Atlas of Healthcare Variation
Falls methodology

General points:

- Data are not presented where the number of people was less than 10. This is to preserve confidentiality.
- People were assigned to their district health board (DHB) of domicile unless otherwise noted. Where more than one domicile was recorded, the most recent value was selected.
- Ethnicity data presented is prioritised ethnic group (Māori, Pacific peoples, Asian and European/Other). For people reporting multiple ethnic groups, the most recent value was selected.

Acknowledgements:

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- From the Ministry of Health: Chris Lewis for his assistance providing the data.

Underlying data

If you would like the excel file of the underlying data, please email atlas@hqsc.govt.nz.

Standard deviation

Data are presented as standard deviation from the mean.

Standard deviation is a statistical measure of variation from a mean. Assuming that recorded instances are normally distributed (ie, they are in the usual 'bell-shaped curve'), 68 percent of all recorded instances would be expected to be within one standard deviation either side of the mean and 95 percent within two standard deviations. The two 'middle' shades will be within one standard deviation of the mean.

Confidence intervals

Data for each DHB is presented as rate per 1,000 population. Upper and lower confidence intervals were calculated to 95 percent level of confidence.

Identifying the hospital admission of interest

As it is possible that people may have more than one admission for a fall in a year, or have multiple hospital events in relation to one fall event (for example as a result of transfer to another hospital for treatment or transfers for rehabilitation), the following rules were applied to identify the most important hospital admission in a year:

The first (earliest) discharge in a year for individuals with a fall before or on the date of admission as the external cause of admission and then admissions were prioritised in order of:

a. Hip surgery during event (select this admission as first priority), or
b. Fractured neck of femur (if no hip surgery, select this admission), or
c. Fall as an external cause of admission (select first event in the year).

Further analysis	See further on in this document for a table showing national rates for this indicator in 5-year age bands. Additional analysis has also been undertaken exploring the percent of people who had more than one ACC claim in 2016 by age, gender, ethnicity and year.

Indicator #1:	**People with one or more ACC claims for a fall**
Numerator	People having one or more accepted ACC claim due to a fall in a year, by DHB
Denominator	Resident population, Stats NZ population projections
Data source	ACC and Stats NZ
Analysis	Subanalysis: - age 50 – 64, 65 – 74, 75 – 84, 85 and over - ethnicity: Maori, Pacific, Asian and European/other - gender
Discussion	This includes the group of people who are treated in primary care or A&M centre in addition to people who received their treatment in a public hospital.
Further analysis	Most people had only one ACC claim in the year for a fall-related injury in 2016, however 25 percent of those aged 85 and over had more than one claim. Around 11 percent of 50 to 74 year olds had more than one claim, this increased to 17 percent of those aged 75 to 84.

Indicator #2:	**People with one or more hospital admissions due to a fall**
Numerator	The number of people who were admitted one or more times to hospital with an external cause code of fall (W00-W19)
Denominator	Resident population, Stats NZ population projections
Data source	NMDS and Stats NZ
Analysis	Subanalysis by year, age, ethnicity, gender
Exclusions	• Falls and fractures that occur after admission date
Comment	Note: although falls and fractures occurring after the date of admission are excluded, it is possible that this analysis includes people who entered the hospital with a fall and had an in-hospital fracture on the same day. Patients who fell whilst in hospital are not included in these data.

Indicator #3:	**People admitted to hospital with a fall with a LOS ≥ 1 day**
Numerator	People admitted one or more times to hospital with an external cause code of fall (W00-W19) who had a length of stay of one day or more
Denominator	Resident population, Stats NZ population projections
Data source	NMDS and Stats NZ
Analysis	Subanalysis by year, age, ethnicity, gender
Exclusions	• Falls and fractures occurring after admission date
Comment	Patients who fell whilst in hospital are not included in these data.

Indicator #4:	**Average bed days for people admitted with a fall | DHB of domicile**
Numerator	The total number of bed days for people admitted to hospital with an external cause of fall
Denominator	The number of people admitted to hospital with an external cause of fall (indicator 2)
Data source	NMDS and Stats NZ
Analysis	Subanalysis by year, age, ethnicity, gender
Exclusions	• Falls and fractures occurring after admission date
Discussion	This indicator is a broad measure of resource use. It could be a proxy for severity, or of policy, eg use of interim care schemes during non-weight bearing periods.

Indicator #5:	**Fractured neck of femur due to a fall | DHB of domicile**
Numerator	People admitted with any diagnosis of FNOF and an external cause code of fall
Denominator	Resident population, Stats NZ population
Data source	NMDS
Analysis	Subanalysis by year, age, gender
Inclusions/ exclusions	• Diagnosis code: S72.0, S72.1, S72.2 • To avoid double counting, only one fracture per person in a year was counted • Exclude falls and fractures that occur after the admission date
Comment	Patients who fell whilst in hospital and experienced a hip fracture as a result are not included in these data. This indicator is measured slightly differently to that reported in for example OECD patient safety indicators, in that people not events are counted.

Indicator #6:	**Percent of fractured neck of femur operated on the same or next day of admission | DHB of service**
Numerator	The number of people operated on the same or next day of admission
Denominator	Admissions with any diagnosis of FNOF, an external cause code of fall and who had a hip operation in the year
Data source	NMDS
Analysis	Subanalysis by year DHB of service
Inclusions/ exclusions	• To avoid double counting, only one fracture per person in one year was counted • Exclude falls and fractures that occur after the admission date • FNOF ICD10 S72.0, S72.1, S72.2 • Hip operation codes: fixation, hip joint (4930600), application of external fixator device (5013000, 4748300), implantation of internal device, hip joint (4792100), fixation, femur (4751900, 4753700, 4753400, 4758800, 4759100, 4753100), implantation of internal device, hip joint (4792100), closed reduction of fracture with internal fixation (4753100, 4751900), open reduction of fracture with internal fixation (4752801), total hip replacement (4931800, 4931900, 9060700, 9060701), partial hip replacement (4931500, 4752200).
Note	The previous analysis had a technical error meaning that the numerator included people whose hip operation did not have an external cause of a fall. The exclusion of these cases has reduced the percent of people being operated on the same or next day of admission. All previous data have been replaced with corrected figures.

Indicator #7:	**Bisphosphonate medication on discharge following an operation for fractured neck of femur | DHB of service**
Numerator	The number of people dispensed a bisphosphonate within 6 months of discharge for a FNOF
Denominator	Admissions with any diagnosis of FNOF, an external cause code of fall and who had a hip operation in the year
Data source	NMDS and Pharms
Analysis	Subanalysis by year (calendar), NMDS up to July 2013. DHB of service
Exclusions	Exclude people who died
Medications	Bisphosphonate: 1037 Alendronate sodium; 3868 Alendronate sodium with cholecalciferol; 1487 etidronate; 3938 raloxifene (evista); 4015 risedronate; 3913 zoledronic acid (aclasta)
Discussion	This indicator only looked at bisphosphonate dispensing on discharge following a FNOF; whether people received this medication prior or **during** admission was not analysed.

Indicator #8:	**Vitamin D medication on discharge following an operation for fractured neck of femur | DHB of service**
Numerator	The number of people dispensed vitamin D within 6 months of discharge for FNOF
Denominator	Admissions with any diagnosis of FNOF, an external cause code of fall and who had a hip operation in the year
Data source	NMDS and Pharms
Analysis	Subanalysis by year (calendar), NMDS up to July 2013. DHB of service
Exclusions	People who died
Medications	Vitamin D: 1020 Alfacalcidol; 1187 Cholecalciferol; 1189 Calcitriol; 3868 Alendronate sodium with cholecalciferol
Discussion	This indicator only measured vitamin D dispensing following an admission with a FNOF; whether people received vitamin D prior or **during** admission was not analysed.

Further analysis:

Table showing the rates per 1,000 for 2016 in 5-year age bands.

Age group	People with one or more ACC claims for a fall-related injury (rate/1,000)	People admitted to hospital for one or more days with a fall-related injury (rate/1,000)	Average bed days for people admitted with a fall-related injury (bed days)	People admitted with a hip fracture due to a fall (rate/1,000)
50 – 54	121.8	3.3	3.6	0.1
55 – 59	122.3	4.2	5.2	0.2
60 – 64	121.9	5.7	5.8	0.4
65 – 69	126.2	7.8	6.9	0.8
70 – 74	137.1	11.9	8.4	1.8
75 – 79	155.7	20.8	10.6	3.5
80 – 84	194.6	41.6	12.4	8.9
85 and over	249.1	86.5	13.4	21.8
Total	137.7	13.4	10.0	2.4

Additional exploratory analysis for Falls Atlas – February 2018

Methodology notes

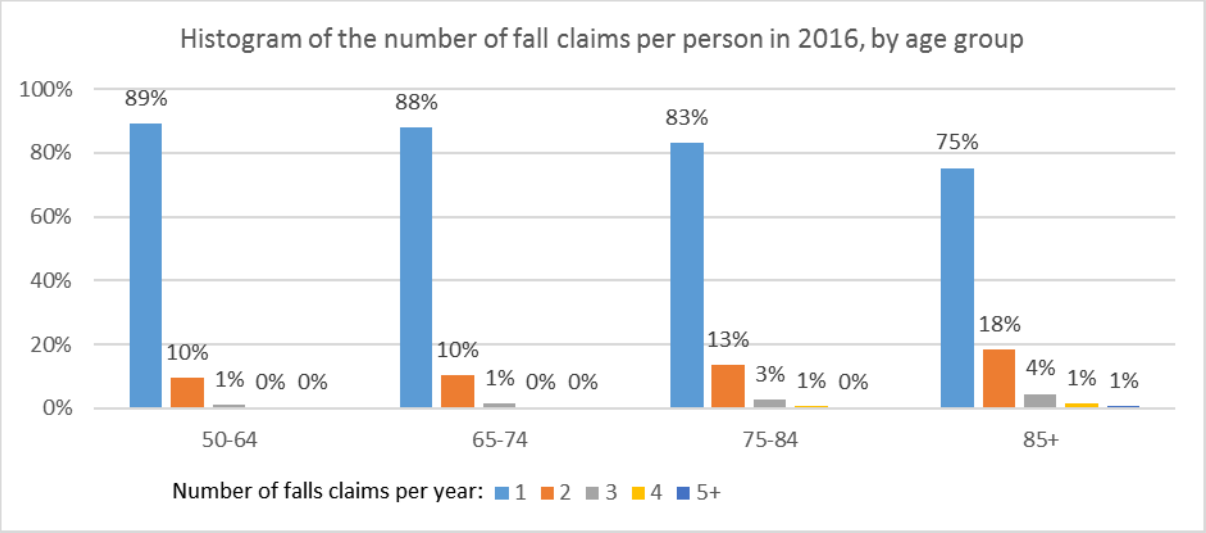
In the following analyses, 'fallers' refers to people who had at least one accepted falls claim in a year.

All percentages below are calculated from the number of people with two or more claims for a fall, divided by the number of fallers (people who had at least one claim for a fall). For example, if 10 people had at least one ACC claim in a year, and 5 of those people had two or more claims, the percentage would be 50%.

Indicator 1: People with one or more accepted ACC claims for a fall-related injury

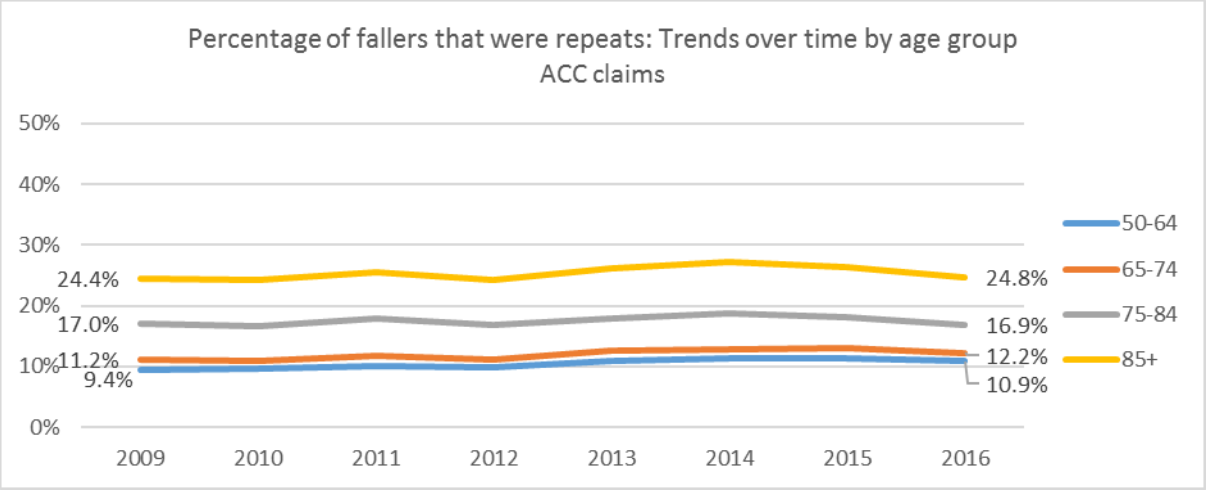
A. Age group

The likelihood of having more than one ACC claim for a fall-related injury increased with each age group. Of those aged over 85 who had at least one fall-related claim in 2016, 25% had two or more claims in 2016.



B. Trends over time

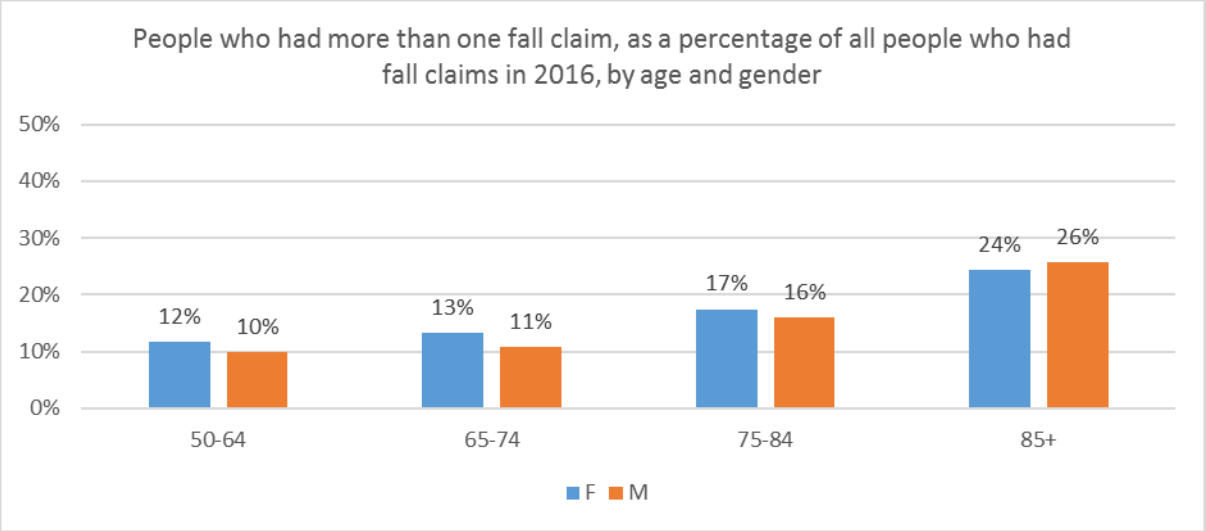
The percent of fallers who had two or more fall-related claims has remained fairly steady over the past seven years.



Note: Y-axis ends at 50 percent.

C. Gender

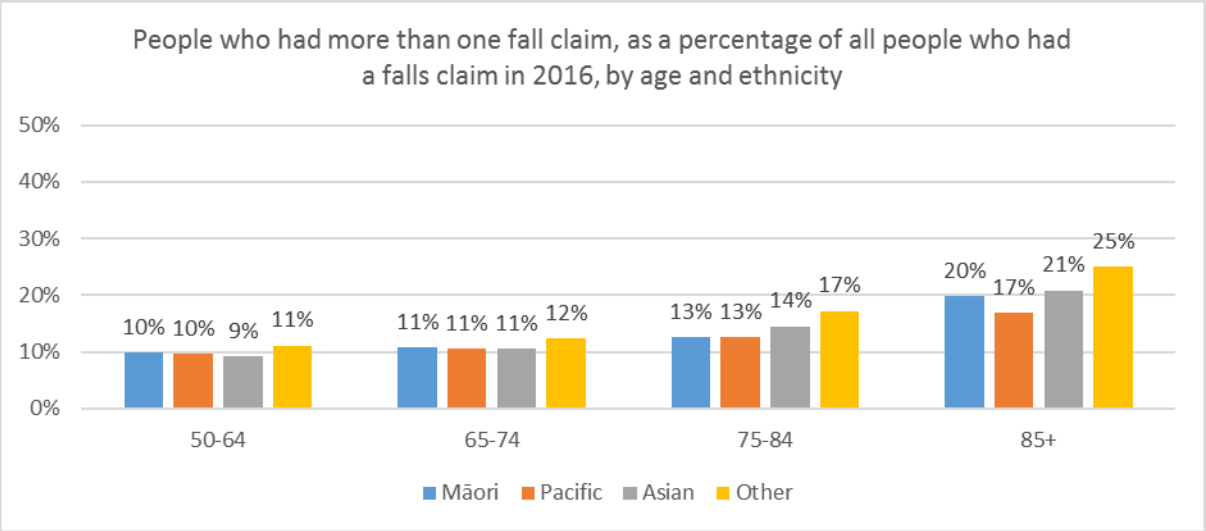
In the younger age groups, a slightly higher percentage of female fallers had two or more fall-related claims, compared with males. This reversed in the 85 and over age group.



Note: Y-axis ends at 50 percent.

D. Ethnicity

In the younger age groups, there was no difference between ethnicities in the percent of fallers who had two or more fall-related claims. From age 75 and over, the percent of fallers with two or more claims was higher for those of European and Other ethnicities ('Other'), compared with Māori, Pacific, and Asian ethnicities.



Note: Y-axis ends at 50 percent.