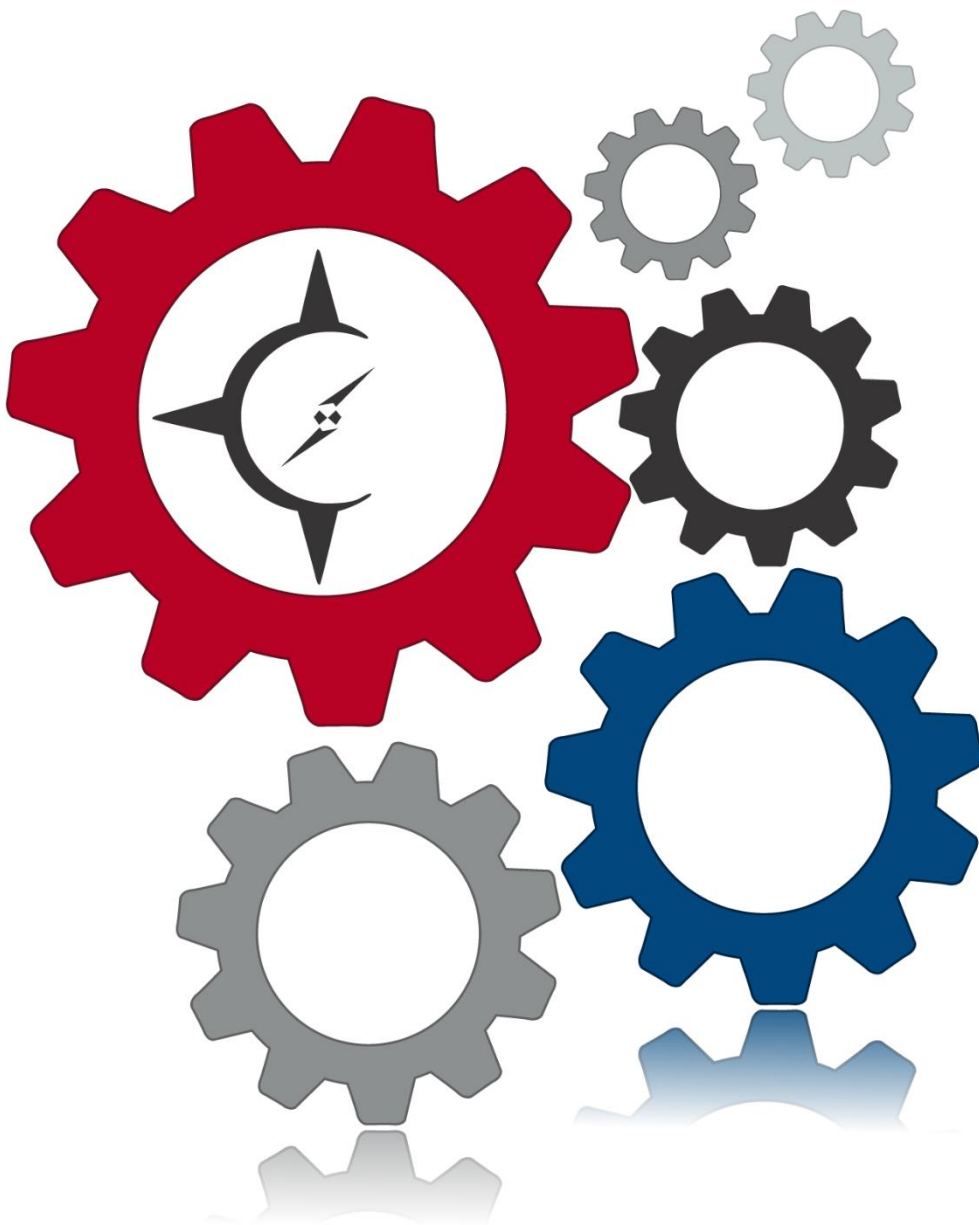# Methods and procedures for International Social Survey Programme (ISSP) 2021: Health & Healthcare II New Zealand

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Background

This report summarises the sampling procedures for the 2021 International Social Survey Programme (ISSP) 'Health & Healthcare' survey for New Zealand. The survey was undertaken by the Centre of Methods and Policy Application in the Social Sciences (COMPASS Research Centre, http://www.compass.auckland.ac.nz), at the University of Auckland. COMPASS is the New Zealand Representative on the ISSP.

The ISSP is a cross-national collaboration on surveys covering a different social science topic each year. The topic for 2021, Health & Healthcare, was previously fielded internationally in 2011 (though not in New Zealand). The 2021 survey repeated most of the 2011 questions, e.g. self-reported health behaviours and wellbeing, confidence in healthcare services, perceptions about alternative medicine, and included new items assessing perceptions about equity in healthcare access, eHealth access, attitudes towards vaccination, and COVID-19 impacts. Consequently, the present survey enables international comparisons in novel health-related areas.

Once again, due to COVID-19 lockdowns in Auckland in the second half of 2021, the implementation of this survey was delayed. Data were collected from 1 February to 31 July 2022.

Methods

In New Zealand, survey response rates tend to be lower among certain demographic groups (male gender, younger age groups, Māori ethnicity, lower socioeconomic status) – introducing the possibility of non-response bias (see, for examples, Fink, et al. 2011; 't Mannetje, et al. 2011; Meiklejohn, et al. 2012). Oversampling is commonly used to overcome this challenge and achieve a more representative sample.

We used similar methods for oversampling as we used in the 2018, 2019, and 2020 ISSP surveys (https://tinyurl.com/compass-issp). Specifically, we undertook a stratified random sample, stratifying by age group, gender, and ethnicity, and oversampled groups that are typically underrepresented in New Zealand surveys – specifically Pacific and Asian ethnic groups. Using data from the New Zealand electoral roll, we defined into 40 strata: 4 'ethnic' (Māori descent, high Pacific geographical meshblocks, high Asian meshblocks, remainder) × 2 gender (male, female) × 5 age group (18–30, 31–45, 46–60, 61–75, 76+).

Sampling from the electoral rolls provides an indicator for Māori descent, but not for other ethnicities. To define our other 'ethnic' strata, we used published ethnicity counts for each geographical meshblock in the country – the smallest unit for which statistical data is collected by Statistics NZ – based on the boundaries as at the 2018 New Zealand Census of Population and Dwellings.

In order to ensure we had the numbers for sampling, we defined "High Pacific" meshblocks as those where Pacific ethnicities made up at least 36.5% of the population, and "High Asian" meshblocks as those where Asian ethnicities made up at least 49.5%. These cutoffs were chosen iteratively, to ensure that we could fill all of our strata from an initial random sample of 100,000 from the electoral roll (see below).

The electoral roll provided names and addresses, but not genders, for 3,502,988 voting age New Zealanders, i.e. Citizens or Permanent Residents aged 18 or over. The address information enabled the removal of 75,253 people reporting an overseas mailing address. From those remaining (with domestic addresses), a random sample of 100,000 was taken, large enough to secure sufficient people from all 40 strata, and small enough that the task of coding and adding variables was not too onerous. Gender needed to be imputed where there was no title, and free-text occupation data needed to be coded to the Australian and New Zealand Standard Classification of Occupations v1.3 (ANZSCO). We also added the NZDep2018 socioeconomic deprivation quintile, and a 3-level urbanicity scale, for survey weighting.

Each sampled person was categorised into the appropriate stratum, and questionnaires were mailed to a random sample from each stratum. Figure 1 illustrates the distribution of the strata and Table 1 provides the number selected from each stratum. As our final sample target was n = 1,200, we made the number selected in each stratum roughly the same as for the ISSP in 2019, when we received n = 1,210 responses. We made slight changes based on where we had observed higher and lower response rates to the ISSP in 2020. We also boosted numbers sent to the "other ethnicity", i.e. mainly European, strata, by around 30%, in reaction to our relatively low overall response rate to the ISSP in 2020.

Figure 1. Demographic distributions in our sampling strata, from the random sample of 100,000 from the New Zealand electoral rolls
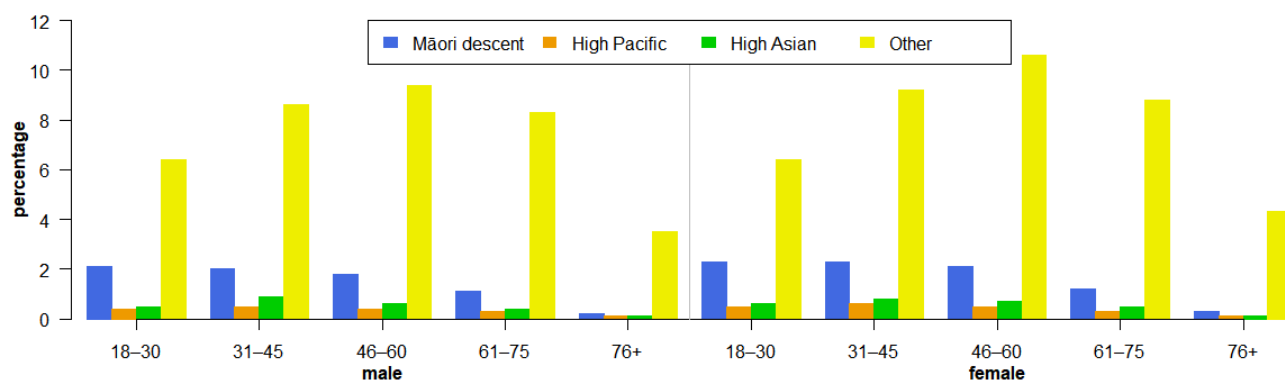

Table 1. Number selected to be mailed from each stratum

	Māori descent	High Pacific	High Asian	Other	Total
Male					
18–30 years	160	180	160	275	775
31–45 years	160	180	160	275	775
46–60 years	120	120	120	262	622
61–75 years	80	60	80	183	403
76+ years	60	60	70	223	413
Total	580	600	590	1,218	2,988
Female					
18–30 years	170	180	150	341	841
31–45 years	130	120	120	328	698
46–60 years	120	120	100	210	550
61–75 years	70	90	70	236	466
76+ years	70	90	100	197	457
Total	560	600	540	1,312	3,012
Total					
18–30 years	330	360	310	616	1,616
31–45 years	290	300	280	603	1,473
46–60 years	240	240	220	472	1,172
61–75 years	150	150	150	419	869
76+ years	130	150	170	420	870
Total	1,140	1,200	1,130	2,530	6,000

Of these 6,000 individuals, 75 were deemed by New Zealand Post to have insufficient or incorrect address information. The remaining 5,925 were mailed the ISSP questionnaire along with a cover letter and a separate participant information sheet. We also trialled the inclusion of a courier ticket on the return envelopes, so that respondents could have the survey picked up from their home. This alteration was made considering people's reluctance to leave their homes during COVID and the general decline of post boxes in urban areas.

The cover letter explained:
   (i)   what the survey was about and that it was approved by the University of Auckland Human Participants Ethics Committee (ref. UAHPEC22565);
   (ii)   how we obtained their names and addresses, and how we selected participants;
   (iii) that their participation was voluntary;
   (iv)   that they could complete the survey either on the paper questionnaire they had received, or online via Qualtrics, and that either would put them in a draw for one of ten $100 gift cards;
   (v)   that they could have the completed survey picked up by courier.

The participant information sheet went into more details on all of the above, and explained:
   (i)   the steps we take to ensure their confidentiality, and that we take their completing the questionnaire as their consenting to participate;
   (ii)   that an anonymised data set would be permanently stored in both New Zealand and international data archives, as a historical record of the 2021 ISSP survey.

The return mail instructions sheet gave full details of how to fill in the details on the website to have the questionnaire picked up from their home, including screenshots from the online form.

We sent the first mailout of 5,925 on Tuesday 1 February 2022. We sent a reminder postcard to the 5,059 people we still had not heard from on Tuesday 8 March, and a follow-up survey invitation (cover letter, participant information sheet, courier return instructions, and questionnaire) was sent out on Friday 1 April to 4,836 non-respondents. By the end of July 2022, we had received a total of n = 1,135 responses that were complete enough for inclusion in the ISSP – a raw response rate of 19.16% and standardised response rate of 22.98% (the response rate that would have been achieved had each stratum been sent questionnaires proportional to their actual share of the population).

Figure 2 shows the timing of the returned responses. Recording of dates for offline surveys was subject to inaccuracies from accumulated mail at the COMPASS offices while the research team worked remotely for most of the first half of 2022 because of COVID-19 lockdowns. Nevertheless, we still see clear peaks after each mailout and reminder.
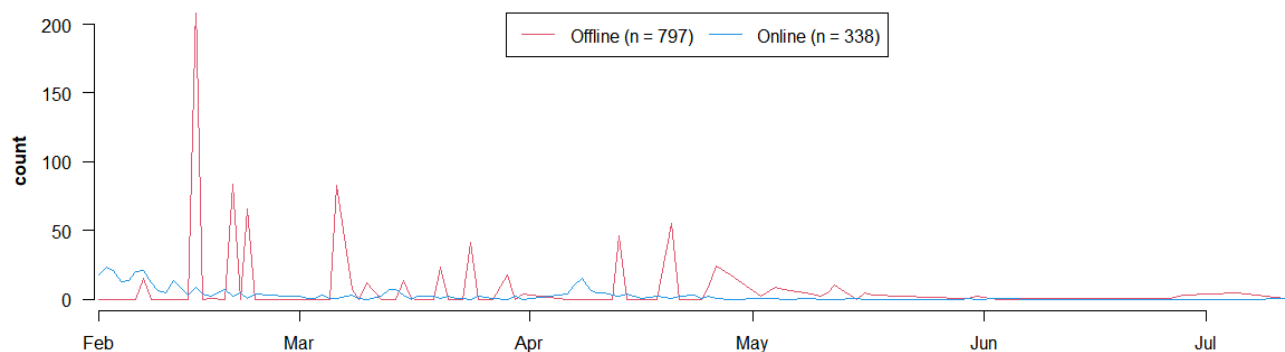
Figure 2. Questionnaires returned, by date

Table 2 shows the number of people that responded from each stratum, with percentages based on the numbers that were actually sent out to each stratum. As for previous ISSP surveys, the younger Māori descent and High Pacific strata exhibited the lowest response rates.

Response numbers returned indicate that we successfully reached people of Pacific and Asian ethnicities with our strategy of selecting meshblocks containing high proportions of them. The raw response rate was higher overall, in particular for the 61–75 age group, which saw higher response rates in all but one stratum compared to the previous (2020) ISSP survey. Given the changing topic (environment versus health), the boosted sample in high-response groups, and the option of returning surveys by courier, it is hard to know which factor (or combination of factors) had an impact on the overall response rate.

Table 2. Number of respondents (response rate %) within each stratum

| Age	Māori descent	High Pacific	High Asian	Other	Total	% of responses
Male						
18–30 years	8 (5.0%)	8 (4.7%)	12 (7.6%)	28 (10.2%)	56 (7.3%)	**4.93%**
31–45 years	17 (10.8%)	7 (4.0%)	23 (14.6%)	45 (16.5%)	92 (12.1%)	**8.11%**
46–60 years	17 (14.2%)	11 (9.2%)	16 (13.6%)	65 (25.1%)	109 (17.7%)	**9.60%**
61–75 years	37 (46.3%)	12 (20.3%)	27 (35.1%)	70 (38.3%)	146 (36.6%)	**12.86%**
76+ years	20 (34.5%)	14 (23.3%)	16 (22.9%)	93 (41.7%)	143 (34.8%)	**12.60%**
Total	99 (15.7%)	52 (11.2%)	94 (15.5%)	301 (25.1%)	546 (17.8%)	**48.11%**
Female						
18–30 years	9 (5.4%)	9 (5.1%)	14 (9.7%)	48 (14.2%)	80 (9.7%)	**7.05%**
31–45 years	15 (11.8%)	10 (8.5%)	12 (10.0%)	66 (20.2%)	103 (14.9%)	**9.07%**
46–60 years	24 (20.2%)	11 (9.2%)	23 (23.0%)	59 (28.6%)	117 (21.5%)	**10.31%**
61–75 years	20 (29.4%)	19 (21.6%)	15 (21.4%)	105 (44.7%)	159 (34.5%)	**14.01%**
76+ years	23 (33.3%)	7 (8.1%)	24 (24.5%)	76 (38.8%)	130 (29.0%)	**11.45%**
Total	91 (15.8%)	56 (12.3%)	88 (18.3%)	354 (26.1%)	589 (19.0%)	**51.89%**
Total						
18–30 years	17 (5.2%)	17 (4.9%)	26 (8.6%)	76 (12.4%)	136 (8.5%)	**11.98%**
31–45 years	32 (11.3%)	17 (5.8%)	35 (12.6%)	111 (18.5%)	195 (13.4%)	**17.18%**
46–60 years	41 (17.2%)	22 (9.2%)	39 (17.9%)	124 (26.7%)	226 (19.5%)	**19.91%**
61–75 years	57 (38.5%)	31 (21.1%)	42 (28.6%)	175 (41.9%)	305 (35.5%)	**26.87%**
76+ years	43 (33.9%)	21 (14.4%)	40 (23.8%)	169 (40.3%)	273 (31.7%)	**24.05%**
Total	190 (16.9%)	108 (9.2%)	182 (16.3%)	655 (26.1%)	1,135 (19.2%)	**100.00%**
% of responses	**16.74%**	**9.52%**	**16.04%**	**57.71%**	**100.00%**	**1,135 (100%)**

Note: Percentages in shaded cells show the row and column percentages of responses out of the total responses (n = 1,135).

Representativeness

1. Was the oversampling of Māori, Pacific, and Asian groups successful?

Figure 3 shows the percentage for each stratum in the electoral roll and ISSP samples. A comparison of stratum percentages shows that the sampling strategy did result in a higher representation of: males and females of Māori descent in the older age groups; all High Pacific groups; and all High Asian groups. However, all 'Other' strata ended up under-represented, except for the oldest males – an exception that was also observed in our ISSP survey in 2019.

Figure 3. Percentage of each stratum in the electoral roll sample and among ISSP respondents
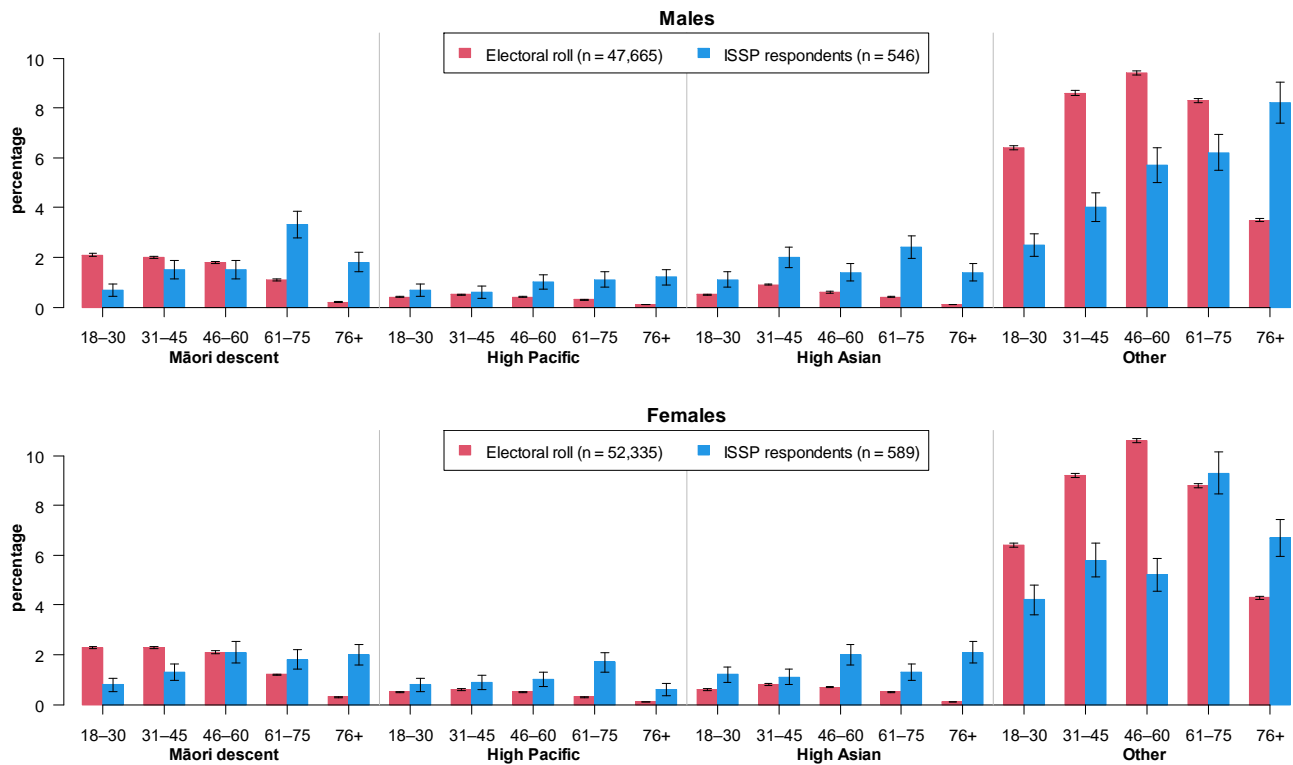
2. What were the response rates by gender, age group, and ethnicity?

As Figure 4 illustrates, response rates were higher for the 'Other' ethnic grouping, and generally increased with age. High Pacific strata and the younger age groups saw the lowest response rates among our stratification variables. These differences are also reflected in the stratum response rates presented in Figure 5. Males aged 18–30 years from High Pacific meshblocks had the lowest response rate (3.9%) while males aged 76+ years of Māori descent had the highest (45.0%).

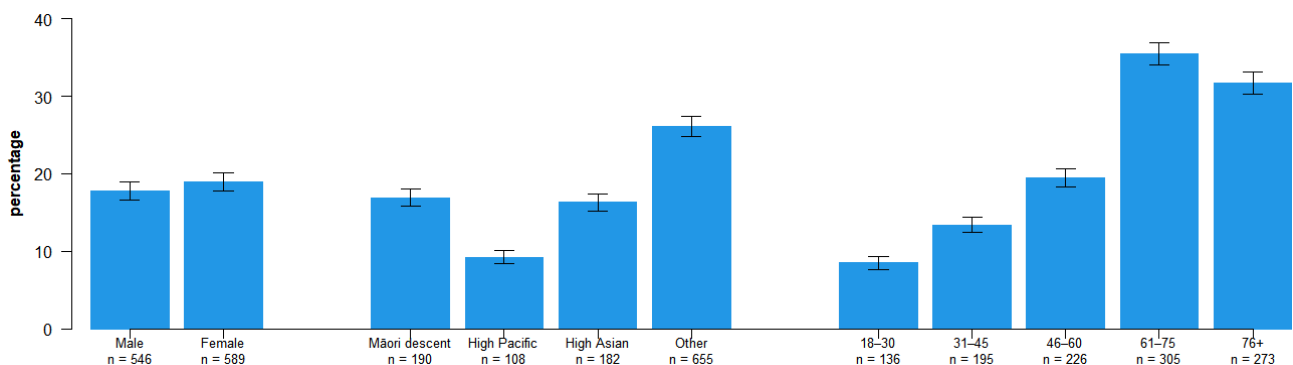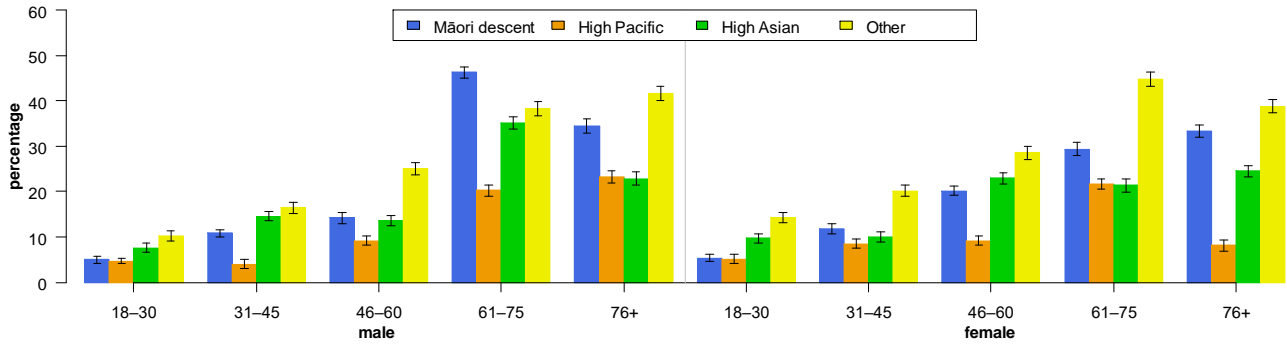**Figure 4. Response rates for stratification variables**

Figure 5. Response rates for all sampling strata

3. What was the distribution of responses like relative to the electoral roll?

The comparisons in Figure 6 show that the percentage distribution of all variables except for gender differed slightly – and with non-overlapping confidence intervals – from those in the electoral roll.

Figure 6. Percentages of demographic variables in the electoral roll and in our ISSP data set
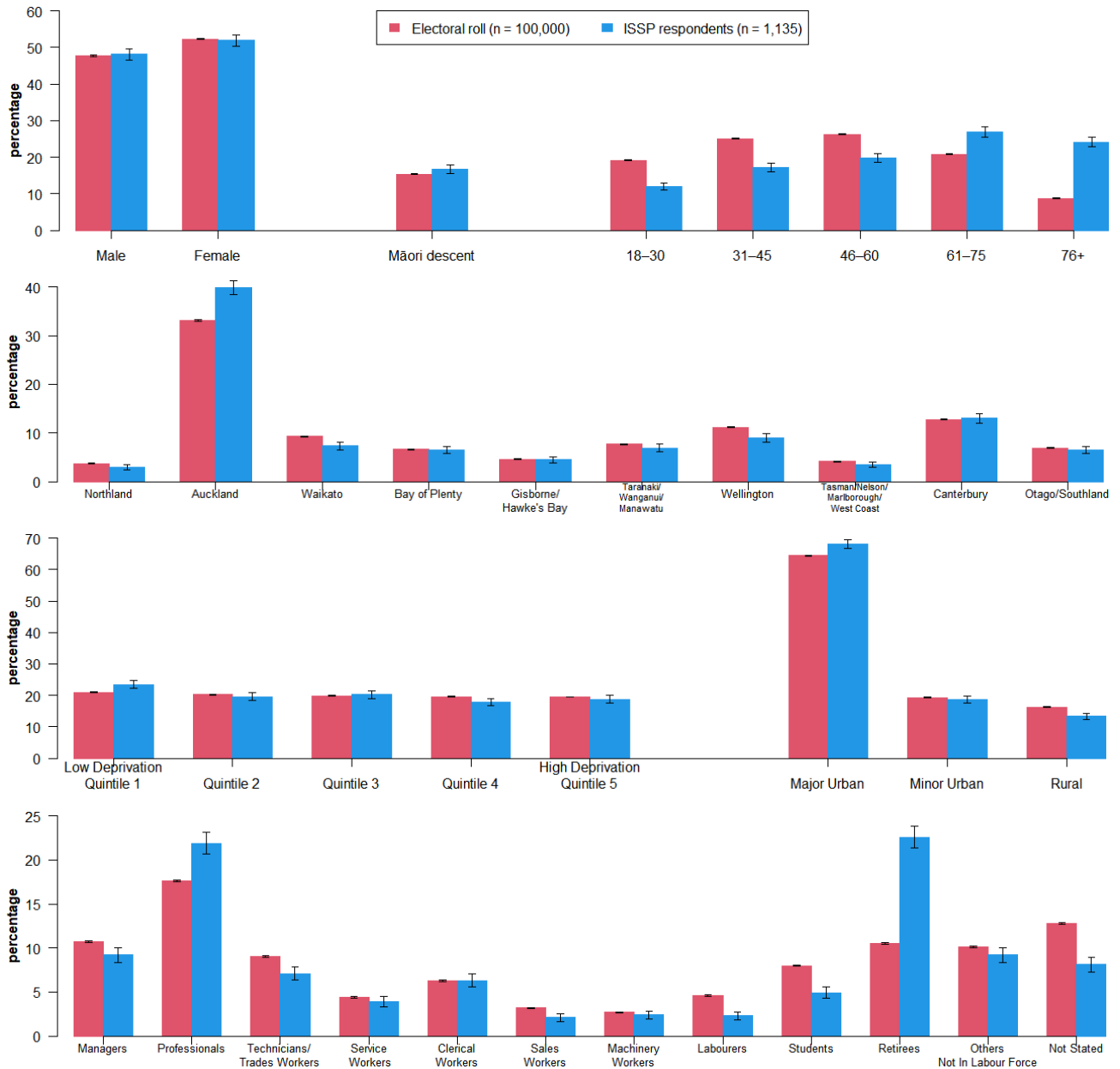
Specifically:
- The two oldest age groups were overrepresented, while the younger ones were all underrepresented;
- People of Māori descent were overrepresented, as were those from Auckland and other major urban areas;
- Among occupation categories at the 1-digit level of ANZSCO, Professionals were overrepresented while Managers and Technicians/Trades Workers and Labourers were underrepresented. Retirees were overrepresented to a large extent, which is common in survey research (Gigliotti & Dietsch 2014).

Weighting

To account for the above differences, we constructed weights based on the inverse response probability. We conducted a logistic regression using the 100,000 original sample from the electoral roll, with responded (Yes/No) as the outcome, and gender, age group, Māori descent, region, NZDep quintile, urbanicity, and occupation as explanatory variables. A main effects model was computed, and all possible two-way interactions were tested in separate models.

Eight two-way interactions were found to be significant:
- Age group × Māori descent
- Māori descent × region
- Māori descent × NZDep quintile
- Māori descent × urbanicity
- Region × NZDep quintile
- Region × urbanicity
- NZDep quintile × urbanicity
- Urbanicity × occupation.

These interactions and all main effects except for gender – which was not predictive of response – were included in the final model. The resulting weights were capped at both ends, bringing the range in from 0.03 through 19.34, to 0.10 through 10.00: 33 records were affected by this. Finally, these weights were adjusted so that the total weighted n was the same as the total unweighted n of 1,135, i.e. the average was 1, while respecting the caps described.
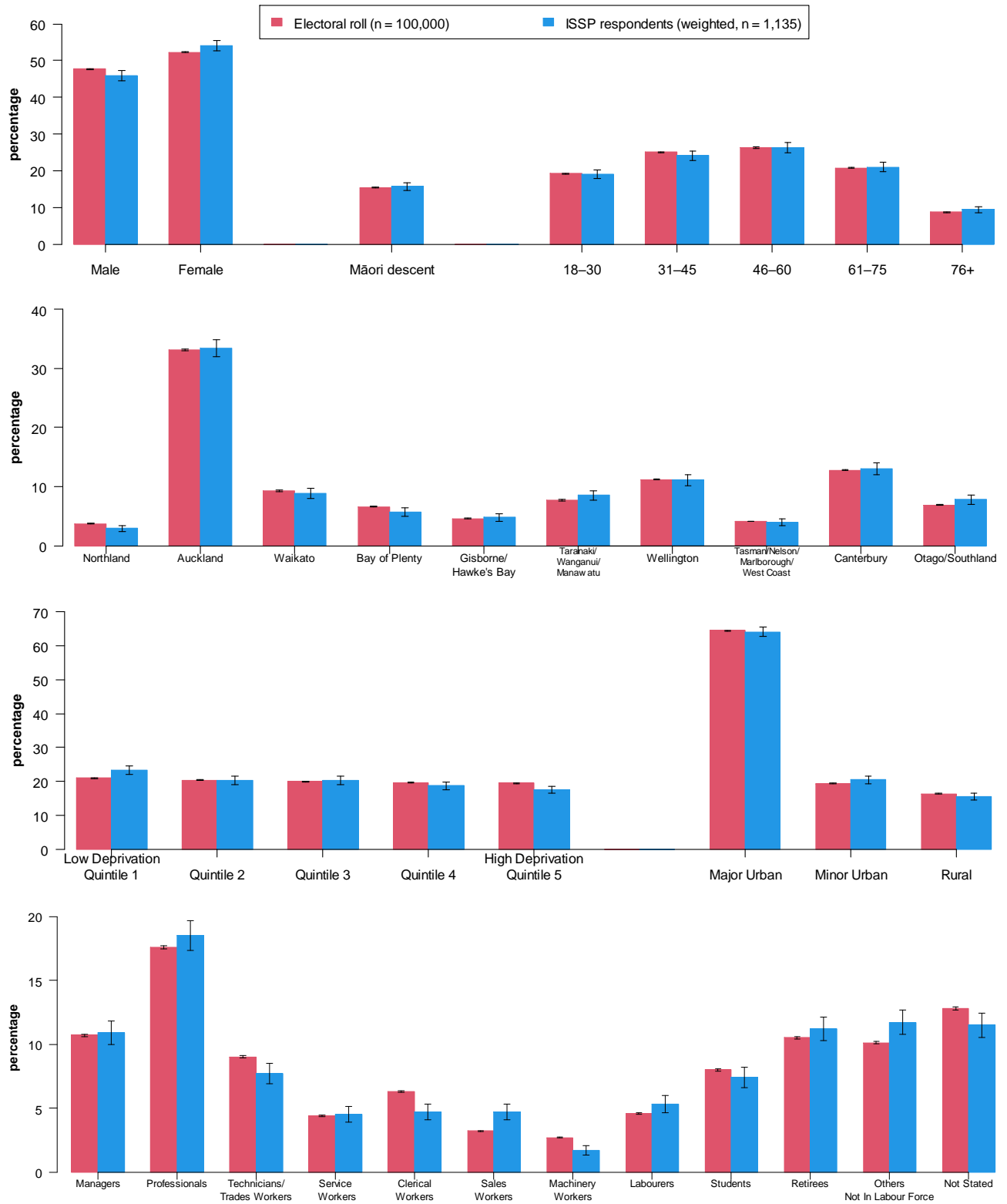
The odds ratios from the final model are presented in Appendix Table A1. The graphs in Figure 7 show the same comparisons to the electoral roll sample as Figure 6, for our data set with weights applied.

These show that our weighting removed most of the differences we observed earlier. The main exceptions to this were:
- Among deprivation quintiles, we still slightly overrepresent the lowest deprivation quintile (20.9% in the roll sample and 23.2% with our weights) and slightly underrepresent the highest (19.5% in the roll sample and 15.5% with our weights);
- Among occupations, we reduced the discrepancies for Managers (10.7% in the roll sample, 9.2% in our data, and 10.9% with our weights), Professionals (17.6% in the roll sample, 21.9% in our data, and 18.5% with our weights), Labourers (4.6% in the roll sample, 2.3% in our data, and 5.3% with our weights), and the various categories not in the labour force. Unfortunately the weights also produced an overrepresentation of Sales Workers, where they were underrepresented in our raw data (3.2% in the roll sample, 2.1% in our data, and 4.7% with our weights), and a bigger underrepresentation of Machinery Workers (2.7% in the roll sample, 2.4% in our data, and 1.7% with our weights).

All other comparisons show overlapping confidence intervals.

Figure 7. Percentages of demographic variables in the electoral roll and in our weighted data set

Legend: Electoral roll (n = 100,000) ■ (red) ISSP respondents (weighted, n = 1,135) ■ (blue)

Panel 1 categories: Male, Female, Māori descent, 18–30, 31–45, 46–60, 61–75, 76+

Panel 2 categories: Northland, Auckland, Waikato, Bay of Plenty, Gisborne/Hawke's Bay, Taranaki/Wanganui/Manawatu, Wellington, Tasman/Nelson/Marlborough/West Coast, Canterbury, Otago/Southland

Panel 3 categories: Low Deprivation Quintile 1, Quintile 2, Quintile 3, Quintile 4, High Deprivation Quintile 5, Major Urban, Minor Urban, Rural

Panel 4 categories: Managers, Professionals, Technicians/Trades Workers, Service Workers, Clerical Workers, Sales Workers, Machinery Workers, Labourers, Students, Retirees, Others Not In Labour Force, Not Stated

External validation

We compared two survey questions' responses to official figures:
- Which party did you give your party vote to at the 2020 General Election?;
- To which of the following ethnic groups do you belong? (multiple response).

Figure 8 compares our weighted party vote distribution to confirmed results from the 2020 General Election. This shows that we overrepresented major party voters – both Labour and National – and underrepresented minor party voters.

Figure 8. Percentages of main parties that people gave their party vote at the 2020 New Zealand General Election, official results compared to our weighted data set
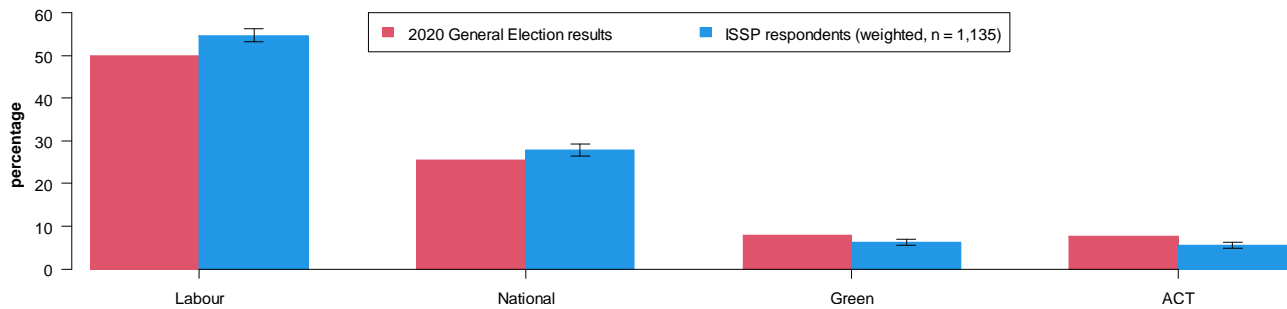

Figure 9 compares our ethnic group distribution against the 2018 New Zealand Census of Population and Dwellings. It shows that we overrepresented European and Māori groups, and underrepresented Pacific and Asian groups.

Figure 9. Percentages of major ethnic groups reported (multiple response), 2018 New Zealand Census of Population and Dwellings compared to our weighted data set
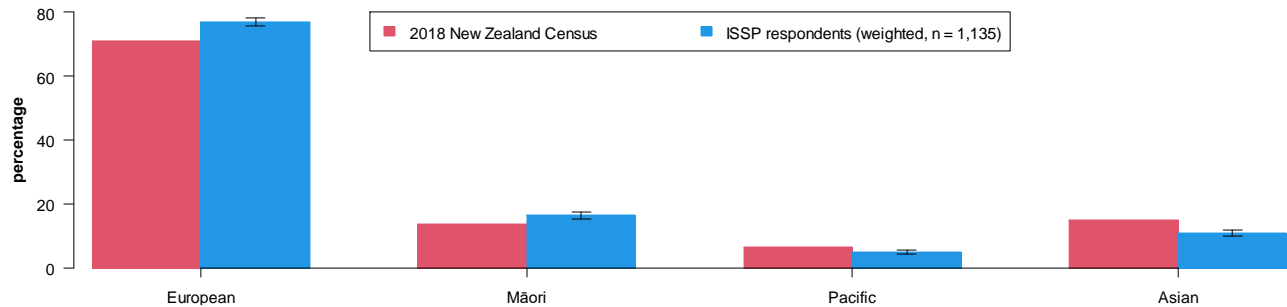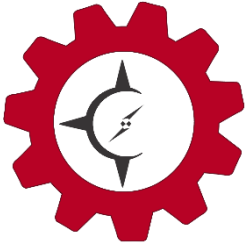
Conclusion

This report summarises the sampling procedures for the 2021 ISSP 'Health & Healthcare' survey for New Zealand, and the weighting methods used to ensure the data are representative of the adult population of New Zealand.

Weighting the data set on characteristics that predict response enabled a representative sample across age, Māori descent, region, occupation, deprivation, and urbanicity. Responses were representative by gender already. With our sampling strategy, the weighting brought us closer to representativeness by ethnicity as confirmed through external validation.

Weighting allows respondents from underrepresented groups to act as 'spokespeople' for others like them in the population, i.e. respondents with the lowest capped weight 'speak' for 0.1 of a person who shares their demographic characteristics, each, while those with the highest capped weight 'speak' for 10 people who share theirs. We set the average weight at 1 so that the weighted sample size is the same as the unweighted.

We cannot know if our respondents' views are actually typical of people within their demographic groups in the population; nevertheless, our weights explain *some* of the variation in survey responses, based on the variables in our models. Weighted responses provide descriptive and analytic results that are *closer* to those that would be observed in the whole population.

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Appendix

Table A1. Logistic regression model predicting response for those who responded to ISSP 2021 (n = 1,135 of n = 100,000 individuals sampled from the New Zealand electoral roll)

Parameter	Odds Ratio (95% Confidence Interval)
Age group	
18–30 years	*Reference*
31–45 years	0.870 (0.675–1.122)
46–60 years	0.965 (0.747–1.246)
61–75 years	1.601 (1.245–2.059)
76+ years	3.351 (2.527–4.442)
Māori descent	
Yes	*Reference*
No	2.100 (0.777–5.675)
Region	
Northland	*Reference*
Auckland	6.767 (1.719 –26.635)
Waikato	2.657 (0.632 –11.160)
Bay of Plenty	3.046 (0.704 –13.181)
Hawke's Bay / Gisborne	3.939 (0.872 –17.805)
Taranaki / Manawatū-Whanganui	2.889 (0.658 –12.680)
Wellington	4.025 (0.992 –16.327)
Tasman / Nelson / Marlborough / West Coast	1.038 (0.201 – 5.354)
Canterbury	4.874 (1.226 –19.382)
Otago / Southland	3.584 (0.862 –14.912)
NZDep quintile	
Q1 – Low	*Reference*
Q2	0.722 (0.142–3.677)
Q3	1.812 (0.406–8.081)
Q4	1.548 (0.365–6.569)
Q5 – High	1.725 (0.420–7.089)

Parameter	Odds Ratio (95% Confidence Interval)
Urbanicity	
Major Urban	*Reference*
Minor Urban	1.148 (0.334– 3.942)
Rural	4.639 (1.381–15.583)
Occupation	
Not Stated	*Reference*
Managers	1.033 (0.730–1.460)
Professionals	1.845 (1.398–2.433)
Technicians / Trades Workers	1.062 (0.738–1.526)
Service Workers	1.323 (0.866–2.021)
Clerical Workers	1.309 (0.902–1.901)
Sales Workers	1.026 (0.617–1.706)
Machinery Operators / Drivers	0.869 (0.488–1.548)
Labourers	0.545 (0.301–0.988)
Students	1.247 (0.860–1.807)
Retirees	1.316 (0.965–1.794)
Others Not In Labour Force	0.955 (0.679–1.341)
Age group × Māori descent	
18–30 years × Yes	*Reference*
31–45 years × No	1.917 (1.012– 3.632)
46–60 years × No	2.352 (1.269– 4.362)
61–75 years × No	3.344 (1.847– 6.054)
76+ years × No	6.003 (3.212–11.221)
Māori descent × Region	
Yes × Northland	*Reference*
No × Auckland	0.268 (0.117–0.615)
No × Waikato	0.805 (0.338–1.917)
No × Bay of Plenty	0.396 (0.158–0.994)
No × Hawke's Bay / Gisborne	0.518 (0.199–1.349)
No × Taranaki / Manawatū-Whanganui	0.651 (0.264–1.607)
No × Wellington	0.729 (0.297–1.790)
No × Tasman / Nelson / Marlborough / West Coast	0.896 (0.297–2.701)
No × Canterbury	0.496 (0.199–1.236)
No × Otago / Southland	0.448 (0.165–1.216)

Parameter	Odds Ratio (95% Confidence Interval)
Māori descent × NZDep quintile	
Yes × Q1 – Low	*Reference*
No × Q2	0.942 (0.552–1.609)
No × Q3	0.519 (0.300–0.898)
No × Q4	0.435 (0.252–0.753)
No × Q5 – High	0.347 (0.205–0.588)
Māori descent × Urbanicity	
Yes × Major Urban	*Reference*
No × Minor Urban	1.079 (0.690–1.690)
No × Rural	1.460 (0.898–2.376)
Region × NZDep quintile	
Northland × Q1 – Low	*Reference*
Auckland × Q2	1.572 (0.305–8.091)
Auckland × Q3	0.654 (0.144–2.973)
Auckland × Q4	0.820 (0.189–3.551)
Auckland × Q5 – High	0.947 (0.226–3.961)
Waikato × Q2	0.290 (0.048–1.763)
Waikato × Q3	0.454 (0.091–2.255)
Waikato × Q4	0.353 (0.075–1.661)
Waikato × Q5 – High	0.541 (0.121–2.423)
Bay of Plenty × Q2	0.942 (0.158–5.624)
Bay of Plenty × Q3	0.790 (0.153–4.079)
Bay of Plenty × Q4	1.118 (0.232–5.386)
Bay of Plenty × Q5 – High	0.639 (0.129–3.161)
Hawke's Bay / Gisborne × Q2	0.500 (0.070–3.591)
Hawke's Bay / Gisborne × Q3	0.917 (0.168–4.996)
Hawke's Bay / Gisborne × Q4	0.646 (0.123–3.384)
Hawke's Bay / Gisborne × Q5 – High	0.798 (0.158–4.025)
Taranaki / Manawatū-Whanganui × Q2	0.851 (0.142–5.094)
Taranaki / Manawatū-Whanganui × Q3	0.672 (0.131–3.447)
Taranaki / Manawatū-Whanganui × Q4	0.595 (0.122–2.898)
Taranaki / Manawatā-Whanganui × Q5 – High	0.531 (0.111–2.528)

Parameter	Odds Ratio (95% Confidence Interval)
Wellington × Q2	1.153 (0.211–6.290)
Wellington × Q3	0.811 (0.169–3.891)
Wellington × Q4	0.415 (0.085–2.019)
Wellington × Q5 – High	0.707 (0.154–3.251)
Tasman / Nelson / Marlborough / West Coast × Q2	0.623 (0.089–4.377)
Tasman / Nelson / Marlborough / West Coast × Q3	0.484 (0.081–2.884)
Tasman / Nelson / Marlborough / West Coast × Q4	0.651 (0.121–3.504)
Tasman / Nelson / Marlborough / West Coast × Q5 – High	1.100 (0.195–6.215)
Canterbury × Q2	1.153 (0.222–5.990)
Canterbury × Q3	0.512 (0.110–2.387)
Canterbury × Q4	0.267 (0.057–1.246)
Canterbury × Q5	0.434 (0.094–2.002)
Otago / Southland × Q2	0.730 (0.131–4.058)
Otago / Southland × Q3	0.455 (0.090–2.290)
Otago / Southland × Q4	0.522 (0.111–2.454)
Otago / Southland × Q5 – High	0.333 (0.062–1.789)

Region × Urbanicity

Parameter	Odds Ratio (95% Confidence Interval)
Northland × Major Urban	*Reference*
Auckland × Minor Urban	0.068 (0.026– 0.178)
Auckland × Rural	0.050 (0.018– 0.141)
Waikato × Minor Urban	1.148 (0.432– 3.051)
Waikato × Rural	0.649 (0.223– 1.894)
Bay of Plenty × Minor Urban	0.633 (0.232– 1.730)
Bay of Plenty × Rural	0.362 (0.117– 1.116)
Hawke's Bay / Gisborne × Minor Urban	0.268 (0.085– 0.845)
Hawke's Bay / Gisborne × Rural	0.380 (0.123– 1.176)
Taranaki / Manawatū-Whanganui × Minor Urban	0.718 (0.266– 1.937)
Taranaki / Manawatū-Whanganui × Rural	0.572 (0.197– 1.662)
Wellington × Minor Urban	0.190 (0.067– 0.540)
Wellington × Rural	0.087 (0.026– 0.291)
Tasman / Nelson / Marlborough / West Coast × Minor Urban	3.579 (1.097–11.679)
Tasman / Nelson / Marlborough / West Coast × Rural	1.449 (0.383– 5.482)
Canterbury × Minor Urban	0.516 (0.199– 1.340)
Canterbury × Rural	0.247 (0.088– 0.696)
Otago / Southland × Minor Urban	0.826 (0.295– 2.308)
Otago / Southland × Rural	0.618 (0.209– 1.823)

Parameter	Odds Ratio (95% Confidence Interval)
NZDep × Urbanicity	
Q1 × Major Urban	*Reference*
Q2 × Minor Urban	1.354 (0.785–2.334)
Q2 × Rural	1.141 (0.672–1.936)
Q3 × Minor Urban	0.810 (0.472–1.392)
Q3 × Rural	0.382 (0.210–0.696)
Q4 × Minor Urban	1.300 (0.755–2.238)
Q4 × Rural	0.504 (0.275–0.922)
Q5 × Minor Urban	1.147 (0.654–2.010)
Q5 × Rural	0.228 (0.108–0.480)
Urbanicity × Occupation	
Major Urban × Not Stated	*Reference*
Minor Urban × Managers	1.609 (0.605– 4.282)
Minor Urban × Professionals	1.715 (0.723– 4.068)
Minor Urban × Technicians / Trades Workers	2.607 (1.007– 6.748)
Minor Urban × Service Workers	2.000 (0.677– 5.909)
Minor Urban × Clerical Workers	4.061 (1.595–10.339)
Minor Urban × Sales Workers	0.947 (0.180– 4.969)
Minor Urban × Machinery Operators / Drivers	3.290 (0.951–11.383)
Minor Urban × Labourers	2.925 (0.839–10.196)
Minor Urban × Students	0.656 (0.161– 2.669)
Minor Urban × Retirees	2.686 (1.166– 6.187)
Minor Urban × Others Not In Labour Force	2.452 (0.978– 6.147)
Minor Urban × Managers	2.228 (0.965– 5.143)
Minor Urban × Professionals	1.082 (0.487– 2.403)
Minor Urban × Technicians / Trades Workers	1.290 (0.506– 3.288)
Minor Urban × Service Workers	0.779 (0.221– 2.747)
Minor Urban × Clerical Workers	0.395 (0.101– 1.547)
Minor Urban × Sales Workers	1.001 (0.243– 4.117)
Minor Urban × Machinery Operators / Drivers	3.465 (1.084–11.080)
Minor Urban × Labourers	2.770 (0.864– 8.876)
Minor Urban × Students	0.315 (0.065– 1.527)
Minor Urban × Retirees	0.874 (0.387– 1.972)
Minor Urban × Others Not In Labour Force	1.344 (0.545– 3.317)