AGED CARE COHORT IN CENTRAL AND EASTERN SYDNEY:

FACTORS ASSOCIATED WITH REPORT OF A FALL IN THE LAST 12 MONTHS

A PRELIMINARY ANALYSIS

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EXECUTIVE SUMMARY

Rationale: Falls are a significant cause of unplanned hospital admissions. There are currently a number of falls prevention activities occurring in the health region. However the population reach of these programs is generally low and there is insufficient capacity to increases resources on them. Hence there is a need to improve targeting of falls prevention to those most in need; both in terms of their risk and their vulnerability to missing out on interventions.

Project aims: The aim of this project was to determine the rate of self-reported falls in the previous 12 months using baseline data of the '45 and Up' Study and to investigate the risk factors that are associated with increased risk of reported falls.

Methods: A cross sectional analysis using the '45 and Up' baseline study data linked to the administrative datasets was performed. These administrative datasets included Medicare Benefits Schedule data, NSW Admitted Patient Data Collection and the Registry of Births, Deaths, and Marriages. The participants were 31,173 '45 and Up' Study participants who resided within the common catchments of Sydney and South Eastern Sydney Local Health Districts (LHDs). These LHDs combined formed the catchment for Central and Eastern Sydney Primary Health Network (CESPHN).

The primary outcome measure was self-report of falls during the last 12 months. The association of self-reported falls and demographic, socioeconomic, lifestyle, wellbeing, and health services factors were explored.

Results: 22.5% of participants reported a fall in the last 12 months in the catchment area. Of these just under 50% reported one fall only. 12.8% reported a fracture in the last 5 years, usually associated with an upper or lower limb. The rate of falls reported was more frequent for females and increased with age. The report of fractures increased with age for females but not males.

Low household income was strongly associated with an increased risk of a reported fall after adjusting for age. Participants who reported a fall in the last 12 months were 2.45 times more likely to also report multiple chronic health conditions. Participants with low bone density, osteoporosis or osteoarthritis were about 60% more likely to report a fall. Those who reported having a knee or hip replacement were 60% more likely to report a fall in the last 12 months. There was a strong association with report of a fracture in the last 5 years (OR: 2.9).

Participants who self-reported a fall were also more likely to report anxiety, depression and insufficient physical activity. They were also more likely to frequently use health services like regular visits to GP and have had a general practice management plan /team care arrangement.

Implications for health services: Falls are a significant issue for older people and increase with age. Risk of falling is associated with decreasing mobility, health and wellbeing. Participants who self-reported a fall were more likely to have attended a general practice. Hence general practice presents an opportunity to identify patients that are at an increased risk of a fall and implement preventive

care. Patients with multiple chronic health conditions, or fractures in the past with a low household income may also be suitable for targeting of LHD falls prevention programs. The use of the chronic disease management items to improve access to prevention health programs may assist.

Further research opportunities: Further analyses of these data will include up to date data (to 2014) and could be used to evaluate falls prevention activities in the area. It would also be useful to explore risk among participants who were admitted to hospital with a falls related issue. The potential access to longitudinal data will enable more detailed exploration of the longer term consequences and health service use of participants at different health risks as reported during completion of the baseline questionnaire.

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Background

Falls are common among older people and often result in fractures or other serious injuries and are a significant cause of hospitalisation admissions as well as morbidity and mortality in both Sydney and South East Sydney Local Health Districts (SLHD, SESLHD). There were 15,377 falls related hospitalisations in the two LHDs in 2013-14 alone (1). Hospital admission for a falls related event is also associated with length of stay for the acute episode and ongoing care including rehabilitation and thus the costs of health care for patients and the system.

Falls and the resultant injury have an impact on the overall health and quality of life for older people. This can often lead to a substantial loss of independence and hasten admission to residential care. Importantly, having had one fall is a risk factor for future falls (2) and developing a fear of falling, which may result in reduced activity levels, can also increase falls risk (3).

It is well recognised that the risk of a fall causing serious body harm increases with age. The increasing risk of a serious fall is also associated with health status. A recent systematic review found risk factors for falls in a community-dwelling older people included: a history of falls, vertigo, fear of falling, gait problems, use of walking aids, Parkinson disease and antiepileptic drug use(4). These risk factors can be classified as intrinsic including health status and extrinsic such as a side effect of a medication or environmental hazards. Less is known about the demographic, socioeconomic, lifestyle and overall health risk factors for falls among a community dwelling population.

In 2011–12, 96,385 people aged 65 and over were hospitalised for a fall-related injury—three and a half times as many cases as among people 45–64 year olds (Figure 1). Of these, 65,965 (68%) were women compared with 30,420 (32%) men. The rate of hospitalised falls also increased markedly with age among Australians aged 65 and over in 2011–12 (Figure 1). For women aged 65–69, the age-specific rate of hospitalised falls was 1,100 cases per 100,000 population, compared with 9,451 cases per 100,000 for women aged 85–89 (Figure 2). For men, the equivalent rates were 737 and 6,383 per 100,000 men. (5)

FIGURE 1: FALL-RELATED HOSPITALISATIONS BY AGE GROUP, 2011–12[5]
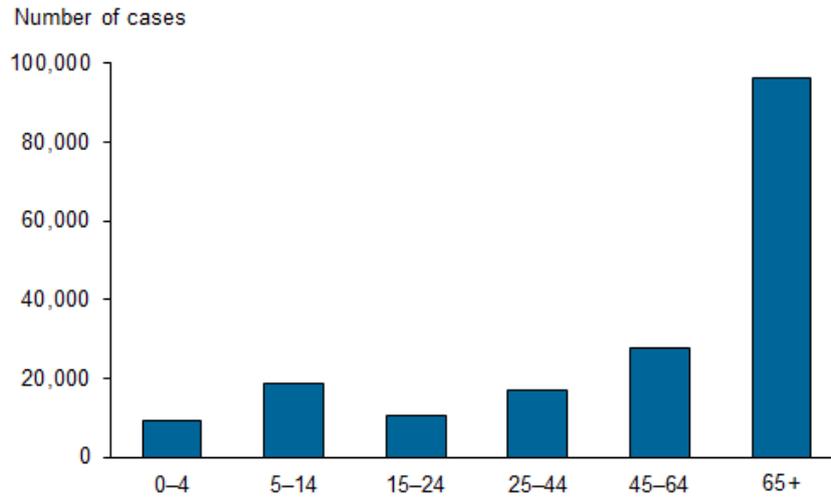
Source: AIHW National Hospital Morbidity Database.

FIGURE 2: AGE SPECIFIC RATES FOR CASES OF FALL-RELATED HOSPITAL ADMISSION BY AGE GROUP, 2011–12[5]
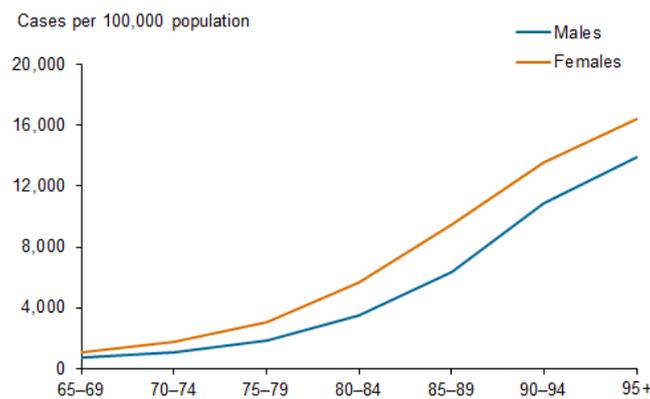
Source: AIHW National Hospital Morbidity Database.

A number of falls prevention activities currently exist within Central and South Eastern Sydney. However the reach of these programs is generally low and there is limited capacity to increase resources. Hence, there is a need to better target prevention to those most in need (both in terms of their risk and their vulnerability to non-participation in these interventions). In order to reduce the burden of preventable falls hospitalisation, requires a better understanding of the epidemiology of falls among older people. This understanding would lead to better integration of services and development of targeted falls prevention programs within the Central and Eastern Sydney Primary Health Network (CESPHN).

PROJECT AIMS

The aim of this project is to explore risk factors for a fall among a population of older residents of SLHD and SESLHD. The analyses aims to describe the demographic, socioeconomic, lifestyle and overall health risk factors for the self-report of a fall during the last 12 months among the baseline data of the 45 and Up Study. The results section describes the frequency of reported falls during the last 12 months, the frequency of reported fracture during the last five years, and the role of demographic characteristics, socioeconomic status, lifestyle, health and wellbeing, and health service use of participants who reported a recent fall. The results will inform who to target and the intervention mechanisms for a falls prevention program in the region.

The specific research questions that were addressed:

1. What is the proportion of adults by age and sex who self-report at least one fall in the past 12 months?

2. What is the proportion of adults by age and sex who self-report at least one fracture in the past five years?

3. What factors (demographic, socioeconomic, lifestyle, health and wellbeing) are associated with report of at least one fall in the last 12 months?

4. Is there an association between reported fall during the last 12 months and reported fracture during the last 5 years?

5. Is there any association between report of a fall during the last 12 months and health service use (claims for GP care, and hospital admission) during the same period for a fall related issue?

METHODS

This is a record linkage study employing cross-sectional analysis of baseline data from the 45 and Up Study linked to Medicare Benefits Schedule data and NSW Admitted Patient Data Collection. This dataset was also linked to the Registry of Births, Deaths, and Marriages to exclude participants who had died during the study period.

STUDY DATA

THE 45 AND UP STUDY

The Sax Institute's 45 and Up Study comprises more than 250,000 residents of NSW, Australia. Details of the recruitment of this cohort have been described previously (6). Potential study participants aged 45 years or older in NSW were randomly sampled from Medicare enrolment database. They were sent an invitation to participate, a description of the Study, a self-administered questionnaire, and a consent form. Participants joined the Study by completing the baseline questionnaire and providing consent for long-term follow up, including linkage of their questionnaire data to health records being collected by public health authorities. Recruitment occurred between 2006 and 2009, with 70% of the sample being recruited in 2008. The response rate was 18%. The baseline questionnaire collected information on a range of participant characteristics (available at https://www.saxinstitute.org.au/our-work/45-up-study/). PBS and MBS data were supplied by the

Australian Government Department of Human Services and deterministically linked to the 45 and Up Study baseline data. The remaining datasets were probabilistically linked by the NSW Centre for Health Record Linkage, with quality audits showing fewer than 0.5% false positive links.

DEPARTMENT OF HUMAN SERVICES DATA

The Department of Human Services (formerly Medicare Australia) is the administering body for Australia's universal health insurance system: the Medicare Benefits Schedule (MBS). The MBS data includes all claims for subsidised medical, diagnostic and some allied health services provided to Australians by registered medical and other eligible health care practitioners(7)). The following informationwas extracted for the purposes of this study: date of the service, the 'Item Number' for the service, and provider practice postcode.

NSW REGISTRY OF BIRTHS, DEATH AND MARRIAGES

The NSW Registry of Births, Death and Marriages is a record of all deaths that have been certified as to cause and date by a registered medical practitioner or a coroner. Information was used to identify and exclude study participants who died within 12 months of recruitment.

NSW MINISTRY OF HEALTH: ADMITTED PATIENT DATA COLLECTION

The NSW Ministry of Health has responsibility for all inpatient services and collates data on admissions into the NSW Admitted Patient Data Collection (APDC). Data were available for 2000-2009. The APDC collates inpatient admissions (discharges, transfers and deaths) from all public, private, and repatriation hospitals, private day procedure centres and public nursing homes in NSW. These data include limited demographic characteristics, diagnoses, date of admission and discharge, and length of stay for individual episodes of hospitalisation. The diagnoses were coded using International Classification of Disease 10th revision-Australian Modification (ICD-10-AM) codes. APDC data were available for this study for 2000-2009. For these analyses, APDC records were extracted for the 12 months following recruitment for each participant.

STUDY POPULATION

45 and Up Study participants who were resident in Sydney Local Health District (SLHD) or South East Sydney Local Health District (SESLHD) were eligible for the study and were identified for this study using residential postcode at recruitment. These LHDs combined formed the catchment for Central and Eastern Sydney Primary Health Network (CESPHN).

OUTCOME MEASURES

The main outcomes measure of interest for this study was

- Self-reported fall in the last 12 months

This variable was derived from the baseline questionnaire question: *During the last 12 months how many times have you fallen to the floor or ground?*

STUDY FACTORS

Individual factors were derived from participant responses recorded in the baseline questionnaire and health service use from the administrative datasets. These included six broad categories: demographic, socioeconomic factors, lifestyle factors, health status, wellbeing, and health service use.

Demographic characteristics
- age *(categorised as 45-59 years, 60-74 years, 75-84 years, >=85 years)*
- gender *(male or female)*
- language other than English spoken at home *(yes/no)*

Socio-economic factors
- highest educational qualification *(University, Trade/diploma, School Certificate, less than Year 10)*
- annual household income *(>=$70,000, $40,000-$69,000, $20,000-$39,000, <$20,000)*
- housing status *(house, apartment including a flat, apartment, mobile home or retirement accommodation, hostel/nursing home, other)*
- employment status *(fulltime or part-time employment, not in the workforce)*

Lifestyle factors
- smoking status *(never smoked, current smoker or ex-smoker)*
- alcohol intake *(zero, 1-13, or 14+ drinks per week)*
- Body Mass Index/BMI *(underweight (BMI<20), normal weight (20=<25), overweight (25-29), and obese (>30))*
- physical activity *(sedentary-no physical activity was reported and sufficient if physical activity comprised at least 150 minutes of walking during at least 5 sessions per week; all other categories were classified as insufficient(8).*

Wellbeing
- Self-reported fracture in the last 5 years (This variable was derived from the baseline questionnaire question: 'Have you had a broken/fractured bone in the last 5 years?'. Information on the site of the fracture was also ascertained.)
- Number of health conditions (The number of chronic conditions was identified from participants' responses to the questions "Has a doctor ever told you that you have . . . ." or 'In the last month have you been treated for -?' and listed a number of chronic health conditions including cancer, heart disease, high blood pressure, stroke, anxiety, and depression. Participant responses were summed and classified as none, 1, 2, and 3 or more.)
- Self-rated general health and quality of life (*rated on a five-point scale as excellent, very good, good, fair, and poor and presented as three groups (excellent/very good, good, and fair/poor*).
- Psychological distress *(measured using the Kessler-10 score and categorised as low (score of 10-15), moderate (16-21), high (22-29), and very high (30+)(9,10).*
- Functional capacity *(measured using the Medical Outcomes Study, Short Form 36 Physical Functioning Scale (SF36-PF) and was classified as no limitation (score of 100), minor (90-99), moderate (60-89), and severe (0-59)(11,12).*
- Help with daily living activities. *(Participants were asked if they needed help with daily activities using the question: 'Do you regularly need help with daily tasks because of long-term illness or disability? (e.g. personal care, getting around, preparing meal)'. Dichotomous responses were sought*)

Health service use
- Number of general practice (GP) consultations (*categorised as 0, 1-4, 5-9, and 10+ consultations*)

- Hospital admissions in the last 12 months *(categorised as yes/no)*
- Continuity of provider care (*calculated from the methods of Eriksson and Mattsson(10) to calculate usual provider continuity of care (UprovC). For this study usual provider or usual practice was defined as the provider or practice that provided the highest number of consultations for a participant in a 12 month period. Usual provider continuity of care was calcuated as the percentage of consultations that a participant had with the same usual provider. Finally, we created a dichotomous measure of continuity of care by provider. Participants were considered to have continuity of provider care if they had ≥4 GP consultations and UProvC of ≥80%.*)
- Preparation of General practice Management Plan/Team Care Arrangements GPMP/TCA (*evidence of a claim for preparation of a GPMP/TCA in 12 months following Index Admission*)
- Review of GPMP/TCA (*evidence of a claim for preparation of a GPMP/TCA in 12 months following Index Admission)*

DATA ANALYSIS

Descriptive and multivariate methods were undertaken to assess the incidence of falls and fractures and the associated risk factors. The data were analysed to describe the self-reported incidence of falls and fractures. The age specific rates of falls and fractures were calculated as the percentage of participants within age and gender groups who reported a fall in the last 12 months. Contingency tables were created to describe the association between study factors and the main outcome variable, self reported fall in the last 12 months.

Logistic regression models were created to estimate the odds of falls in the last 12 months among the study participants compared to participants who did not fall. The odds ratio and 95 % confidence interval were calculated. Independent multivariate models were undertaken for each of the study variables and were adjusted for gender, age, language other than English spoken at home (LOTE), educational qualifications, and household income. Missing data were included in the multivariate models, using the 'missing values' category. All analyses were carried out in SAS version 9.3 (SAS Institute Inc., Cary, NC, USA). All the tests were two-sided and a p-value of less than or equal to 0.05 was considered statistically significant.

RESULTS

The linked dataset included 31,115 participants in the 45 and Up Study who were resident in the combined study regions (12,551 in SLHD and 18,564 in SESLHD) and were successfully linked to the MBS and APDC data.

At least one fall in the last 12 months was reported by 6,988 (22.5%) participants. Of these just under 50% reported one fall only (Table 1).

There were 3,983 (12.8%) participants who reported a fracture in the last five years. These fractures affected a number of sites (Table 1). Upper limb fracture were most commonly reported. A fractured hip was reported by 212 (5.3%) of participants.

TABLE 1: NUMBER OF FALLS AND FRACTURES REPORTED BY RESIDENTS OF CENTRAL AND SOUTH EASTERN SYDNEY (CES) STRATIFIED BY SYDNEY AND SOUTH EAST SYDNEY LOCAL HEALTH DISTRICTS (SLHD, SESLHD)

	SLHD N=12,551		SESLHD N=18,564		CES N=31,115	
	n	%	n	%	n	%
Frequency of self-report of at least one fall in last 12 months						
Number of falls reported						
Zero	9,630	76.7	14,497	78.1	24,127	77.5
1	993	7.9	1,481	8.0	2,474	8.0
2	596	4.8	813	4.4	1,409	4.5
3+	586	4.7	710	3.8	1,296	4.2
Broken bone/Fractured in the last five years						
No	10,504	83.7	15,454	83.3	25,958	83.4
Yes	1,580	12.6	2,403	12.9	3,983	12.8
Site of reported fracture	**N=1,580**		**N=2,403**		**N=3,983**	
Upper limb						
Finger/toe	289	18.3	499	20.8	458	19.8
Wrist	286	18.1	424	17.6	710	17.8
Arm	142	9.0	180	7.5	322	8.1
Lower limb						
Ankle	200	12.7	313	13.0	513	12.9
Hip	88	5.6	124	5.2	212	5.3
Torso						
Rib	224	14.2	345	14.4	569	14.3
Other	193	12.2	265	11.0	458	11.5

The age and gender specific rates of reported falls are shown in Table 2 and Figure 3. For all age groups females were more likely to report a fall during the last 12 months than males. However the report of falls increased with age for both males and females and by age 85 years the reported fall rates were similar.

TABLE 2: RATE OF FALLS AMONG 45 AND UP PARTICIPANTS RESIDENT OF CES (N=31,115) IN THE LAST 12 MONTHS STRATIFIED BY AGE AND GENDER

	Male		Female		Total	
Age group (years)	n	%	n	%	N	%
45-49	150	8.5	347	13.9	497	11.7
50-54	213	9.3	439	14.6	652	12.3
55-59	229	9.3	507	17.7	736	13.8
60-64	203	9.8	414	18.4	617	14.3
65-69	172	10.3	329	22.0	501	15.8
70-74	164	13.4	243	22.3	407	17.6
75-79	175	17.1	250	29.1	425	22.6
80-84	391	23.0	453	32.1	844	27.1
85-89	161	31.0	198	34.2	359	32.7
>=90	56	41.2	85	43.4	141	42.5

FIGURE 3: RATE OF FALLS AMONG 45 AND UP PARTICIPANTS RESIDENT OF CES (N=31,115) IN THE LAST 12 MONTHS STRATIFIED BY AGE AND GENDER
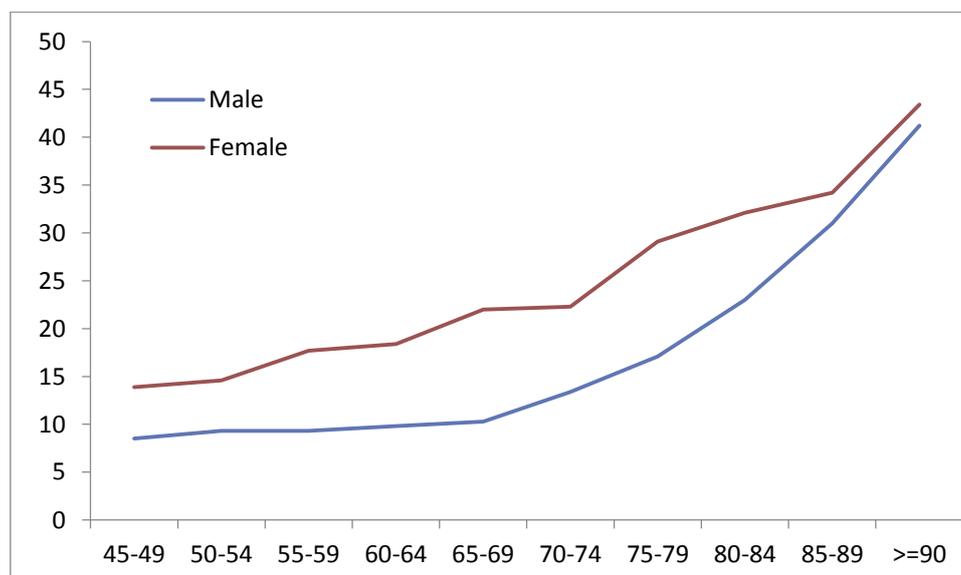
The rate of self reported fractures in the last five years is summarised in Table 3 and Figure 4. The rate of fractures reported by males varied between 8% and 11% across all age groups with younger and older males more likely to report fractures. A different pattern was reported for females. The rates reported at 45-49 years was 9.6% for females compared to 11.5% for males. Unlike males the rate of reported fractures increased with age. At age 80 years 24.6% of females reported a fracture compared to 11.3% of males.

TABLE 3: RATE OF FRACTURES REPORTED BY 45 AND UP PARTICIPANTS RESIDENT IN CES (N=31,115) IN THE LAST 5 YEARS STRATIFIED BY AGE AND GENDER

Age group (years)	Male		Female		Total	
	n	%	n	%	N	%
45-49	201	11.5	241	9.6	442	10.4
50-54	231	10.1	321	10.7	552	10.4
55-59	221	9.0	388	13.5	609	11.4
60-64	187	9.0	359	16.0	546	12.6
65-69	132	7.9	260	17.4	392	12.4
70-74	100	8.2	220	20.2	320	13.9
75-79	109	10.6	186	21.7	295	15.7
80-84	192	11.3	348	24.6	540	17.4
85-89	67	12.9	145	25.1	212	19.3
>=90	15	11.0	60	30.6	75	22.6

Note: Percentages do not consistently total to 100% due to missing values

FIGURE 4: RATE OF FRACTURES REPORTED BY 45 AND UP PARTICIPANTS RESIDENT IN CES (N=31,115) IN THE LAST 5 YEARS STRATIFIED BY AGE AND GENDER
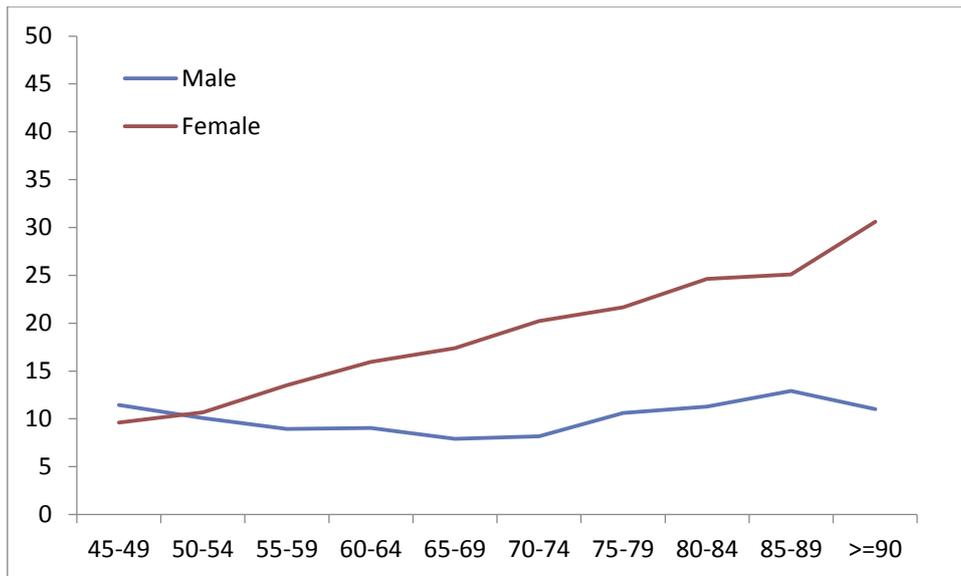
Table 4 presents an analysis of the demographic, socioeconomic, lifestyle, and health and wellbeing factors that were associated with a report of a fall within the past 12 months. The risk of reporting a fall was associated with a range of these factors. As well as age and gender which have already been highlighted report of falls were associated with socioeconomic status, household income, housing, and employment status (Table 4a).

TABLE 4A: ASSOCIATION OF DEMOGRAPHIC CHARACTERISTICS AND SOCIOECONOMIC STATUS WITH REPORT OF A FALL IN THE LAST 12 MONTHS AMONG 45 AND UP PARTICIPANTS IN CES (N=31,115)

Characteristic	n	%	OR*	95% CI	
				Report of fall in last 12 months	
Gender					
Male	1,914	12.9	1		
Female	3,265	20.1	1.79	1.68-1.91	
Age group (years)					
45-59	1885	12.7	1		
60-74	1525	15.6	1.17	1.09-1.29	
75-84	1269	25.4	2.05	1.89-2.24	
>=85	500	35.0	3.09	2.72-3.52	
Language other than English spoken at home					
Yes	978	16.0	1		
No	4,201	16.8	1.15	1.06-1.25	
Educational Qualifications					
University	1,510	14.4	1		
Trade/Cert/Diploma	1,410	16.2	0.93	0.86-1.01	
School certificate	1,561	17.5	0.82	0.75-0.90	
Less than year 10	604	23.9	1.01	0.90-1.14	
Household income					

14
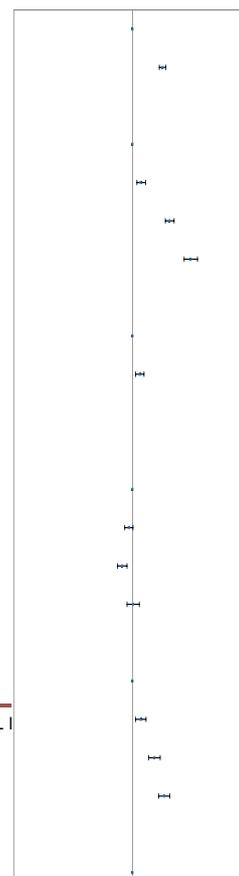
	n	%	OR*	95% CI
>=$70,000	1,170	11.5	1	
$40,000-$69,999	725	14.2	1.17	1.06-1.30
$20,000-$39,999	801	19.8	1.53	1.37-1.71
<$20,000	1,281	25.8	1.85	1.66-2.06
Housing status				
House	3,390	15.6	1	
Apartment	1,605	18.6	1.1	1.04-1.19
Hostel/nursing home	77	42.1	1.86	1.36-2.55
Other	65	22.3	1.36	1.02-1.80
Work status				
Fulltime/Part-time	1,864	11.6	1	
Not in workforce	3,246	22.0	1.42	1.30-1.55

*: adjusted for gender, age, language other than English spoken at home, educational qualifications, and household income

Small associations were observed between lifestyle and self-reported fall in the last 12 months (Table 4b). Participants who were classified as sedentary or insufficient activity were more likely to report a recent fall than other groups.

TABLE 4B: ASSOCIATION OF LIFESTYLE FACTORS WITH REPORT OF A FALL IN THE LAST 12 MONTHS AMONG 45 AND UP PARTICIPANTS IN CES (N=31,115)

Characteristic	Report of fall in last 12 months			
	n	%	OR*	95% CI
Smoking status				
Never smoked	1,747	16.5	1	
Current smoker	361	17.7	1.2	1.05-1.36
Ex-smoker	3,071	16.6	0.92	0.86-0.98
Alcohol consumption				
Zero	1,890	20.1	1	
1-13 drinks/week	2,544	15.3	0.91	0.86-0.99
14+ drinks/week	604	14.0	1.04	0.93-1.15
BMI status				
Normal weight	1,712	15.4	1	
Under weight	2,030	16.0	0.91	0.84-0.97
Over weight	1,023	19.7	1.34	1.22-1.46
Obese	414	19.5	1.05	0.93-1.19
Physical activity status				
Sufficient	375	13.5	1	
Sedentary	1,026	17.0	1.26	1.11-1.44
Insufficient	3,499	16.6	1.21	1.07-1.35

: adjusted for gender, age, language other than English spoken at home, educational qualifications, and household income

Table 4c shows the association of health conditions with report of a fall in the last 12 months. Report of a fall was associated with all of the health conditions that were included. Participants who reported a fall in the last 12 months were 2.45 times more likely to also report multiple chronic health conditions. Participants with low bone density, osteoporosis (OR: 1.64) or osteoarthritis (OR: 1.57) were about 60% more likely to report a fall. Anxiety (OR: 1.8) and depression (OR: 1.85) were also associated with increased report of a fall. Participants who reported having a knee or hip replacement were 60% more likely to report a fall in the last 12 months whereas those with cardiac surgery were only slightly more likely to report a fall. There was a strong association with report of a fracture in the last 5 years (OR: 2.9).

| Health condition	n	%	OR*	95% CI	
Report of fall in last 12 months					
Number of chronic health conditions					
None	3,103	14.0	1		
1 condition	1,433	20.9	1.38	1.28-1.48	
2 condition	481	28.6	1.81	1.60-2.04	
3 or more conditions	162	35.6	2.45	2.00-3.01	
Osteoporosis or low bone density					
No	4,510	15.5	1		
Yes	669	32.1	1.64	1.48-1.82	
Osteoarthritis					
No	4,485	15.6	1		
Yes	694	29.9	1.57	1.42-1.74	
Heart disease					
No	4,138	15.5	1		
Yes	1,041	23.8	1.33	1.23-1.45	
High blood pressure					
No	3,130	15.0	1		
Yes	2,049	19.9	1.22	1.14-1.30	
High blood cholesterol					
No	4,240	16.1	1		
Yes	939	19.8	1.19	1.09-1.29	
Depression					
No	3,476	15.3	1		
Yes	925	25.0	1.85	1.69-2.01	
Anxiety					
No	3,743	15.7	1		
Yes	658	25.4	1.8	1.63-1.99	
Operations reported					
Knee replacement					
No	4,810	16.1	1		
Yes	369	30.6	1.63	1.42-1.86	
Hip replacement					
No	4,881	16.2	1		
Yes	298	31.3	1.63	1.40-1.88	
Heart/coronary bypass					
No	4,760	16.3	1		
Yes	419	21.5	1.17	1.04-1.32	
Fracture in last 5 years					
No	3,704	14.3	1		
Yes	1,433	36	2.93	2.72-3.16	

*: *adjusted for gender, age, language other than English spoken at home, and household income*

Physical functioning was strongly associated with reporting of a fall. In particular participants who reported that they needed help with daily activities were 3.4 times more likely to report a fall in the last 12 months. For measures of physical limitation, psychological distress and quality of health and of life there was a strong association with the risk of a fall in the last 12 months.

TABLE 4D: ASSOCIATION OF FUNCTIONAL STATUS AND WELL-BEING WITH REPORT OF A FALL IN THE LAST 12 MONTHS AMONG 45 AND UP PARTICIPANTS IN CES (N=31,115)

Characteristic	n	%	OR*	95% CI	
Report of fall in last 12 months					
Need help with daily activities					
No	4,207	15.0	1		
Yes	732	47.2	3.44	3.08-3.86	
SF36-PF (level of physical limitation)					
No (100)	912	8.9	1		
Minor (90-99)	977	12.7	1.43	1.30-1.57	
Moderate (60-89)	1,348	21.7	2.4	2.17-2.64	
Severe (0-59)	1,498	38.2	4.65	4.17-5.17	
Kessler – 10 (level of psychological distress)					
Low (10-15)	2,880	13.5	1		
Moderate (16-21)	921	21.5	1.82	1.67-1.99	
High (21-29)	404	27.2	2.44	2.15-2.76	
Very high (30-50)	227	38.6	4.18	3.49-5.00	
Rating of overall health					
Excellent/Very good	1,945	12.0	1		
Good	1,708	17.8	1.45	1.35-1.56	
Fair/poor	1,364	33.5	3.06	2.81-3.35	
Rating of quality of life					
Excellent/Very good	2,279	12.6	1		
Good	1,616	19.8	1.5	1.40-1.62	
Fair/poor	1,033	32.8	2.76	2.51-3.04	
Rating of vision					
Excellent/very good	1,712	13.0	1		
Good	2,062	17.8	1.35	1.26-1.45	
Fair/poor	1,281	25.2	1.89	1.74-2.07	
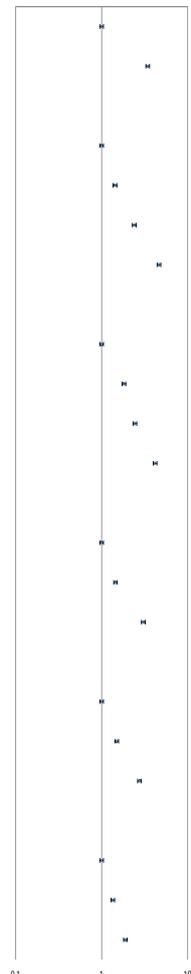
*: adjusted for gender, age, language other than English spoken at home, educational qualifications, and household income

Table 5 reports the health service use of participants who reported a fall in the last 12 months. There was an association between participant report of a fall and more frequent use of health services. They were more likely to have 10 or more GP consultations during the year at recruitment and were more likely to have had a hospital admission in the year following recruitment.

However in regard to general practice, participants who reported a fall in the last 12 months at recruitment were no more likely to have a regular GP who they saw 80% of the time (continuity of care measure). There was an association between report of a fall in the last 12 months and the presence of a claim for the preparation of or review of a General practice management plan of team care arrangements. Participants with a GPMP/TCA were more likely to report a fall in the last 12 months.

TABLE 5: ASSOCIATION OF HEALTH SERVICES USE AND RELATIVE ODDS OF FALLS AMONG 45 AND UP PARTICIPANTS IN LOCAL HEATH DISTRICTS (N=31,115) FALLEN WITHIN THE LAST 12 MONTHS.

	Report of fall in last 12 months				
	n	%	OR*	95% CI	
Number of GP consultations					
0	1,492	14.4	1		
1-4	783	12.6	0.94	0.85-1.03	
5-9	1,252	16.5	1.09	1.00-1.18	
10+	1,652	24.0	1.42	1.30-1.54	
Hospital admission in 12 months following recruitment					
No	3,749	15.4	1		
Yes	1,430	21.1	1.29	1.20-1.38	
Continuity of care					
Yes	1,723	19.8	1		
No	3,418	15.4	0.94	0.88-1.01	
Preparation of GPMP/TCA					
Yes	9,65	22.5	1		
No	4,214	15.7	0.82	0.75-0.89	
Review of GPMP/TCA					
Yes	392	23.7	1		
No	4,787	16.3	0.8	0.71-0.90	

*: adjusted for gender, age, language other than English spoken at home, educational qualifications, and household income

DISCUSSION

This study describes the rates of self- reported falls among participants in the 45 and Up study and explores the associated risk factors. This project represents a preliminary analysis of these data.

Falls among older residents in the CES is an issue. Among resident participants in the 45 and Up Study, 22% reported at least one fall during the twelve months prior to their recruitment to the 45 and Up Study and more than half of those who reported a fall reported more than one fall. In addition nearly 13% of participants reported a fracture in the last 5 years. These involved most commonly an upper limb or ankle fracture.

The rate of falls reported for males and females increased with age, although for most age groups females were more likely to report a fall than males. It is not clear from these data whether this is a reporting issue or represented a propensity for more falls among females. Except for the youngest group (40-49 years) where males were more likely to report a fracture than females, the report of a fracture in the last 5 years was more common among females. The rate of fractures reported increased with age for females but not for males.

A wide range of demographic, socioeconomic, lifestyle, health and wellbeing and health service use factors were associated with increased likelihood of reporting a fall in the last 12 months. Specifically participants with low socioeconomic status including household income were more likely to report falls. This may suggest that there are environmental issues that were associated with increased risk of falls.

Being overweight was a risk factor for falling in these data as was the lack of physical activity. This suggests that there is a role for improving access to physical activity programs for less mobile participants.

Health status was a strongly associated with risk of reporting a fall. Participant who reported a number of chronic health conditions including osteoarthritis and osteoporosis as well as circulatory conditions and mental health and psychological health problems were also more likely to report a fall in the last 12 months. There were also strong associations between reporting of a fall and reporting of certain operations and previous fracture. Poor quality of health and well being were associated with report of falls. These findings are consistent with previous research(4). They are also well recognised by service providers. Early discussions about the establishment of this cohort work identified an interest in better programs that were targeted at older residents who were at risk of failing health.

The linked data on health service use indicated that participants who reported a fall during the last 12 months were more likely to be associated with more frequent use of general practice and having had a hospital admission. The data do suggest that participants who were reported a fall were more likely to have received a GPMP/TCA. Our previous work has indicated that participants who are receiving enhanced primary care through GPMP/TCAs are at lower risk of poor outcomes such as hospitalisation (Comino et al., 2015).

The limitations of this study are the use of self-reported data at baseline on health status and falls report. We have no information on participants' propensity to report a fall. Further this was a cross sectional analysis of data available at baseline when the participants to the 45 and Up study were recruited. The low response rate may have affected the frequency data on report of falls although it

is recognised that internal comparisons are valid and comparable(14). This study did not investigate falls related admissions. Further, this preliminary study did not attempt to explore reports of falls or their outcomes among participants who were more likely to be at risk due to physical functioning.

These results have implications for health services. The data show that the risk of reporting a fall increases with age. This increase in risk of falls is likely to be exacerbated among participants who have chronic health problems including but not limited to arthritis or osteoporosis, and is likely to be complicated by poor physical activity. Prevention programs provided through the primary health care sector have the potential to address these factors through the use of GPMP/TCA to provide enhanced access to physical activity programs and identify and address issues for those at risk. Enhancing existing programs to improve their reach as well as ensuring that patients can access these services is a challenge for all health services.

There are opportunities for further analyses using these data to explore these data in more depth. In particular, it would be useful to explore risk among participants who were admitted to hospital with a falls related issue. The potential access to longitudinal data will enable more detailed exploration of the longer term consequences and health service us of participations at different health risk as reported during completion of the baseline questionnaire.

Future analyses would consider use of other methods of handling the data such as the use of negative binomial modelling to take into account the shewed nature of the falls data. Further work is required to explore the impact of age and number of falls on the outcomes reported. These preliminary analyses did not consider the effect of number of falls reported on the results reported. Work is underway to update the data that were available and will allow for more robust exploration of the impact of reported falls on health outcomes including the clustering of risk factors.

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