



International Tobacco Control (ITC)

New Zealand Survey

Wave 2 (Second Cohort)

ITC New Zealand Technical Report

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Preface to ITC New Zealand Wave 2 Technical Report

The International Tobacco Control Policy Evaluation (ITC) Project is a multi-country research programme that includes prospective cohort studies designed to measure the psychosocial and behavioral impact of key policies of the WHO Framework Convention on Tobacco Control (FCTC) in 29 countries. In January 2004, New Zealand ratified the WHO FCTC.

The first cohort of the ITC New Zealand (NZ) Survey was conducted from 2006-2009. The sample list was developed through a complex sample selection process, which included systematic boosted-sampling of the Māori, Pacific peoples, and Asian populations. Adult smokers were interviewed by computer-assisted telephone survey in two waves (N=1,376 and N=923), a year apart. Wave 1 was conducted from March 2007 to February 2008. Wave 2 was conducted between March 2008 and February 2009.

Following proposals to the New Zealand Health Research Council, a second ITC New Zealand Project with a new cohort was funded in 2015, starting in October of that year. In order to differentiate it from the first cohort (ITC NZ Project), the second cohort was given a 3-letter country code, i.e., ITC NZL Project. The ITC NZL Wave 1 (NZL1) Survey was conducted from August 30, 2016 to April 22, 2017 (ITC Project, 2017). This technical report documents the methods of the second wave (ITC NZL2) of the second cohort of this project. The ITC NZL2 Survey was conducted from June 26, 2018 to December 11, 2018.

1 Introduction

1.1 Background

The International Tobacco Control Policy Evaluation (ITC) Project is a multi-country research programme with a prospective cohort study in each participating country designed to measure the psychosocial and behavioral impact of key policies of the WHO Framework Convention on Tobacco Control (FCTC). The ITC Project is a large global research initiative that currently involves 29 countries (Australia, Bangladesh, Bhutan, Brazil, Canada, China (Mainland), France, Germany, Greece, Hungary, India, Ireland, Japan, Kenya, Republic of Korea, Malaysia, Mauritius, Mexico, Netherlands, New Zealand, Poland, Romania, Spain, Thailand, Abu Dhabi-United Arab Emirates, United Kingdom, Uruguay, United States of America, and Zambia) inhabited by over 50% of the world's population, over 60% of the world's smokers, and over 70% of the world's tobacco users.

1.2 Main Objectives and Research Questions

The aims of the ITC New Zealand Survey are to:

1. Describe smoking-related behaviours and attitudes, experiences and perceptions;
2. Identify determinants of smoking-related behaviours;
3. Assess the impact of tobacco control measures (e.g., plain packaging introduced March 2018, taxation, smoke-free etc) on smoking-related behaviours;
4. Explore patterns of use and impacts of alternative nicotine delivery devices;
5. Explore the feasibility and acceptability of novel policy and practice interventions.

The research questions that are addressed in the ITC New Zealand Survey include the following:

1. What are the individual, policy and environmental determinants of key smoking related behaviours (e.g., quit attempts, relapse and cessation) among smokers and former smokers? How do these vary between key population groups, such as Māori and lower socio-economic status groups?
2. What are the impacts of tobacco control policy changes (e.g., tobacco tax; plain packaging), smoking cessation interventions (e.g., mass media) and new technologies (e.g., e-cigarettes) on smoking-related behaviours, and what factors mediate these responses? How do these responses and mediators vary between key population groups?

3. What are the attitudes, experiences and perceptions of smokers and former smokers to the Smokefree Aotearoa 2025 goal; the acceptability of smoking; current and possible future tobacco control policies and cessation interventions; and new nicotine-delivery technologies? How do these attitudes, experiences and perceptions change over time and vary between key population groups?
4. What are the prevalence and patterns of use of alternative nicotine delivery devices? How is use associated with key smoking-related behaviours, and how does this vary between key population groups?

1.3 The Research Team

The ITC New Zealand Project is a collaborative venture with the ITC Project at the University of Waterloo, Canada, led by Principal Investigator, Geoffrey T. Fong. The ITC New Zealand Project is based at the Department of Public Health, University of Otago, Wellington, New Zealand. It is led by Principal Investigator, Richard Edwards. Co-investigators are based at the Department of Public Health and Dean's Department at the University of Otago (Wellington), Department of Marketing, University of Otago (Dunedin), Whakauae Research for Māori Health and Development (Whanganui), and the Auckland University of Technology in New Zealand.

2 ITC New Zealand Wave 2 Overview

The ITC New Zealand Wave 2 (NZL2) Survey is the follow-up survey of the ITC New Zealand Wave 1 (NZL1) Survey. Respondents who participated in Wave 1 were recontacted at Wave 2 to answer a follow-up survey. The ITC NZL1 Survey included a cohort of smokers and recently-quit former smokers aged 18 and older drawn from respondents from the New Zealand Health Survey (NZHS). Smokers and recent quitters from the NZHS who indicated that they could be approached to participate in other health research were eligible for participation. The ITC NZL1 Survey was conducted between August 30, 2016 and April 22, 2017. The ITC NZL2 Survey was conducted from June 26 to December 11, 2018. New respondents were recruited for NZL2 to replace participants from NZL1 who had been lost to follow up.

3 Sampling Design, Sampling Frame, and Sample Size

3.1 Sampling Design and Frame at Wave 1

NZL1 respondents were sampled from respondents in the New Zealand Health Survey (NZHS). The NZHS is a rolling cross-sectional survey that has an annualised achieved sample of 12,000-12,500, of whom around 85% consent to be recontacted for further studies within 24 months. The NZHS uses a two-stage sampling process based on area selection at the first stage, with oversampling of Māori, Pacific, and Asian members of the NZ population and stratification according to District Health Board (DHBs) area of residence (see Figure 1). Full details of the NZHS sampling scheme are available in the Ministry of Health's 2015-2016 NZHS Methodology Report at the following web link:

<http://www.health.govt.nz/publication/methodology-report-2015-16-new-zealand-health-survey>

NZL1 respondents were recruited from NZHS respondents of 2015 and 2016, with the sampling frame spanning the six quarters from the start of 2015 to mid-year 2016. In summary, eligible individuals at Wave 1 were those who:

- participated in the NZHS up to 24 months prior;

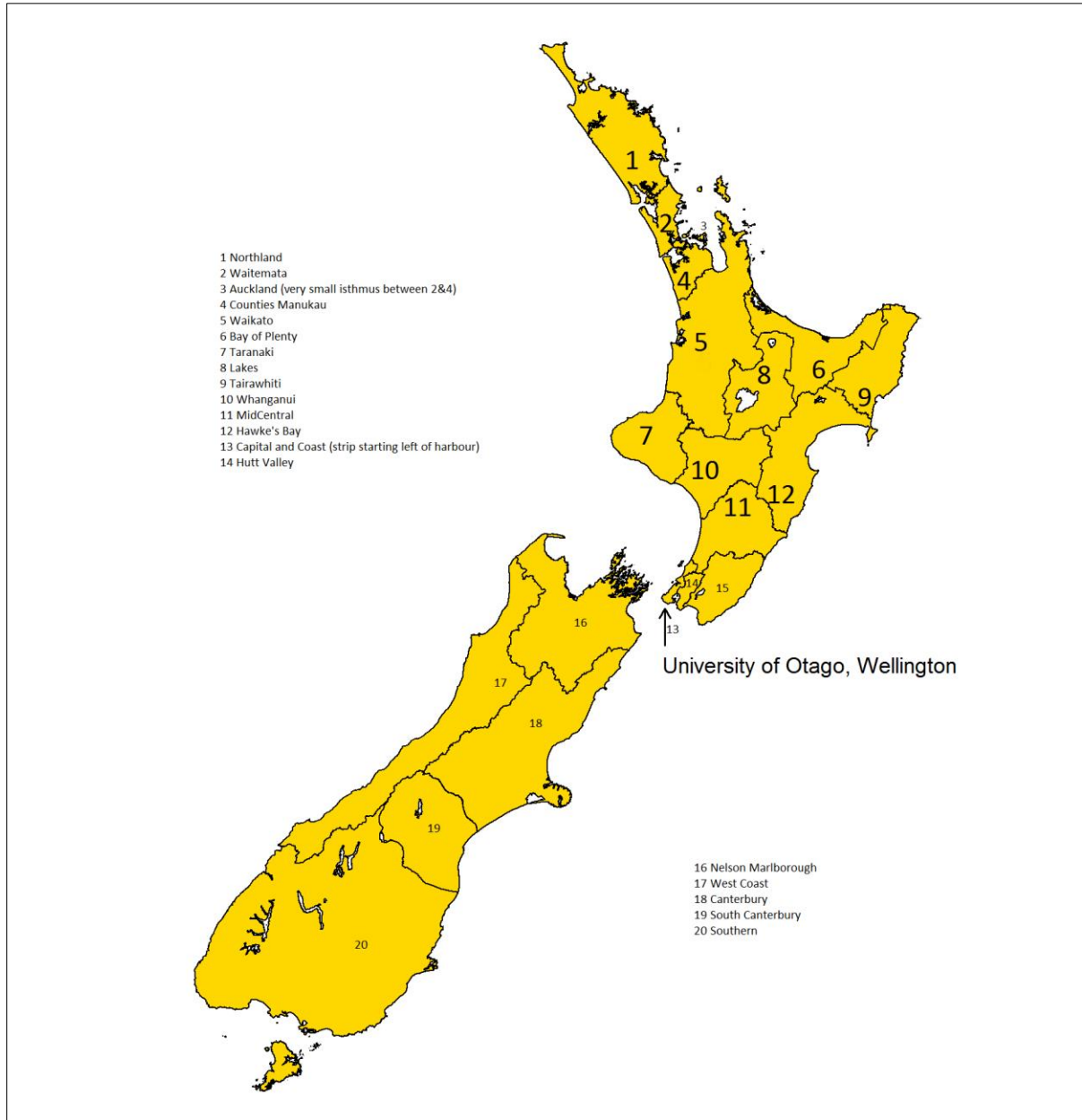
- agreed to be contacted about further research when they completed the NZHS;
- were current smokers at the time they completed the NZHS (i.e., someone who has smoked more than 100 cigarettes in their lifetime and currently smokes at least monthly) OR were former smokers who had quit within the previous 12 months at the time they completed the NZHS;
- were born on or before March 01, 1998 (i.e., aged 18 and older at the start of the data collection period);
- were mentally and physically able to complete the interview and had no major language barriers.

A stratified sampling design was used to help achieve good estimation precision for specific sub-groups of the New Zealand (NZ) smoker and recent ex-smoker population:

1. Māori current smokers
2. Pacific current smokers
3. Non-Māori non-Pacific (NMNP) younger smokers (aged 18-24y).
4. NMNP older smokers (aged 25y+).
5. Recently-quit or former smokers (quit within the previous 12 months, defined at the time of the NZHS interview). The cut off period for recent quitters was based on the NZHS responses. Due to the limited number of recent quitters based on NZHS, all recent quitters in this list were invited to the ITC NZL1 Survey regardless of total time quit by the time of the ITC interview.

The University of Otago (UO) team prepared sampling lists for each of the five stratified sampling groups. To manage response rates, the sample lists were released in tranches. The ideal numbers of respondents in each tranche were negotiated between the UO team and the survey firm, Research New Zealand (RNZ), to ensure that: a) the RNZ interviewers had sufficient numbers of contacts to follow-up and b) once a sampling strata group was completed there were not significant numbers of people where contact attempts had been initiated but not completed and who were not included in the final sample (thereby reducing response rates).

Figure 1: Map of New Zealand (with District Health Board boundaries)



3.2 Sample Size at Wave 2

At Wave 1, a total of 1,082 respondents were recruited and completed the survey. At the time of their NZHS interview, 951 were smokers and 131 were recent quitters. By the time of their ITC interview, some smokers had quit, and thus there were 849 adult smokers and 233 adult former smokers in the ITC sample. At Wave 2, the overall sample aim was $n=1,100$. This sample was subdivided along two dimensions:

1. Five *subsample strata* based on ethnicity, age, and smoking status (Section 3.2.1)
2. *Recontact sample* (cohort members who completed the ITC NZL1 Survey) vs. *Replenishment sample* (new recruits at Wave 2 to replace those lost to follow up).

3.2.1 Subsample Status at Wave 2

The target numbers of participants (across recontact and replenishment groups) for the five subsamples based on ethnicity, age, and smoking status were:

1. 400 Māori current smokers
2. 100 Pacific current smokers
3. 70 NMNP younger current smokers (aged 18-24 years)
4. 400 NMNP older current smokers (aged 25+ years)
5. Approximately 130 recent quitters from a combined Māori, Pacific and Other groups

3.2.2 Recontact Sample Retention at Wave 2

- Those eligible to be included in the recontact sample were individuals who completed the ITC NZL1 Survey (i.e., were among the 1,082 who either fully or substantially (> 50%) completed the survey). These individuals were invited to participate in the ITC NZL2 Survey. The 73 ITC NZL1 respondents who completed less than half of the survey were excluded from those invited for the recontact sample. All recontact sample respondents from Wave 1 as defined in the previous statement were eligible for Wave 2, regardless of their current tobacco-use status at Wave 2.
- Strong efforts were made to contact all respondents from Wave 1 who were eligible and had agreed to be recontacted.
- For each recontact respondent, the same unique ID number used at Wave 1 was used at Wave 2 to link the respondent's Wave 1 and Wave 2 data.
- The retention rate was the proportion of eligible respondents from Wave 1 who completed the survey at Wave 2.

3.2.3 Replenishment Sample at Wave 2

- Wave 1 respondents who were not successfully recontacted and surveyed at Wave 2 were replaced by replenishment respondents.

- The replenishment sample consisted of individuals who were recruited into the cohort at Wave 2 for the first time, to replace respondents from Wave 1 who were lost to follow up. The replenishment sample was selected from the Wave 2 sampling frame.
- The Wave 2 sampling frame consisted of eligible smokers/recent quitters amongst recent NZHS respondents (2016-2017 and 2017-2018).
- The procedure used for selecting replenishment respondents at Wave 2 followed the same process as was used for sampling from the initial NZHS groups at Wave 1.
- The replenishment sample for the ITC NZL2 Survey were smokers aged 18 and older who met the appropriate ethnicity and age requirements for open quotas (as determined from their NZHS interview data, in the same manner as for Wave 1 sampling, except that in Wave 2 only NZHS respondents who were smoking at the time of their NZHS interview were recruited for ITC NZL2 Survey).
- Once the quota for a sample stratum had been achieved, no additional calls were made for that stratum. Individuals who had already been engaged for contact when this target was reached (e.g., had made a date and time for interview) completed the interview as per the standard protocol.

3.2.4 Relationship Between Subsample Status Vs. Recontact/Replenishment Status

- Within each of the five subsample strata, those lost to follow up were replaced with new recruits (replenishment sample) who met the criteria for the subsample stratum.
- There was an overall retention rate for the entire sample, as well as five subsample retention rates for each of the five subsample groups.
- Table 1 provides the Wave 2 sample and *projected* retention from Wave 1, by subsample group (assumes 67% retention in all groups, based on retention in the original ITC NZL1 Survey from the NZHS.) These retention rates were estimates used in the planning phases and do not reflect actual retention (see section 3.4 for achieved retention).
- The Wave 1 sample numbers are for the “achieved” groups using reported smoking status at Wave 1, rather than being based on how these groups were sampled (e.g.,

Māori respondents selected from the Māori current smokers frame at the time of the NZHS but who were quitters at the time of the ITC NZL1 Survey were counted under the “Quitters” row).

- The final column in Table 1 shows the anticipated number of invitations that would be required for the replenishment sample at Wave 2 (based on Wave 1 recruitment).

Table 1. ITC NZL2 sample design with projected retention and replenishment targets, by subsample based on achieved Wave 1 sample respondents who either fully or substantially (>50%) completed the survey.

Subsample group	Target NZL2 sample	Projected NZL2 Recontact sample**	Projected NZL2 Replenishment sample required	Anticipated number of invitations for NZL2 Replenishment***
1. Māori current smokers	400	198	202	808
2. Pacific current smokers	100	28	72	288
3. NMNP* younger current smokers (aged 18-24y)	70	24	46	184
4. NMNP* older current smokers aged (25+y)	400	301	99	330
5. Quitters	130	172	-42 [#]	0****
Total sample	1100	723	377	1610

*NMNP= Non-Māori non-Pacific

** With 67% retention from Wave 1

*** This was the anticipated number of invites per group to hit replenishment recruitment target (assuming recruitment rates similar to Wave 1: simplified to 25% for Māori, Pacific and younger NMNP smokers; and 30% for older NMNP smokers and quitters.)

**** With anticipated 67% retention among Wave 1 quitters, the researchers projected that they would not need a replenishment sample for recent quitters (also some replenishment respondents sampled as current smokers based on NZHS data would be quitters by the time of the Wave 2 interview, which would boost numbers here).

3.3 Fieldwork Dates

The fieldwork for the ITC NZL2 Survey started with a pilot survey on June 26, 2018. The recruitment started on July 5, 2018. On December 11, 2018, RNZ completed data collection. However, the ITC Survey Management Group (ITC SMG) noted one error in which 98

quitters who were supposed to be asked about their use of e-cigarettes were not and UW requested the UO team and RNZ to recontact the 98 quitters to ask them the question that was erroneously missed. RNZ agreed and managed to recontact and interview 88 quitters.

3.4 Achieved Sample Size

The aim was to recontact and interview a total of 1,100 respondents at Wave 2, i.e., 970 adult smokers and 130 adult quitters from Wave 1. A total of 574 Wave 1 participants took part. To replace the Wave 1 respondents that were lost to follow up at Wave 2, a further 396 respondents were interviewed for the replenishment sample at Wave 2. Overall, only 970 respondents fully completed the survey. Table 2 shows planned and achieved completed interviews by NZHS sampling strata groups. Table 3 shows the number of replenishment and recontact participants in Wave 2.

Table 2 Completed Interviews by NZHS Sampling Stratum in the ITC NZL2 Survey

Sampling stratum from NZHS / NZ1	Target NZL2 Sample (n=1,100)	Planned sample (%)	Achieved sample (n= 970)	Achieved sample (%)
1. Māori current smokers	400	36.4%	350	36.1%
2. Pacific current smokers	100	9.1%	48	4.9%
3. NMNP younger current smokers (aged 18-24)	70	6.4%	48	4.9%
4. NMNP remainder current smokers (aged 25+)	400	36.4%	443	45.6%
5. Recent quitters	130	11.8%	81	8.4%

Key: NMNP = non-Māori non-Pacific

Table 3 Numbers of Recontact and Replenishment Sample Participants in the ITC NZL2 Survey, According to Their Status at NZHS interview

Sampling stratum from NZHS / NZ1	Recontact sample (n=574)	Recontact recruitment rate (%)	Replenishment sample (n=396)	Recruitment Rate (%)*	Total achieved sample
1. Māori current smokers	142	43.3%	208	17.7	350
2. Pacific current smokers	17	34.7%	31	13.3	48
3. NMNP younger current smokers (aged 18-24)	13	32.5%	35	30.5	48
4. NMNP remainder current smokers (aged 25+)	321	60.9%	122	17.1	443
5. Recent quitters	81	62.3%	0	NA	81

Key: NMNP = non-Māori non-Pacific

*For the definition of recruitment rate, see Definition 2 on page 18; and the calculation is in Table 4 on page 20.

4 Retention, Cooperation and Response Rates of the ITC NZL2 Survey

4.1 Recontact sample: retention rate from Wave 1

Including the 5 respondents from ITC NZL1 known to have moved, died or withdrawn before fieldwork began, there were 8 altogether among the 1,082 Wave 1 respondents who were not eligible at Wave 2 (2 moved overseas, 5 died, 1 withdrawn). The retention rates were calculated for the remaining 1074 Wave 1 respondents. The overall Wave 1 to Wave 2 retention rate was 53.4%. The subgroup retention rates, according to their NZHS group membership, were 43.3% for Maori current smokers, 34.7% for Pacific current smokers, 32.5% for NMNP current smokers younger than 25 years, 60.9% for NMNP current smokers 25 years and over, and 62.3% for recent quitters (Table 3).

4.2 Replenishment sample response rates

For replenishment respondents (new recruits), aggregated disposition codes for calculating response rates are summarised in Table 5. More detailed data for individual disposition codes are provided in Appendix G. These data describe final disposition codes allocated to the 2,015 NZHS respondents selected for the ITC NZL2 sample list (excluding those who were found to be ineligible).

ITC uses the Standard Definitions for calculating response rates developed by the American Association for Opinion Poll Research [[http://www.aapor.org/Standards-Ethics/Standard-Definitions-\(1\).aspx](http://www.aapor.org/Standards-Ethics/Standard-Definitions-(1).aspx)] as a guide for calculating response rates for cohort studies.

Three different response rates were calculated for the replenishment sample. These capture different dimensions of response to new recruitment to the ITC NZL2 Survey:

1. **Proportion of those selected for the ITC survey who completed the survey:** This measure gives an indication of the response to the recruitment process and represents the

response rate conditional on agreeing to be recontacted for research purposes and being identified as potentially in-scope for ITC.

This was estimated by dividing 396 (the number of complete replenishment surveys) by the number invited to ITC NZL2, namely 2,015, giving 19.7%.

- 2. Proportion of those selected and eligible for the ITC who completed the survey.** A second measure of response rate is the response rate conditional on being called by ITC and actually being in-scope for ITC (i.e., after excluding ineligible respondents). This measure has been used as the main estimate of response for the ITC NZL2 study.

This was estimated by dividing 396 by 1,996 (of 2,015 called, 19 were found to be ineligible through dispositions P-B32, P-B33, P-D10 and P-D90) giving 19.8%.

The number characterised as not eligible is most likely an under-estimate because non-contacts and refusals may mask cases of ineligibility, and hence 19.8% is probably an underestimate of this response rate.

- 3. Proportion of those selected and eligible for the ITC who completed the survey, allowing for NZHS non-response.** The most stringent measure of response is the combined ITC/NZHS response rate, i.e., the proportion of in-scope people selected for the NZHS who provide complete data to the ITC. This can be estimated by the response rate of ITC conditional on responding to the NZHS, multiplied by the NZHS response rate (assuming that smokers and recent quitters have the same response rate as other NZHS potential respondents). This gives a combined response rate of 15.8% (obtained by multiplying 19.8% by 80%).
- 4. Proportion of those contacted who completed the survey.** The least stringent measure of response is the proportion of respondents where some form of contact occurred who completed the survey (i.e., excluding respondents where contact was not successful). This can be estimated as 396 divided by 1,210, giving 32.7%; or as 396 divided by 840 if only

those who were contacted and actively refused to take part or withdrew after starting the interview are included in the denominator, giving 41.7%

Response was generally lower among Pacific, Māori and under 25 years of age respondents and higher among recent quitters. The main reason for the lower response among Pacific, Māori and under 25 years of age respondents was a lower rate of contacting selected respondents in these groups (Table 4). Possible reasons include lower access to landline telephones and greater residential mobility.

Several NZHS variables were used to weight the ITC NZL2 back to the NZHS: Age, sex, region, ethnicity and deprivation index benchmarks were used (see Appendix E for details). The use of weighting would be expected to reduce potential bias due to ITC non-response.

Table 4: Replenishment disposition codes of potentially eligible respondents from NZHS sampling frame and response rates

	All potential participants	Māori current smokers	Pacific current smokers	Other current smokers (> 24 years)	Other current smokers (< 25 years)	Recent quitters
Completed	396	208	31	122	35	0
Ineligible	19	12	5	2	0	0
No contact achieved	786	514	96	98	78	0
Some contact but no interview	370	203	55	70	42	0
Contacted but refused or withdrew	444	240	46	108	50	0
Total	2015	1177	233	400	205	0
Response (% completed) among all potential participants	19.7	17.7	13.3	30.5	17.1	NA
Response (% completed) among all eligible participants	19.8	17.9	13.6	30.7	17.1	NA
Response (% completed) among all with any contact	32.7	32.0	23.5	40.7	27.6	NA
Response (% completed) among all contacted	41.7	38.1	33.0	57.5	41.5	NA

4.3 Survey weights for data analysis

Two sets of survey weights were calculated for Wave 2 respondents. The process for calculating these weights is summarised in detail in Appendix F. The following is intended as a brief and relatively non-technical summary.

The first set of weights are for cross-sectional analyses of the Wave 2 data, and were created so that sample estimates would correspond to the overall target population of current smokers and recent quitters in NZ at the time of Wave 2.

The second set of weights are longitudinal weights were created for use when examining changes in participant outcomes from Wave 1 to Wave 2. These longitudinal weights were created from the cross-sectional weights derived for Wave 1 for each participant, with additional adjustment for non-response. Thus the target population for the longitudinal weights is the New Zealand population of current smokers and recent quitters as defined at the time of Wave 1 (i.e. the initial cohort entry time). For full details of weighting methods, see Appendix F.

5 Questionnaire Development Process

The questionnaire development process began with a series of teleconferences to review the previous questionnaires from the ITC NZL1 Survey and current ITC Project questionnaires from other countries. We sought agreement regarding what questions would be dropped from earlier waves and considered new questions to evaluate the impact of tobacco control policies and interventions that had been implemented since the second wave of the first cohort or were planned or under discussion (further details of these interventions are provided in Appendix A). The ITC NZL2 Survey questionnaire was entered into the ITC Survey Management Group (ITC SMG) database.

The final questionnaire represented a balance between ensuring questions were appropriate and relevant to the NZ context, whilst maximizing consistency with common questions included in other ITC Project surveys to allow comparative analyses. The main topic areas covered by the survey included the following:

- Demographic information
- Current use and frequency of cigarettes and other tobacco products (including E-cigarettes, Heated Tobacco Products)
- Quitting attempts and outcomes
- Type of tobacco and smoked brands
- Tobacco dependence
- Knowledge of health effects and constituents, and perceived risk
- Awareness and impact of warning labels
- Plain packaging evaluation questions
- Awareness and impact of anti-smoking campaigns
- Sources of tobacco, costs and economic impacts of, support for and impact of tobacco tax
- Support for tobacco control policies and interventions
- Cessation advice and support
- Quitting intentions, motivation and beliefs
- SHS exposure and attitudes/support for smokefree policies
 - Psychosocial: Beliefs about smoking
 - Perceived risk
 - Attitudes towards tobacco industry
 - Awareness and attitudes to Smokefree 2025 goal
 - Smoking and quitting in social network
 - Perceptions and experiences of stigma and denormalisation smoking-related beliefs and norms
 - E-cigarette use, types of product, brands, purchase, reasons for use, vaping-related beliefs and behaviours
 - Use for e-cigarette cessation
 - E-cigarettes Environmental Exposure
 - E-cigarettes: Psychosocial beliefs and perceived risk
 - Moderators- Alcohol use, racism, mental health,

Most of the questions that were asked at ITC NZL Wave 2 Survey were similar to the ones asked at ITC NZL Wave 1. However, there were several questions removed and several new questions added to the ITC NZL1 Survey. Specifically:

- Some questions on various topics were removed because they were considered low priority for inclusion either because the topic area was no longer considered a high priority or because it was not considered necessary to repeat the question in Wave 2.
- A smaller number of questions were added to obtain information not covered in the Wave 1 questionnaire, including the following:
 - Some additional questions covering aspects of smoker experience and marginalisation not covered in Wave 1;
 - Some revised and new questions to collect data on views of potential population-based tobacco control interventions included in a proposed comprehensive tobacco control strategy (ASPAP, 2017) that was published after Wave 1 data collection e.g. evaluating support for: 95% reduction of the number of places that can sell tobacco products; increasing government spending on media campaigns and quitting campaigns; implementing Tobacco Free Generation policy; and running advertisements to inform people about SF 2025 goals;
 - Additional questions on awareness and use of ‘Heat not Burn’ (Heated Tobacco) products;
 - Additional questions on e-cigarettes e.g. the accessibility of e-cigarettes; reasons not using or stopping using e-cigarette; the use of e-cigarettes or vaping devices by family, close relatives, or flatmates, workmates etc.; comparing cost of e-cigarettes vs. ordinary cigarettes; satisfaction regarding using e-cigarettes/vaping devices compared to smoking ordinary cigarettes; views on places where e-cigarettes should be sold.

6 ID Codes

The UO team oversaw the survey fieldwork of the ITC NZL2 Survey, hiring RNZ (survey firm) to conduct the study's fieldwork as they did for ITC NZL1 Survey. The fieldwork carried out by RNZ included programming and doing initial tests of the questionnaire, scripting the questionnaire for Computer-Aided Telephone Interview (CATI) software, sending out participant invitation letters, contacting respondents, conducting the interviews, providing regular reports to the UO and UW research teams, and performing initial data cleaning procedures prior to forwarding the raw data to the ITC Data Management Centre (DMC).

At Wave 2, respondents were treated similarly across the five subsample groups; however, fieldwork procedures were slightly different for the recontact vs. replenishment sample. During fieldwork, the recontact sample was surveyed first. After a reasonable degree of retention had been achieved (513/1,077, 48 %) and efforts to recruit Wave 1 participants had been exhausted, the replenishment surveying began. Note that the denominator for the preliminary retention rate is 1,077 rather than 1,082, because 5 Wave 1 respondents were known to have moved away or to have died, or had notified the research team of withdrawal from the study before Wave 2 fieldwork began.

- Replenishment targets were established and refined based on the actual survey response as fieldwork continued. Once the replenishment fieldwork began, the survey firm conducted both recontact and replenishment interviewing at the same time, until the recontact sample records had been attempted per the planned specifications and there were no further responses expected.
- After the recontact survey closed, the firm recruited the final replenishment sample to meet any open subsample recruitment targets in order to come close to the final sample targets.

6.1 Unique ID

- For recontact records, the same unique ID number from Wave 1 was used for each respondent's Wave 2 record;

- For replenishment records, a novel unique ID was assigned at Wave 2 (i.e. no overlap with ID codes employed at Wave 1).

6.2 Smart Data

Although the recontact and replenishment survey pathways were programmed within one single CATI instrument, the recontact records and replenishment records included ‘smart data’ that were specific to the recontact vs. replenishment records.

- The ‘smart data’ for the recontact sample records included information from the ITC NZL1 Survey that was read into the ITC NZL2 CATI program from a back-end data file.
- The ‘smart data’ for the replenishment sample records included information from the NZHS that was read into the ITC NZL2 CATI program from a back-end data file.
- University of Otago (UO) was responsible for collating and providing the smart data for both the recontact sample (based on Wave 1 cleaned data from UW as held by UO) and for the replenishment sample (based on NZHS data from the Ministry of Health as held by UO).

7 Fieldwork Procedures

7.1 Overview of Fieldwork

Fieldwork consisted of the following main tasks, each of which is described in detail subsequently in the sections below:

1. Sending an email/mobile phone text reminder message to the recontact sample (all Wave 1 respondents eligible for Wave 2 who provided their email address or mobile phone number to the research team)
2. Mailing invitation letters to the recontact sample (all Wave 1 respondents eligible for Wave 2)
3. Telephone interviewing of recontact sample
4. Mailing thank you letters and incentives to the recontact sample

After the recontact retention was determined and the replenishment targets were set, tasks included:

1. Mailing invitation letters to the replenishment sample
2. Telephone interviewing of the replenishment sample
3. Mailing thank you letters and incentives to the replenishment sample
4. Assigning final disposition codes to all respondents survey records, and cleaning the survey response data and any contact information data files.

7.2 Procedures for Sending the Reminder Message (via email or text messages to mobile phones)

- Reminder email messages or text messages (for mobile phones) were sent to the recontact sample members who had provided their email address or mobile phone number to the research team.
- The template for the *Reminder Message* is provided in *Appendix B*.
- The UO team provided a file with the contact information for the reminder messages to RNZ at the appropriate time, prior to the fieldwork launch date.

- RNZ sent the messages to all appropriate recontact sample members, and maintained a file that documented any responses to the mail out, and provided the file to the UO team after fieldwork was completed.
- RNZ consulted the UO team for guidance on any relevant issues; otherwise, RNZ updated contact information and handled requests as necessary.
 - Any revisions to respondents' addresses were maintained in a data file by RNZ and transferred into the final contact information file that was sent to the designated UO team member upon completion of fieldwork.

7.3 Procedures for Mailing Invitation Letters

- Mailing invitation letters was divided into two phases: 1) The recontact sample invitation mailing, and 2) the replenishment sample invitation mailing.
- Initially the *ITC NZL2 Recontact Invitation Letters* (Appendix C) were mailed to the recontact sample (all respondents from the NZL Wave 1 Survey) inviting each Wave 1 participant to participate in the Wave 2 follow up survey. It was very important to maximize retention among the Wave 1 respondents.
- After a time when RNZ and the study investigators believed that the overall recontact retention rate could be estimated with some accuracy, the UO team then generated the replenishment sample lists for each subsample stratum, and provide this list to RNZ.
- New recruits to the Wave 2 survey (i.e., the ITC NZL2 replenishment sample) were mailed the *ITC NZL2 Replenishment Invitation Letters* (Appendix D).

7.3.1 Procedures for Mailing Letters to the Recontact Sample

- Recontact sample lists for the ITC NZL2 Survey were provided to RNZ by the UO.
- All recontact sample respondents (i.e., those who participated in the ITC NZL1 Survey) were eligible for the ITC NZL2 Survey, regardless of current tobacco-use status.
- The *ITC NZL2 Recontact Invitation Letter* was mailed to the recontact sample (those who participated in the NZL1 Survey) 7-10 days prior to the launch of the NZL2 Survey fieldwork.

- For most sample groups all letters were sent at the start of the survey wave.
- The invitation letter was followed up by the interview call within about 7-10 days.

7.3.2 Procedures for Mailing Letters to the Replenishment Sample

- Eligibility was determined based on respondents' previous answers to the NZHS. The NZHS is conducted by the NZ Ministry of Health. The Ministry provided lists of eligible respondents to the UO team.
- The respondents that were invited to participate in the ITC NZL2 Survey were drawn from the sampling lists provided by the UO team.
- The replenishment sample lists were transferred from UO to RNZ in tranches to allow for an adaptive approach to recruitment numbers (based on how many recontact respondents they were achieving).
- The *ITC NZL2 Replenishment Invitation Letter* was mailed to each identified potential new recruit for NZL2 (i.e., those who would become the replenishment sample when they completed the NZL2 Replenishment Survey) about 7-10 days prior to when the replenishment NZL2 Survey fieldwork interviewing was scheduled to occur.
- The invitation letter was followed up by the interview call within about 7-10 days.

7.4 Procedures for Telephone Interviewing

This section of the protocol first provides overall guidelines for telephone interviewing in both the recontact and the replenishment samples, and then describes the different procedures between these samples.

- As stated previously, the initial phase of fieldwork was only recontact interviewing, and then at a later time the replenishment interviewing phase started. The two phases overlapped in time as the recontact calls were finishing and the replenishment calls were started.
- Interviewing the correct intended respondent: For both the recontact records and the replenishment records, the interviewer was expected to know the name of the intended respondent and their contact information to ensure that they obtained the correct intended participant on the phone, even in the rare case in which another member of the household had the same name.

- ‘Smart data’: The ‘smart data’ in recontact vs. replenishment records were tailored to the respondent being interviewed. The ‘smart data’ allowed the interviewer to conduct a tailored, responsive interview, based on the respondent’s past responses from NZL1 (for recontact respondents) or from the NZHS (for replenishment respondents):
 - A smart data field informed the interviewer if the intended respondent was part of the recontact sample, or part of the replenishment sample.
 - The unique ID number (generated by the UO team) also informed the interviewer whether the intended respondent was part of the recontact sample, or part of the replenishment sample (e.g., all recontact unique IDs were the same as those used in Wave 1; and replenishment sample unique IDs had a different format).

7.4.1 Calling Guidelines for Whole Sample (Recontact and Replenishment)

- To avoid call-scheduling bias, recruitment calls were conducted at various times of the day and on different days of the week, including the weekend. More calls were made during the evening and/or weekends in order to increase the chances of contact.
- If no contact was made by the second contact attempt, then subsequent attempts alternated between cell phones and landlines (the 3rd attempt being to a cell phone) continuing to call at various times of the day and on different days of the week, including weekends. All calls regardless of whether they were to a landline or to a cell phone were counted as contact attempts.
- Interviewers making the initial recruitment call were expected not to leave any message (not even a limited one) when recruiting new respondents.
- If automatically forwarded to an alternative phone number: the interviewer proceeded as usual.
- When the telephone was answered and if the person answering the telephone was the intended recipient of the call, interviewers proceeded to obtain consent¹ to participate before interviewing the person.

¹ Respondents gave oral consent to participate in the survey following a script which stated that all personal identifier information will be kept confidential and not shared with any person or group not associated with this

- At any time, the respondent was free to suggest an alternate survey interview time, or could withdraw from the survey.
- Those who agreed to participate did so (if possible) during the same call.
- Those who could not participate immediately were scheduled for a future call in which the interview was administered.
- If respondent showed psychological distress, interviewers used discretion and tact, as per their usual procedures.
 - If the interviewer noted that the interview was resulting in distress or the respondent was too distressed to continue they gave the respondent the option to complete interview at a later time, or if this resulted in further distress, the option to abandon the interview was given to respondent.
- As this was a cohort study and we wished to influence the behaviours of the respondents as little as possible, the interviewer was not allowed to provide any advice or information about quitting support (even just providing the Quitline number) or health advice even if information was requested by the respondent. If the respondent requested such information the interviewer was expected to say (or paraphrase) “I am not qualified to give you clinical advice, however it should be readily available through your local health service or other means”.
- Refusal conversion was as per the ITC script (programmed within the survey).
- If possible the same interviewer was used at various calls to the respondent, but the priority was to call on the specified day and time requested by respondent.

7.4.2 Number of Call Attempts for Whole Sample (Recontact and Replenishment)

- If the phone rang, but there was no answer and no answering machine or voicemail: a total of 7 call attempts by landline or cell phone were made.
- If the phone rang and there was no answer, but there was an answering machine/voicemail: a total of 7 call attempts were made.

survey. A Q & A information sheet accompanying the invitation letter stated that anonymised data will be sent to the University of Waterloo and that data from the NZL-ITC survey will be matched to NZHS data.

- If the phone was constantly busy: a total of 7 call attempts were made.
- If a non-adult (i.e., someone younger than 18) answered, or if an adult answered and the respondent from the sampling list was not home, then: a total of 7 call attempts were made.

7.4.3 Number of Call Attempts for Callbacks for Whole Sample (Recontact and Replenishment)

- If a respondent missed his/her scheduled interview appointment and had an answering machine, the interviewer hung up without leaving any message.
- If respondent missed his/her scheduled appointment time and had an answering machine or did not have an answering machine and the call was not answered: the interviewer called back later in the same day twice (first within an hour and again later), and then called back twice a day for the next 3 days.
- If respondent missed his/her scheduled appointment time and another member of household answered the call: the interviewer left a message and asked for the best time to reach respondent, then called at that time; and if this call was not answered, the interviewer called one more time over the next couple of days.
- Previous experience had indicated that the proportion of respondents requiring more than 2 calls to complete the survey was very small.

7.4.4 Cell Phone Protocol for Whole Sample (Recontact and Replenishment)

- The cell phone scripts were programmed into the telephone survey.

7.4.5 Length of Interviews for Whole Sample (Recontact and Replenishment)

All interviews were conducted by RNZ using a Computer-Assisted Telephone Interview (CATI) system as per the standard calling/interview protocol used in the majority of ITC CATI Surveys. The mean interview durations were as follows:

- Current smokers: mean duration 77 minutes (median 74 min; range 30-170 min)

- Recently quit smokers: mean duration 67 minutes (median 63 min, range 36 – 116 min).

For Māori and Pacific respondents, interviewers of the same ethnicity were assigned wherever possible. Around 80% of the RNZ interviewers working on the survey were Māori or Pacific ethnicity.

7.4.6 Open-ended Questions for Whole Sample (Recontact and Replenishment)

- There were several open-ended questions (but not many) and some questions with a list of options and with 'other' and 'other-specify' options, which required verbatim entry by CATI interviewer. Non-numeric open-ended questions were not post-coded by the survey firm.

7.5 Procedures for Sending Thank-you Letters with Tokens of Appreciation to Respondents

- RNZ mailed the Thank-you Letter, which included the token of appreciation, i.e., a \$20 Warehouse voucher, to survey respondents within 1-2 days of completing the interview.
- RNZ compiled the mailing list each day and checked it for accuracy, including spelling and postcodes. If any problems arose, RNZ checked with participant contact details on electronic phone books and other sources, e.g., reviewing interview recording and/or recontacting the participant if still unclear.
 - Any revisions to addresses was maintained in a data file by RNZ and transferred into the final Contact Information File that was sent to the designated UO team member upon completion of fieldwork.
- The mailing address was printed at the top of the front page as per a normal letter. The envelopes were tri-folded so that the address would appear in the window but made sure that the body of the letter could not be seen through the window.
- The Thank-You letter was signed by two individuals: the NZL-ITC PI and the Survey Field Director. These signatures were scanned and digitized for easy insertion into the mail merge forms.
- The voucher was placed within the tri-folded letter and into the envelope.

- The *ITC NZL2 Replenishment Thank You Letter* template is provided as Appendix E.

7.6 Issues/Troubleshooting

- RNZ provided an automated toll-free 0800 number for potential or actual survey respondents to call. This system provided options for callers to opt out of the survey, or to provide details for preferred interview appointment times, or for the survey firm project manager to call them back. Respondents selecting any of these options were asked to leave their name and contact details.
- RNZ designated a staff person to check messages on their toll-free number on a daily basis during the fieldwork period.
- Requests to reschedule appointments were integrated into the interviewers' database.
- All other requests were addressed within 24 hours.

8 Assigning disposition codes and determining survey completes

8.1 Assigning Disposition Codes

- A set of standard disposition codes was provided by UW. RNZ used these disposition codes to track recruitment progress and final outcomes for each respondent throughout the fieldwork period.
- The ITC NZL2 Survey disposition codes are provided in Appendix G.
- RNZ completed the MS Excel spreadsheet provided by the ITC DMC. This information was used by the ITC DMC to compute response and cooperation rates.

8.2 Determining the Number of Survey Completes

- For the purposes of the fieldwork sample and subsample targets, the number of survey completes was the number of interviews that reached the end of the survey.
- Partial completes were defined as interviews in which the respondent answered at least one question, but did not complete the interview.

9 Quality Control

The ITC NZL2 Survey is part of a global project—the ITC Project, which consists of longitudinal cohort surveys in 29 countries throughout the world. Thus, it was very important that the telephone (CATI) protocol and specifications for ITC NZL2 Survey would be carried out with very high quality and high fidelity in order to allow the ITC Project team to be able to compare the results of the ITC NZL2 survey to those in the other 28 ITC countries.

The ITC Project Manager (ITC PM), in collaboration with the ITC DMC, prepared a Protocol to guide the survey firm (RNZ), regarding the standard telephone (CATI) data collection procedures. In addition, the survey firm was in constant communication with the UW and the UO team throughout the entire duration of the project.

The RNZ call centre was accredited with the industry’s highest quality standard, ‘Interviewer Quality Standard’ or IQS up to 2016. RNZ was one of only a small number of Research Association members that was IQS-accredited. IQS ensures all survey research is completed in conformance with ISO 20252. The performance of a firm was independently audited each year and RNZ held its accreditation for over 14 consecutive years. RNZ withdrew from the accreditation in 2016 when the Research Association decided to no longer have IQS independently audited. However, all RNZ survey work still conforms to ISO 20252.

The key requirements of IQS are as follows:

- All interviewers who work on a project must attend a briefing.
- A minimum of 10 percent of all interviewers’ work must be validated.

Validation is completed by a small team of supervisors, either by listening to an interview as it is taking place (intercepting) or recontacting respondents and asking them to provide answers to a small selection of key survey questions (verifications).

9.1 Data Monitoring and Quality Checking

Several quality measures were taken to ensure high quality data:

- The survey firm worked with UW team prior to finalizing the survey to ensure accuracy of the CATI Program. The UO team was copied in all correspondence between UW and the survey firm throughout this process.
- The recontact and replenishment survey pathways were specified within the same single CATI instrument.
- RNZ worked with the ITC SMG to test the programmed CATI survey and quotas to ensure that all technical components necessary for fieldwork met ITC standards. This process involved a high degree of interaction between RNZ and UW.
- To achieve this goal, the survey firm provided access to the CATI Program to UW team. The latter assisted the survey firm in reviewing the CATI Program and pointing out any errors. These errors were fixed by the firm prior to the fieldwork launch.
- The ITC SMG provided guidance throughout the process.
- The UW and the UO teams both approved the CATI survey program before the survey firm commenced the data collection.
- At the end of the data collection, the ITC SMG checked the fielded NZL2 questionnaire against the survey in their database and found that some information was missing for 98 quitters. They informed the RNZ who managed to recontact and collect the missing information from 88 out of the 98 quitters.

9.2 Progress Reports

Weekly reports were sent to the UO team and UW by the survey firm (RNZ). They also informed the UO team and the UW Project Manager about any concerns or problems that arose in the field. The progress reports were discussed at the regular (approx. every 2-3 weeks) study team meetings.

9.3 Data Delivery, Security and Cleaning

A test of the data collection procedures was done at the beginning of the fieldwork launch. If an issue was identified it was relayed to the survey firm for correction before proceeding on with the full launch of the data collection activity.

Data were transferred to ITC DMC team using the SENDIT programme. As an extra precaution to maintain security, data files were encrypted prior to uploading them to the SENDIT website. Once the data were successfully transferred, the University of Waterloo data analyst commenced data cleaning.

The RNZ team and in-country data manager performed initial data checking and identified discrepancies and correction. The data were then sent to the UW ITC data analyst who conducted additional checks on the data to ensure that all skip patterns (routing commands) had been correctly followed and to ensure that the data did not contain invalid values. Respondent identifier codes were also checked thoroughly to ensure the data could be correctly linked within a survey wave and between waves over time. Any additional discrepancies that were identified were also sent back to the in-country data manager for verification. This back and forth communication between the UW ITC data analyst and the in-country data manager went on until the data were deemed clean by the UW ITC data analyst.

The UO team sent a partial data set (encrypted) to ITC DMC on July 26, 2018 for cleaning. ITC DMC cleaned and encrypted the partial data set and sent it back to the UO team on about August 20, 2018 to enable them to examine and become familiar with the data early. Once the data collection of the ITC NZL2 Survey was finished, ITC DMC completed cleaning the full data set. This was followed by the construction of sampling weights (the weighting procedure is described in Appendix F). A dataset containing the longitudinal Wave 1-Wave 2 weights was released to the country team on April 11, 2019. Finally, the cleaned dataset with both longitudinal and cross-sectional weights was released to the country team July 4, 2019, by posting it on the secure, internal ITC website.

10 Disposition Codes for ITC NZL Wave 2 Survey

Table 5: Disposition codes used to track progress on recontact respondents and their final interview outcomes in the ITC NZL2 Survey.

DMC Code	AAPOR	Type†	Description	Comments
Interview				
C-A1	1.1	D	Respondent completes survey; perhaps refuses a few questions	
C-A2	1.2	D	Respondent completes all essential questions and at least 50% of the survey (see C-B11.9)	
Eligible, non-interview				
C-B11.2	2.11	P	Respondent refuses at consent	
C-B11.3	2.11	I	Respondent completes consent, but refuses later on, either before the interview starts or during/after the interview	This means refusing and withdrawing of previously given consent.
C-B11.4		I	Person who answers phone hangs up before saying whether s/he is the intended respondent	
C-B11.5		P	Person who answers phone refuses to get the respondent	
C-B11.9	2.11	D	Respondent is deemed to be eligible, and enters the survey, but refuses to answer some essential questions and/or answers less than 50% of the survey (see C-A2)	
C-B12	2.12	I	Respondent breaks off during the interview	
C-B21	2.21	I	Respondent is deemed to be eligible, but is never available (is away throughout the survey period, or unable to be contacted after multiple call-backs)	
C-B22	2.22	I	Answering machine	
C-B23		I	Rings only and no answer	
C-B24		I	Disconnected or wrong number	
C-B25		I	Always busy, no answering machine, call blocking, or other technical phone problems	
C-B30.1		I	Respondent has died	
C-B30.2	2.3	I	Respondent calls to withdraw before a scheduled appointment without having provided consent	
C-B32	2.32	I	Respondent physically/mentally unable or incompetent	

DMC Code	AAPOR	Type†	Description	Comments
C-B39	2.36	I	Any other reason why respondent did not/cannot complete the interview	Unlikely to be used, but left in as a precaution
C-B40.1		I (T)	Call-back needed to complete interview with respondent	
C-B40.3	2.2	P (T)	Person who answers phone makes appointment for respondent	
C-B40.4	2.2	P (T)	Respondent makes an appointment to complete the interview (landline)	
C-B41	M	P (T)	Respondent driving or can't talk on mobile/cell phone, call-back to complete screener	Converted to C-B21 if unable to contact respondent after multiple call-backs
Unknown eligibility, non-interview				
C-C90	3.9	I	Any other reason why respondent's eligibility is unknown	Unlikely to be used, but left in as a precaution
Not eligible				
C-D10	4.1	I	Out of sample (e.g., respondent has moved to another country or is no longer part of the 5 groups being studied)	Unlikely to be used, but left in as a precaution
C-D90	4.9	I	Other reason why respondent is not eligible	Unlikely to be used, but left in as a precaution

† Type of Disposition code:

I = Disposition code to be entered by the interviewer or supervisor

P = Disposition code which can be programmed into the script

D = Disposition code which can be derived after all data are collected

T = Temporary code

Table 6: Lists the codes used to track progress on replenishment participant recruitment and final interview outcomes for individuals recruited in the ITC NZL2 Survey. Most were entered by the interviewers. The questionnaire refers to the ITC DMC codes as (DC: [code]). The disposition codes are in the first column of the table.

DMC Code	AAPOR	Type†	Description	Comments
Interview				
P-A1	1.1	D	Respondent completes survey; perhaps refuses a few questions	
P-A2	1.2	D	Respondent completes all essential questions and at least 50% of the survey (see P-B11.9)	
Eligible, non-interview				
P-B11.2	2.11	P	Respondent refuses at consent	
P-B11.3	2.11	I	Respondent completes consent, but refuses later on, either before the interview starts or during/after the interview	This means refusing and withdrawing of previously given consent.
P-B11.4		I	Person who answers phone hangs up before saying whether s/he is the intended respondent	
P-B11.5		P	Person who answers phone refuses to get the respondent	
P-B11.9	2.11	D	Respondent is deemed to be eligible, and enters the survey, but refuses to answer some essential questions and/or answers less than 50% of the survey (see P-A2)	
P-B12	2.12	I	Respondent breaks off during the interview	
P-B21	2.21	I	Respondent is deemed to be eligible, but is never available (is away throughout the survey period, or unable to be contacted after multiple call-backs)	
P-B22	2.22	I	Answering machine	
P-B23		I	Rings only and no answer	
P-B24		I	Disconnected or wrong number	
P-B25		I	Always busy, no answering machine, call blocking, or other technical phone problems	

DMC Code	AAPOR	Type†	Description	Comments
P-B30.1		I	Respondent has died	
P-B30.2	2.3	I	Respondent calls to withdraw before a scheduled appointment without having provided consent	
P-B32	2.32	I	Respondent physically/mentally unable or incompetent	
P-B33	2.33	I	Respondent has language barrier	
P-B39	2.36	I	Any other reason why respondent did not/cannot complete the interview	Unlikely to be used, but left in as a precaution
P-B40.1		I (T)	Call-back needed to complete interview with respondent	
P-B40.3	2.2	P (T)	Person who answers phone makes appointment for respondent	
P-B40.4	2.2	P (T)	Respondent makes an appointment to complete the interview (landline)	
P-B41	M	P (T)	Respondent driving or can't talk on mobile/cell phone, call-back to complete screener	Converted to P-B21 if unable to contact respondent after multiple call-backs
Unknown eligibility, non-interview				
P-C11		P	Respondent refuses, can't answer or doesn't know his/her smoking status; thus unknown if he/she is eligible	
P-C90	3.9	I	Any other reason why respondent's eligibility is unknown	Unlikely to be used, but left in as a precaution

DMC Code	AAPOR	Type†	Description	Comments
Not eligible				
P-D10	4.1	I	Out of sample (e.g., respondent has moved to another country or is no longer part of the 5 groups being studied)	Unlikely to be used, but left in as a precaution
P-D80	4.7	I	Quota/Sampling Strata Group has been filled	Unlikely to be used, but left in as a precaution
P-D90	4.9	I	Other reason why respondent is not eligible	Unlikely to be used, but left in as a precaution

† Type of Disposition code:

- I = Disposition code to be entered by the interviewer or supervisor
- P = Disposition code which can be programmed into the script
- D = Disposition code which can be derived after all data are collected
- T = Temporary code

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Appendix A: New Zealand Tobacco Control Policies

On January 2004, New Zealand ratified the WHO FCTC. A range of tobacco control interventions have been implemented since the original ITC NZ study and others are scheduled for or may be implemented during the period of the current ITC NZL Wave 2 study. This creates opportunities to investigate the impact of these interventions through within country cross-sectional before-after and/or within cohort analyses, and in some instances through cross-country comparison studies.

Some of the key interventions implemented in New Zealand are described below.

- **Smoke-Free Places:** Some indoor workplace smoking restrictions were introduced in the **1990** Smokefree Environments Act. Smoking was prohibited in all indoor workplaces and indoor public places, including bars and restaurants, with very limited exceptions from **December 2004** in the Smokefree Environments Amendment ACT. Smoking was also generally prohibited on all public transportation, again with some very limited exceptions (such as when a taxi is not in use, or when all persons in a small passenger vehicle agree that smoking should be permitted). There were also limited restrictions introduced on smoking in outdoor places, namely in outdoor areas of schools and early childhood education centers. Sub-national jurisdictions may enact smoke free laws that are more stringent than the national law, provided they do not conflict with national law. In recent years (**mainly since 2010**) many towns, cities and districts have introduced further restrictions such as smokefree parks, playgrounds and sports fields.
- **Tobacco Advertising, Promotion and Sponsorship:** There is a near comprehensive ban on tobacco advertising and promotion, including a ban on the display of all tobacco products at points of sale. Bans on TV and radio advertising were introduced in 1963 and cinemas and billboards in 1973. All remaining advertising was banned in the 1990 Smokefree Environments Act, with sponsorship banned by 1995. **In 2011**, internet sellers were banned from showing pack or brand images. They had to show health warnings. They were also banned from covert tobacco sponsorship of events. **In 2012** all tobacco

products in shops were required to be kept out of sight with no point of sale displays of tobacco products allowed.

- **Tobacco Packaging and Labeling:** Warnings on cigarette packs were first introduced in 1973. **In 2008**, New Zealand implemented 14 rotating pictorial warnings. The warning message was in English and the corresponding graphic occupied 30 percent of the front of the cigarette package; the warning message was in English and Te Reo Māori; the corresponding explanatory message, corresponding graphic, and Quitline logo covered **90 percent** of the back of the package; and an information message occupied one entire side of the package. The warning message for loose or pipe tobacco was the same but the corresponding explanatory message, corresponding graphic, and Quitline logo covered **50 percent** of the back of the package.. **In May 2016**, draft regulations for plain packaging were published and passed by parliament and implementation of plain packaging was done **in March 14, 2018** together with 14 new health warnings with an increased size (at least 75% of the front and 90% of back of packs), including a Quitline logo, freephone number, and other information about quitting smoking. Seven of these images will be rotated each year. The cigarette packs are the same standard dark brown/green background color as Australia, United Kingdom, Ireland and France. After June 6, 2018 only standardized plain packs were sold in New Zealand market. Cigarettes are only sold in packs of either 20 or 25 sticks, in standard cardboard packs and loose tobacco in pouches of 30 or 50 grams in standard rectangular soft plastic pouches.
- **Misleading Descriptors** or other types of misleading packaging and labeling are not banned. The tobacco industry voluntarily does not use the terms “light” or “mild” but has replaced these terms with the equally misleading terms “mellow” and “smooth.”
- **Tobacco Taxation and Prices:** **In April 2010** there was a 10% increase on excise taxes per year on cigarettes for three years. There was a 25% increase of excise tax on loose tobacco. From **2011** there have been annual 10% above CPI increases in tobacco excise taxes from January 1, and these are scheduled to continue to at least 2020. The price of Marlboro cigarettes in NZ is the second highest worldwide in 2017. Duty free allowances of cigarettes were reduced from 200 to 50 cigarettes in **November 2014**.

- **Retail Availability of Tobacco Products:** There are no current restrictions on where tobacco products can be sold, and they are widely available in dairies, conveniences stores, supermarkets, gas stations and bars.
- **E-cigarettes:** nicotine-containing e-cigarettes and e-liquids were initially not allowed to be sold within New Zealand though importation for personal use was allowed.
- **Smokefree 2025 Goal: In 2011:** Government announced the goal for New Zealand to be smoke-free by 2025, defined as a minimal level of smoking and availability of tobacco products. This has been commonly interpreted as achieving a prevalence of below 5% for all population groups.

The ITC NZL2 Survey will allow the ITC Study to further evaluate the effectiveness of New Zealand tobacco control laws, regulations and policies that have been introduced at national level between 2017 and 2018, including:

- Implementation of Plain Packaging regulations along with a new set of 14 larger Pictorial Health Warnings (PHWs) covering at least 75% of the front and 90% of the back of cigarette pack and with greater prominence of the national Quitline number implementation date was March 13, 2018, only plain packaging cigarette packs could be sold in New Zealand after June 6, 2018).
- Additional tobacco excise tax increases by 10% above inflation on 1st January 2017 and 2018.
- *De facto* changes to e-cigarette regulation in New Zealand. This began with the announcement of the intention by the National-led Government to legislate to allow the sale of nicotine-containing cigarettes in March 2017 and from around that time an unofficial policy was implemented not to prosecute specialist shops selling nicotine-containing e-cigarettes and e-liquids, and as a result retail availability progressively increased. However, sales were still largely confined to these locations (and online sales). In March 2018, since a Court Decision against the NZ Ministry of Health ruling that it is legal to sell IQOS ‘Heet’ sticks, the legal and regulatory status of nicotine containing e-cigarettes and e-liquids has been confused. In theory, the current legal status of nicotine-

containing e-cigarettes and e-liquids in New Zealand is that they can be legally sold with the same restrictions as smoked tobacco products e.g. no advertising or sales to minors. However, in practice this is impossible to enforce as the Act applies only to nicotine manufactured from tobacco and there is no mechanism to determine whether the nicotine in vaping liquid is manufactured from tobacco - so evidential standards for a prosecution are unlikely to be met. The Ministry has publicly stated this position, so the practical effect has been that e-cigarettes and e-liquids are now increasingly sold from dairies and convenience stores, supermarkets and gas stations (i.e. the same places as cigarettes are sold) and advertising (including on TV) of these products has begun to appear. There is no current regulation of product standards, flavours, packaging etc. In November 2018, the new Labour-led Government announced the intention to introduce e-cigarette regulations of a similar nature to those proposed by the previous Government.

Some new questions (see p17) were added to the Wave 2 questionnaire to enable the evaluation of the impact of these policy changes).

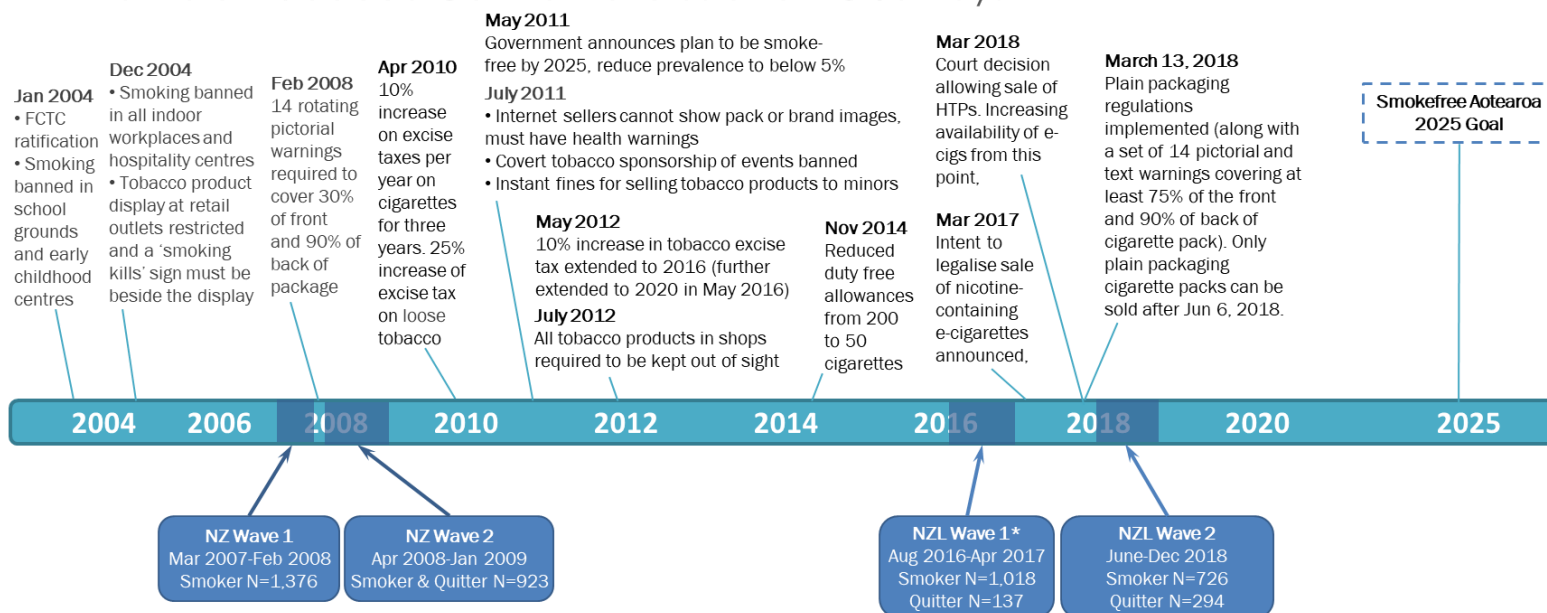
ITC New Zealand Survey Timelines

The ITC NZL2 Survey was conducted from June 26, 2018 to December 11, 2018. Figure 2 shows details of the ITC New Zealand Surveys timeline including the tobacco control policies that have been implemented so far and how these relate to the field work for the ITC NZL Wave 2 Survey.

Figure 2: ITC New Zealand Survey Timeline

NEW ZEALAND

Timeline of Tobacco Control Policies and ITC Surveys



Survey Mode: Telephone (CATI)
Respondent Types: Smoker and Quitter

Updated August 2019

Appendix B: ITC NZL2 Email/Text Reminder Message

Note: A text message (for mobile phones) version may also be generated. The text version would use similar phrasing, but may be edited for improved brevity.

“Hi [name]. You may remember taking part in a University of Otago telephone survey for the New Zealand International Tobacco Control (ITC) Survey about 18 months ago. This message is to let you know that we will be writing to you in a few weeks to invite you to participate in a follow-up survey. If you are willing to take part but have changed your address in the last 18 months (or since your original ITC interview), we invite you to go to this website to change your contact details: <https://ITC.researchnz.com>. To get to the participant section of the website you will need to use the following login [] and password []. You can also update your contact details by calling 0800 500 168. Thanks very much. Richard Edwards, ITC NZL Survey.”

Appendix C: ITC NZL2 - Recontact Invitation Letter and Question and Answer Sheet

The University of Otago invites you to take part in the International Tobacco Control Follow-Up Survey

About 18 months ago you kindly participated in a University of Otago telephone survey for the New Zealand International Tobacco Control (ITC) Survey. This survey was supported by the Ministry of Health. The survey provided valuable information about New Zealand smokers' and ex-smokers' behaviours and views on smoking issues.

We are writing to invite you to participate in a follow-up survey for the New Zealand ITC Survey.

The follow-up survey will include a similar range of questions to those in the original interview. Topics will include asking about your current smoking status and what might have caused any changes to how you smoke now; or if you have quit, what might have influenced your quitting.

Please see the attached "Question and Answer Sheet" to refresh your memory about the study and for additional information about the follow-up survey.

An interviewer from Research New Zealand will contact you by telephone within the next few weeks to invite you to take part. They will be able to answer any questions you may have.

Your participation is entirely voluntary and if you take part all your answers will be kept confidential.

Also, in recognition of the time required to complete the survey, we will send you a \$20 voucher after your interview. Everyone who completes their interview will go in to a prize draw for one of three *Apple iPad tablet computers*.

Your views are very important to us, and we believe that the findings from the study will make an important contribution to improving health in New Zealand. The University of Otago ITC team hope you decide to participate in this survey.

Kind regards

Prof Richard Edwards
Principal Investigator of the
University of Otago ITC Survey Team

Question and Answer Sheet for the New Zealand International Tobacco Control (ITC) Survey

What is the survey about? New Zealand is participating in the International Tobacco Control Policy Evaluation (ITC) Project. This is a long-term survey that covers smokers' views on smoking issues over time. The ITC Project also conducts surveys in 28 other countries, including Australia, Canada, the USA and the United Kingdom. Details about the international ITC project can be found at: <http://www.itcproject.org>

Why was I invited to take part? When you took part in the first survey for the *New Zealand International Tobacco Control Survey* about 18 months ago, you agreed that the University of Otago could recontact you for this follow-up survey. We are interested in whether there have been any changes since we last interviewed you.

What if I don't smoke now? We are still interested in speaking to you. The information you provide will allow us to compare ex-smokers and those who still smoke.

Why is this survey important? The researchers are investigating what New Zealand smokers and ex-smokers think about tobacco control policies and regulations and how these policies and regulations might affect them over time.

Who is carrying out the survey? The University of Otago is leading this research, in collaboration with Auckland University of Technology, Whakauae Research, the Ministry of Health, and an international team of researchers (the ITC Project). Research New Zealand is conducting the interviewing on behalf of the University of Otago. You can find out more details about the research by looking at the New Zealand and the ITC Project websites (details at the end of this Question and Answer Sheet).

What sort of questions will be asked? The survey will gather similar information to the first survey about your views on tobacco smoking and smoking-related policies. There will be questions about smoking and related matters, about services available to smokers, and about your views on topical smoking issues.

How long will the interview take? The telephone interview will take about 45 to 70 minutes, depending on how many of the questions are relevant to you. We will schedule appointments to call at a time that is convenient for you.

Is there any risk of discomfort or harm from participation? There is no risk. You do not have to answer any questions you do not wish to answer, and you can stop the interview at any time without any disadvantage to yourself.

How many times will I be asked to participate in the survey? This is a continuing survey, which means that we are interested in your views over time. This will be the second time you are taking part. If the study continues in the future we may invite you to participate in future surveys (in around 18 months' time). You can withdraw from the study at any time without any disadvantage.

How is my privacy protected? The information you provide to the interviewer is confidential and protected by the Privacy Act 1993. This means that the interviewer will not discuss your information with anyone else, and no-one will be able to know that you have taken part in the survey.

The answers you give in this survey will be added to other people's answers to create an anonymised dataset. This means that your name is not included and no one will be able to identify you by looking at your answers. The dataset will be stored securely. Your name and contact details will be kept in another secure file, separate from the survey answers, with strictly limited access.

The anonymised dataset will also be made available to the ITC Project administrators at the University of Waterloo, in Canada, who hold the datasets securely for all participating ITC Project countries. This means that approved researchers can apply to use the data for international comparison studies which have been through the ITC study review process.

The University of Otago will also be linking the data in this survey with your responses to the *New Zealand Health Survey*. This process will be done using an anonymous code number so that your identity will always remain hidden. This linked data will only be available to the University of Otago team and will not be shared with any international ITC Project collaborators.

Participants will not be identifiable in any of the reports or presentations of findings from this survey.

Where can I find results from the survey? Findings (e.g., publications and presentations) from the study are made available on the New Zealand ITC website (see details at the end of this Question and Answer sheet).

What will the information be used for? The information gathered from this survey will be used to inform and improve national smoking and health policies. It will also be used for international comparisons, for example to find out if new tobacco control policies in New Zealand have made a difference in comparison to countries that have not introduced that policy.

Why is a voucher being offered? We wish to recognise the time you have contributed by taking part in this survey. So once you have completed the telephone interview, a \$20 Warehouse voucher will be mailed out to you.

What if I don't want to participate? Participation is voluntary. You do not have to participate, and you can withdraw from the study at any time without giving a reason. If you withdraw from the study, or decide not to participate, there will be no disadvantage to you of any kind.

Who has funded this survey? The Health Research Council of New Zealand is the main funder, and the Ministry of Health is also contributing resources and expertise.

Has the study received ethical approval? Yes, this project has been approved by the University of Otago, Human Ethics Committee (Reference 15/126), and has received ethics clearance from an ethics committee at the University of Waterloo (the lead institution for the ITC Project). If you have any concerns about the ethical conduct of the research you may contact the University of Otago Human Ethics Committee through the Human Ethics Committee Administrator (ph. 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

How can I update my contact details? Because this is a continuing survey, it is important that we have your current contact details. These can be checked and updated by calling 0800 500 168.

Where can I find more information or ask questions? For further information about this survey, please visit the ITC New Zealand website. If you have questions about the study or wish to raise any concerns, please contact the New Zealand ITC Study administrator:

Beck O'Shaughnessy
University of Otago, Wellington
Phone: 04 918 6251
Email: beck.oshaughnessy@otago.ac.nz

Website details relevant to this study

ITC New Zealand website:

<http://www.otago.ac.nz/wellington/departments/publichealth/research/otago577201.html>

ITC International website:

<http://www.itcproject.org>

New Zealand Health Survey

<https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/surveys/current-recent-surveys/new-zealand-health-survey>

Appendix D: ITC NZL2 - Replenishment Invitation Letter and Question and Answer Sheet

The Ministry of Health and the University of Otago invite you to take part in the International Tobacco Control (ITC) Survey

You recently participated in the New Zealand Health Survey where you were interviewed in your home. At that time you kindly agreed that you would be willing to be contacted about taking part in additional health-related research.

We now invite you to participate in the New Zealand International Tobacco Control (ITC) Survey.

This survey will provide valuable information about New Zealand smokers' behaviours and views on smoking issues over time. The information collected will be used to improve policies and programmes in New Zealand and help us to compare with what is happening in other countries. Please see the attached "Question and Answer Sheet" for more information about the survey.

An interviewer from Research New Zealand will contact you by telephone within the next few weeks to invite you to take part. They will be able to answer any questions you may have.

If you agree to participate, you will be interviewed by telephone at the time of the call, or at a time that suits you better. You may be recontacted about 18 months after your first interview for a follow-up interview.

Your participation is entirely voluntary and all your answers will be strictly confidential. In recognition of the time required to complete the survey, we will send you a \$20 voucher after your interview.

Your views are important to us and we believe that the findings from the study will make an important contribution to improving health in New Zealand. The Ministry of Health and the University of Otago ITC team hope you decide to participate in this survey.

Kind regards

Stephen McKernan
Acting Director-General of Health
Ministry of Health

Prof Richard Edwards
Principal Investigator of the
University of Otago ITC Survey Team

Question and Answer Sheet for the International Tobacco Control (ITC) Survey

What is the survey about? New Zealand is participating in the International Tobacco Control Policy Evaluation (ITC) Project. This is a long-term survey that covers smokers' views on smoking issues over time. The ITC Project also conducts surveys in 28 other countries, including Australia, Canada, the USA and the United Kingdom. Details about the ITC Project can be found at: <http://www.itcproject.org>

Why was I invited to take part? When you recently took part in the *New Zealand Health Survey*, you agreed that the Ministry of Health could recontact you for further health research. We have contacted you for this survey because you identified yourself as a tobacco smoker (or ex-smoker) during that interview, and you are 18 years or older.

What if I don't smoke now? We are still interested in speaking to you. The information that you provide will allow us to compare ex-smokers and those who still smoke.

Why is this survey important? The researchers are investigating what New Zealand smokers and ex-smokers think about tobacco control policies and regulations and how these policies and regulations affect them over time.

Who is carrying out the survey? The University of Otago is leading this research, in collaboration with Auckland University of Technology, Whakauae Research, the Ministry of Health, and an international team of researchers (the ITC Project). Research New Zealand is conducting the interviewing on behalf of the University of Otago. You can find out more details about the research by looking at the New Zealand and the ITC Project websites (details at the end of this Question and Answer Sheet).

What sort of questions will be asked? The survey gathers information about your views on tobacco smoking and smoking-related policies. There will be questions about smoking and related matters, about services available to smokers, and about your views on topical smoking issues.

How long will the interview take? The telephone interview will take about 45 to 70 minutes, depending on how many of the questions are relevant to you. We will schedule appointments to call at a time that is convenient for you.

Is there any risk of discomfort or harm from participation? There is no risk. People usually find the questions quite interesting. You do not have to answer any questions you do not wish to answer, and you can stop the interview at any time without any disadvantage to yourself.

How many times will I be asked to participate in the survey? This is a continuing survey, which means that we are interested in your views over time. If the study continues in the future we may continue to invite you to participate in future surveys (in around 18 months' time). You can withdraw from the study at any time without any disadvantage.

How is my privacy protected? The information you provide to the interviewer is confidential and protected by the Privacy Act 1993. This means that the interviewer will not discuss your information with anyone else, and no-one will be able to know that you have taken part in the survey.

Like the *New Zealand Health Survey*, the answers you give in this survey will be added to other people's answers to create an anonymised dataset. This means that your name is not included and no one will be able to identify you by looking at your answers. The dataset will be stored securely. Your name and contact details will be kept in another secure file, separate from the survey answers, with strictly limited access.

The anonymised dataset will also be made available to the ITC Project administrators at the University of Waterloo, in Canada, who hold the datasets securely for all participating ITC Project countries. This means that approved researchers can apply to use the data for international comparison studies which have been through the ITC study review process. The University of Otago will also be linking the data in this survey with your responses to the *New Zealand Health Survey*. This process will be done using an anonymous code number so that your identity will always remain hidden. This linked data will only be available to the University of Otago team and will not be shared with any international ITC Project collaborators.

Participants will not be identifiable in any of the reports or presentations of findings from this survey.

Where can I find results from the survey? Findings (e.g., publications and presentations) from the study are made available on the New Zealand ITC website (see details at the end of this Question and Answer sheet).

What will the information be used for? The information gathered from this survey will be used to inform and improve national smoking and health policies. It will also be used for international comparisons, for example to find out if new tobacco control policies in New Zealand have made a difference in comparison to countries that have not introduced that policy.

Why is a voucher being offered? We wish to recognise the time you have contributed by taking part in this survey. So once you have completed the telephone interview, we will mail you a \$20 Warehouse voucher.

What if I don't want to participate? Participation is voluntary. You do not have to participate, and you can withdraw from the study at any time without giving a reason. If you withdraw from the study, or decide not to participate, there will be no disadvantage to you of any kind.

Who has funded this survey? The Health Research Council of New Zealand is the main funder, and the Ministry of Health is also contributing resources and expertise.

Has the study received ethical approval? Yes, this project has been approved by the University of Otago, Human Ethics Committee (Reference 15/126). This project has also been reviewed and received ethics clearance from a research ethics committee at the

University of Waterloo (the lead institution for the ITC Project) in Canada. If you have any concerns about the ethical conduct of the research you may contact the University of Otago Human Ethics Committee through the Human Ethics Committee Administrator (ph. 03 479-8256). Any issues you raise will be treated in confidence and investigated, and you will be informed of the outcome.

How can I update my contact details? Because this is a continuing survey, it is important that we have your current contact details. These can be checked and updated by calling 0800 500 168.

Where can I find more information or ask questions? For further information about this survey, please visit the ITC New Zealand website. If you have questions about the study or wish to raise any concerns, please contact the New Zealand ITC Study administrator:

Beck O'Shaughnessy
University of Otago, Wellington
Phone: 04 918 6251
Email: beck.oshaughnessy@otago.ac.nz

Website details relevant to this study

ITC New Zealand website:

<http://www.otago.ac.nz/wellington/departments/publichealth/research/otago577201.html>

ITC International website:

<http://www.itcproject.org>

New Zealand Health Survey

<https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/surveys/current-recent-surveys/new-zealand-health-survey>

Appendix E: ITC NZL2 - Thank You Letter

Dear [name]:

Thank you for taking part in the New Zealand International Tobacco Control Policy Evaluation (ITC) Survey. This is a unique long-term study with 28 other countries involved, including Australia, Canada, the United States, and the United Kingdom.

Your participation greatly enhances our ability to provide excellent research which can help efforts to reduce the harms of smoking.

During our recent phone call to you on «DATE», we mentioned that we would be sending you a voucher in recognition of your participation. Enclosed you will find a Warehouse Voucher for \$20 as we promised. [Recontact participants only: We have also entered your name into a prize draw for one of three *Apple iPad tablet computers*. [Add odds] We will let you know if you are one of the winners when the survey is completed (most likely early in 2019)].

We may contact you within 18 months to organise an interview for the next wave of the survey. If your contact information changes before then, please let us know:

Your details can be checked and updated by visiting this website: <https://ITC.researchnz.com>. To get to the participant section of the website you will need to use the following login and password. Your login is [login] and your password is [password]. You can also check or update your contact details by calling 0800 500 168.

If you have any comments or questions about the study, we would love to hear from you. Please find contact details on the following page, along with information about how to find out more about the survey.

Many thanks again for joining the large group of respondents in New Zealand and the 28 other ITC countries who are participating in this important study.

Kind regards
Sincerely,

Richard Edwards
Principal Investigator
University of Otago, ITC NZL Survey

Katrina Magill
Research Director
Research New Zealand

Appendix F: Weights Construction for Wave 2 of the new ITC New Zealand Survey (2018-2019)

Mary Thompson, Yingchen Fan, Mi Yan and Christian Boudreau

July 4, 2019

1 Introduction

The method for constructing weights for the new ITC New Zealand Survey is based on the method devised by Clark (2008).

The 2016-2017 ITC sample (NZL Wave 1) was obtained by a complex sampling and response process. The first phase of sampling was the selection of the 2015/2016 New Zealand Health Survey (NZHS) sample using an unequal probability, multi-stage sampling design. NZHS respondents were asked if they were willing to be recontacted for further research. Those who had agreed and were eligible (being a regular smoker or recent quitter at the time of the NZHS interview) were subsequently approached for the ITC survey, and complete responses were obtained from a subset of this group. Fieldwork took place between August 30, 2016 and April 22, 2017.

Calibrated weighting was used to correct for non-response biases from the ITC Wave 1 sample. In some surveys, calibrated weights are calculated using population benchmarks; for example the NZHS weights were calculated using population benchmarks from Statistics New Zealand's estimated resident population for each calendar quarter, broken down by age, sex, ethnicity and socioeconomic position. The ITC survey has a restricted scope (regular smokers and recent quitters only) and was a subsample of the NZHS sample. Because of this, ITC weights for NZL Wave 1 were based on benchmarks calculated from the 2015/2016 NZHS sample.

Wave 2 of the ITC survey was conducted by telephone from June 26, 2018 to December 11, 2018. In NZL Wave 2, strong efforts were made to recontact the 1082 respondents from Wave 1 who had answered all essential questions and completed at least 50% of the survey. Dropouts were replaced by members of a replenishment sample, drawn from the NZHS samples of 2016/2017 and 2017/2018. In Wave 2, all respondents in the replenishment sample were smokers at the time of their NZHS interview.

The aim for overall sample size was 1100, broken down as follows:

1. 400 Māori current smokers
2. 100 Pacific current smokers
3. 70 Non-Māori non-Pacific (NMNP) younger current smokers (aged 18-24 years)
4. 400 NMNP older current smokers (aged 25+ years)
5. Approximately 130 recent quitters from the combined Māori, Pacific and Other groups

Within each of these five subsample strata, shortfalls due to attrition or change of status were to be replaced with new recruits (replenishment sample) who met the criteria for the subsample stratum.

In the end, the numbers achieved (according to their ITC NZL2 status) were as follows:

1. 308 Māori current smokers
2. 52 Pacific current smokers
3. 38 Non-Māori non-Pacific (NMNP) younger current smokers (aged 18-24 years)
4. 328 NMNP older current smokers (aged 25+ years)
- 5a. 148 quitters up to 12 months, all ethnicities
- 5b. 146 quitters for more than 12 months, all ethnicities

Note concerning quitters:

All recontacted sample participants were eligible to participate, regardless of tobacco use status at the time of NZL2. Thus, in the NZL2 sample, there are both recent quitters and longer term quitters who had been interviewed for NZL1:

- There were 93 recontacted sample respondents and 55 replenishment respondents who were quit for up to 12 months by the time of NZL2, making a total of 148, and thus more than meeting the target of 130.
- There were 133 recontact and 13 replenishment respondents who by the time they were interviewed in NZL2 were quit for longer than one year, making 146 in total. Of the recontact respondents, 38 had also been quit for longer than one year in NZL1.

There are two sets of weights computed at Wave 2. The first set comprises the Wave 1-Wave 2 longitudinal weights, for respondents present in both Wave 1 and Wave 2; these are the Wave 1 initial weights recalibrated to the Wave 1 benchmarks, so that the longitudinal respondents will be representative of the population at the time of Wave 1. The second set comprises the Wave 2 cross-sectional weights, for respondents (recontacted or newly recruited) present in Wave 2; these are

calibrated to Wave 2 benchmarks obtained from the NZHS weights at the time of Wave 2, making the Wave 2 respondents representative of the population at the time of Wave 2.

Section 2 summarizes the weighting method used in the NZHS, as this was the starting point for the calculation of the ITC weights. Section 3 describes the calculation of ITC weights and the characteristics of the weights.

2 Weighting in the NZ Health Survey

A commonly used methodology for survey weighting is (i) to compute for each respondent an *initial weight* as the reciprocal of an estimate of the respondent's probability of inclusion in the sample; (ii) to calibrate the resulting weights. Calibrated weights are calculated using population benchmark information obtained externally from the survey. The aim in calibrated weighting is for the sum of the weights in the sample, broken down by variables of interest, to agree with external population counts. This means that discrepancies between the responding sample and the population are corrected for in weighted estimates, at least with respect to the variables used in weighting.

In the case of the 2015/2016 NZ Health Survey, steps (i) and (ii) were carried out, with the external population counts being based on census-based resident population estimates for the relevant quarter broken down by

- age group (0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-74, 75+) by sex (male, female) for all people
- age group (0-4, 5-9, 10-14, 15-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-64, 65+) by sex (male, female) for all Maori
- adult population by Pacific and Non-Pacific peoples
- adult population by Asian and non-Asian peoples
- total population by New Zealand Deprivation Index (NZDep2013) quintile

For full details, see the Methodology Report for the 2015/2016 New Zealand Health Survey (Ministry of Health, 2016).

The same procedure was carried out for the 2016/2017 and 2017/2018 NZ Health Surveys. See e.g. the Methodology Report for the 2017/2018 New Zealand Health Survey (Ministry of Health, 2018).

3 Two-Phase Calibrated Weighting for ITC Wave 1

NZHS respondents were in the scope (target population) for the ITC Survey at Wave 1 if:

- they were aged 18 years or over;
- they had smoked a lifetime total of 100 or more cigarettes (i.e. the NZHS data item A3.14 was equal to 1);
- they smoked at least once a month at the time of the NZHS interview (A3.15 equal to 2, 3 or 4) OR
- they had quit within the 12 months preceding their NZHS interview (A3.16 equal to 1, 2, 3 or 4).

All in scope NZHS respondents who agreed to be recontacted about the possibility of answering other health questions of importance to the Ministry of Health (A6.04 equal to 1) were selected in the ITC sample.

Initially, the ITC NZL sample list(s) were stratified into the following groups, as determined from responses to the NZHS:

1. Maori current smokers
2. Pacific current smokers
3. Younger smokers (aged 18-24) who are not of Maori/Pacific ethnicity.
4. Older smokers (aged 25+) who are not of Maori/Pacific ethnicity.
5. Recently-quit or former smokers (quit within the last 12 months, defined at the time of the NZHS interview).

The initial target sample sizes were:

- 600 Māori current smokers
- 100 Pacific current smokers
- 80 Other ethnicity current smokers <25 years
- 570 Other ethnicity current smokers 25+ years
- Approximately 150 of the recent quitters (as of their NZHS interview) from a combined Māori, Pacific and Other groups

In the end, all NZHS respondents in the chosen 2015/2016 cohorts who met the eligibility requirement were selected in the ITC sample. Of the NZHS respondents who were in scope for the ITC survey, 4048 had agreed to be recontacted and were invited, and of these 1155 people responded fully or partially to the ITC survey. There were 1082 who completed all essentials and at least 50% of the survey.

The numbers achieved in the groups were:

Smoking Status in NZHS	Frequency	Percent
1. Maori current smoker	332	30.68
2. Pacific current smoker	49	4.53
3. NMNP younger current smoker (18-24)	40	3.70
4. NMNP remainder current smoker (age 25+)	530	48.98
5. Recent quitter (last 12 months)	131	12.11

If all in-scope NZHS respondents had agreed to be recontacted and responded to ITC, the NZHS weight for these people could have been used as the weight on the ITC file also. This is because the probability of selection in ITC is the same as the probability of selection in NZHS, for eligible persons. However, only 1155 of the potential respondents actually responded fully or partially to ITC. Weights are therefore needed to reflect the fact that the responding ITC sample is a subsample from the eligible component of the NZHS sample.

We first describe the *inflation weights*, which are constructed so that a respondent's weight is the number of people in the population deemed to be represented by that respondent.

The ITC sample is said to be a two-phase sample, where the first phase consists of the NZHS sample and the second phase sample is the subset of this sample who also responded to ITC. The aim was to produce ITC weights which reflected both the first phase sampling process (i.e. the NZHS sample design), and the fact that the ITC responding sample may differ from the eligible NZHS sample.

Two-phase calibrated weighting was used. This means that the sum of the ITC weight over the ITC sample in each of various categories (for example Māori adults in a region) was set equal to a factor times the sum of the NZHS weight over in-scope NZHS respondents in the category. (Because NZHS data over 18 months were used for this sum, the factor was taken to be 2/3). Subject to this constraint, the ITC weights were required to be close to the NZHS weights. The approach taken to achieve this is known as *raking*, in which a set of initial weights is rescaled to satisfy several sets of compatible constraints in succession until convergence occurs (Battaglia et al, 2009).

The categories of the sets of constraints selected for smokers (as of the time of the NZHS interview) were:

- Region by Maori vs non-Maori (4 regions were used, consisting of the following DHBs:
Northern Region: Northland, Auckland, Waitemata, Counties-Manakau;
Midland Region: Bay of Plenty, Lakes, Tairāwhiti, Taranaki, Waikato;
Lower North Island: Hawkes Bay, Midcentral, Wanganui, Wairarapa, Capital & Coast, Hutt Valley;
South Island: Nelson-Marlborough, Canterbury, West Coast, South Canterbury, Otago, Southland.)
- Sex by Age (6 age categories: 18-24, 25-34, 35-44, 45-54, 55-64, 65 and over)
- Sex by (Maori, Pacific Islander, other)
- 2006 NZ Deprivation index decile (10 categories)

The categories of the sets of constraints selected for recent quitters (who had quit within the twelve months previous to their NZHS interview) were:

- Sex by Age (3 age categories: 18-34, 35-54, 55 and over)
- All Maori, Female Non-Maori, Male Non-Maori
- 2006 NZ Deprivation index (deciles 1-3, 4-5, 6-10)

Note that these respondents may or may not have been quitters at the time of responding to the ITC Wave 1 survey.

Trimming was applied to two smoker weights which were greater than 10 times the median of the final weights as first calculated. After the first raking, there were two very large weights obtained, $W_{t_{max1}} = 6837.634$ and $W_{t_{max2}} = 5937.846$. They were set equal to 10 times the median (4399.9), and raking was then repeated to obtain the final ITC weights, resulting in the reduction of these two weights to 4908.479 and 5051.426 respectively.

Tables F1 and F2 show the properties of the initial weight, given by the inverse of the probability of inclusion in the NZHS sample, and the final calibrated weight. Some observations on these tables:

- The median calibrated weight for smokers (as of NZHS interview) is about 2.1 times the median of the initial weights. This is because about half of the in-scope respondents identified in the NZHS resulted in a complete ITC interview.
- The coefficients of variation of the initial and final weights are 73.2% and 79.7%, respectively for smokers, and 62.3% and 76.2%, respectively, for recent quitters (as of NZHS interview).

- The distribution of the final weights looks to be reasonable, without excessive variability, or too many weights being trimmed.

Note: Smoking and quitting status will have changed for many of the NZHS respondents in scope for ITC by the time of their ITC survey. Thus those in the Wave 1 ITC survey who were quit at the time of the ITC interview may have been quit for up to three years, while a number of those who were smokers at the time of the Wave 1 ITC survey will have been quitters at their NZHS interview who have relapsed. Table F3 shows the frequencies of the various transitions between the NZHS 2014/2015 survey and the Wave 1 ITC survey.

For use in cross-country analyses of quitters and smokers, *analytic (rescaled) weights* for Wave 1 were also constructed. They are equal to the inflation weights, rescaled to sum to sample size within smokers and within quitters, according to their NZHS status.

Table F1: Properties of Initial Inverse Selection Probability Weights and Final Calibrated Weights for ITC Wave 1: Smokers (at time of NZHS interview)

	Initial Weights	Calibrated Weights (first raking)	Final Calibrated Weights
Mean Weight	281.475	560.723	560.723
Coefficient of Variation (%) of Weights	73.177	84.515	79.720
Minimum Weight	60.644	79.350	78.952
First Quartile of Weights	158.871	300.303	299.813
Median Weight	212.138	439.993	443.977
Upper Quartile of Weights	349.860	675.237	685.827
95 th Percentile of Weights	635.257	1338.878	1362.550
Maximum Weight	2172.478	6837.634	5051.426

Table F2: Properties of Initial Inverse Selection Probability Weights and Final Calibrated Weights for ITC Wave 1: Quitters (at time of NZHS interview)

	Initial Weights	Final Calibrated Weights
Mean Weight	296.442	501.762
Coefficient of Variation (%) of Weights	62.339	76.194
Minimum Weight	81.337	94.097
First Quartile of Weights	164.247	221.851

Median Weight	237.345	394.228
Upper Quartile of Weights	370.280	662.820
95 th Percentile of Weights	631.013	1241.082
Maximum Weight	1028.007	2321.822

Table F3: Frequencies of transitions between the NZHS interview and the ITC Wave 1 survey for ITC sample members

	ITC Wave 1 smoker	ITC Wave 1 quitter up to 12 months	ITC Wave 1 quitter more than 1 year
NZHS smoker	859	136	23
NZHS recent quitter	51	39	47

4 Wave 1-Wave 2 Longitudinal Weights

The Wave 1-Wave 2 longitudinal inflation weights have been computed for respondents present in both Wave 1 and Wave 2; these are the Wave 1 initial weights recalibrated to the Wave 1 benchmarks, so that the longitudinal respondents will be representative of the population at the time of Wave 1.

The initial weight for the recontact respondents was taken to be their initial weight from the NZHS, and these were recalibrated by raking to the Wave 1 benchmarks, so that the weights of dropouts were redistributed to respondents who stayed in, having similar values of the demographic and socio-economic classifications.

The weights for quitters (at NZHS) required no trimming. For smokers, the top two weights were more than 10 times the median. These weights were set equal to 10 times the median, and raking was reapplied, resulting in a small reduction of the maximum weights and the coefficient of variation of the weights.

Tables F4 and F5 show the properties of the initial weight, given by the inverse of the probability of inclusion in the NZHS sample, and the final calibrated weight.

Table F4: Properties of Initial Inverse Selection Probability Weights and Final Longitudinal Calibrated Inflation Weights for ITC: Smokers (at time of NZHS interview)

	Initial Weights	Calibrated Weights (first raking)	Final Calibrated Weights
Mean Weight	292.31	1134.82	1134.82
Coefficient of Variation (%) of Weights	64.67	103.59	102.68
Minimum Weight	60.64	101.73	100.62
First Quartile of Weights	165.20	511.16	511.07
Median Weight	224.80	809.52	812.42
Upper Quartile of Weights	357.19	1243.40	1257.66
95 th Percentile of Weights	643.68	3175.58	3213.12
Maximum Weight	1231.47	10135.81	9084.94

Table F5: Properties of Initial Inverse Selection Probability Weights and Final Longitudinal Calibrated Inflation Weights for ITC: Quitters (at time of NZHS interview)

	Initial Weights	Final Calibrated Weights
Mean Weight	306.97	818.35
Coefficient of Variation (%) of Weights	64.92	82.85
Minimum Weight	98.09	160.73
First Quartile of Weights	164.00	340.85
Median Weight	240.15	561.58
Upper Quartile of Weights	383.85	1071.88
95 th Percentile of Weights	631.61	2042.45
Maximum Weight	1028.01	3885.77

We computed analytic (rescaled) longitudinal weights, of which the mean is equal to 1 within those who were quitters and within those who were smokers at the time of their NZHS interview prior to Wave 1.

5 Wave 2 Cross-sectional Weights

The Wave 2 cross-sectional inflation weights were computed for respondents (recontacted or newly recruited) present in Wave 2; these are calibrated to Wave 2 benchmarks obtained from the NZHS weights at the time of Wave 2, making the Wave 2 respondents representative of the population at the time of Wave 2.

A difference between the practices at Wave 1 and at Wave 2, is that, at Wave 1, the calibration variables for an individual were taken to be equal to their values at the time of their NZHS survey. However, at Wave 2, when recontact and replenishment samples are being combined, the calibration variables for an individual were taken to be equal to their values at the time of their ITC Wave 2 survey.

Table F6 shows the pattern of transitions for recontact sample members from their smoker/quitter status at Wave 1 to their smoker/quitter status at Wave 2.

Table F6: Frequencies of transitions between the ITC Wave 1 survey and the ITC Wave 2 survey for ITC recontact sample members

	ITC Wave 2 smoker	ITC Wave 2 quitter up to 12 months	ITC Wave 2 quitter more than 1 year
ITC Wave 1 smoker	334	75	34
ITC Wave 1 quitter up to 12 months	24	16	61
ITC Wave 1 quitter more than 1 year	3	2	38
All	361	93	133

For purposes of the Wave 2 cross-sectional weights, we calibrated to the benchmark totals for the NZHS sample from which the Wave 2 replenishment respondents were drawn. (Because two years of NZHS sample were used, the sums of the weights from the NZHS sample were multiplied by a factor of ½.) The benchmark totals included totals for people who had quit for more than 1 year at the time of the NZHS data collection.

We pooled the ITC recontact and replenishment samples. For replenishment respondents, the initial weight was the initial NZHS weight, while the status was taken to be the status at the time of their NZHS, as was done for new respondents at Wave 1. For recontact respondents, the initial weight was the initial NZHS weight, and the initial status was taken to be the status at the time of Wave 2.

Longer term quitters from the recontact respondents were weighted up to benchmark totals calculated as follows: $\frac{1}{2}$ (the sum of the weights for NZHS respondents who had quit between 1 and 2 years + (the sum of the weights for NZHS respondents who had quit between 2 and 5 years)/3)).

Again for Wave 2, the categories of the sets of constraints selected for smokers (as of the time of the ITC Wave 2 interviews) were:

- Region by Maori vs non-Maori (4 regions were used, consisting of the following DHBs:
 - Northern Region: Northland, Auckland, Waitemata, Counties-Manakau;
 - Midland Region: Bay of Plenty, Lakes, Tairāwhiti, Taranaki, Waikato;
 - Lower North Island: Hawkes Bay, Midcentral, Wanganui, Wairarapa, Capital & Coast, Hutt Valley;
 - South Island: Nelson-Marlborough, Canterbury, West Coast, South Canterbury, Otago, Southland.)
- Sex by Age (6 age categories: 18-24, 25-34, 35-44, 45-54, 55-64, 65 and over)
- Sex by (Maori, Pacific Islander, other)
- 2006 NZ Deprivation index decile (10 categories)

The categories of the sets of constraints selected for recent quitters (who had quit within the twelve months previous to their ITC Wave 2 interview, and who had quit for longer at the time of their ITC Wave 2 interview) were benchmarks calculated as described above for quit duration, crossed with:

- Sex by Age (3 age categories: 18-34, 35-54, 55 and over)
- All Maori, Female Non-Maori, Male Non-Maori
- 2006 NZ Deprivation index (deciles 1-3, 4-5, 6-10)

There were 4 respondents (3 smokers and 1 quitter) for whom the NZ Deprivation index value was not available, because no value was associated with their psu areas in the NZHS data set. For the purposes of weights construction only, we imputed for each of these the most probable value based on an ordinal logistic regression of NZ Deprivation index, with explanatory variables sex, age and ethnicity. Thus these respondents are in the sample and do have Wave 2 cross-sectional weights.

It was judged that no trimming of these weights was required. Statistics for the Wave 2 cross-sectional weights appear in Tables F7 to F9

Table F7: Properties of Initial Weights and Calibrated Cross-sectional Weights for ITC NZL2: Current smokers (at time of ITC Wave 2) (N=726)

	Initial Weights	Calibrated Weights
Mean Weight	272.74	814.32
Coefficient of Variation (%) of Weights	63.05	88.78
Minimum Weight	71.28	56.69
First Quartile of Weights	162.57	336.62
Median Weight	209.08	616.46
Upper Quartile of Weights	337.99	1020.46
95 th Percentile of Weights	608.96	2245.42
Maximum Weight	1155.91	5608.11

Table F8: Properties of Initial Weights and Cross-sectional Calibrated Weights for ITC NZL2: Quitters up to 12 months (at time of ITC Wave 2) (N=148)

	Initial Weights	Calibrated Weights
Mean Weight	305.06	651.18
Coefficient of Variation (%) of Weights	61.42	80.50
Minimum Weight	102.94	102.87
First Quartile of Weights	176.92	287.78
Median Weight	238.61	466.40
Upper Quartile of Weights	371.32	873.15
95 th Percentile of Weights	665.20	1753.28
Maximum Weight	1176.31	2757.87

Table F9: Properties of Initial Weights and Cross-sectional Calibrated Weights for ITC NZL2: Quitters more than 12 months (at time of ITC Wave 2) (N=146)

	Initial Weights	Calibrated Weights
Mean Weight	305.35	570.02

Coefficient of Variation (%) of Weights	66.15	87.47
Minimum Weight	60.64	38.48
First Quartile of Weights	165.52	265.69
Median Weight	247.56	442.52
Upper Quartile of Weights	382.03	690.91
95 th Percentile of Weights	643.16	1597.34
Maximum Weight	1231.47	3866.92

Table F10 shows the frequencies of smoker and quitter status at the ITC Wave 2 survey for ITC replenishment sample members in the four quota categories. All were smokers at the time of their interview for the NZHS 2016/2017 or 2017/2018 survey.

Table F10: Frequencies of smoker and quitter status at the ITC Wave 2 survey for ITC replenishment sample members in the four quota categories

	ITC Wave 2 smoker	ITC Wave 2 quitter up to 12 months	ITC Wave 2 quitter more than 1 year
Maori Current smoker	196	27	8
Pacific Current Smoker	35	2	1
Younger smokers (18-24) other ethnicity	29	9	2
Older smokers (25+) other ethnicity	105	17	2
All	365	55	13

For use in cross-country analyses of quitters and smokers, *analytic (rescaled) weights* for Wave 2 cross-sectional analyses were also constructed. They are equal to the cross-sectional inflation weights, rescaled to sum to sample size within smokers, within quitters up to 12 months, and within quitters for longer than 12 months, according to their ITC Wave 2 status.

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Appendix G: Final Replenishment Disposition Counts for the New ITC New Zealand Wave 2 Survey (2018-2019)

Table G1: Disposition codes by ITC NZL2 respondent sub-groups

DISPOSITION CODES	Māori current smokers	Other current smokers 25yrs plus	Other current smokers < 25yrs	Pacific current smokers	Total
P-A1_Completed	208	122	35	31	396
P-A2_Completed all essentials and at least 50% of survey	0	0	0	0	0
P-B11.2_Respondent refused at consent	217	96	44	38	395
P-B11.3_Respondent completed consent, but refused later on	23	12	6	8	49
P-B11.4_Hung up before saying they were the named respondent	31	6	3	5	45
P-B11.5_Person who answered phone refused to get the respondent	15	6	3	3	45
P-B11.9_Started survey but refused some essential and/or refused ≥ 50% of the survey	0	0	0	0	0
P-B21_Respondent is eligible but never available	157	58	36	47	298
P-B22_Answering machine	221	41	33	42	298
P-B23_Rings only and no answer	56	21	7	8	92
P-B24_Disconnected or wrong number	237	36	38	46	357
P-B25_Always busy, no answer phone, call blocking or other technical problem	0	0	0	0	0
P-B30.1 Respondent deceased	3	0	0	0	3
P-B30.2_Respondent called to cancel appointment	0	0	0	0	0
P-B32_Respondent physically/mentally unable to complete interview	6	0	0	0	6
P-B33_Language barrier	0	2	0	4	6
P-B40.1_Call-back to complete interview with respondent	0	0	0	0	0
P-B40.4_Respondent made appointment to complete interview (landline)	0	0	0	0	0
P_D10_Out of sample	3	0	0	1	4
P-D90_Other reason why respondent is not eligible	0	0	0	0	0
Total	1,177	400	205	233	2,015

Table G2: Grouped recontact disposition codes by ITC NZL2 respondent sub-groups

	Maori current smokers	Other current smokers 25yrs plus	Other current smokers younger than 25yrs	Pacific current smokers	Recent quitters	Total
Completed	142	321	13	17	81	574
Interview scheduled or call-back arranged (Temp codes)	0	0	0	0	0	0
Answering machine or rings and no answer	35	35	6	7	9	92
Some contact but not able to reach named respondent	37	50	9	10	12	118
Disconnected or wrong number	52	43	4	8	10	117
Not eligible (Physical/mental or other barrier)	3	1	0	0	0	4
Refused consent, or later withdrew consent	62	77	8	7	18	172
Total	331	527	40	49	130	1077
Retention Rates	43.3%	60.9%	32.5%	34.7%	62.3%	53.4%

Table G3: Grouped recontact cumulative percentages by ITC NZL2 respondent sub-groups

	Maori current smokers	Other smokers 25+	Other smokers >25	Pacific current smokers	Recent quitters	Total
Completed	43%	61%	33%	35%	62%	53%
Interview scheduled or call-back arranged (Temp codes)	43%	61%	33%	35%	62%	53%
Answering machine or rings and no answer	53%	68%	48%	49%	69%	62%
Some contact but not able to reach named respondent	65%	77%	70%	69%	78%	73%
Disconnected or wrong number	80%	85%	80%	86%	86%	84%
Not eligible (Language or other barrier)	81%	0%	0%	0%	0%	0%
Refused consent, or later withdrew consent	100%	100%	100%	100%	100%	100%

Table G4: Grouped replenishment disposition codes by ITC NZL2 respondent sub-groups

GROUPED DISPOSITION CODES	Maori current smokers	Other current smokers 25yrs plus	Other current smokers younger than 25yrs	Pacific current smokers	Total
Completed	208	122	35	31	396
Interview scheduled or call-back arranged	0	0	0	0	0
Answering machine or rings and no answer	277	62	40	50	429
Some contact but not able to reach named respondent	203	70	42	55	370
Disconnected or wrong number	237	36	38	46	357
Not eligible (Language or other barrier)	12	2	0	5	19
Refused consent, or later withdrew consent	240	108	50	46	444
Total	1177	400	205	233	2015
Response Rate	17.7%	30.5%	17.1%	13.3%	19.7%

Table G5: Grouped replenishment cumulative percentages by ITC NZL2 respondent sub-groups

	Maori current smokers	Other smokers 25yrs+	Other smokers >25	Pacific current smokers	Total
Completed	18%	31%	17%	13%	20%
Interview scheduled or call-back arranged (Temp codes)	18%	31%	17%	13%	20%
Answering machine or rings and no answer	41%	46%	37%	35%	41%
Some contact but not able to reach named respondent	58%	64%	57%	58%	59%
Disconnected or wrong number	79%	73%	76%	78%	77%
Not eligible (Language or other barrier)	80%	73%	0%	2%	1%
Refused consent, or later withdrew consent	100%	100%	100%	100%	100%