

# - Technical Report - 2016 Health, Work and Retirement (HWR) survey

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**Report Prepared by**

**Joanne Allen**

**Health & Ageing Research Team**

**Massey University**

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## Background: the 2016 Health, Work and Retirement survey

The New Zealand Health, Work & Retirement (HWR) study is an initiative of Massey University's Health & Ageing Research Team (HART). The HWR study aims to track and describe factors associated with health, retirement and 'ageing well' in the older New Zealand population. Since commencing in 2006, study methods have included a biennial longitudinal postal survey, face to face qualitative and cognitive interviews, an online survey pilot, and data linkage with national health and mortality records. Participant cohorts in the HWR have been drawn from random samples of persons aged over 50 years who are listed on the New Zealand electoral roll, on which around 97.6% of eligible voters aged over 50 years are enrolled<sup>1</sup>. In 2006 and 2016, the population samples have included an over-sampling of persons listed on the electoral roll as being of Māori descent, so as to adequately represent this important section of the older New Zealand community.

The 2016 HWR postal survey, which is the focus of this report, represents the 10 year follow up of the original cohort recruited in 2006, the seven year follow-up of cohorts recruited in 2009, and the two-year follow-up of the cohort recruited in 2014. Follow-up of the cohort recruited in 2010 was concluded in 2012. The 2016 protocol continues the 'refresh' recruitment of new cohorts of persons aged 55-65 to the HWR study.

Funded by the Ministry of Business, Innovation and Employment, the 2016 HWR survey has a focus on housing tenure and quality among the older New Zealand population and how this facilitates social connections. Additionally, the 2016 survey represents a move to combine the recruitment of new participants to the study with a concurrent approach for consent to participation in the HART health data linkage project. Details of approaches to existing longitudinal HWR participants for consent to participate in the HART health data linkage project are detailed elsewhere<sup>2</sup>.

## Investigators

Professor Christine Stephens, Professor Fiona Alpass, Dr Sally Keeling (Otago University), Dr Mary Breheny and Mr Brendan Stevenson.

## Other project team members

Dr Andy Towers, Dr Joanne Allen, Dr Agnes Szabo, Ms Vicki Beagley.

## Ethics and funding

**HEC:** Southern A Application – 15/73; Health, Work and Retirement survey 2016-2018

**Funding** Ministry of Business, Innovation and Employment (MAUX1403)

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<sup>1</sup> Accessed from the New Zealand Electoral Commission, 18th January, 2017: <http://www.elections.org.nz/research-statistics/enrolment-statistics-electorate>. Calculations based on estimated population statistics as at 30 June 2016 (Provisional) using 2013 census data and enrolment statistics as at 31 December 2016

<sup>2</sup> Allen, J. (2016). *Health, Work and Retirement (HWR) National Health Data Linkage Project '14-'15: approach protocol and response*. Technical report for the Health, Work and Retirement Study. Palmerston North: Massey University.

## Method

The 2016 Health, Work and Retirement survey comprised a 24 page postal survey to persons who had participated previously in the survey between 2006-2016 ('existing participants'), as well as a new sample invited to participate in the study for the first time (2016 'refresh' cohort). All materials sent to participants are provided in Appendix 1.

Participants were sent:

- an **initial approach** comprised of an introductory letter, information sheet, survey booklet and reply paid return envelope (23<sup>rd</sup> June, 2016);
- a **first reminder** sent 2 weeks later, comprised of a postcard thanking persons who had returned the survey and asking those who had not to do so (8<sup>th</sup> July 2016), and;
- those who had not returned the survey (or otherwise notified as being lost to contact) after 8 weeks were sent a **second reminder** (approximately 9 weeks after the initial approach), comprised of a final reminder letter, information sheet, survey booklet and a reply paid return envelope (majority sent 23<sup>rd</sup> August 2016).

### Differences in approach to new and existing participants

New participants were additionally approached for their written consent to participate in the health data-linkage component of the study. Their information sheet included information related to the health data-linkage component and they were also sent a consent form. Existing participants had been previously approached for consent to data linkage and were not approached again (see Allen, 2016)<sup>3</sup>.

To facilitate future follow up of new participants, the last page of their survey booklet also included a tear-out form on which they were given the option provide their phone and email contact details and those of an alternative contact person in the case that the participant was unable to be contacted. This form was removed prior to data entry and stored separately from participant data. Existing participants had been requested to provide this information previously, and were not asked again in the 2016 survey approach.

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<sup>3</sup> Allen, J. (2016). *Health, Work and Retirement (HWR) National Health Data Linkage Project '14-'15: approach protocol and response*. Technical report for the Health, Work and Retirement Study. Palmerston North: Massey University.

## Participant sample

### Existing participants

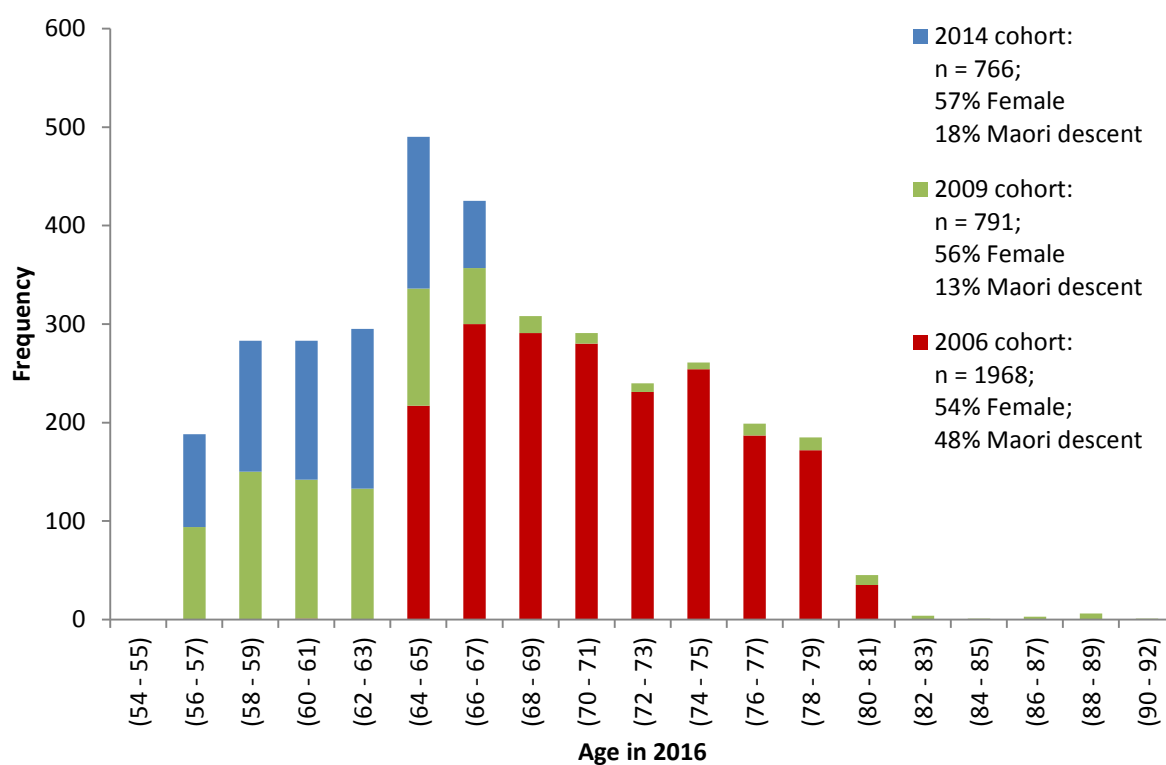
#### Inclusion criteria

Persons who were from cohorts recruited in 2006, 2009, and 2014 were surveyed in 2016 if they were not excluded (deceased, withdrawn, relocated overseas) or lost to contact (that is, there was evidence that persons no longer lived at the address and forwarding details were not available, including: mail RTS and no forwarding details available AND phone disconnected OR phone contact indicated the person was no longer at the premises and no forwarding address was available). Further details are provided in the reported section addressing the 2016 response rate.

#### Demographic profile

The age, gender and Māori descent profile of existing participants approached for participation in the 2016 survey by cohort are presented in Figure 1.

**Figure 1. Demographic profile of existing survey participants approached in 2016 survey by cohort recruitment year.**



## New 2016 refresh cohort

The aim of recruiting the 2016 ‘refresh’ cohort was to recruit a new representative sample of New Zealand residents of Māori and non-Māori descent who were aged 55-65 years in 2016. As part of this approach, new participants were also asked for consent to participate in both the longitudinal survey and the health data-linkage study.

### Sample frame

As per the 2006 sampling protocol (Towers, 2007)<sup>4</sup>, an oversampling of persons indicated as being of Māori descent in the New Zealand electoral roll (current at 4<sup>th</sup> March, 2016) was undertaken to provide adequate observations within this population for the purposes of representation and analysis. All persons on the electoral roll who were born between 05/03/1951 and 04/03/1961 (aged 55-65 in 2016) were assessed for inclusion in the study. Those who resided outside New Zealand ( $n = 8048$ , 1.53%) and those who had responded to a previous Health, Work & Retirement survey ‘06-‘14 were excluded from the sample. The remaining eligible persons enrolled on the NZ electoral roll were assigned a random number. A ‘general’ sample was randomly selected from within all eligible persons enrolled on the electoral roll. A ‘Māori descent’ sample was selected from within remaining persons who were identified as being of Māori descent on the electoral roll.

### Target sample size

The target sample size was based on established guidelines, with reference to the size of the populations of interest as indicated in the 2013 New Zealand census. Briefly, as per the 2006 sampling strategy, the Dillman (2014) sample size calculation for population surveys, employing a finite population correction (see Box 1) was used to calculate the target responding sample size. Based on 2013 census data, it was determined that a general population sample of  $n = 1066$  participants and a Māori sample of  $n = 1044$  participants would be required to adequately represent the populations of interest.

#### BOX 1. Dillman (2014) sample size calculation formulae

General formula:

$$N_s = (Z^2 * p * q) / MoE^2$$

Formula with a *finite population correction* (*fpc*), which accounts for the size of the target population in the calculation:

$$N_{s(fpc)} = (N_p * p * q) / \{ (N-1) * (MoE/z)^2 + p * q \}$$

Where

$n$  = completed sample size needed for desired level of precision

$p$  = the proportion being tested

$q = 1 - p$

MoE = the desired margin of sampling error

$z$  = the z-score or critical value for the desired level of confidence

$N_p$  = the size of the target population

<sup>4</sup> Towers, A. J. (2007). Methodology. In, Health, Work and Retirement Survey: Summary report for the 2006 data wave. Palmerston North: School of Psychology, Massey University

## Approach sample size

As the approach method for the 2016 survey closely matched that employed in 2006, response rates for 2006 were used to project response rates and to calculate the initial approach sample size. Table 2 shows the response rate following the initial 2006 survey mail out, the first reminder, the second reminder and the final reminder (which was not included in the 2016 protocol). More recent response rates for the cohort recruited in 2014 were also considered.

**Table 1 Response rates to 2006 survey mail out by protocol phase**

|   | N responses<br>subsequent to phase | % responses<br>attributable to<br>phase | Cumulative %<br>responses to phase |
|---|------------------------------------|---|------------------------------------|
| Pre-survey notification                         | -                                  | -                                       | -                                  |
| Initial survey mail out with incentive (magnet) | 3751                               | 29%                                     | 29%                                |
| Reminder 1                                      | 1785                               | 14%                                     | 42%                                |
| Reminder 2                                      | 973                                | 7%                                      | 50%                                |
| Final reminder                                  | 153                                | 1%                                      | 51%                                |
| <b>Overall</b>                                  | <b>6662</b>                        | <b>51%</b>                              | <b>51%</b>                         |

Table 3 shows the response rates for the Māori and general sub-samples within the 2006 cohort and the response rates for persons of Māori descent and non-Māori descent in the 2014 refresh sample. It was considered that the low response rate to the 2014 survey may be attributable to the timing of the survey over the Christmas break period, the delay in reminder post card, which was delivered approximately four months after the initial survey, and the absence of a second reminder (re-posting of survey). Further details of the 2006, 2014 and 2016 survey protocols are provided in the *Method* section of this report.

**Table 2 Response rate by Māori descent in 2006 and 2014**

| Sample               | 2006         |                | 2014          |                |
|----------------------|--------------|----------------|---------------|----------------|
|                      | Māori sample | General sample | Māori descent | General sample |
| N sampled            | 7781         | 5264           | 583           | 2317           |
| N responded          | 3558         | 3103           | 147           | 626            |
| <b>Response rate</b> | <b>46%</b>   | <b>59%</b>     | <b>25%</b>    | <b>27%</b>     |

Accounting for the lack of pre-notification, final reminder and unconditional incentive components of the 2006 survey protocol, it was projected that a response rate of 43% could be expected for the Māori descent sample and 57% for the general sample in the 2016 survey approach to new 2016 refresh cohort. Using these projections, an initial Māori descent sample of  $n = 2428$  persons and a general sample of  $n = 1870$  persons were approached to achieve the target sample size.

## Characteristics of the 2016 refresh cohort sampling frame and approach samples

The tables below describe the size, age and Māori descent profile of: 1) the sampling frame (electoral roll); 2) the 2016 refresh sample overall; 3) the general sample, and 4) the Mori descent sample. These may be used for generating survey weights and for initial assessment of bias associated with survey response.

### 1) Electoral roll (n = 525,045):

#### 11.9% Māori descent

| Start_Year | End_Year  | Age     | %     |
|------------|-----------|---------|-------|
| 5/03/1951  | 4/03/1952 | (64-65) | 8.8   |
| 5/03/1952  | 4/03/1953 | (63-64) | 9.0   |
| 5/03/1953  | 4/03/1954 | (62-63) | 9.2   |
| 5/03/1954  | 4/03/1955 | (61-62) | 9.5   |
| 5/03/1955  | 4/03/1956 | (60-61) | 9.8   |
| 5/03/1956  | 4/03/1957 | (59-60) | 10.1  |
| 5/03/1957  | 4/03/1958 | (58-59) | 10.4  |
| 5/03/1958  | 4/03/1959 | (57-58) | 10.7  |
| 5/03/1959  | 4/03/1960 | (56-57) | 11.0  |
| 5/03/1960  | 4/03/1961 | (55-56) | 11.4  |
| Total      |           |         | 100.0 |

### 2) Refresh sample overall (n = 4298):

#### 61.8% Māori descent

| Start_Year | End_Year  | Age     | %     |
|------------|-----------|---------|-------|
| 5/03/1951  | 4/03/1952 | (64-65) | 7.6   |
| 5/03/1952  | 4/03/1953 | (63-64) | 8.5   |
| 5/03/1953  | 4/03/1954 | (62-63) | 9.0   |
| 5/03/1954  | 4/03/1955 | (61-62) | 8.9   |
| 5/03/1955  | 4/03/1956 | (60-61) | 9.5   |
| 5/03/1956  | 4/03/1957 | (59-60) | 9.5   |
| 5/03/1957  | 4/03/1958 | (58-59) | 10.1  |
| 5/03/1958  | 4/03/1959 | (57-58) | 11.6  |
| 5/03/1959  | 4/03/1960 | (56-57) | 12.5  |
| 5/03/1960  | 4/03/1961 | (55-56) | 12.7  |
| Total      |           |         | 100.0 |

### 3) General refresh sample (n = 1870):

#### 12.2% Māori descent

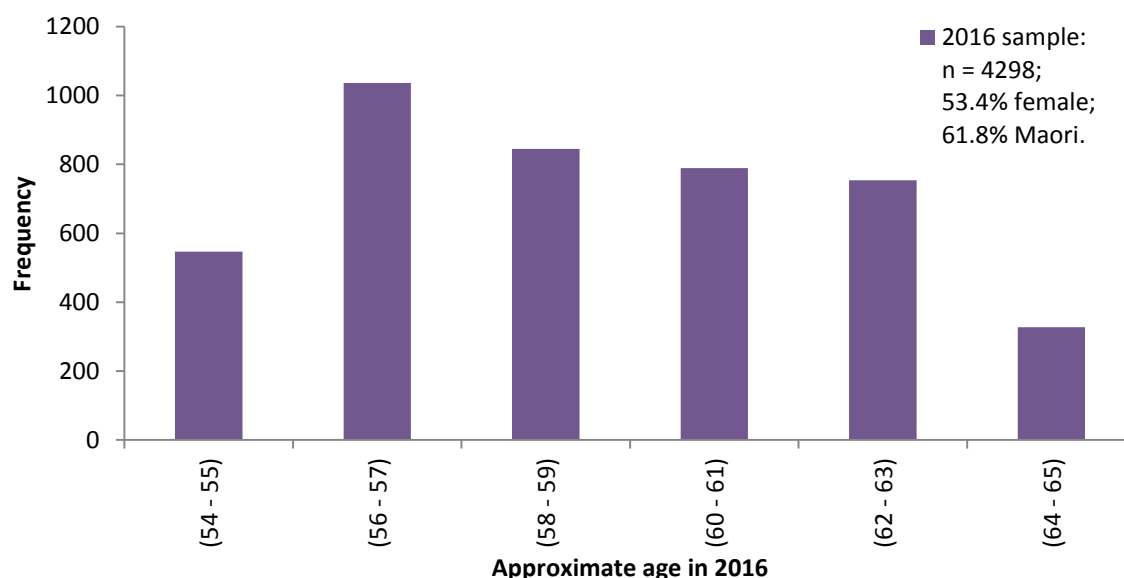
| Start_Year | End_Year  | Age     | %     |
|------------|-----------|---------|-------|
| 5/03/1951  | 4/03/1952 | (64-65) | 8.1   |
| 5/03/1952  | 4/03/1953 | (63-64) | 8.1   |
| 5/03/1953  | 4/03/1954 | (62-63) | 10.8  |
| 5/03/1954  | 4/03/1955 | (61-62) | 9.4   |
| 5/03/1955  | 4/03/1956 | (60-61) | 8.5   |
| 5/03/1956  | 4/03/1957 | (59-60) | 10.0  |
| 5/03/1957  | 4/03/1958 | (58-59) | 10.2  |
| 5/03/1958  | 4/03/1959 | (57-58) | 11.1  |
| 5/03/1959  | 4/03/1960 | (56-57) | 11.7  |
| 5/03/1960  | 4/03/1961 | (55-56) | 12.1  |
| Total      |           |         | 100.0 |

### 4) Māori descent sample (n = 2428):

#### 100% Māori descent

| Start_Year | End_Year  | Age     | %     |
|------------|-----------|---------|-------|
| 5/03/1951  | 4/03/1952 | (64-65) | 7.2   |
| 5/03/1952  | 4/03/1953 | (63-64) | 8.9   |
| 5/03/1953  | 4/03/1954 | (62-63) | 7.6   |
| 5/03/1954  | 4/03/1955 | (61-62) | 8.5   |
| 5/03/1955  | 4/03/1956 | (60-61) | 10.2  |
| 5/03/1956  | 4/03/1957 | (59-60) | 9.1   |
| 5/03/1957  | 4/03/1958 | (58-59) | 10.1  |
| 5/03/1958  | 4/03/1959 | (57-58) | 12.0  |
| 5/03/1959  | 4/03/1960 | (56-57) | 13.1  |
| 5/03/1960  | 4/03/1961 | (55-56) | 13.2  |
| Total      |           |         | 100.0 |

Figure 1 Demographic profile of 2016 refresh sample approached in 2016 survey.





## HWR 2016 survey response

A total of  $n = 4035$  responses to the 2016 survey were received.  $N = 6$  were excluded due to mismatch between previously recorded and reported demographic (date of birth, gender) data.  $N = 1$  response was excluded as the participant subsequently withdrew from the study. As such,  $n = 4028$  survey respondents were included in the 2016 data set.

## Response cleaning

The gender and date of birth reported by responders to the 2016 survey were assessed for consistency against those previously reported (gender, date of birth) and information from the electoral role (gender, year of birth range). One digit difference in reported day OR month OR year of birth was allowed as long as reported gender also matched previous records (e.g., reported date of birth and gender 25/05/1958 Female *vs.* existing record of 27/05/1958 Female 1957-1958). Where it was apparent that a mix-up between dd/mm/yyyy and mm/dd/yyyy formats had occurred, a match was also recorded as long as the remaining information matched existing records for the participant (e.g., reported date of birth and gender 11/12/1954 Male *vs.* existing record of 12/11/1954 Male 1954-1955). Similarly reported gender was allowed to vary as long as reported date of birth was consistent with previously reported date of birth, electoral start/end year (i.e., 25-May-1958 Male *vs.* existing record 25-May-1958 Female 1958-1959).

$N = 6$  responses received reported combinations of gender and/or date of birth that were considered inconsistent with recorded data. These survey responses were excluded from the dataset and participants noted as not responding to the survey. A participant was considered lost to contact but participant's study participation status remained 'active'.  $N = 36$  participants ( $n = 31$  existing,  $n = 5$  2016 refresh cohort) reported neither their date of birth or gender in the 2016 survey and were considered matches by default. Gender and approximate age values were obtained from electoral roll details and input into the dataset.

## Response rate by cohort

Overall,  $n = 4028$  (51.5%) survey responses to the 2016 survey were received. Table 4 presents data on response rate by cohort for the cohort's original year of recruitment and 2016 survey response.

**Table 3 Approach size and response rate by cohort at original approach and 2016 survey.**

| Year cohort recruited | Approach and response at original recruitment |                   |              | Approach and response at 2016 survey |                    |                    | 2016 response rate as % of original approach sample |
|-----------------------|---|-------------------|--------------|--------------------------------------|--------------------|--------------------|---|
|                       | Sample size                                   | <i>n</i> response | % response   | Sample size                          | N response in 2016 | 2016 response rate |   |
| <b>2006</b>           | <b>13045</b>                                  | <b>6661</b>       | <b>51.1%</b> | <b>1968</b>                          | <b>1563</b>        | <b>79.4%</b>       | <b>12.0%</b>  |
| <i>GS/GM</i>          | 5264  | 3103              | 58.9%        | 1078                                 | 917                | 85.1%              | 17.4%   |
| <i>MS</i>             | 7781  | 3558              | 45.7%        | 890                                  | 646                | 72.6%              | 8.3%  |
| <b>2009</b>           | <b>4502</b>                                   | <b>1000</b>       | <b>22.2%</b> | <b>791</b>                           | <b>586</b>         | <b>74.1%</b>       | <b>13.0%</b>  |
| <i>RP</i>             | 3002  | 555               | 18.5%        | 607                                  | 432                | 71.2%              | 14.4%   |
| <i>NZP</i>            | 1500  | 445               | 29.7%        | 184                                  | 154                | 83.7%              | 10.3%   |
| <b>2014</b>           | <b>2900</b>                                   | <b>774</b>        | <b>26.7%</b> | <b>766</b>                           | <b>607</b>         | <b>79.2%</b>       | <b>20.9%</b>  |
| <i>M</i>              | 583   | 147               | 25.2%        | 141                                  | 91                 | 64.5%              | 15.6%   |
| <i>NM</i>             | 2317  | 627               | 27.1%        | 625                                  | 516                | 82.6%              | 22.3%   |
| <b>2016</b>           | <b>4298</b>                                   | <b>1269</b>       | <b>29.5%</b> | <b>4298</b>                          | <b>1272</b>        | <b>29.6%</b>       | <b>29.6%</b>  |
| <i>MY</i>             | 2428  | 653               | 26.9%        | 2428                                 | 655                | 27.0%              | 27.0%   |
| <i>GY</i>             | 1870  | 616               | 32.9%        | 1870                                 | 617                | 33.0%              | 33.0%   |
| <b>Total</b>          | <b>24745</b>                                  | <b>9704</b>       | <b>39.2%</b> | <b>7823</b>                          | <b>4028</b>        | <b>51.5%</b>       | <b>16.3%</b>  |

Note: GS: general sample, non-Maori descent; GM: general sample, Maori descent; MS: Maori over-sample; RP: Retirement Planning study; NZP: New Zealand Longitudinal Study of Ageing pilot sample; M: 2014 sample, Maori descent; NM: 2014 sample, non-Maori descent; M: 2016 Maori over-sample; GY: 2016 general sample.

### Existing cohort

Of the existing (recruited prior to 2016) longitudinal participants surveyed in 2016 ( $n = 3525$ ),  $n = 2756$  (78.2%) returned a completed survey. The response rate for persons not indicated on the electoral roll as being of Māori descent was higher ( $n = 1916$ , 82.1%) than for persons indicated as being of Māori descent ( $n = 839$ , 70.4%). There was little difference in the response rate for men ( $n = 1216$ , 77.1%) and women ( $n = 1540$ , 79.1%).

Of the 769 existing participants who did not return a completed survey, 11 returned a blank survey, 10 were notified to the study as being recently deceased, 22 contacted the study to withdraw, 215 were considered lost to contact (returned to sender/gone no address postal sticker on returned mail), and 511 received no response.

Table 5 presents the proportion of persons responding in 2016 as a function of the year they last responded to the survey. These response rates suggests that persons who had not responded in the last six years (in this case, since 2010) had a lower than 20% response rate. Of the  $n = 3266$  persons who had responded in the past four years,  $n = 2707$  (82.9%) responded to the 2016 survey. Going forward, to best utilise resources, the study will consider participants who have not responded in the six years prior to a survey wave, ‘lost to contact due to non-response’.

**Table 4 response rate in 2016 by last participation year**

| Participant last responded in: | 2006        | 2008         | 2009          | 2010         | 2012         | 2013         | 2014           | Total          |
|--------------------------------|-------------|--------------|---------------|--------------|--------------|--------------|----------------|----------------|
| N (%) responded in 2016        | 1<br>(20.0) | 16<br>(19.8) | 12<br>(18.8%) | 20<br>(18.3) | 75<br>(38.5) | 22<br>(42.3) | 2610<br>(86.5) | 2756<br>(78.2) |
| N surveyed in 2016             | 5           | 81           | 64            | 109          | 195          | 52           | 3019           | 3525           |

### New 2016 refresh cohort

Of the new 2016 refresh cohort sample ( $n = 4298$ ),  $n = 1272$  (29.6%) returned a survey. The response rate for the general sample ( $n = 617/1870$ , 33.0%) was 6% higher than that for the Māori descent over-sample ( $n = 655/2428$ , 27.0%). Overall  $n = 568/1642$  (34.6%) persons of non-Māori descent and  $n = 704/2656$  (26.5%) persons of Māori descent responded. The response rate for men (28.2%) was 4.9% lower than that for women (31.1%).

Of the 3026 persons who did not return a completed survey, 44 returned a blank survey, 6 were notified to the study as being deceased, 77 contacted the study to say they did not want to participate, 132 were lost to contact (returned to sender/gone to address), and 2767 received no response.

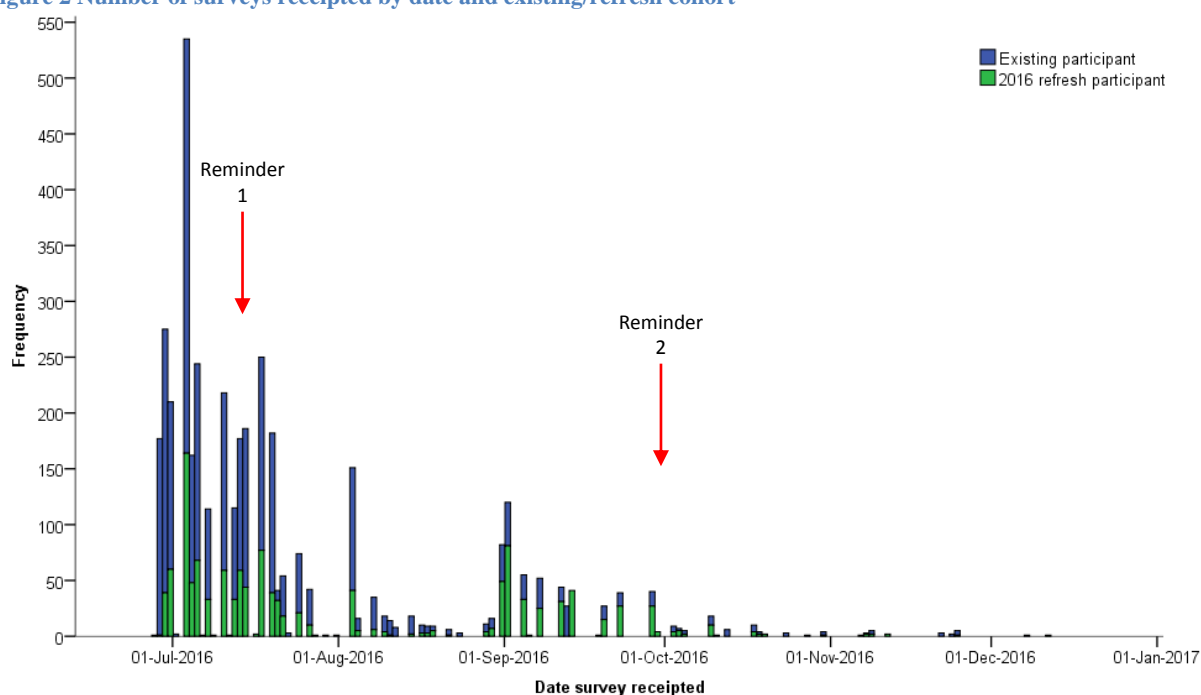
## Response rate by mail out phase

Response rates by cohort and mail out phase were broken down (Table 6, Figure 2) to examine the relative value associated with each mail out phase. Responses received approximately a week after each phase was initiated were attributed that phase. The majority of responses for both cohorts were received within the first two weeks of the initial mail out. The second reminder may have been particularly valuable for attracting responses from the new 2016 refresh cohort, with 30.3% of responses from this cohort received after this phase, compared to 9.6% from the existing cohorts.

**Table 5 Responses by survey protocol phase**

|   | N responses<br>subsequent to phase | % response rate<br>attributable to phase | % of responses<br>received |
|---|------------------------------------|--|----------------------------|
| <b>Over all cohorts</b> ( <i>n</i> = 7822 sent) |                                    |  |                            |
| Initial survey mail out (23/06-13/07)           | 2056                               | 26.3%                                    | 51.0%                      |
| Reminder 1 (14/07-29/08)                        | 1322                               | 16.9%                                    | 32.8%                      |
| Reminder 2 (30/08/16-30/01/17)                  | 650                                | 8.3%                                     | 16.1%                      |
| <b>Overall</b>                                  | <b>4028</b>                        | <b>51.4%</b>                             | <b>100%</b>                |
| <b>Existing cohorts</b> ( <i>n</i> = 3525 sent) |                                    |  |                            |
| Initial survey mail out                         | 1548                               | 43.9%                                    | 56.2%                      |
| Reminder 1                                      | 944                                | 26.8%                                    | 34.2%                      |
| Reminder 2                                      | 264                                | 7.5%                                     | 9.6%                       |
| <b>Overall</b>                                  | <b>2756</b>                        | <b>78.2%</b>                             | <b>100.0%</b>              |
| <b>2016 refresh</b> ( <i>n</i> = 4298 sent)     |                                    |  |                            |
| Initial survey mail out                         | 508                                | 11.8%                                    | 39.9%                      |
| Reminder 1                                      | 378                                | 8.8%                                     | 29.7%                      |
| Reminder 2                                      | 386                                | 8.9%                                     | 30.3%                      |
| <b>Overall</b>                                  | <b>1272</b>                        | <b>29.6%</b>                             | <b>100.0%</b>              |

**Figure 2 Number of surveys received by date and existing/refresh cohort**



## Second reminder

To examine the impact of the second reminder phase on response rates, response rates for those who were sent this reminder were examined. It is likely that some of these responses would have come in without the reminder, although there is little reason to think this may differ across samples. Table 7 provides an overview of the number of persons approached with the second reminder by 2016 refresh sample and existing cohorts.

**Table 6 Number of second reminder packs sent by cohort in 2016.**

| Participant group      | 2016 refresh<br>Māori sample | 2016 refresh<br>General sample | 2016 refresh<br>cohort | Existing<br>cohorts | Over all<br>cohorts |
|------------------------|------------------------------|--------------------------------|------------------------|---------------------|---------------------|
| <b>Second reminder</b> |                              |                                |                        |                     |                     |
| Outgoing Mail N        | 1917                         | 1359                           | 3376 <sup>a</sup>      | 667 <sup>b</sup>    | <b>3943</b>         |

<sup>a</sup> Second reminder sent from Orange Box  $n = 2838$  (24/08/2016);  $n = 316$  sent from HART (22/08/2016 – 20/10/2016),  $n = 122$  not sent (see section *Second reminder*). <sup>b</sup> Due to budget considerations and a desire to bolster refresh recruitment, it was decided that existing participants persons who had not responded to the past three waves of the survey (2014, 2013, 2012) would not be re-approached in the second reminder. Persons who had not responded to the survey in the past six years had a response rate of less than 20%.

### Existing participants

All existing participants who were not considered lost to contact, deceased or withdrawn 8 weeks after the initial mail out ( $n = 667$ ), were sent the second reminder by OrangeBox. Of these,  $n = 285$  (42.7%) ultimately responded. In the absence of a comparison sample of existing participants who did not receive the second reminder, it is difficult to quantify the value of the second reminder for existing participants.

### 2016 refresh cohort

A second reminder to the 2016 refresh sample was attempted for all 3276 participants who were not considered lost to contact, deceased or withdrawn 8 weeks after the initial mail out. Due to resource constraints not all participants could be included the second reminder from OrangeBox with which  $n = 2838$  participants were re-approached. A delayed mail out from the HART as survey stock became available (mail RTA/GNA or returned blank) was planned for the remaining  $n = 438$  refresh participants.

Table 8 displays the response rate for the 2016 participants who met criteria for receiving the second reminder. Overall, 12.9% of those approached in the second reminder eventually responded and results suggest that receiving second reminder improved response rates by over 10%, compared to those who did not receive the second reminder. Further, inspection of the response rates across the dates that reminders were sent by OrangeBox and HART (as survey stock became available) suggest that a longer lag between the initial mail out and the second reminder may improve response rates.

**Table 7. Second reminder delay and associated response rate for 2016 refresh sample**

| Lag from initial mail out            | <i>n</i> sent | <i>n</i> responded | % responded |
|--------------------------------------|---------------|--------------------|-------------|
| 9 weeks post (OrangeBox)             | 2838          | 360                | 12.7        |
| 8.5-10 weeks post (HART)             | 126           | 17                 | 13.5        |
| 10-12 weeks post (HART)              | 127           | 23                 | 18.1        |
| 12-14 weeks (HART)                   | 39            | 7                  | 17.9        |
| 14-16 weeks (HART)                   | 24            | 4                  | 16.7        |
| <b>Total</b>                         | <b>3154</b>   | <b>411</b>         | <b>13.0</b> |
| <b>No reminder sent (comparison)</b> | 122           | 2                  | 1.6         |

**Appendices (see supplementary file).**

**Appendix 1.1: First letter - existing participants**

**Appendix 1.2: First letter - new participants**

**Appendix 2.1: Information sheet - existing participants**

**Appendix 2.2: Information sheet - new participants**

**Appendix 3: 2016 survey**

**Appendix 4: consent and contact form (new 2016 cohort only)**

**Appendix 5: First reminder (post card)**

**Appendix 6: Final reminder (letter sent with replacement survey and information sheet)**