



THE ONTARIO  
TOBACCO  
RESEARCH  
UNIT

UNITÉ  
DE RECHERCHE  
SUR LE TABAC  
DE L'ONTARIO

# Ontario Tobacco Survey

Technical Report 1: Baseline Data

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## Executive Summary

The Ontario Tobacco Survey (OTS) is a provincial longitudinal survey of adult smokers and cross-sectional survey of non-smokers on smoking attitudes and behaviours. It was undertaken to evaluate and inform the Smoke-Free Ontario Strategy and to gain a better understanding of the processes of, and influences on, smoking cessation and relapse. The OTS is a unique study as smokers are re-interviewed every six months for a minimum of three years. Baseline data collection for the OTS began in July 2005 and concluded in June 2008.

This report outlines the study design for the OTS and further focuses on specific details regarding the baseline data for all six waves of study recruitment. Smokers (any smoking in the past six months) completed interviews that averaged 23 minutes, while non-smokers completed interviews approximately 13 minutes in length. Overall, the OTS has an adjusted response rate of 57% (ineligible and estimated ineligible respondents were removed from the denominator); the smoker and non-smoker response rates were 61% and 51%, respectively. The cooperation rate was 85% for smokers and 89% for non-smokers. This report discusses data weighting for the OTS and describes the baseline sample and representativeness to the Ontario adult population. Details for data analysis and requirements for data use are also discussed.

This report is the first of three technical guides for the OTS. The technical reports to follow include:

- OTS Technical Report II: Six and Twelve Month Follow-up
- OTS Technical Report III: Complete data

## Overview

The Ontario Tobacco Survey (OTS), conducted by the Ontario Tobacco Research Unit (OTRU), is a population-based provincial study monitoring tobacco use and opinions about tobacco control to inform the progress of the Smoke-Free Ontario (SFO) Strategy. The OTS combines six semi-annual cross-sectional surveys of smokers, and of non-smokers, with a major longitudinal study of adult smokers. The study focuses on attitudes, behaviours, and beliefs about tobacco, the factors that influence smoking cessation, and exposure to smoking-related government policies and programs.

The **main** objectives of the study are:

- To evaluate existing SFO projects or policies;
- To serve as a baseline for evaluating new or likely projects or policies; and
- To serve as a basis for planning projects rated as likely or high priority.

This report describes the overall OTS study design, sampling strategy, and content areas of the overall OTS initiative. Also presented in this first technical report are: response rates and sample description; description of study data for all baseline interviews in both the smokers and non-smoker samples; and the specific questionnaires for each cohort.

Future Technical Reports will address the longitudinal components and samples for the OTS.

## Methodology

### Study Design

The cross-sectional survey component of the OTS consists of a set of six population- representative telephone surveys of Ontario adults (18 years of age and over), stratified by region (Eastern, Greater Toronto Area, South Western, and Northern based on telephone area code) and smoking status (any smoking in the past six months, see below).<sup>1</sup> Data collection for the first baseline survey (Cohort 1 of the OTS) began in July 2005; collection of the final baseline study (Cohort 6) was completed in June 2008. These six cross-sectional surveys samples were paired with a longitudinal component that allowed for repeated follow-up interviews of the recent smokers (had smoked within the past six months at recruitment). Follow-up interviews took place at approximately six-month intervals, for a minimum of three years. This cross-sectional / longitudinal hybrid design provides descriptive snapshots of the Ontario population and allows for the examination of changes over time in behaviours, exposures and attitudes.

Survey data for the OTS are collected by the Survey Research Centre (SRC) at the University of Waterloo using computer-assisted telephone interview (CATI) technology. The sample is stratified

into four regional strata defined by telephone area code (see Survey Recruitment and Baseline Protocols below). Oversampling of recent smokers was used in order to accommodate attrition in the longitudinal design. During each month of recruitment, quota sampling of recent smokers and non-smokers was maintained. For each of six waves of the survey, 1250 new study participants were recruited, comprising:

- 750 recent smokers who are invited to participate one baseline (cross-sectional interview) and a minimum of three follow-up surveys occurring in 6-month intervals; and
- 500 non-smokers who are invited to participate in a single baseline (cross-sectional only) survey.<sup>2</sup>

Table 1 provides an illustration of the overall study design and data collection schedule for the OTS. Specific details regarding the longitudinal design and protocols will be detailed in the next Technical Report for the OTS.

**Table 1: Study Design and Data Collection Schedule for the Ontario Tobacco Survey (OTS)**

Wave	Date	Cross-Section Non Smokers	Longitudinal Smokers – Baseline	Longitudinal Smokers – Follow-Up 1	Follow-Up 2	Follow-Up 3	Follow-up 4	Follow-up 5	Follow-up 6
1	July - December, 2005	500	750 BLC1						
2	January - June, 2006	500	750 BLC2	F1C1					
3	July - December, 2006	500	750 BLC3	F1C2	F2C1				
4	January - June, 2007	500	750 BLC4	F1C3	F2C2	F3C1			
5	July - December, 2007	500	750 BLC5	F1C4	F2C3	F3C2			
6	January - June, 2008	500	750 BLC6	F1C5	F2C4	F3C3	F4C2		
7	July - December, 2008			F1C6	F2C5	F3C4	F4C3	F5C2	
8	January - June, 2009				F2C6	F3C5	F4C4	F5C3	F6C2
9	July - December 2009					F3C6	F4C5	F5C4	F6C3
10	January - June 2010						F4C6	F5C5	F6C4
11	July - December 2010							F5C6	F6C5
12	January - June 2011								F6C6

Notes: BLCx represents the baseline survey for cohort x (e.g. BLC1 = baseline survey for Cohort 1); FyCx represents the interview follow-up survey y in cohort x (e.g. F2C3 = Follow-up 2 for Cohort 3). Cohort 1 has only three follow-up interviews as per the original study design which was extended to six follow-up interviews for Cohorts 2 to 6.

Each colour represents one of the six cohorts in the OTS. The darker colours represent the cross-sectional non-smokers; the lighter colours represent the cohorts of recent smokers that are followed over time.

## Survey Recruitment and Baseline Protocols

The SRC purchased Random Digit Dial (RDD) samples of Ontario telephone numbers from ASDE Survey Sampler. ASDE uses a geographically stratified, general phone population random sampling program. It samples using RDD methodology and checks its samples against published phone lists to divide the RDD frame into “directory listed” and “directory not listed” components.<sup>3</sup> Their method is adapted from the Mitofsky-Waksberg Method.<sup>4</sup> Following the initial purchase, ASDE blocked numbers previously released to the OTS from successive samples. For the OTS, the purchased list was randomly ordered within four regional strata:

- Northern Ontario – area codes 807/705
- Eastern Ontario – area code 613
- Toronto region – area codes 416/647/905/289
- South Western Ontario<sup>a</sup> - area code 519

The OTS was stratified into these regions to ensure adequate sample of respondents outside the Toronto region.

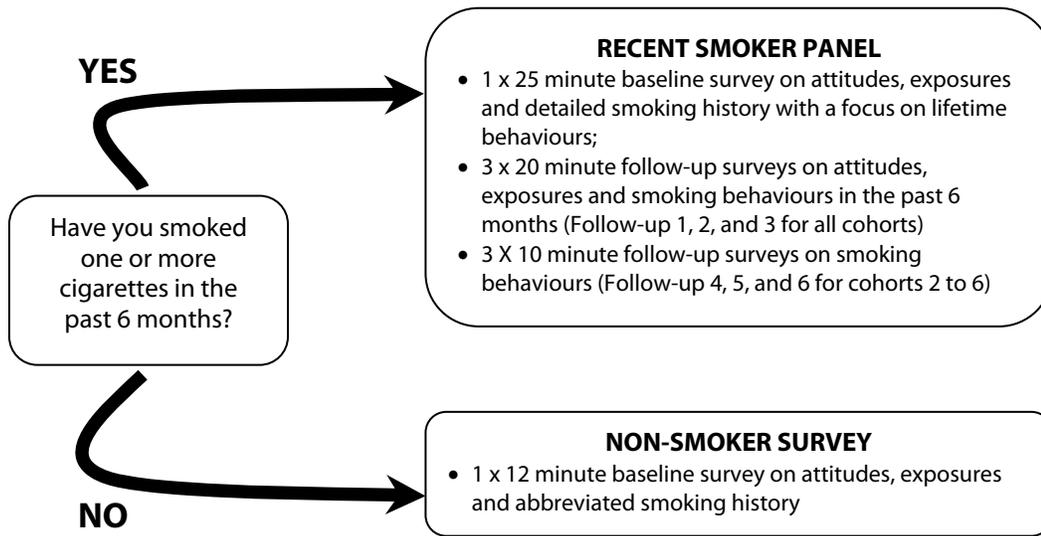
When a dialed number reached a private household, the person who answered was asked to provide minimal information on the number of adult residents (18 years of age and over), and one person per household was selected at random using the ‘next birthday’ method. When the chosen individual was reached, they were asked for basic eligibility information, including ability to complete an interview in English, confirmed respondent age and determined smoking status -- approximated by a single question that determined if the participant had smoked one or more cigarettes in the past six months.<sup>5</sup> The measure of smoking status used in sampling is not as detailed as standard definitions, but provided an easy and cost-effective approximation for recruitment while minimizing personal information requested from participants before they have an opportunity to provide full informed consent. Potential participants who were incompetent, unable to complete an interview in English, or less than 18 years of age were ineligible for participation in the study. Additionally, cell phone numbers were also considered ineligible and thus not recruited into the study.

Once interviewers established eligibility and recent smoker/non-smoker status, quota sampling determined if eligible non-smokers were retained or, if the quota was filled, notified that non-smokers were not being recruited at that time. All respondents meeting eligibility criteria and chosen for inclusion into the study were informed of the expected survey length, confidentiality issues, and future data collection when applicable. Interviewers then asked respondents to provide verbal consent to participate in the survey. The non-smokers were asked to continue with consent

<sup>a</sup> South Western Ontario introduced a second area code – 226 – in October 2005. At the time of data collection, this area code was used mostly for cell phones and had not yet appeared in the phone books of this region as an area code for home land lines.

and complete an interview of approximately 12 minutes. Figure 1 illustrates OTS recruitment into the recent smoker (longitudinal panel) or the non-smoker (cross-sectional) survey. Respondents identified as recent smokers were asked to consent to the longitudinal component of the OTS and complete an interview of a maximum length of 25 minutes.

**Figure 1: OTS Recruitment into the Recent Smoker and Non-smoker Sample**



The OTS was originally designed to interview recent smokers at baseline and three follow-up interviews. In January 2008, the longitudinal study design was enhanced by doubling the number of follow-up interviews for consenting participants. At recruitment (i.e., baseline), cohorts in the OTS consented to follow-up participation as detailed in Table 2.

**Table 2: OTS Recruitment of Recent Smokers**

OTS Cohort Number (Data Collection Date)	Number of Follow-up Interviews	Follow-up Recruitment Script at Time of Consent
COHORT 1 (July – December 2005)	Eligible for 3 follow-up interviews	<b>At recruitment:</b> “There will be 3 additional follow-up surveys that take place every six months.”
COHORTS 2 – 4 (January 2006 – June 2007)	Eligible for 6 follow-up interviews	<b>At recruitment:</b> “There will be 3 additional follow-up surveys that take place every six months.”  <b>At the end of follow-up three:</b> These cohorts were invited to continue their participation in the survey for up to three additional follow-up interviews.
COHORTS 5 & 6 (July 2007 – June 2008)	Eligible for 6 follow-up interviews	<b>At recruitment:</b> “There will be <b>up to six</b> additional follow-up surveys <b>ranging from 10-20 minutes in length</b> that take place every six months.”

When consenting participants were unable to complete the interview at the time of recruitment, the telephone interview was scheduled for a mutually convenient time over the next 14 days.

For household numbers where there was no contact, a minimum of 14 call attempts were made. In order to increase representativeness, calls were made at various times of the day (e.g. morning, afternoon, and evenings) as well as different days of the week, including Sundays. There were no calls made on Saturdays or during any holiday weekend. The OTS included protocols for refusal conversions on numbers with an initial 'soft' refusal (those stating that they are too busy or not interested). These numbers were placed in a callback list that was first called no sooner than 14 days after the first refusal (in Waves 1 and 2, these callbacks were made anywhere from 3 to 14 days). If a second refusal for participation was received during the second call, the number was given a final refusal disposition and retired from the queue.

At the time of recruitment, participants were informed that they will be compensated for their participation. After being recruited to the survey, each participant was mailed a thank-you letter along with a \$15 honourarium. Every six months, longitudinal participants are mailed a reminder letter regarding their participation in the upcoming phase of the study, along with a \$15 honourarium, two weeks prior to re-contact. At follow-up 1, recent smokers with complete baseline data were eligible for recontact. Specific details regarding longitudinal protocols will be outlined in the next Technical Report for the OTS.

## **Study Instruments**

The OTS questionnaires focused on smoking behaviours, cessation and protection of Ontario adults from second-hand smoke (SHS). Baseline (cross-sectional) telephone interview scripts were programmed to include significantly more information from smokers than non-smokers. Both recent smokers and non-smokers were asked questions about their attitudes and beliefs regarding smoking, environmental tobacco smoke, exposure to tobacco industry marketing, mass media tobacco control campaigns aired in Ontario, and demographic information. For smokers (longitudinal participants), the baseline script also included detailed questions about their personal smoking behaviour and experience, including past quit attempts and quit intentions, as well as their lifetime exposure to smoking cessation aids and resources. Table 3 outlines the major content areas of the OTS instruments for recent smokers and non-smokers.

In general, the baseline instrument and data presented in this technical report focuses on EVER or LIFETIME behaviour and experiences of smokers. Follow-up instruments focus on smoking behaviours in the six-months (since their last interview) and provide more detailed information on the factors that may have initiated these changes.

**Table 3: Major Content Areas for the OTS, by Recruitment Status (Recent Smokers vs. Non-smokers)**

Content Area	Recent Smokers	Non-Smokers
General Smoking Behaviour Current / past tobacco use	•	•
Detailed Smoking Behaviour Frequency / Quantity	•	•
Addiction Perceived addiction / Fagerstrom	•	
Quitting Behaviour Previous attempts and motivation Intentions / Stages of Change Perceived ability to quit	•	
Quit Aids Usage / Opinions of quit aids	•	
Health Professionals Previous advice Likelihood of seeking advice	•	
Purchasing Profile Specific brand / Discount purchasing	•	
Point of Sale Awareness of signage	•	•
Second-Hand Smoke Exposure at home, work, public places Workplace and household policies	•	•
Typology <sup>6</sup> Attitudes and behaviours regarding smoking	•	•
Tobacco Industry Exposure to tobacco sponsored events	•	•
Mass Media Aided recall of mass media campaigns	•	•
Demographics	•	•

Throughout data collection, the OTS instruments were modified in order to rectify errors or problems identified. Over time, a modest number of new questions were incorporated into baseline questionnaires. These new questions reflected changes in the tobacco control policy environment, as identified by the Principal Investigators. The *OTS Question Database* (Appendix B) details the data collection period for each survey question (by cohort) while the survey questionnaires (Appendix A) detail for each question any edits or notes from the previous waves. (Note: an electronic supporting document can be accessed on our website; the *OTS Baseline Question Edits* file details edits or revisions made for each question over the baseline collection period.). The study questionnaires also note any changes made throughout the data collection (Appendices A1 to A6).

### ***The Role of Skip Logic in the OTS***

The OTS study instruments employ a significant amount of skip logic in order to minimize respondent burden while obtaining detailed information from respondents where appropriate. In the baseline instruments, the most significant logical branching is the distinction made between

recent smokers (any smoking in the past six months) and non-smokers. There are also numerous questions that will skip out respondents for whom the questions are less relevant. As an example, many questions are relevant for current smokers only (respondents smoking in the past month), such as detailed smoking behaviours in the past 30 days. As a second example, detailed information about plans to quit smoking or recent quit attempts are limited to those who have smoked at least 100 cigarettes in their lifetime as these questions are less relevant to those who are beginning or experimenting with cigarettes. Respondents that are skipped out of a question will be given a 'Not Applicable' code of 7, 77, or 777 depending on the type of question (See Appendix D – *OTS Baseline Data Dictionary*).

The data analyst should pay particular attention to the respondent eligibility for each question. This is the question coverage provided in the questionnaires (Appendix A) under each interview question. Please refer to the table at the beginning of the questionnaires for common coverage definitions (e.g., current smoker versus self-report smoker).

The skip patterns in the OTS must be assessed for each question and fully understood by the data analyst. This issue is discussed in more detail in the Data Analysis section below.

## **Pilot Testing and Quality Control**

Baseline recruitment protocols and the baseline study instrument were pilot tested in April 2005 on more than 150 recent smokers and non-smokers. Questionnaire and technical issues were identified and adjusted prior to the beginning of study data collection which commenced in July 2005.

The SRC trained interviewers participated in OTS interviewer training prior to the pilot study and prior to the beginning of each new wave of the study. Additionally, the SRC held mid-wave training, allowing for a discussion of specific item issues and participant responses. Training sessions also allowed for SRC managers to inform interviewers about monthly quotas, review progress, and outline targets for the coming months. The SRC provides manager supervision of interviewers at all times. Managers also monitored interviewers' performance by patching into a terminal to listen in on the execution of an interview as well as assess the interviewer's coding of responses. Managers provided regular feedback to interviewers to help enhance their interview skills, ensure study protocols were followed, and participant responses were entered accurately.

## **Ethical Approvals**

Ethical approval for the OTS initiative was received from the appropriate Human Subjects Research Ethics Committees of the Universities of Waterloo and Toronto. A priori explicit ethical approval was obtained for the OTS initial protocol design and pilot studies, as well as all changes to the protocol, questionnaires, recruitment and remuneration scripts and procedures over time.

## Data Weighting

Expansion weights (xwt2006 ) were produced for baseline respondents. Weights were calculated for each wave of data collection and according to the sample characteristics and completion rates for each wave respectively. For the purposes of the combined baseline dataset, all weights were recalibrated to sum to the 2006 census population.

## Algorithm

The numbers of OTS baseline survey respondents are as follows:

**Table 4: Number of Non-smokers and Recent Smokers in the OTS by Sampling Stratum**

Region	Non-smokers	Recent Smokers
416; 647; 905; 289	706	868
519	808	1296
613	767	1094
807; 705	720	1246
Total	3001	4504

For new respondents, the sampling design samples households randomly within each of the four area code regions. When a household is screened, the next birthday adult is interviewed if they are a smoker; if they are a non-smoker, the respondent is interviewed if the non-smoker quota is open. If the non-smoker quota is closed but the next birthday adult is a non-smoker, the household is ruled ineligible.

The following computation of preliminary (inverse inclusion probability weights) is done within each region. The same method was used in all waves (Wave 1 through 6).

Let  $N$  be the estimated number of households for the region, at the time of the Wave.

Let  $n$  be the total number of non-refusal households screened in the region, where the next birthday person is determined, and approached if eligible.

Let  $n_{open}$  be the total number of non-refusal households where the next birthday person is determined while the non-smoker quota is open.

Now consider an individual  $j$  in the sample. Let  $a_j$  be the number of adults in the household of that person.

If  $j$  is a smoker, the inverse or reciprocal of the probability of inclusion may be approximated as

$$(1) \quad \frac{N}{n} \times a_j \times \frac{1}{c_{sm}}$$

where  $c_{sm}$  is a “completion rate” for smokers.

If  $j$  is a non-smoker, the inverse of the probability of inclusion may be approximated as

$$(2) \quad \frac{N}{n} \times \frac{n}{n_{open}} \times a_j \times \frac{1}{c_{ns}} = \frac{N}{n_{open}} \times a_j \times \frac{1}{c_{ns}}$$

where  $c_{ns}$  is a “completion rate” for non-smokers.

### Calculations

Weights were calculated for respondents with complete data on all variables required for weight calculation or calibration (including age and sex). Details of the actual calculation are as follows:

Where  $a_j$  was more than 4, its value was replaced by 4; where  $a_j$  was missing, its value was set equal to 1.

Region was defined through area codes, as indicated below.

The values of  $N$  used were the estimated numbers of telephones provided by ASDE. These were as follows:

**Table 5: Estimated Number of Ontario Telephones by Sampling Stratum**

Region	ASDE Estimated No. of Ontario Telephones		
	Wave 1	Wave 2	Waves 3 – 6
519	916 000	899 287	899 995
613	629 825	623 777	633 207
705-807	633 438	641 432	640 709
416-905-647-289	2 295 688	2 121 388	2 095 077
Total	4 475 331	4 285 384	4 268 988

Source: ASDE Survey Sampler<sup>3</sup>

This total seems reasonable, since the estimated number of occupied dwellings in Ontario from the 2006 census was 4,554,251.

The reciprocals of the completion rates were taken to be 1.25 for smokers and 1.25 for non-smokers. The weights obtained from (1) and (2), summed over the entire sample, yielded about 9,380,000 as a raw estimate of the population size.

For production of the final weights (xwt2006), the weights from (1) and (2) were then calibrated so that within age-sex groups the weights would sum to the corresponding population estimates for Ontario from the 2006 Census. The estimates, taken from the Statistics Canada website are as follows:

**Table 6: Census Data for the 2006 Ontario Population by Age and Sex, 18 Years of Age and Older**

Age Group	Male	Female
18 – 24 years	565 955	554 910
25 – 44 years	1 679 910	1 772 145
45 – 64 years	1 571 805	1 646 080
65+ years	717 510	931 660
Total	4 535 180	4 904 795

Source: Statistics Canada<sup>10</sup>

Note: The OTS weights are calibrated to reflect this sample of Ontario adults

All respondents who provided a valid response to age were assigned a weight. In the OTS, there were 45 females and 56 males that did not give their age; of these, 92 were partial and 9 were complete interviews. These individuals could not be used in the calculation of weights, and therefore do not have any weights associated with their records.

## Baseline Study Data

### Recruitment Statistics

Table 7 details the recruitment statistics by cohort (or six-month waves), including the interviewed sample of smokers and non-smokers, a summary of the total sample, and smoker and non-smoker response and cooperation rates, as well as survey length.

OTS response rates were calculated according to the American Association for Public Opinion Research Guidelines Response Rate #4, which removes from the denominator those who were ineligible (e.g. language problem) and those estimated to be ineligible among those with unknown eligibility.<sup>7</sup> As seen in Table 7, the smoker response rate was generally higher than the non-smoker response rate. The combined baseline data for the OTS has a smoker response rate of 61% and a non-smoker response rate of 51% – the overall response rate for smokers and non-smokers is 57%. These rates are higher than recently reported response rates for other surveys in Ontario and Canada.<sup>8,9</sup> In addition, the OTS had exceptional cooperation rates for both smokers and non-smokers: 85% and 89% respectively (Table 7).

**Table 7: Baseline Recruitment Statistics of Recent Smokers and Non-smokers in the OTS, by Cohort and Overall**

Baseline	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	All Cohorts
Data Collection Period	Jul-Dec 2005	Jan-Jun 2006	Jul-Dec 2006	Jan-Jun 2007	Jul-Dec 2007	Jan-Jun 2008	Jul '05 – Jun '08
Completed Interviews – Smokers	749	752	750	752	752	749	4504
Completed Interviews – Non-Smokers	501	499	500	501	498	502	3001
Partial Interviews*	0	18	16	16	22	20	92
Total Interviews	1250	1269	1266	1269	1272	1271	7597
Eligible Refusals	229	225	220	296	272	237	1479
Smoker Refusals	149	142	125	206	190	173	985
Non-smoker Refusals	80	83	95	90	82	64	494
Unknown Eligibility Refusals	2033	1831	2062	2553	2681	2337	13 497
Not Eligible†	6177	7032	7116	8216	8471	8779	45 791
Total Sample	9689	10 357	10 664	12 334	12 696	12 624	68 364
Response Rate Smokers (%) ‡	62.8	65.8	64.2	58.0	58.0	59.4	61.4
% of Response Rate Refusal Conversions §	8.5	10.9	7.1	16.0	17.1	12.0	11.9
Response Rate NS (%) ‡	50.0	49.4	57.3	59.0	43.0	48.3	51.2
Overall Response Rate (%) ‡	57.0	58.2	61.3	58.4	51.0	54.4	56.7
Cooperation Rate (%) – Smokers	87.1	86.0	87.5	81.8	83.1	83.6	84.9
Cooperation Rate (%) – NS	89.2	89.2	86.6	87.6	90.4	91.2	89.0
Average survey length (minutes) – Smokers	21.3	22.1	23.8	23.0	24.4	23.2	23.0
Average survey length (minutes) – Non-smokers	12.6	12.5	14.6	13.9	13.1	12.1	13.1

\* Partial Interviews are those in which respondents began the survey but did not complete the full interview

† Not eligible represents dialed numbers that were a non-residence, fax/modem, a cell phone, not-in-service, or potential participants who were unable to complete an interview in English, incompetent, less than 18 years of age, or ineligible since the non-smoker quota was filled

‡ Response rates were calculated according to AAPOR #4<sup>7</sup>

§ Percentage of all completed interviews that were a result of refusal conversions

|| Cooperation rates were calculated according to AAPOR COOP#4<sup>7</sup>

Note: NS = non-smokers

## Baseline Study Participants

In the public use data file, partial interviews without weight information are omitted. Partial interviews (N=92) represent those where the respondent started the interview, but terminated the interview prior to completion. In these cases, it is not possible to assign a final weight including post-stratification adjustments, because partial respondents' ages are unknown. Therefore, respondents with partial data have been excluded from this public use data file, but may be made available upon request.<sup>b</sup> In addition, nine participants with complete survey data did not provide their age and therefore are given a final weight (xwt2006) of zero. These individuals are included in the baseline public use data file, however, will automatically be excluded by the software from any weighted analysis. Thus, the public use dataset has 7505 respondents, of which 7496 respondents have weight information.

The actual unweighted numbers of total eligible participants described in reports and publications using OTS data may deviate from analysis to analysis depending on when the analysis was completed during the extended period of data collection for the OTS initiative. Reported totals may vary slightly across analyses for several reasons. First, the number of observations available for analyses using probability sampling weights may change as a small number of participants have provided information required to assign design weights only on follow-up interviews. Second, under Ontario privacy legislation, changes in described total numbers of eligible participants may reflect participants who withdrew their consent to participate, retrospectively, and requested their data be removed (this is a theoretically possible but rare occurrence). Either of these causes can be expected to explain differences of fewer than five unweighted observations and should have a negligible influence on any, otherwise reliable, statistical analysis. The third reason for deviation is that different analysts will apply different inclusion/exclusion criteria for the immediate uses (examples include restriction of the analysis to baseline smokers based on differing definitions). Deviations in explicit inclusion/exclusion criteria can have a larger effect on total Ns. Detailed inclusion criteria will appear in the method section of the report in question. Finally, the OTS baseline weights were adjusted in February 2010, thus prior analyses may result in slightly different estimates.

Table 8 provides basic demographic information regarding the baseline study sample in the public use file which includes the sample of recent smokers and non-smokers with complete data. Table 9 outlines key smoking indicators among current smokers at baseline.

<sup>b</sup> Recent smokers with partial data at baseline are not recontacted for follow-up interviews.

**Table 8: Demographic Characteristics of the Complete OTS Baseline Sample (Includes Smokers and Non-smokers)**

<b>Demographic</b>	<b>Number of Interviews</b>	<b>Weighted %</b>
<b>Total N</b>	7505	7496
<b>Age (years)</b>		
18-29	1361	18.5
30-44	2211	29.8
45-64	2910	34.2
65+	949	17.5
Missing	74	
<b>Sex</b>		
Male	3257	48.0
Female	4248	52.0
<b>Marital Status</b>		
Married / Partner	4390	67.9
Widowed	476	4.7
Divorced	635	4.9
Separated	400	2.6
Never married	1562	20.0
Missing	42	
<b>Regional Status (Area Code)</b>		
807 / 705	1966	13.9
613	1861	14.4
519	2104	19.8
416 / 647 / 905 / 289	1574	51.9
<b>Highest Education</b>		
Less than high school	1006	9.0
Completed high school	2071	24.5
Some college or university	789	10.3
Graduated college or university	3489	53.8
Other	121	2.4
Missing	29	
<b>6-month Smoking (study selection variable)</b>		
Yes (recent smoker / longitudinal participant)	4504	22.6
No (non-smoker / cross-sectional participant)	3001	77.4
<b>Smoking Status*</b>		
Current smoking	4064	19.9
Formerly smoker	1428	28.7
Never smoked	2006	51.4
Missing	7	

\* Smoking status is based on the derived variable dvTSsmk3 as outlined in the *OTS Derived Variables* document in Appendix C

**Table 9: Key Smoking Indicators Among Baseline Current Smokers\***

Smoking Indicator	Number of Interviews	Weighted %
<b>Total N</b>	4064	4061
<b>% Daily smokers</b>	3554	84.8
<b>Average cigarettes smoked per day</b>		
Less than 10	1276	36.3
10 – 20	1726	40.9
More than 20	1016	22.9
Missing	46	
<b>Intention to Quit</b>		
Within 6 months	1580	39.3
In the future, beyond 6 months	1366	37.3
Not planning to quit	914	22.5
I have already quit	32	0.9
Missing	172	
<b>Time to First Cigarette (min) †</b>		
Less than 5 minutes	337	7.9
5 – 30 minutes	1902	51.2
More than 30 minutes	1299	41.0
Missing	526	

\* Current smoking is determined from the derived variable dvTSsmk3 – self-defined daily, almost every day, or occasional smokers who have smoked 100+ cigarettes in their lifetime

† Time to first cigarette measured for daily smokers only

## Evaluation of the OTS Baseline Sample

We assess the representativeness of the OTS sample by comparing selected demographics of the OTS weighted distribution to Ontario Census data. There is perfect agreement between the OTS weighted sample and the 2006 Census, as the OTS weights were calibrated to the 2006 Census based on age and sex.

Demographic comparisons with the Census were available only for adults 20 years of age and older. These include marital status and education. In Table 10, we see some significant differences between the OTS sample and the 2006 Census.<sup>10</sup> Compared to the 2006 Census, the OTS sample over-represented those that were married or in a common-law relationship (70.5% vs. 56.6%), thereby under-representing those that have been never married (16.9% vs. 25.4%) and those that are widowed, separated or divorced (12.6% vs. 17.9%). In addition, the OTS over-represented those with a university degree (32.9% vs. 22.4%), while under-representing those with only a high school education or less (31.8% vs. 44.6%). This over-representation of high education is common to telephone surveys.<sup>11</sup>

**Table 10: Weighted OTS Baseline Sample versus 2006 Census Data, Ontarians 20 Years of Age and Older**

	OTS Baseline Sample* (N=7154) Weighted % (95% CI)	2006 Ontario Census (N=9,116,375)
<b>Marital Status</b>		
Married / Common Law	70.5 [68.7, 72.3]	56.6
Widowed / Separated / Divorced	12.6 [11.5, 13.8]	17.9
Never Married	16.9 [15.3, 18.4]	25.4
<b>Education</b>		
High school or less	31.8 [30.1, 33.6]	44.6
Some post-secondary	35.4 [33.5, 37.3]	33.0
University degree	32.9 [30.8, 34.6]	22.4

\* OTS data excludes missing items

Source: Statistics Canada<sup>10</sup>

## Data Analysis and Requirements for Data Use

The OTS employed complex sampling procedures in the recruitment of its sample. For each component of the OTS, and several combinations of OTS elements, probability sampling weights have been defined and are to be used with appropriate survey software (see following section) to provide survey estimates that can be generalized to the Ontario adult population for the study years. The standard population structure used to define probability sampling weights reflected the population of Ontario adults (aged 18 and older) residing in private dwellings during the respective year of baseline data collection (stratified by age group, sex and geographical stratum). Underlying population structure estimates were derived from 2006 Census estimates.<sup>10</sup>

Due to the complexity introduced by the stratified, quota-based sampling of recent smokers and non-smokers (described above), OTS survey data are not used to estimate the crude proportion of recent smokers and non-smokers in the population. A summary of weight variables and descriptions are in Table 11.

**Table 11: Weights for the OTS Baseline Data (July 2005 – June 2008)**

Weight	Purpose
<b>Combined Data - All Waves</b>	
xwt2006	Population expansion weight for all respondents across all waves calibrated to the 2006 Census age and sex distribution
<b>Individual Waves*</b>	
xwt_w1_0	Population expansion weight for Wave 1
xwt_w2_0	Population expansion weight for Wave 2
xwt_w3_0	Population expansion weight for Wave 3
xwt_w4_0	Population expansion weight for Wave 4
xwt_w5_0	Population expansion weight for Wave 5
xwt_w6_0	Population expansion weight for Wave 6

\* All weights have been calibrated to the 2006 Census age and sex distribution

## Data Suppression and Protection of Privacy

To protect against identification of respondents, any analysis with OTS data that generates an unweighted cell size of less than five respondents is required to be suppressed. This would include tabular analyses which produce 100% and 0% cells. Further suppression guidelines based on precision are given below. For the purposes of the public use data file, all geographic personal identifiers have been omitted including postal code and telephone number. Only area code (regional stratification variable) is provided. For reasons of confidentiality, responses to open-ended questions are also not provided in the public use file; however, these may be released upon request pending approval.

## Analytic Techniques Appropriate to Complex Survey Design

The stratified OTS samples require the use of probability sampling weights to obtain estimates which are applicable to the underlying population. Because of the complexity of the sampling design, statistical software designed for use with complex survey data (or fully equivalent routines) must be used in all analyses of OTS data. Appropriate software includes (but may not be limited to) the following: EpiInfo (complex survey procedures), SAS Survey Procedures, SPSS Complex Sampling module, Stata complex survey procedures, SUDAAN and WesVar software. Some users of OTS data may also use bootstrap variance routines which are compatible with complex survey bootstrap variance utilities supported by Statistics Canada.

Users have the obligation to understand and use their chosen software correctly. However, to ease the task and ensure consistency, we provide below some information regarding software and syntax. Table 12 identifies variables in OTS datasets which may be used to define the complex sampling design. See Table 13 for some example SAS and STATA code incorporating the sample design.

**Table 12: OTS Baseline Data Sampling Design Elements and Corresponding Variables in Data Files\***

<b>Design element to be specified for Complex Survey analysis software</b>	<b>Variable name in datasets</b>
<b>Stratum indicator</b> For data containing only non-recent smokers or smokers For data files combining non-recent smokers with smokers	region_bl_0 region_strata_0
<b>Primary sampling unit (PSU)</b>	ID_0
<b>Probability sampling weight</b> Expansion weight for multiple waves Expansion weight for a single wave	xwt2006 see Table 11 above

\* The present application of weights is for the baseline cross-sectional component of the OTS. Future releases of longitudinal data will discuss weighting implications for longitudinal analyses.

### Special Note on Sub-population Analysis

In order to calculate appropriate variance estimates, confidence intervals, and p-values when analysing survey data using complex survey procedures, the entire sample must be used in the statistical procedure. When the user wants to create estimates or perform statistical tests on a sub-population (e.g. females, respondents with complete data on certain variables, respondents reporting a quit attempt), incorrect variances, confidence intervals and p-values will be produced if the user employs standard subsetting techniques (e.g. ‘by’ statement, ‘if’ statement, ‘where’ statement, or a minimised dataset). Instead, the user should employ domain analysis. For a further discussion of domain analysis see Lohr (1999).<sup>12</sup> In brief, the user should create an indicator variable identifying whether each respondent on the dataset should be included in the analysis (1) or omitted (0). This indicator variable will then be used in the statistical procedure (see Table 13). However, domain analysis is NOT required when the sub-population examined represents one stratum on which the sample was chosen (e.g. recent smokers, non-smokers, geographic region).

**Table 13: Sample Code for SAS and STATA Analyses to Demonstrate OTS Design Variables and Sub-population Analyses**

Analysis	SAS v9.2 Code	STATA v10.0 Code
Estimate of Mean of VARIABLE across all waves	proc surveymeans data=DATA; cluster id_0; strata region_strata_0; weight xwt2006; var VARIABLE; run;	svyset id_0 [pweight=xwt2006], strata(region_strata_0) svy: mean VARIABLE
Estimate of Mean of VARIABLE across all waves FOR ONLY FEMALES (Sub-population analysis – create FEMALE variable that is 1=F, 0=M)	proc surveymeans data=DATA; cluster id_0; strata region_strata_0; weight xwt2006; domain FEMALE; var VARIABLE; run;	svyset id_0 [pweight=xwt2006], strata(region_strata_0) svy, subpop(FEMALE): mean VARIABLE
Estimate a proportion or frequency of VARIABLE	Proc surveyfreq data=DATA; cluster id_0; strata region_strata_0; weight xwt2006; tables VARIABLE; Run;	svyset id_0 [pweight=xwt2006], strata(region_strata_0) svy: tabulate VARIABLE
Estimate of proportion of VARIABLE across all waves FOR ONLY FEMALES (Sub-population analysis – create FEMALE variable that is 1=F, 0=M)	proc surveyfreq data=DATA; cluster id_0; strata region_strata_0; weight xwt2006; tables FEMALE*VARIABLE; run;	svyset id_0 [pweight=xwt2006], strata(region_strata_0) svy, subpop(FEMALE): tabulate VARIABLE

**Acknowledgement of Estimate Precision in Reports Released**

All users of OTS data producing survey estimates reflecting the population must use population-weighted data along with appropriate demonstration of estimate precision (e.g., 95% confidence intervals) calculated using appropriate techniques as listed above.

Users of OTS data preparing population descriptive documents, especially those intended to a mixed or lay audience are strongly advised to apply data suppression criteria based on the coefficient of variation (CV = standard error of estimate/ estimate \*100) and the guidelines for suppression of estimates based on CV used by Statistics Canada.<sup>13</sup> Data suppression guidelines based on CV are detailed in Table 14.

**Table 14: Coefficient of Variation (CV) Data Suppression Guidelines**

CV range	Estimate Stability and Action
0 - 16.5	Estimate is stable and reportable
16.6 - 33.3	Estimate has moderate sampling variability and should be interpreted with caution
33.4 and above	Estimate is unstable and should be suppressed

Users of OTS data writing for scientific and professional audiences are also encouraged to comply with data suppression criteria above, and, at a minimum, comply with best practice for presenting data including data precision. This includes reporting numbers of observations in each step of the analysis and the use of 95% confidence intervals and/or standard error estimates and p-values to an appropriate number of decimal places for all estimates.<sup>14</sup> Also recall that for purposes of confidentiality, any analysis with OTS data that generates an unweighted cell size less than five respondents is required to be suppressed.

**Accounting for Skip Logic**

As described above under Study Instruments, the OTS questionnaires incorporate significant skip logic in order to minimize respondent burden. The data analyst must evaluate the question coverages (or skip logic) for each question being analysed. This will require the analyst identify their study population to answer their research question(s). Subsequently, the analyst should assess the coverage for each survey item (or question) to be analysed and determine if the coverage for each question matches their study population. If so, no further action is required for the given question; if not, the analyst must assess the following:

- Who is excluded from this question but included in your study population?
- Why are these individuals excluded? Are they skipped out because of their response(s) from previous questions or is it a limitation to the study data? If it is the former, then the analyst must evaluate the questionnaire(s) and skip logic to determine if re-coding (or imputation)

can be done to include these respondents. If it is the latter, the analyst may have to revise their study population to reflect the OTS data.

## Data Limitations

Those using or interpreting OTS data should recognise (and acknowledge as appropriate) study limitations. These include:

- **Oversampling.** Since the OTS oversamples smokers, there are different sampling schemes for smokers and non-smokers; therefore, this study data **cannot** be used to estimate smoking prevalence in the population.
- **Telephone-based sample.** Since the OTS targets Ontario households with a telephone, homeless populations and individuals residing in institutions (prisons, hospitals, and military establishments) were not eligible for participation. Additionally, cell-phone-only individuals are not captured in this study.
- **Self-report.** The OTS, as with all survey data, relies on self-reported behaviours which may underestimate the actual frequency of such behaviours.
- **Language.** Individuals unable to adequately communicate in English were not eligible to participate in this study.

## Accessing OTS Data

Research teams may apply for access to OTS data through one of the following university-based data libraries:

- Propel Population Health Data Repository at the University of Waterloo ([http://ice-rci.org/data\\_repository/index.cfm](http://ice-rci.org/data_repository/index.cfm));
- University of Toronto Data Library (<http://www.chass.utoronto.ca/datalib/>).

Please refer to our website for release dates of OTS datasets:  
[http://www.otru.org/tobacco\\_survey.html](http://www.otru.org/tobacco_survey.html).

## Citing Technical Reports and OTS Data

The OTS Technical Reports should be cited as indicated on the second page of each report. This technical report should be cited as follows:

Diemert, L., Victor, J.C., Chaiton, M., Bondy, S.J. *Ontario Tobacco Survey Technical Report 1: Baseline Data*. Toronto, ON: Ontario Tobacco Research Unit, April 2010.

Data files from the OTS must be cited and will vary depending on the distributor of the data. For example, baseline data accessed from the University of Waterloo Propel Population Health Repository should be cited as follows:

Ontario Tobacco Research Unit. *Ontario Tobacco Survey: Baseline Data* [computer file]. Toronto, ON: Ontario Tobacco Research Unit [producer], 2010. Propel Population Health Data Repository [distributor], 2010.

The bibliographic citation for datasets using baseline and six-month follow-up data accessed from the University of Toronto Data Library Service would cite:

Ontario Tobacco Research Unit. *Ontario Tobacco Survey: Baseline and Six Month Follow-up Data* [computer file]. Toronto, ON: Ontario Tobacco Research Unit [producer], 2010. University of Toronto Data Library Service [distributor], 2010.

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