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Residential aged care in Auckland, New Zealand 1988–2008: do real trends over time match predictions?
Abstract

**Background:** in Auckland, New Zealand in 1988, 7.7% of those aged over 65 years lived in licenced residential aged care. Age-specific rates approximately doubled for each 5-year age group after the age of 65 years. Even with changes in policies and market forces since 1988, population increases are forecast to drive large growth in demand. This study shows previously unrecognised 20-year trends in rates of care in a geographically defined population.

**Methods:** four cross-sectional surveys of all facilities (rest homes and hospitals) licenced for long-term care of older people were conducted in Auckland, New Zealand in 1988, 1993, 1998 and 2008. Facility staff completed survey forms for each resident. Numbers of licenced and occupied beds and trends in age-specific and age-standardised rates in residential aged care are reported.

**Results:** over the 20-year period, Auckland’s population aged over 65 years increased by 43% (from 91,000 to 130,000) but actual numbers in care reduced slightly. Among those aged over 65 years, the proportion living in care facilities reduced from 1 in 13 to 1 in 18. Age-standardised rates in rest-home level care reduced from 65 to 33 per thousand, and in hospital level care, from 29 to 23 per thousand. Had rates remained stable, over 13,200 people, 74% more than observed, would have been in care in 2008.

**Conclusion:** growth predicted in the residential aged care sector is not yet evident. The introduction of standardised needs assessments before entry, increased availability of home-based services, and growth in retirement villages may have led to reduced utilisation.

**Keywords:** health services research, population trends, health services for the aged, long-term care, utilisation, elderly

Introduction

Need for long-term care rises with age-related morbidity and disability, particularly from degenerative, multiple or chronic conditions, with some people unable to live at home moving into residential aged care. In 1991, 11% of the New Zealand population was aged over 65 years. That proportion has risen due to low birth rates and rising longevity [1]. By 2021, the proportion is expected to reach 17%, a level already seen in Europe. In Auckland, New Zealand in 1988, 7.7% of those aged over 65 years lived in licenced residential aged care facilities. With each 5-year increase in age, age-specific rates in care approximately doubled after the age of 65 years [2]. The terms residential aged care and long-term care are used interchangeably in this paper.

New Zealand legislation provides for long-term care ‘hospitals’ for those requiring 24 h nursing or medical care, and ‘rest homes’ for those who are frail, or need support, but not 24 h nursing or medical services [3].

Questions around sustainability of models of long-term care have been raised in many westernised countries [4–7]. Projections for New Zealand had suggested an 83% increase in the demand for aged residential care by 2021, even assuming a low population growth [8]. More recent forecasts are that, by 2026, up to 20,000 extra people will require residential aged care [9].

Policies for providing residential aged care vary between countries, between regions and over time. There are geographical differences in numbers of places provided [10–13] and in dependency levels at admission [12, 14]. In New Zealand, there is comparatively little sheltered (supported) housing, and only limited payment to family carers. Home-based support services are provided following formal needs assessment. Because residential aged care is provided partly with public funding (by means-tested subsidy), increased pressure on funding is a concern [13]. The total New Zealand expenditure on residential aged care in 2008 was estimated as exceeding $1.05 billion, of which two-thirds was government-funded (8.6% of health spending) [15], with a worsening shortage forecasted for the health-care workforce [16]. Concerns over sustainability of public funding in New Zealand have been expressed [8, 9, 16].

Since 1988, in New Zealand and elsewhere policy changes have tried to stem the increased demand for long-term care, including compulsory pre-admission needs assessment [17] and extending provision and funding of home-based support [18]. There has also been rapid growth in commercial retirement complexes providing security and some supports for independent living for those able to afford the lifestyle [19].

Care providers have argued that over the last 15–20 years both average age and dependency levels of residents have increased [16]. However, the impact of population trends, policy and social changes and market forces, is unknown. This study describes trends in provision and
utilisation of residential aged care in greater Auckland (2006 population 1.3 million, one-third of New Zealand's population). Increased levels of dependency of long-term care residents are described separately [20].

**Methods**

Between 1988 and 2008, our department conducted four census-type surveys of all long-term care facilities for older people in the Auckland region. The first was in 1988 [2, 21] and repeated in 1993 [22, 23], 1998 [24] and 2008 [25], using the same tool and protocols.

**Study design**

Full methodological details are described elsewhere [2, 22–25]. Briefly, licencing authorities of the time provided lists of facilities approved for residential aged care of older people, including numbers of beds licenced for rest-home and hospital-level care. The research team invited all facilities to participate. Facility staff completed a single form identifying the facility, bed numbers licenced for each care type (rest-home or hospital care), number of current residents and nature of the organisation (for-profit, or not-for-profit). Where bed numbers differed from those in the licencing data, counts were reconciled through consultation.

Information about residents was collected, generally by facility staff, using one census-type form per resident. The 36-item form covered demographics, and functional and care needs. Minor variations between surveys were aligned.

**Population data**

Each survey occurred 2 years after a national census. To calculate population rates consistently, we employed data for the Auckland region from the prior censuses. Although there were small variations between the four time-points in geographical boundaries of health authorities and statistical regions, these were in regions of low population density and did not impact on inclusion of facilities in either the census or in the studies.

**Survey data management**

All counts, derived variables and analytical code were re-assessed and standardised across the four surveys. Results may therefore differ slightly from previously published reports.

Residents’ ages were calculated as the age at the last birthday (whole years). Age at admission was age (whole years) when admitted. Facility length-of-stay was calculated as difference (days) between survey date and admission date. Some forms had information missing for either age (less than 0.4% of residents in any phase) or sex (less than 1.8%). To more correctly assess age- and sex-specific rates, we increased known counts in direct proportion to those with non-missing age/sex data.

**Rates calculations and analysis**

Where facilities did not provide bed numbers or declined to participate, we used licenced bed numbers provided by licencing authorities. Records of residents in participating facilities were weighted to adjust for non-response, weights being calculated as the inverse of the ratio of licenced bed numbers in participating facilities to total licenced bed numbers. Weighting considered both facility type (rest home, or hospital) and the nature of its organisation (for-profit, or not-for-profit) because of differences in both response rates and in characteristics of facilities and residents. Trends in resident characteristics over time were tested (two-sided Jonckheere–Terpstra test for trend).

The Auckland 2006 population was used to calculate age-standardised rates to illustrate time trends in crude and age-–sex-specific rates overall, and in rest homes and hospitals. The 2001 WHO standard population [26] was used to derive age-standardised rates for comparison of trends between men and women over time and facilitate future international comparisons.

**Results**

**Facilities, beds and participation**

Numbers of beds licenced to provide care for older people increased from 8,620 (1988) to 9,189 (1993), then reduced to 8,842 (1998) and to 8,816 (2008) (Table 1). This small overall increase (2% over 20 years) results from a 44% increase in hospital-level care beds and a 15% reduction in rest-home beds.

Facility participation rates were 99% (1988), 86% (1993), 65% (1998) and 89% (2008). Facilities choosing not to participate were all, or almost all, for-profit, rather than not-for-profit enterprises. Occupancy in participating facilities on survey nights varied slightly between studies, between 89.6 and 86.4% (in 2008 after removing one outlier).

**Population**

Over the 20-year period, the total usually resident population aged 65 years and over in the region rose by 43%, from 91,000 to 129,900 (Table 1). The population over 85 years more than doubled, from 7,400 to 15,400, with men increasing as a proportion from 28 to 31% of those over 85 years. Bed provision for people aged over 65 years decreased from 95 beds per thousand (1988) to 67 per thousand (2008).

**Demographics of people in care**

In 2008, the number of people occupying long-term care beds was 7,601, the least of any of the surveys—7,635 (1988), 8,219 (1993) and 7,626 (1998). In 2008, 69.8% were women; women outnumbered men substantially in every survey (Supplementary data are available in
The proportion of those in care reported as never married decreased over time, with corresponding increases in those reported as married or partnered.

The median age of residents rose markedly, from 82 years (1988) to 86 years (2008), and the percentage under 65 years reduced from 8.6 to 5.4% (Supplementary data are available in Age and Ageing online, Table S1, Appendix 1).

Median age at admission increased with each survey, from 79 years (1988) to 83 years (2008). In 2008, 16.8% were admitted to the facility when aged over 90 years (versus 9.2% in 1988). Of those admitted within the 6 months before the 2008 survey, median age of admission was even higher, 85 years, suggesting a continuing trend to admit people of increasingly older age.

Characteristics of stay

While 30.6% of residents were in hospital-level care in 1988, by 2008 this had increased to 41.3%, effectively shifting balance of care provision from rest-home level towards hospital-level care (Supplementary data are available in Age and Ageing online, Table S2, Appendix 1).

Almost all residents were classified as being in long-term or permanent care; no more than 2.0% of residents were for short stays, e.g. respite care. The median length of stay ranged from 1.7 to 2.2 years. Stays longer than 4 years were recorded for 19.3% of residents in 2008, less than at any other time-point. This reduction in the length of stay across the 20-year period was significant (P-value for trend $P < 0.0001$). Stays under 3 months were recorded for 10.8% of residents in 1988, 12.8% in 2008.

Population rates living in residential aged care

The crude rate of people aged over 65 years living in long-term care facilities decreased from 75 people per thousand (one person in 13) in 1988, to 54 per thousand (one person in 18) in 2008. However, at each phase, the proportion in care increased markedly with age, almost doubling with each 5-year increase in age (Supplementary data are available in Age and Ageing online, Figure S2, Appendix 2).

After adjusting for the changing age structure of the population, rates of care in all age–gender-specific groups fell across the 20 years ($P < 0.0001$). The most marked reduction was observed among women aged 75–84 years, whose rates more than halved from 12 to 6% (Figure 1). If the 1988 age–sex-specific rates had applied in 2008, over 13,200 people would have been in care—5,600 (74%) more than observed. In all four studies, women in older age groups (over 75 years) were much more likely than men of similar age to be in care, but the difference lessened over 20 years. For example, in the age group 85–89 years, rates for women and men changed from 37 and 22% in 1988, to 22 and 15%, respectively, in 2008. In 1988, the age-standardised proportion in care was 50% higher among women than men (824 and 550 per thousand, respectively).

![Figure 1. Trends in rates of long-term care in the Auckland population aged 65+ years.](image-url)
By 2008, this excess had almost halved to 28% (450 and 350 per thousand, respectively).

Reductions occurred for both rest-home and hospital stays: age-standardised rates in care reduced by 49% in rest-home-level care, from 65 to 33 per thousand, and by 22% in hospital-level care, from 29 to 23 per thousand (Figure 2).

**Discussion**

The proportion of older people living in residential aged care has fallen over the last 20 years in Auckland, particularly in rest homes where age-specific rates halved. As recently as 2006, Statistics New Zealand projected that the number of older people living in non-private dwellings (mainly rest homes and long-stay hospitals) could more than double between 2001 and 2021 [27]. By 2008, our most recent survey date, over a third of that time had elapsed, but at least in Auckland, no growth in numbers had occurred and population proportions in care decreased.

The population-based nature and the high response rate of our surveys indicate that they accurately describe regional trends. No similar population-based studies are known. The simple form and provider organisation support encouraged high facility participation. Although response rates were substantially lower in 1998, estimated rates fit the declining trend. Surveying all residents of all licenced facilities, rather than sampling, allowed calculation of accurate rates, rendering estimation unnecessary. Age-related increases confirm the importance of using age–sex-specific rates to report utilisation or estimate future demand, rather than regard all people aged over 65 years as a homogeneous group. It is particularly important to differentiate age groups beyond 85 years: 17% of current residents were admitted when aged over 90 years and the oldest populations showed the most growth.

At each phase, use of 2-year-old census counts will have slightly underestimated true populations, thus slightly overestimating proportions in care. The study used facility staff to report demographic characteristics, perhaps not as residents themselves would report. Not included in our counts are those living with substantial support provided in retirement villages, or in private dwellings, for which no trends data are available. The study is not nationally representative but is representative of over a third of the country’s population in a well-defined geographical area.

Recent Australian data allows international comparison with Auckland 2008 results [28]. Whereas Auckland’s bed provision dropped from 95 (1988) to 67 (2008) per thousand aged 65 or over, Australia had 88 places per thousand aged 70 years and over in 2006/07. Fifty-four per cent of Australian aged care residents were aged 85 or over (56% in Auckland). In Australia, 4% of residents were aged less than 65 years (5% in Auckland). Age-specific rates of residential aged care were broadly similar. The similarities between Australia and New Zealand are perhaps unexpected, especially as Australia is regarded as having greater community support capacity.

New Zealand has previously reported high rates of residential aged care relative to other OECD countries [13, 29]. This may be because rest-home care was regarded as a social option for older people and home-based support was difficult to access and unevenly distributed [18]. New Zealand has little sheltered housing such as provided by local authorities in the UK, and few other options: there are almost no day-care centres or rehabilitation facilities outside acute hospitals.

In 2008, population rates for rest home care in Auckland had decreased to almost half the 1988 rates for those over 65 years. Auckland’s trends in utilisation in the long-term care sector, peaking in the mid-1990s, is similar to that observed in the UK [30].

This study cannot provide direct evidence for reasons for the reduction in rates in care. It is likely, however, that both policy changes and market forces had some impact. Since 1993, the survey year with the highest rates, needs assessments using a standardised assessment tool have...
been required before admission to care [17]. One report describes only 33% of assessments recommending admission to care [17]. Additionally, national public expenditure on home-based support services has increased from $93.5 million (1998/99) to $170.6 million (2003/04) [31]. Number of occupants of retirement villages has increased from almost none in 1988, to over 27,000 currently, of which about 35% (9,500) are in Auckland (personal communication, Retirement Villages Association, December 2010), exceeding the numbers in residential care. While we did not record dependency levels at admission, the reduced rates are consistent with higher levels of care at admission, and in the shift from rest-home to hospital-level care.

Other relevant factors include closure of most long-stay public and psychiatric hospital beds, reduction in local-body housing, migration and changing ethnic mix, and possibly movements in population preferences and expectations. There is also a potential population-level reduction in age-related disability [32]. We conclude that demographic changes do not only determine demand for residential aged care, but suggest that policy changes do impact upon care utilisation, possibly effecting gradual changes in expectations. Because public funding is involved, there is a need for co-ordinated research evaluating policy changes, monitoring trends in care placement and utilisation, comparing different populations and describing disability levels and care needs in whole populations. Population projections for the use of residential care may need to consider current rates, recent trends and the potential for future change.

Conference presentations

New Zealand Association of Gerontology and Age Concern combined New Zealand conference, October 2009, Wellington, New Zealand.

19th World Congress of Gerontology and Geriatrics, July 2009, Paris, France (2 slides only).

Australian and New Zealand Society for Geriatric Medicine Annual Retreat, November 2010, Dunedin, New Zealand.

We have also presented to some local meetings of clinicians.

Key points

- In Auckland, age-standardised rates in residential aged care have almost halved over 20 years
- While the population aged 65+ years increased by 43%, numbers in care in 2008 and 1988 were similar
- Compulsory needs assessments before entry, more home-based services and market changes may have reduced utilisation.

Supplementary data

Supplementary data mentioned in the text is available to subscribers in Age and Ageing online.

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Conflicts of interest

J.B.B. has during 2010 received salary support from Bupa Giving, and with their support, both J.B.B. and M.B. were funded to travel to the UK to work collaboratively on a joint report of international comparisons of residential aged care data. M.B. has provided paid education sessions for some care providers in this study. N.K. provides primary medical care services to one facility that participated in this study. None of the authors has non-financial interests that may be relevant to the submitted work.

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2008 study, and by assisting with publicity. They played no other role.

References

Telomere length and anaemia in old age: results from the Newcastle 85-plus Study* and the Leiden 85-plus Study

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Abstract

Background: reduced telomere length in blood cells has been associated with increased risk of multiple age-related diseases and is widely regarded as a general biomarker of ageing. Therefore, it is important to know both the extent and limitations of this association. We investigated the relation between telomere length and anaemia in two independent cohorts, with the prior expectation of adding anaemia to the list of conditions for which telomere reduction is a risk factor.

Participants and methods: the present study is embedded in the Newcastle 85-plus Study and Leiden 85-plus Study, two population-based studies of inhabitants of Newcastle and North Tyneside, UK (n = 749) and Leiden, the Netherlands (n = 658) aged 85 and over. High-molecular-weight DNA was isolated from full fresh blood (Newcastle) and peripheral blood mononuclear cells samples (Leiden). Telomere length was measured as abundance of telomeric template versus a single gene by quantitative real-time polymerase chain reaction. Anaemia was defined according to World Health Organization criteria.

Results: in both studies, no differences in median telomere length were observed between participants with anaemia and participants without anaemia (Newcastle: 2,846 bp (interquartile range (IQR) 2,433–3,630) versus 2,920 bp (IQR 2,425–3,570), P = 0.63; Leiden: 4,136 bp (IQR 3,879–4,428) versus 4,167 bp (IQR 3,893–4,501), P = 0.41). Telomere length also did not correlate with any other haematological parameter in both men and women.

Conclusions: in contrast to other age-related diseases, telomere length is not associated with anaemia or any other haematological parameter in older individuals in the general population.

Keywords: aging, anaemia, telomeres, elderly

†Both authors contributed equally to this work.