
Version Date: 20 July 2018

Suggested Citation: ITC Project. (2017, September). ITC Four Country Smoking and Vaping Survey Wave 1 (2017) Technical Report. University of Waterloo, Waterloo, Ontario, Canada; Medical University of South Carolina, Charleston, South Carolina, United States; Cancer Council Victoria, Melbourne, Australia; King’s College London, London, United Kingdom.

Funding: The ITC 4 Country Smoking and Vaping Survey in the US, Canada, and England was supported by the National Cancer Institute of the USA (P01 CA200512-01), and a Foundation Grant from the Canadian Institute of Health Research (FDN-148477). The ITC Australia Project was supported by National Health and Medical Research Council of Australia (APP1106451).
Table of Contents

Acknowledgments ........................................................................................................................................... v

ITC Four Country Smoking and Vaping Project Team ...................................................................................... vi

1. Summary and overview of the project ........................................................................................................ 1
   1.1 Introduction ........................................................................................................................................ 1

1.2 Summary description of the 4CV1 sample ................................................................................................. 3
   Figure 1.1. ITC 4CV1 sample by country, recontact vs. replenishment status, and probability vs. non-
   probability (NP) sampling frame ................................................................................................................. 4

1.3 Overview of the project .......................................................................................................................... 4
   Table 1.1. Countries surveyed at 4CV1, survey fieldwork period by country/wave, survey samples in
   each country/wave, and retention rates at 4CV1 (i.e., percent retained from Wave 9 CA/US or Wave
   10 AU/EN of the ITC Four Country Project). .............................................................................................. 6

2. Survey Measures ....................................................................................................................................... 7
   2.1 Survey Development ................................................................................................................................. 7
      2.1.1 The ITC Survey Development Process ............................................................................................. 7
      2.1.2 4CV1 Survey Development Process and Timeline ........................................................................... 7
      Table 2.1: Summary of the 4CV1 survey development timeline ................................................................. 7
      2.2 Survey Content ...................................................................................................................................... 8

3. Study sample .............................................................................................................................................. 9
   3.1 Overview of 4CV1 sample and quotas ..................................................................................................... 9
      Table 3.1. Countries surveyed at 4CV1, survey fieldwork period by country/wave, survey samples in
      each country/wave, and retention rates at 4CV1 (i.e., percent retained from Wave 9 CA/US or Wave
      10 AU/EN of the ITC Four Country Project). (Q) = quotas applied. See Section 3 for quotas
      description. ............................................................................................................................................. 10
      Table 3.2: 4CV1 Sample by user type, age, country, source, and whether quota used (marked with Q) ............................................................................................................................... 10

3.2 Inclusion criteria in Canada, England, and United States (Recontact and Replenishment) samples
   vs. Australia sample (Recontact and Replenishment) ................................................................................. 11
      3.2.1 4CV1 sample inclusion/exclusion criteria for 4CV1 CA, EN, US Recontact and Replenishment 11
      3.2.2 4CV1 sample inclusion/exclusion criteria for 4CV1 AU Recontact and Replenishment ........... 11
      Table 3.3. Definition of users types from Table 3.2 ................................................................................. 13

4 Description of 4CV1 CA, EN, US, and AU Replenishment sample regional quotas .................................. 16
   4.1 4CV1 Australia Replenishment sample quotas ..................................................................................... 16
   4.2 4CV1 Canada Replenishment sample quotas ....................................................................................... 16
   4.3 4CV1 England Replenishment sample quotas ....................................................................................... 17
   4.4 4CV1 United States Replenishment sample quotas ............................................................................... 18
4.5 Fieldwork issues related to quotas ................................................................................................. 19
5. Study procedures and survey firms .................................................................................................. 21
5.1 Overview of survey firms and responsibilities .............................................................................. 21
5.2 ITC-owned Cohort re-contact procedures – Canada, England, US .............................................. 23
  5.2.1 Invitations and reminders for CA, EN, US ITC-owned cohort members (email vs. letter) .......... 23
  5.2.2 Procedures to ensure all respondents provide an email address ............................................. 24
  5.2.3 Telephone reminder calls – ITC-owned CA, EN, US cohort .................................................... 24
  5.2.4 US phone interviews ................................................................................................................. 25
5.3 ITC-owned cohort re-contact procedures – Australia ................................................................. 26
  5.3.1 Invitations and reminders for AU ITC-owned cohort members (email vs. letter) ................. 26
  5.3.2 Procedures to ensure all ITC-owned AU cohort respondents provided an email address .... 27
  5.3.3 Protocol for telephone reminder calls for the ITC-owned AU cohort .................................. 27
  5.3.4 Thank you emails/letters for the ITC-owned AU cohort ....................................................... 27
5.4 Panel-owned recontact procedures .............................................................................................. 28
  5.4.1 Procedures for panel-owned cohort members from CA, EN, US (Leger, Ipsos, GfK).............. 28
  5.4.2 Procedures for panel-owned cohort members from AU ......................................................... 28
5.5 Panel-owned replenishment procedures ....................................................................................... 28
  5.5.1 Procedures for panel-owned replenishment samples from CA, EN, US (Leger, Ipsos, GfK) ... 28
  5.5.2 Procedures for the panel-owned AU replenishment smoker/recent quitter sample (RMR) ... 29
  5.5.3 Procedures for the panel-owned AU replenishment dedicated vaper sample (RMR) ......... 29
5.6 Study Incentives ............................................................................................................................. 31
  Table 5.2. Summary of 4CV1 incentives by country and sample source. ..................................... 31
6 Quality Control and Uniformity ....................................................................................................... 32
6.1 Identification and removal of ‘satisficers/speeders’ from the data set ........................................... 32
Appendices ........................................................................................................................................ 34
  Appendix 1.1. ITC Australia sample composition, sample source, and mode of survey completion over Waves 1-10 and 4CV1 ................................................................. 35
  Appendix 1.2. ITC Canada sample composition, sample source, and mode of survey completion over Waves 1-9 and 4CV1 ........................................................................... 36
  Appendix 1.3. ITC England sample composition, sample source, and mode of survey completion over Waves 1-10 and 4CV1 ............................................................................. 37
  Appendix 1.4. ITC United States sample composition, sample source, and mode of survey completion over Waves 1-9 and 4CV1 ................................................................................. 38
  Appendix 2.3: Allocation (per stratum) of 4CV1 England panel sample ........................................ 41
  Appendix 2.4: Allocation (per stratum) of 4CV1 United States panel sample of e-cigarette users..... 42
Acknowledgments

This Four Country Smoking and Vaping Survey Technical Report was prepared from documents and other material that the International Tobacco Control Policy Evaluation Project (ITC) Research Team has created since 2015. The compilation of these documents and preparation of the material that accompanies those documents was conducted by Geoffrey T. Fong, Principal Investigator of the ITC Project; Mary Thompson, Co-Investigator and Director of the Data Management and Analysis Team; Christian Boudreau, Associate Director of the Data Management and Analysis Team; Pete Driezen, Senior Analyst; Grace Li, Data Analyst; and ITC staff members Janine Ouimet and Anne Quah. We thank the Co-Investigators from the participating sites across the four countries: University of Waterloo, Canada; Medical University of South Carolina, US; King’s College London, UK; Cancer Council Victoria, Melbourne, Australia; and the survey firms: Roy Morgan Research in Melbourne, Australia, the Survey Research Centre at the University of Waterloo, Leger in Toronto, Ipsos MORI in London England, and GfK in Washington DC for their assistance.

The 4CV1 Project has been generously supported by a number of organizations. We thank these organizations for their support:

U.S. National Cancer Institute (United States)
National Health and Medical Research Council (Australia)
Canadian Institutes of Health Research (Canada)
## ITC Four Country Smoking and Vaping Project Team

### Canada

Geoffrey T. Fong, Ph.D. (Principal Investigator), University of Waterloo  
Christian Boudreau, Ph.D., University of Waterloo  
David Hammond, Ph.D., University of Waterloo  
Mary Thompson, Ph.D., University of Waterloo  
Shannon Gravely, Ph.D., University of Waterloo

<table>
<thead>
<tr>
<th>Project and Survey Management Support, University of Waterloo</th>
<th>Data Analysis Support, University of Waterloo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anne C.K. Quah, Ph.D</td>
<td>Pete Driezen, Ph.D.</td>
</tr>
<tr>
<td>Ruth Loewen, M.A.</td>
<td>Gang Meng, Ph.D.</td>
</tr>
<tr>
<td>Michelle McAvoy, B.A.</td>
<td></td>
</tr>
<tr>
<td>Thomas Agar, M.A.</td>
<td></td>
</tr>
<tr>
<td>Edward Bauer, B.Sc.</td>
<td></td>
</tr>
<tr>
<td>Simon Thompson, B.A.</td>
<td></td>
</tr>
<tr>
<td>Michelle Bauer, B.A.Sc.</td>
<td></td>
</tr>
<tr>
<td>Dana Komer, B.A.</td>
<td></td>
</tr>
<tr>
<td>Mary Culham, B.A.</td>
<td></td>
</tr>
</tbody>
</table>

### England

Ann McNeill, Ph.D., (Principal Investigator), King’s College London  
Sara C. Hitchman, Ph.D., King’s College London

### United States

K. Michael Cummings, Ph.D., MPH (Principal Investigator), Medical University of South Carolina  
Andrew Hyland, Ph.D., Roswell Park Cancer Institute  
Richard J. O’Connor, Ph.D., Roswell Park Cancer Institute  
Frank J. Chaloupka, Ph.D., University of Illinois at Chicago  
Bryan Heckman, Ph.D., Medical University of South Carolina  
Ce Shang, Ph.D., University of Illinois at Chicago  
James T. Thrasher Ph.D., University of South Carolina  
David Levy Ph.D., Georgetown University  
Maciej Goniewicz Ph.D., Roswell Park Cancer Institute  
Maansi Travers Ph.D., Roswell Park Cancer Institute  
Warren Bickel Ph.D., Virginia Tech Carilion Research Institute  
Anthony Alberg Ph.D., University of South Carolina  
Matthew Carpenter, Ph.D., Medical University of South Carolina  
Georges El Nahas, Ph.D., Medical University of South Carolina  
Travis Poole, M.H.A., Medical University of South Carolina  
Yoojin Cho, M.P.H., University of South Carolina  
Kai-Wen Cheng, Ph.D., University of Illinois at Chicago  
Eric N. Lindblom, JD, Georgetown University

### Australia

Ron Borland, Ph.D. (Principal Investigator), Cancer Council Victoria
Australia team (continued)
  Hua Yong, Ph.D., Cancer Council Victoria
  Coral Gartner, Ph.D., University of Queensland
  Wayne Hall, Ph.D., University of Queensland
  Ryan Courtney, Ph.D., University of New South Queensland
  Lisa Mundy, Ph.D., University of Queensland
1. Summary and overview of the project

1.1 Introduction
The International Tobacco Control Policy Evaluation Project (ITC Project) was established in 2002 to monitor and evaluate key health policies implemented in countries that are signatories to the Framework Convention on Tobacco Control (FCTC)—the first-ever international public health treaty—that was adopted in May 2003 by all 192 member states of the World Health Organization. Over the past two decades, the ITC Project has provided invaluable data to inform governments and other stakeholders on whether public health policies designed to reduce the health, economic, and societal costs of tobacco use throughout the world, are effective. The ITC Project conducts longitudinal surveys in representative cohorts in over 28 countries.

Since 2002, the ITC Four Country (4C) Survey has conducted longitudinal surveys of a nationally representative cohort of approximately 1,500 to 2,000 adult smokers (aged 18 years or older) in each of Australia (AU), Canada (CA), the United Kingdom (UK), and the United States (US). Nine full waves (i.e., involving all four countries) of the 4C Survey plus two interim waves (involving one country each) were conducted between 2002 and 2015, and the final wave, Wave 10, was conducted in AU and the UK only. The new and expanded Four Country Smoking and Vaping (4CV) Survey was initiated after the conclusion of the 4C Survey. The 4CV Survey was designed to investigate the relationship between use of vaporized nicotine products (VNPs), including e-cigarettes (ECs) and other electronic nicotine delivery devices (ENDs) and tobacco use (i.e., cessation, uptake, and/or sustained use), and to inform emerging policies on VNPs in the four countries. The ITC 4CV Project expanded upon the existing ITC 4C Survey infrastructure, conceptual model, and methodologies to examine the use and evolution of the VNP marketplace and policy environments by surveying adult smokers, recent ex-smokers, and VNP-only users in AU, CA, England (EN, not the entire UK), and the US -- four countries with similar cigarette-smoking rates, but divergent policies related to VNPs.

Over the past few years, demand for VNPs has grown rapidly, and data are required to inform public health policies. While VNPs seem much less harmful compared to combustible tobacco products (the known leading preventable cause of premature death in high-income countries), the effect of VNP use on tobacco cessation, uptake, and/or sustained use is currently not well understood. Tobacco control experts are divided on whether policies should support, restrict, or ban VNP use. The specific objectives of the ITC 4CV Project are to:

1) describe how VNP and cigarette use differ among smokers and recent ex-smokers both over time and between important subgroups (e.g., age, gender, income, those planning to quit cigarettes, nicotine dependence level), in particular whether the interactions between VNP and cigarette use vary across countries;
2) examine how differences in tobacco control and VNP policies between countries are related to different patterns of VNP and cigarette use; and
3) contribute to the methods for monitoring health behaviours (e.g., VNP use) by comparing characteristics of the online samples recruited in this study with samples collected by conventional methods, and to explore the extent to which behaviours of the self-identified early adopters of VNPs provide useful indications of the behaviour of the broader adult smoker population.

This report provides the methodological background and key statistical indicators for the 4CV Wave 1 Survey (4CV1) and provides information on the sampling methods, procedures, and survey.
administration. This report also provides survey outcome rates, measures of representativeness, and guidelines for data analysis for 4CV1 data. Refer to the ITC Project website (www.itcproject.org) for country-specific timelines of smoking and vaping/VNP policies in each of Australia, Canada, England/UK, and the US.
1.2 Summary description of the 4CV1 sample

Methods statement for a study using only 4CV1 data
Methodological details for each country are available via the ITC website (http://www.itcproject.org/methods). In brief, the ITC Four Country Smoking and Vaping Wave 1 Survey (4CV1) sample comprised the following cohorts: (1) re-contact smokers and quitters who participated in the previous wave of the ITC 4C Project, regardless of e-cigarette use, (2) newly recruited current smokers and recent quitters (quit smoking in the past 24 months) from country-specific panels, regardless of e-cigarette use, and (3) newly recruited current e-cigarette users (use at least weekly) from country-specific panels. The smoker sample in each country was designed to be representative of smokers, and used either probability-based sampling frames or non-probability opt-in sampling frames, or a combination of these. Respondents for the ITC 4CV1 survey were recruited via random-digit-dialing (RDD) sampling frames, or web-based or address-based panels, or a combination of these frames, as an expansion to the previous ITC 4C Project.

Methods statement for a study using 4C data (last wave or multiple waves) and 4CV1 data
Methodological details for each country are available via the ITC website (http://www.itcproject.org/methods). In brief, for the ITC Four Country (ITC 4C) Project the sample in each country was designed to be representative of smokers, and used either probability-based sampling frames or non-probability opt-in sampling frames, or a combination of these, for initial recruitment. Respondents for the ITC surveys were smokers* recruited via random-digit-dialing (RDD) sampling frames, or web-based or address-based panels, or a combination of these frames. Respondents at each survey wave analyzed in this study were either re-contact/cohort respondents (recruited in previous waves) or replenishment respondents (new respondents in the last completed follow-up survey wave to replace the respondents from previous wave who could not be re-contacted). The newly-recruited replenishment participants were selected using the same sampling design as in the initial survey wave, with the exception that in the last completed ITC Four Country (ITC 4C) survey waves in Canada (Wave 9), the US (Wave 9), Australia (Waves 9 and 10) and the UK (Waves 9 and 10), the replenishment respondents were sampled from both the original sampling frame as well as a new panel frame (a change necessitated by the increasing challenges in the representativeness and logistics of conducting RDD recruitment and telephone surveying).

In Australia, Canada, the United Kingdom, and the United States, the most recent wave of data came from the ITC Four Country Smoking and Vaping (4CV) Project, which was a new study including the previous ITC Four Country (ITC 4C) Project participants among its respondents. The ITC 4CV Wave 1 sample comprised the following cohorts: (1) re-contact smokers and quitters who participated in the previous wave of the ITC 4C Project, regardless of e-cigarette use, (2) newly recruited current smokers and recent quitters from country-specific panels, regardless of e-cigarette use, and (3) newly recruited current e-cigarette users (use at least weekly) from country-specific panels.

*The 4C Wave 9 US Survey also recruited adult recent quitters (quit in the past 12 months), non-cigarette tobacco/nicotine users, non-smokers; as well as a youth sample.
1.3 Overview of the project

Note on terminology:
In this report, the term “ITC-owned cohort/respondents” refers to those respondents who were originally recruited from an RDD sampling frame purchased by ITC. The “ITC-owned respondents” have subsequently provided ITC with their contact information for the purpose of re-contacting them at each wave.

The term “panelist” or “panel-owned cohort/respondents” refers to respondents recruited for the ITC Survey via a country-specific panel firm. ITC does not have the right to contact the panelists directly, and thus, the panel firm handles all communications with the panelists.

- The 4CV1 Survey was launched on July 11, 2016, and was completed on November 29, 2016.
- The 4CV1 Survey sample was expanded to include tobacco smokers, recent ex-smokers (who had quit smoking within the past 24 months), and VNP/EC users.
- Respondents from the original ITC 4C Survey (i.e., those who had completed the survey in the last wave in each country) were asked to continue participating in an expanded 4CV1 Survey. Inclusion criteria varied slightly between AU vs. the other three countries (see Section 3.3).
Survey respondents were recruited from two or more sources in each country: 1) the ‘ITC-owned’ cohort (i.e., those originally recruited via a RDD sampling frame and whose contact information was maintained over time in an ITC database), 2) from country-specific panel firms, or 3) from partner panel firms affiliated with the main firm.

In AU, CA, and EN, the survey was offered by web only. However, in the US, a small proportion of respondents (n=46) completed a telephone interview.

At each wave of this multi-country survey, at least two or more survey firms worked together in a coordinated effort to complete fieldwork at each wave (see Section 5.1 for a summary of the firms and their roles at each wave).

Most aspects of the study protocol and survey measures were standardized across the four countries, but there are some differences, particularly between AU vs. the other three countries.

Table 1.1 provides a summary of the countries surveyed at 4CV1, survey fieldwork period by country/wave, survey samples in each country/wave, and retention rates at 4CV1 (i.e., percent retained from Wave 9 CA/US or Wave 10 AU/EN of the ITC Four Country Project).

Figure 1.1 provides a summary of the sample for all four countries, including the counts, source, and if the sampling frame was probability vs. non-probability.
Table 1.1. Countries surveyed at 4CV1, survey fieldwork period by country/wave, survey samples in each country/wave, and retention rates at 4CV1 (i.e., percent retained from Wave 9 CA/US or Wave 10 AU/EN of the ITC Four Country Project).

<table>
<thead>
<tr>
<th>Country</th>
<th>Sample size of ITC-owned cohort (n)</th>
<th>Retention from previous wave (ITC-owned)</th>
<th>Sample size of panel-owned cohort (n)</th>
<th>Retention from previous wave (panel-owned)</th>
<th>Replenishment sample and source</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>276</td>
<td>48.5%</td>
<td>239 (RMR)</td>
<td>38.2%</td>
<td>989 – RMR 581 – dedicated vapers</td>
<td>2,085</td>
</tr>
<tr>
<td>Canada</td>
<td>525</td>
<td>39.2%</td>
<td>137 (Leger)</td>
<td>54.2%</td>
<td>3167</td>
<td>3,829</td>
</tr>
<tr>
<td>England</td>
<td>304</td>
<td>35.7%</td>
<td>N/A</td>
<td>N/A</td>
<td>4070</td>
<td>4,374</td>
</tr>
<tr>
<td>United States</td>
<td>296</td>
<td>25.7%</td>
<td>1161 (GfK)</td>
<td>54.2%</td>
<td>127 – GfK KP 496 – GfK opt in 494– US Ipsos EC users 238* – US Ipsos smokers</td>
<td>2,812</td>
</tr>
<tr>
<td>Total, all countries</td>
<td>13,101</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: n=238 US smokers from the Ipsos panel were added to the sample after being surveyed as a result of a quota programming issue. See Section 4.5 for details.
2. Survey Measures

2.1 Survey Development

2.1.1 The ITC Survey Development Process
The survey development process comprises two main phases:
1) teleconferences, and
2) operationalization.

Phase 1 begins with a series of teleconferences with the research investigators, the project management team, and the survey management team. During the teleconferences, the team systematically reviews the questionnaire from the previous wave, examines dropped questions from earlier waves, and considers suggestions for new lines of questioning. After the teleconference period is over, the draft survey is then sent to the ITC Survey Management Group (SMG) for operationalization of the survey (Phase 2). Phase 1 usually takes about 12 weeks, depending on the extent of the survey content changes.

Phase 2, the operationalization of survey development, involves comprehensively and iteratively reviewing and revising the survey to ensure that routing, question wording, response options, and all other survey elements are refined and cross-referenced for consistency, clarity, and accuracy. At the conclusion of Phase 2, the final draft of the survey is generated by SMG and sent to the firm(s) for programming and testing. Phase 2 usually takes about 12 weeks, depending on the extent of the survey content changes.

During the period when the survey firm is programming and testing the survey, additional revisions are made in consultation between the programming firm and SMG, until a fieldwork version of the survey is achieved. The fieldwork version of the survey is sent to SMG by the programming firm and is retained in the SMG database. The updated last version of the survey in the database will later be used to cross reference with the data set.

2.1.2 4CV1 Survey Development Process and Timeline
For the 4CV1 Survey, Phase 1 lasted from September 23, 2015 until February 1, 2016. During the first month of survey development, the investigator team divided into eight working groups. Each group reviewed and made recommendations for major changes in one of eight survey sections. The working groups connected by both email and teleconference to make their initial recommendations for their respective sections. After the first month, the sections were consolidated into the first draft of the overall survey, and then full-team teleconferences ensued to review and refine the content over two full rounds. After Phase 1, a further revision was necessary to ensure comparability with the ITC 6 Europe Survey. Phase 2 of 4CV1 survey development lasted from February 1 to April 29, 2016 (the date on which the survey was sent for programming).

Table 2.1: Summary of the 4CV1 survey development timeline.

<table>
<thead>
<tr>
<th>Wave</th>
<th>Teleconferences</th>
<th>Survey operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>4CV1</td>
<td>September 23, 2015- Feb 1, 2016</td>
<td>Feb 1, 2016 – Apr 29, 2016</td>
</tr>
</tbody>
</table>
2.2 Survey Content

- 4CV survey content was developed by reviewing the ITC 4C Wave 10 Survey (4C10), and revising content to delete variables that were no longer of interest or useful in analyses, and to add content to measure EC use and transitions between smoking and EC/VNP use. Additional content to measure important tobacco or EC policies in one or more of the four countries was also added.
- Of the survey content in 4CV1, 28% was also in the ITC 4C10 Survey.
- Of the survey content in 4CV1, 25% was also in the ITC Four Country Wave 9 Canada and US Survey (4C9 CAUS).
- Five entirely new sections were added to the 4CV1 Survey: 1) E-cigarette screening section, 2) E-cigarettes warning labels, 3) Cigarette advertising and promotion, 4) E-cigarette advertising and promotion, and 5) Delayed discounting task.
- The Anti-Smoking Campaigns and Light Mild sections from the ITC 4C Wave 10 Survey were omitted from 4CV1.
- The order of sections in 4CV1 was generally similar to that of 4C10, with some exceptions: In 4CV1, the E-cigarette Screening and Consumption Sections were added at the beginning of the survey, whereas the ITC 4C Wave 10 Replenishment Web (4C10-Pw) Survey included an early section on Stop-Smoking Medications or E-cigarettes on the Last Quit Attempt. Perceived Harm and Addiction questions were asked around the middle of the survey for 4CV1 compared to near the end for 4C10-Pw; and in 4CV1 Warning Labels questions were asked near the middle of the survey, compared to being asked around the first third of the survey in 4C10-Pw.
3. Study sample

3.1 Overview of 4CV1 sample and quotas

- In order to achieve the sample necessary to study the natural trajectory of e-cigarette/vaping device (ECs) use, the impact of EC use on tobacco use, and the impact of both tobacco and EC polices on nicotine product use, the sample consisted of:
  - a cohort in each country designed to be representative of smokers and recent quitters in that country (but using stratified sampling within the age ranges of 18-24 years old (y), and 25y+ in each of CA, EN, and US), and
  - a supplementary sample of current at-least-weekly EC users aged 18y+.

- Sample was recruited from two or more sources in each country:
  1) the ‘ITC-owned’ cohort (i.e., those originally recruited via an RDD sampling frame and whose contact information was maintained over time in an ITC database),
  2) country-specific panel firms (including both Replenishment sample and, in some cases, a Recontact sample from the previous 4C wave), or
  3) partner panel firms affiliated with the main firm.

  - Firms varied in their quality of sample; some firms had high-quality probability-based samples, and others had opt-in samples, or a combination of these. For this reason, quotas based on one or more of region, sex, and age using national benchmarks were used to further ensure that appropriate distributions were realized in the final study sample. In CA and EN, ‘dual users’ who met criteria for both the cigarette smoker quota and the EC user quota were allocated to the EC user quota first, and then once the EC user quota was filled, such dual users were allocated to the appropriate smoker quota (based on age range). This issue only occurred in CA and EN because in these countries the entire Replenishment sample (comprising three sample subgroups) came from one firm only.

- Inclusion/exclusion criteria differed between:
  - the Recontact vs. Replenishment samples, and
  - the AU sample compared to the other three countries’ samples (CA, EN, US).

- Table 3.1 summarizes the sample in each country, including Recontact vs. Replenishment sample, and sampling frame.

- Table 3.2 provides the sample by user type, age, country and source.
Table 3.1. Countries surveyed at 4CV1, survey fieldwork period by country/wave, survey samples in each country/wave, and retention rates at 4CV1 (i.e., percent retained from Wave 9 CA/US or Wave 10 AU/EN of the ITC Four Country Project). (Q) = quotas applied. See Section 3 for quotas description.

<table>
<thead>
<tr>
<th>Country</th>
<th>Sample size of ITC-owned cohort (n)</th>
<th>Retention from previous wave (ITC-owned)</th>
<th>Sample size of panel-owned cohort (n)</th>
<th>Retention from previous wave (panel-owned)</th>
<th>Replenishment sample and source</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>276</td>
<td>48.5%</td>
<td>239 (RMR)</td>
<td>38.2%</td>
<td>989 – RMR (Q) 581 – UQ/CCV EC users</td>
<td>2,085</td>
</tr>
<tr>
<td>Canada</td>
<td>525</td>
<td>39.2%</td>
<td>137 (Leger)</td>
<td>54.2%</td>
<td>3167 (3 subsamples, each Q)</td>
<td>3,829</td>
</tr>
<tr>
<td>England</td>
<td>304</td>
<td>35.7%</td>
<td>N/A</td>
<td>N/A</td>
<td>4070 (3 subsamples, each Q)</td>
<td>4,374</td>
</tr>
<tr>
<td>United States</td>
<td>296</td>
<td>25.7%</td>
<td>1161 (GfK)</td>
<td>54.2%</td>
<td>127 – GfK KP 496 – GfK opt in (Q) 494– US Ipsos EC users (Q) 238 – US Ipsos smokers</td>
<td>2,812</td>
</tr>
</tbody>
</table>

Total, all countries 13,101

Table 3.2: 4CV1 Sample by user type, age, country, source, and whether quota used (marked with Q).

<table>
<thead>
<tr>
<th>Type of respondent recruited</th>
<th>Australia (n)</th>
<th>Canada (n)</th>
<th>England (n)</th>
<th>United States (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ITC-owned participants from 4C9/10</td>
<td>276</td>
<td>525</td>
<td>304</td>
<td>296</td>
</tr>
<tr>
<td>2a,b) Panel-owned current smokers/recent quitters, aged 25y+ (includes Recontact participants from previous wave if applicable + fresh sample. See Table 1).</td>
<td>1,185</td>
<td>1,843 (Q)</td>
<td>2,635 (Q)</td>
<td>1,508</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2c) Panel-owned current smokers, aged 18-24y (includes Recontact participants from previous wave if applicable + fresh sample. See Table 1).</td>
<td>43 (Q for smokers/recent quitters aged 18y+)</td>
<td>734 (Q)</td>
<td>884 (Q)</td>
<td>514 (Q)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Panel-owned e-cigarette users (new recruits)</td>
<td>-</td>
<td>727 (Q)</td>
<td>551 (Q)</td>
<td>494 (Q)</td>
</tr>
<tr>
<td>4) New recruit e-cigarette users (opt in sample recruited by Cancer Council Victoria)</td>
<td>581</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Country subtotal 2,085 3,829 4,374 2,812

Total, all countries 13,101
3.2 Inclusion criteria in Canada, England, and United States (Recontact and Replenishment) samples vs. Australia sample (Recontact and Replenishment)

3.2.1 4CV1 sample inclusion/exclusion criteria for 4CV1 CA, EN, US Recontact and Replenishment

Recontact Sample of 4C10/9 CA, EN, US respondents (including both ITC-owned and panel-owned):
- All past 4C respondents from CA, EN, and the US* were eligible to complete 4C1, regardless of current status (see note on the 4C US sample below).

Thus, the past 4C9/10 CA, EN, US user types in 4CV1 CA, EN, US* included:
- Current smoker (currently smoke at least monthly, has smoked at least 100 cigs), +/- EC use
- Recent (<24 months) or long-term (>24 months) former smoker (smoked at least monthly in past, has smoked at least 100 cigs), +/- EC use

*Note on the 4C US past respondents:
The 4C US sample had been expanded at Wave 9 to include recruited smokers, recruited non-cigarette tobacco or e-cigarette users, recruited former tobacco users (quit in the past 12 months), recruited non-users, and recruited youth (regardless of tobacco use status). To be eligible for the current 4CV1 Study, the 4C Wave 9 US respondents had to have been recruited as adult tobacco or e-cigarette users (thus, the non-users and youth were not eligible for the 4CV1 Survey).

During fieldwork 16 respondents from the US 4C9 Survey who were tobacco /e-cigarette-naive were invited to the 4CV1 Survey in error. These cases were removed from the data set, but can be obtained from the ITC Data Management Core upon request.

CA, EN, US Replenishment Sample (panel-owned only):
- Recent former smoker (has smoked in the past 24 months, has smoked at least 100 cigs), +/- EC use
- Current smoker (smokes at least monthly, has smoked at least 100 cigs), +/- EC use
- Current EC user (uses ECs at least weekly), including long-term (quit >24 months ago) former smokers

Thus, panelists who met the following criteria were excluded from the 4CV1 CA, EN, and US samples:
- Respondents who have not smoked cigarettes in past 24 months and who do not currently use ECs at least weekly

3.2.2 4CV1 sample inclusion/exclusion criteria for 4CV1 AU Recontact and Replenishment
Note: Differences between the CA, EN, US criteria vs. AU are indicated in bold.

Recontact Sample of 4C10 AU respondents (including both ITC-owned and panel-owned):
- Past 4C respondents who were current smokers or who had quit in the past 24 months were eligible to complete the survey (note: those who had quit longer then 24 months ago were not surveyed for 4CV1 AU).

Thus, the past 4C10 AU user types in 4CV1 AU included:
- Current smoker (currently smoke at least monthly, has smoked at least 100 cigs), +/- EC use
- Recent (<24 months) former smoker (smoked at least monthly in past, has smoked at least 100 cigs), +/- EC use
AU Replenishment Sample:
From a probability-based sampling frame (Roy Morgan Research Single Source Panel)
  • Recent former smoker (has smoked in the past 24 months, has smoked at least 100 cigs), +/- EC use
  • Current smoker (smokes at least monthly, has smoked at least 100 cigs), +/- EC use

From an opt in sampling frame (i.e., University of Queensland/Cancer Council Victoria-recruited ‘AU dedicated vapers’ sample)
  • Current EC user (uses ECs at least weekly), +/- cigarette use
Table 3.3. Definition of users types from Table 3.2.

<table>
<thead>
<tr>
<th>Type of respondent recruited to 4CV1</th>
<th>Definition and inclusion/exclusion criteria</th>
<th>Australia</th>
<th>Canada, England, US</th>
</tr>
</thead>
</table>
| **1) ITC-owned participants from 4C9/10** | Past ITC-owned 4C10 AU participants who were:  
• Current smokers (smoked at least occasionally, had smoked at least 100 cigs), regardless of EC use  
• Recent former smokers (smoked in the past 24 months, had smoked at least 100 cigs), regardless of EC use  
• At-least-weekly EC users who had quit smoking for longer than 24 months | | • All past ITC-owned 4C respondents were eligible, regardless of current status.  
Thus, the 4CV1 user types included:  
• Current smoker (currently smoke at least occasionally, has smoked at least 100 cigs), regardless of EC use  
• Recent (<24 months) or long-term (>2y) former smoker (smoked at least monthly in past, has smoked at least 100 cigs), regardless of EC use |
| **2a,b) Panel-owned current smokers/recent quitters, aged 25y+** | Adults aged 25y+ who were:  
• Current smokers (smoked at least occasionally, had smoked at least 100 cigs), regardless of EC use  
• Recent former smokers (smoked in the past 24 months, had smoked at least 100 cigs), regardless of EC use | | Adults aged 25y+ who were:  
• Current smokers (smoked at least occasionally, had smoked at least 100 cigs), regardless of EC use  
• Recent former smokers (smoked in the past 24 months, had smoked at least 100 cigs), regardless of EC use  
• Cohort panelists surveyed at 4C9 (CA/US). All were eligible, regardless of current smoking/EC-use status. (Note: Non-users recruited at 4C9 US were not invited). |
| **2c) Panel-owned current smokers, aged 18-24y** | Same as above, but aged 18-24y. | | Same as above, but aged 18-24y. |
| **3) Panel-owned e-cigarette users (new recruits)** | Current EC user (uses ECs at least weekly), regardless of current smoking status/quitter status  
• This group was not targeted for recruitment in AU, but would be surveyed if identified when screening for smoker/quitters | | Current EC user (uses ECs at least weekly), regardless of current smoking status/quitter status |
| **4) New recruit e-cigarette users (opt in sample recruited by Cancer Council Victoria)** | Current EC user (uses ECs at least weekly), regardless of current smoking status/quitter status  
• Recruited via EC user registry, and online and print advertisements | | N/A |
3.3 Description of country panel firms’ recruitment procedures

**GfK Knowledge panel**

**Authorized Language for Client Communications Involving Descriptions of KnowledgePanel® Methodology**

**Sample: United States smokers and quitters**

The survey was conducted using the web-enabled KnowledgePanel®, a probability-based panel designed to be representative of the U.S. population. GfK provided the following description for their panel at the time of the 4CV1 Survey: Initially, participants are chosen scientifically by a random selection of telephone numbers and residential addresses. Persons in selected households are then invited by telephone or by mail to participate in the web-enabled KnowledgePanel®. For those who agree to participate, but do not already have internet access, GfK provides at no cost a laptop and ISP connection. People who already have computers and Internet service are permitted to participate using their own equipment. Panelists then receive unique log-in information for accessing surveys online, and then are sent emails throughout each month inviting them to participate in research. Details available at: [http://www.gfk.com/products-a-z/us/knowledgepanel-united-states/](http://www.gfk.com/products-a-z/us/knowledgepanel-united-states/)

**Lucid**

**Sample: United States smokers and recent quitters, aged 18-24y**

GfK provided the following description for their opt-in panel partner, Lucid, at the time of the 4CV1 Survey: Lucid sources recruit traffic through partners that own ad space on websites and have access to respondents that are looking to join Double Opt In panels.

**Ipsos MORI**

**Sample: England smokers, quitters, and EC users; United States smokers and EC users**

Ipsos MORI provided the following description for their relevant panels at the time of the 4CV1 Survey: Ipsos MORI’s online panels are subject to a rigorous recruitment procedures aimed at ensuring accuracy, consistency and non-duplication. To join, panel applicants are validated by a means of sophisticated vetting procedures, using a variety of opt-in recruitment channels. Shortly after joining, panel members’ survey-taking behaviour is tested, with those most likely to make intentional or unintentional errors on future surveys deactivated. Subsequently, panelists’ behaviour is monitored and tracked across all surveys. Ipsos employs purging procedures based on these data to remove suspects from eligible sampling pools. In view of the scope and scale of the 4CV research, approved panel partners, that met Ipsos quality control procedures, were also used in EN (but not in the US) to support with the project. Fieldwork was conducted between July 7, 2016 and Nov 22, 2016.

**Leger**

**Sample: Canadian smokers, quitters, and EC users**

Respondents were selected at random from the Leger web panel to participate in the study. Leger provided the following description for their panel at the time of the 4CV1 Survey: Leger’s online panel has approximately 475,000 members nationally – with between 10,000 and 20,000 new members added each month, and has a retention rate of 90%. The Leger panel is high-quality because most panel members are recruited among a pool of respondents participating in random-digit-dialing surveys, which have a wide reach employing probability sampling. In other words, the “population” of the Leger panel was from samples that can be considered nationally representative of Canada. Additionally, all respondents who completed the previous wave of the study were recruited and qualified.
Roy Morgan Research (RMR)
Sample: Australian smokers, quitters, and EC users.
RMR’s tasks in this project were carried out in compliance with ISO 20252 Market, Opinion & Social Research. RMR’s face-to-face proprietary survey Single Source is representative of the Australian population aged 14+y in terms of gender, age and geographical location. Sample selection was conducted for Single Source via face-to-face, door-to-door interviewing using a randomized cluster sampling approach for household selection and a rule of priority approach for respondent selection within the household. Rigorous sampling procedures were applied each month to ensure that respondents reflect the key demographic characteristics of the Australian population. Interviewing for Single Source is conducted weekly, so our sample was replenished continuously.

This survey method also serves as a form of validation for the respondent – we know that someone who claims to be “male, aged 29 years, living in Tamworth, NSW” is indeed that, because we have met with him and interviewed him in his own home. For 4CV1, RMR drew Single Source respondents who were over 18y, interviewed after October 2014 (when fieldwork was conducted for ITC 4C10), had provided a telephone number for re-contact and indicated during their Single Source interview that they smoked factory-made cigarettes (FMC) or e-cigarettes at that time. Those who recently quit smoking would be identified during the computer-assisted telephone interview (CATI) screening survey. By re-contacting Single Source respondents who broadly qualified for 4CV, we were able to ensure that the sample would be representative of the Australian smoking population. The sample was then screened via CATI to ensure it met the University of Waterloo’s specifications and were automatically sent an email invitation from the telephone interviewing system, once they qualified for the research and had provided an email address.

Survey Sampling International (SSI) was RMR’s partner to obtain the 4CV1 sample in AU. SSI panelists were recruited via partnerships with other corporations or invited by banners, invitations and messages. To minimise the impact of different partnerships on survey results, SSI uses a combination of personality and psychographic characteristics to understand and identify the underlying traits which make a difference in the way people answer survey questions. By asking participants a short set of key questions, SSI can control the characteristics of people within the sample and allows SSI to provide an exceptionally consistent sample blend. SSI uses also uses digital fingerprinting, to ensure that the same person does not take a survey more than once from the same device.

The CATI recruitment survey for Single Source sample was converted to an online format for SSI panelists and collected additional personal information (email address, physical address, and best contact number). The questions were phrased in exactly the same manner, although the response options were slightly modified to better suit an online environment.

When an SSI panelist completed the online recruitment survey, their details were transferred into the Roy Morgan re-direct survey. Once an hour the re-direct survey automatically sent out an invitation to the 4CV1 survey using the email format provided by the Cancer Council Victoria (CCV).
4 Description of 4CV1 CA, EN, US, and AU Replenishment sample regional quotas

4.1 4CV1 Australia Replenishment sample quotas

- The research team assigned quotas to one of the AU subsamples to ensure appropriate sex, age, and regional distributions were realized in the final study sample.
- A summary of the AU Replenishment sample subgroups and whether quotas were used or not is provided below (Table 4.1).

<table>
<thead>
<tr>
<th>4CV1 Australia replenishment sample subgroups</th>
<th>Quotas used (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a,b) Smokers/recent quitters aged 18y and older recruited from a probability-based panel</td>
<td>Yes</td>
</tr>
<tr>
<td>4) E-cigarette users (at-least-weekly) recruited from an opt-in sampling frame</td>
<td>No</td>
</tr>
</tbody>
</table>

- The AU Replenishment smoker/recent quitter sample aged 18 years and older, recruited from a probability-based panel (RMR), was allocated proportionally to stratum size based on AU census data.
- The DMC established targets for female and male cigarette smokers/recent quitters aged 18y+ in each of the following regions (refer to Appendix 2.1: Allocation (per stratum) of 4CV1 Australian panel sample):
  1) New South Wales and Australian Capital Territory,
  2) Victoria,
  3) Queensland,
  4) South Australia,
  5) Western Australia,
  6) Tasmania,
  7) Northern Territory.
- No quotas were established for the ‘AU dedicated vapers’ sample from UQ/CCV, which was recruited from a non-probability sampling frame.

4.2 4CV1 Canada Replenishment sample quotas

- The research team assigned quotas for the CA subsamples to ensure appropriate sex, age, and regional distributions were realized in the final study sample.
- A summary of the CA Replenishment sample subgroups and whether quotas were used or not is provided below (Table 4.2).
Table 4.2. Summary of 4CV1 CA replenishment sample subgroups and whether quotas were used or not. Note: Row number (i.e., 2a, 2b, etc.) corresponds to Row Number in “Type of Respondent” Column in Table 4b.

<table>
<thead>
<tr>
<th>4CV1 Canada Replenishment sample subgroups</th>
<th>Quotas used (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a) Smokers/recent quitters aged 25y+ and older recruited from a probability-based panel</td>
<td>Yes</td>
</tr>
<tr>
<td>2b) Smokers/recent quitters aged 18-24y recruited from a probability-based panel</td>
<td>Yes</td>
</tr>
<tr>
<td>3) EC users (at-least-weekly) aged 18y+ recruited from a probability-based panel</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- The CA replenishment sample recruited from a probability-based panel (via Leger) was allocated proportionally to stratum sizes based on CA census data.
- The DMC established targets for English-speaking and French-speaking respondents for the three sample subgroups of EC users aged 18y+, cigarette smokers/recent quitters aged 18-24y, and cigarette smokers/recent quitters aged 25y+, in each of the following regions (refer to Appendix 2.2: Allocation (per stratum) of 4CV1 Canadian web panel sample):
  1) British Columbia – Vancouver,
  2) British Columbia – all areas other than Vancouver,
  3) Alberta,
  4) Saskatchewan,
  5) Manitoba,
  6) Ontario – Toronto,
  7) Ontario - Greater Toronto Area (GTA), excluding metropolitan Toronto,
  8) Ontario – all areas other than Toronto and the GTA,
  9) Quebec – Montreal, 10) Quebec – all areas other than Montreal,
  11) New Brunswick,
  12) Nova Scotia,
  13) Prince Edward Island,
  14) Newfoundland and Labrador

- **Important:** Because all Replenishment sample subgroups, i.e., 1) EC users aged 18y+, 2) cigarette smokers/recent quitters aged 18-24y, and 3) cigarette smokers/recent quitters aged 25y+, were recruited from the same source (Leger’s web panel), dual user smokers/EC users were first counted to the appropriate EC user quota, and once the EC quota was filled, then dual users were counted towards the appropriate cigarette smoker/recent quitter quota.
- If the quota value was very small (i.e., for EC users in Eastern Canadian provinces, they were presented as one value for the aggregated regions).
- The panel firm and UW monitored survey response in the cohort sample and adjusted the replenishment sample quotas during fieldwork to achieve the final representative sample.

### 4.3 4CV1 England Replenishment sample quotas
- The research team assigned quotas for the EN subsamples to ensure appropriate sex, age, and regional distributions were realized in the final study sample.
- A summary of the EN Replenishment sample subgroups and whether quotas were used or not is provided below (Table 4.3).
Table 4.3. Summary of 4CV1 EN replenishment sample subgroups and whether quotas were used or not. Note: Row number (i.e., 2a, 2b, etc.) corresponds to Row Number in "Type of Respondent" Column in Table 4b.

<table>
<thead>
<tr>
<th>4CV1 England Replenishment sample subgroups</th>
<th>Quotas used (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a) Smokers/recent quitters aged 25y+ recruited from an opt-in panel</td>
<td>Yes</td>
</tr>
<tr>
<td>2b) Smokers/recent quitters aged 18-24y recruited from an opt-in panel</td>
<td>Yes</td>
</tr>
<tr>
<td>3) E-cigarette users (at-least-weekly) aged 18y+ recruited from an opt-in panel</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- The EN Replenishment sample recruited from a non-probability based panel (Ipsos) was allocated proportionally to stratum sizes based on EN census data.
- The DMC established targets for female and male respondents for the three sample subgroups of EC users aged 18y+, cigarette smokers/recent quitters aged 18-24y, and cigarette smokers/recent quitters aged 25y+, in each of the following regions (Refer to Appendix 2.3: Allocation (per stratum) of 4CV1 England web panel sample):
  1) North East,
  2) Yorkshire and Humber,
  3) East Midlands,
  4) East of England,
  5) London,
  6) South East
  7) South West
  8) West Midlands,
  9) North West.
- **Important:** Because all Replenishment sample subgroups, i.e., 1) EC users aged 18y+, 2) cigarette smokers/recent quitters aged 18-24y, and 3) cigarette smokers/recent quitters aged 25y+, were recruited from the same source (Ipsos’s web panel), dual user smokers/EC users were first counted to the appropriate EC user quota, and once the EC quota was filled, then dual users were counted towards the appropriate cigarette smoker/recent quitter quota.
- The panel firm and UW monitored survey response in the cohort sample and adjusted the Replenishment sample quotas during fieldwork to achieve the final representative sample.

4.4 4CV1 United States Replenishment sample quotas
- The research team assigned quotas for some of the US subsamples to ensure appropriate sex, age, and regional distributions were realized in the final study sample.
- A summary of the US Replenishment sample subgroups and whether quotas were used or not is provided below (Table 4.4).
Table. 4.4. Summary of 4CV1 US Replenishment sample subgroups and whether quotas were used or not. Note: Row number (i.e., 2a, 2b, etc.) corresponds to Row Number in “Type of Respondent” Column in Table 4b.

<table>
<thead>
<tr>
<th>4CV1 US Replenishment sample subgroups</th>
<th>Quotas used (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a,b) Smokers/recent quitters aged 18y+ recruited from a probability-based panel</td>
<td>No</td>
</tr>
<tr>
<td>2a,b) Smokers/recent quitters aged 18y+ recruited from an opt-in panel</td>
<td>No (this subsample of n=238 was surveyed in error, but retained)</td>
</tr>
<tr>
<td>2b) Smokers/recent quitters aged 18-24y recruited from an opt-in panel</td>
<td>Yes</td>
</tr>
<tr>
<td>3) EC users (at-least-weekly) aged 18y+ recruited from an opt-in panel</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- The US EC user Replenishment sample recruited from a non-probability panel (Ipsos) was allocated proportionally to stratum sizes based on US census data.
- The DMC established targets for e-cigarette users aged 18y+ old in each of the following regions (Refer to Appendix 2.4 Allocation (per stratum) of 4CV1 US web panel sample):
  1) Northeast,
  2) Midwest,
  3) South, and
  4) West.
- The US young adult (aged 18-24y) smoker/recent quitter Replenishment sample recruited from a non-probability panel (Lucid via GfK) was allocated proportionally to stratum sizes based on US census data.
- The DMC established targets for smokers/recent quitters aged 18-24y old in each of the following regions (Refer to Appendix 2.5 Allocation (per stratum) of 4CV1 US web panel sample):
  1) Northeast,
  2) Midwest,
  3) South, and
  4) West.
- No quotas were established for the US smoker/recent quitter replenishment sample aged 25y+, given that these respondents were recruited from a high-quality probability based sample.

4.5 Fieldwork issues related to quotas
At 4CV1 there were over 130 lines of complicated quotas with very specific conditions. Three issues from 4CV1 fieldwork and their resolutions are described below.

1) The overlap between the sample subgroups (i.e., dual users were supposed to be counted towards the EC user quota first, and then start filling the respective smoker quota) was not readily accommodated by the survey software (Acuity4). An issue in which the quotas were briefly not functioning as intended was uncovered and resolved right away. As a result, some respondents were accepted into the survey instead of being terminated on the basis of full regional quotas. Ultimately, these respondents were used in the sample (i.e., n=238 US smokers were added to the sample) and helped offset the lower response in the US ITC-owned cohort sample.
2) Initially, the team did not include specific quotas for French-speaking respondents in CA. Due to the delay between launching the English and French surveys, French quotas were subsequently added because the open quotas were rapidly filling with English-speaking participants. This resulted in 15% French-speaking representation, where, ideally it would have been about 21%.

3) Because the Wave 1 panel target samples were so large (see Tables 4, 2a-c), the England panel firm ultimately needed to draw upon its partner panel firms to recruit new panelists for the harder-to-reach young adults (aged 18-24y) in this study, and also offered a higher incentive for this group. The Canadian panel firm used the same strategy of increasing the incentive for the young adult group, and also used a labor intensive customized recruitment process to achieve the targets for this sub-sample.
5. Study procedures and survey firms

- All study procedures for all samples were cleared by a research ethics research committee at the University of Waterloo (Ontario, Canada) as well as a committee at the country-specific institution, if applicable.
  - The Medical University of South Carolina (South Carolina, United States) waived ethics review for this study deemed minimal risk;
  - a research ethics committee at King’s College London (London, England) provided ethics clearance for the England sample; and
  - a research ethics committee at the Cancer Centre Victoria (Melbourne, Australia) provided ethics clearance for the Australian sample.

- Study procedures were conducted in a coordinated effort by four country-specific survey firms, plus the host survey firm (the Survey Research Centre, SRC, at the University of Waterloo in Ontario, Canada), and other institutions/firms that provided logistical and/or administrative support (i.e., Logistic Solutions in England, and the University of Waterloo Administrative Team in Canada).

- Study procedures differed between the:
  1) AU sample compared to the other three countries’ samples (CA, EN, US),
  2) ITC-owned vs. panel-owned samples, and
  3) Recontact vs. Replenishment samples.

- Note on the relationship between the ITC-owned vs. panel-owned and Recontact vs. Replenishment samples:
  - All ITC-owned respondents were Recontact sample,
  - Panel-owned respondents were either Recontact sample, or newly-recruited Replenishment sample, and
  - All Replenishment sample at 4CV1 were panel-owned respondents.

5.1 Overview of survey firms and responsibilities

- Six survey firms and the University of Waterloo Administrative Team were involved in 4CV1 Fieldwork. The firms/team and their main responsibilities were:

  1. The SRC at the University of Waterloo:
     a) programmed and hosted the web survey,
     b) provided all other relevant firms with PINs and URL templates to link web panelists to their survey records,
     c) securely transferred data files to other firms as necessary (for mailing incentives, etc),
     d) managed email and telephone communications with the “ITC-owned” past 4C respondents for CA, EN, and the US.

  2. Leger Marketing Solutions (Canada):
     a) recruited Leger Canadian smoker/recent quitter/e-cigarette user web panelists (English-speaking and French speaking) to complete the survey, including all past 4C9 Canadian respondents as well as ‘fresh’ Replenishment sample,
b) monitored activity and sent email reminders to any Leger panelists who had been invited but had not yet submitted a completed survey per the usual schedule determine by Leger,
c) provided incentives to Leger panelists who submitted a completed survey,
d) provided to ITC disposition outcomes for all Leger panelists who were invited to participate,
e) provided to ITC demographic information (plus whether each respondent participated in 4C9) about all invited Leger panelists, and
f) maintained data files that link each panelist to his/her unique survey PIN and also that will allow ITC to re-survey the Wave 1 survey completes at Waves 2 and 3.

3. GfK (formerly Knowledge Networks, United States):
   a) recruited GfK Knowledge Panel (KP) and opt-in panelist (Lucid) American smoker/recent quitter/EC user web panelists (English-speaking) to complete the survey, including identified past target 4C9 US respondents as well as ‘fresh’ replenishment sample,
   b) monitored activity and sent email reminders to any GfK/opt-in panelists who had been invited but had not yet submitted a completed survey per the usual schedule determine by GfK,
   c) provided incentives to GfK/opt-in panelists who submitted a completed survey, and
   d) provided to ITC disposition outcomes for all GfK/opt-in panelists who were invited to participate, and
   e) provided to ITC demographic information (plus whether each respondent participated in 4C9) about all invited GfK/opt-in panelists, and
   f) maintained data files that link each GfK KP panelist to his/her unique survey PIN and also that will allow ITC to re-survey the Wave 1 survey completers at Waves 2 and 3.

4. Ipsos Mori (England):
   a) recruited Ipsos British smoker/recent quitter web panelists (English-speaking) to complete the survey,
   b) recruited Ipsos British EC-only user web panelists (English-speaking) to complete the survey,
   c) recruited Ipsos American EC-only user web panelists (English-speaking) to complete the survey,
   d) monitored activity and sent email reminders to any Ipsos panelists who had been asked to complete the survey but who had not yet submitted a completed survey per the usual schedule determine by Ipsos,
   e) provided incentives to Ipsos panelists who submitted a completed survey, and
   f) provided to ITC disposition outcomes for all Ipsos panelists who were invited to participate, and
   g) provided to ITC demographic information about all invited Ipsos panelists, and
   h) maintained data files that link each panelist to his/her unique survey PIN and also that will allow ITC to re-survey the Wave 1 survey completers at Waves 2 and 3.

5. Logistic Solutions (England):
   a) Mailed invitation letters to the British ITC-owned past 4C10 respondents who did not provide an email address to ITC (n=395),
b) emailed incentives (£16 Amazon e-gift card) to ‘ITC-owned’ 4CV1 participants who completed the web survey (using data files transferred by SRC).

6. The UW Administrative Team:
   a. Coordinated and mailed invitation letters to the CA (n=473) and US (n=538) ITC-owned past 4C respondents who had not previously provided an email address to ITC, and
   b. coordinated and emailed/mailed the Canada ($25 cheque or $25 Amazon e-gift card) and US survey incentives ($25 cheques) to ‘ITC-owned’ 4CV1 respondents.

• Note: The Canadian Survey was also conducted in French. All procedures for the French Canadian sample were the same as those for the English Canadian sample, but the French Survey launched 2 months after the English survey.

5.2 ITC-owned Cohort re-contact procedures – Canada, England, US

• ITC-owned respondents from CA, EN, and the US who were invited to the 4CV1 Survey were managed by the UW SRC; these respondents met the following definition:
  o They were part of the 4CV1 Recontact sample (i.e., respondents who had participated in the last wave of the ITC 4C Survey, and were presently being invited to participate in 4CV1).
  o They had originally been recruited by ITC from an RDD sampling frame, and had provided their contact information and agreed to receive requests for participation in future surveys from ITC.

5.2.1 Invitations and reminders for CA, EN, US ITC-owned cohort members (email vs. letter)

• ITC-owned cohort members were recruited differently depending on if they had previously provided ITC with their email address (vs. all past correspondence having been done by phone and postal address):
  o ITC-owned CA, EN, US cohort members who had previously provided an email address: were invited to participate in the 4CV1 Survey by email invitation, plus a series of email reminders (see Section 5.2.1.1) until submitting a completed survey.
  o ITC-owned CA, EN, US cohort members who had NOT provided an email address to ITC: were mailed an invitation letter, and were prioritized to receive a telephone reminder call, in order to maximize the uptake of the web survey by past phone respondents (see Section 5.2.3 for details of telephone reminder calls).

5.2.1.1 Email invitations for ITC-owned CA, EN, US cohort members who had previously provided their email address to ITC

• On Day 1 of fieldwork all ITC-owned cohort members (i.e., who completed the previous 4C wave) who had previously provided an email address to ITC were emailed an invitation to participate in the survey.
  o The email invitation described the study and invited the person to participate by clicking on the direct link to the survey.
  o The survey firm contact phone number and email address were provided in the survey and in the emails/invitation letter. Respondents could phone/send a message to opt out. They could also call/email the institutional ethics contact to opt out.
• If the email invitation ‘bounced back’, then the respondent’s record was updated so that he/she would: 1) receive a telephone reminder call for ‘bounced email addresses’, and 2) be required to provide his/her updated email address in order to be eligible for the 4CV1 Survey.

• All ITC-owned CA, EN, US cohort members who had not completed the survey after receiving the initial email invitation were sent reminder emails on Days 3, 8, 10, and 15. Note: Day 1 is the day the initial email invitation is sent).

• A final set of reminder emails was sent at 6 weeks, 3 weeks, and 4 days before the survey was closed, to all outstanding invitees who had not submitted a completed survey AND not responded stating that they did not wish to participate.

• At appropriate time points during fieldwork, the survey firm(s) identified the number of partially completed surveys, and sent email reminders to partial respondents.

• ITC-owned CA, EN, US cohort respondents who were emailed the study invitation were prioritized to receive Telephone Reminder Calls, depending on their mode of participation at the previous 4C Wave and by their country (see Section 5.2.3).

• If the email invitation ‘bounced back’, then the respondent’s record was updated so that he/she would: 1) receive a telephone reminder call for ‘bounced email addresses’, and 2) be required to provide his/her updated email address in order to be eligible for the 4CV1 Survey.

5.2.1.2 Letters for ITC-owned CA, EN, US cohort members who had NOT provided their email address to ITC

• On Day 1 of fieldwork all ITC-owned cohort members (i.e., who completed the previous 4C wave) who had NOT previously provided an email address to ITC were mailed an invitation letter that:
  o described the study,
  o invited the respondent to participate via the URL address and a unique PIN,
  o stated that respondents must provide an email address and be willing to receive study correspondence by email to be eligible for the survey, and
  o included information on how to opt out of the study and future contact.

• ITC-owned cohort members who had NOT provided an email were prioritized to receive a telephone reminder call inviting them to participate in the web survey and provide an email address to which the survey link could be sent (see Section 5.2.3).

5.2.2 Procedures to ensure all respondents provide an email address

• All 4CV1 participants were required to provide their email address and to be contacted in the future by email, in order to be eligible for the survey.

• All recruitment letters, emails, and phone calls described this requirement.

• All respondents who accessed the survey via the URL address and PIN (i.e., from the method other than the direct email link to the survey) were required to provide their email address in the screening portion of the survey in order to meet eligibility criteria.

5.2.3 Telephone reminder calls – ITC-owned CA, EN, US cohort

• At the beginning of fieldwork, the ITC-owned cohort members were categorized into six priority groups for receiving a telephone reminder call. (i.e., Group 1 was prioritized as the most important cohort members to be phoned, then Group 2, etc.).
- The objectives of the telephone reminder calls were to: 1) increase the survey response overall, and 2) promote conversion from the telephone-administered to the web-administered survey.

- Categorization into a priority group was determined based on two factors: 1) having provided an email address to ITC, and 2) having completed the survey by web (vs. phone) at the last wave (Table 5.1).

- The original protocol was to phone only Groups 1-5 in each country; however, because the actual rate of survey accrual was slower than projected in CA and the US, Group 6 in each of CA and the US (but not EN) were also telephoned for reminder calls.

<table>
<thead>
<tr>
<th>Priority group</th>
<th>Provided email to ITC</th>
<th>Survey mode at last wave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (top priority)</td>
<td>No</td>
<td>Phone</td>
</tr>
<tr>
<td>Group 2</td>
<td>No</td>
<td>Web</td>
</tr>
<tr>
<td>Group 3</td>
<td>Yes, but invalid</td>
<td>Phone</td>
</tr>
<tr>
<td>Group 4</td>
<td>Yes, but invalid</td>
<td>Web</td>
</tr>
<tr>
<td>Group 5</td>
<td>Yes, valid</td>
<td>Phone</td>
</tr>
<tr>
<td>Group 6 (last priority)</td>
<td>Yes, valid</td>
<td>Web</td>
</tr>
</tbody>
</table>

5.2.3.1 Protocol for telephone reminder calls for the ITC-owned cohort in Canada, England, and the US

- Telephone reminder calls were conducted by the UW SRC.
- Slightly different phone scripts were used depending on the situation, but in general, the script stated that the intended person had been invited to participate in the 4CV1 survey and we were calling to request participation. If possible, the interviewer would also obtain updated email address and/or contact information during the call.
- At any time, the respondent could suggest an alternate recruitment call time, or withdraw from the survey.
- To avoid call-scheduling bias, calls were made at various times of the day and on different days of the week, including the weekend.
- Overall, 7 call attempts were made; on the 7th call attempt, the interviewer left an appropriate voicemail message per the 4CV1 Reminder Call Scripts.

5.2.4 US phone interviews

- In the field, the survey response in the US ITC-owned cohort was slower than the research team projected (possibly this was partially attributable to a fatigue effect of US citizens being polled for the upcoming US election, or perhaps this was due to the changing surveying environment in the US).
- Thus, the research team added a telephone interview component for US cohort members who reported that they would be willing to complete the survey by phone, but could not complete the survey by web for some reason. This resulted in 46 telephone-administered survey completes from the US (15% of the n=300 ITC-owned cohort sub-sample).
The UW SRC conducted the interviewing using the web survey with a leading modified script to introduce the phone interview. The phone survey protocol was similar to that used for the reminder calls.

5.3 ITC-owned cohort re-contact procedures – Australia

- ITC-owned respondents from AU who were invited to the 4CV1 Survey were managed by RMR; these respondents met the following definition:
  - They were part of the 4CV1 Recontact sample (i.e., respondents who had participated in the last wave of the 4C Survey, and were presently being invited to participate in 4CV1).
  - They had originally been recruited by ITC from an RDD sampling frame, and had provided their contact information and agreed to receive requests for participation in future surveys from ITC.

5.3.1 Invitations and reminders for AU ITC-owned cohort members (email vs. letter)

- The UW SRC hosted the 4CV1 AU Survey, but RMR (in Melbourne, Australia) handled all communications with the ITC-owned AU cohort and the RMR-owned AU cohort. This section describes procedures for the ITC-owned AU cohort (Section 5.4 provides procedures for the RMR (panel)-owned AU cohort.
- ITC-owned AU cohort members were recruited differently depending on if they had previously provided ITC with their email address (vs. all past correspondence having been done by phone and postal address):
  - ITC-owned AU cohort members who had provided an email address: were invited to participate in the 4CV1 Survey by email invitation, plus a series of letter, email, and phone reminders (per Section 5.3.1.1) until submitting a completed survey.
  - ITC-owned AU cohort members who had NOT provided an email address to ITC: were mailed an invitation letter, and if they did not respond, were then telephoned and asked to participate.

5.3.1.1 Email invitations and follow up for ITC-owned AU cohort members who had previously provided their email address to ITC

- On Day 1 of fieldwork all ITC-owned AU cohort members (i.e., who completed the 4C Wave 10 Survey) and had previously provided an email address to ITC, were emailed an invitation to participate in the survey.
  - The email invitation described the study and invited the person to participate by clicking on the direct link to the survey.
  - The survey firm contact phone number and email address were provided in the survey and in the emails/invitation letter. Respondents could phone/send a message to opt out. They could also call/email the institutional ethics contact to opt out.
- If the email invitation ‘bounced back’, then the respondent’s record was updated so that he/she would: 1) be mailed an invitation letter and receive the standard follow up to the mailed invitation, and 2) be required to provide his/her updated email address in order to be eligible for the 4CV1 Survey.
• All ITC-owned AU cohort members who had not completed the survey after receiving the initial email invitation were sent a reminder letter on Day 6, a reminder email on Day 8, and then were telephoned on Day 9 or 10 for a reminder phone call.

• A final set of reminder emails was sent at 1 week before the survey was closed, to all outstanding invitees who had not submitted a completed survey AND not responded stating that they did not wish to participate.

• The survey firm reminded respondents with partially completed surveys, concurrently with those who had not submitted a completed survey AND not responded stating that they did not wish to participate.

• If the email invitation ‘bounced back’, then the respondent’s record was updated so that he/she would: 1) receive a telephone reminder call for ‘bounced email addresses’, and 2) be required to provide his/her updated email address in order to be eligible for the 4CV1 Survey.

5.3.1.2 Letter invitations and follow up for ITC-owned AU cohort members who had NOT provided their email address to ITC

• On Day 1 of fieldwork all ITC-owned cohort members (i.e., who completed the previous 4C wave) who had NOT previously provided an email address to ITC were mailed an invitation letter that:
  o described the study,
  o invited the respondent to participate via the URL address and a unique PIN,
  o stated that respondents must provide an email address and be willing to receive study correspondence by email to be eligible for the survey, and
  o included information on how to opt out of the study and future contact.

• ITC-owned AU cohort members who had responded to the mailed invitation letter were subsequently telephoned for a reminder phone call.

5.3.2 Procedures to ensure all ITC-owned AU cohort respondents provided an email address

• Procedures are the same as those described in Section 5.2.2.

5.3.3 Protocol for telephone reminder calls for the ITC-owned AU cohort

• Telephone reminder calls were conducted by RMR.

• At any time, the respondent could suggest an alternate recruitment call time, or withdraw from the survey.

• To avoid call-scheduling bias, calls were made at various times of the day and on different days of the week, including the weekend.

• Overall, 3 call attempts were made; on the 3rd call attempt, the interviewer left an appropriate voicemail message, and then no further attempts were made to contact the intended participant.

5.3.4 Thank you emails/letters for the ITC-owned AU cohort

• RMR sent a thank you email to all ITC-owned AU cohort members who completed the 4CV1 Survey. If the email bounced back, then RMR mailed a thank-you letter to the respondent, which included a request for an updated email address.
5.4 Panel-owned recontact procedures

5.4.1 Procedures for panel-owned cohort members from CA, EN, US (Leger, Ipsos, GfK)

- All communications with the panel-owned cohort members were conducted by the respective country panel firms.
- The panel firms identified panelists who participated in the last wave of the 4C Survey and emailed them invitations for the 4CV1 Survey. The emailed invitations had an embedded direct link to the participant’s unique web survey record. All cohort panelists from CA, EN, and US were eligible for the 4CV1 Survey, regardless of current cigarette and EC use status.
- After completing and submitting his/her web survey, the panel-owned cohort respondent was redirected to the panel firm’s (Leger, Ipsos, GfK) website via a URL.
- The survey incentive was credited to the respondent’s web panel account after completing the 4CV1 Web Survey.
- Respondents who were not eligible for the web survey were also be re-directed back to the panel firm’s (Leger, Ipsos, GfK) website by a URL.
- The panel firms’ (Leger, Ipsos, GfK) sent email reminders to those invited panelists who had not yet completed the survey, per their normal protocols.

5.4.2 Procedures for panel-owned cohort members from AU

- Procedures for the panel-owned AU cohort were the same as those for the ITC-owned AU cohort described in Section 5.3.

5.5 Panel-owned replenishment procedures

5.5.1 Procedures for panel-owned replenishment samples from CA, EN, US (Leger, Ipsos, GfK)

- The SRC hosted the 4CV1 Web Survey for all samples, but communications with panelists were handled by the country panel firms.
- In some cases (i.e. for the Ipsos EN sample and the GfK US smoker sample), the firms subcontracted to their panel partners.
- The panel firms (Leger, Ipsos, and GfK) emailed the 4CV1 Survey invitation to their panelists who meet preliminary eligibility criteria* (see below) and provided them with a link to the 4CV1 Web Survey.
- Respondents who completed the web survey were sent back to their respective panel firm’s website and were credited their study payment.
- A respondent who left a partially completed survey was able to return to the survey at a later time, up until the end of the fieldwork period.
- Panel firms (Leger, Ipsos, GfK) sent reminder emails to selected panelists who had not submitted a completed web survey (incompletes), until quotas were achieved (fieldwork ended) per their regular procedures.

* Preliminary eligibility criteria were based on the panel firms’ (Leger, GfK, Ipsos) existing knowledge of the panelists, and used to screen in potential eligible panelists. Criteria were:

  - Past respondents from the panel (Leger, GfK) who participated in the ITC Four Country Wave 9 Survey (4C9) should be invited to participate in the 4CV1 Survey (regardless of current smoking status, with the exception that recruited non-users from the 4C9 US Survey were not invited to 4CV1).
  - For the Replenishment smoker/quitters sample, the panel firms (Leger, Ipsos, GfK) identified any panelist who had reported being a smoker at any panel update in the past 24 months.
For the Replenishment EC sample, the panel firms (Leger, Ipsos) identified any panelist who had reported using EC at their last panel update.

5.5.2 Procedures for the panel-owned AU replenishment smoker/recent quitter sample (RMR)

- RMR sampled any panelists who had reported that they were smokers at any point during the past 2 years.
- RMR then phoned the identified panelists and screened them for eligibility (i.e., those who reported being current smokers, ex-smokers with the past 24 months, or current at-least-weekly EC users).
- Those who screened positive were then emailed an invitation to participate in the 4CV1 Survey.
- If the invited panelists had not responded within 7 days of being sent the email invitation, then RMR sent a Reminder Email on Day 8.
- If the invited panelists have not responded within 1-2 days of being sent the Reminder Email, then RMR telephoned the invited panelists to ask them to participate in the 4CV1 Survey. If the intended panelist was not reached by phone after 3 attempts, then a message was left on the 3rd attempt if an answering machine is available.
- Panelists that started the survey but had not submitted a completed survey were sent emails notifying them of the survey end date and asking them to submit their completed survey.
- RMR sent a thank you email to all ITC-owned AU cohort members who completed the 4CV1 Survey. If the email bounced back, then RMR mailed a thank-you letter to the respondent, which included a request for an updated email address.

5.5.3 Procedures for the panel-owned AU replenishment dedicated vaper sample (RMR)

- In AU, a non-probability, opt-in sample of early adopters of vaping/EC use was sampled. The target for this sample was N=600 EC users recruited from 3 sources:
  - An existing database of past research participants who had signed up for future studies on the HABIT website at UQ, provided by Dr. Coral Gartner, a co-investigator. The research team sent an email to those registered on the website to identify anyone who was interested in the 4CV1 Survey.
  - Advertisements on vapers websites (e.g., Aussie Vapers and Vapers café).
  - Advertisements in vaper shops/cafés.
- All interested persons who responded to the recruitment materials were sent to the UQ website and were screened for eligibility for the survey.
- All interested and eligible participants (from all 3 sources) provided consent to participate by registering their contact details (names, mailing address, phone, email address) on the UQ website. All potential participants were required to view the Participants Information Sheet prior to clicking the “Proceed to Survey” link.
- Upon registration, potential participants were told that they had been assigned a unique PIN (from a pre-determined list provided by the UW SRC), were given an email with instructions on how to return to their survey should they stop their survey prior to submitting it, and were sent a Participant’s Information Sheet for their record. Specifically, they were told that they should use the URL link provided in the email to get back into the survey to continue where they had left off should they leave the survey for any reason.
- Upon clicking on the “Proceed to survey” button, the study participants were directed to the SRC website (based in CA) to complete the web survey.
- Upon submitting the completed survey, participants were redirected back to the UQ website for incentive processing.
• All completers were sent a thank you email. This also allowed their email addresses to be verified. Participants with invalid email addresses were phoned by the research team to update their email address.
### 5.6 Study Incentives

Table 5.2. Summary of 4CV1 incentives by country and sample source.

<table>
<thead>
<tr>
<th>Country/panel</th>
<th>4CV1 Survey incentive type</th>
<th>Responsible for processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘ITC-owned’ cohort</td>
<td>cheque for $40 OR entry into a draw for $1,000 (one name will be drawn for every 100 completed surveys)</td>
<td>RMR</td>
</tr>
<tr>
<td>Leger panelists (cohort and new recruits at 4CV1)</td>
<td>[Cohort] cheque for $40 OR entry into a draw for $1,000 (one name will be drawn for every 100 completed surveys) / [New recruits] entry into a draw for $1,000 (one name will be drawn for every 100 completed surveys)</td>
<td>RMR</td>
</tr>
<tr>
<td>Dedicated vapers</td>
<td>entry into a draw for $1,000</td>
<td>CCV</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘ITC-owned’ cohort</td>
<td>choice of a $25 CAD Amazon e-gift card or a $25 CAD cheque</td>
<td>UW administrative team</td>
</tr>
<tr>
<td>Leger panelists (cohort and new recruits at 4CV1)</td>
<td>$25 CAD or AIR MILES equivalent</td>
<td>Leger</td>
</tr>
<tr>
<td>EN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘ITC-owned’ cohort</td>
<td>£16 Amazon e-gift card</td>
<td>Logistic Solutions</td>
</tr>
<tr>
<td>Ipsos panelists (all are new recruits at 4CV1)</td>
<td>[Age=18-24] 3,200 points; broadly the equivalent of £20 [Age=&gt;25] 2,000 points; broadly the equivalent of £16</td>
<td>Ipsos</td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘ITC-owned’ cohort</td>
<td>Check for $25 USD</td>
<td>UW administrative team</td>
</tr>
<tr>
<td>GfK Knowledge Panel panelists (cohort and new recruits at 4CV1)</td>
<td>[Age=18-24] 15,000 points / [Age=&gt;25] 10,000 points</td>
<td>GfK</td>
</tr>
<tr>
<td>US Opt in panelists (Lucid)</td>
<td>Points worth $5-7 USD</td>
<td>GfK/Lucid</td>
</tr>
</tbody>
</table>
6 Quality Control and Uniformity

6.1 Identification and removal of ‘satisficers/speeders’ from the data set

- There were two criteria for poor data quality that were identified from a cursory look at the data:
  1) Seconds per question (secperQ) and
  2) % of responses that were either Refused or Don’t Know (%RDK).
    - Very extreme values occurred for both of these variables: times of less than 1.7 seconds per question, which by published estimates doesn’t allow time for even reading the question, and RDK responses for more than 70% of the questions completed.

- The strategy was to create a group of normal respondents by dropping all ‘suspicious’ respondents, those with very low secperQ and/or high %RDK, and to use this main group to calculate normal behaviour ranges. Then suspicious behaviour could be defined relative to the normal behaviour.

- The initial criteria for creating the normal group were high and somewhat arbitrary, because the goal was to get rid of anyone who might not have been answering responsibly.
  - Anyone with secperQ less than or equal to 3.5 (approx. the 90th percentile for the normal group) or %RDK greater than 38.24% (the 99th percentile for the normal group) was removed from the normal group.
  - 361 respondents were culled at this stage.

- The normal group was then split by country. Frequency distributions by country were used to create more precise cut-offs for ‘suspicious’ responding. ‘Suspiciousness points’ were assigned, based on the cut-offs for the respondent’s country, and all respondents – initially suspicious and initially normal – had points assigned. Respondents were removed from the dataset if they scored too many points.

- Points were assigned on these bases:
  1) SecperQ — The calculated value was time taken to complete the survey divided by the number of questions answered by the respondent. Very short times suggest poor data quality.
     - 3 points were assigned if the respondent’s value was lower than the normal group’s minimum. This could only apply to respondents not in the normal group.
     - 2 points were assigned if the respondent’s value fell between the minimum and the normal group’s 1st percentile. This could apply to respondents in the normal group as well as to suspicious respondents.
     - Because time per question was considered the most important of the 3 data-quality criteria, it was weighted more heavily, so the points assigned here were 2 and 3, rather than 1 and 2 as for the next two criteria.

  2) %RDK — The calculated value was the number of questions answered with either Refused or Don’t know, divided by the number of questions answered by the respondent. Large numbers represent poor data quality.
     - 2 points were assigned if the respondent’s value was higher than the normal group’s maximum. This could only apply to respondents not in the normal group.
1 point was assigned if the respondent’s value fell between the maximum and the normal group’s 99\textsuperscript{th} percentile. This could apply to respondents in the normal group as well as to suspicious respondents.

1 extra point was assigned if %RDK was over 70%.

3) \%Topbox -- This was a new criterion that arose from the observation that quite a few respondents checked only the first item (the ‘top box’) in many of the checklists. This is as fast a way of responding carelessly as checking off Refused or Don’t know for the entire list. It only applies to checklists; all other questions, including other series, require an answer for every item in the list. The calculated value was the number of checklists answered by checking off only the first item, divided by the number of checklists answered by the respondent. Large numbers suggest poor data quality.

1 point was assigned if the respondent’s value fell between the maximum and the normal group’s 99\textsuperscript{th} percentile. This could apply to respondents in the normal group as well as to suspicious respondents.

Points results: The range of possible points was 0-8. The actual range in the data was 0-6. 94.77% of the respondents had 0 points.

Cut-offs for dropping respondents: A cut-off of 3 points was considered, but this meant dropping 269 respondents, many of whom were dual users. Dual users are extremely valuable, because they are of interest as dual users and because they contribute data to both the cigarette-user and e-cigarette-user groups. Therefore it was decided that a stricter criterion, a cut-off of 4 points, would be applied to dual users; dual users with 3 points would be kept in the dataset but tagged as ‘uncertain’ so they could be removed from analyses if desired. For non-dual-users, anyone with a cut-off of 3 points was dropped from the dataset. This resulted in dropping a total of 182 respondents from the dataset.

Caution: Because speed counted for only 3 points, dual users could not be dropped on the basis of speed alone, since their cut-off was 4 points. One respondent, whose secperQ was a very improbable 1.77, was therefore kept in the dataset.

Comparison between respondents who were dropped and those who were kept in the dataset:

- Dropped respondents were more likely to be in the 18-24 and 25-39 age groups than in the 40+ age group. There was a significant effect of age group.
- They were significantly more likely to be male than female.
- England had significantly more dropped respondents than other countries, but this was because the majority of the dropped respondents were from the Ipsos panel in England, which provided a very large proportion of the respondents overall.
- Dropped respondents were more likely to be dual users than either cigarette-only or e-cigarette-only users; however, this was not statistically significant.
- They were somewhat more likely to have higher education and higher income. The association with education was significant but that with income was not. This suggests that intelligence and test-taking experience allow respondents to figure out ways to ‘beat the system’ – i.e to complete surveys quickly.
Appendix 1.1. ITC Australia sample composition, sample source, and mode of survey completion over Waves 1-10 and 4CV1

<table>
<thead>
<tr>
<th>Survey Fieldwork Dates</th>
<th>Recontact Sample</th>
<th>Recruitment Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 16 2003—Sep 28 2003</td>
<td>W2 C: n=1876 phone</td>
<td>W2 P: n=258 RDD</td>
</tr>
<tr>
<td>Jun 3 2004—Dec 27 2004</td>
<td>W3 C: n=1571 phone</td>
<td>W3 P: n=532 RDD</td>
</tr>
<tr>
<td>Oct 11 2006—Feb 17 2007</td>
<td>W5 C: n=1482 phone</td>
<td>W5 P: n=686 RDD</td>
</tr>
<tr>
<td>Sep 21 2007—Feb 12 2008</td>
<td>W6 C: n=1631 phone</td>
<td>W6 P: n=539 RDD</td>
</tr>
</tbody>
</table>

Phone mode only

<table>
<thead>
<tr>
<th>Survey Fieldwork Dates</th>
<th>Recontact Sample</th>
<th>Recruitment Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul 13 2010—Jun 24 2011</td>
<td>W8 C: n=740 phone; &amp; n=552 web</td>
<td>W8 P: n=221 RDD</td>
</tr>
<tr>
<td>Sept 26 2011—Feb 13 2012</td>
<td>W8.5 C: n=563 phone; &amp; n=676 web</td>
<td>W8.5 P: n=268 RDD</td>
</tr>
<tr>
<td>Feb 7, 2013—May 31, 2013</td>
<td>W9 C: n=425 phone; &amp; n=682 web</td>
<td>W9 Single Source (RMR owned) n=238 phone; n=147 web</td>
</tr>
<tr>
<td>Aug 27, 2014—Dec 30, 2014</td>
<td>W10 C: n=237 and n=144 phone; &amp; n=614 and n=84 web</td>
<td>W10 Single Source Panel (RMR) n=397</td>
</tr>
</tbody>
</table>

Web mode only

<table>
<thead>
<tr>
<th>Survey Fieldwork Dates</th>
<th>Recontact Sample</th>
<th>Recruitment Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 25, 2016—Oct 30, 2016</td>
<td>4CE1 C: n=276 and n=239 Single Source Panel (RMR)</td>
<td>4CE1 P: Single Source Panel (RMR) n=989</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4CE1 P: Dedicated vapers (opt in) n=581</td>
</tr>
</tbody>
</table>
Appendix 1.2. ITC Canada sample composition, sample source, and mode of survey completion over Waves 1 to 5 (2002-2014).
Appendix 1.3. ITC England sample composition, sample source, and mode of survey completion over Waves 1-10 and 4CV1

<table>
<thead>
<tr>
<th>Survey Fieldwork Dates</th>
<th>Recontact Sample</th>
<th>Recruitment Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 16 2003—Sep 28 2003</td>
<td><strong>W2 C: n=1865 phone</strong></td>
<td><strong>W2 P: n=255 RDD</strong></td>
</tr>
<tr>
<td>Jun 3 2004—Dec 27 2004</td>
<td><strong>W3 C: n=1494 phone</strong></td>
<td><strong>W3 P: n=586 RDD</strong></td>
</tr>
<tr>
<td>Oct 10 2005—Jan 31 2006</td>
<td><strong>W4 C: n=1540 phone</strong></td>
<td><strong>W4 P: n=503 RDD</strong></td>
</tr>
<tr>
<td>Oct 11 2006—Feb 17 2007</td>
<td><strong>W5 C: n=1406 phone</strong></td>
<td><strong>W5 P: n=613 RDD</strong></td>
</tr>
<tr>
<td>Sep 21 2007—Feb 12 2008</td>
<td><strong>W6 C: n=1484 phone</strong></td>
<td><strong>W6 P: n=523 RDD</strong></td>
</tr>
<tr>
<td>Jul 13 2010—Jun 24 2011</td>
<td><strong>W8 C: n=893 phone; &amp; n=432 web</strong></td>
<td><strong>W8 P: n=0; No P this wave</strong></td>
</tr>
<tr>
<td>Feb 7 2013—Sep 10 2013</td>
<td><strong>W9 C: n=363 phone; &amp; n=507 web</strong></td>
<td><strong>W9 P RDD: n=176 landline; n=7 mobile</strong></td>
</tr>
<tr>
<td>Aug 27 2014—Dec 2014</td>
<td><strong>W10 C: n=294 phone; &amp; n=549 web</strong></td>
<td><strong>W10 P RDD (Ipsos): n=229</strong></td>
</tr>
<tr>
<td></td>
<td><strong>W10 C web panel (EMI): n=175</strong></td>
<td><strong>W10 P web panel (EMI): n=223</strong></td>
</tr>
<tr>
<td></td>
<td>{No further contact}</td>
<td></td>
</tr>
<tr>
<td>Jul 7, 2016—Sep 30 2016</td>
<td><strong>4CE1 C: n=304 web</strong></td>
<td><strong>4CE1 P web panel (Ipsos): n=4070 smokers, recent quitters, e-cigarette users</strong></td>
</tr>
</tbody>
</table>

Legend
- RDD = Random digit dialled recruitment, by phone
- C = Recontact sample
- P = Replenishment sample
- Red text = Web-administered survey sample
- Underline = panel-owned sample
Appendix 1.4. ITC United States sample composition, sample source, and mode of survey completion over Waves 1-9 and 4CV1

<table>
<thead>
<tr>
<th>Survey Fieldwork Dates</th>
<th>Recontact Sample</th>
<th>Recruitment Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 16 2003—Sep 28 2003</td>
<td>W3 C: n=1199 phone; W3 P: n=889 RDD</td>
<td>W4 C: n=1262 phone; W4 P: n=742 RDD</td>
</tr>
<tr>
<td>Jun 3 2004—Dec 27 2004</td>
<td>W5 C: n=1289 phone; W5 P: n=745 RDD</td>
<td></td>
</tr>
<tr>
<td>Oct 10 2005—Jan 31 2006</td>
<td>W6 C: n=1291 phone; W6 P: n=711 RDD</td>
<td></td>
</tr>
<tr>
<td>Oct 11 2006—Feb 17 2007</td>
<td>W7 C: n=1339 phone; &amp; n=42 web (pilot); W7 P: n=382 RDD</td>
<td></td>
</tr>
<tr>
<td>Sep 21 2007—Feb 12 2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 25 2008—Jul 28 2009</td>
<td>W8 C: n=749 phone; &amp; n=395 web; W8 P: n=376 RDD</td>
<td></td>
</tr>
<tr>
<td>Jul 13 2010—Jun 14 2011</td>
<td>W9 P: RDD n=167 tobacco users</td>
<td>W9 P: RDD n=84 non-users</td>
</tr>
<tr>
<td>Aug 28 2013—Mar 2015</td>
<td>W9 P: RDD n=84 youth</td>
<td>W9 P: web panel (GfK KP) 18y+ n=1924 non-users</td>
</tr>
<tr>
<td>Jul 7 2016—Sep 30 2016</td>
<td>W9 P: web panel (GfK KP) n=127</td>
<td>W9 P: web panel (GfK KP) 18y+ n=2144 Tobacco users</td>
</tr>
<tr>
<td></td>
<td>4CE1 P: web panel (GfK KP) n=127</td>
<td>4CE1 P: web panel (GfK KP) 18y+ n=2144 Tobacco users</td>
</tr>
<tr>
<td></td>
<td>4CE1 C: n=47 phone; &amp; n=249 ITC-owned web; &amp; n=1161 web panel (GfK KP) n=127</td>
<td>4CE1 P: web panel (GfK opt-in) n=496</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4CE1 P: web panel (Ipsos US) n=238 smokers, and n=494 e-cigarette users</td>
</tr>
</tbody>
</table>

*During fieldwork 16 respondents from the US 4C9 Survey who were tobacco /e-cigarette-naive were invited to the 4CV1 Survey in error; these cases were removed from the dataset.
Appendix 2.1: Allocation (per stratum) of 4CV1 Australia panel sample

Notes:
1) All quotas must be met or slightly exceeded by the end of fieldwork.
2) Cells in gray are meant to be easily modified (just type in a new number); all other cells/calculation are automated and thus those cells shouldn't be modified.
3) Except for the overall quota of 600, there are no age/gender/region specific quotas for the AU dedicated smoker group.
4) For the purpose of quotas, the Australian Capital Territory (ACT), which obviously includes Canberra, is included with New South Wales (NSW).

<table>
<thead>
<tr>
<th></th>
<th>Population Estimates/Projections</th>
<th>Estimated numbers of smokers</th>
<th>\hline</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Total</td>
<td>Men</td>
<td>Women</td>
<td>Total</td>
<td>Men</td>
<td>Women</td>
<td>Total</td>
<td>Men</td>
<td>Women</td>
<td>Total</td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>New South Wales (NSW) &amp; ACT</td>
<td>2,853,061</td>
<td>32.1%</td>
<td>2,366,168</td>
<td>32.7%</td>
<td>5,829,229</td>
<td>32.4%</td>
<td>543,982</td>
<td>32.1%</td>
<td>412,297</td>
<td>32.7%</td>
<td>956,279</td>
<td>32.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria (VIC)</td>
<td>2,231,766</td>
<td>25.0%</td>
<td>2,325,868</td>
<td>25.7%</td>
<td>4,557,624</td>
<td>25.3%</td>
<td>424,034</td>
<td>25.0%</td>
<td>323,296</td>
<td>25.7%</td>
<td>747,330</td>
<td>25.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland (QLD)</td>
<td>1,777,507</td>
<td>19.9%</td>
<td>1,824,130</td>
<td>20.1%</td>
<td>3,601,637</td>
<td>20.0%</td>
<td>337,726</td>
<td>19.9%</td>
<td>253,554</td>
<td>20.1%</td>
<td>591,280</td>
<td>20.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Australia (SA)</td>
<td>754,670</td>
<td>8.5%</td>
<td>674,778</td>
<td>7.4%</td>
<td>1,429,448</td>
<td>7.9%</td>
<td>143,387</td>
<td>8.5%</td>
<td>93,784</td>
<td>7.4%</td>
<td>237,171</td>
<td>8.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Australia (WA)</td>
<td>1,000,811</td>
<td>11.2%</td>
<td>984,245</td>
<td>10.9%</td>
<td>1,985,056</td>
<td>11.0%</td>
<td>190,154</td>
<td>11.2%</td>
<td>136,810</td>
<td>10.9%</td>
<td>326,964</td>
<td>11.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tasmania (TAS)</td>
<td>197,010</td>
<td>2.2%</td>
<td>202,762</td>
<td>2.2%</td>
<td>399,763</td>
<td>2.2%</td>
<td>37,449</td>
<td>2.2%</td>
<td>28,184</td>
<td>2.2%</td>
<td>65,633</td>
<td>2.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Territory (NT)</td>
<td>96,501</td>
<td>1.1%</td>
<td>84,642</td>
<td>0.9%</td>
<td>181,143</td>
<td>1.0%</td>
<td>18,335</td>
<td>1.1%</td>
<td>11,765</td>
<td>0.9%</td>
<td>30,100</td>
<td>1.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Australia</td>
<td>8,921,407</td>
<td>100.0%</td>
<td>9,062,593</td>
<td>100.0%</td>
<td>17,984,000</td>
<td>100.0%</td>
<td>1,695,067</td>
<td>100.0%</td>
<td>1,259,700</td>
<td>100.0%</td>
<td>2,954,767</td>
<td>100.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
*1 Adult (i.e., 18 and older) population estimates/projections by regions for 2014
*2 Estimated number of smokers using a 19% prevalence for men and 13.9% for women
*3 A total of 1188 cohort individuals are eligible at 4CE wave 1

Assuming a retention rate of 45.17808219178089, about 527 of them should successfully be recontacted at wave 1
Hence, 1500 - 527 = 973 new individuals will need to be recruited

\# of cohort individual eligible at 4CE wave 1: 1188
Assumed retention rate: 45%
Total sample size for 18+ smokers at wave 1: 1500
Appendix 2.2: Allocation (per stratum) of 4CV1 Canada panel sample

Notes:
1) All quotas must be met or slightly exceeded by the end of fieldwork.
2) Cells in grey are meant to be easily modified (just type in a new number); all other cells/calculation are automated and thus those cells shouldn’t be modified.
3) Except for language specific strata (e.g., ML-Eng & ML-Fr) respondents should be recruited regardless of their language preference/choice

<table>
<thead>
<tr>
<th>Strata</th>
<th>Population Estimates/Projections¹</th>
<th>Quotas smokers 18-24</th>
<th>Revised Quota 18-24</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18-24 N</td>
<td>25+ N</td>
<td>18+ N</td>
</tr>
<tr>
<td>Maritimes</td>
<td>772,997</td>
<td>21.7</td>
<td>6,009,099</td>
</tr>
<tr>
<td>Maritimes - English</td>
<td>202,424</td>
<td>6.0%</td>
<td>1,751,820</td>
</tr>
<tr>
<td>Maritimes - French</td>
<td>24,203</td>
<td>0.7%</td>
<td>211,379</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>41,438</td>
<td>1.2%</td>
<td>394,359</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>13,382</td>
<td>0.4%</td>
<td>118,640</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>84,359</td>
<td>2.5%</td>
<td>695,752</td>
</tr>
<tr>
<td>Nova Scotia - English</td>
<td>81,153</td>
<td>2.4%</td>
<td>669,313</td>
</tr>
<tr>
<td>Nova Scotia - French²</td>
<td>3,206</td>
<td>0.1%</td>
<td>26,418</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>63,245</td>
<td>1.9%</td>
<td>537,050</td>
</tr>
<tr>
<td>New Brunswick - English</td>
<td>42,248</td>
<td>1.3%</td>
<td>372,109</td>
</tr>
<tr>
<td>New Brunswick - French²</td>
<td>20,997</td>
<td>0.7%</td>
<td>184,941</td>
</tr>
<tr>
<td>Quebec</td>
<td>1,045,006</td>
<td>30.2%</td>
<td>8,151,575</td>
</tr>
<tr>
<td>Québec - English</td>
<td>135,793</td>
<td>4.1%</td>
<td>1,040,122</td>
</tr>
<tr>
<td>Quebec - French</td>
<td>595,347</td>
<td>80%</td>
<td>4,957,931</td>
</tr>
<tr>
<td>Greater Montreal</td>
<td>362,166</td>
<td>11.4%</td>
<td>2,905,124</td>
</tr>
<tr>
<td>Greater Montréal - English</td>
<td>129,554</td>
<td>3.9%</td>
<td>944,129</td>
</tr>
<tr>
<td>Greater Montréal - French</td>
<td>252,612</td>
<td>7.5%</td>
<td>1,919,136</td>
</tr>
<tr>
<td>Rest of Quebec</td>
<td>346,871</td>
<td>10.3%</td>
<td>3,015,685</td>
</tr>
<tr>
<td>Rest of Quebec - English</td>
<td>6,239</td>
<td>0.2%</td>
<td>55,864</td>
</tr>
<tr>
<td>Rest of Quebec - French²</td>
<td>9,879</td>
<td>0.3%</td>
<td>85,421</td>
</tr>
<tr>
<td>Ontario</td>
<td>1,345,274</td>
<td>40.1%</td>
<td>9,772,452</td>
</tr>
<tr>
<td>GTA</td>
<td>611,698</td>
<td>18.2%</td>
<td>4,309,824</td>
</tr>
<tr>
<td>Toronto</td>
<td>278,906</td>
<td>0.8%</td>
<td>2,062,093</td>
</tr>
<tr>
<td>GTA minus Toronto</td>
<td>332,792</td>
<td>9.9%</td>
<td>2,247,711</td>
</tr>
<tr>
<td>Rest of Ontario</td>
<td>733,576</td>
<td>21.9%</td>
<td>5,462,628</td>
</tr>
<tr>
<td>Prairies</td>
<td>631,852</td>
<td>18.8%</td>
<td>4,529,451</td>
</tr>
<tr>
<td>Manitoba - English</td>
<td>128,823</td>
<td>6.8%</td>
<td>871,556</td>
</tr>
<tr>
<td>Manitoba - English²</td>
<td>124,185</td>
<td>7.3%</td>
<td>842,108</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>108,873</td>
<td>3.2%</td>
<td>767,014</td>
</tr>
<tr>
<td>Saskatchewan - English</td>
<td>187,340</td>
<td>5.8%</td>
<td>755,680</td>
</tr>
<tr>
<td>Saskatchewan - French²</td>
<td>1,633</td>
<td>0.0%</td>
<td>11,505</td>
</tr>
<tr>
<td>Alberta</td>
<td>394,156</td>
<td>11.8%</td>
<td>2,888,911</td>
</tr>
<tr>
<td>Alberta - English</td>
<td>367,455</td>
<td>11.6%</td>
<td>2,839,800</td>
</tr>
<tr>
<td>Alberta - French²</td>
<td>6,701</td>
<td>0.2%</td>
<td>49,111</td>
</tr>
<tr>
<td>British Columbia</td>
<td>443,889</td>
<td>13.2%</td>
<td>3,400,949</td>
</tr>
<tr>
<td>Greater Vancouver</td>
<td>256,806</td>
<td>7.7%</td>
<td>1,805,885</td>
</tr>
<tr>
<td>British Columbia - English</td>
<td>167,033</td>
<td>5.6%</td>
<td>1,270,508</td>
</tr>
</tbody>
</table>

Notes:
² Population estimates/projections for July 1, 2016
³ Estimated from 2011 Census data

1) All quotas must be met or slightly exceeded by the end of fieldwork.
2) Cells in grey are meant to be easily modified (just type in a new number); all other cells/calculation are automated and thus those cells shouldn’t be modified.
3) Except for language specific strata (e.g., ML-Eng & ML-Fr) respondents should be recruited regardless of their language preference/choice

Downloaded from Statistics Canada’s CANSIM (http://www5.statcan.gc.ca/cansim/a33RT?TABLE&themeID=3433&spMod=table&lang=eng) on Jun 8, 2016
See other spreadsheets in this Excel file

Assuming a retention rate of 50%, 127 of them should successfully be recontacted at wave 1
Hence, 1850 - 127 = 1723 new individuals will need to be recruited
Assumed retention: 50% ± 5%
Total sample size (from Leger) for 25+ at wave 1: 1850

4) As per email from Lisa Covens (covens@leger360.com): 220 (or 87%) of the 253 LegerWeb respondents who completed the wave 9 survey are still members of their panel

Assuming a contact/retenion rate of 70% for 4CV1 is fairly conservative

5) See table in cells P20-P23, and the following links:
## Appendix 2.3: Allocation (per stratum) of 4CV1 England panel sample

### Notes:
1. All quotas must be met or slightly exceeded by the end of fieldwork.
2. Cells in [ ] are meant to be easily modified (just type in a new number); all other cells/calculations are automated and thus these cells shouldn’t be modified.
3. See file quotas4CV1-IPSOS.pdf containing email exchange with Mark Ginnell <Mark.Ginnell@ipsos.com> about those quotas.

### Quotas for smokers (and recent quitters) ages 25 and older

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Estimated Nb smokers</th>
<th>% Pop</th>
<th>Quotas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men aged 25-34</td>
<td>1,157,809</td>
<td>26.3%</td>
<td>116</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men aged 35-49</td>
<td>1,316,428</td>
<td>26.3%</td>
<td>132</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men aged 50 and over</td>
<td>1,402,452</td>
<td>28.3%</td>
<td>152</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women aged 25-34</td>
<td>770,883</td>
<td>26.4%</td>
<td>78</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women aged 35-49</td>
<td>1,086,033</td>
<td>26.0%</td>
<td>110</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women aged 50 and over</td>
<td>1,357,263</td>
<td>28.6%</td>
<td>148</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7,390,848</td>
<td></td>
<td>2700</td>
</tr>
</tbody>
</table>

### Quotas for smokers ages 18-24

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Estimated Nb smokers</th>
<th>% Pop</th>
<th>Quotas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men aged 18-24</td>
<td>656,876</td>
<td>28.9%</td>
<td>150</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women aged 18-24</td>
<td>479,654</td>
<td>29.1%</td>
<td>110</td>
</tr>
<tr>
<td>North and Yorkshire &amp; the Humber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London and East of England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,136,530</td>
<td></td>
<td>300</td>
</tr>
</tbody>
</table>

### Quotas for e-cigarettes

<table>
<thead>
<tr>
<th>Region</th>
<th>% Pop</th>
<th>Quotas</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>4.8%</td>
<td>24</td>
</tr>
<tr>
<td>North West</td>
<td>13.0%</td>
<td>65</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>9.8%</td>
<td>49</td>
</tr>
<tr>
<td>East Midlands</td>
<td>8.6%</td>
<td>43</td>
</tr>
<tr>
<td>West Midlands</td>
<td>10.4%</td>
<td>52</td>
</tr>
<tr>
<td>East of England</td>
<td>11.3%</td>
<td>56</td>
</tr>
<tr>
<td>London</td>
<td>15.8%</td>
<td>79</td>
</tr>
<tr>
<td>South East</td>
<td>16.3%</td>
<td>81</td>
</tr>
<tr>
<td>South West</td>
<td>10.2%</td>
<td>51</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
1. Estimated number of smokers as of Jul 2010; see spreadsheet “Nb smk” in this Excel file.
2. Estimated percentage of population in each 4 geographic regions per gender/age group; see spreadsheet “Nb smk” in this Excel file.

\[
\text{quota}_{g,a} = \frac{\hat{N}_{g,a} \times 2700 \times \text{prop}_{g,a}}{N}
\]

\[\hat{N}_{g,a} = \text{estimated number of smokers for gender } g \text{ and age group } a\]

\[N = \sum_{g=1}^{2} \sum_{a=1}^{m} \hat{N}_{g,a} = \text{total estimated number of smokers}\]

\[\text{prop}_{g,a,h} = \text{proportion of the population gender } g \text{ and age group } a \text{ that resides in region } h\]
Appendix 2.4: Allocation (per stratum) of 4CV1 United States panel sample of e-cigarette users

Last updated by C. Boudreau on Jun 14, 2016

Notes:
1) All quotas must be met or slightly exceeded by the end of fieldwork.
2) Cells in gray are meant to be easily modified (just type in a new number); all other cells/calcuations are automated and thus those cells shouldn’t be modified.

<table>
<thead>
<tr>
<th>Census Region</th>
<th>Population Estimates/Projections</th>
<th>Quotas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>44,223,902</td>
<td>89</td>
</tr>
<tr>
<td>Midwest</td>
<td>52,359,918</td>
<td>106</td>
</tr>
<tr>
<td>South</td>
<td>92,091,900</td>
<td>186</td>
</tr>
<tr>
<td>West</td>
<td>58,635,704</td>
<td>119</td>
</tr>
<tr>
<td>Total</td>
<td>247,309,424</td>
<td>500</td>
</tr>
</tbody>
</table>

Notes:
1 Adult (i.e., 18 and older) population estimates/projections per state/Census Region for 2016
   Downloaded from CDC (http://wonder.cdc.gov/population-projections.html) on Jun 14, 2016
   See spreadsheet “Projections 18+” in this Excel file

Appendix 2.5: Allocation (per stratum) of 4CV1 United States panel sample of smokers/quitters, aged 18-24y

Last updated by C. Boudreau on Sep 6, 2016

Notes:
1) All quotas must be met or slightly exceeded by the end of fieldwork.
2) Cells in gray are meant to be easily modified (just type in a new number); all other cells/calcuations are automated and thus those cells shouldn’t be modified.

<table>
<thead>
<tr>
<th>Census Region</th>
<th>Population Estimates/Projections</th>
<th>Quotas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>5,023,858</td>
<td>85</td>
</tr>
<tr>
<td>Midwest</td>
<td>6,182,797</td>
<td>104</td>
</tr>
<tr>
<td>South</td>
<td>11,013,171</td>
<td>186</td>
</tr>
<tr>
<td>West</td>
<td>7,387,949</td>
<td>125</td>
</tr>
<tr>
<td>Total</td>
<td>29,607,775</td>
<td>500</td>
</tr>
</tbody>
</table>

Notes:
1 Population estimates/projections for 18-24 years old per state/Census Region for 2016
   Downloaded from CDC (http://wonder.cdc.gov/population-projections.html) on Jun 8, 2016
   See spreadsheet “Projections 18-24” in this Excel file
2 Population estimates/projections for 25+ years old per state/Census Region for 2016
   These estimates/projections were obtained by simply taking the difference between projections for 18+ and projections for 18-24
   Downloaded from CDC (http://wonder.cdc.gov/population-projections.html) on Jun 8, 2016
   See spreadsheets “Projections 18-24” and “Projections 18+” in this Excel file
3 Total - # already recruited by IPSOS
Sampling Weights and Design of the International Tobacco Control (ITC) 4CV Wave 1 Survey

C. Boudreau\textsuperscript{1,2}, M.E. Thompson\textsuperscript{1,2} and Y. Li\textsuperscript{2,3}

This short document describes the various longitudinal weights (section 2.1) and cross-sectional weights (section 2.2) available for the ITC 4CV Wave 1 Survey (labeled as wave V1 in this document to prevent confusion with previous waves of the ITC 4C Survey). It also provides some guidance on which set of weights should be used depending on the analysis they are performing, as well as some basic characteristics of the sampling design and protocol.

Contents

1 Important remark about quitters 2

2 Sampling weights 2

\hspace{1.5em} 2.1 Longitudinal sampling weights .................................................. 5
\hspace{1.5em} 2.2 Cross-sectional sampling weights .................................................. 6
\hspace{2em} 2.2.1 Cross-sectional weights for the main sample .......................... 6
\hspace{2em} 2.2.2 Cross-sectional weights for the reduced US sample ............... 9
\hspace{2em} 2.2.3 Cross-sectional weights for the Australian e-cig users .......... 10
\hspace{1.5em} 2.3 Inflation versus rescaled weights ............................................... 11
\hspace{1.5em} 2.4 Additional remarks ........................................................................ 12
\hspace{2em} 2.4.1 Cautionary note about quitters .............................................. 12
\hspace{2em} 2.4.2 Cautionary note about e-cigarette users ................................ 12
\hspace{2em} 2.4.3 Covariates to include in statistical modelling ......................... 13

3 Data Collection & Sampling Design 14

\hspace{1.5em} 3.1 ITC 4C Survey ........................................................................... 14
\hspace{1.5em} 3.2 Data Collection and Recruitment ............................................... 14
\hspace{1.5em} 3.3 Sample Sizes and Inclusion Criteria ......................................... 14
\hspace{1.5em} 3.4 Sample Sources ........................................................................... 15
\hspace{1.5em} 3.5 Sampling Protocols ..................................................................... 16
\hspace{1.5em} 3.6 Cautionary notes ........................................................................... 18

\textsuperscript{1}Dept. of Statistics & Actuarial Science, University of Waterloo, Waterloo, Ontario, Canada.
\textsuperscript{2}Data Management Core (DMC) – ITC Project, University of Waterloo.
\textsuperscript{3}Dept. of Psychology, University of Waterloo.
\textsuperscript{4}This document was created using \LaTeX, and last updated on Mar. 21, 2018
1  Important remark about quitters

After careful consideration, it was decided not to compute cross-sectional weights for long-term quitters (i.e., those who had quit smoking more than five years ago at the time of wave V1 data collection) in Canada, the US and England. This resulted in a total of 224 long-term quitters (79 from the US, 95 from Canada and 50 from England) not receiving any cross-sectional weights. Note that this only applies to cross-sectional weights, and that longitudinal weights were computed for those quitters; see section 2.1.

As mentioned in section 2.4.1, the vast majority of quitters in the ITC 4CV sample were initially recruited as smokers. Since quitting is one of the reasons for dropping out of the survey, quitters in the 4CV sample should not be viewed as representative of quitters in the general population. This lack of representativeness becomes more and more important when length of quit gets longer. Hence the decision to remove those who have quit more than five years ago. This has also the advantage of making the quitters in Canadian, US and English samples more comparable to those in the Australian sample, where it was decided that respondents who had quit more than two years ago were not to be recontacted at wave V1. Last but not least, since this sample of 224 long-term quitters would have had “represented” millions of quitters in those three countries (e.g., about 20% of Canadians and about 17% of Americans are long-term quitters), this would have resulted in very high sampling weights for those respondents. Consequently, analyses including all quitters (i.e., both those who have quit more than five years ago and those who have quit within the last five years) would have been dominated by those long-term quitters. Likewise, analyses involving all respondents (i.e., cigarette smokers, e-cigarette users and quitters) would have been greatly biased towards the behaviours of those long-term quitters.

2  Sampling weights

Four sets of longitudinal weights (section 2.1) and 18 sets of cross-sectional weights (section 2.2) were computed at wave 1 of the ITC 4CV Survey; see tables 1 and 2 below. The 18 sets of cross-sectional weights can be divided into 3 categories:

1. The first 7 sets of cross-sectional weights (see section 2.2.1 and column 2 of table 2) were computed for the main sample. That sample consists of 12295 respondents (2733 from the US, 3734 from Canada, 4324 from England, and 1504 from Australia). It includes all respondents except the 581 Australian respondents from the dedicated CCV sample, the 224 long-term quitters (79 from the US, 95 from Canada, 50 from England, and 0 from Australia) mentioned in section 1 and the 87 respondents (26 from the US, 13 from Canada, 48 from England, and 0 from Australia) deemed to be fraudulent (also referred to as speeders in some 4CV documentation).

2. The next 7 sets of cross-sectional weights (see section 2.2.2 and column 3 of table 2) were computed for the reduced US sample. This sample is the main US sample of
2733 respondents (mentioned above) minus the 494 US e-cigarette users recruited by Ipsos; hence, the reduced US sample consists of 2239 respondents. Those e-cigarette users were recruited via a non-probability based panel, and those sets of cross-sectional weights were thus computed to give data users the flexibility to remove those individuals if they so desired for their specific analyses. Since this only applies to US respondents, no such weights were computed for respondents from Canada, England or Australia.

3. The last 4 sets of cross-sectional weights (see section 2.2.3 and column 4 of table 2) were computed for Australian respondents using e-cigarettes. This sample contains all 816 Australian respondents that were using e-cigarettes at the time of wave V1. This was done to allow for weighted analyses including the 581 respondents recruited via the dedicated CCV sample. This concerns Australian respondents only, and no such weights were computed for respondents from the US, Canada or England.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Variable Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rescaled waves 8–V1 longitudinal weights</td>
<td>kWTS967v</td>
</tr>
<tr>
<td>Rescaled waves 8.5–V1 longitudinal weights (Australia only)</td>
<td>kWTS969v</td>
</tr>
<tr>
<td>Rescaled waves 9–V1 longitudinal weights</td>
<td>kWTS971v</td>
</tr>
<tr>
<td>Rescaled waves 10–V1 longitudinal weights (England and Australia only)</td>
<td>kWTS973v</td>
</tr>
</tbody>
</table>

Table 1: List of the available longitudinal sampling weights for wave V1 of the ITC 4CV Survey
<table>
<thead>
<tr>
<th>Weight</th>
<th>Main sample*</th>
<th>reduced US sample†</th>
<th>AU e-cig users‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave V1 cross-sectional inflation weights</td>
<td>kWTS100v</td>
<td>kWTS102v</td>
<td>n/a</td>
</tr>
<tr>
<td>Wave V1 cross-sectional inflation weights for e-cigarette users</td>
<td>n/a</td>
<td>n/a</td>
<td>kWTS304v</td>
</tr>
<tr>
<td>Rescaled wave V1 cross-sectional weights for cigarette smokers</td>
<td>kWTS201v</td>
<td>kWTS203v</td>
<td>n/a</td>
</tr>
<tr>
<td>Rescaled wave V1 cross-sectional weights for e-cigarette users</td>
<td>kWTS301v</td>
<td>kWTS303v</td>
<td>kWTS305v</td>
</tr>
<tr>
<td>Rescaled wave V1 cross-sectional weights for dual users</td>
<td>kWTS401v</td>
<td>kWTS403v</td>
<td>kWTS405v</td>
</tr>
<tr>
<td>Rescaled wave V1 cross-sectional weights for quitters Rescaled wave V1 cross-sectional weights for quitters who use e-cigarettes</td>
<td>kWTS501v</td>
<td>kWTS503v</td>
<td>n/a</td>
</tr>
<tr>
<td>Rescaled wave V1 cross-sectional weights for all tobacco users</td>
<td>kWTS601v</td>
<td>kWTS603v</td>
<td>n/a</td>
</tr>
<tr>
<td>Rescaled wave V1 cross-sectional weights for all respondents (i.e., all tobacco users and quitters)</td>
<td>kWTS101v</td>
<td>kWTS103v</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* The main sample consists of 12295 respondents (2733 from the US, 3734 from Canada, 4324 from England, and 1504 from Australia). It includes all respondents except the 581 Australian respondents from the dedicated CCV sample, the 224 long-term quitters (79 from the US, 95 from Canada, 50 from England, and 0 from Australia) mentioned in the remark section of page 1 and the 87 respondents (26 from the US, 13 from Canada, 48 from England, and 0 from Australia) deemed to be fraudulent (also referred to as speeders in some 4CV documentation).

† The reduced sample is the main US sample of 2733 respondents minus the 494 US e-cigarette users recruited by Ipsos; hence, the reduced US sample consists of 2239 respondents. Those e-cigarette users were recruited via a non-probability based panel, and those sets of cross-sectional weights were thus computed to give data users the flexibility to remove those individuals if they so desired for their specific analyses.

‡ This sample contains all 816 Australian respondents that were using e-cigarettes at the time of wave V1. As detail in section 2.2.3, this was done to allow for weighted analyses including the 581 respondents recruited via the dedicated CCV sample.

Table 2: List of the available cross-sectional sampling weights for wave V1 of the ITC 4CV Survey
2.1 Longitudinal sampling weights

1- Variable kWTS967v contains the waves 8–V1 longitudinal weights for the 1202 respondents (258 from the US, 467 from Canada, 240 from England, and 237 from Australia) who completed the wave 8 survey, and were successfully retained and interviewed at wave V1 (and all the waves in between). These weights are designed to make these 467 Canadian smokers (and quitters) representative of the Canadian population of smokers at the time of wave 8 data collection; likewise for the US, England and Australia.

2- Variable kWTS969v contains the waves 8.5–V1 longitudinal weights for the 276 Australian respondents who completed the wave 8.5 survey, and were successfully retained and interviewed at wave V1 (and all the waves in between). These weights are designed to make these 276 smokers (and quitters) representative of the Australian population of smokers at the time of wave 8.5 data collection.

3- Variable kWTS971v contains the waves 9–V1 longitudinal weights for the 2662 respondents (1400 from the US, 661 from Canada, 269 from England, and 332 from Australia) who completed the wave 9 survey, and were successfully retained and interviewed at wave V1 (and all the waves in between). These weights are designed to make these 1400 US smokers (and quitters) representative of the American population of smokers at the time of wave 9 data collection; likewise for the Canada, England and Australia.

4- Variable kWTS973v contains the waves 10–V1 longitudinal weights for the 819 respondents (304 from England, and 515 from Australia) who completed the wave 10 survey, and were successfully retained and interviewed at wave V1. These weights are designed to make these 304 English smokers (and quitters) representative of the English population of smokers at the time of wave 10 data collection; likewise for Australia.

Note: It was decided to no longer compute waves 1–V1, waves 2–V1, . . . , waves 7–V1 longitudinal weights. There are essentially 3 reasons for this: 1) before wave 8, all interviews were conducted by phone, whereas (practically\(^1\)) all interviews at wave V1 were done online, 2) the tobacco landscape in the 4 countries has changed quite a lot since waves 1–7 took place, and 3) given the high level of attrition of cohorts 1–7 respondents between waves 8 and V1, the wisdom of conducting longitudinal analyses of those cohorts is becoming more and more questionable. Note that this is different from conducting cross-sectional analyses, or waves 8–V1, waves 8.5–V1, waves 9–V1 or waves 10–V1 longitudinal analyses. Though cohorts 1–7 respondents (successfully retained and interviewed at wave V1) will be part of the sample when conducted such cross-sectional or longitudinal analyses, they are only a fraction of the sample, as opposed to the whole sample when conducting waves 1–V1, waves 2–V1, etc. longitudinal analyses. It is thus perfectly acceptable to include cohorts 1–7 respondents with cohorts 8–V1 respondents in cross-sectional and longitudinal analyses.

\(^1\)46 US cohort respondents where exceptionally allowed to complete the V1 survey by phone.
2.2 Cross-sectional sampling weights

<table>
<thead>
<tr>
<th>User group†</th>
<th>US Main‡</th>
<th>US Reduced‡</th>
<th>Canada Main‡</th>
<th>England Main‡</th>
<th>Australia Main‡</th>
<th>E-cig‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarette only</td>
<td>1347</td>
<td>1347</td>
<td>2180</td>
<td>2664</td>
<td>1147</td>
<td>0</td>
</tr>
<tr>
<td>Dual users</td>
<td>980</td>
<td>542</td>
<td>1036</td>
<td>1222</td>
<td>192</td>
<td>292</td>
</tr>
<tr>
<td>Pure e-cigarette users</td>
<td>37</td>
<td>20</td>
<td>71</td>
<td>17</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>Quitters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-cig users</td>
<td>126</td>
<td>87</td>
<td>103</td>
<td>181</td>
<td>38</td>
<td>495</td>
</tr>
<tr>
<td>Do not use e-cig</td>
<td>243</td>
<td>243</td>
<td>344</td>
<td>240</td>
<td>122</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>369</td>
<td>330</td>
<td>447</td>
<td>421</td>
<td>160</td>
<td>495</td>
</tr>
<tr>
<td>Total</td>
<td>2733</td>
<td>2239</td>
<td>3734</td>
<td>4324</td>
<td>1504</td>
<td>816</td>
</tr>
</tbody>
</table>

† Variable kUserGroup in the dataset
‡ See notes below Table 2

Table 3: 4CV wave V1 respondents by country and user group.

2.2.1 Cross-sectional weights for the main sample

1- Variable kWTS100v contains the wave V1 cross-sectional inflation weights for the main sample of 12295 respondents (2733 from the US, 3734 from Canada, 4324 from England, and 1504 from Australia).

These weights were computed by dividing the respondents into four broad user groups (variable kUserGroup in the dataset): i) cigarette only users, ii) dual users, iii) pure e-cigarette users and iv) quitters; see table 3. For the US, Canada and England, the quitter group consists of individuals that have quit cigarette smoking within the last 5 years; whereas in Australia it consists of individuals that have quit cigarette smoking within the last 2 years. Not that some of those quitters were using e-cigarettes at the time of wave V1 data collection. The pure e-cigarette users group consists of individuals who have smoked less than 100 cigarettes in their lifetime and were using e-cigarettes at the time of data collection, as well as who have quit more than five years ago (more than 2 years ago in Australia) and using e-cigarettes. In addition to those 4 groups, quitters were further divided into 4 sub-groups (variable kQuitGroup in the dataset): iv.a) those who had quit within the last year, but were using e-cigarettes at the time of wave V1 data collection, iv.b) those who had quit 1–5 years ago (1–2 years in Australia), but were

---

2 Where 1 = cigarette only, 2 = dual users, 3 = pure e-cigarette users, and 4 = quitters; see appendix
3 Where 1 = quit within the last year and uses e-cigarettes, 2 = quit more than 1 year ago and uses e-cigarettes, 3 = quit within the last year and does not use e-cigarettes, and 4 = quit more than 1 year ago and does not use e-cigarettes; see appendix

48
using e-cigarettes at the time of data collection, iv.c) those who had quit within the last year and were not using e-cigarettes at the time of data collection, and iv.d) those who had quit 1–5 years ago (1–2 years in Australia) and were not using e-cigarettes at the time of data collection; see table 3.

Calibration/target figures (e.g., estimated number of individuals that are dual users and estimated number of individuals that are e-cigarette users) were then obtained for each of the four groups and four subgroups. In the US, those calibration figures were obtained from the 2016 National Health Interview Survey (NHIS); whereas as the 2015 Canadian Tobacco Alcohol and Drugs Survey (CTADS), the 2015 Opinions and Lifestyle Survey (OPN), and the 2016 National Drug Strategy Household Survey (NDSHS) were used for Canada, England and Australia, respectively. For groups i, ii and iv, estimated number of individuals in each cells of the following cross-tabs were obtained: user group × gender, user group × age group, user group × geographic region, user group × ethnicity (US only), user group × education (except for Canada) and user group × language (Canada only). For quitters (group iv), estimates were also obtained for the 4 subgroups mentioned above. Since the pure e-cigarette groups are fairly small (see table 3), it was not possible/practical to use as many cross-tabs as for the other three groups. Hence, for group iii, separate estimates were obtained for gender (male vs. female) and age group (18–24 vs. > 24) in the US, Canada and England (since there are only 5 such respondents in Australia, they were combined into a single group for weight calculation purposes). A raking procedure was then applied to calibrate the weights using the above mentioned cross-tabs; this was done separately for each country.

These weights are designed to make respondents in each of the four groups representative of the corresponding population at the time of wave V1 data collection. For example, the kwTS100v weights of the 1036 Canadian dual users (i.e., individuals who smoked traditional cigarettes and also use e-cigarettes) are designed to make them representative of the Canadian population of dual users at the time of data collection; likewise for the other countries and the other groups. If interests lie in a target population that consists of two or more of the four user groups, the kwTS100v weights are still appropriate. For example, when studying Canadian cigarette smokers, one can simply combine the kwTS100v weights of the 2180 cigarette only users with those of the 1036 dual users (for a total of 3216 respondents in the analysis), and assigned a weight of 0 to respondents in the other two user groups.

Last but not least, since these are inflation/un-rescaled weights, they should not be used in analyses involving two or more countries. The various rescaled weights (i.e., variables kwTS101v to kwTS601v) described below were created especially for such multi-country analyses; see section 2.3 for more information on inflation versus rescaled weights.

2- Variable kwTS201v contains the rescaled wave V1 cross-sectional weights for the 10768 (2327 from the US, 3216 from Canada, 3886 from England and 1339 from Australia; see table 3) respondents who were cigarette smokers at the time of wave E1 data collection. These are simply the wave V1 cross-sectional inflation weights (variable kwTS100v) of
those 10768 respondents rescaled to sum to sample size in each country (i.e., 2327 in the US, 3216 in Canada, 3886 in England and 1339 in Australia). These weights are designed to make these 3216 Canadian cigarette smokers representative of the Canadian population of cigarette smokers at the time of wave V1 data collection; likewise for the US, England and Australia.

3- Variable kWTS301v contains the rescaled wave V1 cross-sectional weights for the 4589 (1143 from the US, 1210 from Canada, 1420 from England and 816 from Australia; see table 3) respondents who were e-cigarette users at the time of wave V1 data collection. These are simply the wave V1 cross-sectional inflation weights (variable kWTS100v) of those 4589 respondents rescaled to sum to sample size in each country. These weights are designed to make these 1210 Canadian e-cigarette users representative of the Canadian population of e-cigarette users at the time of wave V1 data collection; likewise for the US, England and Australia.

4- Variable kWTS401v contains the rescaled wave V1 cross-sectional weights for the 3530 (980 from the US, 1036 from Canada, 1222 from England and 292 from Australia; see table 3) respondents who were dual users at the time of wave V1 data collection. These are simply the wave V1 cross-sectional inflation weights (variable kWTS100v) of those 3530 respondents rescaled to sum to sample size in each country. These weights are designed to make these 1036 Canadian dual users representative of the Canadian population of dual users at the time of wave V1 data collection; likewise for the US, England and Australia.

5- Variable kWTS501v contains the rescaled wave V1 cross-sectional weights for the 1397 (369 from the US, 447 from Canada, 421 from England and 160 from Australia; see table 3) quitters at the time of wave V1 data collection. These are simply the wave V1 cross-sectional inflation weights (variable kWTS100v) of those 1397 respondents rescaled to sum to sample size in each country (i.e., 369 in the US, 447 in Canada, 421 in England and 160 in Australia). Though these weights are designed to make these 447 Canadian quitters as representative as possible of the Canadian population of quitters at the time of wave V1 data collection, the vast majority of those quitters were initially recruited as smokers. Consequently, they are an imperfect sample when it comes to be representative of the whole population of quitters; see section 2.4.1 on the representativeness of quitters in the ITC 4CV sample. The same cautionary note also applies to the US, England and Australia. Furthermore, the US, Canadian and English samples consist of those who have quit smoking within the last five years, whereas the Australian sample consists of those who have quit smoking within the last two years. Since the target populations are different, care must be taken when comparing Australian quitters with those of the other three countries.

6- Variable kWTS601v contains the rescaled wave V1 cross-sectional weights for the 11346 (2490 from the US, 3390 from Canada, 4084 from England and 1382 from Australia; see table 3) respondents who were tobacco users (i.e., cigarette smoker and/or e-cigarette
users) at the time of wave V1 data collection. These are simply the wave V1 cross-sectional inflation weights (variable $kWTS100v$) of those 11346 respondents rescaled to sum to sample size in each country. These weights are designed to make these 3390 Canadian tobacco users representative of the Canadian population of tobacco users (i.e., cigarette smoker and/or e-cigarette users) at the time of wave V1 data collection; likewise for the US, England and Australia.

7- Variable $kWTS101v$ contains the rescaled wave V1 cross-sectional weights for the main sample of 12295 respondents (2733 from the US, 3734 from Canada, 4324 from England, and 1504 from Australia; see table 3). These are simply the wave V1 cross-sectional inflation weights (variable $kWTS100v$) of those 12295 respondents rescaled to sum to sample size in each country (i.e., 2733 in the US, 3734 in Canada, 4324 in England and 1504 in Australia). These weights are designed to make these 3734 Canadian tobacco users and quitters representative of the Canadian population of tobacco users and quitters at the time of wave V1 data collection; likewise for the US, England and Australia.

In addition to the warning about the representativeness of quitters in the ITC 4CV sample (see variable $kWTS501v$ above), it should be noted that tobacco users and quitters are ultimately two distinct populations. Hence, great care must be taken when deciding to analyse them together using the $kWTS101v$ weights. This is probably fine when the goal is to carry out descriptive inference about the joint population of tobacco users and quitters. However, carrying out analytical inference (e.g., linear regression and logistic regression) from that same joint population is probably much more questionable.

### 2.2.2 Cross-sectional weights for the reduced US sample

As mentioned at the beginning of section 2.2, the following 7 sets of weights only applies to the US sample.

1- Variable $kWTS102v$ contains the wave V1 cross-sectional inflation weights for the reduced US sample of 2239 respondents. As noted below table 2, the reduced sample is the main sample of 2733 respondents minus the 494 US e-cigarette users recruited by Ipsos (identifiable via the variables kOWNERID and kEC309v in the dataset). Those e-cigarette users were recruited via a non-probability based panel, and the 7 sets of cross-sectional weights were thus computed to give data users the flexibility to remove those individuals if they so desired for their specific analyses.

These weights were computed the same way as the wave V1 cross-sectional inflation weights for the main sample (see variable $kWTS100v$ in section 2.2.1). Consequently, respondents were divided into four broad user groups (cigarette only users, dual users, e-cigarette only users and quitters), and the weights were then calibrated (user group $\times$ gender, user group $\times$ age group, user group $\times$ 4 Census Regions, user group $\times$ ethnicity,

\footnote{Use ![kOWNERID=5 and kEC309v $\in \{1, 2\}$] to exclude the 494 US e-cigarette users recruited by Ipsos, where ! is the logic symbol for not.}

51
user group × education and the 4 quitter sub-groups) based on figures from the 2016 NHIS.

2- Variable kWTS203v contains the rescaled wave V1 cross-sectional weights for the 1889 respondents (see table 3) from the reduced US sample who were cigarette smokers at the time of wave V1 data collection. These are simply the wave V1 cross-sectional inflation weights (variable kWTS102v) of those 1889 respondents rescaled to sum to sample size (i.e., 1889). These weights are designed to make these 1889 US cigarette smokers representative of the US population of cigarette smokers at the time of wave V1 data collection. In other words, variable kWTS203v is the analogue of variable kWTS201v, but for the reduced sample.

3- Variable kWTS303v is the analogue of variable kWTS301v, but for the reduced US sample of 649 respondents who were e-cigarette users at the time of wave V1 data collection.

4- Variable kWTS403v is the analogue of variable kWTS401v, but for the reduced US sample of 542 respondents who were dual users at the time of wave V1 data collection.

5- Variable kWTS503v is the analogue of variable kWTS501v, but for the reduced US sample of 330 respondents who were quitters at the time of wave V1 data collection.

6- Variable kWTS603v is the analogue of variable kWTS601v, but for the reduced US sample of 1996 respondents who were tobacco users (i.e., cigarette smoker and/or e-cigarette users) at the time of wave V1 data collection.

7- Variable kWTS103v is the analogue of variable kWTS101v, but for the reduced US sample of 2239 respondents. Hence, the same cautionary notes listed for variable kWTS101v also applies here.

2.2.3 Cross-sectional weights for the Australian e-cig users

As mentioned at the beginning of section 2.2, the following 4 sets of weights only applies to the Australian sample of 816 respondents (235 from the main sample and 581 from the CCV sample; see table 3) that were using e-cigarettes at the time of wave V1. No such weights were computed for respondents from the US, Canada, England or for Australian respondents that are not e-cigarette users.

It should first be mentioned that CCV vaper sample (identifiable via the variable kOWNERID in the dataset) consists of self-selected individuals recruited mainly through on-line sites. They are a group of vaper activists and early adopters. They are thus not a representative sample of vaper users in Australia. This is why those respondents are excluded from the 7 sets of weights computed in section 2.2.1. Nevertheless, respondents from the CCV sample can be of scientific interests, and some data users might want to include them in their analyses. This is why the following 4 sets of weights were computed.

5Use kOWNERID=7 to select the 581 Australian respondents from the dedicated CCV sample.
The initial plan was to compute weights for the entire/full sample of 2085 Australian respondents. Though this was technically possible, those weights would have been unstable. It was thus decided to instead compute weights for the 816 respondents that were using e-cigarettes at the time of wave V1. There are 617 quitters (individuals who have quit cigarette smoking within the last 2 years) in the full sample. Of those, only 122 (or 19.7%) are not e-cigarette users. However, according to the 2016 NDSHS data, 96.4% of those who quit within the last two years are not using e-cigarettes. This huge difference between the ITC sample of quitters and the 2016 NDSHS target data results in the weights of quitters who do not use e-cigarettes being extremely large (the average weight of a quitter who does not use e-cigarette is about 200 times that of a quitter who uses e-cigarettes); making the weights unstable.

1- Variable kWTS304v contains the wave V1 cross-sectional inflation weights for the Australian sample of 816 respondents (235 from the main sample and 581 from the CCV sample; see table 3) that were using e-cigarettes at the time of wave V1. These weights were computed in a very similar way as the wave V1 cross-sectional inflation weights for the main sample (see variable kWTS100v in section 2.2.1). However, respondents were first divided into three (dual users, e-cigarette only users and quitters using e-cigarettes) instead of for user groups. The weights were then calibrated (user group × gender, user group × age group, and the 2 quitter sub-groups) based on figures from the 2016 NDSHS.

2- Variable kWTS305v contains the rescaled wave V1 cross-sectional weights for the 816 (235 from the main sample and 581 from the CCV sample; see table 3) Australian respondents who were e-cigarette users at the time of wave V1 data collection. These are simply the wave V1 cross-sectional inflation weights (variable kWTS304v) of those 816 respondents rescaled to sum to sample size (i.e., 816). These weights are designed to make these 816 e-cigarette users representative of the Australian population of e-cigarette users at the time of wave V1 data collection. In other words, variable kWTS305v is the analogue of variable kWTS301v, but for all 816 Australian e-cigarette users.

3- Variable kWTS405v is the analogue of variable kWTS401v, but for the 292 (192 from the main sample and 100 from the CCV sample; see table 3) Australian respondents who were dual users at the time of wave V1 data collection.

4- Variable kWTS505v contains the rescaled wave V1 cross-sectional weights for the 495 (38 from the main sample and 457 from the CCV sample; see table 3) Australian respondents who had quit cigarette smoking but were using e-cigarettes at the time of wave V1 data collection.

### 2.3 Inflation versus rescaled weights

The main reason for rescaling the weights is to facilitate joint analyses involving data from multiple ITC countries. Taking wave V1 as an example, from the data used to calibrate the
weights, there were about 39.8 million cigarette smokers in the United States at the time of wave V1 data collection; whereas there were only 3.6 millions such individuals in Canada, 7.4 millions in England and 2.7 millions in Australia. Hence, any joint analysis using data from all four countries will be dominated by the US if the inflation weights (i.e., variables k\text{WTS100v} or k\text{WTS102v}) are used.

On the other hand, the various rescaled weights sum to the sample size, as described above. Hence, if the rescaled weights are used, England and Canada will have a slightly greater impact on the results (since the Canadian and British sample sizes are larger than the Australian and US samples; see table 3), but no country will dominate the analysis. In summary, rescaling the weights to sum to the sample size is a simple and efficient way to make countries with different population sizes comparable. This also holds true when comparing 4CV data to other ITC countries; for example, ITC Netherlands and ITC 6E.

Last but not least, it should be mentioned that rescaling the weights will not affect the results when estimating population means and proportions/percentages, as well as when fitting various statistical models (e.g., logistic and linear regressions). However, the rescaled weights should not be used to estimate population totals (e.g., the total number of daily smokers or e-cigarette users).

### 2.4 Additional remarks

#### 2.4.1 Cautionary note about quitters

As mentioned above (see variable k\text{WTS501v}), the vast majority of quitters in the ITC 4CV sample were initially recruited as smokers. Since quitting is one of the reasons for dropping out of the ITC Survey, quitting experience of our cohort respondents could well be affected by being in the sample and because of the sampling design itself, quitters in the ITC 4CV sample should not be considered to be representative of quitters in the population. For example, comparisons between the quitters in the ITC sample and quitters in the cross-sectional Smoking Toolkit Study showed an important discrepancy in distribution of length of time quit.

As described in the section detailing the construction of the wave V1 cross-sectional inflation weights (see variable k\text{WTS100v}), the sampling weights of quitters were calibrated on gender, age group, geographic region, ethnicity (US only), education (except for Canada), language (Canada only) and use of e-cigarettes \times length of quit (\leq 1 year vs. > 1 year). Quitters in the ITC 4CV sample should thus be representative of the population in terms of those variables, but not in terms of other related attributes. Again, they are an imperfect sample when it comes to be representative of the whole population of quitters.

#### 2.4.2 Cautionary note about e-cigarette users

Comparisons on measures related to e-cigarettes between the 4CV1 Survey and other ITC countries must be viewed with caution, as weight construction for the 4CV1 Survey was done in a different fashion than of other ITC countries.
As described in the section detailing the construction of the wave V1 cross-sectional inflation weights (see variable kWTS100v), weights were computed by first dividing respondents into four broad user groups: cigarette only users, dual users, pure e-cigarette users and quitters. The sampling weights of dual users and of quitters were then calibrated on gender, age group, geographic region, ethnicity (US only), education (except for Canada) and language (Canada only), whereas those of pure e-cigarette users were calibrated on gender and age group. The sampling weights of quitters were also calibrated on use of e-cigarettes and length of quit (≤ 1 year vs. > 1 year). In other ITC countries, separate estimates for the number of individuals that are dual users and individuals that only smoke cigarettes were not available at the time of weight calculation. Hence, the weights were calibrated using smoking prevalences (often by age/gender groups and/or geographic regions), and thus have no special adjustment for e-cigarette usage.

2.4.3 Covariates to include in statistical modelling

As with other surveys, it is good practice to include the survey design variables and the variables used in the weight construction, when fitting statistical models (e.g, linear or logistic regression models) using ITC 4CV data. Hence, we highly recommend that any statistical model includes the following covariates:

- gender (labelled sex in the dataset)
- age (labelled kAGE, continuous, and kageGroup, categorical, in the dataset)
- user group (labelled kUserGroup in the dataset); see description of the kWTS100v weight variable.

The geographic region (labelled kStrata in the dataset) should also be used as the stratification variable in the statistical software. Though somewhat less essential, users should also strongly consider adding the following covariates:

- ethnicity (labelled ethnic in the dataset), when fitting models using US data
- education (labelled kDE312v in the dataset), when fitting models using US, English and/or Australian data
- language (labelled kcaFrench in the dataset), when fitting models using Canadian data
- use of e-cigarettes and/or length of quit (labelled kQuitGroup in the dataset), when fitting data using quitters; see description of the kWTS100v weight variable
- frequency of use of e-cigarettes/vaping (labelled kEC309v in the dataset), when fitting models with e-cigarettes users.
3 Data Collection & Sampling Design

3.1 ITC 4C Survey

Respondents in these countries had previously been surveyed in the ITC Four Country (4C) Survey, as described at http://www.itcproject.org/methods. The respondents of the first few waves of the ITC 4C Survey were recruited by telephone. Telephone recruitment continued in later waves, but was eventually supplemented by recruitment from commercial panels in Canada (wave 9), the UK (waves 9 and 10) and the US (wave 9), as more and more of the sample (including telephone recruits) were responding online. Respondents (mainly the telephone recruits) for whom contact information has been retained by the ITC Project are referred to as the ITC-owned in this document.

3.2 Data Collection and Recruitment

- During the design stage of ITC 4CV, it was decided that all survey response data would be collected through an online questionnaire, hosted by the Survey Research Centre at the University of Waterloo. This requirement was later relaxed for 46 respondents in the US, who were members of the ITC-owned cohort and who agreed to participate by telephone, but not online.

- All members of the ITC-owned cohort were to be invited to the new study. (Exception: In Australia, those who had been quit for more than 24 months at Wave 10 of the ITC 4C Survey were not contacted for the new study.)

- New respondents in each country were to be obtained from the best possible survey firms and sources, subject to budgetary constraints. In Australia, the main part of the sample was a custom-recruited by telephone and in part obtained from a partner (SSI) by the firm Roy Morgan Research; in the US, Canada and England, firms with online panels supplied the recruits.

3.3 Sample Sizes and Inclusion Criteria

- US, Canada and England
  
  ○ In the US, Canada and England, the sample consisted primarily of cigarette smokers or recent (within past 24 months) quitters of cigarette smoking, aged 18 and over.
  
  ○ Because of the importance of studying younger smokers, it was decided to obtain altogether 500 such individuals in the 18–24 age group in the US and 900 in England, and 750 in Canada. The sample sizes in Canada and England are larger because of the expected lower retention rates between waves 1 and 2.
○ The wave 1 sizes of the samples aged 25 & older were chosen so as to provide at least 1400 who would be present in both waves 1 and 2 (about 18 months later), according to retention rate estimates provided by the firms at the design stage.

○ As well, an additional sample of 500 at-least-weekly users of e-cigarettes were to be recruited in the US and England, and 715 in Canada.

○ In Canada, geographic quotas crossed with language (i.e., French vs English) were applied to each of the three groups: 18–24 smokers (and recent quitters), 25 & older smokers (and recent quitters), and the sample of 715 e-cigarette users.

○ In the US, geographic quotas were used for the sample of 18–24 smokers (and recent quitters) and for the sample of e-cigarette users. No quotas were used for the sample of 25 & older smokers (and recent quitters), as the majority of those individuals were cohort members from the ITC 4C Survey.

○ In England, geographic quotas crossed with sex were applied to the 18–24 age group of smokers (and recent quitters). For the sample of e-cigarette users, only geographic quotas were used; whereas, geographic quotas crossed with sex and age group (i.e., 25–34 vs 35–49 vs 50 & older) were used for the sample of 25 & older smokers (and recent quitters).

• Australia

○ In Australia, the sample was to consist mainly of cigarette smokers or recent (within past 24 months) quitters of cigarette smoking, aged 18 and over.

○ The sample size was to be approximately 1500, determined by the available budget.

○ Male/female crossed with geographic quotas were applied.

○ As well, an additional sample of users of e-cigarettes (vapers) was to be recruited by Cancer Council Victoria by referral sampling from vaper sites. This technique eventually yielded 581 respondents.

3.4 Sample Sources

• US

○ The ITC-owned members invited were wave 9 respondents who had been recruited as smokers by telephone in waves 1 through 8, and recruited as smokers or recent quitters by telephone or by the firm GfK (probability-based online KnowledgePanel) in wave 9.

○ ITC 4CV new recruits who were being recruited as smokers or recent quitters in the 25 & older age group were supplied by the GfK KnowledgePanel.

○ ITC 4CV new recruits who were being recruited as smokers or recent quitters in the 18–24 age group were supplied from an opt-in panel by the GfK partner Lucid.
The sample of 500 who were being recruited as e-cigarette users (but who could also be smokers) was supplied by Ipsos US.

There were also 238 additional smokers supplied by Ipsos US because of a quota programming issue, and retained in the sample.

- Canada
  - The ITC cohort members invited were wave 9 respondents who had been recruited as smokers by telephone in waves 1 through 8, and recruited as smokers by telephone or by the firm Léger (probability-based online panel) in wave 9.
  - ITC 4CV new recruits aged 18 & older who were being recruited as smokers or recent quitters were supplied by Léger, where possible from their probability-based panel.
  - The sample of approximately 715 who were being recruited as e-cigarette users (but who could also be smokers) was also supplied by Léger.

- England
  - The ITC cohort members invited were wave 10 respondents who had been recruited as smokers by telephone in waves 1 through 10. Those supplied by the online panel firm EMI in waves 9 and 10 were not included.
  - ITC 4CV new recruits aged 18 & older who were being recruited as smokers or recent quitters were supplied by Ipsos UK, where possible from their own panel.
  - The sample of approximately 500 who were being recruited as e-cigarette users (but who could also be smokers) was also supplied by Ipsos UK.

- Australia
  - The ITC cohort members invited were wave 10 respondents who had been recruited as smokers by telephone in waves 1 through 10, and had not been quit by more than 24 months at wave 10.
  - ITC 4CV new recruits aged 18 & older who were being recruited as smokers or recent quitters were custom recruited by Roy Morgan Research.
  - The additional sample of 581 users of e-cigarettes (vapers) was recruited by Cancer Council Victoria by referral sampling from vaper sites.

3.5 Sampling Protocols

- Canada and England
  In Canada and England, all new respondents were being recruited from the same sources, regardless of smoking and e-cigarette use status. Both Léger and Ipsos found it most economical to give priority to filling the e-cigarette user quotas, and thus to begin with, dual users or recent quitters who used e-cigarettes were assigned to the
e-cigarette user quotas; as these were filled, dual users and recent quitters who used e-cigarettes were assigned to the smoker/recent quitter quotas. However, the e-cigarette user quotas were not filled until relatively late in the fieldwork period. Thus, in each of Canada and England, the overall new sample in each age-sex-geography group should be approximately representative of the corresponding Léger or Ipsos population which is the union of smokers, recent quitters and e-cigarette users.

When the ITC cohort respondents are put together with the new recruits, discrepancies from the overall population in proportions of cigarette only users, dual users, and e-cigarette only users (and, to some extent, quitters who use neither) can be corrected in the combined sample by weighting; the weights are expected to be fairly smooth within age groups (18–24 and 25 & older).

- **US**

In the US, in each age group, the new recruit sample had two separate pieces: one part consisted of those recruited as smokers or recent quitters (who could also be e-cigarette users), and one part consisted of those recruited as e-cigarette users (who could also be smokers or recent quitters). An unweighted combination of the two samples would be expected to depart from representativity. For example:

- The relative proportions of the group who use cigarettes only and the group who use e-cigarettes only would not reflect their proportions in the population, because these sample groups come from different sources;
- There are two groups of recent quitters: those recruited with smokers and recent quitters and those recruited as e-cigarette users. The overall sample is thus likely to over-sample recent quitters who are e-cigarette users and under-sample those who are not.

When the ITC cohort respondents are put together with the new recruits, discrepancies from the overall population in proportions of cigarette only users, dual users, and e-cigarette only users are corrected in the combined sample by weighting.

- **Australia**

The situation in Australia resembles that in the US, with the new part of the sample being recruited in two pieces, and the added difficulty that the CCV vaper sample is quite different from the subsample of e-cigarette users in the main sample, in terms of age-sex composition, socioeconomic status (SES), and frequency of vaping.

When the ITC cohort respondents are put together with all the new recruits, discrepancies from the overall population in proportions of cigarette only users, dual users, and e-cigarette only users will be corrected to a large extent in the combined sample by weighting according to demographics and geography.
3.6 Cautionary notes

- Although it offers rich possibilities for analysis, the ITC 4CV Survey is not particularly well suited for estimation of prevalences. The weighted data will give prevalences of cigarette, e-cigarette and dual use that match those of the national health surveys used to calibrate the weights. However, because of rapid change in patterns of use, the calibration figures may not correspond well to the pattern which existed at the time of data collection.

- If the desired analysis involves quitters or comparison of quitters and smokers, please contact the DMC for advice.

- Cross country analyses, even among the four countries of the survey, should take into account differences in sample composition with respect to demographics, time-in-sample, and perhaps other characteristics.

- When comparing characteristics of e-cigarette users across groups or countries, controlling for frequency of use is advised.
Appendix: pseudo code

Pseudo code detailing how variables kUserGroup and kQuitGroup were created (for US, Canada and England). The code for Australia is identical, with the exception that cut-off for quitters is 2 years instead of 5.

```plaintext
if {smokes cigarettes at least monthly (ie, kFR309v in (1,2,3))}
    and {uses e-cig less than once a month or not at all
    (ie, kEC309v in (4,5,6,7,8) or kNC304=4)}
    then kUserGroup=1; /* cig only */;
else if {smokes cigarettes at least monthly (ie, kFR309v in (1,2,3))}
    and {uses e-cig at least monthly (ie, kEC309v in (1,2) or kNC304=3)}
    then kUserGroup=2; /* dual user */;
else if {never smoked cigarette or quit over 5 years
    (ie, kFR309v=9 or kQA439=10)}
    and {uses e-cig at least monthly (ie, kEC309v in (1,2) or kNC304=3)}
    then kUserGroup=3; /* pure ecig */;
else if {quit cigarette smoking (ie, kFR309v in (4,8))}
    then kUserGroup=4; /* quitter */;

if {quitters (ie, kUserGroup=4)} then do;
    if {quit within the last 12 months (ie, kQA439<=6)}
        and {uses e-cig at least monthly (ie, kEC309v in (1,2) or kNC304=3)}
        then kQuitGroup=1;
    else if {quit 1–5 years ago (ie, 6 < kQA439 <= 9)}
        and {uses e-cig at least monthly (ie, kEC309v in (1,2) or kNC304=3)}
        then kQuitGroup=2;
    else if {quit within the last 12 months (ie, kQA439<=6)}
        and {uses e-cig less than once a month or not at all
        (ie, kEC309v in (4,5,6,7,8) or kNC304=4)}
        then kQuitGroup=3;
    else if {quit 1–5 years ago (ie, 6 < kQA439 <= 9)}
        and {uses e-cig less than once a month or not at all
        (ie, kEC309v in (4,5,6,7,8) or kNC304=4)}
        then kQuitGroup=4;
end;
```