISCONTINUE

3. What is the highest level of education you have completed? (READ LIST IF USEFUL; GET MIX WITHIN EACH OF THE TWO MAIN CATEGORIES) NOTE: ALLOCATION IS ACCORDING TO SMOKING BEHAVIOR AND EDUCATION. YOUTH GROUPS SHOULD INCLUDE MIX OF ALL EDUCATION LEVELS.

Less than high school	1
Completed some high school	2
Graduated high school	3
Some college/technical school/CEGEP	4
Graduated college/technical school/CEGEP	5
Some university	6
Graduated university	7

ASK THOSE WHO GRADUATED COLLEGE OR UNIVERSITY:

4. In which subject or area did you get your degree/diploma?

Subject/area: _____: DISCONTINUE IF CHEMISTRY/BIOCHEMISTRY OR SIMILAR DEGREE

5. Do you need to have an understanding of chemistry to be able to perform your work duties and responsibilities as part of your job?

Yes	1	THANK/DISCONTINUE
No	2	
Do not work	3	

SMOKING STATUS

I'm now going to ask some questions about cigarette smoking. This includes cigarettes that are bought ready-made as well as cigarettes that you make yourself.

6. At the present time, do you smoke cigarettes every day, occasionally or not at all?

Every day	1	(daily smoker)
Occasionally	2	(occasional smoker)
Not at all	3	

7. Have you smoked at least 100 cigarettes in your life?

Yes	1
No	2

- IF Q6, ANSWERS "Every Day" OR "Occasionally", QUALIFIES AS 'CURRENT SMOKER'.
- IF Q6, ANSWERS "Not at all" AND ANSWERS "Yes" in Q7, QUALIFIES AS 'FORMER SMOKER'.
- IF Q6, ANSWERS "Not at all" AND ANSWERS "No" in Q7, QUALIFIES AS 'NEVER SMOKER'.

ASK 'CURRENT SMOKERS':

8. How long have you smoked cigarettes? (READ LIST; GET MIX)

Less than one year	1
1-3 years	2
4-5 years	3
6-10	4
11-20 years	5
Over 20 years	6

9. On average, how many cigarettes do you smoke per day? (GET MIX)

[__ __] cigarettes per day

1-4 cigarettes a day	1
5-10 cigarettes a day	2
11 to 20 cigarettes a day	3
More than 20 cigarettes a day	4

10. Are you now seriously thinking of quitting smoking? (GET MIX; INCLUDE AS POTENTIAL QUITTERS)

Yes	1
No	2

ASK 'FORMER' SMOKERS:

11. When did you stop smoking? (READ OPTIONS; GET MIX BUT MOSTLY MORE THAN YEAR AGO)

Within the past year	1
More than a year ago	2

12. How long had you smoked cigarettes? (READ LIST; GET MIX) NOTE: IF PERSON SAYS THEY SMOKED OFF/ON AGAIN, ASK THEM TO PROVIDE OVERALL ESTIMATE.

Less than one year	1
1-3 years	2
4-5 years	3
6-10	4
11-20 years	5
Over 20 years	6

13. When you smoked cigarettes, did you smoke every day or occasionally (i.e. less than every day) (GET MIX, BUT MOSTLY DAILY SMOKERS)

Every day	1
Occasionally	2

14. On average, how many cigarettes were you smoking per day at the time you quit? (GET MIX)

[__ __] cigarettes per day

1-4 cigarettes a day	1
5-10 cigarettes a day	2
11 to 20 cigarettes a day	3
More than 20 cigarettes a day	4

FOCUS GROUP HISTORY

15. Have you attended <u>in the last 12 months</u> a discussion group or interview that was arranged in advance and for which you received a small sum of money?

Yes	1	(THANK/DISCONTINUE)
No	2	

16. In total, how many times have you ever participated in a discussion group or arranged interview?

Never	1	
Once or twice	2	(GO TO Q17)
Three times or more	3	(THANK/DISCONTINUE)

17. What were the topics of the discussion groups or arranged interviews?

_____

THANK/DISCONTINE IF TOPIC RELATED TO SMOKING, TOBACCO PRODUCTS, TOBACCO PACKAGE LABELING, CHEMISTRY/BIOCHEMISTRY.

18. In the discussion group, there will be two short written exercises. Are you comfortable reading and writing in English (French)?

Yes	1	
No	2	(THANK/DISCONTINUE)

RECORD GENDER BY OBSERVATION (ENSURE APPROXIMATE SPLIT)

Female	1	
Male	2	

I would like to invite you to attend a discussion group on (DAY), (DATE), at (TIME). It will last approximately two hours. You will receive a cash payment of $50 for your time, and light refreshments will be served. Would you be willing to attend?

Yes	1	
No	2	THANK AND DISCONTINUE

Do you have a pen handy so that I can give you the address where the discussion group will be held? It will be held at _____. Please tell people you are there for a focus group. I would like to remind you that the group is at (TIME) on (DATE). If you use glasses for reading, or if you use a hearing aid, please bring them with you.

The group will be taped for research purposes and members of the research team will be observing the discussion from an adjoining room. You will be asked to sign a waiver to acknowledge that you will be audio or video-taped during the session. All information collected will be used for research purposes only and administered in accordance with laws designed to protect your privacy.

As we are only inviting a small number of people to attend, your participation is very important to us. If for some reason you are unable to attend, please call so that we can get someone to replace you. You can reach us at ____ at our office. Please ask for ____. Someone will call you the day before to remind you about the discussion group.

Could I please confirm your name and phone number?

****

RESPONDENT'S NAME: _____

PHONE #: HOME _____

FOCUS GROUP TIME/LOCATION: _____

Thank you.

Étude visant à vérifier et à améliorer la compréhension qu'ont les Canadiens et Canadiennes de la chimie de la cigarette et des effets de celle-ci sur la santé (POR-05-54)
Questionnaire de recrutement

Caractéristiques des participants :

— **Prétest : 2 groupes à Ottawa.**

— 14 rencontres de discussion : 4 rencontres à Montréal (en français) et 4 à Toronto (en anglais); 2 rencontres à Halifax, 2 à Winnipeg et 2 à Calgary.

— Groupe cible : résidents canadiens âgés de 18 ans ou plus, appartenant aux sous-groupes suivants :

- Fumeurs actuels : personnes qui fument la cigarette tous les jours ou à l'occasion (fumeurs occasionnels).
- Anciens fumeurs : personnes qui ne fument pas présentement mais qui ont déjà fumé au moins 100 cigarettes au cours de leur vie.
- Jamais fumé : personnes n'ayant jamais fumé ou qui ont fumé moins de 100 cigarettes au cours de leur vie.
- Moins scolarisés : personnes possédant un diplôme d'études secondaires, tout au plus.
- Plus scolarisés : personnes ayant au moins entrepris des études postsecondaires.
- Jeunes (18 à 24 ans).

— Les groupes de fumeurs doivent présenter une composition équilibrée en fonction de la durée du tabagisme, du type de fumeur (quotidien ou occasionnel) et de la quantité de cigarettes fumées (par jour). Dans chaque groupe, inclure de 3 à 5 fumeurs qui envisagent cesser de fumer.

— Les groupes d'anciens fumeurs doivent présenter une composition équilibrée en fonction de la durée du tabagisme, du type de fumeur (quotidien ou occasionnel), de la quantité de cigarettes fumées (par jour) et du montant de temps s'étant écoulé depuis qu'ils ont cessé de fumer.

— En ce qui a trait à l'éducation, les deux principaux groupes doivent présenter une composition équilibrée. Les groupes réunissant des participants moins scolarisés doivent être composés de personnes ayant fréquenté uniquement l'école publique, de personnes ayant fait des études secondaires et d'autres, ayant obtenu un diplôme d'études secondaires. Les groupes réunissant des participants plus scolarisés doivent être composés de personnes ayant fait des études collégiales ou universitaires et d'autres, ayant obtenu un diplôme d'études collégiales ou universitaires.

— Tous les groupes doivent présenter une composition équilibrée en fonction du sexe et de l'âge. Les participants des groupes sans jeunes doivent représenter tous les groupes d'âge de 25 ans à 60 ans.

— Au moment de recruter les participants, on écartera les personnes possédant un diplôme en chimie et travaillant dans le domaine des soins de santé, du tabac ou des produits chimiques ou encore, dans le domaine pharmaceutique.

— On recrutera 12 personnes de sorte à obtenir de 8 à 10 participants.

— Les participants recevront 50 $.

— On dévoilera le commanditaire de l'étude (Santé Canada / le gouvernement du Canada).

— Nota : Vérifier que les participants sont en mesure d'articuler clairement leurs idées en anglais ou en français.

— Les rencontres servant au prétest auront lieu à Ottawa :

	Ottawa
	Anglais
17 :30 h	École secondaire Anciens fumeurs
20 h	Postsecondaire Fumeurs

— Les groupes seront répartis comme suit :

	Halifax	**Montréal**	**Montréal**	**Toronto**	**Toronto**	**Winnipeg**	**Calgary**
	Anglais	**Français**	**Français**	**Anglais**	**Anglais**	**Anglais**	**Anglais**
18 h	Jeunes Jamais fumé	École secondaire Fumeurs	Jeunes Fumeurs	École secondaire Fumeurs	Jeunes Fumeurs	Postsecondaire Fumeurs	Jeunes Jamais fumé
20 h	Postsecondaire Fumeurs	Postsecondaire Anciens fumeurs	École secondaire Anciens fumeurs	Postsecondaire Anciens fumeurs	École secondaire Anciens fumeurs	École secondaire Fumeurs	Postsecondaire Fumeurs

Questionnaire de recrutement

Bonjour/bonsoir, je suis _____ , de Phœnix, une maison de recherche indépendante sur l'opinion publique. Nous réalisons présentement une étude pour Santé Canada, un ministère du gouvernement du Canada, auprès des gens de votre région.

Cette étude comportera une série de rencontres de discussion d'une durée de deux heures chacune. Les participants et participantes recevront une rétribution et des rafraîchissements seront servis. Vous êtes tout à fait libre de participer ou non à cette étude et votre décision d'y participer ou de vous abstenir n'aura aucun effet sur vos relations avec le gouvernement du Canada. Vos réponses seront traitées de manière confidentielle. Elles ne seront utilisées qu'à des fins de recherche et seront traitées conformément aux lois visant à protéger les renseignements personnels.

Puis-je vous poser quelques questions pour déterminer votre admissibilité à cette étude ?

Oui	1	CONTINUER
Non	2	REMERCIER ET METTRE FIN À L'ENTRETIEN

1. Est-ce qu'un membre de votre foyer ou de votre famille immédiate, y compris vous-même, travaille dans l'un des domaines suivants ? (LIRE LA LISTE)

   Une maison d'études de marché, une agence de relations publiques ou une agence de publicité
   Les médias (radio, télévision, journaux, revues, etc.)
   Le secteur de la santé (médecins, infirmières, dentistes, hôpitaux, cliniques)
   Un ministère ou une agence d'un gouvernement fédéral, provincial ou municipal, voué à la santé
   L'industrie du tabac
   Une entreprise biochimique, pharmaceutique ou de produits chimiques

   [ ] Oui (REMERCIER ET METTRE FIN À L'ENTRETIEN)
   [ ] Non (CONTINUER)

2. Auquel des groupes d'âge suivants appartenez-vous ? (LIRE)

Moins de 18 ans	1	REMERCIER ET METTRE FIN À L'ENTRETIEN
18 à 24 ans	2	JEUNES
25 à 34 ans	3	
35 à 44 ans	4	
45 à 54 ans	5	
55 à 60 ans	6	
Plus de 60 ans	7	REMERCIER ET METTRE FIN À L'ENTRETIEN

3. Quel est le niveau de scolarité le plus élevé que vous ayez réussi ? (LIRE LA LISTE AU BESOIN; VISER UNE COMPOSITION ÉQUILIBRÉE DANS LES DEUX PRINCIPALES CATÉGORIES) NOTA : LES GROUPES SONT ÉTABLIS EN FONCTION DU COMPORTEMENT EN MATIÈRE DE TABAGISME ET DE LA SCOLARITÉ. LES GROUPES DE JEUNES DOIVENT REPRÉSENTER TOUS LES NIVEAUX DE SCOLARITÉ.

École primaire	1
Études secondaires partielles	2
Études secondaires terminées	3
Collège ou école technique ou cégep : études partielles	4
Collège ou école technique ou cégep : études terminées	5
Études universitaires partielles	6
Études universitaires terminées	7

POSER LES QUESTIONS SUIVANTES AUX RÉPONDANTS AYANT TERMINÉ LEURS ÉTUDES COLLÉGIALES OU UNIVERSITAIRES :

4. Dans quelle matière ou dans quel domaine avez-vous obtenu un diplôme ?

Matière/domaine : _____: METTRE FIN À L'ENTRETIEN SI A OBTENU UN DIPLÔME EN CHIMIE / BIOCHIMIE OU AUTRE DOMAINE SEMBLABLE

5. Devez-vous avoir une connaissance de base de la chimie pour effectuer vos tâches ou vous acquitter de vos responsabilités au travail ?

Oui	1	REMERCIER ET METTRE FIN À L'ENTRETIEN
Non	2	
Ne travaille pas	3	

USAGE DE LA CIGARETTE

Je vais maintenant vous poser des questions sur l'usage de la cigarette. Il est question ici des cigarettes que vous achetez toutes faites de même que celles que vous fabriquez vous-même.

6. Actuellement, fumez-vous la cigarette tous les jours, à l'occasion ou jamais ?

Tous les jours	1	(fumeur quotidien)
À l'occasion	2	(fumeur occasionnel)
Jamais	3	

7. Avez-vous fumé au moins 100 cigarettes au cours de votre vie ?

Oui	1
Non	2

- SI RÉPOND « Tous les jours » OU « À l'occasion », À LA Q6, CONSIDÉRER LE RÉPONDANT COMME UN FUMEUR ACTUEL.

- SI RÉPOND « Jamais », À LA Q6, ET « Oui » À LA Q7, CONSIDÉRER LE RÉPONDANT COMME UN ANCIEN FUMEUR.
- SI RÉPOND « Jamais », À LA Q6, ET « Non » À LA Q7, CONSIDÉRER LE RÉPONDANT COMME UNE PERSONNE N'AYANT JAMAIS FUMÉ.

POSER LES QUESTIONS SUIVANTES AUX FUMEURS ACTUELS :

8. Depuis combien de temps fumez-vous la cigarette ? (LIRE LA LISTE; OBTENIR UNE COMPOSITION ÉQUILIBRÉE)

Moins d'un an	1
1 à 3 ans	2
4 à 5 ans	3
6 à 10 ans	4
11 à 20 ans	5
Plus de 20 ans	6

9. En moyenne, combien de cigarettes fumez-vous par jour ? (OBTENIR UNE COMPOSITION ÉQUILIBRÉE)

[__ __] cigarettes par jour

1 à 4 cigarettes par jour	1
5 à 10 cigarettes par jour	2
11 à 20 cigarettes par jour	3
Plus de 20 cigarettes par jour	4

10. Considérez-vous sérieusement cesser de fumer ? (OBTENIR UNE COMPOSITION ÉQUILIBRÉE; CONSIDÉRER CES RÉPONDANTS COMME DES FUMEURS QUI ENVISAGENT CESSER DE FUMER)

Oui	1
Non	2

POSER LES QUESTIONS SUIVANTES AUX ANCIENS FUMEURS :

11. Quand avez-vous cessé de fumer ? (LIRE LES CATÉGORIES DE RÉPONSE; RETENIR SURTOUT DES RÉPONDANTS AYANT CESSÉ DE FUMER IL Y A PLUS D'UN AN MAIS AUSSI, DES RÉPONDANTS AYANT CESSÉ DE FUMER CETTE ANNÉE)

Cette année	1
Il y a plus d'un an	2

12. Pendant combien de temps aviez-vous fumé la cigarette ? (LIRE LA LISTE; OBTENIR UNE COMPOSITION ÉQUILIBRÉE) NOTA : SI LE RÉPONDANT INDIQUE AVOIR FUMÉ DE FAÇON INTERMITTENTE, DEMANDER UN CHIFFRE APPROXIMATIF.

Moins d'un an	1
1 à 3 ans	2
4 à 5 ans	3
6 à 10 ans	4

11 à 20 ans	5
Plus de 20 ans	6

13. Quand vous fumiez la cigarette, fumiez-vous chaque jour ou à l'occasion (moins d'une fois par jour) (RETENIR SURTOUT DES FUMEURS QUOTIDIENS MAIS AUSSI, DES FUMEURS OCCASIONNELS)

Chaque jour	1
À l'occasion	2

14. En moyenne, combien de cigarettes fumiez-vous chaque jour quand vous avez cessé de fumer ? (OBTENIR UNE COMPOSITION ÉQUILIBRÉE)

[__ __] cigarettes par jour

1 à 4 cigarettes par jour	1
5 à 10 cigarettes par jour	2
11 à 20 cigarettes par jour	3
Plus de 20 cigarettes par jour	4

PARTICIPATION ANTÉRIEURE À DES RENCONTRES DE DISCUSSION

15. Au cours des derniers 12 mois, avez-vous participé à une rencontre de discussion ou à une entrevue organisées à l'avance et reçu une somme d'argent en échange de votre participation ?

Oui	1	(REMERCIER ET METTRE FIN À L'ENTRETIEN)
Non	2	

16. Au total, combien de fois avez-vous participé à une rencontre de discussion ou à une entrevue organisée à l'avance, au cours de votre vie ?

Jamais	1	
Une ou deux fois	2	(ALLER À LA Q17)
Trois fois ou plus	3	(REMERCIER ET METTRE FIN À L'ENTRETIEN)

17. Quel était le sujet de la rencontre de discussion ou de l'entrevue ?

_____

REMERCIER ET METTRE FIN À L'ENTRETIEN SI LA RENCONTRE OU L'ENTREVUE PORTAIT SUR LE TABAGISME, LES PRODUITS DU TABAC, L'ÉTIQUETAGE DES PRODUITS DU TABAC, LA CHIMIE OU LA BIOCHIMIE.

18. Pendant la rencontre de discussion, on fera deux courts exercices écrits. Êtes-vous à l'aise de lire et d'écrire en français?

Oui	1	
Non	2	(REMERCIER ET METTRE FIN À L'ENTRETIEN)

NOTER LE SEXE PAR OBSERVATION (VISER UNE COMPOSITION ÉQUILIBRÉE)

Femme	1
Homme	2

J'aimerais vous inviter à une rencontre de discussion le (JOUR) (DATE), À (HEURE). Elle durera environ deux heures. Vous recevrez 50 $ comptant en reconnaissance du temps accordé et des rafraîchissements seront servis. Acceptez-vous d'y participer ?

Oui	1	
Non	2	REMERCIER ET METTRE FIN À L'ENTRETIEN

Si vous avez un crayon à portée de la main, je vais vous donner l'adresse où aura lieu la discussion. Elle aura lieu au _____. Au moment de vous présenter, veuillez indiquer qu'on vous attend pour participer à une rencontre de discussion. Permettez-moi de vous rappeler que la discussion aura lieu à (HEURE) le (DATE). Si vous avez besoin de lunettes pour lire ou si vous utilisez un appareil auditif, veuillez les apporter.

Nous enregistrerons la discussion à des fins de recherche et des membres de l'équipe de recherche observeront la rencontre à partir d'une pièce voisine. Nous vous demanderons de signer un formulaire de renonciation indiquant que vous êtes au courant que la rencontre sera enregistrée sur audiocassette ou vidéocassette. Tous les renseignements recueillis ne seront utilisés qu'à des fins de recherche et seront traités conformément aux lois visant à protéger les renseignements personnels.

Étant donné que nous n'invitons qu'un petit nombre de personnes, votre participation est très importante pour nous. S'il vous est impossible de vous présenter, pour une raison ou pour une autre, veuillez communiquer avec nous afin que nous puissions trouver un remplaçant. Vous pouvez nous joindre à nos bureaux au ____. Veuillez demander ____. Quelqu'un vous téléphonera la veille pour vous rappeler la rencontre.

Puis-je confirmer votre nom et votre numéro de téléphone ?

****

NOM DU RÉPONDANT : _____

N^{O} DE TÉLÉPHONE – RÉSIDENCE : _____

HEURE/LIEU DE LA RENCONTRE : _____

Je vous remercie.

Understanding of Chemistry of Cigarette Smoking and Impact on Health Study (POR-05-54) Moderator's Guide

Introduction (5 minutes)

- ❑ Introduce moderator/Phoenix
- ❑ Thanks for attending/value your being here
- ❑ Explain general purpose of focus group discussions:
  - Gauge *opinions* about issues/ideas/products
  - Okay to disagree; want people to speak up if hold different view
- ❑ Tonight, we're conducting research on behalf of Health Canada to explore issues related to smoking.
- ❑ Looking for candour and honesty; comments treated in confidence; reporting in aggregate form only; observers behind one-way glass; taping for note-taking purposes only.
- ❑ Please turn off cell phones.
- ❑ Any questions? ACCEPT BRIEF QUESTIONS BUT DO NOT LINGER.
- ❑ Roundtable introduction: please tell us your first name and one of your favourite interests or hobbies.

Background/Context: Smoking-Related Behaviour (10 minutes)

When we recruited you for this study, you all indicated that you are… (current smokers/former smokers/people who have never smoked).

NOTE: 'NEVER SMOKERS' CAN INCLUDE PEOPLE WHO HAVE SMOKED FEWER THAN 100 CIGARETTES IN THEIR LIFE. EXPLAIN THIS IF ISSUE IS RAISED.

CURRENT SMOKERS:

1. How many of you smoke on a daily basis? (HANDCOUNT) For those of you who do, approximately how many cigarettes do you smoke a day? For those who don't, how often do you smoke?

2. How long have you been smoking?

3. Has anyone tried to quit smoking? If so, how did that go?

FORMER SMOKERS:

4. When did you quit smoking for good?

5. How long had you smoked before you quit? How much did you tend to smoke before quitting? By this, I mean how many cigarettes a day did you smoke, or how many days a month did you smoke if you didn't smoke on a daily basis?

6. Why did you quit smoking? Any other reasons?

   Probe: - cost/financial reasons
   - societal pressure

NEVER SMOKERS:

7. What is the main reason why you have never smoked? Any other reasons?
8. Have you ever tried to smoke? If so, what was that like?
9. Do any of your friends or family members smoke?

Basic Understanding of Chemistry (Exercise 1) (30 minutes)

Most of the rest of our discussion tonight is going to focus on issues related to chemistry. None of us is an expert in chemistry, including me, so please don't worry about how much you know or don't know about it. We just want to explore people's basic understanding of chemistry, and then how it relates to smoking.

10. How many people took chemistry in school? How many think they have at least a basic understanding of chemistry? (QUICK HANDCOUNTS FOR EACH, NO DISCUSSION)

I'm now going to ask you to complete a short exercise that explores some basic issues in chemistry. Unlike the tests you did in school, you're getting paid to do this one!

Before I ask you to do this, I want to point out the following:

- Please complete the exercise on your own and in silence. No need to put your name on the sheet.
- Answer the questions to the best of your ability, but do not guess at an answer. If you are genuinely unsure about something, check the 'Don't know' box or leave it blank. Remember, you're here because you are not experts in chemistry, so please don't be uncomfortable if there is something you don't know or are unsure about.
- Do not go back to change any answers. Once you have completed a question, please continue on and do not backtrack. This is important.
- If you have a question or if something is unclear, just raise your hand and I'll come to see you.
- When you have completed the exercise, please put your pencil down to indicate that you have finished. Again, no revisiting any answers.
- I'll give you about 5 minutes to do the exercise. It's not very long. After that, we'll talk about it all together.

HAND OUT COPIES OF EXERCISE. ALLOW PARTICIPANTS 5-7 MINUTES TO COMPLETE IT. WHEN PARTICIPANTS HAVE FINISHED, CONTINUE. MAKE SURE PENCILS STAY ON TABLE. BE VERY BRIEF FOR Qs 11-14.

11. How did you find the exercise… was it easy or difficult to do? (HANDCOUNTS)

12ab 12. Which questions did you find easiest to answer? Why? 12a 12b

13ab 13. And which questions were the most difficult to answer? Why? 13a 13b

14 14. Did you check the 'don't know' box very often or leave things blank?

We'll talk about some of the questions now, but not others because there's not enough time to go through everything.

15ab 15. How did you describe what a chemical is in question 1? Anything else? 15a 15b

16abc 16. Let's go through the true or false statements in question 6. How many people said true/false for that question? 16a

- QUICKLY READ EACH STATEMENT AND RIGHT ANSWER. RECORD NUMBER WHO ANSWERED CORRECTLY ON ANSWER SHEET.
- PROBE ISSUES WHERE MANY GAVE WRONG ANSWERS FOR THE REASONS BEHIND THEIR PERCEPTIONS AND THE WAY THEY THINK ABOUT ISSUE. 16b
- PROBE UNDERSTANDING OF MILLIGRAMS. 16c

17ab 17. When you think of smoke, do you tend to think of it as composed of chemicals? What about pollution, do you tend to think of it as a mixture of chemicals? 17a 17b

18abcd 18. Let's move to question 7. Before discussing the impact you attributed to these items, do you tend to think of the health impact of these items as resulting from exposure to a chemical or mixture of different chemicals? If not, why not? Which, if any, would you be most likely to think of in terms of exposure to chemicals? 18a 18b 18c

Probe: - do they make a link between health impact and chemicals per se? 18d

19ab 19. Who attributed a moderate or big impact to…? 19a

Instruction

- READ EACH ITEM AND RECORD NUMBER WHO PUT BIG/MODERATE IMPACT.
- PROBE 3-4 ITEMS PER GROUP. DETERMINE SELECTION METHOD IN PRE-TEST, INCLUDING EFFECTIVE PROBES. THIS MIGHT INCLUDE PERCEPTIONS OF BIG/ MODERATE IMPACT BOTH WHERE THIS IS TRUE AND WHERE IT IS NOT. 19b
- DO NOT PROBE RE: SECOND-HAND SMOKE Instruction

Let's briefly talk about… (INSERT ITEM. DO FOR 3-4 ITEMS)

20. How would you describe the impact on health of this item? That is, how does it have an impact on people's health? How do the effects show themselves? What are they?

Probe: - link health impact to exposure to number, concentration & type of chemicals?

Link Between Chemistry and Smoking (Exercise 2) (45 minutes)

I'm now going to ask you to complete another short exercise. This one focuses more specifically on chemistry and cigarettes. Please follow the same procedure as last time.

BRIEFLY RECAP 'RULES' IF NEEDED. COLLECT PREVIOUS QUESTIONNAIRE.

HAND OUT COPIES OF EXERCISE. ALLOW PARTICIPANTS 10 MINUTES TO COMPLETE IT. WHEN PARTICIPANTS HAVE FINISHED, CONTINUE. MAKE SURE PENCILS STAY ON TABLE. BE VERY BRIEF FOR Qs 22-25.

21. How did you find the exercise… was it easy or difficult to do? (HANDCOUNTS)

22. Which questions did you find easiest to answer? Why?

23. And which questions were the most difficult to answer? Why?

24. Did you check the 'don't know' box very often or leave things blank?

Once again, we'll talk about some of the questions, but not others.

25. What chemicals did people put down for question 1? How many identified that chemical? What else?

- HAVE PARTICIPANTS IDENTIFY CHEMICALS. FOR EACH ONE MENTIONED, ASK HOW MANY IDENTIFIED IT AND RECORD NUMBER ON ANSWER SHEET.

26. Was anyone unable to identify any chemicals in cigarette tobacco? How many identified one chemical?, two chemicals?, more than two? (HANDCOUNT FOR EACH)

27. Moving to question 2, who said…? (GO THROUGH RESPONSE OPTIONS)

- OBTAIN/RECORD NUMBER THAT ANSWERED EACH OPTION.
- PROBE FOR REASONS BEHIND ANSWERS.

28. For those who think tobacco smoke does not contain more chemicals than cigarette tobacco, or only a few more, why do you think that? For those who think tobacco smoke contains many more chemicals, or different chemicals, why do you think that? What is the difference between burned and unburned tobacco?

29. For question 3, how many identified the same chemicals as in Q1? (HANDCOUNT)

30. What additional/new chemicals were identified at Q3?

- HAVE PARTICIPANTS IDENTIFY NEW CHEMICALS. FOR EACH ONE MENTIONED, ASK HOW MANY IDENTIFIED IT AND RECORD NUMBER ON ANSWER SHEET.

31. When people answered question 1, were you thinking of cigarette tobacco (unlit) or cigarette tobacco smoke or both? Do you differentiate between the composition of cigarette tobacco and cigarette tobacco smoke? Why/why not?

32. Looking at question 6, which parts of the body do you think are affected by cigarette tobacco smoke and how are they affected?

- HAVE PARTICIPANTS IDENTIFY BODY PARTS. FOR EACH ONE MENTIONED, ASK HOW MANY IDENTIFIED IT AND RECORD NUMBER. USE FLIP CHART WITH IMAGE OF HUMAN BODY.

33. Looking at question 7, which health conditions do you think are caused by cigarette tobacco smoke?

- READ EACH ITEM AND RECORD NUMBER WHO SAID IT IS CAUSED BY SMOKE.
- DETERMINE EFFECTIVE PROBES IN PRE-TEST, TIME PERMITTING.

Review of Summary Document (20 minutes)

I'm now going to hand out a short document that presents information on the chemistry of cigarette smoking and its health impacts. No questions to answer on this one – we are done with that. Please read this on your own, and we'll talk about it as a group when everyone is finished.

COLLECT PREVIOUS QUESTIONNAIRE. HAND OUT NEW DOCUMENT. GIVE PARTICIPANTS 4-5 MINUTES TO READ IT. ONCE THEY HAVE FINISHED, CONTINUE.

34. What's your overall impression of this document? Why?

35. Is it clear and easy to understand? If not, what is not clear? Anything else?

36. Does the document do a good job informing you about the chemistry of smoking and its health impacts? Why/why not? Does it tell you the things you would want to know about the basic chemistry of tobacco and tobacco smoke? If not, what is missing?

Probe: - what works/what does not
- strengths/weaknesses

37. Is it clear from the information in the document that …

- New chemicals are formed when tobacco is lit (i.e. through the act of combustion)?
- It is the chemicals in cigarette tobacco smoke that are responsible for the health hazards associated with smoking?

38. How much of this is <u>new</u> information that you did not know before tonight? What information is new to you? Anything else?

39. Does this document provide you with important or relevant information? What information do you consider to be <u>most</u> important or relevant? Why?

40. Do you think it's important to understand the chemistry behind smoking and its health impacts (i.e. as opposed to focusing on the effects)? Why do you say that? Do you think this type of information would help people make an <u>informed</u> choice about smoking? Why/why not? What, if anything, could make it more effective in this regard?

41. Do you have any suggestions on how the key messages in this document could be improved?

42. How would you like to receive this type of information? Do you have any other suggestions that could help inform and educate Canadians on the harmful effects of chemicals in tobacco smoke on human health?

Probe: - written material, television, radio, website, other…

Review of Smoking Wheel (10 minutes)

DEPENDING ON TIME AVAILABLE, THE SMOKING WHEEL MAY NOT BE REVIEWED IN EVERY LOCATION.

I'd like to show you one last thing – a tool developed to inform people about the concentration and health impact from exposure to various chemicals through smoking.

HAND OUT COPIES OF WHEEL AND EXPLAIN HOW IT WORKS. AS PARTICIPANTS EXAMINE IT, CONTINUE.

43. What's your overall impression of this tool? Why?

44. Is it clear how it works?

45. Do you think this is useful? Why/why not? Who do you think would use it?

46. Do you think it is an <u>informative</u> tool that could <u>educate</u> people on the harmful effects of chemicals in tobacco smoke on human health? Why?

47. Do you have any suggestions on how it could be improved?

Conclusion

48. Do you have any final comments or suggestions about anything we have discussed tonight?

THANK PARTICIPANTS. COLLECT ALL MATERIALS.

Étude sur la compréhension de la chimie et de la cigarette et des effets sur la santé (POR-05-54)
Guide de modération

Introduction (5 minutes)

- Présenter le (la) modérateur(rice) et Phoenix.
- Remercier les participants de leur présent et leur rappeler l'importance de leurs commentaires
- Expliquer l'objectif général des groupes de discussion :

  - Mesurer l'*opinion* des participants à l'égard d'enjeux, d'idées et de produits.

  - Les participants peuvent être en désaccord; nous voulons que les gens s'expriment s'ils ont des points de vue divergents.
- Nous effectuons ce soir une étude pour le compte de Santé Canada afin d'explorer des enjeux liés à la cigarette et au tabagisme.
- Nous désirons des réponses franches et honnêtes. Vos commentaires demeureront confidentiels et ne seront rapportés que sous forme regroupée. Des observateurs se trouvent derrière le miroir d'observation. Nous enregistrons la discussion aux fins de prise de note seulement.
- Veuillez éteindre votre téléphone cellulaire.
- Avez-vous des questions? RÉPONDEZ BRIÈVEMENT AUX QUESTIONS, MAIS NE VOUS ATTARDEZ PAS.
- Tour de table : présentez-vous en donnant votre prénom ainsi que l'un de vos passe-temps favoris.

Contexte : Comportements liés au tabagisme (10 minutes)

Lorsque nous vous avons recruté(e) pour cette étude, vous nous avez indiqué que vous (êtes fumeur(euse)/êtes un(e) ancien(ne) fumeur(euse)/n'aviez jamais fumé).

NOTE : LES PERSONNES QUI N'ONT « JAMAIS FUMÉ » INCLUENT ÉGALEMENT CELLES QUI ONT FUMÉ MOINS DE 100 CIGARETTES AU COURS DE LEUR VIE. EXPLIQUEZ SI LA QUESTION VOUS EST POSÉE.

FUMEURS ACTUELS :

1. Combien d'entre vous fumez tous les jours? (À MAIN LEVÉE) Environ combien de cigarettes fumez-vous par jour? Si vous ne fumez pas tous les jours, à quelle fréquence fumez-vous?

2. Depuis quand fumez-vous?

3. Est-ce qu'il y en a parmi vous qui ont déjà essayé d'arrêter de fumer? Si oui, comment cela s'est-il passé?

ANCIENS FUMEURS :

4. Quand avez-vous arrêté de fumer?

5. Pendant combien de temps avez-vous fumé avant d'arrêter? Quelles étaient vos habitudes de fumeur(euse)? C'est-à-dire combien de cigarettes fumiez-vous par jour ou combien de jours par mois fumiez-vous si vous ne fumiez-vous tous les jours?

6. Pourquoi avez-vous arrêté de fumer? Y a-t-il d'autres raisons?

   Sondez : - Coût ou raisons monétaires
   - Pression sociale

JAMAIS FUMÉ :

7. Quelle est la principale raison pour laquelle vous n'avez jamais fumé? Y a-t-il d'autres raisons?
8. Avez-vous déjà essayé de fumer? Si oui, comment avez-vous trouvé cela?
9. Y a-t-il des fumeurs parmi vos parents et amis?

Notions de base en chimie (Exercice 1) (30 minutes)

La majeure partie de la discussion de ce soir portera sur la chimie. Personne ici n'est expert en chimie, moi y compris; donc ne vous inquiétez pas. Nous voulons voir dans quelle mesure les gens possèdent des notions de base en chimie et ensuite établir un lien avec le tabagisme.

10. Combien d'entre vous ont étudié la chimie à l'école? Et combien d'entre vous diraient qu'ils possèdent des notions de base en chimie? (À MAIN LEVÉE POUR CHAQUE QUESTION, AUCUNE DISCUSSION.)

Je vais vous demander de faire un court exercice sur certains principes de base en chimie. Sauf que contrairement aux tests que vous avez subis à l'école, vous serez payé(e) pour faire celui-ci!

Avant de commencer, j'aimerais apporter quelques précisions :

- Veuillez faire l'exercice seul(e) et en silence. Vous n'avez pas besoin d'écrire votre nom sur la feuille.
- Répondez aux questions du mieux que vous le pouvez, mais ne cherchez pas à deviner les réponses. Si vous n'êtes pas certains, cochez « Je ne sais pas » ou ne répondez pas. Rappelez-vous que vous êtes ici parce que vous n'êtes pas des experts en chimie. Donc, ne soyez pas mal à l'aise si vous ne connaissez pas la réponse ou si vous êtes incertain(e) de quelque chose.
- Ne revenez pas en arrière pour changer vos réponses. Lorsque vous avez répondu à une question, passez aux suivantes et ne revenez pas sur vos pas. Ceci est important.
- Si vous avez des questions ou si vous ne comprenez pas quelque chose, levez la main et je viendrai vous voir.

- Une fois l'exercice terminé, veuillez déposer votre crayon. Je le répète encore, ne révisez pas vos réponses.
- Vous avez environ 5 minutes pour faire l'exercice. Ce n'est pas très long. Après, nous en discuterons ensemble.

DISTRIBUEZ L'EXERCICE AUX PARTICIPANTS. ALLOUEZ DE 5 À 7 MINUTES POUR QU'ILS Y RÉPONDENT. LORSQU'ILS AURONT TERMINÉ, CONTINUEZ. ASSUREZ-VOUS QUE LES CRAYONS DEMEURENT SUR LA TABLE. SOYEZ TRÈS BREF (BRÈVE) POUR LES QUESTIONS 11 À 14.

11. Comment avez-vous trouvé l'exercice … facile ou difficile? (MAIN LEVÉE)

12. Quelles étaient les questions les plus faciles? Pourquoi?

13. Et quelles étaient les questions les plus difficiles? Pourquoi?

14. Avez-vous souvent coché « Je ne sais pas » ou laissé plusieurs réponses en blanc?

Nous discuterons de certaines questions, mais pas de toutes parce nous n'aurons pas le temps.

15. À la question 1, comment avez-vous décrit ce qu'est une substance chimique? Avez-vous autre chose à ajouter?

16. Passons aux énoncés vrai ou faux à la question 6. Combien d'entre vous ont répondu vrai/faux à chacun de ces énoncés?

    - LISEZ RAPIDEMENT CHACUN DES ÉNONCÉS ET DONNEZ LA RÉPONSE. NOTEZ LE NOMBRE DE PERSONNES QUI ONT RÉPONDU CORRECTEMENT SUR LA FEUILLE DE RÉPONSES.
    - SONDEZ LORSQUE PLUSIEURS PARTICIPANTS ONT DONNÉ UNE MAUVAISE RÉPONSE. TENTEZ DE CONNAÎTRE LES RAISONS DERRIÈRE LEURS PERCEPTIONS ET LEUR RAISONNEMENT.
    - SONDEZ POUR CONNAÎTRE LEUR COMPRÉHENSION DE MILLIGRAMME.

17. Lorsque vous pensez à la fumée, la voyez-vous généralement comme étant composée de plusieurs substances chimiques? Qu'en est-il de la pollution, la voyez-vous généralement comme un mélange de substances chimiques?

18. Passons à la question 7. Avant de discuter de la façon dont vous avez noté l'effet de chacun de ces éléments sur la santé, pensez-vous généralement que cet effet est produit par l'exposition à une substance chimique ou à un mélange de plusieurs substances chimiques? Pourquoi? Lorsqu'on parle d'exposition aux substances chimiques, pensez-vous à une seule substance ou à un mélange de plusieurs substances chimiques?

    Sondez : - Y a-t-il un lien entre les effets sur la santé et les substances chimiques elles-mêmes?

19. Qui a indiqué que (insérez l'élément) pouvait nuire moyennement ou grandement à la santé des gens?

- LISEZ LES ÉLÉMENTS ET, POUR CHACUN D'ENTRE EUX, NOTEZ LE NOMBRE DE PARTICIPANTS QUI ONT INDIQUÉ QU'IL POURRAIT NUIRE MOYENNEMENT OU GRANDEMENT À LA SANTÉ HUMAINE.
- SONDEZ POUR 3 OU 4 ÉLÉMENTS PAR GROUPE. DÉTERMINEZ LA MÉTHODE DE SÉLECTION ET LES FAÇONS EFFICACES DE SONDER LORS DU PRÉ-TEST; CECI INCLUT LES PERCEPTIONS DES EFFETS MOYENNEMENT OU GRANDEMENT NOCIFS, AUTANT LORSQUE C'EST VRAI QUE LORSQUE C'EST FAUX.
- NE SONDEZ PAS À PROPOS DE LA FUMÉE SECONDAIRE

Discutons brièvement… (INSÉREZ LES ÉLÉMENTS. DISCUTEZ DE 3 OU 4 D'ENTRE EUX.)

20. Selon vous, quel serait l'effet de cet élément sur la santé? C'est-à-dire, comment affecte-t-il la santé des gens? Comment se manifestent les effets? Quels sont-ils?

Sondez : Liez les effets de l'exposition au nombre, à la concentration et au type de substances chimiques.

La chimie et la cigarette (Exercice 2) (45 minutes)

Je vous demanderais maintenant d'effectuer un autre court exercice. Celui-ci porte plus précisément sur la chimie et la cigarette. Veuillez suivre les mêmes directives que pour le premier exercice.

AU BESOIN, REVOYEZ RAPIDEMENT LES « DIRECTIVES ». RAMASSEZ LE PREMIER QUESTIONNAIRE.

DISTRIBUEZ LE DEUXIÈME QUESTIONNAIRE. ALLOUEZ ENVIRON 10 MINUTES AUX PARTICIPANTS POUR Y RÉPONDRE. LORSQU'ILS AURONT TERMINÉ, CONTINUEZ. ASSUREZ-VOUS QUE LES CRAYONS DEMEURENT SUR LA TABLE. SOYEZ TRÈS BREF (BRÈVE) POUR LES Q22 À 25.

21. Comment avez-vous trouvé l'exercice … facile ou difficile? (MAIN LEVÉE)

22. Quelles étaient les questions les plus faciles? Pourquoi?

23. Et quelles étaient les questions les plus difficiles? Pourquoi?

24. Avez-vous souvent coché « Je ne sais pas » ou laissé plusieurs réponses en blanc?

Encore une fois, nous discuterons de certaines questions, mais pas de toutes les questions.

25. Quelles substances chimiques avez-vous inscrites à la question 1? Combien d'entre vous ont inscrit cette substance chimique? Y en a-t-il d'autres?

- LES PARTICIPANTS ONT-ILS INSCRIT DES SUBSTANCES CHIMIQUES? POUR CHACUNE DES SUBSTANCES CHIMIQUES MENTIONNÉES, DEMANDEZ COMBIEN D'ENTRE EUX L'ONT INSCRITE ET NOTEZ LE NOMBRE SUR LA FEUILLE DE RÉPONSES.

26. Est-ce que quelqu'un a été capable d'inscrire certaines substances chimiques qui se trouvent dans le tabac de cigarette? Combien en ont inscrit une? deux? plus de deux? (À MAIN LEVÉE POUR CHACUN)

27. Passons à la question 2, qui a dit…? (LISEZ LA LISTE D'OPTIONS)

    - NOTEZ LE NOMBRE DE PARTICIPANTS QUI ONT CHOISI CHACUNE DES OPTIONS.
    - SONDEZ POUR CONNAÎTRE LES RAISONS QUI MOTIVENT CES RÉPONSES.

28. Pour ceux qui croient que la fumée de tabac ne contient PAS plus de substances chimiques que le tabac de cigarette ou qu'elle n'en contient qu'un peu plus : qu'est-ce qui vous fait croire cela? Pour ceux qui croient que la fumée de tabac contient plus de substances chimiques que le tabac de cigarette ou qu'elle contient des substances chimiques de nature différente : qu'est-ce qui vous fait croire cela? Quelle est la différence entre le tabac grillé et le tabac non grillé?

29. À la question 3, combien d'entre vous ont inscrit les mêmes substances chimiques qu'à Q1? (À MAIN LEVÉE)

30. Quelles autres substances chimiques avez-vous inscrites à Q3?

    - LES PARTICIPANTS ONT-ILS INSCRIT D'AUTRES SUBSTANCES CHIMIQUES? POUR CHACUNE DES SUBSTANCES CHIMIQUES MENTIONNÉES, DEMANDEZ COMBIEN D'ENTRE EUX L'ONT INSCRITE ET NOTEZ LE NOMBRE SUR LA FEUILLE DE RÉPONSES.

31. En répondant à la question 1, pensiez-vous au tabac à cigarette (non grillé), à la fumée de cigarette ou aux deux? Faites-vous une distinction entre la composition du tabac de cigarette et celle de la fumée de cigarette? Pourquoi ou pourquoi pas?

32. Passons à la question 6, selon vous, quelles parties du corps sont affectées par la fumée de cigarette et de quelle façon le sont-elles?

    - LES PARTICIPANTS ONT-ILS ENCERCLÉ OU MARQUÉ D'UN « X » CERTAINES PARTIES DU DIAGRAMME DU CORPS HUMAIN? POUR CHACUNE DE CES PARTIES, DEMANDEZ COMBIEN D'ENTRE EUX L'ONT INDIQUÉE ET NOTEZ LE NOMBRE SUR LE DIAGRAMME AU TABLEAU.

33. Passons à la question 7, selon vous, quels problèmes de santé sont causés par la fumée de cigarette?

    - LISEZ CHACUNE DES OPTIONS ET NOTEZ LE NOMBRE DE PARTICIPANTS QUI ONT DIT QUE LA FUMÉE ÉTAIT EN CAUSE.
    - SI LE TEMPS LE PERMET, DÉTERMINEZ COMMENT SONDER DE FAÇON EFFICACE LORS DU PRÉ-TEST.

Examen du Résumé (20 minutes)

Je vais maintenant vous distribuer un court document sur la chimie du tabac et la santé. Vous n'aurez plus à répondre par écrit ce soir. Veuillez prendre le temps de lire le document et nous en reparlerons une fois que vous en aurez tous pris connaissance.

RAMASSEZ LE QUESTIONNAIRE PRÉCÉDENT. DISTRIBUEZ LE NOUVEAU DOCUMENT. ALLOUEZ 4 OU 5 MINUTES AUX PARTICIPANTS POUR LE LIRE. LORSQU'ILS AURONT TERMINÉ, CONTINUEZ.

34. Dans l'ensemble, que pensez-vous de ce document? Pourquoi?

35. Est-il clair et facile à comprendre? Si tel n'est pas le cas, qu'est-ce qui n'est pas clair? Y a-t-il autre chose?

36. Est-ce que le document réussit à vous renseigner sur la chimie du tabac et la santé? Pourquoi ou pourquoi pas? Vous renseigne-t-il sur les principes de base que vous vouliez savoir concernant la chimie du tabac et de la fumée de tabac? Si tel n'est pas le cas, que manque-t-il?

    Sondez : - Qu'est-ce qui est efficace / non efficace?
    - Quelles sont les forces et les faiblesses du document?

37. Est-ce que le document communique clairement que…

- Lorsque l'on allume une cigarette, il en résulte de nouvelles substances chimiques (c.-à-d., par combustion)?
- Ce sont les substances chimiques contenues dans la fumée de tabac qui sont responsables des problèmes de santé liés au tabagisme?

38. Combien de ces renseignements sont nouveaux pour vous? Qu'avez-vous appris ce soir? Autre chose?

39. Ce document contient-il des renseignements importants et pertinents? Quels sont les renseignements les plus importants ou les plus pertinents selon vous? Pourquoi?

40. Croyez-vous qu'il est important de comprendre la chimie du tabac et ses effets sur la santé (c.-à-d., plutôt qu'insister sur les effets)? Pourquoi dites-vous cela? Croyez-vous que ce type d'information pourrait permettre aux gens de faire un choix informé concernant le tabagisme? Pourquoi ou pourquoi pas? Qu'est-ce qui rendrait le message plus efficace à cet égard?

41. Avez-vous des suggestions pour améliorer la présentation des principaux messages véhiculés ici?

42. Dans quelle mesure souhaiteriez-vous recevoir ce type d'information? Avez-vous d'autres suggestions pour aider à informer et à éduquer vos concitoyens sur les effets

nocifs sur la santé qui sont causés par les substances chimiques contenues dans la fumée de tabac?

Sondez : - des documents écrits, la télévision, la radio, des sites Web, autre…

Examen de la roue (10 minutes)

SI LE TEMPS LE PERMET, L'EXAMEN DE LA ROUE N'AURA PAS LIEU LORS DE TOUS LES GROUPES DE DISCUSSION.

J'aimerais vous montrer une dernière chose. Il s'agit d'un outil conçu pour informer les gens de la concentration et des effets sur la santé causés par l'exposition à diverses substances chimiques lorsque l'on fume.

DISTRIBUEZ UNE COPIE DE LA ROUE ET EXPLIQUEZ-EN LE FONCTIONNEMENT. PENDANT QUE LES PARTICIPANTS L'EXAMINENT, CONTINUEZ.

43. Dans l'ensemble, que pensez-vous de cet outil? Pourquoi?

44. Son utilisation est-elle claire?

45. Croyez-vous qu'il s'agit d'un outil utile? Pourquoi ou pourquoi pas? Selon vous, qui l'utiliserait?

46. Croyez-vous qu'il s'agit d'un outil informatif qui pourrait éduquer les gens sur les effets nocifs des substances chimiques contenues dans la fumée de tabac? Pourquoi?

47. Avez-vous des suggestions qui permettraient d'améliorer cet outil?

Conclusion

48. En terminant, avez-vous d'autres commentaires ou suggestions concernant notre discussion de ce soir?

REMERCIEZ LES PARTICIPANTS. RAMASSEZ TOUT LE MATÉRIEL.

Basic Chemistry (Exercise 1)

Please answer the following questions to the best of your ability. If you are completely unsure about something, please leave the answer blank rather than guess at the answer. Also, do not go back to rethink or change any of your answers – once you have completed a question, you should continue on and not return to it.

1. Please complete the following sentences to explain the **bolded** word.

   a. A **chemical** is…

   _____
   _____
   _____
   _____

   b. **Toxic** means that something is able to cause _____ health effects.

   c. A **carcinogen** is a chemical that can cause _____.

2. What is a concentration? PLEASE CHECK ONE ONLY
   - ☐ A quantity
   - ☐ A quantity per unit
   - ☐ A mass
   - ☐ Don't know

3. Which of the following statements refer to a concentration? PLEASE CHECK ALL THAT APPLY
   - ☐ I bought 2% milk.
   - ☐ I bought 200g of meat.
   - ☐ There is 6.4g of sugar per granola bar.
   - ☐ Don't know.

4. Which of the following statements refer to a range? PLEASE CHECK ALL THAT APPLY
   - ☐ The maximum temperature expected today is 20°C.
   - ☐ Today, the temperature will be between 10°C and 20°C.
   - ☐ Weather forecasters are right less than 50% of the time.
   - ☐ Don't know

5. Vapour is…? PLEASE CHECK ONE ONLY
   - ☐ Water
   - ☐ Gas
   - ☐ Solid
   - ☐ Don't know

6. Please complete the following true or false questions.

	True	False	Don't Know
All chemicals have harmful health effects.			
A molecule is made of atoms.			
A quantity of one (1) microgram (μg) is more than one (1) milligram (mg).			
Arsenic, Mercury, Carbon and Copper are chemical elements, also called atoms.			
Combustion is a chemical reaction in which matter is irreversibly transformed. Burning wood in a fireplace is an example of combustion.			
Generally, smoke is generated when there is combustion.			
Smoke consists of a variety of chemicals.			
Smoke formed by combustion is **not** a source of pollution.			
Not all pollution is harmful to human health.			

7. The following are examples of where chemistry *might* have an impact on people's health. Please identify the impact of each item on human health (not including environmental/disposal issues). If necessary, put an 'x' in more than one box for each item.

Item	No impact	Small	Moderate	Big impact	Don't Know
Pollution and Smog					
Antiperspirant.					
Chlorine in swimming pools.					
Second-hand smoke from cigarette smoking.					
Car exhaust.					
Dry cleaning.					
Food additives.					
Freshly painted house.					
Calcium in milk.					

8. Dilution will …

☐ Increase the concentration
☐ Decrease the concentration
☐ Not affect the concentration
☐ Don't know

9. Absorption of a substance means…

☐ Exposure to a substance
☐ Retention of a substance
☐ Rejection of a substance
☐ Don't know

Notions de base en chimie (Exercice 1)

Veuillez répondre aux questions suivantes au meilleur de votre connaissance. Si vous êtes incertain ou incertaine d'une réponse, ne cherchez pas à deviner celle-ci; passez plutôt à la prochaine question. Une fois que vous avez répondu à une question, vous ne devez pas modifier votre réponse.

1. Veuillez compléter les phrases suivantes pour expliquer les mots en caractères **gras**.

   a. Une **substance chimique** est…

   _____
   _____
   _____
   _____

   b. « **Toxique** » qualifie quelque chose qui peut avoir un effet _____ sur la santé.

   c. Une substance **cancérogène** est une substance chimique pouvant causer _____.

2. Qu'est-ce qu'une concentration ? NE COCHEZ QU'UNE SEULE RÉPONSE
   - ☐ Une quantité
   - ☐ Une quantité par unité
   - ☐ Une masse
   - ☐ Je ne sais pas

3. Lequel ou lesquels des énoncés suivants fait référence à une concentration ? COCHEZ TOUTES LES RÉPONSES APPLICABLES
   - ☐ J'ai acheté du lait 2 %.
   - ☐ J'ai acheté 200 g de viande.
   - ☐ Chaque barre granola contient 6.4 g de sucre.
   - ☐ Je ne sais pas

4. Lequel ou lesquels des énoncés suivants font référence à un intervalle ? COCHEZ TOUTES LES RÉPONSES APPLICABLES
   - ☐ La température maximale prévue aujourd'hui est 20 °C.
   - ☐ Aujourd'hui, la température se situera entre 10 °C et 20 °C.
   - ☐ Les météorologues ont raison dans moins de 50 % des cas.
   - ☐ Je ne sais pas

5. La vapeur est… ? NE COCHEZ QU'UNE SEULE RÉPONSE
   - ☐ de l'eau
   - ☐ un gaz
   - ☐ un solide
   - ☐ Je ne sais pas

6. Veuillez répondre aux questions suivantes par « vrai » ou « faux ».

	Vrai	**Faux**	**Je ne sais pas**
Toutes les substances chimiques sont nuisibles à la santé.			
Une molécule est composée d'atomes.			
Une quantité d'un (1) microgramme (µg) est supérieure à un (1) milligramme (mg).			
L'arsenic, le mercure, le carbone et le cuivre sont des éléments chimiques aussi appelés « atomes ».			
La combustion est une réaction chimique où la matière est irréversiblement transformée. Le bois qui brûle dans un foyer est un exemple de combustion.			
Généralement, la combustion génère de la fumée.			
La fumée est composée de diverses substances chimiques.			
La fumée résultant de la combustion n'est **pas** une source de pollution.			
Certaines formes de pollution ne sont pas nuisibles à la santé de l'être humain.			

7. Vous trouverez ci-dessous des exemples où la chimie *pourrait* avoir un effet sur la santé des gens. Veuillez indiquer l'impact de chacun des éléments suivants sur la santé humaine (ne pas inclure les effets sur l'environnement). Si nécessaire, cochez plus d'une case pour un élément.

Éléments	**Aucun impact**	**Petit impact**	**Impact moyen**	**Grand impact**	**Je ne sais pas**
La pollution et le smog					
Les produits antisudorifiques					
Le chlore dans les piscines					
La fumée secondaire produite par la cigarette					
Le gaz d'échappement d'une voiture					
Le nettoyage à sec					
Les additifs alimentaires					
Maison fraichement painte					
Le calcium dans le lait					

8. La dilution va :

☐ Augmenter la concentration
☐ Diminuer la concentration
☐ Ne va pas affecter la concentration
☐ Ne sait pas

9. L'Absorption d'une substance signifie qu'un organisme

☐ Est exposé à une substance
☐ Retient une substance
☐ Rejète une substance
☐ Ne sait pas

Chemistry and Cigarettes (Exercise 2)

Please answer the following questions to the best of your ability. If you are completely unsure about something, please leave the answer blank rather than guess at the answer. Also, do not go back to rethink or change any of your answers – once you have completed a question, you should continue on and not return to it.

1. Please identify some of the chemicals present in cigarette tobacco (i.e. unlit cigarettes).

   - _____ _____
   - _____ _____
   - _____ _____
   - _____ _____
   - _____ _____
   - _____ _____

2. Is there a difference in the chemicals that are present in cigarette tobacco (i.e. unlit cigarettes) and the chemicals present in cigarette tobacco **smoke**?
   - ☐ No difference.
   - ☐ Same number of chemicals in both, but different chemicals.
   - ☐ A few more chemicals in tobacco smoke than tobacco.
   - ☐ Many more chemicals in tobacco smoke than tobacco.
   - ☐ Don't know

3. Please identify some of the chemicals present in cigarette tobacco **smoke** (inhaled smoke and second-hand smoke):

   - _____ _____
   - _____ _____
   - _____ _____
   - _____ _____
   - _____ _____

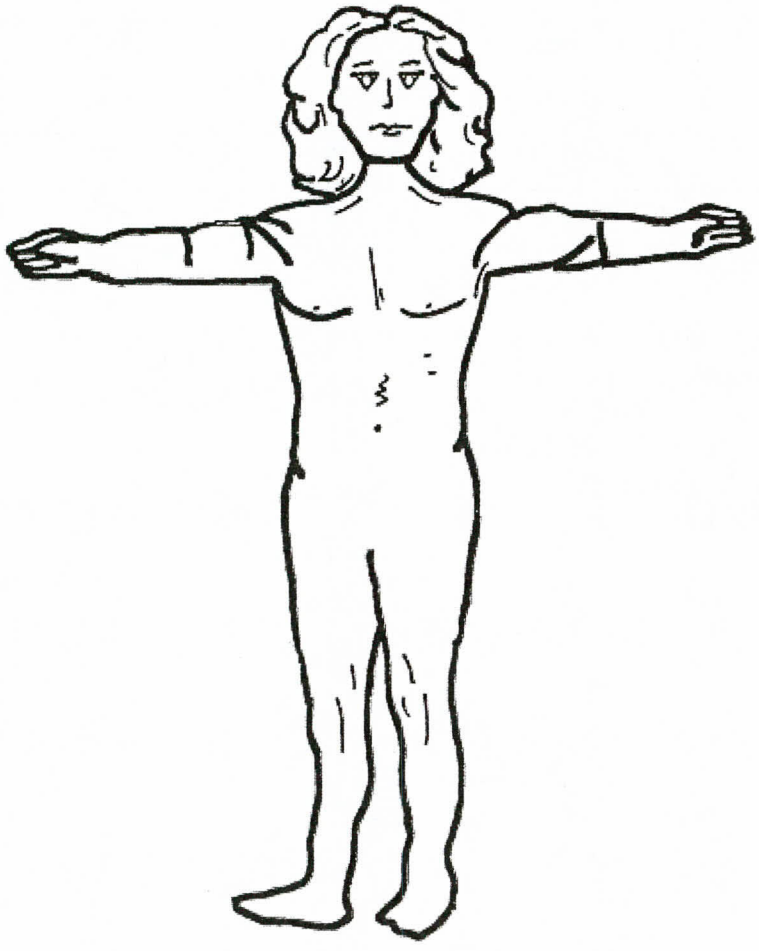
4. In the table below, please identify the chemicals that are present in cigarette tobacco (unlit) and in cigarette tobacco smoke (inhaled smoke and second-hand smoke). PLEASE CHECK ONE COLUMN FOR EACH CHEMICAL

Chemicals	In Cigarette Tobacco	In Tobacco smoke	In Both	In Neither	Don't Know
Benzene					
Lead					
Tar					
Carbon monoxide					
Benzo(a)pyrene					
Arsenic					
Nitric oxide					
Formaldehyde					
Nitrosamines					
Toluene					
Mercury					
Nicotine					
Acetone					
Ammonia					
Cadmium					
Hydrogen Cyanide					

5. Please complete the following true or false questions.

	True	False	Don't Know
Cigarette tobacco smoke contains over 4,000 chemicals.			
Exposure to the chemicals in cigarette tobacco smoke is responsible for the harmful health effects.			
The harmful health effects caused by cigarette tobacco smoke to smokers can affect non-smokers exposed to second-hand smoke.			
Smoking during pregnancy can have serious health effects for the baby, such as premature birth, low-weight birth, asthma, etc.			
Tobacco smoke contains carcinogens.			

6. In the diagram of a human body presented below, please put a circle or an 'X' on the parts of the body that you think are negatively affected from a health perspective by cigarette **smoke** (inhaled smoke and second-hand smoke).



7. In the table below, please identify the health effects that you think are caused by cigarette tobacco smoke (inhaled smoke and second-hand smoke).

	Caused by Cigarette Tobacco Smoke?		Don't Know
Health Effects	**Yes**	**No**	
Cystic fibrosis			
Heart attacks			
Multiple sclerosis			
Low birth-weight baby			
Emphysema			
Hepatitis			
Lung cancer			
Sleep problems			
Premature birth			
Arthritis			
High blood pressure			
Fertility problems			

8. The effects of tobacco smoke on health are observed…? PLEASE CHECK ONE ONLY
   - ☐ Immediately.
   - ☐ Short to middle-term.
   - ☐ Longer-term (e.g. 25-30 years).
   - ☐ All of the above.
   - ☐ Don't know

La chimie et la cigarette (Exercice 2)

Veuillez répondre aux questions suivantes au meilleur de votre connaissance. Si vous êtes incertain ou incertaine d'une réponse, ne cherchez pas à deviner celle-ci; passez plutôt à la prochaine question. Une fois que vous avez répondu à une question, vous ne devez pas modifier votre réponse.

1. Veuillez nommer quelques substances chimiques présentes dans le tabac des cigarettes (i.e. non allumées).

▪ _____	▪ _____
▪ _____	▪ _____
▪ _____	▪ _____
▪ _____	▪ _____
▪ _____	▪ _____
▪ _____	▪ _____

2. Y a-t-il une différence entre les substances chimiques présentes dans le tabac des cigarettes (i.e. non allumées) et celles présentes dans la **fumée** de tabac des cigarettes ?
   - ☐ Aucune différence
   - ☐ Même nombre de substances chimiques dans les deux, mais de natures différentes
   - ☐ Un peu plus de substances chimiques dans la fumée de tabac que dans le tabac
   - ☐ Beaucoup plus de substances chimiques dans la fumée de tabac que dans le tabac
   - ☐ Je ne sais pas

3. Veuillez nommer quelques substances chimiques présentes dans la **fumée** de tabac de cigarettes (fumée inspirée et fumée secondaire):

▪ _____	▪ _____
▪ _____	▪ _____
▪ _____	▪ _____
▪ _____	▪ _____
▪ _____	▪ _____

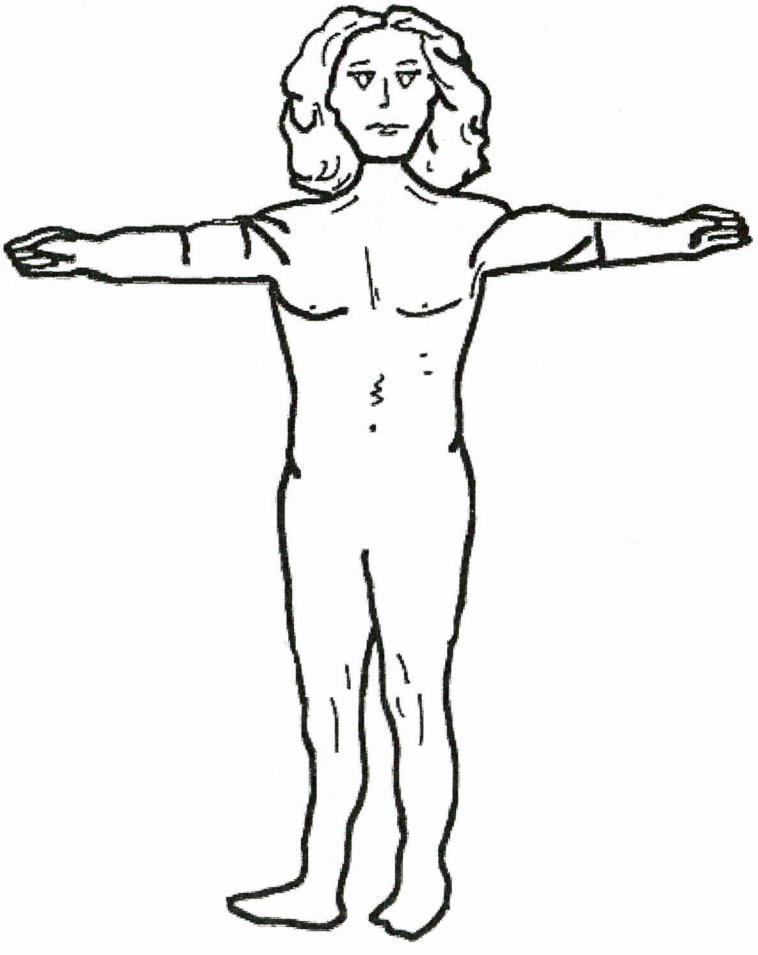
4. Dans le tableau ci-dessous, veuillez indiquer les substances chimiques présentes dans le tabac des cigarettes (i.e. non allumées) et dans la fumée de tabac des cigarettes (fumée inspirée et fumée secondaire). NE COCHEZ QU'UNE SEULE CASE PAR LIGNE (SUBSTANCE CHIMIQUE)

Substances chimiques	**Dans le tabac des cigarettes**	**Dans la fumée de tabac**	**Dans les deux**	**Dans aucun des deux**	**Je ne sais pas**
Benzène					
Plomb					
Goudron					
Monoxyde de carbone					
Benzo(a)pyrène					
Arsenic					
Monoxyde d'azote					
Formaldéhyde					
Nitrosamines					
Toluène					
Mercure					
Nicotine					
Acétone					
Ammoniac					
Cadmium					
Acide cyanhydrique					

5. Veuillez répondre aux questions suivantes par « vrai » ou « faux ».

	Vrai	**Faux**	**Je ne sais pas**
La fumée de tabac des cigarettes contient plus de 4 000 substances chimiques.			
L'exposition aux substances chimiques présentes dans la fumée de tabac des cigarettes peut nuire à la santé.			
Les effets nocifs sur la santé de la fumée de tabac des cigarettes qui affectent les fumeurs peuvent aussi toucher les non-fumeurs exposés à la fumée secondaire.			
Fumer la cigarette durant la grossesse peut nuire gravement à la santé du bébé, par exemple causer une naissance prématurée, un poids insuffisant à la naissance, l'asthme, etc.			
La fumée de tabac contient des substances cancérogènes.			

6. Sur le diagramme ci-dessous, veuillez encercler ou faire un « X » sur les parties du corps humain pouvant être affectées par la **fumée** de cigarette (fumée inspirée et fumée secondaire).



7. Dans le tableau ci-dessous, veuillez indiquer les problèmes de santé qui sont causés par la fumée de tabac des cigarettes (fumée inspirée et fumée secondaire).

	Causé par la fumée de tabac des cigarettes ?		**Je ne sais pas**
Problèmes de santé	**Oui**	**Non**	
Fibrose Kystique			
Crises cardiaques			
Sclérose en plaques			
Bébé ayant un poids insuffisant à la naissance			
Emphysème			
Hépatite			
Cancer du poumon			
Troubles du sommeil			
Naissance prématurée			
Arthrite			
Haute pression sanguine			
Problèmes de fertilité			

8. Les effets sur la santé de la fumée de tabac peuvent être observés… ? NE COCHEZ QU'UNE SEULE RÉPONSE
   - ☐ immédiatement
   - ☐ à court ou à moyen terme
   - ☐ à plus long terme (par exemple, dans 25 ou 30 ans)
   - ☐ Toutes ces réponses
   - ☐ Je ne sais pas

Chemistry, Tobacco Combustion and Health

Health Canada would like to better inform Canadians on tobacco chemistry to help them understand:

- How cigarette smoke is formed
- What chemicals are in tobacco smoke
- Where the chemicals found in tobacco smoke come from
- What is responsible for the health hazards associated with smoking.

Tobacco Combustion

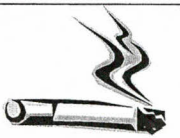
Heat

Oxygen (O_2)

Cigarette

Chemical Reaction →

up to 900°C



Tobacco Smoke + Ash

Tobacco smoke contains over 4,000 chemicals

Unburnt cigarette tobacco naturally contains:

- nicotine
- proteins carbohydrates and sugars
- vegetable oil and sterols
- nitrates
- metals and minerals from soil
- fertilizers and pesticides

Formation of many **new** chemicals →

Some chemicals are carried in the smoke

Tobacco smoke contains:

- nicotine
- tar
- carbon monoxide
- benzene
- formaldehyde
- hydrogen cyanide
- and many other **toxic** chemicals...

Most chemicals found in tobacco smoke are formed <u>during</u> the burning of tobacco.
They are not added to the cigarettes.

Exposure to Tobacco Smoke and the Impact on Health

- Exposure to over 4,000 chemicals in tobacco smoke is responsible for the harmful health effects associated with smoking.
- The tobacco smoke you breathe in goes into your lungs, where chemicals are absorbed and then transferred to your blood.

Tobacco Smoke Exposure

Exposure can be in the form of:

- Smoking
- Second-hand smoke
- Pre-natal
- Post-natal (breastfeeding)

Exposure to over 4,000 chemicals

Chemicals include:	Also used in :
• Nicotine	Insecticide
• Tar	Seal for roofing shingles
• Carbon monoxide	Car exhaust fumes
• Hydrogen cyanide	Chemical weapons
• Benzene	Gasoline
• Formaldehyde	Disinfectant
• Acetone	Paint stripper
• Nitrosamines	Carcinogens
• Cadmium	Car batteries
• Mercury	Electronic devices
• etc.	

Health Hazards

Tobacco smoke exposure can result in:

- addiction
- lung cancer
- cancer of the throat
- heart diseases
- stroke
- emphysema
- mouth diseases
- bronchitis (respiratory diseases)
- asthma
- death
- and much more….

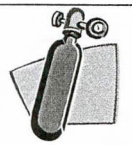
La chimie, la combustion du tabac et la santé

Santé Canada désire mieux informer les canadiens sur la chimie du tabac pour les aider à comprendre:

- comment la fumée de cigarette est formée
- d'où proviennent ces substances chimiques
- quelles substances chimiques sont présentes dans la fumée du tabac
- qu'est-ce qui est responsable des problèmes de santé liés au tabagisme

Combustion du tabac

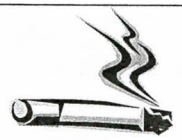
Chaleur



Oxygène (O_2)

Cigarette

Réaction Chimique → jusqu'à 900°C



Fumée du tabac + Cendre

La fumée du tabac contient plus de 4000 substances chimiques

Le tabac à cigarette contient naturellement:

- nicotine
- protéines
- hydrates de carbone et sucres
- huile végétale et stérols
- nitrates
- métaux et minéraux du sol
- engrais et pesticides

Formation de plusieurs **nouvelles** substances chimiques →

Transfert de quelques substances chimiques dans la fumée

La fumée du tabac est composée de:

- nicotine
- goudron
- monoxyde de carbone
- benzène
- formaldéhyde
- acide cyanhydrique
- et plusieurs autres substances chimiques **toxiques**...

La plupart des substances chimiques trouvées dans la fumée du tabac sont formées <u>lors de la combustion</u> du tabac.

Ces substances chimiques ne sont pas ajoutées au tabac

L'exposition à la fumée du tabac et ses effets sur la santé

- L'exposition à plus de 4 000 substances chimiques dans la fumée du tabac est responsable des problèmes de santé liés au tabagisme.

- La fumée du tabac inhalée s'introduit dans les poumons où les substances chimiques peuvent être absorbées et envoyées dans le sang.

Exposition à la fumée du tabac

Type d'exposition:
- Fumeur
- Fumée secondaire
- Prénatale
- Postnatale (allaitement)

Exposition à plus de 4 000 substances chimiques

Ces substances chimiques sont:
- Nicotine
- Goudron
- Monoxyde de carbone
- Acide cyanhydrique
- Benzène
- Formaldéhyde
- Acétone
- Nitrosamines
- Cadmium
- Mercure
- etc.

Aussi utilisées dans :

Insecticide
Scellant à bardeaux
Gaz d'échappement de voiture
Armes chimiques
Essence
Désinfectant
Diluant à peinture
Cancérogènes
Batterie de voiture
Dispositif électronique

Problèmes de santé

L'exposition à la fumée du tabac peut causer:
- la dépendance
- le cancer du poumon
- le cancer de la gorge
- les maladies cardiaques
- l'accident vasculaire cérébral
- l'emphysème
- les maladies de la bouche
- la bronchite chronique
- l'asthme
- la mort
- et plusieurs autres….

Health Canada
Understanding of Chemistry of Cigarette Smoking and Impact on Health Study (POR-05-54)

Telephone Survey

Hello, my name is _____. I'm calling on behalf of Phoenix, a public opinion research company. We are conducting a study for the Government of Canada on issues important to Canadians. Participation in the research is completely voluntary. Your answers will be kept strictly confidential and will be used for research purposes only, in accordance with laws designed to protect your privacy. This survey is registered with the national survey registration system. May I have a few moments of your time?

Yes	1	CONTINUE
No	2	THANK AND DISCONTINUE

We choose telephone numbers at random, then select one person from a household to be interviewed.

A. Does anyone in your household 18 years or older smoke cigarettes (manufactured or roll your own)?

Yes	1	ASK B
No	2	ASK C (UNTIL WE HAVE ENOUGH 'FORMER' OR 'NEVER' SMOKERS)
Don't Know/No Response	3	

B. Is there more than one person in your household 18 or older that smokes cigarettes?

Yes, more than one	1	ASK C
No, one only	2	ASK TO SPEAK TO THAT PERSON; SCHEDULE CALL BACK IF NEEDED; REPEAT INTRO IF NEW PERSON.

C. May I please speak to the person who has had the most recent birthday?

Yes	1	SCHEDULE CALL BACK IF NEEDED
No	2	THANK AND DISCONTINUE

D. Do you or does anyone in your household work for an advertising or market research firm, the media, or a tobacco company?

Yes	1	THANK AND DISCONTINUE
No	2	CONTINUE

READ IF NECESSARY:

E. Are you male or female? (WATCH QUOTAS)

Male	1
Female	2

F. Language of survey (WATCH QUOTAS)

English	1
French	2

INTERVIEWER/PROGRAMMING NOTES:

IF ASKED, INFORM RESPONDENTS THAT SURVEY SHOULD TAKE APPROXIMATELY 20 MINUTES.

SURVERY REGISTRATION SYSTEM: IF RESPONDENT ASKS ABOUT NATIONAL SURVEY REGISTRATION SYSTEM, SAY:

> The registration system has been created by the survey research industry to allow the public to verify that a survey is legitimate, get information about the survey industry or register a complaint. The registration system's toll-free phone number is 1-800-554-9996.

ENCOURAGE RESPONDENTS TO ANSWER THE FACTUAL QUESTIONS TO THE BEST OF THEIR ABILITY, BUT DO NOT ENCOURAGE THEM TO GUESS AT AN ANSWER. IF THEY ARE GENUINELY UNSURE ABOUT SOMETHING, THEY SHOULD JUST SAY 'DON'T KNOW'.

A 'DON'T KNOW/NO RESPONSE' OPTION WILL BE AVAILABLE FOR ALL QUESTIONS IN THE SURVEY.

FOR THE PURPOSES OF THIS SURVEY, CIGARETTES' INCLUDE THOSE THAT ARE BOUGHT READY MADE AS WELL AS CIGARETTES THAT PEOPLE MAKE THEMSELVES.

SMOKING BEHAVIOUR

1. At the present time, do you smoke cigarettes every day, occasionally or not at all?

Every day	1	DAILY SMOKER
Occasionally (less than every day)	2	OCCASIONAL SMOKER
Not at all	3	GO TO Q2

2. Have you smoked at least 100 cigarettes in your life?

Yes	1
No	2

QUOTA 1: **IF Q1, ANSWERS CODE 1 ("Every Day") OR CODE 2 ("Occasionally"), QUALIFIES AS 'CURRENT SMOKER'.**

QUOTA 2: **IF Q1, ANSWERS CODE 3 ("Not at all") AND ANSWERS CODE 1 ("Yes") in Q2, QUALIFIES AS 'FORMER SMOKER'.**

QUOTA 3: **IF Q1, ANSWERS CODE 3 ("Not at all") AND ANSWERS CODE 2 ("No") in Q2, QUALIFIES AS 'NEVER SMOKER'.**

ASK DAILY SMOKERS:

3. On average, how many cigarettes do you smoke per day? PROBE FOR PRECISE NUMBER. IF RESPONDENT SAYS ONE PACK PER DAY, PROBE FOR NUMBER OF CIGARETTES IN A PACK

[__ __] cigarettes per day (RESPONSE MUST BE NUMERICAL. DO NOT ACCEPT RANGE)

DO NOT READ LIST

Less than 1 cigarette a day	1
1-4 cigarettes a day	2
5-10 cigarettes a day	3
11 to 20 cigarettes a day	4
More than 20 cigarettes a day	5

ASK OCCASIONAL SMOKERS:

4. On the days that you do smoke, about how many cigarettes do you smoke?

[__ __] cigarettes per day (RESPONSE MUST BE NUMERICAL. DO NOT ACCEPT RANGE)

DO NOT READ LIST

Less than 1 cigarette a day	1
1-4 cigarettes a day	2
5-10 cigarettes a day	3
11 to 20 cigarettes a day	4
More than 20 cigarettes a day	5

ASK DAILY AND OCCASIONAL SMOKERS:

5. What strength of cigarettes do you usually smoke? (READ LIST; ACCEPT ONE RESPONSE – FOCUS ON TYPE OF CIGARETTE SMOKED 'MOST OFTEN' IF RESPONDENT WANTS TO IDENTIFY MORE THAN ONE TYPE)

Ultra or extra light	1
Light	2
Ultra or extra mild	3
Mild	4
Regular	5

ASK FORMER SMOKERS:

6. When did you quit smoking? Was it…? (READ LIST)

Less than 6 months ago	1
Six months to less than one year ago	2
One to two years ago	3
Three to five years ago	4
More than six years ago	5

7. When you smoked, and just before your most recent quit, on average how many cigarettes did you smoke per day? PROBE FOR PRECISE NUMBER. IF RESPONDENT SAYS ONE PACK PER DAY, PROBE FOR NUMBER OF CIGARETTES IN A PACK

[__ __] cigarettes per day (RESPONSE MUST BE NUMERICAL. DO NOT ACCEPT RANGE)

DO NOT READ LIST

Less than 1 cigarette a day	1
1-4 cigarettes a day	2
5-10 cigarettes a day	3
11 to 20 cigarettes a day	4
More than 20 cigarettes a day	5

ASK NEVER SMOKERS:

8. Have you ever tried smoking cigarettes, even just a puff?

Yes	1
No	2

Quitting Behaviour

IF CURRENT OR FORMER SMOKER WHO QUIT IN PAST YEAR (Q6), ASK:

9. In the past year, how many times have you stopped smoking for at least 24 hours because you were trying to quit smoking? (READ LIST; ACCEPT ONE RESPONSE ONLY)

None	1
Once	2
Twice	3
Three times	4
More than three times	5

Health Effects

10. What specific human health effects or diseases, if any, can you think of that can be caused by smoking cigarettes containing tobacco? Are there any others? (DO NOT READ LIST; PROBE/ACCEPT MULTIPLE RESPONSES UP TO FIVE OR SIX)

00 – All kinds of diseases/a lot (code here first and probe for specifics)
01 - Addiction
02 - Air pollution/environmental damage
03 - Allergies
04 - Asthma
05 - Bad breath
06 - Blood circulation problems/Blood clots
07 - Bronchitis/Chronic bronchitis
08 - Cancer - Breast
09 - Cancer – Lung (includes lung disease)
10 - Cancer - Oral (tongue, lips, mouth, throat)
11 - Cancer in general (**DO NOT PROBE**)
12 - Coughing
13 - Death/Premature death/Can be fatal
14 - Dizziness/Nausea
15 - Effect on the fetus/unborn child (general)
16 - Emphysema
17 - Gangrene
18 - Gum disease/tooth loss/mouth disease
19 - Headaches
20 - Heart disease/attack/angina
21 - High Blood Pressure
22 - Impotence/sexual dysfunction
23 - Lung disease/lungs (unspecified)
24 - Multiple sclerosis
25 - Poor physical condition/loss of energy
26 - Premature birth/Preterm birth
27 - Respiratory problems/difficulty breathing/shortness of breath
28 - Smaller babies/Reduced growth of babies during pregnancy
29 - Second-hand smoke
30 - Stroke
31 - Wrinkles/premature aging
32 - Yellow teeth/fingers/effect on appearance
33 - None
34 - Other (SPECIFY) _____

ASK CURRENT AND FORMER SMOKERS:

11. HOW LIKELY DO YOU THINK IT IS THAT SMOKING WILL LEAD TO HEALTH PROBLEMS FOR YOU? IS IT…? (READ LIST, ACCEPT ONE RESPONSE)

Very likely	1
Somewhat likely	2
Not very likely	3
Not at all likely	4

BASIC UNDERSTANDING OF CHEMISTRY

Switching subjects somewhat, I'd now like to ask you some questions about chemistry. We want to explore people's basic understanding of chemistry.

12. In general, how knowledgeable would you say you are about basic chemistry? Please use a 7-point scale, where '1' means not knowledgeable at all, and '7' means very knowledgeable.

13. Which of the following accurately describe **chemicals**? (READ BUT DO NOT ROTATE LIST; ACCEPT ALL THAT APPLY; PROBE FOR 'YES' OR 'NO' BUT ACCEPT 'DEPENDS' IF VOLUNTEERED)

Most chemicals are man-made	1
Most chemicals have harmful health effects	2
Only substances that are added together are chemicals	3
A key characteristic of chemicals is that they react with one another	4
A chemical is a substance made of "atoms"	5
A chemical is a substance with a unique molecular make-up	6

14. How would you define a **concentration**? Would you say it is…? (READ LIST; ACCEPT ONE RESPONSE)

A quantity	1
A quantity per unit, or	2
A mass	3

15. Please complete the following sentence – a **carcinogen** is a substance that can cause _____. (DO NOT READ LIST; ACCEPT ONE RESPONSE)

Cancer	1
Death	2
Disease (PROBE FOR SPECIFIC DISEASE)	3
Other (specify): _____	

Please tell me whether you think the following statements are true or false. If you are unsure about something, please just say so. (READ QUESTIONS; DO NOT ROTATE)

16. A quantity of one microgram is more than one milligram.
17. **Combustion**, the act of burning, does not change the **type** of chemicals, it just changes their **form** from solid to a gas.
18. Not all **pollution** is harmful to human health.
19. **Combustion** is a type of chemical reaction.
20. **Smoke** consists of a relatively small number of chemicals, 10-20 chemicals or less.
21. Smoke from **fireplaces** is not a complex mixture of chemicals.
22. Smoke from **cigarettes** is not a complex mixture of chemicals.
23. **Smoke** is a source of pollution.

24. Chemicals found in nature are good, while man-made or artificial chemicals are harmful.
25. **Pollution** is a complex mixture of chemicals.
26. **Exposure** to the chemicals in pollution is responsible for harmful health effects.
27. **Toxic** refers to a substance that can cause harmful health effects.

28. Can you identify any examples or situations from **everyday life** where exposure to chemicals can have a negative impact on people's health? Anything else? (DO NOT READ LIST; PROBE FOR AND ACCEPT MULTIPLE RESPONSES UP TO FIVE)

Pollution (general)	1
Smog	2
Smoking	3
Second-hand smoke from cigarette smoking	4
Car exhaust	5
Insulation in houses	6
Cosmetics (make up)	7
Food additives	8
House paint	9
Pesticides	10
Poor air circulation in buildings	11
Cleaning supplies (e.g. bleach)	12
Other (specify): _____	

Exposure to chemicals in everyday life can have different impacts on people's health depending on the type of chemicals, the number or concentration of chemicals, and the degree of exposure to them. For example, exposure to car exhaust in a closed space can be fatal because of the **high concentration** of carbon monoxide. For each of the following, please tell me the extent to which you think that specific factor can have a negative impact on health, using a 7-point scale, where '1' means not important at all, and '7' means very important. How about…? (READ/ROTATE LIST)

29. The **type** of the chemicals.
30. The **concentration** of the chemicals.
31. The **number** of different chemicals.
32. Repetitive **exposure** to the chemicals.
33. Different people **react differently** to chemicals.

KNOWLEDGE OF CHEMISTRY OF SMOKING AND IMPACT ON HEALTH

I'd now like to ask you some questions about chemistry as it relates to smoking and the impact on health.

ROTATE NEXT TWO QUESTION:

34. How knowledgeable would you say you are about the basic chemistry involved in cigarettes and smoking? Please use a 7-point scale where '1' means not knowledgeable at all, and '7' means very knowledgeable.

35. How knowledgeable would you say you are about the health impacts of smoking? Please use a 7-point scale where '1' means not knowledgeable at all, and '7' means very knowledgeable.

36. Smoking is associated with disease or harm to health. To the best of your knowledge, **what** is responsible for these harmful health effects associated with smoking? Anything else? (DO NOT READ LIST; PROBE FOR AND ACCEPT MULTIPLE RESPONSES)

    Toxic/bad chemicals in smoke
    Chemical (general)
    Tobacco smoke
    Chemicals added by manufacturers
    Tar
    Carbon monoxide
    Nicotine
    Benzene
    Formaldehyde
    Hydrogen cyanide
    Carbon dioxide
    Nitrosamines
    Lead
    Arsenic
    Cadmium
    Ammonia
    Acetone
    Benzo[a]pyrene
    Other (Specify): _____

37. When do you think the health effects occur that result from smoking cigarettes? Is it…? (READ LIST; ACCEPT ONE RESPONSE)

    Immediately.
    In the short to middle-term.
    In the longer-term, say 20-25 year or more, or
    All of the above.

38. Is there a difference between the chemicals that are present in **unlit tobacco** and the chemicals in **tobacco smoke**? Which of the following statements comes closest to what you believe? (READ LIST; DO NOT ROTATE; REPEAT IF NECESSARY)

There is no difference. It is the same chemicals in both.	1
There are the same number of chemicals, but different chemicals.	2
There are a few more chemicals in tobacco smoke than in unlit tobacco.	3
There are many more chemicals in tobacco smoke than in unlit tobacco.	4

39. Why do you think that? (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES)

No difference/same number of chemicals:

- all chemicals in smoke come from cigarette tobacco
- the chemicals just expand, go up into smoke
- the chemicals just go from solid to gas phase
- the chemicals are just released, but do not change
- the chemicals are in higher concentration
- the chemicals are different (new) but are the same in number
- there is a formation of new chemicals as a result of a chemical reaction
- other (specify): _____

Few/many more chemicals:

- when you burn tobacco (combustion), there is a formation of new chemicals
- there is a formation of new chemicals as a result of a chemical reaction
- if not lit, not harmful
- reaction with oxygen creates more harmful/toxic chemicals
- other (specify): _____

ASK THOSE WHO SAID 'NO DIFFERENCE', 'SAME NUMBER' & 'A FEW MORE' (CODES 1-3) IN Q38:

40. As far as you know, approximately how many chemicals are there in cigarette tobacco and cigarette tobacco smoke? (DO NOT READ LIST; ACCEPT RANGES AND PLACE IN CLOSEST PRE-CODED CATEGORY; IF RESPONDENT SAYS 'DON'T KNOW' ENCOURAGE GUESSES: ADD 'Could you please give us your best estimate?')

1-5	1
6-10	2
11-20	3
21-49	4
50-99	5
100- 999	6
1,000-3,999	7
4,000-4,999	8
5,000-10,000	9
Over 10,000	10

ASK THOSE WHO SAID 'MANY MORE' (CODE 4) IN Q38:

41. As far as you know, approximately how many chemicals are there in **unlit** cigarette tobacco? (DO NOT READ LIST; ACCEPT RANGES AND PLACE IN CLOSEST PRE-CODED CATEGORIES; IF RESPONDENT SAYS 'DON'T KNOW' ENCOURAGE GUESSES: ADD 'Could you please give us your best estimate?')

1-5	1
6-10	2
11-20	3
21-49	4
50-99	5
100- 999	6
1,000-3,999	7
4,000-4,999	8
5,000-10,000	9
Over 10,000	10

42. And approximately how many chemicals are there in cigarette tobacco **smoke**? (DO NOT READ LIST; ACCEPT RANGES AND PLACE IN CLOSEST PRE-CODED CATEGORIES; IF RESPONDENT SAYS 'DON'T KNOW' ENCOURAGE GUESSES: ADD 'Could you please give us your best estimate?')

1-5	1
6-10	2
11-20	3
21-49	4
50-99	5
100- 999	6
1,000-3,999	7
4,000-4,999	8
5,000-10,000	9
Over 10,000	10

ROTATE NEXT TWO QUESTIONS. ASK EVERYONE:

43. **Carbon monoxide** is a chemical that is in cigarette smoke. To the best of your knowledge, what impact does carbon monoxide have on human health? Anything else? (DO NOT READ LIST; PROBE/ACCEPT MULTIPLE RESPONSES)

00 – All kinds of diseases/a lot (code here first and probe for specifics)
01 - Addiction
02 - Air pollution/environmental damage
03 - Allergies
04 - Asthma
05 - Bad breath
06 - Blood circulation problems/Blood clots
07 - Bronchitis/Chronic bronchitis

08 - Cancer - Breast
09 - Cancer – Lung (includes lung disease)
10 - Cancer - Oral (tongue, lips, mouth, throat)
11 - Cancer in general (**DO NOT PROBE**)
12 - Coughing
13 - Death/Premature death/Can be fatal
14 - Dizziness/Nausea
15 - Effect on the fetus/unborn child (general)
16 - Emphysema
17 - Gangrene
18 - Gum disease/tooth loss/mouth disease
19 - Headaches
20 - Heart disease/attack/angina
21 - High Blood Pressure
22 - Impotence/sexual dysfunction
23 - Lung disease/lungs (unspecified)
24 - Multiple sclerosis
25 - Poor physical condition/loss of energy
26 - Premature birth/Preterm birth
27 - Respiratory problems/difficulty breathing/shortness of breath
28 - Smaller babies/Reduced growth of babies during pregnancy
29 - Second-hand smoke
30 - Stroke
31 - Wrinkles/premature aging
32 - Yellow teeth/fingers/effect on appearance
33 - None
34 - Other (SPECIFY) _____

44. **Nicotine** is a chemical that is in unlit tobacco and cigarette smoke. To the best of your knowledge, what impact does nicotine have on human health? Anything else? (DO NOT READ LIST; PROBE/ACCEPT MULTIPLE RESPONSES)

00 – All kinds of diseases/a lot (code here first and probe for specifics)
01 - Addiction
02 - Air pollution/environmental damage
03 - Allergies
04 - Asthma
05 - Bad breath
06 - Blood circulation problems/Blood clots
07 - Bronchitis/Chronic bronchitis
08 - Cancer - Breast
09 - Cancer – Lung (includes lung disease)
10 - Cancer - Oral (tongue, lips, mouth, throat)
11 - Cancer in general (**DO NOT PROBE**)
12 - Coughing
13 - Death/Premature death/Can be fatal
14 - Dizziness/Nausea

15 - Effect on the fetus/unborn child (general)
16 - Emphysema
17 - Gangrene
18 - Gum disease/tooth loss/mouth disease
19 - Headaches
20 - Heart disease/attack/angina
21 - High Blood Pressure
22 - Impotence/sexual dysfunction
23 - Lung disease/lungs (unspecified)
24 - Multiple sclerosis
25 - Poor physical condition/loss of energy
26 - Premature birth/Preterm birth
27 - Respiratory problems/difficulty breathing/shortness of breath
28 - Smaller babies/Reduced growth of babies during pregnancy
29 - Second-hand smoke
30 - Stroke
31 - Wrinkles/premature aging
32 - Yellow teeth/fingers/effect on appearance
33 - None
34 - Other (SPECIFY) _____

Please tell me whether you think the following statements are true or false. If you are unsure about something, please just say so. (READ AND ROTATE STATEMENTS)

45. There is a significant difference in the number of chemicals in light or mild vs. regular cigarettes.
46. Most of the harmful chemicals in tobacco **smoke** are formed during the burning of the tobacco, and are not present in unlit tobacco.
47. Exposure to the chemicals in tobacco **smoke** is responsible for the health hazards associated with smoking.
48. When you breathe in tobacco smoke, the smoke goes into your lungs, where some of the chemicals are absorbed and transferred to the blood.
49. Most of the chemicals found in cigarettes have been added by tobacco manufacturers.
50. The chemicals in tobacco **smoke** are not more harmful than the chemicals in **unlit** tobacco.

51. In fact, there are many more chemicals in tobacco **smoke** compared to **unlit** tobacco. To the best of your knowledge, **where** do the toxic chemicals in tobacco smoke come from? (DO NOT READ LIST; PROBE FOR AND ACCEPT MULTIPLE RESPONSES)

Combustion	1
Chemical reaction	2
Burning	3
Fire	4
Chemicals added to tobacco products	5
Transferred from unlit tobacco/already in unlit tobacco	6
Tobacco smoke	7

Pollution 8
Other (Specify): _____

PERCEPTIONS OF INFORMATION ON BASIC CHEMISTRY BEHIND SMOKING

I'd like to read you a number of true statements, and would like to know whether each one is new information for you. Did you know that...? (READ/ROTATE LIST; ACCEPT YES/NO RESPONSE FOR EACH; PROBE FOR 'YES' OR 'NO'; IF RESPONDENT SAYS 'DON'T KNOW' RECORD AS 'NO' SIGNIFYING THAT THIS IS NEW INFORMATION)

52. Cigarette tobacco **smoke** contains over 4,000 chemicals.
53. There is a significant difference between the chemical composition of **unlit** tobacco and tobacco **smoke**.
54. Most of the harmful chemicals in tobacco **smoke** are formed during the burning of the tobacco.
55. Harmful chemicals in cigarettes are not added by tobacco manufacturers.
56. It is exposure to the chemicals in tobacco **smoke** that is responsible for the health hazards associated with smoking.

57. Do you think it's important to provide Canadians with information on the chemistry behind smoking and its impacts on health to help people make an informed choice about smoking? Please use a 7-point scale, where '1' means you think it is not important at all, and '7' means very important.

58. How important is this type of information to you personally? Please use the same 7-point scale, where '1' means not important at all, and '7' means very important.

59. Who would you trust to provide you with relevant information about the **chemistry behind smoking**? (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES)

    Government (generic)
    Health Canada
    The tobacco companies
    Health groups/national voluntary non-profit organizations (e.g. Canadian Cancer Society, Heart and Stroke Association)
    Health professionals/health care providers (e.g. physicians, pharmacists, dentists)
    Media reports (e.g. newspaper, television, radio, Internet)
    Chemists/scientists
    Teachers
    Family
    Other (specify): _____

60. Who would you trust to provide you with information on the **health impact** of **chemicals in tobacco smoke**? (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES)

    Government (generic)
    Health Canada

The tobacco companies
Health groups/national voluntary non-profit organizations (e.g. Canadian Cancer Society, Heart and Stroke Association)
Health professionals/health care providers (e.g. physicians, pharmacists, dentists)
Media reports (e.g. newspaper, television, radio, Internet)
Chemists/scientists
Teachers
Family
Other (specify): _____

61. What **type** of chemical information do you think would be most useful in helping Canadians make an informed choice about smoking? (DO NOT READ LIST; ACCEPT MULTIPLE RESPONSES)

Number of chemicals in tobacco/tobacco smoke	1
Type of chemicals in tobacco/tobacco smoke	2
Use of chemicals in other products (e.g. paint thinner)	3
Most harmful chemicals in tobacco/tobacco smoke	4
Where the chemicals come from/how they are formed	5
Differences between unlit tobacco and tobacco smoke	6
Health effects caused by specific chemicals	7
The combustion of tobacco	8
Relate chemicals to known products (e.g. arsenic = rat poison)	9
Why/what/how chemicals are added to tobacco	10
Other (specify): _____	

62. If Health Canada were to provide information to Canadians to help them better understand the chemistry behind smoking and its impact on health, how would you prefer to receive such information? (DO NOT READ LIST;ACCEPT MULTIPLE RESPONSES)

Written material (i.e. pamphlets/brochures)	1
Posters/billboards	2
Television ads	3
Radio ads	4
Website(s)	5
In school	6
In buses/bus ads	7
At bus stops	8
Tobacco packaging	9
Pharmacists	10
Doctor's offices	11
Mail/direct mail	12
Other (specify): _____	

63. Do you think that information on the chemistry behind smoking and its impact on health should be included on or in cigarette packaging?

Yes	1
No	2

CHARACTERISTICS OF RESPONDENTS

I have a few last questions for statistical purposes. Please be assured that all your responses will be kept entirely anonymous and absolutely confidential.

64. In what year were you born?

Record year of birth: _____

65. What is the highest level of education that you have reached? (READ LIST IF HELPFUL)

Elementary school or less (schooling up to grade 7)	1
Some high school (grades 8 - 11)	2
Graduated high school (grades 12 or 13 or OAC)	3
Some community college, vocational or trade school or CEGEP	4
Completed community college, vocational or trade school or CEGEP	5
Some university (no degree)	6
Completed university (Bachelor's degree)	7
Post graduate university (Master's, Ph.D., completed or not)	8

66. Which of the following best describes your <u>current</u> employment situation? Are you…? (READ LIST; ACCEPT ONE RESPONSE)

Employed full-time (30 hours/week or more)	1
Employed part-time	2
Self-employed	3
Unemployed or looking for a job	4
Staying at home full-time (home-maker, social assistance)	5
Student	6
Retired	7
Other (specify): _____	

67. Are you…? (READ LIST; ACCEPT ONE RESPONSE)

Married or living as a couple	1
Single	2
Widowed	3
Separated	4
Divorced	5

68. Are there any children in your household under the age of 18? This includes children living there full-time or part-time as part of a shared custody arrangement.

Yes	1
No	2

69. Into which of the following categories would you put the total annual income, before taxes and deductions, for 2005, of all members of your household, including yourself? Is it…? (READ LIST)

Less than $20,000	1
$20,000 to $39,999	2
$40,000 to $59,999	3
$60,000 to $79,999	4
$80,000 to $99,999	5
$100,000 and over	6

Thank you. That completes the survey. Your participation is greatly appreciated.

Record from Database/Interview

- Language
- Gender
- Province/region
- Urban/rural

Santé Canada
Étude sur la compréhension de la chimie du tabac et de ses effets sur la santé (ROP-05-54)

Sondage téléphonique

Bonjour, je m'appelle _____ et je travaille pour **Phoenix,** une entreprise de recherche sur l'opinion publique. Nous faisons un sondage pour le compte du gouvernement du Canada sur des sujets qui sont importants pour les Canadiens. Votre participation est entièrement volontaire. Toutes vos réponses resteront confidentielles et seront utilisées pour des fins de recherche seulement, conformément aux lois sur la protection de la vie privée. Ce sondage est enregistré dans le système national d'enregistrement des sondages. Puis-je prendre quelques minutes de votre temps?

Oui	1	CONTINUEZ
Non	2	REMERCIEZ ET TERMINEZ

Nous choisissons des numéros de téléphone au hasard, puis nous sélectionnons dans chaque foyer une personne qui sera interviewée.

A. Est-ce qu'il y a un membre de votre foyer qui a 18 ans ou plus et qui fume la cigarette (de commerce ou roulée)?

Oui	1	POSEZ B
Non	2	POSEZ C (JUSQU'À CE QUE NOUS AYONS ASSEZ « D'ANCIENS FUMEURS » OU DE « PERSONNES QUI N'ONT JAMAIS FUMÉ »)

Ne sait pas/Préfère ne pas répondre 3

B. Est-ce qu'il y a dans votre foyer plus d'une personne âgée de 18 ans ou plus qui fume la cigarette?

Oui, plus d'une	1	POSEZ C
Non, une seulement	2	DEMANDEZ À PARLER À CETTE PERSONNE; AU BESOIN, PRENEZ RENDEZ-VOUS POUR LE RAPPEL; RÉPÉTEZ L'INTRO À LA NOUVELLE PERSONNE.

C. Puis-je parler à la personne qui a 18 ans ou plus et qui a été la dernière à célébrer son anniversaire?

Oui	1	AU BESOIN, PRENEZ RENDEZ-VOUS POUR LE RAPPEL
Non	2	REMERCIEZ ET TERMINEZ

D. Est-ce que vous ou un membre de votre foyer travaillez pour une agence de publicité, une firme d'études de marché, un média ou une société productrice de tabac?

Oui	1	REMERCIEZ ET TERMINEZ
Non	2	CONTINUEZ

LISEZ AU BESOIN :

E. Est-ce que vous êtes un homme ou une femme? (VÉRIFIEZ LES QUOTAS)

Homme	1
Femme	2

F. Langue du sondage (VÉRIFIEZ LES QUOTAS)

Anglais	1
Français	2

NOTES À L'INTERVIEWEUR/AU PROGRAMMEUR :

SI ON LE DEMANDE, INFORMEZ LES RÉPONDANTS QUE LE SONDAGE EST D'UNE DURÉE D'ENVIRON 20 MINUTES.

SYSTÈME D'ENREGISTREMENT DES SONDAGES : SI LE RÉPONDANT VOUS INTERROGE SUR LE SYSTÈME NATIONAL D'ENREGISTREMENT DES SONDAGES, DITES :

> Le système d'enregistrement a été mis sur pied par l'industrie canadienne de recherche par sondages de façon à permettre au public de vérifier la légitimité d'un sondage, d'obtenir des renseignements sur l'industrie des sondages ou de formuler une plainte. Pour les joindre, composez sans frais le 1 800-554-9996.

ENCOURAGEZ LES RÉPONDANTS À RÉPONDRE AU QUESTIONNAIRE EN FONCTION DE LEURS CONNAISSANCES, NE LES POUSSEZ PAS À DEVINER UNE RÉPONSE. S'ILS SONT INCERTAINS, ILS DEVRAIENT RÉPONDRE « JE NE SAIS PAS ».

L'OPTION « JE NE SAIS PAS/JE PRÉFÈRE NE PAS RÉPONDRE » SERA PRÉSENTÉE AUX RÉPONDANTS À TOUTES LES QUESTIONS.

DANS CE SONDAGE, LE MOT « CIGARETTES » DÉSIGNE AUSSI BIEN LES CIGARETTES ACHETÉES ET PRÊTES À FUMER QUE LES CIGARETTES QUE L'ON ROULE SOI-MÊME.

HABITUDES DE TABAGISME

1. À l'heure actuelle, fumez-vous tous les jours, occasionnellement ou jamais?

Tous les jours	1	FUMEUR « TOUS LES JOURS »
Occasionnellement (pas tous les jours)	2	FUMEUR OCCASIONNEL
Jamais	3	PASSEZ À Q2

2. Avez-vous fumé au moins 100 cigarettes au cours de votre vie?

Oui	1
Non	2

QUOTA 1: **SI Q1=1 (« TOUS LES JOURS ») OU Q1=2 (« OCCASIONNELLEMENT », RECRUTEZ COMME » FUMEUR.**

QUOTA 2: **SI Q1=3 (« JAMAIS ») ET Q2=1 (« OUI »), RECRUTEZ COMME ANCIEN FUMEUR.**

QUOTA 3: **SI Q1=3 (« JAMAIS ») ET Q2=2 (« NON »), RECRUTEZ COMME N'A JAMAIS FUMÉ.**

SI FUME TOUS LES JOURS, DEMANDEZ :

3. En moyenne, combien de cigarettes fumez-vous chaque jour? SONDER POUR OBTENIR UN NOMBRE PRÉCIS. SI LE RÉPONDANT RÉPOND UN PAQUET PAR JOUR, SONDER POUR SAVOIR COMBIEN IL Y A DE CIGARETTES DANS UN PAQUET.

[__ __] cigarettes par jour (LA RÉPONSE DOIT ÊTRE NUMÉRIQUE. N'ACCEPTEZ PAS D'INTERVALLE)

NE LISEZ PAS LA LISTE

Moins d'une cigarette par jour	1
D'une à quatre cigarettes par jour	2
De 5 à 10 cigarettes par jour	3
De 11 à 20 cigarettes par jour	4
Plus de 20 cigarettes par jour	5

SI FUME À L'OCCASION, DEMANDEZ :

4. Les jours où vous fumez, environ combien de cigarettes fumez-vous?

[__ __] cigarettes par jour (LA RÉPONSE DOIT ÊTRE NUMÉRIQUE. N'ACCEPTEZ PAS D'INTERVALLE)

NE LISEZ PAS LA LISTE

Moins d'une cigarette par jour	1
D'une à quatre cigarettes par jour	2
De 5 à 10 cigarettes par jour	3
De 11 à 20 cigarettes par jour	4
Plus de 20 cigarettes par jour	5

SI FUMEUR ACTUEL (TOUS LES JOURS OU OCCASIONNELLEMENT) :

5. Quelle est la force des cigarettes que vous fumez habituellement? (LISEZ LA LISTE; N'ACCEPTEZ QU'UNE SEULE RÉPONSE – CIBLEZ LE TYPE DE CIGARETTE FUMÉES « LE PLUS SOUVENT » SI LE RÉPONDANT EN MENTIONNE PLUS D'UN)

Ultra ou extra légères	1
Légères	2
Ultra ou extra douces	3
Douces	4
Régulières	5

SI ANCIEN FUMEUR :

6. Quand avez-vous cessé de fumer? Était-ce…? (LISEZ LA LISTE)

Il y a moins de 6 mois..... 1
Il y a de six mois à moins d'un an.....2
Il y a un à deux ans 3
Il y a trois à cinq ans..... 4
Il y a plus de six ans.....5

7. Juste avant de cesser de fumer la dernière fois, combien de cigarettes fumiez-vous chaque jour? SONDEZ POUR OBTENIR UN NOMBRE PRÉCIS. SI LE RÉPONDANT RÉPOND UN PAQUET PAR JOUR, SONDEZ POUR SAVOIR COMBIEN IL Y A DE CIGARETTES DANS UN PAQUET.

[__ __] cigarettes par jour (LA RÉPONSE DOIT ÊTRE NUMÉRIQUE. N'ACCEPTEZ PAS D'INTERVALLE)

NE LISEZ PAS LA LISTE

Moins d'une cigarette par jour	1
D'une à quatre cigarettes par jour	2
De 5 à 10 cigarettes par jour	3
De 11 à 20 cigarettes par jour	4
Plus de 20 cigarettes par jour	5

SI N'A JAMAIS FUMÉ :

8. Est-ce que vous avez déjà essayé de fumer la cigarette, même juste une bouffée ou une touche?

Oui	1
Non	2

HISTORIQUE DE L'ABANDON DU TABAGISME

SI FUMEUR ACTUEL OU ANCIEN FUMEUR QUI A CESSÉ DE FUMER AU COURS DE LA DERNIÈRE ANNÉE (Q6), DEMANDEZ :

9. Au cours de la dernière année, combien de fois n'avez-vous pas fumé pendant au moins 24 heures parce que vous avez tenté de cesser de fumer? (LISEZ LA LISTE; N'ACCEPTEZ QU'UNE SEULE RÉPONSE)

Aucune fois	1
Une fois	2
Deux fois	3
Trois fois	4
Plus de trois fois	5

EFFETS SUR LA SANTÉ

10. À votre avis, quels sont les effets spécifiques sur la santé ou les maladies qui sont causés par la consommation de cigarettes faites de tabac, chez les humains? Est-ce qu'il y en a d'autres? (NE LISEZ PAS LA LISTE; SONDEZ/ACCEPTEZ JUSQU'À CINQ OU SIX RÉPONSES)

00 – Toutes sortes de maladies/plusieurs maladies (codez ici pour commencer et puis sondez pour plus de précisions)
01 - Dépendance
02 - Pollution de l'air/problèmes environnementaux
03 - Allergies
04 - Asthme
05 - Mauvaise haleine
06 - Problèmes de circulation sanguine/caillots
07 - Bronchite/Bronchite chronique
08 - Cancer - du sein
09 - Cancer - du poumon (incluant les maladies pulmonaires)
10 - Cancer - buccal (langue, lèvres, bouche, gorge)
11 - Cancer en général (**NE PAS SONDER**)
12 - Toux
13 - Mort/Mort prématurée/Peut être mortel
14 - Étourdissements/Nausées
15 - Effets sur le fœtus/sur l'enfant à naître (en général)
16 - Emphysème
17 - Gangrène
18 - Maladies des gencives/perte de dents/maladies de la bouche
19 - Maux de tête
20 – Maladies cardiaques/crises cardiaques/angine
21 - Hypertension (haute tension)
22 - Impuissance/dysfonction sexuelle
23 - Maladies pulmonaires/poumons (non précisé)
24 - Sclérose en plaques

25 – Mauvaise condition physique/perte d'énergie
26 - Naissance prématurée/avant terme
27 - Problèmes respiratoires/difficulté à respirer/souffle court
28 - Bébés de petit poids à la naissance/Croissance réduite des bébés pendant la grossesse
29 - Fumée secondaire
30 - Accidents vasculaires cérébraux/AVC
31 - Rides/vieillissement prématuré
32 - Jaunissement des dents/des doigts/effets sur l'aspect physique
33 - Aucun
34 - Autre (**PRÉCISER**) _____

SI FUMEUR ACTUEL OU ANCIEN FUMEUR, DEMANDEZ :

11. Selon vous, quelle est la probabilité que fumer vous cause un jour des problèmes de santé? Est-ce…? (LISEZ LA LISTE, N'ACCEPTEZ QU'UNE SEULE RÉPONSE)

Très probable	1
Assez probable	2
Pas très probable	3
Pas du tout probable	4

NOTIONS DE BASE EN CHIMIE

Passons à un autre sujet. J'aimerais maintenant vous poser quelques questions concernant la chimie. Nous voulons savoir dans quelle mesure les gens possèdent des notions de base en chimie.

12. Dans l'ensemble, comment évalueriez-vous vos connaissances sur les notions de base en chimie? Veuillez utiliser un échelle de 1 à 7 où 1 correspond à « faibles connaissances » et 7, à « solides connaissances ».

13. Parmi les descriptions suivantes, lesquelles se rapportent aux **substances chimiques**? (LISEZ DANS L'ORDRE; ACCEPTEZ TOUTES LES RÉPONSES APPLICABLES. SONDEZ POUR OBTENIR UN « OUI » OU UN « NON », MAIS ACCEPTEZ « PEUT-ÊTRE » SI LE RÉPONDANT LE MENTIONNE SPONTANÉMENT)

La plupart des substances chimiques sont fabriquées par l'homme	1
La plupart des substances chimiques ont des effets néfastes sur la santé	2
Seules les combinaisons de produits forment des substances chimiques	3
L'une des principales caractéristiques des substances chimiques est qu'elles réagissent entre elles	4
Une substance chimique est une substance composée d'« atomes »	5
Une substance chimique est une substance qui a une composition moléculaire unique	6

14. Qu'est-ce qu'une **concentration**? Est-ce...? (LISEZ LA LISTE; N'ACCEPTEZ QU'UNE SEULE RÉPONSE)

Une quantité	1
Une quantité par unité, ou	2
Une masse	3

15. Veuillez compléter la phrase suivante : une substance **cancérogène** est une substance pouvant causer _____. (NE LISEZ PAS LA LISTE; N'ACCEPTEZ QU'UNE SEULE RÉPONSE)

Le cancer	1
La mort	2
Une maladie (SONDEZ POUR OBTENIR DES NOMS DE MALADIES)	3
Autre (précisez) : _____	

Pour chacun des énoncés suivants, veuillez indiquer si vous croyez qu'il est vrai ou faux. Si vous êtes incertain(e), n'hésitez pas à le dire. (LISEZ LES ÉNONCÉS DANS L'ORDRE)

16. Une quantité d'un microgramme est supérieure à celle d'un milligramme.
17. **La combustion**, ou le fait de brûler, ne transforme pas le **type** de substance chimique, elle ne transforme que l'**état de cette substance** : de solide, elle devient gazeuse.
18. Certaines formes de **pollution** n'ont pas d'effet néfaste sur la santé humaine.
19. **La combustion** est un type de réaction chimique.
20. **La fumée** est composé de relativement peu de substances chimiques : moins de 10 à 20 substances chimiques.
21. La fumée dégagée par un **foyer** n'est pas un mélange complexe de substances chimiques.
22. La fumée de **tabac** n'est pas un mélange complexe de substances chimiques.
23. **La fumée** est une source de pollution.
24. Les substances chimiques que l'on retrouve dans la nature sont bonnes alors que les substances chimiques fabriquées par l'homme ou artificielles sont nocives.
25. **La pollution** est un mélange complexe de substances chimiques.
26. **L'exposition** aux substances chimiques contenues dans la pollution a des effets néfastes sur la santé.
27. « **Toxique** » qualifie une substance qui peut avoir un effet néfaste sur la santé.

28. Veuillez nommer des exemples ou des situations de **la vie courante** où l'exposition aux substances chimiques peut avoir des effets néfastes sur la santé des gens. Y en a-t-il d'autres? (NE LISEZ PAS LA LISTE; SONDEZ ET ACCEPTEZ JUSQU'À CINQ RÉPONSES)

La pollution (en général)	1
Le smog	2
La tabagisme	3
La fumée secondaire produite par la cigarette	4
Le gaz d'échappement des voitures	5

Les matériaux d'isolation des maisons	6
Les cosmétiques (maquillage)	7
Les additifs alimentaires	8
La peinture domestique	9
Les pesticides	10
La mauvaise circulation d'air dans les édifices	11
Les produits de nettoyage (p. ex. le javelisant)	12
Autre (précisez) : _____	

Les effets sur la santé de l'exposition aux substances chimiques dans la vie courante varient en fonction du type de substance, du nombre ou de la concentration des substances chimiques et de l'intensité de l'exposition. Par exemple, l'exposition au gaz d'échappement de voiture dans un lieu fermé peut être fatal en raison de la **forte concentration** de monoxyde de carbone. Pour chacun des facteurs suivants, veuillez indiquer dans quelle mesure vous croyez qu'il a un effet néfaste sur la santé. Pour ce faire, veuillez utiliser une échelle de 1 à 7 où 1 correspond à « un facteur pas du tout néfaste » et 7, à « un facteur très néfaste ». Qu'en est-il…? (LISEZ/ALTERNEZ)

29. Du **type** de substance chimique.
30. De la **concentration** des substances chimiques.
31. Du **nombre** de différentes substances chimiques.
32. De l'**exposition répétitive** aux substances chimiques.
33. Des personnes différentes **réagissent différemment** aux substances chimiques.

CONNAISSANCE DE LA CHIMIE DU TABAC ET DE SES EFFETS SUR LA SANTÉ

J'aimerais maintenant vous poser quelques questions concernant la chimie liée au tabagisme et ses effets sur la santé.

ALTERNEZ LES DEUX PROCHAINES QUESTIONS :

34. Comment évalueriez-vous vos connaissances sur les notions de base en chimie liées à la cigarette et au tabagisme? Veuillez utiliser une échelle de 1 à 7 où 1 correspond à « faibles connaissances » et 7, à « solides connaissances ».

35. Comment évalueriez-vous vos connaissances sur les effets du tabagisme sur la santé? Veuillez utiliser une échelle de 1 à 7 où 1 correspond à « faibles connaissances» et 7, à « solides connaissances ».

36. Le tabagisme est lié à la maladie ou à des problèmes de santé. À votre connaissance, **qu'est-ce qui** est responsable des problèmes de santé liés au tabagisme? Y en a-t-il d'autres? (NE LISEZ PAS LA LISTE; SONDEZ ET ACCEPTEZ PLUSIEURS RÉPONSES)

    Les substances chimiques toxiques ou nocives présentes dans le fumée de tabac
    Les substances chimiques (en général)
    La fumée de tabac
    Les substances chimiques qu'ajoutent les fabricants

Le goudron
Le monoxyde de carbone
La nicotine
Le benzène
Le formaldhéhyde
L'acide cyanhydrique
Le dioxyde de carbone
Les nitrosamines
Le plomb
L'arsenic
Le cadmium
L'ammoniac
L'acétone
Le benzo[*a*]pyrène
Autre (précisez) : _____

37. Quand croyez-vous que les problèmes de santé causés par le tabagisme surviennent? Est-ce…? (LISEZ LA LISTE; N'ACCEPTEZ QU'UNE SEULE RÉPONSE)

Immédiatement
À court ou à moyen terme
À plus long terme, disons après de 20 à 25 ans
Toutes ces réponses

38. Y a-t-il une différence entre les substances chimiques contenues dans **un produit de tabac non allumé** et les substances chimiques contenues dans la **fumée de tabac**? Lequel des énoncés suivants traduit le mieux votre point de vue? (LISEZ LA LISTE DANS L'ORDRE; RÉPÉTEZ AU BESOIN)

Il n'y a aucune différence. Les substances chimiques sont les mêmes. 1
Il y a le même nombre de substances chimiques, mais elles sont différentes. 2
Il y a un peu plus de substances chimiques dans la fumée de tabac que dans un produit de tabac non allumé. 3
Il y a beaucoup plus de substances chimiques dans la fumée de tabac que dans un produit de tabac non allumé. 4

39. Pourquoi pensez-vous cela? (NE LISEZ PAS LA LISTE; ACCEPTEZ PLUSIEURS RÉPONSES)

Aucune différence/même nombre de substances chimiques :

- Toutes les substances chimiques contenues dans la fumée proviennent du tabac
- Les substances chimiques prennent tout simplement de l'expansion, montent en fumée
- Les substances chimiques passent de l'état solide à l'état gazeux
- Les substances chimiques sont libérées, mais elles demeurent les mêmes
- Les substances chimiques sont plus concentrées

- Les substances chimiques sont différentes (nouvelles), mais elles présentent le même nombre
- De nouvelles substances chimiques sont formées par réaction chimique
- Autre (précisez) : _____

Un peu plus/beaucoup plus de substances chimiques :

- Lorsque le tabac brûle (combustion), de nouvelles substances chimiques se forment
- De nouvelles substances chimiques se forment par réaction chimique
- Le tabac non allumé est inoffensif
- La réaction avec l'oxygène crée davantage de substance chimiques nocives/toxiques
- Autre (précisez) : _____

SI « AUCUNE DIFFÉRENCE », « MÊME NOMBRE » OU « UN PEU PLUS » (CODES 1,2,3) À Q38:

40. À votre connaissance, environ combien de substances chimiques sont contenues dans le tabac et dans la fumée de tabac? (NE LISEZ PAS LA LISTE; ACCEPTEZ LES INTERVALLES ET SÉLECTIONNEZ L'INTERVALLE PRÉ-CODÉ QUI Y CORRESPOND LE MIEUX; SI LE RÉPONDANT DIT « JE NE SAIS PAS », ENCOURAGEZ-LE À VOUS DONNER UNE ESTIMATION, AJOUTEZ : Pouvez-vous me donner votre meilleure estimation)

1 à 5	1
6 à10	2
11 à 20	3
21 à 49	4
50 à 99	5
100 à 999	6
1 000 à 3 999	7
4 000 à 4 999	8
5 000 à 10 000	9
Plus de 10 000	10

SI « BEAUCOUP PLUS » (CODE 4) À Q38:

41. À votre connaissance, environ combien de substances chimiques sont contenues dans **le tabac d'une cigarette non allumée**? (NE LISEZ PAS LA LISTE; ACCEPTEZ LES INTERVALLES ET SÉLECTIONNÉE L'INTERVALLE PRÉ-CODÉ QUI Y CORRESPOND MIEUX; SI LE RÉPONDANT DIT « JE NE SAIS PAS », ENCOURAGEZ-LE À VOUS DONNER UNE ESTIMATION, AJOUTEZ : Pouvez-vous me donner votre meilleure estimation)

1 à 5	1
6 à10	2
11 à 20	3
21 à 49	4
50 à 99	5
100 à 999	6
1 000 à 3 999	7
4 000 à 4 999	8

5 000 à 10 000	9
Plus de 10 000	10

42. À votre connaissance, environ combien de substances chimiques sont contenues dans **la fumée de tabac**? (NE LISEZ PAS LA LISTE; ACCEPTEZ LES INTERVALLES ET SÉLECTIONNÉE L'INTERVALLE PRÉ-CODÉ QUI Y CORRESPOND LE MIEUX; SI LE RÉPONDANT DIT « JE NE SAIS PAS », ENCOURAGEZ-LE À VOUS DONNER UNE ESTIMATION, AJOUTEZ : Pouvez-vous me donner votre meilleure estimation)

1 à 5	1
6 à10	2
11 à 20	3
21 à 49	4
50 à 99	5
100 à 999	6
1 000 à 3 999	7
4 000 à 4 999	8
5 000 à 10 000	9
Plus de 10 000	10

ALTERNEZ LES DEUX PROCHAINES QUESTIONS; POSEZ À TOUS :

43. **Le monoxyde de carbone** est une substance chimique présente dans la fumée de tabac. À votre connaissance, quel effet le monoxyde de carbone a-t-il sur la santé humaine? Y en a-t-il d'autres? (NE LISEZ PAS LA LISTE; SONDEZ/ ACCEPTEZ PLUSIEURS RÉPONSES)

00 – Toutes sortes de maladies/plusieurs maladies (codez ici pour commencer et puis sondez pour plus de précisions)
01 - Dépendance
02 - Pollution de l'air/problèmes environnementaux
03 - Allergies
04 - Asthme
05 - Mauvaise haleine
06 - Problèmes de circulation sanguine/caillots
07 - Bronchite/Bronchite chronique
08 - Cancer - du sein
09 - Cancer - du poumon (incluant les maladies pulmonaires)
10 - Cancer - buccal (langue, lèvres, bouche, gorge)
11 - Cancer en général (**NE PAS SONDER**)
12 - Toux
13 - Mort/Mort prématurée/Peut être mortel
14 - Étourdissements/Nausées
15 - Effets sur le fœtus/sur l'enfant à naître (en général)
16 - Emphysème
17 - Gangrène
18 - Maladies des gencives/perte de dents/maladies de la bouche
19 - Maux de tête
20 – Maladies cardiaques/crises cardiaques/angine

21 - Hypertension (haute tension)
22 - Impuissance/dysfonction sexuelle
23 - Maladies pulmonaires/poumons (non précisé)
24 - Sclérose en plaques
25 – Mauvaise condition physique/perte d'énergie
26 - Naissance prématurée/avant terme
27 - Problèmes respiratoires/difficulté à respirer/souffle court
28 - Bébés de petit poids à la naissance/Croissance réduite des bébés pendant la grossesse
29 - Fumée secondaire
30 - Accidents vasculaires cérébraux/AVC
31 - Rides/vieillissement prématuré
32 - Jaunissement des dents/des doigts/effets sur l'aspect physique
33 - Aucun
34 - Autre (**PRÉCISER**) _____

44. **La nicotine** est une substance chimique présente dans le tabac d'une cigarette non allumée et dans la fumée de tabac. À votre connaissance, quel effet la nicotine a-t-elle sur la santé humaine? Y en a-t-il d'autres? (NE LISEZ PAS LA LISTE; SONDEZ/ ACCEPTEZ PLUSIEURS RÉPONSES)

00 – Toutes sortes de maladies/plusieurs maladies (codez ici pour commencer et puis sondez pour plus de précisions)
01 - Dépendance
02 - Pollution de l'air/problèmes environnementaux
03 - Allergies
04 - Asthme
05 - Mauvaise haleine
06 - Problèmes de circulation sanguine/caillots
07 - Bronchite/Bronchite chronique
08 - Cancer - du sein
09 - Cancer - du poumon (incluant les maladies pulmonaires)
10 - Cancer - buccal (langue, lèvres, bouche, gorge)
11 - Cancer en général (**NE PAS SONDER**)
12 - Toux
13 - Mort/Mort prématurée/Peut être mortel
14 - Étourdissements/Nausées
15 - Effets sur le fœtus/sur l'enfant à naître (en général)
16 - Emphysème
17 - Gangrène
18 - Maladies des gencives/perte de dents/maladies de la bouche
19 - Maux de tête
20 – Maladies cardiaques/crises cardiaques/angine
21 - Hypertension (haute tension)
22 - Impuissance/dysfonction sexuelle
23 - Maladies pulmonaires/poumons (non précisé)

24 - Sclérose en plaques
25 – Mauvaise condition physique/perte d'énergie
26 - Naissance prématurée/avant terme
27 - Problèmes respiratoires/difficulté à respirer/souffle court
28 - Bébés de petit poids à la naissance/Croissance réduite des bébés pendant la grossesse
29 - Fumée secondaire
30 - Accidents vasculaires cérébraux/AVC
31 - Rides/vieillissement prématuré
32 - Jaunissement des dents/des doigts/effets sur l'aspect physique
33 - Aucun
34 - Autre (**PRÉCISER**) _____

Veuillez indiquer si vous croyez que les énoncés suivants sont vrais ou faux. Si vous êtes incertain(e), n'hésitez pas à le dire. (LISEZ ET ALTERNEZ LES ÉNONCÉS)

45. Il y a une différence notable entre le nombre de substances chimiques contenues dans les cigarettes légères ou douces et celui contenu dans les cigarettes régulières.
46. La plupart des substances chimiques nocives contenues dans la **fumée de tabac** sont formées lors de la combustion du tabac; elles ne sont pas présentes dans les produits de tabac non allumés.
47. L'exposition aux substances chimiques contenues dans la **fumée de tabac** est responsable des problèmes de santé liés au tabagisme.
48. Quand on inhale la fumée de tabac, celle-ci s'introduit dans les poumons où certaines des substances chimiques sont absorbées et envoyées dans le sang.
49. La plupart des substances chimiques contenues dans la cigarette sont ajoutées par les fabricants de tabac.
50. Les substances chimiques contenues dans la **fumée de tabac** ne sont pas plus nocives que les substances chimiques contenues dans **les produits de tabac non allumés**.

51. En réalité, il y a beaucoup plus de substances chimiques contenues dans la **fumée de tabac** que dans **les produits de tabac non allumés**. À votre connaissance, **d'où** proviennent les substances chimiques toxiques présentes dans la fumée de tabac? (NE LISEZ PAS LA LISTE; SONDEZ ET ACCEPTEZ PLUSIEURS RÉPONSES)

De la combustion	1
De la réaction chimique	2
Du brûlage	3
Du feu	4
Des substances chimiques ajoutées aux produits du tabac	5
Des produits de tabac non allumés/elles sont déjà présentes dans le tabac séché	6
De la fumée de tabac	7
De la pollution	8
Autre (précisez) : _____	

PERCEPTION DE L'IMPORTANCE DES RENSEIGNEMENTS SUR LA CHIMIE ET LE TABAGISME

Je vais vous lire des énoncés qui sont vrais. J'aimerais savoir s'il s'agit faits nouveaux pour vous. Saviez-vous que...? (LISEZ/ALTERNEZ; ACCEPTEZ OUI OU NON COMME RÉPONSE POUR CHACUN DES ÉNONCÉS; SI LE RÉPONDANT DIT « JE NE SAIS PAS », INDIQUEZ « NON » POUR INDIQUER QU'IL S'AGIT DE FAITS NOUVEAUX POUR LUI)

52. La **fumée de tabac** contient plus de 4 000 substances chimiques.
53. Il existe une différence notable entre la composition chimique **des produits de tabac non allumés** et la **fumée de tabac**.
54. La plupart des substances chimiques nocives contenues dans la **fumée de tabac** sont formées lors de la combustion du tabac.
55. Les substances chimiques nocives contenues dans la cigarette ne sont pas ajoutées par les fabricants de tabac.
56. L'exposition aux substances chimiques contenues dans **fumée de tabac** est responsable des problèmes de santé liés au tabagisme.

57. Selon vous, est-il important d'informer les Canadiens sur le lien qui existe entre la chimie et le tabagisme et sur les effets du tabagisme sur la santé pour les aider à faire un choix éclairé à cet égard? Veuillez utiliser une échelle de 1 à 7 où 1 correspond à « pas du tout important » et 7, à « très important ».

58. Dans quelle mesure ce genre de renseignements est-il important pour vous? Veuillez utiliser la même échelle de 1 à 7 où 1 correspond à « pas du tout important » et 7, à « très important ».

59. À qui feriez-vous confiance pour obtenir des renseignements concernant **le lien entre la chimie et le tabagisme**? (NE LISEZ PAS LA LISTE; ACCEPTEZ PLUSIEURS RÉPONSES)

    Le gouvernement (général)
    Santé Canada
    Les sociétés productrices de tabac
    Des groupes de défense pour la promotion de la santé/ des organismes nationaux sans but lucratif (p. ex. : la Société canadienne du cancer, la Fondation des maladies du cœur)
    Des professionnels de la santé/des fournisseurs de soins de santé (p. ex. : des médecins, des pharmaciens ou des dentistes)
    Des chimistes/des scientifiques
    Des enseignants/des professeurs
    La famille
    Des reportages dans les médias (p. ex. : journaux, télévision, radio ou Internet)
    Autre (précisez) : _____

60. À qui feriez-vous confiance pour obtenir des renseignements concernant **les effets sur la santé** des **substances chimiques contenues dans la fumée de tabac**? (NE LISEZ PAS LA LISTE; ACCEPTEZ PLUSIEURS RÉPONSES)

Le gouvernement (général)
Santé Canada
Les sociétés productrices de tabac
Des groupes de défense pour la promotion de la santé/ des organismes nationaux sans but lucratif (p. ex. : la Société canadienne du cancer, la Fondation des maladies du cœur)
Des professionnels de la santé/des fournisseurs de soins de santé (p. ex. : des médecins, des pharmaciens ou des dentistes)
Des chimistes/des scientifiques
Des enseignants/des professeurs
La famille
Des reportages dans les médias (p. ex. : journaux, télévision, radio ou Internet)
Autre (précisez) : _____

61. Selon vous, quel **type** de renseignements sur les substances chimiques serait le plus utile pour aider les Canadiens à faire des choix éclairés à l'égard du tabagisme? (NE LISEZ PAS LA LISTE; ACCEPTEZ PLUSIEURS RÉPONSES)

Le nombre de substances chimiques contenues dans le tabac/ dans la fumée de tabac	1
Le type de substances chimiques contenues dans le tabac/ dans la fumée de tabac	2
L'utilisation de substances chimiques dans d'autres produits (diluants pour peinture)	3
Les substances chimiques les plus nocives contenues dans le tabac/ dans la fumée de tabac	4
D'où proviennent les substances chimiques/de quelle manière elles sont formées	5
Les différences entre un produit de tabac non allumé et la fumée de tabac	6
Les effets sur la santé causés par des substances chimiques précises	7
La combustion du tabac	8
La relation entre les substances chimiques et leurs usages connus (p. ex. : arsenic = poison contre les rats)	9
Les substances chimiques ajoutées au tabac; pourquoi et comment elles le sont	10
Autre (précisez) : _____	

62. Si Santé Canada offrait des renseignements aux Canadiens pour les aider à mieux comprendre le lien entre la chimie et le tabagisme ainsi que ses effets sur la santé, comment préféreriez-vous recevoir ces renseignements? (NE LISEZ PAS LA LISTE; ACCEPTEZ PLUSIEURS RÉPONSES)

Par écrit (p. ex. : dépliants/brochures)	1
Affiches/babillards	2
Publicités à la télévision	3
Publicités à la radio	4

Site(s) Web	5
À l'école	6
Dans les autobus/publicités dans les autobus	7
Aux arrêts d'autobus	8
Sur les emballages des produits de tabac	9
Pharmaciens	10
Cliniques médicales	11
Par la poste/par le courrier	
Autre (précisez) : _____	

63. Selon vous, les renseignements concernant le lien entre la chimie et le tabagisme ainsi que ses effets sur la santé devraient-ils être ajoutés sur les paquets de cigarettes?

Oui	1
Non	2

PROFIL DES RÉPONDANTS

Enfin, je vais vous poser quelques questions à des fins statistiques. Soyez assuré(e) que toutes vos réponses demeureront tout à fait anonymes et confidentielles.

64. En quelle année êtes-vous né?

Notez l'année de naissance : _____

65. Quel est le plus haut niveau de scolarité que vous avez atteint? (LISEZ LA LISTE AU BESOIN)

Études primaires	1
Études secondaires non terminées	2
Études secondaires terminées	3
Études collégiales, techniques, de métier ou cégep non terminé(es)	4
Études collégiales, techniques, de métier ou cégep terminé(es)	5
Études universitaires non terminées	6
Études universitaires terminées (baccalauréat)	7
Études supérieures (maîtrise ou doctorat) terminées ou non	8

66. <u>À l'heure actuelle</u>, quelle est votre situation d'emploi? Êtes-vous…? (LISEZ LA LISTE; N'ACCEPTEZ QU'UNE SEULE RÉPONSE)

Employé(e) à temps plein (au moins 30 heures/semaine)	1
Employé(e) à temps partiel	2
Travailleur(euse) autonome	3
Sans emploi ou à la recherche d'un emploi	4
Au foyer à temps plein (au foyer, aide sociale)	5
Étudiant(e)	6
Retraité(e)	7

Autre(précisez) : _____

67. Êtes-vous…? (LISEZ LA LISTE; N'ACCEPTEZ QU'UNE SEULE RÉPONSE)

Marié(e) ou en union libre	1
Célibataire	2
Veuf(ve)	3
Séparé(e)	4
Divorcé(e)	5

68. Avez-vous des enfants de moins de 18 ans qui vivent avec vous à la maison? Nous incluons ici les enfants qui habitent avec vous en tout temps ou à mi-temps en vertu d'une entente de garde partagée.

Oui	1
Non	2

69. Pour 2005, laquelle des catégories suivantes correspond le mieux au revenu total de tous les membres de votre foyer avant impôt? Est-ce… (LISEZ LA LISTE)

20 000 $ ou moins	1
De 20 000 $ à 39 000 $	2
De 40 000 $ à 59 999 $	3
De 60 000 $ à 79 999 $	4
De 80 000 $ à 99 999 $	5
100 000 et plus	6

Ceci termine notre sondage. Nous vous remercions de votre collaboration.

Notez à partir de la base de données ou du sondage

- Langue
- Sexe
- Province/région
- Région urbaine/rurale

Canadians' Understanding of the Chemistry Behind Cigarette Smoking and its Impact on Health

EXECUTIVE SUMMARY

May 2006

Submitted to Health Canada

(HC-POR-05-54 – Contract: H4133-051206/001/CY)

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EXECUTIVE SUMMARY

Health Canada commissioned Phoenix SPI to conduct public opinion research to explore Canadians' understanding of the chemistry behind smoking and its impact on health.

Research Purpose & Objectives

Accordingly, the main purpose of this research was to explore awareness, perceptions, beliefs, attitudes, knowledge and behaviour related to Canadians' basic understanding of chemistry, how this relates to cigarette smoking, and how it impacts on human health. More specifically, the research was designed to meet the following objectives:

- Explore Canadians' basic understanding of chemistry.
- Explore their knowledge of harmless versus toxic chemicals.
- Explore their understanding of the chemistry involved in cigarette smoking, including their understanding of the source of toxic compounds in unburned tobacco and tobacco smoke.
- Explore their understanding that toxic chemicals in tobacco smoke are responsible for the health hazards associated with tobacco use and exposure. This includes their knowledge of the particular chemicals in tobacco smoke that cause harm and the type of adverse health effects.
- Explore how best to educate Canadians on these issues.

The research included qualitative and quantitative phases. The qualitative phase consisted of a set of 14 focus groups conducted in five locations across Canada: Halifax, Montreal (French), Toronto, Winnipeg and Calgary. Participants included current, former and never smokers, youth, and adults. For the purposes of this study, 'current smokers' included anyone who currently smokes (either on a daily basis or occasionally). 'Former smokers' included anyone who has smoked at least 100 cigarettes in their life, but who does not currently smoke. Finally, 'never smokers' included those who have never smoked or have smoked fewer than 100 cigarettes in their life.

The quantitative phase consisted of a telephone survey of 1,822 Canadian residents, 18 years of age and older. The telephone survey included an oversample of current and former smokers, and the final data were weighted to reflect that actual distribution of Canadians by age, gender, region and smoking status. Based on a sample of this size, the overall results can be considered to be accurate to within +/- 2.3%, 19 times out of 20. The results of the qualitative research provide an indication of participants' views about the issues explored, but cannot be generalized to the full population of any of the target groups included in the research.

Basic Understanding of Chemistry

Most Canadians believe they have little if any understanding of basic chemistry. Using a 7-point scale (7 = very knowledgeable; 1 = not knowledgeable at all), over half (57%) of survey participants rated their knowledge in this area below the mid-point on the scale, suggesting a very limited level of understanding. By contrast, only one-quarter view themselves as at least moderately knowledgeable, and few (10%) consider themselves to

be very knowledgeable (scores of 6-7). The qualitative findings were consistent with this, where self-assessments generally pointed to very modest knowledge of basic chemistry. As will become evident, respondents' self-assessments were largely consistent with their exhibited knowledge (at least with respect to the issues explored through this research).

Following this self-assessment of knowledge of basic chemistry, respondents were asked a series of questions to try to gauge this in a more objective manner. Relatively strong majorities (70% each) correctly indicated that chemicals are made of atoms and have unique molecular make-ups. As well, a smaller majority, 58%, correctly noted that it is not true that only substances that are added together are chemicals; that said, 28% believe incorrectly that this is the case, while 12% were uncertain. In terms of misconceptions, 74% incorrectly believe that a key characteristic of chemicals is that they react with one another (while many chemicals do, this is not a defining characteristic). Moreover, almost identical majorities (56-57%) believe, incorrectly, that most chemicals are man-made or harmful. Focus group participants tended to hold these same misperceptions, often defining a chemical as something artificial (i.e. man-made) or harmful. In fact, the hardest part of the exercise on basic chemistry that focus group participants were asked to complete, identified by large numbers in all groups, was describing what a chemical is.

The majority of Canadians appear to have a clear understanding of the meaning of the terms 'concentration' and 'carcinogen'. In total, 56% of survey respondents correctly defined 'concentration,' and 64% linked the term 'carcinogen' to cancer. That said, a substantial minority (44%) could not correctly define 'concentration', and almost one-quarter (22%) did not even try to provide a meaning for 'carcinogen'. This same pattern was reflected in the focus groups: while most understood these terms, many did not.

Almost all respondents (93-96%) appear to know the meaning of 'toxic', that smoke is a source of pollution, and that it is *exposure* to the chemicals in pollution that is responsible for its harmful health effects. There was also widespread understanding (84-87%) that combustion is a chemical reaction, and that pollution and cigarette smoke are mixtures of chemicals. However, much smaller majorities (64-66%) know that a microgram is smaller than a milligram, that all pollution is harmful, and that smoke from a fireplace is a complex mixture of chemicals. More than half know that the difference between man-made and natural chemicals does not coincide with the difference between good and harmful ones, and that smoke does not consist of a small number of chemicals. Respondents were divided over whether or not combustion changes the *type* of chemicals or just their *form*, with virtually identical numbers (43-44%) holding correct perceptions or incorrect ones. Despite majorities responding correctly to all but one of these items, the proportion who were wrong or uncertain for half of them ranged from 34% to 56%.

Clearly, many Canadians hold incorrect views, or are simply unsure, regarding many of the areas explored that pertain to basic chemistry. The table below presents this information in another form, where a 'knowledge index' was created that included 20 factual questions related to basic chemistry. As can be seen, slightly more than one-third (36%) answered at least three-quarters of the questions correctly. It is worth noting,

however, that this number falls to 28% for current smokers. At the other end of the spectrum, almost one in five (17%) answered less than half of the questions correctly.

Knowledge of Basic Chemistry	
Number of questions	% who answered correctly
0-9	17%
10-14	48%
15-20	36%

The vast majority of respondents are able to establish some connection between chemicals and day-to-day life. Car exhaust was identified most often as an example from daily life where exposure to chemicals has a negative impact (39%), although nearly half identified cigarette-related exposure in the form of smoking (27%) or second-hand smoke (19%). Also identified frequently (23-24%) were cleaning supplies and pollution in general.

Repetitive exposure to chemicals was seen as the most important factor in terms of the negative impact chemicals can have on health, followed closely by the *concentration* and *type* of chemical. Using a 7-point scale (1 = not important at all; 7 = very important), the vast majority (85-91%) rated each of these factors as important, with over two-thirds ascribing strong importance to each. Comparatively speaking, the *number* of chemicals and the fact that people react differently to different chemicals were considered less important, but still important (73-74% rated each of these as important).

In the focus groups, when participants discussed the impact of chemicals on human health in daily life situations (e.g. car exhaust, chlorine in swimming pools, fresh paint in houses), many spoke about the impacts in coherent and accurate ways (i.e. pointed to things like the concentration or type of chemicals). However, participants appeared to have a much easier time talking about the health effects of the chemicals (e.g. sore throat, irritated skin/eyes) than identifying the way(s) that chemicals bring them about. That is, they had an easier time seeing the impacts than explaining how chemicals cause them. Taken together, the quantitative and qualitative research suggests that, when prompted, Canadians see the link between things like the type and concentration of chemicals, repetitive exposure, etc., and the impact on health. However, in the absence of prompting, they are less likely to identify chemicals as being the cause of the negative health effects, and less able to point to how this actually occurs.

Knowledge of Chemistry of Smoking and Health Impact

Canadians are much more likely to think they know about the health impact of smoking than the basic chemistry behind it. Using a 7-point scale (7 = very knowledgeable; 1 = not knowledgeable at all), 65% of survey respondents rated themselves as at least moderately knowledgeable about the former, while less than half that number (31%) said the same about the latter. Looked at another way, respondents are far more likely to think they know little-to-nothing about the basic chemistry of smoking compared to the health impacts of smoking (49% vs. 18%). The focus groups suggest that these self-assessments

are largely correct – most participants were readily able to identify many health effects of smoking, but had significantly greater difficulty with issues related to the chemistry behind smoking.

When asked to identify what is responsible for the harmful health effects associated with smoking, respondents were most likely to point to chemicals: 31% identified chemicals in general, 14% identified the chemicals in tobacco smoke, and 5% cited chemicals added to tobacco. As well, two specific chemicals were often identified: nicotine (27%) and tar (20%) - a composition of chemicals.

Lung cancer (55%) and cancer in general (43%) were the diseases most often identified as caused by smoking. Smaller numbers identified oral cancer (14%) and breast cancer (3%). Two-thirds identified respiratory system illnesses, including emphysema (29%), asthma (14%), lung disease (13%), respiratory problems in general (7%), and bronchitis (4%). Nearly one-third identified heart-related diseases, including heart attacks/angina (28%) and strokes (4%). Similar findings emerged through the focus groups. When identifying parts of the body negatively affected by cigarette smoke, participants pointed most often to the lungs/respiratory system and the heart. Moreover, specific diseases routinely linked to smoking included lung cancer, bronchitis, emphysema, breathing problems, and heart attacks/strokes. That said, there were typically 2-3 people in each focus group that said the entire body is affected by smoking, including not only the things identified above, but also the skin, hair, teeth, gums, blood, the brain, and many other parts of the body.

Most survey respondents (60%) believe that the health effects of smoking occur over a timeframe ranging from the immediate to the longer term (i.e. 20-25 years or more), as do most focus group participants. Moreover, many of the latter either associated specific health impacts or illnesses with specific timeframes, or thought of certain specific conditions as developing in stages. This was most evident among current and former smokers who tended to base this on their own experience (i.e. they experienced certain health-related effects during specific time periods or have observed them in others). However, current smokers were the most likely to believe the health effects associated with smoking occur over the longer-term only (30% vs. 20-24% of others).

Nearly two-thirds of respondents think there are more chemicals in tobacco smoke than in unlit tobacco, but fewer than half (47%) correctly identified tobacco smoke as having *many* more chemicals than unlit tobacco as opposed to a *few* more (16%). Almost equal numbers (14-15%) think unlit tobacco and tobacco smoke contain the exact same chemicals or the same number of chemicals but different types. Regardless of the relationship they perceive between the number of chemicals in cigarette tobacco and tobacco smoke, the overwhelming majority vastly underestimated the number of chemicals in either or refused to even hazard a guess (even after being pressed for an estimate). Only 2-4% estimated either number correctly. The focus group results were similar, where a large proportion of participants thought there were many more chemicals in tobacco smoke than in unlit tobacco, but most did not think this was the case or simply did not know. Moreover, participants' degree of certainty tended to be quite low (i.e. they

expressed their view on this, but were unsure about it). The reasons offered to explain their view, both in the focus groups and survey, were varied and often displayed a lack of understanding of the combustion process.

In the focus groups, virtually everyone struggled when asked to identify chemicals in unlit cigarette tobacco and tobacco smoke. Typically, participants, whether current, former or never smokers, were only able to identify two or three chemicals in total, some of which were often wrong. Moreover, they were almost totally unable to identify which chemicals were in unlit tobacco versus tobacco smoke. While smokers were generally better able to do this, even they had extreme difficulty recalling more than a few chemicals and could not identify with accuracy which ones were in unlit versus burned tobacco (although some were able to correctly identify that carbon monoxide was in tobacco smoke, but not in unlit tobacco). It was evident that the identification of chemicals on cigarette packages is information that is retained by very few.

Nearly all survey respondents knew that chemicals that are breathed in are absorbed and transferred to the blood (96%) and that it is exposure to the chemicals in tobacco smoke that is responsible for the health hazards (93%). Noticeably fewer (72% each) knew that there is no significant difference in the number of chemicals in cigarette brands with "light" or "mild" on the package versus regular cigarette brands, or that the chemicals in tobacco smoke are more harmful than the chemicals in unlit tobacco. Just over half (54%) were aware that most of the harmful chemicals in tobacco smoke are formed during the burning process. However, almost three-quarters (73%) believe, incorrectly, that most of the chemicals found in cigarettes have been added by tobacco manufacturers. Once again, while many respondents offered correct responses for these issues, the proportion that were incorrect or unsure for four of six items ranged from 28% to 84%.

When asked where the toxic chemicals in tobacco smoke come from, more than one-third (37%) correctly identified the combustion or burning process in one way or another, while 11% identified a chemical reaction and 7% simply pointed to tobacco smoke. However, one-third did not provide any response, while most of the other explanations point to an inability to clearly distinguish between the nature of unlit tobacco and tobacco smoke. Feedback from focus group participants also revealed an inability to clearly distinguish between the nature of unlit tobacco and tobacco smoke.

Another knowledge index was created to identify the number of respondents who correctly answered questions regarding the chemistry behind smoking (13 questions included). Almost two-thirds (65%) answered more than half of these questions correctly. That said, relatively few (16%) answered over three-quarters of the questions correctly, and more than one-third (36%) answered fewer than half of the questions correctly. Current and former smokers were more likely to answer a majority of these questions correctly (67-71% vs. 59% of never smokers).

Information on Basic Chemistry Behind Smoking

In terms of *new* information for survey respondents, there was widespread prior awareness that exposure to the chemicals in tobacco smoke is responsible for the health hazards associated with smoking (85%). A smaller but still sizeable majority (71%) said they already knew that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco. However, while a majority (55%) said they knew that there is a significant difference between the chemical composition of unlit tobacco and tobacco smoke, 43% said this was new information to them. As well, fully 84% did not know that cigarette tobacco smoke contains over 4,000 chemicals, and 79% did not know that harmful chemicals in cigarettes are not added by tobacco manufacturers.

The large majority of respondents (87%) think it is important to provide Canadians with information on the chemistry behind smoking and its impacts on health to help them make an informed choice about smoking (71% attribute the highest importance possible to this). Such information was considered to be less important to respondents themselves. Just over two-thirds (68%) attributed personal importance to this information. There was widespread agreement among focus group participants as well that it is useful to understand the chemistry behind smoking and its health impacts. However, focus group participants tended to have difficulty explaining why this information is useful – most tended to answer in a general way that being informed is better than not being informed.

Health professionals lead the way in terms of groups that people would trust for relevant information about the chemistry behind smoking (39%). This was followed by government in general (30%), Health Canada in particular (17%), and national non-profit organizations and chemists/scientists (13% each). The same main sources were identified, in the same order, as being trustworthy to provide information on the health impacts of chemicals in tobacco smoke.

In terms of important information to convey, focus group participants routinely identified information on other uses of chemicals present in tobacco smoke as most important or relevant to them. They were virtually unanimous in explaining that this gave them a concrete frame of reference for understanding what people ingest when they inhale smoke from a cigarette. While the names of most of the chemicals mean little or nothing even though some are known to be toxic, the point is driven home when they realize they are ingesting ingredients used in such things as paint stripper, gasoline, and car batteries. Participants were reacting to a draft document on tobacco smoke and its impact on health which provided this type of information. Survey respondents pointed to the health effects of specific chemicals (19%), the negative health effects of smoking (10%), and the most harmful chemicals (7%). Substantial numbers also identified the number (15%) and type (13%) of chemicals in tobacco smoke.

By a wide margin, television ads are the preferred method for receiving information about the chemistry behind smoking and its impact on health. Half (51%) identified television advertisements, followed by written materials (30%), mail/direct mail (23%), websites (18%), and radio advertisements (17%). Television was also routinely identified in the focus groups, where suggestions often focused on visually highlighting the toxic

nature of the chemicals in tobacco smoke. When asked specifically, over three-quarters (79%) of survey respondents said that this type of information should be included on or in cigarette packaging, something also suggested by many focus group participants.

Demographic Variations

Differences in education and household income were most likely to follow a pattern and tended to mirror one another, primarily on knowledge-related issues. The likelihood of scoring high on all three knowledge indices increased with income and education (or was higher among those with more formal education). While knowledge of various issues increased with education/income, however, the perceived importance of such knowledge decreased as education and income increased. It may be that the more people know about such issues, the less importance they attribute to the sharing of related information.

Age and gender differences also tended to follow a pattern on knowledge-related issues, but the pattern was not as consistent as it was for education and income. Younger respondents (46 or younger) were more likely to be knowledgeable about basic chemistry and the health impacts of smoking, but not about the chemistry behind smoking. In terms of gender, men were more likely to know about basic chemistry and the chemistry behind smoking, but women were more likely to know about the health effects of smoking. Women were also more likely to attribute importance to information on the chemistry behind smoking and its impact on health. Regionally, respondents in the West were most likely to be knowledgeable about chemistry and the chemistry behind smoking. Beyond this there was no consistent pattern except that Quebec residents stood out in a few areas: they were least likely to know about basic chemistry and the health impacts of smoking, but most likely to regard such information as important to them personally.

Conclusions and Implications

A key finding to emerge from this research, in both its qualitative and quantitative phases, was the discontinuity in participants' knowledge of basic chemistry, how this relates to cigarette smoking, and how the latter impacts on human health. This discontinuity tended to manifest itself in two ways. First, participants were much more likely to know about the health-related impacts of smoking than about basic chemistry and how it relates to smoking. Second, their understanding of the latter (i.e. basic chemistry and how it relates to smoking) tends to be limited and includes a mix of correct and incorrect perceptions.

Participants had little difficulty identifying health effects of smoking. This is not surprising in light of the frequent public awareness campaigns about the health impacts of smoking. In the survey, very few respondents were unable to identify any health effects of smoking. Similarly, focus group participants had little difficulty identifying parts of the human body affected by cigarette smoke or diseases caused by cigarette smoke. People also tend to be attuned to timelines when thinking about the health effects of tobacco smoke. The majority of survey respondents and most focus group participants believe, correctly, that the health effects from smoking manifest themselves over the full scope of time (i.e. from immediate to the long-term). Moreover, focus group participants

were readily able to point to tangible evidence to support this view – that is, health effects that manifest themselves over differing time periods.

However, Canadians' knowledge or awareness of the health effects of smoking is clearly not grounded in an understanding of basic chemistry or the chemistry behind smoking, and many have difficulty making this link in anything more than a general way. Here are some examples of the disconnect between knowledge of the health impact of smoking and knowledge of basic chemistry and the chemistry behind smoking:

- In their own self-assessments, survey respondents were more than twice as likely to consider themselves knowledgeable about the health impacts of smoking than about basic chemistry and the chemistry behind smoking. For their part, focus group participants found it much easier to answer health-related questions about smoking than questions about basic chemistry or the chemistry behind smoking. For instance, questions asking them to define a chemical and name chemicals in cigarette tobacco and tobacco smoke were described as being the most difficult.
- While survey respondents most often identified cancer in various forms as a health effect caused by smoking, almost one-quarter were unable to provide any definition at all for 'carcinogen', and less than two-thirds linked it to cancer (with current smokers least able to do this).
- The vast majority of survey respondents said they are aware that it is exposure to chemicals in tobacco smoke that is responsible for the health hazards associated with smoking, but only two specific chemicals/components (nicotine and tar) were identified with any frequency as responsible for the harmful effects associated with smoking. In addition, relatively few could correctly identify the health impacts of carbon monoxide and nicotine (although many knew the latter was the addictive component in tobacco). In a similar way, most focus group participants knew that exposure to chemicals in tobacco smoke is responsible for the health hazards associated with smoking, but few could correctly identify more than two or three chemicals in tobacco smoke.

As the findings in the previous bullet suggest, while there is a general understanding that chemicals in tobacco smoke are responsible for the health hazards associated with smoking, there is limited awareness of the particular chemicals in tobacco smoke that cause harm or the specific adverse health effects they produce. Moreover, the qualitative research suggests that participants lack the conceptual framework for articulating what it is in the chemicals that cause the adverse health effects (e.g. concentration, type of chemical, number of chemicals) and the actual process of how this happens.

Not only is participants' knowledge of the health impacts of smoking not grounded in an understanding of basic chemistry or the chemistry behind smoking, knowledge of the latter is quite limited and is clouded by incorrect perceptions. In particular, misperceptions related to the difference between unlit and lit tobacco are widespread, and would need to be addressed in any efforts to inform Canadians about issues related to the chemistry behind smoking and its impact on health. These misperceptions related to the difference between unlit and lit tobacco manifested themselves in a number of ways:

- *The process of combustion*: Close to half the survey respondents think that combustion changes only the *form*, not the *type* of chemicals in cigarette tobacco. In addition, one-third said they do not know where the toxic chemicals in tobacco smoke come from. While those who did offer an opinion on this were most likely to identify the combustion process in one way or another, most other explanations pointed to an inability to clearly distinguish between the nature of unlit tobacco and tobacco smoke (i.e. they suggested that the chemicals were already contained in the unlit tobacco in one way or another). While many focus group participants said they tend to distinguish between the composition of unlit tobacco and tobacco smoke in daily life, discussion and probing revealed that a substantial number actually distinguish between an unlit and lit cigarette or between the physical form of the chemicals (i.e. solid vs. gas) as opposed to the chemical composition of each. In short, many do not understand the fundamental significance of the combustion process.
- *The number of chemicals in tobacco smoke*: Fewer than half knew that there are many more chemicals in tobacco smoke than in unlit tobacco, and almost everyone who thought there were many more chemicals in tobacco smoke nonetheless vastly underestimated the number.
- *Whether or not harmful chemicals are added to cigarettes by manufacturers:* Most participants thought that manufacturers add chemicals to cigarettes. This may be related, in part, to another relatively widespread misperception: the belief that natural chemicals are good and man-made ones are bad. The latter may lead some to believe that natural tobacco is harmless so that anything bad or harmful in it must have been added (i.e. is man-made/added by manufacturers).

The two latter information items (i.e. the number of chemicals in tobacco smoke and the fact that chemicals are not added by manufacturers) were the only information items identified as new information by a majority of survey respondents. That said, the extent to which Canadians clearly understand other information should be viewed cautiously. While majorities said they knew that exposure to the chemicals in tobacco smoke is responsible for the health hazards associated with smoking, that most of the harmful chemicals in tobacco smoke are formed during the burning of the tobacco, and that there is a significant difference between the chemical composition of unlit tobacco and tobacco smoke, the qualitative research revealed that some of those who hold these views are simply making a distinction between an unlit and a lit cigarette (assuming that only when a cigarette is lit can it harm someone), as opposed to a distinction between the actual chemical composition in lit versus unlit cigarettes.

In short, Canadians know less than it appears about these issues than one might assume based on a literal interpretation of the survey findings. In terms of how to best educate them on these issues, a general guiding principle should be to frame the issues in such a way as to make them meaningful. Recall that fewer than one-third of survey respondents consider themselves knowledgeable in basic chemistry or the chemistry behind smoking. Recall as well that focus group participants were virtually unanimous in reacting positively to information on other uses of chemicals present in tobacco smoke, explaining

that this gave them a concrete frame of reference for understanding what people ingest when they inhale smoke from a cigarette. Moreover, the primary target group for such information (i.e. current smokers) are the most likely to lack knowledge of basic chemistry and the health impact of smoking.

Finally, Canadians seem receptive to receiving this type of information, with the vast majority viewing it as important to Canadians and over two-thirds viewing it as important to themselves personally. That said, in terms of sources of information, it is worth noting that both government in general and Health Canada in particular were least likely to be identified as trusted sources of information by current smokers (i.e. the primary target group for this information). Current smokers are less likely to support placing such information on/in cigarette packs, although it seems clear that information on the chemistry behind smoking would be more meaningful than simply identifying the chemicals contained in cigarettes/cigarette smoke (which lack meaning for smokers, and is information that is not retained by them).