



## Oral health in advanced age: *Findings from LiLACS NZ*

### Te Puāwaitanga O Ngā Tapuwae Kia Ora Tonu

This report presents key findings about three aspects of oral health in advanced age; denture use, chewing difficulty and use of the dentist.

The findings are from a population-based sample of Māori (aged 80 to 90 years) and non-Māori (aged 85 years), living in the Bay of Plenty, who are taking part in a longitudinal study of advanced ageing, called Life and Living in Advanced Age: a Cohort Study in New Zealand - Te Puāwaitanga O Ngā Tapuwae Kia Ora Tonu (LiLACS NZ).

For data tables about oral health in advanced age and the LiLACS NZ sample, see the Appendix. For details on methodology, recruitment, and data presented in this report that do not feature in the appendix, see [www.fmhs.auckland.ac.nz/en/faculty/lilacs.html](http://www.fmhs.auckland.ac.nz/en/faculty/lilacs.html) and published articles.<sup>1, 2</sup>

### Key findings

**Dentures were worn by most (76%) people in advanced age. Among those living in areas of high socioeconomic deprivation, Māori were less likely to wear dentures than non-Māori. One in four people (24%) in advanced age had difficulty chewing, primarily due to ill-fitting dentures or missing teeth. Fewer Māori visited the dentist than non-Māori.**

This report describes the prevalence of denture use, chewing difficulty and use of the dentist for those in advanced age, by sex, ethnic group, and socioeconomic deprivation.

For this report, **dentures** include any type of denture worn; upper, lower, full mouth or partial.

### Findings

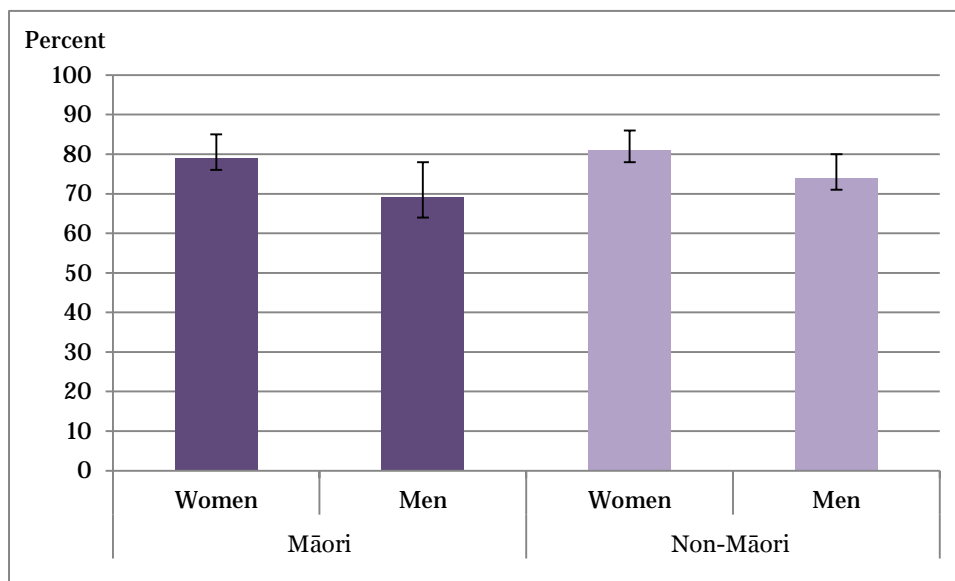
#### Dentures were worn by most people in advanced age

Almost three-quarters of men (72%) and 80% of women wore dentures. Full mouth dentures were worn by 41% of men and 54% of women; the rest wore an upper, lower or partial denture (see Appendix). While significantly<sup>i</sup> more women than men wore dentures (see Appendix Table A-4), there were no differences between Māori and non-Māori. Seventy-nine percent of Māori women and 81% of non-Māori women wore dentures with 69% of Māori men and 74% of non-Māori reporting denture use (Figure 1).

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<sup>i</sup> The difference between two groups is statistically significant if their confidence intervals do not overlap. Sometimes, even when two confidence intervals overlap, the difference between these groups can be statistically significant. In these cases, if the text reports a difference, a statistical test (a 'Chi Square test, or regression') has been carried out to confirm that the finding is statistically significant.

**Figure 1: Denture use in advanced age, by sex and ethnic group**



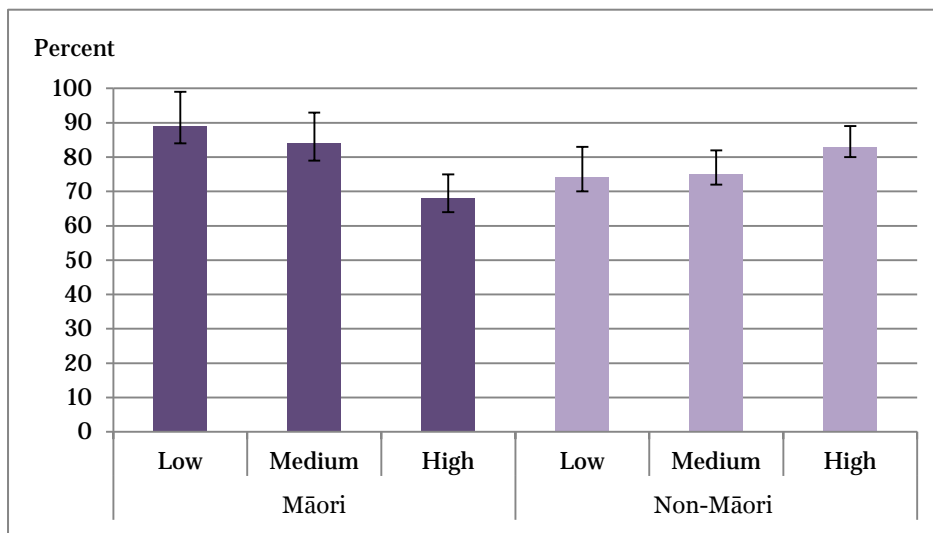
Source: LiLACS NZ

Note: This report uses prioritised ethnicity; self-identification as Māori was prioritised over other ethnicities if more than one was given.

**Māori living in areas of higher socioeconomic deprivation were less likely to have dentures**

For Māori, 68% of those living in areas of high socioeconomic deprivation wore dentures, whereas 89% of Māori living in less deprived areas wore them. This was a statistically significant difference, after adjustment for age and sex (Figure 2). Among those who lived in high deprivation areas, significantly less Māori wore dentures (68%) than non-Māori (83%).

**Figure 2: Denture use in advanced age by socioeconomic deprivation and ethnic group**



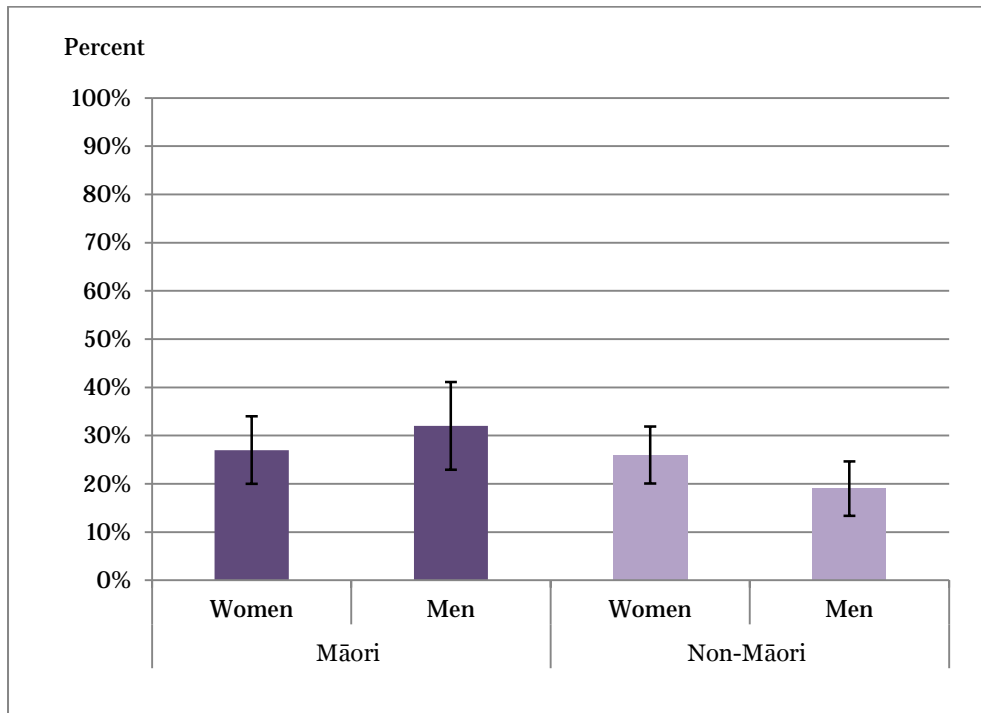
Source: LiLACS NZ

Note: This report uses prioritised ethnicity, self-identification as Māori was prioritised over other ethnicities if more than one was given. The deciles in the New Zealand Deprivation Index (NZDep2006<sup>3</sup>) were used to define the level of socioeconomic deprivation in participants' neighbourhoods as 'Low' (Decile 1-4), 'Medium' (Decile 5-7) or 'High' (Decile 8-10). The higher the decile, the greater the level of deprivation in the neighbourhood.

### Most people do not have chewing difficulties

Most Māori (71%) and non-Māori (77%) reported never having difficulty biting or chewing food. Amongst Māori of advanced age, 27% of women and 32% of men had chewing difficulty. For non-Māori, 26% of women and 19% of men had chewing difficulty (Figure 3).

**Figure 3: Difficulty chewing in advanced age, by sex and ethnic group**



Source: LiLACS NZ

Note: This report uses prioritised ethnicity; self-identification as Māori was prioritised over other ethnicities if more than one was given.

For the 24% who reported chewing difficulty, the main reasons given were poorly fitting dentures and missing teeth. Painful teeth, gum disease or other pain in the mouth were also reported (see Appendix Table A-2)

Chewing difficulties did not vary with having dentures or with socioeconomic deprivation.

### Fewer Māori than non-Māori had visited a dentist in the last 12 months

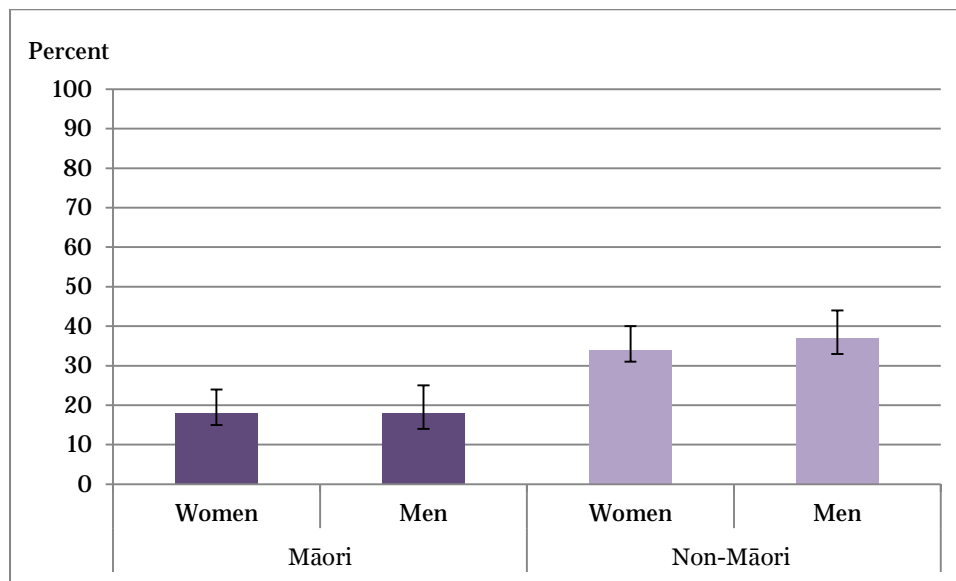
Less than a third (28%) of people in advanced age had visited a dentist in the last 12 months.

Significantly less Māori (18%) than non-Māori (34%) reported they had visited a dentist, after adjusting for age and sex (Figure 4).

Of the 76% of people who wore dentures, 23% went to the dentist in the last 12 months. Among those who did not wear dentures, 50% had been to the dentist. This was a significant difference after adjusting for age, sex, ethnic group and socioeconomic deprivation (see Appendix Table A-6).

Visiting the dentist did not vary between those with chewing difficulty and those who did not have chewing difficulty or by socioeconomic deprivation.

**Figure 4: Use of the dentist in the last 12 months in advanced age, by sex and ethnic group**



Source: LiLACS NZ

Note: This report uses prioritised ethnicity; self-identification as Māori was prioritised over other ethnicities if more than one was given. Unadjusted prevalence is shown

## What is the source of the data?

The source of these data is Life and Living in Advanced Age: a Cohort Study in New Zealand - Te Puāwaitanga O Ngā Tapuwae Kia Ora Tonu (LiLACS NZ). Data were gathered in face-to-face, standardised interviews with Māori aged 80-90 and non-Māori aged 85 at home, plus nursing assessments of physical function and health.

The LiLACS NZ sample lives within the boundaries of the Bay of Plenty and Lakes District Health Boards, excluding the Taupo region of Lakes DHB. The participants were first interviewed and assessed in 2010 (the 'first wave' of data collection). This is a longitudinal study with annual data collection, subject to mortality and participant retention.

The oral health data reported on is from 671 participants who completed the comprehensive questionnaire (see Appendix Figure A-1).

## What were the survey questions?

People were asked whether they wore dentures (upper, lower, full mouth or partial) and if chewing or biting food was difficult. People who had difficulty chewing (were then asked why, from a range of 8 items (see Appendix Table A-2). People were also asked if they had visited a dentist in the last 12 months.

## Further information

You can find more information about the LiLACS NZ study on the website ([www.fmhs.auckland.ac.nz/faculty/lilacs](http://www.fmhs.auckland.ac.nz/faculty/lilacs)) and see also Hayman et al (2012)<sup>1</sup> for the study protocol and Dyall et al (2013)<sup>2</sup> for the recruitment detail.

## References

1. Hayman K, Kerse N, Dyllal L, et al. 2012. Life and living in advanced age: A cohort study in New Zealand, *Te Puāwaitanga O Ngā Tapuwae Kia Ora Tonu – LiLACS NZ: Study protocol. BMC Geriatrics* 12(June). DOI: 10.1186/1471-2318-12-33 (accessed 18 March 2014).
2. Dyllal L, Kepa M, Hayman K, et al. 2013. Engagement and recruitment of Māori and non-Māori people of advanced age to LiLACS NZ. *Australian & New Zealand Journal of Public Health* 37(2): 124-31.
3. Salmond C, Crampton P, Atkinson J. 2007. *NZDep2006 Index of Deprivation User's Manual*. Wellington: Department of Public Health, University of Otago. NZDep2013 was not available at the time of the study.

### LiLACS NZ – at a glance

**Sample:** 932 people of advanced age; Māori aged 80–90 years and non-Māori aged 85 years living in the Bay of Plenty and Lakes District Health Boards region. Non-Māori are 90% NZ European, 9% other European and 1% other. Participant numbers vary slightly according to topic being discussed.

**Mode:** Standardised home-based interview and standardised nursing assessment, repeated annually. Hospitalisation and mortality outcomes data were obtained, with permission, by matching the NHI with nationally held hospitalisation data from the Ministry of Health.

**Timing:** Results refer to the population sample recruited in the first wave of data gathering in 2010.

**Funding:** LiLACS NZ was originally funded by a programme grant from the Health Research Council of New Zealand. Nga Pae o te Maramatanga, Heart Foundation NZ, Oakley Mental Health Foundation, Auckland Medical Research Foundation, the Faculty of Medical and Health Sciences also provided project support. The University of Auckland, the Rotorua Energy Trust and the Ministry of Health have funded LiLACS NZ from 2013.

**Representation:** The study is strengthened by the extensive breath of domains investigated and is designed to engage with a full cohort of Māori allowing equal explanatory power for separate analyses. The findings for Māori and non-Māori may not be generalizable beyond the Bay of Plenty region. However, the overall response rate in the first wave is consistent with other longitudinal studies of ageing; 56% of all Māori and 59% of all non-Māori who were invited participated. In gender and age the sample engaged was similar in proportion to the population of the area and the population of New Zealand. Although all age-eligible older adults were sought and invited, lower enrolments than expected from residential care facilities limits separate analyses of frailer participants.

For more information, see the LiLACS NZ webpage:  
[www.fmhs.auckland.ac.nz/faculty/lilacs](http://www.fmhs.auckland.ac.nz/faculty/lilacs) and other Ministry of Health short reports.

## Appendix: Detailed data tables

The following tables provide detailed data for the key indicators presented in this report. The tables present the prevalence and number of people by sex and ethnic group and 95% confidence intervals for all estimates. Generalised linear models were used for analysis of potentially significant predictors of outcomes and controlled for age, sex and ethnic group.

**Table A-1: Number of participants who answered the questions**

	Māori		Non-Māori	
	Men	Women	Men	Women
Do you wear dentures?	100	155	188	211
Is biting or chewing food difficult for you?	101	155	187	212
In the last 12 months have you visited or been visited by: a dentist?	101	155	188	211

**Table A-2: Dentures, chewing difficulty and dentist use in men**

	Men					
	Māori			Non-Māori		
	n	(%)	(95% CI)	n	(%)	(95% CI)
<b>Dentures</b>						
Upper	21	(21%)	(13–30)	35	(19%)	(13–25)
Lower	1	(1%)	(0–5)	1	(1%)	(0–3)
Full mouth	42	(42%)	(32–52)	76	(40%)	(33–48)
Partial only	5	(5%)	(2–11)	27	(14%)	(10–20)
Some type of dentures	69	(69%)	(59–78)	139	(74%)	(67–80)
<b>Biting or chewing food difficulty</b>						
Never	69	(68%)	(58–77)	151	(81%)	(74–86)
Rarely	11	(11%)	(6–19)	6	(3%)	(1–7)
Sometimes	16	(16%)	(9–24)	21	(11%)	(7–17)
Often or always	5	(5%)	(2–11)	9	(5%)	(2–9)
Yes (Rarely, Sometimes, Often or always)	32	(32%)	(23–42)	36	(19%)	(14–26)
<b>If yes, why is chewing difficult (% of those that answered)</b>						
Pain in mouth (other than gums or teeth)	3	(12%)	(2–30)	2	(7%)	(1–23)
Gum disease	1	(4%)	(0–20)	2	(7%)	(1–23)
Teeth sore	2	(8%)	(1–25)	1	(3%)	(0–18)
Dentures don't fit	8	(31%)	(14–52)	14	(48%)	(29–67)
Missing teeth	6	(23%)	(9–44)	7	(24%)	(10–44)
Particular foods	3	(12%)	(2–30)	4	(14%)	(4–32)
Other medical conditions	1	(4%)	(0–20)	2	(7%)	(1–23)
Other	2	(8%)	(1–25)	0	(0%)	(0–12)
Did not answer	6	(19%)	(5–32)	7	(19%)	(7–32)
<b>Visited the dentist in the last 12 months</b>						
No dentures and visited dentist	8	(44%)	(22–69)	31	(45%)	(33–57)
Dentures (any type) and visited dentist	10	(56%)	(31–78)	38	(55%)	(43–67)

**Table A-3: Dentures, chewing ability and dentist use in women**

	Women					
	Māori			Non-Māori		
	n	(%)	(95% CI)	n	(%)	(95% CI)
<b>Dentures</b>						
Upper	35	(23%)	(16–30)	25	(12%)	(8–17)
Lower	0	(0%)	(0–2)	2	(1%)	(0–3)
Full mouth	82	(53%)	(45–61)	117	(55%)	(48–62)
Partial only	5	(3%)	(1–7)	26	(12%)	(8–18)
Some type of dentures	122	(79%)	(71–85)	170	(81%)	(75–86)
<b>Biting or chewing food difficulty</b>						
Never	113	(73%)	(65–80)	156	(74%)	(67–79)
Rarely	13	(8%)	(5–14)	10	(5%)	(2–9)
Sometimes	19	(12%)	(8–18)	36	(17%)	(12–23)
Often or always	10	(6%)	(3–12)	10	(5%)	(2–9)
Yes (Rarely, Sometimes, Often or always)	42	(27%)	(20–35)	56	(26%)	(21–33)
<b>If yes, why is chewing difficult (% of those that answered)</b>						
Pain in mouth (other than gums or teeth)	1	(4%)	(0–21)	2	(4%)	(0–13)
Gum disease	0	(0%)	(0–14)	0	(0%)	(0–7)
Teeth sore	1	(4%)	(0–21)	2	(4%)	(0–13)
Dentures don't fit	9	(38%)	(19–59)	28	(54%)	(39–68)
Missing teeth	13	(54%)	(33–74)	31	(60%)	(45–73)
Particular foods	4	(17%)	(5–37)	6	(12%)	(4–23)
Other medical conditions	1	(4%)	(0–21)	6	(12%)	(4–23)
Other	1	(4%)	(0–21)	1	(2%)	(0–10)
Did not answer	18	(43%)	(28–58)	4	(7%)	(0–14)
<b>Visited the dentist in the last 12 months</b>						
No dentures and visited dentist	10	(36%)	(19–56)	28	(39%)	(28–52)
Dentures (any type) and visited dentist	18	(64%)	(44–81)	43	(61%)	(48–72)

**Table A-4: Denture use**

Group of interest	Reference group	Adjusted Odds Ratio (95% CI)		Significant (*)	Adjustment variables
Men	Women	0.66	(0.46–0.95)	*	Age
Māori	Non-Māori	0.96	(0.61–1.53)	ns	Age, sex
Māori men	Non-Māori men	1.33	(0.60–2.96)	ns	Age
Māori women	Non-Māori women	0.85	(0.47–1.52)	ns	Age
Most deprived areas	Least deprived areas	0.90	(0.54–1.48)	ns	Age, sex, ethnic group
Most deprived areas - men	Least deprived areas - men	1.18	(0.56–2.45)	ns	Age, ethnic group
Most deprived areas - women	Least deprived areas - women	0.72	(0.36–1.46)	ns	Age, ethnic group
Most deprived areas - Māori	Least deprived areas - Māori	0.28	(0.09-0.86)	*	Age, sex
Most deprived -Māori	Most deprived -Non-Māori	0.39	(0.19-0.74)	*	Age, sex

\*Significant odds ratio for comparison of group of interest to the reference group. ns = no significant difference

**Table A-5: Chewing difficulty**

Group of interest	Reference group	Adjusted Odds Ratio (95% CI)		Significant (*)	Adjustment variables
Men	Women	0.84	(0.57–1.25)	ns	Age
Māori	Non-Māori	1.11	(0.70–1.77)	ns	Age, sex
Māori men	Non-Māori men	1.49	(0.69–3.22)	ns	Age
Māori women	Non-Māori women	0.92	(0.51–1.66)	ns	Age
Most deprived areas	Least deprived areas	0.75	(0.45–1.25)	ns	Age, sex, ethnic group
Most deprived areas - men	Least deprived areas - men	1.10	(0.46–2.64)	ns	Age, ethnic group
Most deprived areas - women	Least deprived areas - women	0.60	(0.31–1.15)	ns	Age, ethnic group
Most deprived areas - Māori	Least deprived areas - Māori	0.86	(0.35-2.10)	ns	Age, sex
Most deprived -Māori	Most deprived -Non-Māori	0.91	(0.34-2.43)	ns	Age, sex

\*Significant odds ratio for comparison of group of interest to the reference group. ns = no significant difference



**Table A-6: Dentist use**

Group of interest	Reference group	Adjusted Odds Ratio (95% CI)		Significant (*)	Adjustment variables
Men	Women	1.17	(0.83–1.64)	ns	Age
Māori	Non-Māori	0.32	(0.19–0.53)	*	Age, sex
Māori men	Non-Māori men	0.33	(0.14–0.74)	*	Age
Māori women	Non-Māori women	0.32	(0.16–0.61)	*	Age
Most deprived areas	Least deprived areas	0.79	(0.50–1.26)	ns	Age, sex, ethnic group
Most deprived areas - men	Least deprived areas - men	0.54	(0.27–1.10)	ns	Age, ethnic group
Most deprived areas - women	Least deprived areas - women	1.08	(0.57–2.04)	ns	Age, ethnic group
Most deprived areas - Māori	Least deprived areas - Māori	0.86	(0.35-2.10)	ns	Age, sex
Most deprived -Māori	Most deprived -Non-Māori	0.91	(0.34-2.43)	ns	Age, sex
Denture use	No Denture use	0.25	(0.17-0.37)	*	Age, sex, ethnic group, dep

\*Significant odds ratio for comparison of group of interest to the reference group. ns = no significant difference

## LiLACS NZ background and sample

LiLACS NZ is a programme of research that is based on a longitudinal cohort study of New Zealanders in advanced age. In 2010, LiLACS NZ invited all Māori aged 80-90 years and all non-Māori aged 85 years within the Bay of Plenty and Lakes District Health Board regions (excluding Taupo area) to undertake a detailed health interview and physical assessment, and to give a blood sample. Those who agreed were interviewed between March 2010 and April 2011, defined as the *2010 first wave*. These participants were then followed up annually at the same time of year, which produced the 2011 second wave and 2012 third wave. Table A-7 shows the age, sex, ethnic group, living arrangements and socioeconomic deprivation area of the LiLACS NZ participants in the first wave.

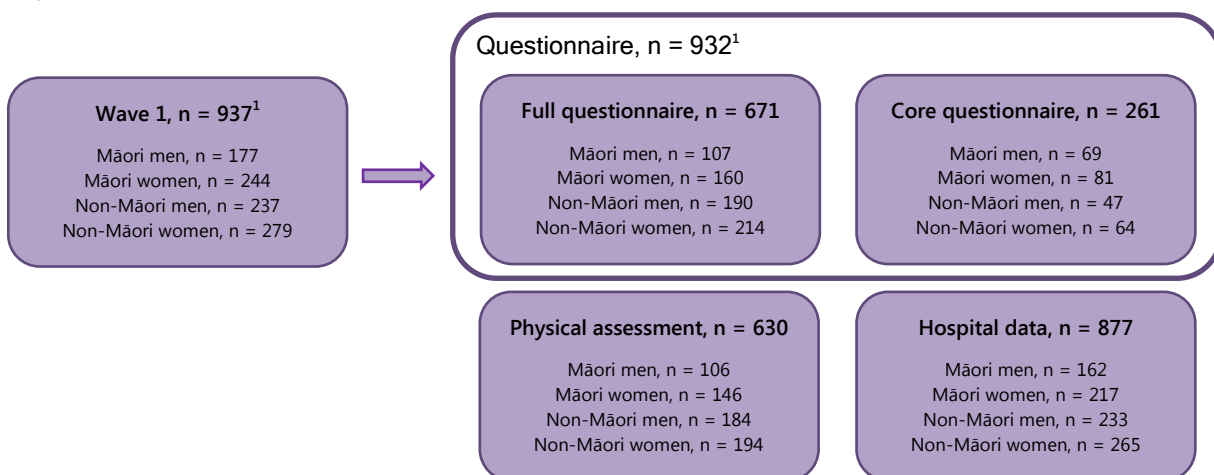
**Table A-7: Demographic summary of LiLACS NZ participants**

	Māori						Non-Māori					
	Men		Women		Total		Men		Women		Total	
Age - Mean (SD)	82.5	(2.8)	82.8	(2.7)	82.7	(2.8)	84.6	(0.5)	84.6	(0.5)	84.6	(0.5)
Living - n (%)												
Alone	29	(27%)	81	(51%)	110	(41%)	61	(32%)	134	(63%)	195	(48%)
Spouse only	40	(37%)	30	(19%)	70	(26%)	106	(56%)	48	(22%)	154	(38%)
Other	38	(36%)	49	(31%)	87	(33%)	23	(12%)	32	(15%)	55	(14%)
Deprivation - n (%)												
Decile 1-4 (Low)	19	(11%)	41	(17%)	60	(14%)	60	(25%)	69	(25%)	129	(25%)
Decile 5-7 (Med)	53	(30%)	56	(23%)	109	(26%)	91	(38%)	117	(42%)	208	(40%)
Decile 8-10 (High)	104	(59%)	147	(60%)	251	(60%)	86	(36%)	93	(33%)	179	(35%)

Note. This report uses prioritised ethnicity; self-identification as Māori was prioritised over other ethnicities if more than one was given. Source: LiLACS NZ demographic data

During their interview, all participants completed a *core* questionnaire of three pages about health and function. The majority of participants also completed the full questionnaire during their interview where, in addition to the core questions, they were asked more detailed questions about social, environmental, cultural, and health status. The oral health questions were part of the full questionnaire.

**Figure A-1: LiLACS NZ recruitment process**



Note 1: n = 4 recruits withdrew before first interview; n = 1 questionnaire lost, no data