

# Hospitalisations and emergency department presentations by older individuals accessing long-term aged care in Australia

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## ABSTRACT

**Objective.** The study examined emergency department (ED) presentations, unplanned hospitalisations and potentially preventable hospitalisations in older people receiving long-term care by type of care received (i.e. permanent residential aged care or home care packages in the community), in Australia in 2019. **Methods.** A retrospective cohort study was conducted using the Registry of Senior Australians National Historical Cohort. Individuals were included if they resided in South Australia, Queensland, Victoria or New South Wales, received a home care package or permanent residential aged care in 2019 and were aged  $\geq 65$  years. The cumulative incidence of ED presentations, unplanned hospitalisations and potentially preventable hospitalisations in each of the long-term care service types were estimated during the year. Days in hospital per 1000 individuals were also calculated. **Results.** The study included 203,278 individuals accessing permanent residential aged care (209,639 episodes) and 118,999 accessing home care packages in the community (127,893 episodes). A higher proportion of people accessing home care packages had an ED presentation (43.1% [95% confidence interval, 42.8–43.3], vs 37.8% [37.6–38.0]), unplanned hospitalisation (39.8% [39.6–40.1] vs 33.4% [33.2–33.6]) and potentially preventable hospitalisation (11.8% [11.6–12.0] vs 8.2% [8.1–8.4]) than people accessing permanent residential aged care. Individuals with home care packages had more days in hospital due to unplanned hospitalisations than those in residential care (7745 vs 3049 days/1000 individuals). **Conclusions.** While a high proportion of older people in long-term care have ED presentations, unplanned hospitalisations and potentially preventable hospitalisations, people in the community with home care packages experience these events at a higher frequency.

**Keywords:** aged care, emergency department presentations, home care, hospitalisations, long-term care, observational research, older adults, residential aged care.

## Introduction

In Australia, older individuals (aged  $\geq 65$  years) account for 16% of the population yet they accounted for 43% of the 11.6 million hospitalisations and 21% of the 8.8 million emergency department (ED) presentations in 2021–2022.<sup>1</sup> Of the older people who have an ED presentation, more than one in two are subsequently admitted to hospital, compared to just over one in four younger people.<sup>1</sup> Unplanned hospitalisations can be burdensome for older people, disrupt their continuity of care, cause further deconditioning and contribute to growing demands for health services.<sup>2–4</sup>

Currently, one in six Australians are aged  $\geq 65$  years, and this is expected to increase to almost one in four by 2066, placing increased demands on aged care services.<sup>5–7</sup>

In Australia and internationally, government-subsidised long-term aged care services are critical to support older people requiring help with personal and health care. In 2022–2023, approximately 1.5 million individuals received long-term aged care services. Of these, over 314,000 people accessed home care packages and approximately 250,000 accessed permanent residential aged care (also known as nursing homes or care homes).<sup>8</sup>

Older adults consistently report an overwhelming preference to ‘age in place,’ which means to remain living at home for as long as possible,<sup>9</sup> and the Australian Government’s home care packages program aims to support older adults with complex care needs to continue to live in their own homes. Older people frequently enter permanent residential aged care following a hospitalisation, e.g. in 2017 one in four people living with dementia moved to residential aged care after a hospitalisation.<sup>10</sup>

Once in permanent residential care, almost one in three people are admitted to a public hospital annually, while 43% of those with home care packages have been reported to experience these events.<sup>11,12</sup> It is likely that the high hospitalisation rates in the older population accessing long-term aged care may be a contributing factor associated with the national challenges of ‘ambulance ramping’.<sup>11–14</sup>

This study used an integrated aged care and healthcare data platform of older people accessing long-term aged care in Australia in 2019. The aim was to examine the cumulative incidence of ED presentations, unplanned hospitalisations, potentially preventable hospitalisations and days spent in hospitals by individuals living in residential aged care facilities and by people living at home with care package support.

## Methods

### Study design and data source

A retrospective cohort study was conducted using the integrated aged care and healthcare information contained within the Registry of Senior Australians (ROSA) National Historical Cohort.<sup>15,16</sup> Briefly, the ROSA Historical Cohort (2002–2020) contains integrated national and state based aged care, healthcare and social welfare datasets to investigate the experiences of aged care recipients nationally.

For this analysis, the following datasets which are included as part of ROSA were employed: Australian Institute of Health and Welfare’s (AIHW) National Data Clearinghouse (including the national aged care eligibility assessments, episodes of long-term care at home or in a facility, National Death Index); and hospitalisation and ED presentations for four major states (South Australia (SA), Queensland (QLD), Victoria (VIC) and New South Wales (NSW), representing 87% of the total national cohort). Private hospitalisation data were not available for SA, but were available for QLD, VIC and NSW.

### Study cohort

Individuals accessing permanent residential aged care or home care packages in NSW, VIC, QLD and SA for at least 1 day between 1 January 2019 and 31 December 2019 and aged between  $\geq 65$  and 105 years were included. Individuals were only included in the study when they entered a residential aged care facility or received a home care package. Individuals in other states and territories, which represented 12.8% of the national aged care population in 2019, were not included due to the unavailability of hospitalisation records for these individuals in the ROSA Historical Cohort. Where individuals had multiple instances of receiving care (e.g. moved to a different residential aged care facility or changed home care provider), these were counted as separate episodes of care.

### Outcomes of interest

ED presentations, unplanned hospitalisations, potentially preventable hospitalisations and days spent in hospital due to unplanned hospitalisations during 2019 were the outcomes of interest. Unplanned hospitalisations were hospitalisations where the ‘Admission Urgency Status’ specified ‘Emergency’ and not ‘Scheduled.’ Potentially preventable hospitalisations were defined according to previously published specifications.<sup>17</sup> Where an ED presentation was followed immediately by a hospital admission, these were counted separately as both an ED presentation and an unplanned hospitalisation.

### Analysis

Descriptive statistics were employed. Cumulative incidence of the outcomes of interest were estimated for the cohort of individuals in care for at least 1 day. The rate of outcomes per 1000 individuals and days in hospital per 1000 individuals in each of the long-term care service types were also calculated. Analysis was conducted for the four states overall and stratified by state. All analyses were conducted using SAS 9.4.

### Ethics approval

This study has approvals from the: University of South Australia Human Research Ethics Committee (Ref: 200489); Australian Institute of Health and Welfare Ethics Committee (Ref: EO2022/4/1376); South Australian Department for Health & Wellbeing Human Research Ethics Committee (Ref: HREC/18/SAH/90); and New South Wales Population & Health Services Research Ethics Committee (Ref: 2019/ETH12028).

## Results

### Cohort description

There were 203,278 individuals (209,639 episodes) who accessed permanent residential aged care and 118,999

**Table 1.** Individual and aged care provider characteristics by type of long-term care received, 2019.

Characteristic	Permanent residential care ( <i>n</i> = 209,639 episodes)	Home care packages ( <i>n</i> = 127,893 episodes)
	<i>N</i> (%)	<i>N</i> (%)
Female	137,401 (65.5)	82,654 (64.6)
Age (years), median (interquartile range)	85 (79–89)	82 (76–87)
Dementia	105,561 (50.4)	23,742 (18.6)
Geographical area		
Major cities	147,175 (70.2)	89,417 (69.9)
Inner regional	46,368 (22.1)	30,302 (23.7)
Outer regional	14,775 (7.0)	7,654 (6.0)
Remote	551 (0.3)	341 (0.3)
Very remote	137 (0.1)	179 (0.1)
Missing remoteness	633 (0.3)	0 (0.0)
Provider ownership		
Not-for-profit	115,145 (54.9)	89,811 (70.2)
Private	85,480 (40.8)	29,379 (23.0)
Government	9,014 (4.3)	8,703 (6.8)
State		
New South Wales	79,449 (37.9)	49,888 (39.0)
Queensland	45,399 (21.7)	30,221 (23.6)
South Australia	21,107 (10.1)	10,482 (8.2)
Victoria	63,684 (30.4)	37,302 (29.2)

Dementia ascertained from aged care eligibility assessments, medications and aged care entry assessments (permanent residential care only).

(127,893 episodes) who accessed home care packages during the study period. For individuals accessing permanent residential aged care, 65.5% (*n* = 137,401) were female, the median (interquartile range, IQR) age was 85 (79–89) years and 50.4% (*n* = 105,561) had a diagnosis of dementia (Table 1). For people accessing home care packages, 64.6% (*n* = 82,654) were female, the median (IQR) age was 82 (76–87) years and 18.6% (*n* = 23,742) had a diagnosis of dementia (Table 1).

### Emergency department presentations

Of people accessing home care packages, 43.1% [95% confidence interval (CI) 42.8–43.3] had an ED presentation, whereas 37.8% [95% CI 37.6–38.0] of people accessing permanent residential aged care had an ED presentation (Fig. 1). There were 929 [95% CI 928–930] ED presentations per 1000 people accessing home care packages, compared to 701 [95% CI 699–703] ED presentations per 1000

people accessing permanent residential aged care (Fig. 2). Of the total 118,805 ED presentations in people accessing home care packages, and 146,964 in people accessing residential aged care, 69.1% (*n* = 82,128) and 71.0% (*n* = 104,293) resulted in a hospital admission, respectively. By state, the proportion of individuals in permanent residential aged care having an ED presentation ranged from 34.2% [95% CI 33.8–34.5] in VIC to 40.4% [95% CI 39.9–40.8] in QLD. For home care package recipients, the smallest proportion of people having an ED presentation was in VIC (39.6% [95% CI 39.1–40.1]), whereas the highest proportion was in NSW (46.0% [95% CI 45.5–46.4], Table 2).

### Unplanned hospitalisations and days in hospitals

The total number of hospitalisations in the study period for people accessing home care packages was 227,408 of which 40.3% (*n* = 91,660) were unplanned. For people accessing permanent residential aged care, there were 190,872 hospitalisations of which 58.9% (*n* = 112,400) were unplanned.

Of people accessing home care packages, 39.8% [95% CI 39.6–40.1] had an unplanned hospitalisation which was higher than for people accessing permanent residential aged care (33.4% [95% CI 33.2–33.6]). While the total days in hospital for unplanned hospitalisations was high in all people receiving long-term care, the total number of days was higher in people receiving home care packages than those in permanent residential aged care (990,561 vs 639,115 days, median (IQR) length of stay per person 11 (4–27) vs 5 (2–11) days). This equated to 7745 days/1000 individuals receiving home care packages and 3049 days/1000 individuals accessing residential aged care.

State differences in the proportion of people having an unplanned hospitalisation from permanent residential aged care were observed (39.8% [95% CI 39.4–40.3] of people in QLD, 31.1% [95% CI 30.8–31.4] in NSW, 32.1% [95% CI 31.5–32.7] in SA and 32.3% [95% CI 31.9–32.6] in VIC). Differences in the proportion of home care recipients having unplanned hospitalisations were also shown (44.3% [95% CI 43.8–44.9] in QLD, 38.1% [95% CI 37.7–38.6] in VIC, 38.5% [95% CI 38.1–38.9] in NSW and 39.2% [95% CI 38.3–40.2] in SA (Table 3).

### Potentially preventable hospitalisations

There were small differences in the proportion of people who had a potentially preventable hospitalisation by type of long-term care received (11.8% [95% CI 11.6–12.0] of people receiving a home care package vs 8.2% [95% CI 8.1–8.4] of people accessing permanent residential aged care, Table 4). State differences were observed, with QLD having the largest proportions of people having potentially preventable hospitalisations from home care packages (14.4% [95% CI 14.0–14.8]) and permanent residential aged care (10.9% [95% CI 10.7–11.2]) than the other states examined.

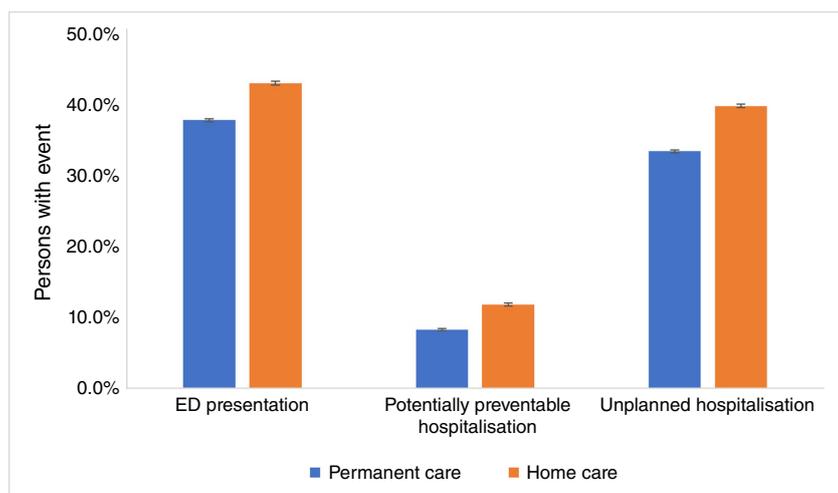


Fig. 1. Proportions of cohort with ED presentations, potentially preventable and unplanned hospitalisations.

Table 2. Emergency department presentations by type of long-term care received, 2019.

Type of long-term care received	State	Number persons	Number of people with ED presentations	Cumulative incidence of ED presentations (%) [95% CI]	Number of ED presentations	Rate of ED presentations/1000 individuals [95% CI]
Permanent residential care		209,639	79,322	37.8 [37.6–38.0]	146,964	701 [699–703]
	NSW	79,449	31,386	39.5 [39.2–39.8]	59,112	744 [741–747]
	QLD	45,399	18,321	40.4 [39.9–40.8]	36,216	797 [794–801]
	SA	21,107	7858	37.2 [36.6–37.9]	14,347	680 [673–686]
	VIC	63,684	21,757	34.2 [33.8–34.5]	37,289	586 [582–589]
Home care packages		127,893	55,084	43.1 [42.8–43.3]	118,805	929 [928–930]
	NSW	49,888	22,928	46.0 [45.5–46.4]	48,977	982 [981–983]
	QLD	30,221	12,805	42.4 [41.8–42.9]	29,678	982 [981–984]
	SA	10,482	4595	43.8 [42.9, 44.8]	10,064	960 [956–964]
	VIC	37,302	14,756	39.6 [39.1–40.1]	30,086	807 [803–811]

CI, confidence interval; ED, emergency department; NSW, New South Wales; QLD, Queensland; SA, South Australia; VIC, Victoria.

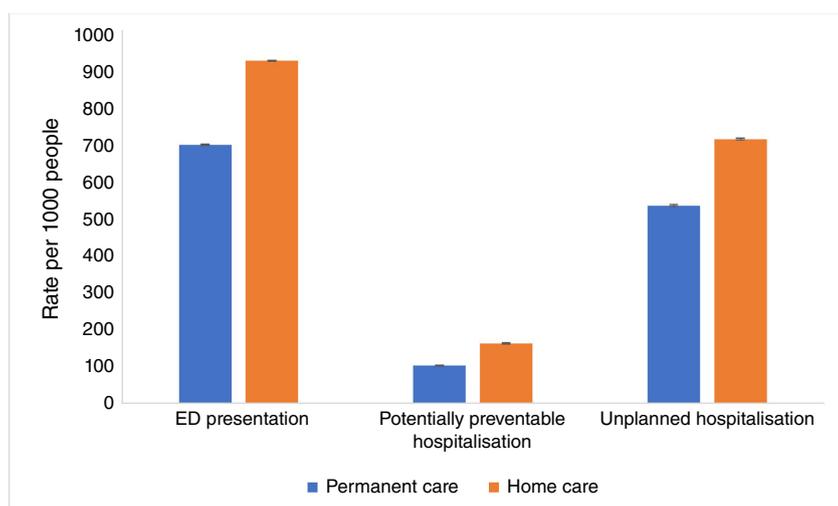


Fig. 2. Rates of emergency department presentations, potentially preventable and unplanned hospitalisations per 1000 persons.

**Table 3.** Unplanned hospitalisations and days in hospital by type of long-term care received, 2019.

Type of long-term care received	State	Number of people	Number of people with unplanned hospitalisation	Cumulative incidence of unplanned hospitalisations (% [95% CI])	Total number of unplanned hospitalisations	Rate of unplanned hospitalisations (n/1000 individuals [95% CI])	Total length of stay (days)	Length of stay per person (days)	Length of stay per person (days)	Acute length of stay (days)	Non acute length of stay (days)	Days in hospital/1000 individuals
Permanent residential care		209,639	70,095	33.4 [33.2–33.6]	112,400	536 [534–538]	639,115	5 (2–11)	3 (1–7)	549,712	89,561	3049
	NSW	79,449	24,686	31.1 [30.8–31.4]	38,343	483 [479–486]	262,169	6 (3–13)	4 (2–8)	221,655	40,599	3300
	QLD	45,399	18,083	39.8 [39.4–40.3]	31,396	692 [687–696]	155,967	5 (2–11)	3 (1–6)	138,226	17,704	3435
	SA	21,107	6,778	32.1 [31.5–32.7]	10,786	511 [504–518]	49,673	4 (2–8)	2 (1–5)	42,693	6967	2353
Home care packages	VIC	63,684	20,548	32.3 [31.9–32.6]	31,875	501 [497–504]	171,306	5 (2–10)	3 (1–6)	147,138	24,291	2690
		127,893	50,945	39.8 [39.6–40.1]	91,660	717 [714–719]	990,561	11 (4–27)	5 (2–13)	656,046	334,823	7745
	NSW	49,888	19,208	38.5 [38.1–38.9]	33,129	664 [660–668]	403,030	12 (5–29)	6 (3–15)	271,464	131,591	8079
	QLD	30,221	13,396	44.3 [43.8–44.9]	25,845	855 [851–859]	243,681	10 (4–25)	5 (2–10)	165,334	78,353	8063
	10,482	4111	39.2 [38.3–40.2]	7562	721 [713–730]	69,927	10 (3–24)	4 (2–11)	47,850	22,025	6671	
	37,302	14,230	38.1 [37.7–38.6]	25,124	674 [669–678]	273,923	10 (4–27)	5 (2–13)	171,398	102,854	7343	

CI, confidence interval; NSW, New South Wales; QLD, Queensland; SA, South Australia; VIC, Victoria.

## Discussion

This large cohort study of older people in Australia accessing long-term care in 2019 shows important differences in ED presentations, unplanned hospitalisations and potentially preventable hospitalisations by the type of long-term care received. ED presentations, unplanned hospitalisations and potentially preventable hospitalisations were high in all people receiving long-term care, but these events were consistently higher for people accessing home care packages than those living in permanent residential aged care. Additionally, the number of days in hospital per 1000 individuals due to unplanned hospitalisations was also higher for those receiving home care packages. Important differences in the proportions of recipients with ED presentations, unplanned hospitalisations and potentially preventable hospitalisations by type of long-term care received were observed in the four states examined (QLD, NSW, VIC and SA).

While many hospitalisations are unavoidable and often prevent further deterioration and premature death, some hospitalisations may be potentially preventable with appropriate primary care provision.<sup>18</sup> These potentially preventable hospitalisations are high in older people in Australia. Between 2017 and 2018, 46% of 748,000 potentially preventable hospitalisations were for people aged 65 years and over.<sup>19</sup> Estimates for 2020–2021 suggested there were over 379,000 potentially preventable hospitalisations for older people living in the community, equating to a cost of A\$3.7 billion.<sup>20</sup> The results of this study highlight the high proportion of older people accessing home care packages who had an ED presentation (43.1%), unplanned hospitalisation (39.8%) and potentially preventable hospitalisation (11.8%), and almost 1 million hospital days were associated with their unplanned hospitalisations.

In 2019–2020, there were 767,151 ED presentations in the general population aged 65 years and over in the four states examined in the current study.<sup>21</sup> Direct comparisons between the current study cohort and the general population cannot be made. However, as 146,964 and 118,805 ED presentations were observed in the current study in 2019 by people living in residential aged care and people with home care packages respectively, it can be estimated that approximately one-third of ED presentations in people aged 65 years and over may be by people receiving long-term care.

The results of this study are in line with a previous analysis which showed that although only 6% of older people in Australia live in residential aged care, over 27,500 potentially preventable hospital admissions and over 47,500 ED presentations from people living in residential aged care were estimated for 2020–2021, and this equated to costs of A\$312 and A\$112 million respectively.<sup>20</sup> The results of the current study further show that over 112,000 unplanned hospitalisations were experienced by people

**Table 4.** Potentially preventable hospitalisations by type of long-term care received, 2019.

Type of long-term care received	State	Number of people	Number of people with PPH	Cumulative incidence of PPH (% [95% CI])	Total number of PPH	Rate of PPHs (n/1000 individuals [95% CI])
Permanent residential care		209,639	17,265	8.2 [8.1–8.4]	21,329	102 [101–103]
	NSW	79,449	6130	7.7 [7.5–7.9]	7559	95 [93–97]
	QLD	45,399	4971	10.9 [10.7–11.2]	6367	140 [137–144]
	SA	21,107	1661	7.9 [7.5–8.2]	2043	97 [93–101]
	VIC	63,684	4503	7.1 [6.9–7.3]	5360	84 [82–86]
Home care packages		127,893	15,081	11.8 [11.6–12.0]	20,720	162 [160–164]
	NSW	49,888	5638	11.3 [11.0–11.6]	7644	153 [150–156]
	QLD	30,221	4340	14.4 [14.0–14.8]	6105	202 [198–207]
	SA	10,482	1169	11.2 [10.6–11.8]	1579	151 [144–158]
	VIC	37,302	3934	10.5 [10.2–10.9]	5392	145 [141–148]

CI, confidence interval; ED, emergency department; PPH, potentially preventable hospitalisations; NSW, New South Wales; QLD, Queensland; SA, South Australia; VIC, Victoria.

living in residential aged care resulting in over 639,000 hospital days. While the underlying reasons for people with home care packages having more ED presentations, unplanned hospitalisations and potentially preventable hospitalisations need further exploration, it is likely that in-house medical services within residential aged care facilities prevent hospitalisations and that facilities may have a higher threshold for hospital transfer.

Unplanned hospitalisations are stressful events for older people that can lead to further adverse events, including hospital-acquired infection, delirium, pressure sores and the need for a higher level of care upon discharge including residential aged care if they were previously living in the community.<sup>10,22,23</sup> Therefore, interventions to reduce unplanned hospitalisations and ED presentations in older people accessing aged care services could offer substantial cost savings and reduce the subsequent detrimental impact of hospitalisations for these individuals.

Previous studies have examined potential predictors of unplanned hospitalisations and ED presentations in older people receiving long-term aged care. Advancing age, being male and increasingly complex health issues and care needs have been identified as potential predictors of unplanned hospitalisations in older people both receiving home care package support and living in residential aged care.<sup>14,24</sup> In people receiving home care package support, cognitive impairment may also be a predictor of unplanned hospitalisations, whereas medicine use, including polypharmacy and high sedative medication load, may also be predictors of unplanned hospitalisations and ED presentations in people living in residential aged care.<sup>25,26</sup>

Studies that have examined the implementation of interventions to reduce hospitalisations in residential aged care settings have been mixed.<sup>27,28</sup> Multi-faceted interventions

that incorporate support from primary care and aged care, improve advance care planning, increase staff expertise, increase use of telemedicine and become integrated as part of everyday person-centred care may have potential to reduce avoidable hospitalisations in residential aged care.<sup>28–31</sup> However, further focus should be given to the challenges, barriers and enablers to implementing change, e.g. issues with resources, novel workforce models, competing demands and leadership.<sup>32</sup>

Interventions focusing on specific causes of unplanned hospitalisations may also have an impact, e.g. falls are the leading cause of injury hospitalisations in Australia.<sup>33</sup> A national study suggested almost 10% of people experience a fall-related hospitalisation within the first year of moving to permanent residential aged care.<sup>34</sup> International evidence of interventions to reduce falls in residential aged care suggests that achieving sustained improvements is difficult, but interventions that are multifactorial, tailored to individual residents and include co-design approaches may improve success rates.<sup>35,36</sup>

For older people living in the community, studies examining hospital admission and ED avoidance programs including hospital-at-home services and urgent care centres for older people have shown many safe options that can reduce the need for hospitalisation and the length of time receiving care.<sup>37,38</sup> These approaches may be acceptable to older adults, but these studies have not specifically focused on older adults receiving home care services who may be at higher risk of admission.<sup>37,38</sup>

Significant changes in access to home care packages have occurred since 2017 including increasing choice and transparency of pricing of home care packages to recipients (February 2017 and July 2019, respectively) and increasing number of home care packages, which have brought the

number of home care package recipients in 2022–2023 to >314,000 (up from >133,000 in 2018–2019).<sup>39,40</sup> The current study could inform future plans for home care support changes.<sup>41</sup>

## Strengths and limitations

This study used the most comprehensive data platform of older people accessing aged care in Australia, which integrates aged care and health care information from national and state-based datasets. By using ROSA, older people accessing government-subsidised home care packages or residential aged care from four of eight states and territories in Australia were included in the study, which accounts for 87% of the ROSA cohort accessing aged care services nationally.<sup>15</sup> The study did not include private hospitalisation data from SA, however, only 4% of ED presentations in Australia are in the private sector.<sup>42</sup> The study is descriptive and does not account for potential confounding factors which should be considered when comparing differences in the results by state. The study also does not examine if the outcomes occurred in people who were new or ongoing service recipients.

## Conclusion

With the aging population, understanding older people's use of health care is essential for future planning and provision of services. In Australia, high numbers of older people receiving long-term care have ED presentations, unplanned hospitalisations and potentially preventable hospitalisations. In this study, these events were higher in people receiving home care packages than in those accessing permanent residential aged care. As we move to having more individuals nationally accessing long-term care through home support than residential care, and further decreases in residential care entry projected,<sup>43</sup> it is critical that an in-depth understanding and planning for the high burden of hospitalisations affecting individuals in home care are planned for. Hospitalisations can be unnecessarily stressful and potentially harmful to the individuals and may lead to older people in the community moving to residential aged care sooner, which also represents a substantial economic cost to the Australian Government. Interventions in the aged care and primary care sector are required to support the increasing number of older Australians living in the community with home care packages to remain living at home as long as possible.

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**Data availability.** Data may be obtained from a third party and are not publicly available. The data for this study were obtained from the Australian Institute of Health and Welfare, Australian Government Department of Health and South Australia, Victoria, Queensland and New South Wales state health authorities and integrated by the Australian Institute of Health and Welfare, the NSW Centre for Health Record Linkage, the Centre for Victorian Data Linkage, Queensland Health's Statistical Services Branch and SA NT DataLink. These data were made available to the researchers under ethical, governance and confidentiality agreements that do not allow public sharing.

**Conflicts of interest.** The authors declare that they have no conflicts of interest.

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