Trends in the use of hospital beds by older people in Australia: 1993–2002

Len C Gray, Margaret A Yeo and Stephen J Duckett

ABSTRACT

Objective: To determine trends in use of Australian acute hospital inpatient services by older patients.

Design and data sources: Secondary analysis of hospital data from the Australian Institute of Health and Welfare in the period 1993–94 to 2001–02, with population data for this period from the Australian Bureau of Statistics.

Outcome measures: Population-based rates of hospital separations and bed utilisation.

Results: The Australian aged population (65 years and older) increased by 18% compared with total population growth of 10%, yet the proportion of hospital beds occupied by older patients remained stable at 47%. The most substantial changes were observed in the population aged 75 years and older, with separations increasing by 89%, length of stay reducing by 35% and bed utilisation increasing by 23%. However, rates of bed utilisation (in relation to population) declined among older groups (10% decline in per capita use in population 75 years and older), but increased in the younger population (1% increase in per capita use in people younger than 65 years).

Conclusion: Important trends in use of inpatient services were identified in this study. These trends are contrary to common perception. Ageing of the Australian population was not associated with an increase in the proportion of hospital beds used by older patients.

MJA 2004; 181: 478–481

In recent years, there has been emerging concern about declining access to hospital beds[1,2] with its attendant flow-on of increasing waiting lists for elective surgery and overcrowded emergency departments. Lack of access to acute hospital beds has been variously attributed to reductions in hospital funding and bed availability, population ageing, and bed "blocking" by older people awaiting places in long-term care facilities.

During the 1990s, there was a decline in availability of hospital beds in Australia of about 3% per annum in absolute terms.[3] In the same period, the availability of residential care places declined from 99 to 82 places per 1000 population aged 70 years and older, although the absolute number of places increased.[4] Hospital use rates increase greatly with age,[3] and hospitals are the major source of new residents to high care (nursing home) facilities.[5] From 1993 to 2001, the Australian population grew by 10%. The population aged ⩾ 65 years increased by 18%: for those aged 65–74 years, the increase was 7%, and for those aged ⩾ 75 years, 36%.[6]

With population ageing, it might be anticipated that older people would consume an increasing proportion of the available hospital resources in Australia. This study aimed to identify patterns of use of acute hospital services by older people in the period from 1993 to 2002.

METHODS

Data for the financial years 1993–94 to 2001–02 were extracted from the Australian Institute of Health and Welfare (AIHW) interactive national hospital morbidity data cubes.[7] The data include all public and private hospitals. Hospital separations, mean length of stay and bed-days are reported for same-day and multi-day admissions, and separately for combined same-day and multi-day data. The proportion of missing data (unreported cases) is negligible — less than 0.004% of cases per year.

The AIHW data are organised into 5-year age groups. For ease of presentation, we report findings in age groupings < 65 years, 65–74 years and ⩾ 75 years. The findings are presented for separations, bed utilisation, and average length of stay.

Hospital separations refers to the sum of discharges, deaths and transfers. *Bed utilisation* is the number of days in hospital, which is recorded as 1 for same-day separations and as the number of nights (the census occurs at midnight) in hospital for multi-day separations. Rates are expressed as the number per 1000 population per annum. Population estimates were sourced from the Australian Bureau of Statistics.[6] Population estimates used to calculate rates were taken at the commencement of the financial year (taken to be the same as the end of the previous year, as ABS population estimates are for 30 June each year). For example, for 2001–02, the population estimate for 30 June 2001 was used.

RESULTS

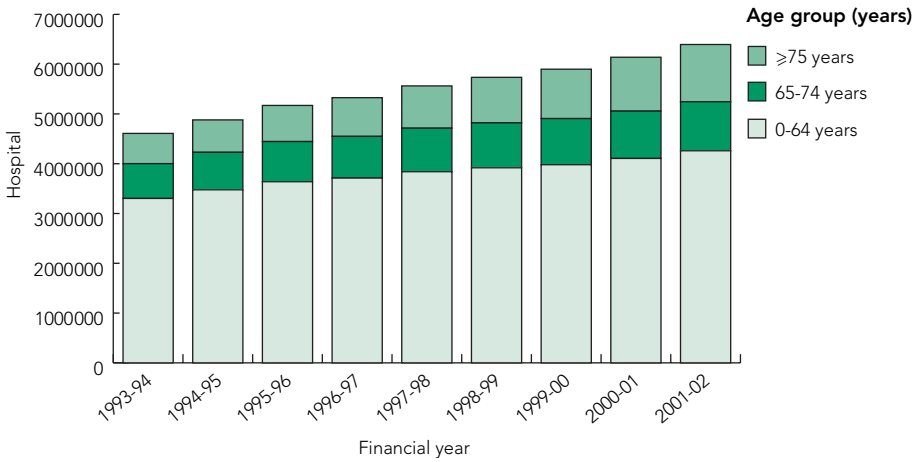
Hospital separations

In the period 1993–94 to 2001–02, total hospital separations increased by 39%, from 4.61 million (m) to 6.39 m. The proportion of separations of people aged ⩾ 65 years increased progressively from 28% (1.31 m) to 33% (2.13 m). All of this increased proportion was attributable to growth in separations in the patient group aged ⩾ 75 years, rising from 13% to 18% of all admissions (Box 1). Separations in the patient group aged ⩾ 75 years rose from 0.61 m to 1.15 m (89%), compared with 0.70 m to 0.99 m (41%) in the patient group aged 65–74 years.

Most of the increase in total separations was attributed to same-day separations, which increased from 1.7 m to 3.34 m (97%), with the greatest increases observed in the oldest age groups: 77% in the group aged < 65 years, 113% in the group aged

Department of Medicine, University of Queensland, Brisbane, QLD.
Len C Gray, PhD, FRACP, Professor in Geriatric Medicine; Margaret A Yeo, MPH, BSc(Hons), Research Assistant.
Faculty of Health Sciences, La Trobe University, VIC.
Stephen J Duckett, PhD, FCHSE, Professor of Health Policy.
Reprints will not be available from the authors. Correspondence: Professor L C Gray, Department of Medicine, University of Queensland, Princess Alexandra Hospital, Ipswich Rd, Woolloongabba, QLD 4102. lgray@soms.uq.edu.au

1 All hospital separations, by age group, 1993–94 to 2001–02



65–74 years, and 260% in those aged ⩾ 75 years.

The growth in multi-day separations was more modest: from 2.91 m to 3.05 m (5%). Multi-day separations increased by 20% overall for the elderly, with the greatest increase observed in the group aged ⩾ 75 years (42%). By contrast, modest declines occurred in younger age groups.

Hospital separation rates

The hospital separation rate increased from 261 to 329 per 1000 population, an increase of 26%. The increase was substantially greater for patients aged ⩾ 65 years, increasing from 635 to 876 per 1000 population (38%), compared with an increase from 212 to 251 (19%) for patients aged < 65 years.

2 Hospital separation rates* for multi-day separations, by age group, 1993–94 to 2001–02

Age group (years)	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01	2001–02
0–64	129	126	126	122	122	120	118	117	116
65–74	346	344	346	337	335	328	321	315	311
⩾ 75	582	586	606	600	604	601	607	611	604
Total	**165**	**163**	**165**	**161**	**161**	**160**	**158**	**158**	**157**

* Hospital separations per 1000 population per annum.

3 Bed utilisation rates* for total and multi-day separations, by age group, 1993–94 to 2001–02

	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01	2001–02
Total									
0–64 years	719	704	751	752	748	728	713	696	725
65–74 years	3132	3061	3228	3082	3033	2931	2914	2786	2761
⩾ 75 years	7247	7166	7314	6891	6788	6625	6779	6682	6516
All ages	1190	1175	1242	1221	1218	1193	1194	1173	1196
Multi-day									
0–64 years	636	610	648	644	634	609	590	568	590
65–74 years	2914	2810	2944	2772	2695	2567	2527	2376	2326
⩾ 75 years	7085	6975	7085	6635	6497	6300	6421	6280	6089
All ages	1094	1065	1121	1091	1079	1046	1041	1011	1024

* Bed-days per 1000 population per annum.

Total multi-day separation rates declined by 5%, from 165 to 157 per 1000 population. The rate decreased in the younger population by 10% and in those aged 65–74 years by 10%, but increased by 4% among the patients aged ⩾ 75 years (Box 2).

Bed utilisation

During the period, total bed utilisation increased by 10%, from 21 m to 23.2 m bed-days. Most of this increase was attributable to same-day separations, with multi-day bed utilisation increasing by only 3%. Bed utilisation increased by 10% in the younger population, declined by 6% in the patient group aged 65–74 years and increased by 23% in the patient group aged ⩾ 75 years.

The proportion of bed-days for the older patient group varied little across the period, remaining close to 47%. However, there were substantial changes within older age groups, with the proportion of bed-days declining for the patient group aged 65–74 years from 3.88 m of 21.02 m (18%) to 3.65 m of 23.22 m (16%) and the proportion of bed-days for the patient group aged ⩾ 75 years increasing from 5.92 m of 21.02 m (28%) to 7.26 m of 23.22 m (31%).

During the period, multi-day bed-day utilisation increased by 3%, from 19.3 m to 19.9 m bed-days. Multi-day bed utilisation increased from 9.93 m to 10.02 m (1%) in the younger population, declined from 3.61 m to 3.07 m (15%) in the group aged 65–74 years and increased from 5.79 m to 6.79 m (17%) in the group aged ⩾ 75 years.

Bed utilisation rates

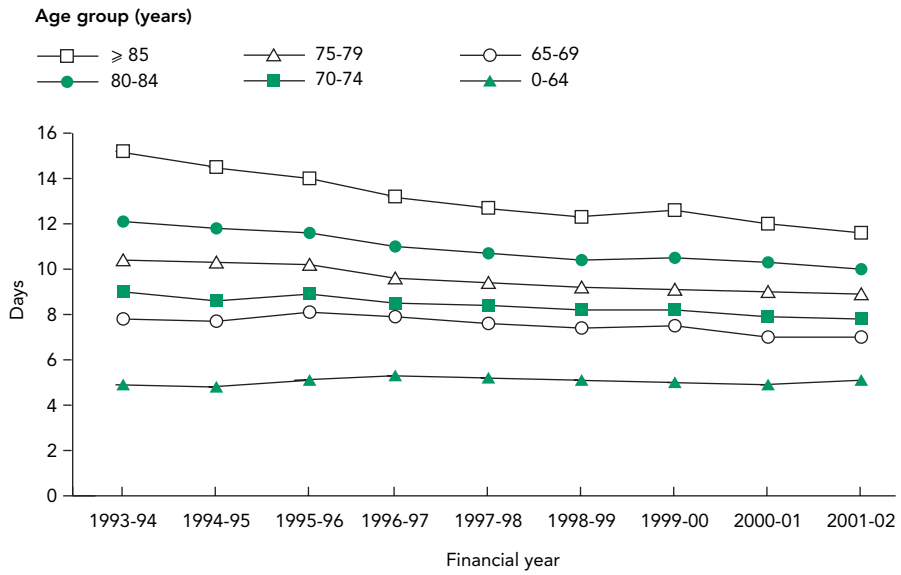
The rate of overall bed utilisation was fairly stable over the period, at about 1200 bed-days per 1000 population. There was a slight overall increase in use by the younger population, whereas rates declined among the older patient groups (Box 3).

However, significant declines were observed for bed utilisation associated with multi-day separations. There were declines in rates for all aged groups, from 636 to 590 (7%) among the younger population, from 2914 to 2326 (20%) in the group aged 65–74 years and from 7085 to 6089 (14%) in the patient group aged ⩾ 75 years.

Length of stay

Overall, including same-day cases, mean length of stay declined by 22%, from a mean of 4.6 days to 3.6 days. The level of decline was greater in older age groups: 15% in the patient group aged < 64 years, 33% in the

4 Mean length of stay, by age group, for multi-day separations



patient group aged 65–74 years and 35% in the patient group aged ⩾ 75 years.

For multi-day separations, the overall length of stay across all ages declined marginally from 6.6 to 6.5 days (2%). However, there were marked age-related differences: an increase from 4.9 to 5.1 days (3%) for the young; a decline of 11%, from 8.4 to 7.5 days, in the group aged 65–74 years; and a decline of 17%, from 12.2 to 10.1 days, in the group aged ⩾ 75 years (Box 4). These changes increased with increasing age, with the most dramatic observed in those aged ⩾ 85 years, for whom there was a decline of 24%, from 15.2 to 11.6 days.

Summary of results

The overall changes over the study period for each parameter — hospital separations, bed utilisation and length of stay — are summarised in Box 5.

DISCUSSION

Ageing of the Australian population over the study period, in the absence of any changes to the same-day/multi-day mix, rates of bed utilisation or length of stay, would have been expected to be associated with substantial increases in the proportion of hospital beds being allocated to older patients. However, our investigation shows that, in spite of disproportionate increases in numbers and rates of separations among the elderly, the proportion of beds occupied by older patients was remarkably stable at about 47%. Within this stable proportion, however, differences could be observed between subgroups. The proportion of beds used increased for the patient group aged ⩾ 75 years and declined for the patient group aged 65–74 years.

This stability was a product of two major phenomena: disproportionate reductions in length of stay for multi-day admissions in the ⩾ 75 years age group, which resulted in dramatic reductions in bed utilisation in spite of escalating separation rates, and reductions in the rate of multi-day separations among the 65–74-years group.

The strength of our study relates to the breadth and reliability of the source data, which are derived from comprehensive national datasets, including public and private sector hospitals, over a substantial time frame. The data coverage is comprehensive.

However, there are several acknowledged limitations. There is no breakdown of data by sector or jurisdiction; if available, this might have provided a deeper understanding of the reasons for the observed trends. Data pertaining to length of stay are available only as averages. This limits our ability to identify whether the observed reductions are related to changes in coding practices around episode length, shortening of stays of high-outlier groups or, alternatively, a general reduction in stays for a wide range of patient groups. Finally, the data do not provide linked information about readmissions, which would be important to identify whether the escalation in separation rates in older groups is related to increasing readmission rates.

This is the first study to report such trends in the Australian context. A Victorian study found that between 1987–88 and 1994–95 mean hospital length of stay declined, same-day admissions increased from 22% to 44% of admissions, and same-day hospital readmissions increased by 21%.[8] However, no age breakdown data were provided. Another study analysed rates of hospital use by older people in Australia in 1985 and speculated on the implications

5 Summary of utilisation trends (percentage change), 1993–94 to 2001–02

	Age group			
	< 65 years	65–74 years	⩾ 75 years	Total
Population change	+ 9%	+ 7%	+ 36%	+ 10%
Same-day separations				
Separations	+ 77%	+ 113%	+ 260%	+ 97%
Separation rate per 1000 population	+ 63%	+ 100%	+ 164%	+ 79%
Multi-day separations				
Separations	− 2%	− 4%	+ 42%	+ 5%
Separation rate per 1000 population	− 10%	− 10%	+ 4%	− 5%
Average length of stay	+ 3%	− 11%	− 17%	− 2%
Bed-days	+ 1%	− 15%	+ 17%	+ 3%
Bed-day rate per 1000 population	− 7%	− 20%	− 14%	− 6%
Total separations				
Separations	+ 29%	+ 41%	+ 89%	+ 39%
Separation rate per 1000 population	+ 19%	+ 32%	+ 39%	+ 26%
Average length of stay	− 15%	− 33%	− 35%	− 22%
Bed-days	+ 10%	− 6%	+ 23%	+ 10%
Bed-day rate per 1000 population	+ 1%	− 12%	− 10%	+ 1%

of population ageing on future use, but did not examine trends.[9]

In conclusion, some speculation on the explanation for our findings is warranted. If the relative reduction in residential care places were associated with growing "bed-blocking" queues in acute hospitals, an increase in bed utilisation among the very elderly would be expected. The findings do not indicate whether this is occurring, but suggest that, if it is, it is outweighed by other changes that reduce bed-utilisation rates. The striking observations of accelerating separation rates and strong reductions in average length of stay among the very old population provide a clue to the processes in play. Restraint on bed availability, reinforced by episode-based casemix payment systems in several states, may have driven down length of stay. The ability to reduce length of stay is clearly greatest among groups at the highest starting point — the very old. Further, it is conceivable that there is a causal association between declining length of stay and rising separation rates in the very old. Should this association be confirmed, there may be a case for adjustment of policy and fiscal incentives that provide a degree of protection for older patients.

Finally, from a planning perspective, it is important to speculate whether the observed trends can continue into the medium to long term. Even if separation rates among the aged were to plateau (the data suggest that they will continue to rise), continuing reductions in length of stay would be required to contain the proportion of beds used by the elderly. A recent United Kingdom publication reported a reversal of the previously continuous decline in hospital average length of stay,[2] suggesting that other strategies might be required to secure ongoing efficiency gains.

COMPETING INTERESTS

None identified.

REFERENCES

1 Cameron PA, Campbell DA. Access block: problems and progress [editorial]. *Med J Aust* 2003; 178: 99-100.
2 Black D, Pearson M. Average length of stay, delayed discharge, and hospital congestion. *BMJ* 2002; 325: 610-611.
3 Australian Institute of Health and Welfare. Australia's health 2002. Canberra: AIHW, 2002.
4 Australian Institute of Health and Welfare. Australia's welfare 2001. Canberra: AIHW, 2001.
5 Australian Institute of Health and Welfare. Residential aged care services in Australia 2000–01: a statistical overview. Canberra: AIHW, 2002.
6 Australian Bureau of Statistics. Australian historical population statistics. 3. Population age–sex structure. Canberra: ABS, 2002. (Catalogue no. 3105.0.65.001.) Viewed September 2003.
7 Australian Institute of Health and Welfare. Interactive national hospital morbidity data (data cubes). Available at: www.aihw.gov.au/hospitaldata/datacubes/ (accessed Feb 2004).
8 MacIntyre CR, Brook CW, Chandraraj E, Plant AJ. Changes in bed resources and admission patterns in acute public hospitals in Victoria, 1987–1995. *Med J Aust* 1997; 167: 186-189.
9 Mathers CD, Moore G. Utilisation of acute hospitals by age and sex in Australia, 1985. *Community Health Stud* 1989; 13: 316-328.

(Received 13 May 2004, accepted 14 Sep 2004) ❑