



Falls in advanced age: Findings from *LiLACS NZ*

Te Puāwaitanga O Ngā Tapuwae Kia Ora Tonu

This report presents key findings about falls in advanced age, including how often falls caused injury and hospital admissions. Physiotherapy services are also included.

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 falls 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 <https://www.fmhs.auckland.ac.nz/en/faculty/lilacs.html> and published articles.^{1,2}

Key findings

More than a third of people in advanced age had a fall in the last 12 months. Of those who fell, one in five needed hospitalisation and 20% of those who fell had used physiotherapy services.

This report describes the prevalence of falls, multiple falls, injury from falls and hospitalisations from falls for people in advanced age, by sex, ethnic group, and socioeconomic deprivation. Use of physiotherapy services is also described for people who fell.

For this report, a **fall** is defined as an unexpected event (including slips and trips) in which the person lost their balance and landed on the floor, ground or lower level. **Fallers** are people who had fallen at least once in the last 12 months.

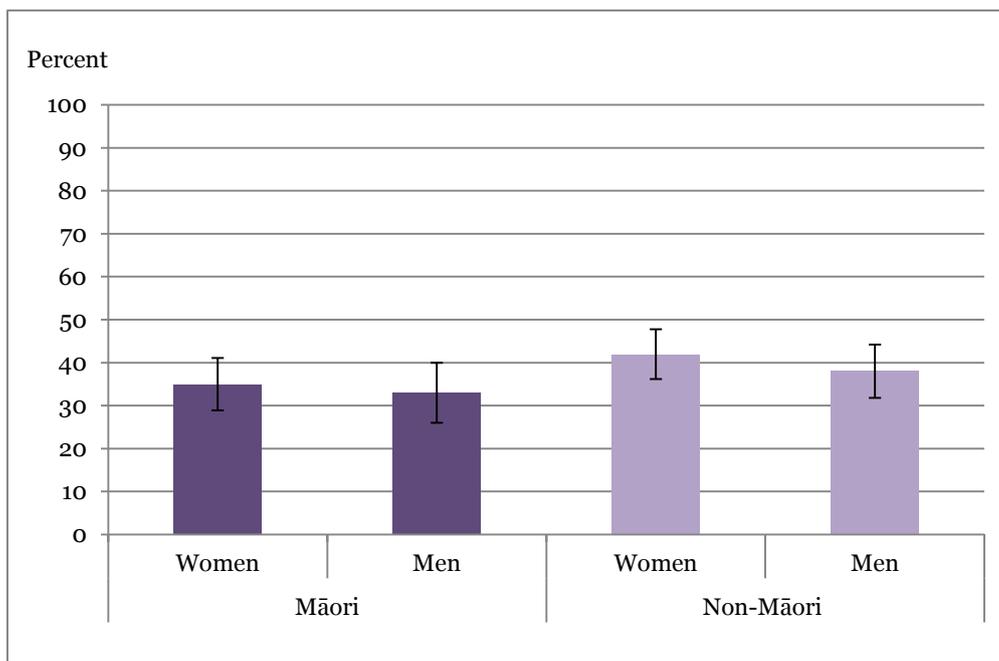
Findings

More than a third of people in advanced age had had a fall in the last 12 months

More than a third (37%) of people reported having fallen in the last 12 months. Thirty-six percent of men and 38% of women had had at least one fall in the last 12 months. For Māori, 35% of women and 33% of men reported having fallen in the last 12 months (Figure 1). For non-Māori, 42% of women and 38% of men reported having fallen in the last 12 months (Figure 1). There were no significant differences¹ in the proportion of Māori and non-Māori, or of men and women, who reported having fallen, after adjustment for age.

¹ 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: Falls in advanced age, by sex and ethnic group



Source: LiLACS NZ

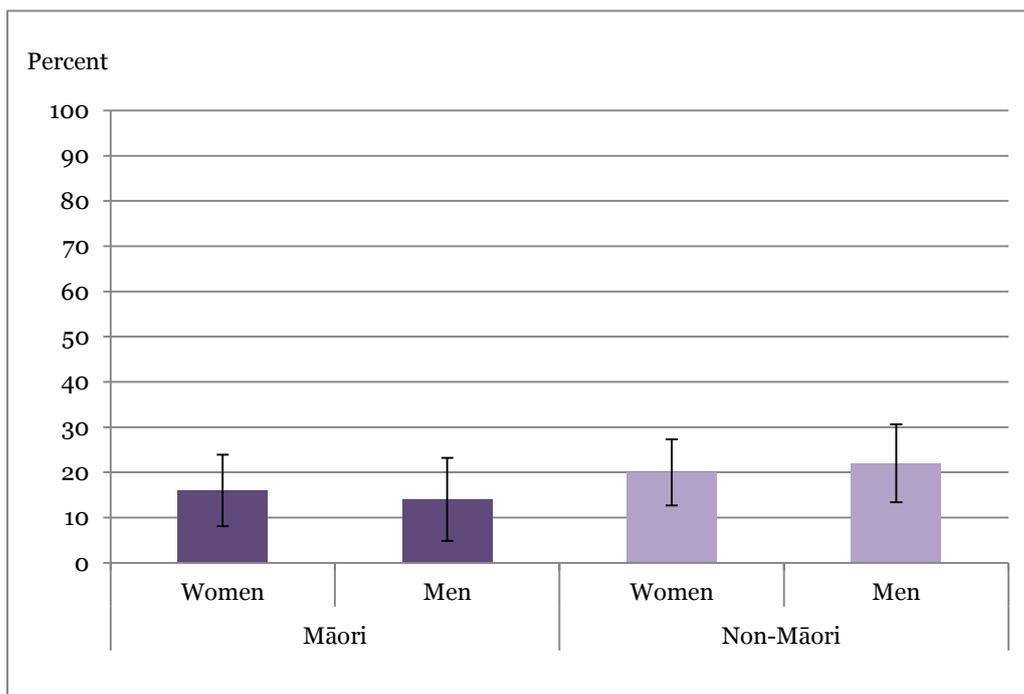
Note: This report uses prioritised ethnicity; self-identification as Māori was prioritised over other ethnicities if more than one was given

One in five people in advanced age had fallen more than once in the last 12 months

Twenty percent of people reported that they had fallen more than once (Figure 2), 13% reported that they had fallen two or three times and 7% reported that they had fallen four times or more (Appendix Tables A2 and A3).

The rate of falls did not vary by socioeconomic deprivation. Those who had fallen more than once did not vary by sex, ethnic group or socioeconomic deprivation.

Figure 2: Multiple falls 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

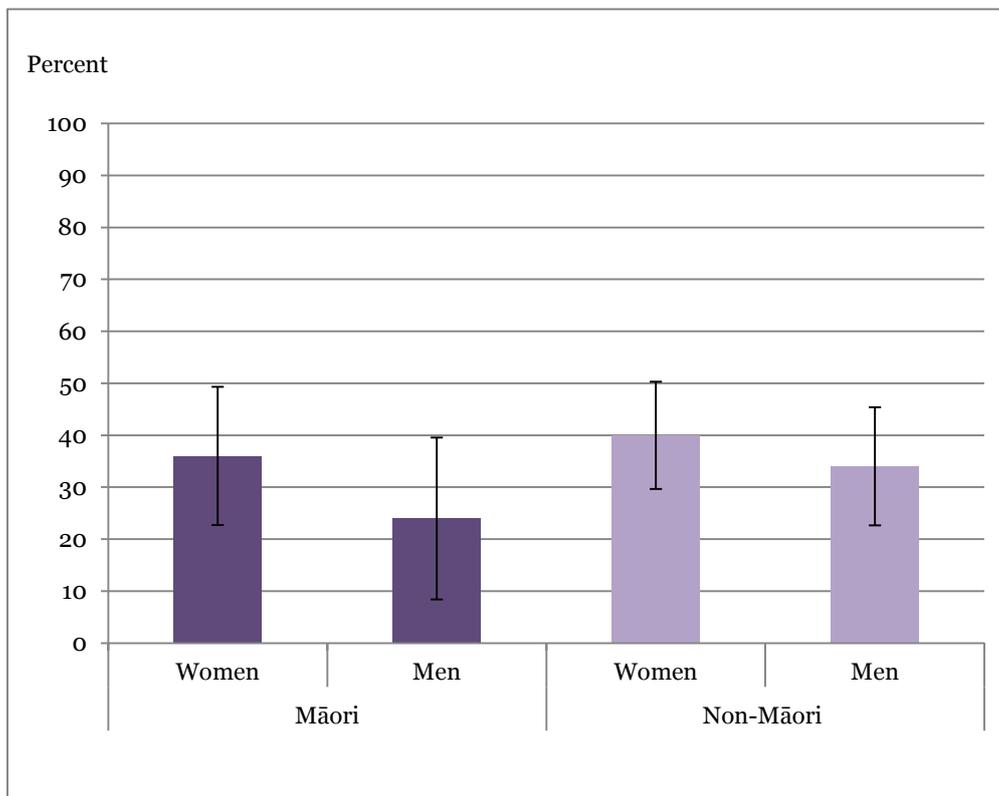
More than a third of people in advanced age were injured after they fell

Thirty five percent of people reported that they were injured from a fall, and 10% reported a fracture.

Thirty six percent of Māori women reported that they were injured from a fall and 40% of non-Māori women reported a fall related injury (Figure 3). Twenty four percent of Māori men and 34% of non-Māori men reported an injury from a fall (Figure 3).

Sustaining an injury from a fall in the last 12 months did not vary by socioeconomic deprivation.

Figure 3: Fall related injury in the last 12 months in advanced age, by sex and ethnic group



Source: LiLACS NZ

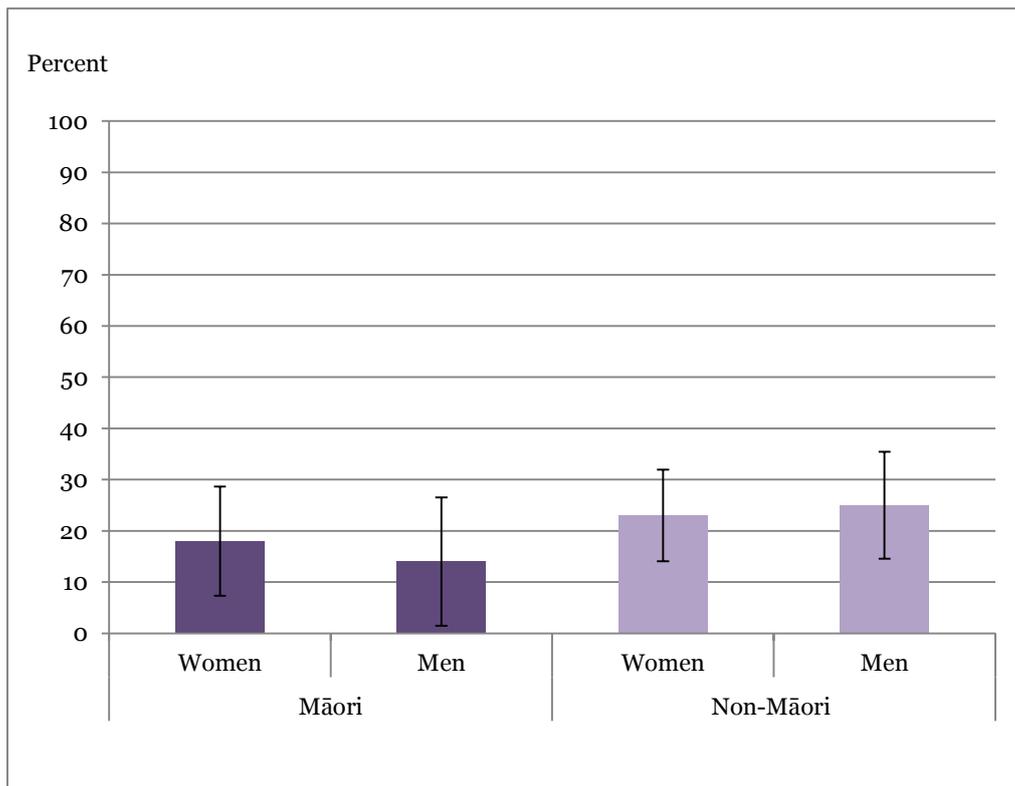
Note: This report uses prioritised ethnicity; self-identification as Māori was prioritised over other ethnicities if more than one was given

One in five people in advanced age who fell had to go to hospital after their fall

Twenty one percent of people reported that they were hospitalised because of the fall. Eighteen percent of Māori women fallers had been to hospital because of a fall and 14% of Māori male fallers had been to hospital because of a fall (Figure 4). For non-Māori men, 25% who had fallen had been to hospital because of a fall. For non-Māori women, 23% of fallers had been to hospital because of a fall (Figure 4). Eight percent of those who reported a fracture were not hospitalised.

Hospitalisation from falls did not vary by socioeconomic deprivation.

Figure 4: Fall related hospitalisations 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

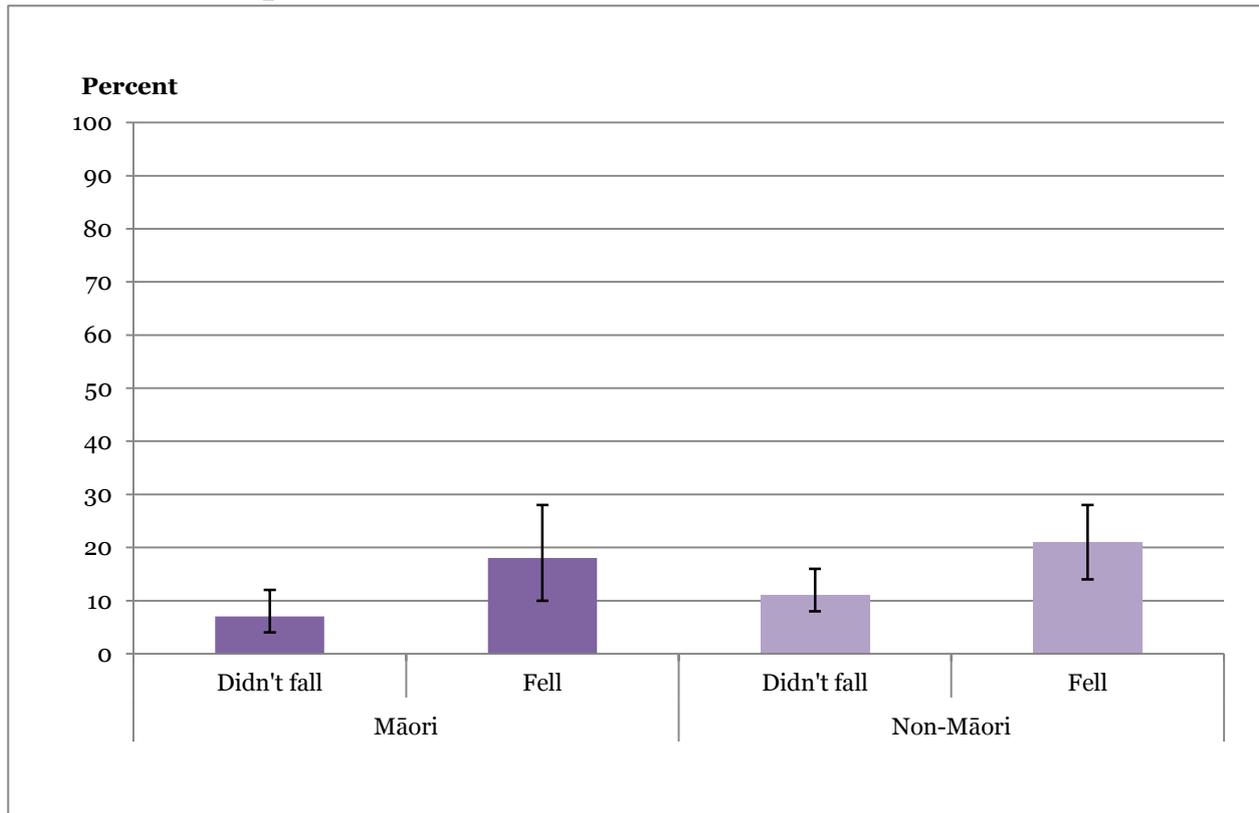
Twenty percent of people in advanced age who had fallen visited a physiotherapist

Eight percent of men and 11% of women had visited a physiotherapist in the last 12 months. There was no difference between ethnic groups in visiting the physiotherapist.

Twenty percent of fallers visited a physiotherapist in the last 12 months (Figure 5) and ten percent of non-fallers reported that they had visited a physiotherapist. This means that those who had fallen were twice as likely to visit a physiotherapist, after adjusting for age, sex and ethnic group.

Significantly more people with a fall related injury (25%) had visited a physiotherapist, compared with 11% who had not had a fall related injury, adjusting for age, sex, and ethnic group. Physiotherapy use did not vary by socioeconomic deprivation.

Figure 5: Physiotherapy use in the last 12 months in advanced age, by ethnic group and whether the person had had a fall



Source: LiLACS NZ

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

What is the source of the data?

The source of the data is Life and Living in Advanced Age: a Cohort Study in New Zealand—Te Puāwaitanga O Ngā Tapuwāe 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. Nursing assessments of physical function and cardiorespiratory health were also completed.

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.

What were the survey questions?

All people were asked whether they had had a fall, ‘including a slip or trip in which you lost your balance and landed on the floor or ground or lower level’ in the last 12 months, and whether they had fallen more than once (2-3 times, or 4+ times). They were also asked if they had visited a physiotherapist in the last 12 months as part of questions on visits to a range of health providers such as optometrists, dentists and others. Those who answered the full questionnaire were asked additional questions about injuries from a fall in the last 12 months and visits to hospital because of a fall.

Further information

You can find more information about the LiLACS NZ study on the website (<https://www.fmhs.auckland.ac.nz/en/faculty/lilacs.html>) and see also Hayman et al (2012)¹ for the study protocol and Dyllal et al (2013)² 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. Lamb S, Jorstad-Stein E, Hauer K, Becker C. 2005. Prevention of Falls Network Europe and Outcomes Consensus Group. Development of a common outcome data set for fall injury prevention trials: the Prevention of Falls Network Europe consensus. *J Am Geriatr Soc* 53(9): 1618-22.

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. Ngā Pae o te Māramatanga, 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:

<https://www.fmhs.auckland.ac.nz/en/faculty/lilacs.html> 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: Total number of participants who answered the questions

	Māori		Non-Māori	
	Men	Women	Men	Women
How many times have you fallen in the past 12 months?	172	236	235	277
When you fell during the last 12 months did you have a fracture?	28	50	67	86
When you fell during the last 12 months did you have some other kind of injury?	32	53	67	89
When you fell during the last 12 months were you admitted to hospital?	29	50	64	81
Have you sought medical attention because of a fall in the last 12 months	29	50	64	81
In the last 12 months have you visited or been visited by: a physiotherapist?	101	155	188	209

Table A-2: Prevalence of falls and injury for Māori and non-Māori men in advanced age

	Men					
	Māori			Non-Māori		
	n	(%)	(95% CI)	n	(%)	(95% CI)
Any fall in last 12 months	56	(33)	(26–40)	90	(38)	(32–45)
Fell 2-3 times in last 12 months	25	(15)	(10–21)	19	(8)	(5–12)
Fell 4+ times in last 12 months	8	(5)	(2–9)	20	(9)	(5–13)
Any injury from falls over last 12 months	7	(24)	(8–41)	23	(34)	(23–46)
Fracture from falls over last 12 months	0	(0)	(0–3)	9	(4)	(2–8)
Hospitalised from falls over last 12 months	4	(3)	(1–7)	17	(8)	(5–13)
Physiotherapy use over last 12 months						
Fallen	6	(21)	(5–36)	12	(18)	(8–27)
Not fallen	6	(8)	(2–15)	10	(8)	(3–13)
Injured from fall	2	(29)	(4–71)	5	(22)	(8–44)
Not injured from fall	4	(18)	(5–40)	7	(16)	(7–30)

Note: 1) All LiLACS NZ participants (n = 932) were asked this question; 2) Only those who completed the full questionnaire answered these questions on numbers of falls and injury and physiotherapy use (n = 671)

Table A-3: Prevalence of falls and injury for Māori and non-Māori women in advanced age

	Women					
	Māori			Non-Māori		
	n	(%)	(95% CI)	n	(%)	(95% CI)
Any fall in last 12 months ¹	82	(35)	(29–41)	115	(42)	(36–48)
Fell 2-3 times in last 12 months ²	29	(12)	(8–17)	43	(16)	(11–20)
Fell 4+ times in last 12 months	13	(6)	(3–9)	23	(8)	(5–12)
Any injury from falls over last 12 months	18	(36)	(22–50)	34	(40)	(29–50)
Fracture from falls over last 12 months	7	(3)	(1–7)	11	(4)	(2–8)
Hospitalised from falls over last 12 months	9	(4)	(2–8)	19	(8)	(5–12)
Physiotherapy use over last 12 months						
Fallen	8	(16)	(5–27)	19	(23)	(13–32)
Not fallen	7	(7)	(2–25)	18	(14)	(8–21)
Injured from fall	3	(17)	(4-41)	10	(30)	(16-49)
Not injured from fall	5	(16)	(5-33)	9	(18)	(8-31)

Notes: 1) All LiLACS NZ participants (n = 932) were asked this question; 2) Only those who completed the full questionnaire answered these questions on numbers of falls and injury and physiotherapy use (n = 671)

Table A-4: Falls in advanced age

Group of interest	Reference group	Adjusted Odds Ratio (95% CI)	Significant (*)	Adjustment variables
Falls				
Men	Women	0.89 (0.68–1.17)	ns	Age
Māori	Non-Māori	0.84 (0.62–1.13)	ns	Age, sex
Māori men	Non-Māori men	0.86 (0.54–1.37)	ns	Age
Māori women	Non-Māori women	0.82 (0.55–1.23)	ns	Age
Most deprived areas	Least deprived areas	1.49 (1.02–2.16)	ns	Age, sex, ethnic group
Most deprived areas - men	Least deprived areas - men	1.41 (0.79–2.51)	ns	Age, ethnic group
Most deprived areas - women	Least deprived areas - women	1.53 (0.94–2.51)	ns	Age, ethnic group
Most deprived areas - Māori	Least deprived areas - Māori	1.42 (0.77-2.65)	ns	Age, sex
Most deprived -Māori	Most deprived -Non-Māori	1.42 (0.88-2.29)	ns	Age, sex
Injury from falls				
Men	Women	0.74 (0.42–1.3)	ns	Age
Māori	Non-Māori	1.06 (0.56–2.04)	ns	Age, sex
Māori men	Non-Māori men	0.58 (0.17–1.96)	ns	Age
Māori women	Non-Māori women	1.42 (0.61–3.26)	ns	Age
Most deprived areas	Least deprived areas	0.91 (0.42–1.96)	ns	Age, sex, ethnic group
Most deprived areas - men	Least deprived areas - men	2.39 (0.58–9.92)	ns	Age, ethnic group
Most deprived areas - women	Least deprived areas - women	0.55 (0.20–1.52)	ns	Age, ethnic group
Most deprived areas - Māori	Least deprived areas - Māori	0.31 (0.07-1.39)	ns	Age, sex

Group of interest	Reference group	Adjusted Odds Ratio (95% CI)	Significant (*)	Adjustment variables
Most deprived -Māori	Most deprived -Non-Māori	1.32 (0.53-3.29)	ns	Age, sex
Hospitalisation from falls				
Men	Women	1.07 (0.56-2.05)	ns	Age
Māori	Non-Māori	1.05 (0.55-2.02)	ns	Age, sex
Māori men	Non-Māori men	0.45 (0.10-1.98)	ns	Age
Māori women	Non-Māori women	1.00 (0.39-2.55)	ns	Age
Most deprived areas	Least deprived areas	0.75 (0.32-1.74)	ns	Age, sex, ethnic group
Most deprived areas - men	Least deprived areas - men	0.70 (0.19-2.55)	ns	Age, ethnic group
Most deprived areas - women	Least deprived areas - women	0.83 (0.27-2.55)	ns	Age, ethnic group
Most deprived areas - Māori	Least deprived areas - Māori	0.80 (0.14-4.57)	ns	Age, sex
Most deprived -Māori	Most deprived -Non-Māori	0.68 (0.26-1.83)	ns	Age, sex
Physiotherapy use				
Men	Women	0.80 (0.50-1.27)	ns	Age
Māori	Non-Māori	0.60 (0.32-1.11)	ns	Age, sex
Māori men	Non-Māori men	0.66 (0.20-2.12)	ns	Age
Māori women	Non-Māori women	0.53 (0.25-1.10)	ns	Age
Most deprived areas	Least deprived areas	0.86 (0.47-1.56)	ns	Age, sex, ethnic group
Most deprived areas - men	Least deprived areas - men	0.74 (0.28-1.97)	ns	Age, ethnic group
Most deprived areas - women	Least deprived areas - women	0.92 (0.43-1.99)	ns	Age, ethnic group
Most deprived areas - Māori	Least deprived areas - Māori	0.98 (0.30-3.15)	ns	Age, sex
Most deprived -Māori	Most deprived -Non-Māori	0.77 (0.37-1.59)	ns	Age, sex
Fallen	Not fallen	2.23 (1.40-3.55)	*	Age, sex, ethnic group, dep
Fallen - men	Not fallen - men	2.74 (1.30-5.75)	*	Age, ethnic group, dep
Fallen - women	Not fallen - women	1.97 (1.08-3.60)	*	Age, ethnic group, dep
Fallen with injury	Not fallen with injury	2.77 (1.63-4.64)	*	Age, ethnic group, sex

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 in 2012 the third wave. Table A-5 shows the age, sex, ethnic group, living arrangements and socioeconomic deprivation area of the LiLACS NZ participants in the first wave.

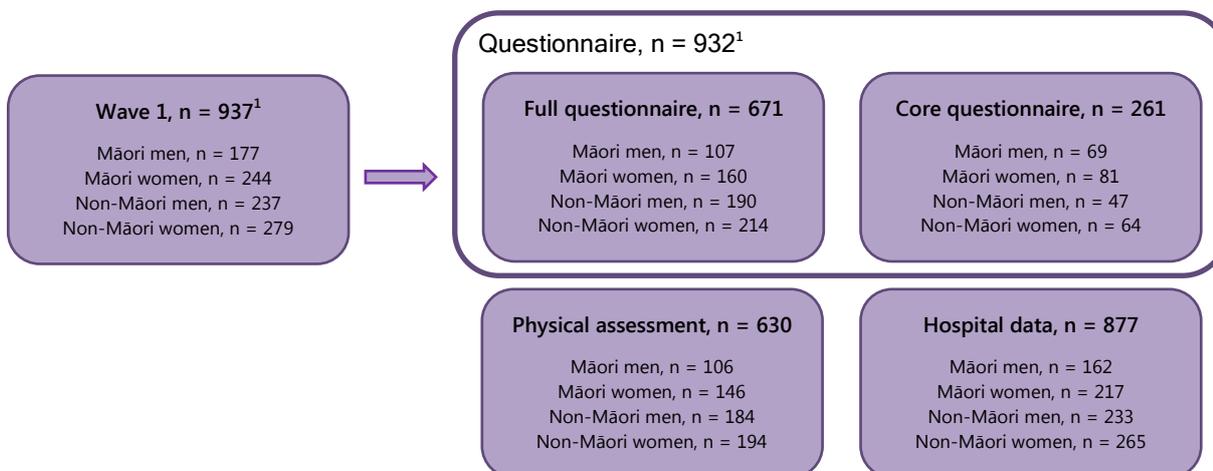
Table A-5: Demographic summary of LiLACS NZ participants

	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%)

Source: LiLACS NZ

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 basic falls question was part of the core questionnaire (n = 932); questions on injury and hospitalisation from falls and physiotherapists visits were part of the full questionnaire (n = 671).

Figure A-1: LiLACS NZ recruitment process



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