



Ontario Tobacco Survey

Technical Report 2: Six and Twelve Month 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 up to three years. Data collection for the OTS began in July 2005; at the present time, follow-up data collection is ongoing, while all baseline data has been collected.

This report reviews the study design for the OTS and further focuses on specific details regarding the six and twelve month follow-up data for all six cohorts in the longitudinal study. Follow-up 1 data were collected from January 2006 through December 2008; Follow-up 2 data collection was conducted between July 2006 and June 2009. Smokers (any smoking in the past six months at baseline) completed six and twelve month follow-up interviews averaging 19 minutes in length. The six-month retention rate for the OTS was 85% of the baseline sample; the six-month contact rate was 94% and the cooperation rate was 97%. The twelve-month retention rate for the OTS was 80% of the baseline sample; the twelve-month contact rate was 92% and the cooperation rate was 96%.

This report describes the six and twelve month follow-up sample, as well as provides specifics regarding loss-to-follow-up. Details for data analysis and requirements for data use are also discussed.

This report is the second technical guide for the OTS. The first technical report outlined the OTS design and baseline 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. Longitudinal respondents are re-interviewed every six-months for up to three years. The study focuses on attitudes, behaviours, and beliefs about tobacco, the factors that influence smoking cessation and relapse, as well as exposures to smoking-related government policies and programs.

This report describes the specific details of OTS follow-up protocols. Also presented in this second technical report are: six and twelve month follow-up (Follow-up 1, F1, and Follow-up 2, F2) retention rates and sample description; description of study data for each of the six and twelve month interviews; and the specific questionnaires for each cohort. F1 data were collected from January 2006 through December 2008; F2 data collection was conducted between July 2006 and June 2009.

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);
- 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.

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., Chaiton, M., Victor, J.C., Bondy, S.J. *Ontario Tobacco Survey Technical Report 2: Six and Twelve Month 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 ICE 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.

Methodology

Study Design

The OTS consists of a cross-sectional set of six population-representative telephone surveys of Ontario adult (18 years of age and over) recent smokers and non-smokers, defined by six-month smoking status.¹ Oversampling of recent smokers was used in order to accommodate attrition in the longitudinal design: at each baseline, every six months for three years, 750 recent smokers and 500 non-smokers were recruited. The cross-sectional survey samples were paired with a longitudinal component that allowed for repeated follow-up interviews of the recent smokers – those who had smoked cigarettes within the past six months at recruitment. From July 2005 to June 2008, 4,572 recent smokers of six cohorts were recruited. Follow-up interviews took place at approximately six-month intervals, for up to three years. Survey data for the OTS was collected by the Survey Research Centre (SRC) at the University of Waterloo using computer-assisted telephone interview (CATI) technology. The OTS study design, sample and specific details regarding recruitment and baseline surveys were provided in the OTS Technical Report 1.²

OTS Sample and Follow-up 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.³ Their method is adapted from the Mitofsky-Waksberg Method.⁴ 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^a - area code 519

Quota sampling was used in order to recruit the required numbers of recent smokers and non-smokers: recent smokers were those who answered yes to the question “Have you smoked one or more cigarettes in the past six months?” When a dialled number reached a private household, an adult residing in the household (18 years of age or older) was randomly selected using the next birthday method⁵ and asked their six-month smoking status. If the non-smoker quota was full, these potential respondents were informed that non-smokers were not being recruited at that time. Recent

^a 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.

smokers consented to participating in a longitudinal study and non-smokers consented to a single interview. All participants received a \$15 honourarium. Specific details regarding baseline protocols were provided in the first technical report.²

The OTS was originally designed to interview recent smokers at baseline (BL) and three follow-up interviews (F1, F2 and F3) in six-month intervals. In July 2007 (Wave 5), the longitudinal study design was augmented by doubling the number of follow-up interviews for consenting participants. Table 1 provides an illustration of the study design and follow-up schedule by cohort in the OTS. As you can see in the table below, 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.

Table 1: Study Design and Follow-up 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

Note: 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.

Note: 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.

The additional follow-up interviews (F4, F5 and F6) were designed to be a minimal dataset that would obtain smoking behaviours over time, but considerably reduce the interview time required for study participants; the additional follow-ups took about half the amount of time compared to the first three follow-up intervals (10 vs. 20 minutes, respectively). Since additional follow-up surveys were added to the OTS almost two years into data collection, the protocol varied by starting cohort. At the end of their third follow-up, Cohorts 2 to 4 were invited to continue their participation by consenting to be recontacted in six-month time for participation in up to three additional follow-up interviews. Cohorts 5 and 6 consented to participating in up to six follow-up interviews at baseline, while Cohort 1 was retired after 18 months of follow-up according to the original study design. Table 2 details the number and type of follow-up intervals as well as the specific protocols for each of the six cohorts in the OTS.

Table 2: OTS Follow-up of Recent Smokers by Cohort

OTS Cohort Number (Recruitment Date)	Number and Type of Follow- up Interviews	Protocol for Follow-up Recruitment
COHORT 1 (July – December 2005)	3 detailed follow-up interviews	At recruitment: "There will be 3 additional follow-up surveys that take place every six months."
COHORTS 2 – 4 (January 2006 – June 2007)	3 detailed follow-up interviews 3 brief follow-up interviews	At recruitment: "There will be 3 additional follow-up surveys that take place every six months." At the end of follow-up three: These cohorts were invited to continue their participation in the survey for up to three additional follow-up interviews. "We will be conducting up to 3 additional surveys that will be reduced to 10-15 minutes in length – you will continue to receive a \$15 cheque for each survey in which you participate. Can we contact you again in approximately 6-months from now for an additional follow-up interview?"
COHORTS 5 & 6 (July 2007 – June 2008)	3 detailed follow-up interviews 3 brief follow-up interviews	At recruitment: "There will be up to six additional follow-up surveys ranging from 10-20 minutes in length that take place every six months."

The OTS attempted to recontact all longitudinal participants every six months. Seven to ten days prior to the first call attempt, eligible participants were sent a reminder letter regarding their continued participation in this study, along with their \$15 honourarium. Every attempt was made to deliver any reminder letters that were returned: this included checking the address on file to correct any entry errors; checking telephone directories; attempting to call the participant for their interview and confirm correct address information. In cases where there was no address on file (i.e. the participant did not provide their address at previous interviews), interviewers attempted to contact them for their follow-up interview as well as invite them to provide their address. If an address was provided at subsequent interviews, they would receive the honourarium for their current and

previous interviews; if an address was not obtained, they were retained in the sample and attempted to be recontacted via telephone only.

At six-month follow-up, all recent smokers with complete baseline data were eligible for recontact; at subsequent follow-ups – F2 and beyond – those ineligible for recontact included the following (determined from contact at the previous follow-up interview): respondents identified as deceased, out of the country, and participants who explicitly request they be removed from further participation in the study. In addition, respondents who were not successfully contacted for two consecutive follow-up interviews were subsequently removed from the recontact list.

During each follow-up, a minimum of 14 call attempts were made to each number (including their alternate number if one was provided during the previous surveys) 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). As of January 2009 (Wave 8), recontact procedures were modified in order to allow the interviewer to leave a general message for the respondent in the case where an answering machine is reached on the first contact. This was implemented given the increase in call screening and requiring identification for a call to be completed. When contact was made, interviewers asked to speak directly to the participant, obtained consent to participate in the follow-up survey and set up a mutually convenient and agreed upon time to complete the interview; every attempt was made to encourage the participant to schedule their follow-up interview over the next 14 days. Following the interview, participants were sent a thank-you letter for their continued participation in the ongoing study.

For longitudinal participants we were unable to contact, a letter was sent requesting they contact our toll-free number in order to update their contact information and indicate the best times to call. The SRC managers implemented several measures to locate those with an invalid (or non-reported) address and a phone number that is no longer in service or the wrong number. This included identifying potential numbers through Canada 411 and any reported alternate numbers the participant has provided. Interviewers called these numbers and determined if the individual was the respondent who participated in our study six months ago (or one-year ago if the respondent missed the previous follow-up interview). If the participant was located, they were invited to complete the current follow-up survey; if the participant was not located, all potential and alternate numbers were exhausted before a respondent was classified as lost-to-follow-up.

Study Instruments

The OTS questionnaires focused on smoking behaviours, cessation and protection of Ontario adults from second-hand smoke (SHS).

Recent smokers were asked questions about their demographic information, attitudes and beliefs regarding smoking, as well as exposures to second-hand smoke, tobacco industry marketing, and

mass media tobacco control campaigns aired in Ontario. The baseline interview included detailed questions about personal smoking behaviours and experiences, including past quit attempts and quit intentions, as well as their lifetime exposure to smoking cessation aids and resources. In general, the baseline instrument focused on *ever* or *lifetime* behaviours and experiences of smokers whereas the follow-up instruments focused on smoking behaviours in the past six-months (e.g., since their last interview) and provide more detailed information on the factors that may have initiated these changes. Please refer to the OTS Technical Report 1 for details regarding the major content areas in the OTS and the lifetime behaviours of recent smokers.²

Throughout data collection, the OTS instruments were modified in order to rectify errors or problems identified, such as correcting skip logic or improving question wording for study participants. Over time, a modest number of new questions were incorporated into the follow-up questionnaires. These new questions reflected changes in the tobacco control policy environment, as identified by the OTRU Principal Investigators. The *OTS Follow-up Question Database* [Appendix B] details the data collection period for each survey question (by wave) while the *OTS F1 and F2 Questionnaires* [Appendix A1 to A11] document any edits or revisions made for each question over the six and twelve month interview periods.

The Role of Skip Logic in the OTS

The OTS study instruments employed a significant amount of skip logic in order to minimize respondent burden while obtaining detailed information from respondents where appropriate. In the follow-up instruments, the most significant branching is the distinction made between continuing smokers, relapsers, and/or quitters. Respondents that are skipped out of a question were given a 'Not Applicable' code of 7, 77, or 777 depending on the number of response options for a given question (See Appendix D – *F1 Data Dictionary* and Appendix E – *F2 Data Dictionary*).

The question coverages provide details for the respondents eligible for a given question. Please refer to the table at the beginning of the questionnaires (Appendix A) 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

Follow-up recruitment protocols and the six-month follow-up study instrument was pilot tested in October 2005 on approximately 75 recent smokers from the baseline pilot study. Questionnaire and technical issues were identified and adjusted prior to the beginning of follow-up data collection which commenced in January 2006.

The SRC trained interviewers participated in OTS follow-up 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 review progress with interviewers and goals 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 for changes over time to the protocol, questionnaires, and recruitment and remuneration scripts and procedures.

Six and Twelve Month Follow-up Study Data

Follow-up 1 Statistics: Study Sample and Retention

Table 3 details the six-month follow-up statistics by cohort, including the interviewed sample of recent smokers at F1, contact, cooperation and retention rates, as well as survey length. As seen in Table 3, the recent smoker contact rate at F1 was 94% and the cooperation rate was 97%. The OTS six-month retention rate from baseline was 85%.

Table 3: Six-Month Follow-up 1 Statistics of Recent Smokers in the OTS, by Cohort and Overall

Follow-up 1	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	All Cohorts
Data Collection Period	Jan-Jun 2006	Jul-Dec 2006	Jan-Jun 2007	Jul-Dec 2007	Jan-Jun 2008	Jul-Dec 2008	Jan '06 – Dec '08
Completed F1 Interviews	651	634	648	619	660	623	3835
Partial Interviews*	5	1	0	1	3	2	12
Eligible sample †	749	752	750	752	752	749	4504
Contact Rate (%) ‡	93.7	94.1	93.6	93.3	94.7	92.0	93.6
Cooperation Rate (%) §	98.1	97.5	97.0	96.1	97.5	96.5	97.1
Retention from Baseline (%)	87.6	84.4	86.4	82.4	88.2	83.4	85.4
Average survey length (minutes)	18.8	20.6	20.3	19.5	18.4	17.6	19.2

Note: F1 = follow-up one (six month follow-up)

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

† Number of baseline participants eligible for follow-up (i.e., recent smokers with complete baseline data)

‡ Percentage of the eligible sample that was contacted at F1⁶

§ Cooperation rates were calculated according to AAPOR COOP#4⁶

|| Percentage of baseline respondents who were retained at F1, including both completed and partial interviews [e.g., (652+5)/750=87.6%]

Source: OTS Six Month Follow-up Data⁷

Follow-up 2 Statistics: Study Sample and Retention

Table 4 details the twelve-month follow-up statistics by cohort, including the interviewed sample of recent smokers at F2, contact, cooperation and retention rates, as well as survey length. As seen in Table 4, the recent smoker contact rate at F2 was 92% and the cooperation rate was 96%. The OTS twelve-month retention rate from baseline was 80%.

Table 4: Twelve-Month Follow-up (F2) Statistics of Recent Smokers in the OTS, by Cohort and Overall

Follow-up 2	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	All Cohorts
Data Collection Period	Jul-Dec 2006	Jan-Jun 2007	Jul-Dec 2007	Jan-Jun 2008	Jul-Dec 2008	Jan-Jun 2009	Jan '06 – Dec '08
Completed F2 Interviews	590	598	601	620	599	580	3588
Partial Interviews*	2	0	1	2	3	3	11
Eligible sample †	747	752	745	751	745	734	4474
Contact Rate (%) ‡	90.3%	92.2%	92.5%	93.4%	92.2%	89.1%	91.6%
Cooperation Rate (%) §	96.3%	94.9%	96.2%	95.6%	95.6%	96.7%	95.9%
Retention from Baseline (%)	79.0%	79.5%	80.3%	82.7%	80.1%	77.8%	79.9%
Average survey length (minutes)	20.6	19.8	19.3	19	18.4	17.6	19.1

Note: F2 = follow-up two (twelve month follow-up)

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

† Number of participants eligible for F2 (i.e., respondents eligible for F1, less those who at F1 explicitly asked to be removed from the study, and those identified at F1 as being deceased or out of the country)

‡ Percentage of the eligible sample that was contacted at F1⁶

§ Cooperation rates were calculated according to AAPOR COOP#4⁶

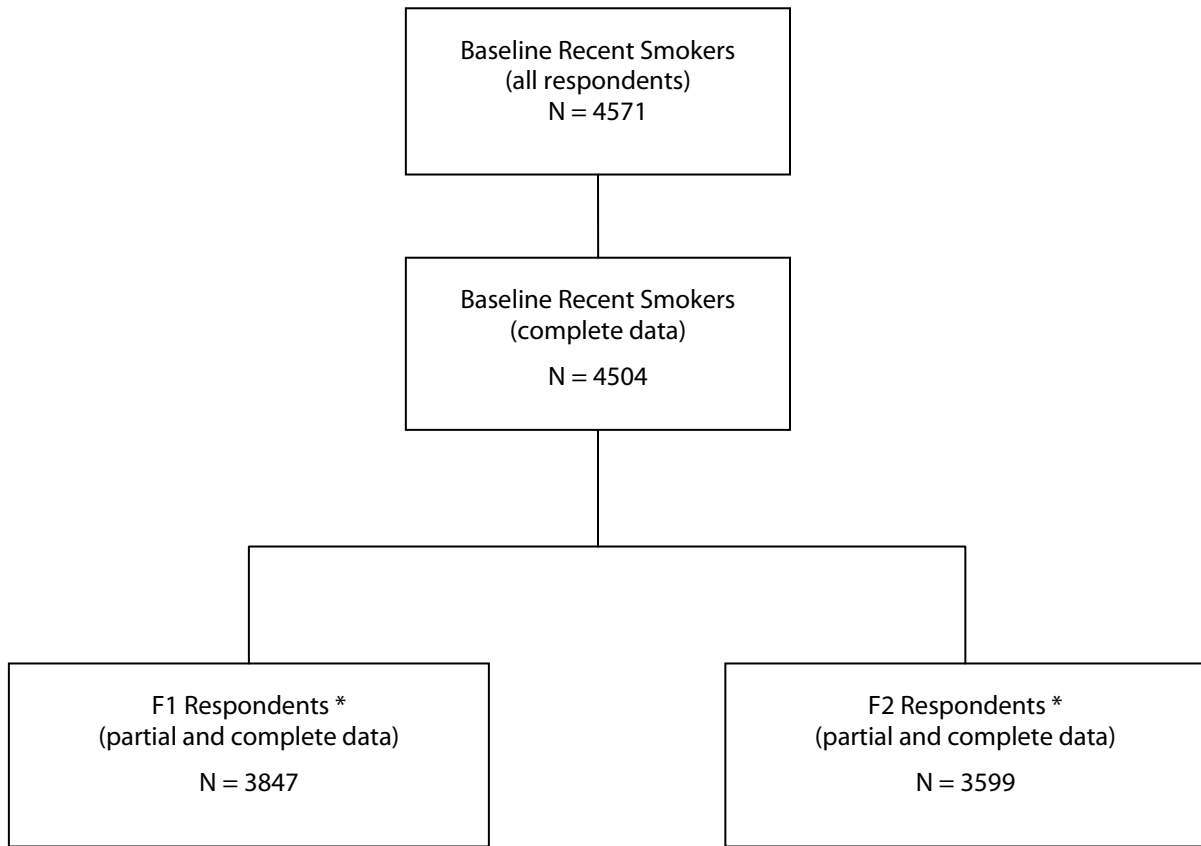
|| Percentage of baseline respondents who were retained at F2, including both completed and partial interviews [e.g., (591+2)/750=79.1%]

Source: OTS Twelve Month Follow-up Data⁸

Longitudinal Study Participants

Partial interviews (BL N=67 F1 N=12, F2 N=11) represent those where the respondent started the interview, but terminated the interview prior to completion. Respondents with partial data at baseline are not eligible for follow-up. Therefore, of the 4571 recent smokers at baseline, 4504 participants had complete data and were eligible for recontact; at six-month follow-up (F1), data was available on 3847 participants and at twelve-month follow-up (F2), data was available on 3599 participants (Figure 1). There were 198 respondents that started F2 who were not successfully contacted for an interview at F1. Baseline recent smokers eligible for follow-up (n=4504) who only provide partial data during a follow-up interview are recontacted for subsequent interviews unless they explicitly request to be withdrawn from the study, are identified as deceased, incompetent or out of the country. In addition, follow-up participants are withdrawn from the study if they are not successfully contacted for two consecutive interviews.

Figure 1: OTS Eligible Baseline Sample for Follow-Up and Interviewed Sample at Six and Twelve Month Follow-Ups



*Eligibility for follow-up is based on complete baseline data, continued consent, and not missing two consecutive follow-up interviews.

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 5 provides basic baseline demographic information for the complete baseline recent smoker sample as well as those that are lost to follow up and those that are retained at six and twelve months. At F1, those lost-to-follow-up were more likely to be younger, male, and single (Table 5). Similar trends were observed for those lost-to follow-up compared to those retained at F2, with one exception: there were no sex differences at F2 (Table 5).

Among current smokers at baseline, respondents who were lost to follow-up at the six month (F1) and twelve month (F2) interviews were more likely to smoke fewer cigarettes, although there was no difference in the proportion that reported being daily smokers at baseline (Table 6). In addition, there were no significant differences for time to first cigarette, and intention to quit at baseline between responders and those lost to follow-up at F1 or F2 (Table 6).

Table 6 outlines key smoking indicators among current smokers at baseline, and at six and twelve month follow-ups.

Please refer to the OTS F1 Data Dictionary (Appendix D) and OTS F2 Data Dictionary (Appendix E) for detailed codebook and variable frequencies.

Table 5: Demographic Characteristics of the OTS Sample of Recent Smokers at Baseline, Respondents Lost-to-Follow-up and Respondents Retained at Six and Twelve Month Follow-ups ⁵

Demographic	Baseline		Six-Month Lost to Follow-up		Six-Month Retained at Follow-up		Twelve-Month Lost to Follow-up		Twelve-Month Retained at Follow-up	
	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %
	N = 4504		N = 657		N = 3847		N = 905		N = 3599	
Age (years) *†										
18-29	1007	22.4	243	37.4	764	20.0	337	37.6	670	18.7
30-44	1428	31.7	211	32.5	1217	31.8	292	32.6	1136	31.8
45-64	1698	37.7	161	24.8	1537	40.2	217	24.2	1481	41.4
65+	341	7.6	34	5.2	307	8.0	50	5.6	291	8.1
Don't know/Refused	30		8		22		9		21	
Sex *										
Male	2078	46.1	352	53.7	1726	44.9	459	50.7	1619	45.0
Female	2426	53.9	305	46.3	2121	55.2	446	49.3	1980	55.0
Marital Status *†										
Married / Partner	2386	53.0	290	44.6	2096	54.7	394	43.4	1992	55.4
Widowed	230	5.1	21	3.2	209	5.5	31	3.5	199	5.5
Divorced	449	10.0	52	8.0	397	10.4	83	9.2	366	10.2
Separated	307	6.8	57	8.8	250	6.5	77	8.6	230	6.4
Never married	1111	24.7	230	35.4	881	23.0	313	34.6	798	22.2
Don't know/Refused	21		7		14		6		14	
Regional Status (Area Code)										
807 / 705	1246	27.7	183	27.9	1063	27.6	257	28.4	989	27.5
613	1094	24.3	144	21.9	950	24.7	204	22.5	890	24.7
519	1296	28.8	185	28.2	1111	28.9	251	27.7	1045	29.0
416 / 647 / 905 / 289	868	19.3	145	22.1	723	18.8	193	21.3	675	18.8
Highest Education										
Less than high school	742	16.5	126	19.2	616	16.1	160	17.7	582	16.2

Completed high school	1360	30.2	212	32.3	1148	29.9	294	32.6	1066	29.7
Some college or university	506	11.2	67	10.2	439	11.4	96	10.6	410	11.4
Graduated college or university	1831	40.6	243	37.0	1588	41.4	339	37.6	1492	41.5
Other	55	1.2	8	1.2	47	1.2	13	1.4	42	1.7
Don't know/Refused	10		1		9		3		7	
Smoking Status ‡										
Current smoking	4064	90.2	596	90.7	3468	90.2	817	90.3	3247	90.3
Formerly smoker	291	6.5	39	6.0	252	6.6	50	5.5	241	6.7
Never smoked	146	3.2	22	3.4	124	3.2	38	4.2	108	3.0
Don't know/Refused	3		0		3		0		3	

* $p < 0.05$ for difference between the sample lost to follow-up, and those responding to six-month follow-up

† $p < 0.05$ for difference between the sample lost to follow-up at twelve-months, and those responding to twelve-month follow-up

‡ Smoking status is based on the derived variable dvTSsmk3 as outlined in the Derived Variables document in Appendix C; current smokers are respondents who have smoked within the past month and have smoked 100+ lifetime cigarettes; former smokers are those who have smoked 100+ lifetime cigarettes but last smoked more than 30 days ago; never smokers are those who have not smoked 100+ cigarettes in their lifetime.

§ Source: Ontario Tobacco Survey: Baseline, Six and Twelve Month Data⁹

Table 6: Key Smoking Indicators Among Current Smokers[‡] at Baseline, Respondents Lost-to-Follow-up and Respondents Retained at Six and Twelve Month Follow-ups[§]

Smoking Indicator	Baseline		Six-Month Lost to Follow-up		Six-Month Retained at Follow-up		Twelve-Month Lost to Follow-up		Twelve-Month Retained at Follow-up	
	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %	No. of Interviews	Unweighted %
	N = 4064		N = 595		N = 3469		N = 817		N = 3247	
% Self-report daily smokers	3554	87.5	516	86.6	3038	87.6	712	87.06	2842	87.6
Average cigarettes smoked per day *†										
Less than 10	1276	31.8	213	36.3	1063	31.0	278	34.1	998	31.1
10 – 20	1726	43.0	252	42.9	1474	43.0	336	40.5	1390	43.3
More than 20	1016	25.3	122	20.8	894	26.1	191	25.4	825	25.7
Don't know/Refused	46		9		37		12		34	
Intention to Quit										
Within 6 months	1580	40.6	242	42.7	1338	40.3	318	38.8	1262	38.9
In the future, beyond 6 months	1366	35.1	201	35.4	1165	35.1	296	36.1	1071	33.0
Not planning to quit	914	23.5	122	21.5	792	23.8	168	20.5	746	23.0
I have already quit	32	0.8	3	0.5	29	0.9	3	0.3	30	0.1
Don't know/Refused	172		28		144		34		138	
Time to First Cigarette (min) §										
Less than 5 minutes	337	9.5	51	10.0	286	9.5	76	10.7	261	9.2
5 – 30 minutes	1902	53.5	251	49.1	1651	54.5	355	50.1	1547	54.7
More than 30 minutes	1299	36.6	209	40.9	1091	36.0	377	21.3	1022	36.1
Don't know/Refused	526		6		14		109		417	

* p< 0.05 for difference between the sample lost to follow-up, and those responding to six-month follow-up

† p< 0.05 for difference between the sample lost to follow-up at twelve-months, and those responding to twelve-month follow-up

‡ Current smoking is determined from the derived variable dvTSsmk3 (see Appendix C) – self-defined daily, almost every day, or occasional smokers who have smoked 100+ cigarettes in their lifetime

§ Time to first cigarette measured for self-report daily/almost daily smokers only

|| Source: Ontario Tobacco Survey: Baseline, Six and Twelve Month Data⁹

Guidelines for Data Analysis and Release

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.¹⁰

Study Weights

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.¹⁰

A complete description of the algorithm and census values used to calculate these weights was detailed in the OTS Technical Report 1: Baseline Data.²

Due to the complexity introduced by the stratified, quota-based sampling of recent smokers and non-smokers (noted above and described in detail in Technical Report 1), OTS survey data are not to be used to estimate the crude proportion of recent smokers and non-smokers in the population. This means that the OTS cannot be used to provide the prevalence of smoking in the population, but it can be used to report prevalence of smoking-related behaviours such as Heaviness of Smoking Index and daily smoking rates among Ontario smokers. A summary of weight variables and descriptions are in Table 7.

Table 7: Study Weights for the OTS

Weight	Purpose
Combined Data – All Cohorts	
xwt2006	Population expansion weight for all baseline respondents across all cohorts calibrated to the 2006 Census age and sex distribution. Expands to the Ontario population across all cohorts; cohorts given equal weight.
Individual Cohorts*	
xwt_w1_0	Population expansion weight for Cohort 1
xwt_w2_0	Population expansion weight for Cohort 2
xwt_w3_0	Population expansion weight for Cohort 3
xwt_w4_0	Population expansion weight for Cohort 4
xwt_w5_0	Population expansion weight for Cohort 5
xwt_w6_0	Population expansion weight for Cohort 6

* All weights are calibrated to the 2006 Census age and sex distribution (expands to the Ontario population within each cohort)

Data Suppression and Protection of Privacy

To protect against identification of respondents, any analysis for public release with OTS data that generates an unweighted cell size of less than five respondents must 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. Technical reports include unweighted frequencies of all data fields for methodologic purposes which include some small cell sizes. These values must not be repeated for population inference. Data suppression rules for small cell sizes are applied here for selected sensitive subject areas.

Analytic Techniques Appropriate to Complex Survey Design

Given the complex 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 Canada¹¹; in this case, the user should check with the OTS team to determine what is available and appropriate. Unweighted estimates should be identified as such. In non-longitudinal analyses of these data, the sampling weights are the greatest contributor to design effect. Analytic weights and non-survey specific routines must not be used for variance estimation.

For data users wanting weighted estimates or weighted analyses, it is suggested that the data user apply the baseline weights to the longitudinal analysis. It should be noted that the expansion weights will sum to a number smaller than the 2006 Ontario population aged 18 years or older. This is because of the respondents that are lost to follow-up. Caution must be taken to interpret weighted estimates – the user needs to assess the degree to which the weighted estimates reflect the population given study inclusion criteria, attrition and changes in the population over time.

For some longitudinal analyses, particularly regression analyses, the user may not wish to employ the probability sampling weights. The user is suggested to review literature on the requirement of sampling weights in survey research, and when this requirement may be relaxed.^{12, 13} However, even when the sampling weights are not used, the design of the survey sampling should be taken into account in all estimates of variance, margins of error and p-values (i.e., stratum indicator and primary sampling unit).

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 8 identifies variables in OTS datasets which may be used to define the complex sampling design. See Table 9 for some example SAS and STATA code incorporating the sample design.

Table 8: OTS Sampling Design Elements and Corresponding Variables in Data Files

Design element to be specified for Complex Survey analysis software	Variable name in datasets
Stratum indicator* For data containing only non-recent smokers or smokers For data files combining non-recent smokers with smokers	region_bl_0 region_strata_0
Primary sampling unit (PSU)*	ID_0
Probability sampling weight Expansion weight for multiple waves Expansion weight for a single wave	xwt2006 see Table 7 above

*required elements for complex survey analysis

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 subpopulation (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).¹³ 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 9). 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 9: Sample Code for SAS and STATA Analyses to Demonstrate OTS Design Variables and Subpopulation Analyses

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

Coefficient of Variation Release Guidelines

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 ($CV = \text{standard error of estimate} / \text{estimate} * 100$) and the guidelines for suppression of estimates based on CV used by Statistics Canada.¹⁴ Data suppression guidelines based on CV are detailed in Table 10.

Table 10: 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.¹⁵ 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** (see Data Suppression and Protection of Privacy).

Accounting for Skip Logic

As described above under Study Instruments, the OTS questionnaires incorporate significant skip logic in order to minimise respondent burden. The data analyst must evaluate the question coverages (or skip logic) for each question being analysed. This will require the analyst to identify the study population needed 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:

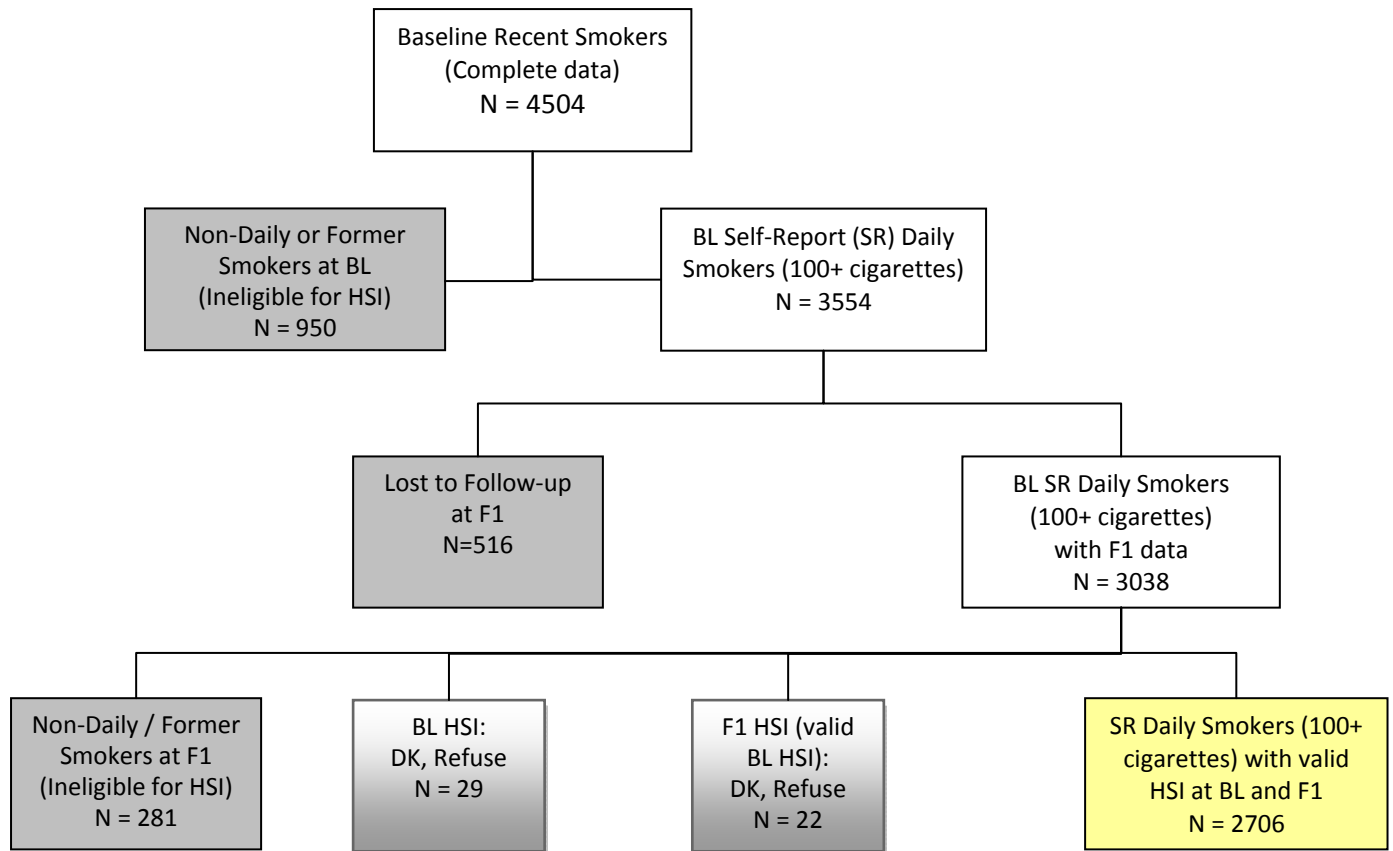
- Who is excluded from this question but included in your study population?
- Why are these individuals excluded? Are they skipped out because of their response(s) from previous questions or is it a limitation to the study data? If it is the former, then the analyst must evaluate the questionnaire(s)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

Users will find that the skip logic is increasingly complex when using the longitudinal data. This is, in part, because some skip patterns are based on answers to both the baseline and current follow-up surveys. Therefore, it is strongly advised that prior to analysis the analyst construct a flow diagram outlining the population to be analysed, and the reasons for exclusion for each respondent. An example of this type of flow diagram is presented in Figure 2.

Example 1

The flow diagram in Figure 2 assumes you wanted to look at Heaviness of Smoking Index (HSI) among respondents at both baseline and six-month follow-up. The diagram starts with the sample of BL participants eligible for follow-up (e.g. recent smokers with complete data, n=4504). In the OTS, HSI is only calculated on daily smokers who have smoked 100+ lifetime cigarettes; thus, those who have not smoked at least 100 cigarettes in their lifetime, non-daily and former smokers at BL (n=950) are excluded from the analysis, leaving 3554 daily smokers (100+ cigarettes) with complete data at BL. Respondents who are lost-to-follow-up are also ineligible for analysis, leaving 3038 daily smokers with BL and F1 data. Similar to BL, non-daily^b or former smokers at F1 are excluded from this sample (n=281). Eligible respondents who do not provide a valid response are also removed from the proposed analysis (n=29 and n=22 for BL and F1 respectively), resulting in 2706 eligible respondents (yellow box) with valid HSI data for this proposed analyses.

Figure 2: Sample Flow Diagram for Analysis on Longitudinal Respondents at Six-Month Follow-up with Valid Data on Heaviness of Smoking Index (HSI) at Baseline



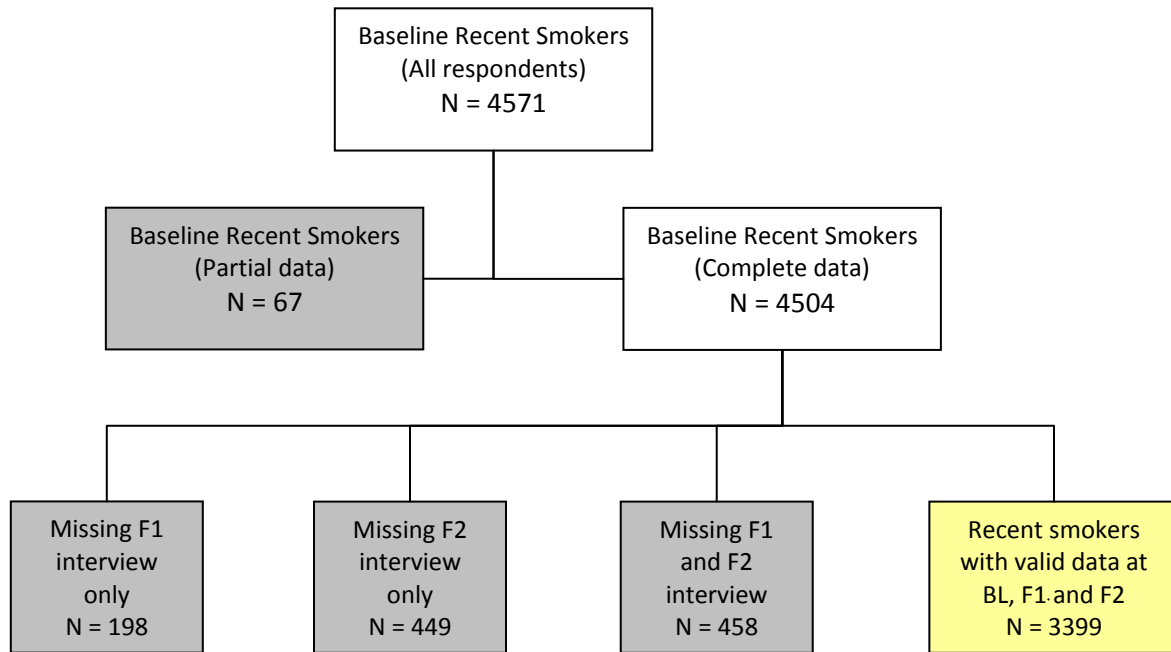
Note: Boxes with full grey backgrounds represent those who are ineligible from the analysis; boxes with shading from light to grey are those excluded from the analysis as they are lacking valid response to the required questions. The yellow box represents the eligible respondents in the sample with valid data for the variable of interest.

^b An investigator may decide it is appropriate to impute HSI values for those who have become a non-daily smoker at follow-up by deriving a time-to-first cigarette value to be greater than 1 hour as required by the HSI Index

Example 2

The flow diagram in Figure 3 assumes you were interested in assessing respondents’ smoking status over the course of one year, at BL, F1 and F2. There are 4571 recent smokers at BL, however 4504 had complete BL data and were eligible for follow-up. The bottom of the figure shows that 647 respondents answered only one of the follow-up interviews (198 respondents missed F1 and 449 respondents missed F2), and 458 respondents were lost-to-follow-up at F1 and F2. Therefore, 3399 respondents are eligible for this analysis with data at all three time points.

Figure 3: Sample Flow Diagram for Analysis on Longitudinal Respondents’ Smoking Status at Baseline, Six and Twelve Month Follow-up



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.

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