

Use of care services in relation to proximity to death among older people: Evidence from Finland

Mike Murphy and Pekka Martikainen

Summary: An analysis of register data for Finland shows that the use of health and social care services by older people varies by both age and proximity to death. Acute health care use depends more on proximity to death, suggesting that the need for such services will be less than might have been expected given the likely increase in numbers of older people. However, this is more than offset by a greater use of residential long-term care especially by the “old old”. The balance of care is likely to shift from acute to long-term care services.

Key words: long-term care, ageing, proximity to death, Finland

Determinants of health care costs

The use of health and social care services depend on individuals' sex, age and health/disability status, as well as external factors such as availability of facilities and health care technology. Service use rises sharply with age and therefore the future number of older people is often assumed to be an important determinant of overall use. A simple widely-used assumption is that future demand for health care remains constant within each sex and age-group so that changes in provision depend only on changing population numbers.

However, the average costs of acute health care services, principally based on use of hospital services, are greater at any given age for those who die relatively shortly afterwards ('decedents') than those who do not ('survivors'). Fuchs¹ concluded that: "health care spending among the elderly is not so much a function of time since birth as it is a function of time to death. The principal reason why expenditures rise with age...is that the proportion of persons

near death increases with age". Studies in a number of countries confirm the robustness of these conclusions, typically finding that acute care in the last year of life accounts for about one third of total lifetime costs.²

The implications of whether the use of services is affected more by proximity to death than by age are substantial. If age is the key driver, then increased longevity will lead to more care use at older ages. However, if proximity to death is more important, then pushing back the age of death will reduce the number of deaths occurring in a given year. Moreover, most studies find that acute health care costs in the last year of life fall with later age at death.²

Much less is known about the relationship of social care costs, including long-term care costs, with age and proximity to death,³ although an early Canadian study found that: "those dying at older ages have more rather than less expensive deaths, largely due to heavy nursing home use by the very elderly".⁴

Data and methods

Most studies have been based on cost-oriented data from service providers which may relate to selected sub-populations and often contain little socioeconomic infor-

mation on service users (and none on non-users). Finland has good data on joint use of long-term care (LTC) and community and hospital facilities, so we use a 40% random sample of the Finnish population aged 65 and older at the end of 1997 with information on socio-demographic factors that were followed to death in 1998–2003 or to the end of 2003. The number of days in hospital and long-term institutional care was assessed in each calendar year between 1998 and 2003 (for survivors), and the number of days in twelve month intervals before death (for decedents). The initial population size was 301,263.⁵

Differentials by age and sex

Days in both hospital and LTC increase with age for men and women, although women spend more days in care than men do, especially for LTC (Table 1). For the 'young old', use is low among survivors, but much higher among decedents especially for hospital care. Decedents typically have around 60 more days in hospital than survivors at any age. Decedents also use LTC more than survivors, but the difference is smaller than for hospital days. The number of days in LTC overtakes days in hospital around age 80. As populations age, this will change the balance of use between the two sectors.

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Table 1: Average number of days spent in hospital and long-term care by sex and age group for those who do not die and those who die in subsequent 12 months, Finland 1998–2003

Sex and age group	Hospital		Long-term care		
	Survivor	Decedent	Survivor	Decedent	
Males	65–69	4.2	48.0	2.2	10.1
	70–74	6.0	56.4	4.2	18.9
	75–79	9.8	65.7	9.1	29.2
	80–84	14.8	72.2	18.3	45.1
	85–89	21.2	78.6	35.5	66.0
	90–94	27.4	80.7	62.6	91.8
	95+	31.2	85.5	84.4	119.2
Females	65–69	3.5	63.7	2.3	15.4
	70–74	5.9	71.4	5.2	27.8
	75–79	10.8	81.3	12.6	44.0
	80–84	18.2	89.3	28.5	67.7
	85–89	29.4	96.1	54.7	93.2
	90–94	42.5	104.3	88.4	118.2
	95+	59.2	107.8	128.0	146.1

Source: Authors' analysis of 40% Finnish register-based population sample

Differentials by marital status

Use of services varies among socio-demographic groups such as by marital status (Figure 1). All groups show increasing use of services with age (apart from decedents' use of hospital care for the oldest age groups). Among the groups shown, the main difference is between those who are married, and the three non-married groups, which are very similar, especially below age 90. Married people are lower users of services, substantially so in the case of LTC. This reflects the availability of a co-resident partner (and possibly better health) among the married. While the proportion of older people who are married is likely to increase for some decades in Finland, as for many Western countries, this will reverse sharply for cohorts born from the 1950s.

Differentials by socioeconomic status: occupational class and educational level

Socioeconomic differences in health and mortality exist up to the highest ages even in the most egalitarian countries with comprehensive, high-quality welfare services, such as in the Nordic countries. While substantial socioeconomic differentials in health and mortality exist, differentials in the use of care services are relatively small compared with those, for example, by marital status. People with the highest levels of education are the lowest users at

Figure 1: Days in care in previous 12 months by age, survival and marital status

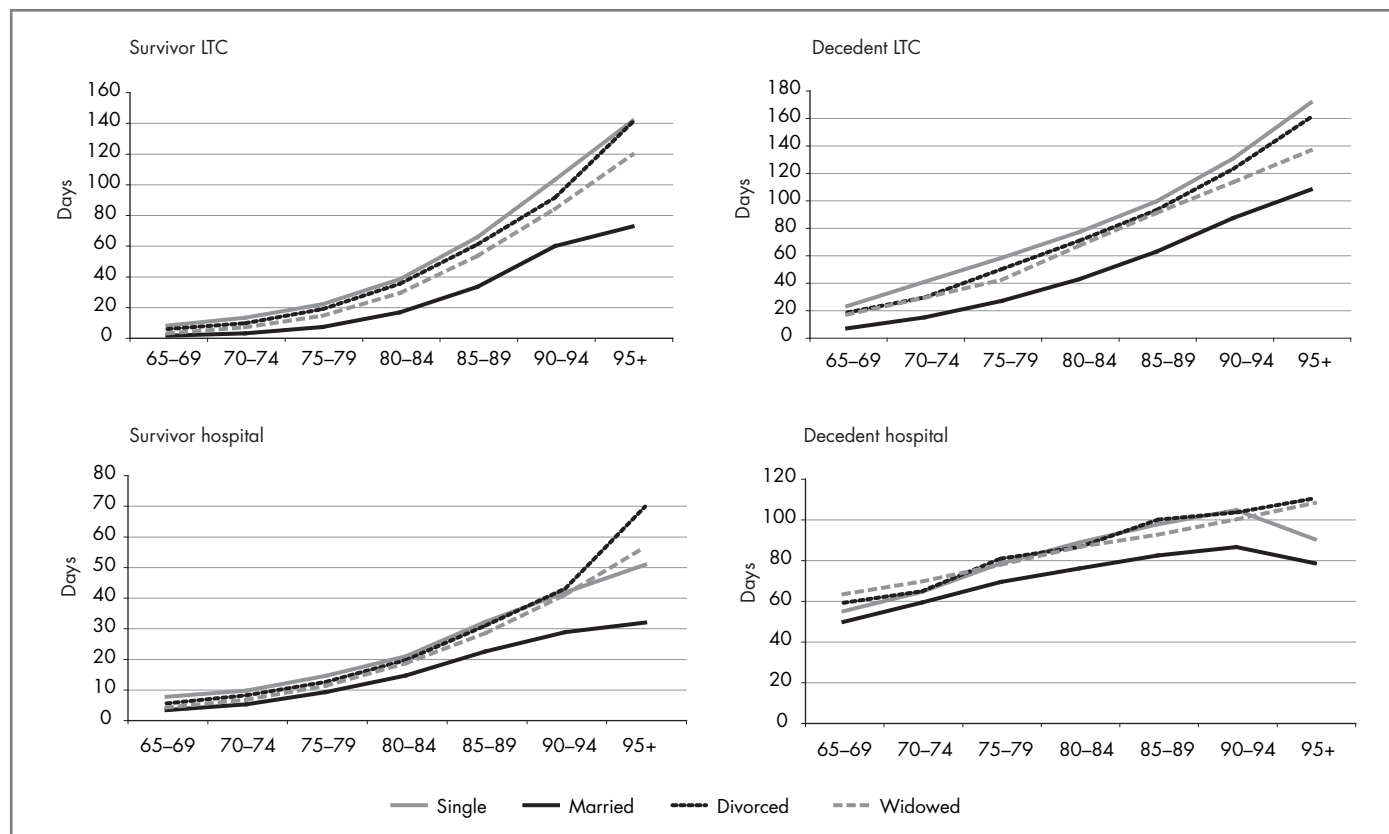
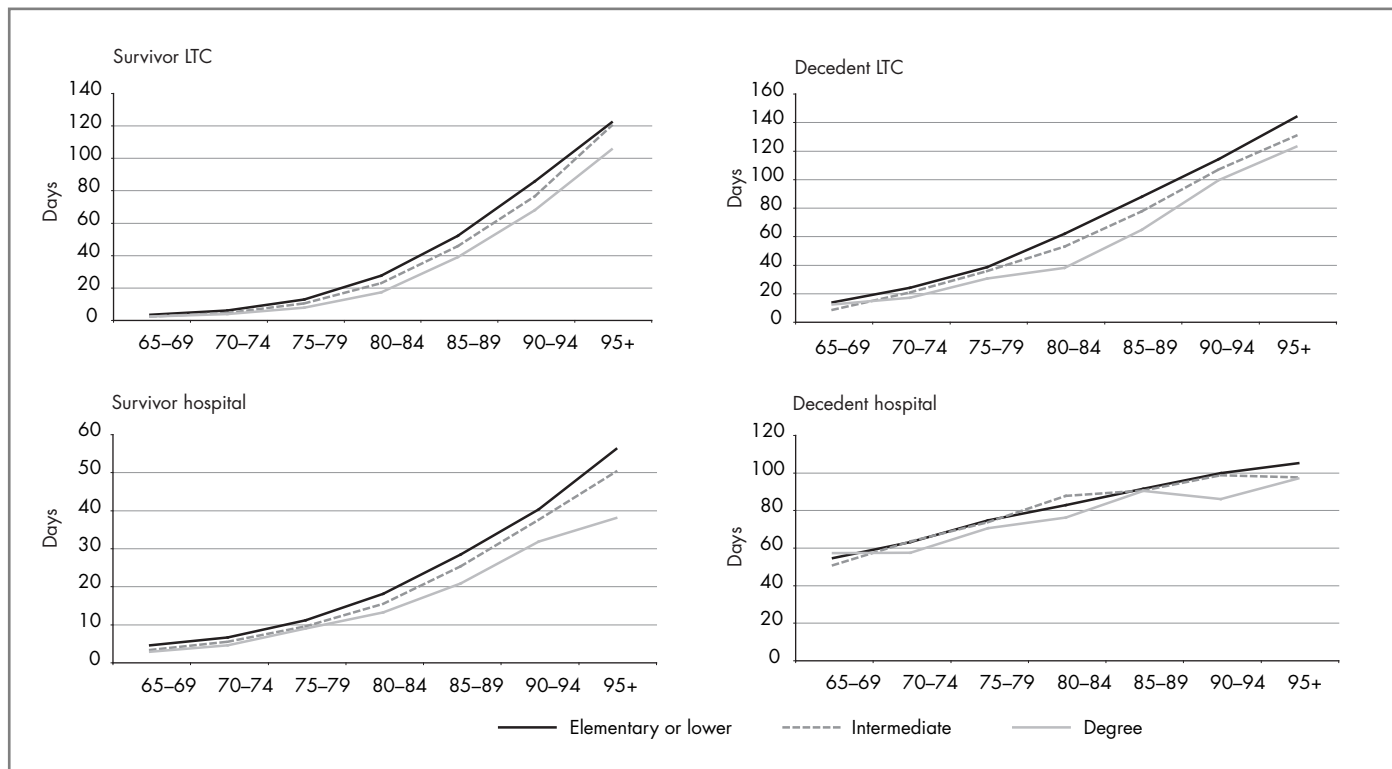


Figure 2: Days in care in previous 12 months by age, survival and educational level



any given age, followed by the intermediate group and then by the lowest education group (Figure 2). However, the longer life expectancy of better educated groups means that their overall expected lifetime use of services will not be less. While the educational level of the population is increasing, the lower use at any given age by better educated groups is likely to be more than offset by the higher proportions of these groups surviving to the highest ages, when the use of services is much more substantial.

Proximity to death or time to death?

Early studies compared decedents and survivors in the last year of life, where decedents' additional use of hospital care is mainly concentrated. However, the 'penalty' associated with proximity to death does not exist only in the twelve months preceding death; it can be observed up to 30 years before death.⁶ LTC use patterns are rather different, at younger ages, there is little additional use among those who are close to death compared with those who survive longer, but the gap widens with age, so that among those aged 90-94, a person who dies within the next twelve months spends twice as many days in LTC on average as someone who survives for six years.

Concentration on the last year of life therefore understates the additional use of

services associated with proximity to death especially for LTC. This is because a substantial fraction of excess hospital care occurs in the last twelve months of life (especially in the few months immediately before death). While the end-of-life expenditures of older patients may be lower per year, they are typically disabled longer and their illnesses often continue for years so that people in the US who die at age 73 and 93, for example, cost Medicare nearly the same amount⁷ and, of course, older people are much greater users of long-term residential care.

Summary and conclusions

These results are consistent with earlier cost-orientated studies that found that proximity to death is more important for acute care use, but age is more important for LTC. Populations in Europe will continue to age considerably in future decades, especially for the oldest-old from about 25 years time. The demand for health care might not increase wholly in line with the number of older people⁸ and health status improvement may tend to reinforce the cost lowering tendencies on acute care of proximity to death. However, the view that needs may not increase in line with the number of older people because of the 'proximity to death' effect is optimistic, since the implied additional LTC needs (bed-days in our case) overwhelm such factors. LTC needs are likely to grow more

quickly than acute care needs for older people, other things being equal.

A model that incorporates proximity to death implicitly assumes improvement in health status since lower mortality increases the time to death at each age and postpones intensive use of services. While some studies show the proportion of life spent in poor health is increasing (an expansion of morbidity), others suggest the opposite (a compression of morbidity). The lack of clear trends makes it difficult to predict health status in the future. It might be thought that later age at death would push back the onset of disability; however, even with optimistic assumptions about improvements in health status it is still likely that there will be no change in the proportions of people entering or time spent in nursing homes,⁹ nor average lifetime health care costs.⁷

Recent Organisation for Economic Cooperation and Development (OECD)¹⁰ and European Union¹¹ studies have incorporated proximity to death in forecasts of health care. The inclusion of proximity to death is likely to become increasingly important for forecasting health care needs and costs, especially for the balance between acute and social care for older people, although other factors such as future changes in marital status distributions may also be important to future projections of social care needs.

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REFERENCES

1. Fuchs VR. Though much is taken: reflections on aging, health, and medical care. *Milbank Memorial Fund Quarterly. Health and Society Special Issue: Financing Medicare: Explorations in Controlling Costs and Raising Revenues* 1984;62(2):143–66.
2. McGrail K, Green B, Barer ML, Evans RG, Hertzman C, Normand C. Age, costs of acute and long-term care and proximity to death: evidence for 1987/88 and 1994/95 in British Columbia. *Age and Ageing* 2000;29:249–53.
3. Payne G, Laporte A, Deber R, Coyte P. Counting backward to health care's future: using time-to-death modeling to identify changes in end-of-life morbidity and the impact of aging on health care expenditures. *The Milbank Quarterly* 2007; 85(2):213–57.
4. Roos NP, Montgomery P, Roos LL. Health care utilization in the years prior to death. *The Milbank Quarterly* 1987;65(2):231–54.
5. Murphy M, Martikainen P. Demand for long-term residential care and acute health care by older people in the context of the ageing population of Finland. In: Doblhammer G, Scholz R (eds). *Ageing, Care Need, and Quality of Life*. Wiesbaden: VS Verlag für Sozialwissenschaften, 2010, pp.143–62.
6. Engberg H, Oksuzyan A, Jeune B, Vaupel JW, Christensen K. Centenarians – a useful model for healthy aging? A 29-year follow-up of hospitalizations among 40,000 Danes born in 1905. *Ageing Cell* 2009;8:270–76.
7. Lubitz J, Cai L, Kramarow E, Lentzner H. Health, life expectancy, and health care spending among the elderly. *New England Journal of Medicine* 2003;349(11):1048–55.
8. Lafortune G, Balestat G, Disability Study Expert Group Members. *Trends in Severe Disability Among Elderly People: Assessing the Evidence in 12 OECD Countries and the Future Implications*. OECD Health Working Papers No. 26. Paris: OECD, 2007. Available at: www.oecd.org/dataoecd/13/8/38343783.pdf
9. Laditka SB. Modeling lifetime nursing home use under assumptions of better health. *Journal of Gerontology: Social Sciences* 1998;3(4):S177–87.
10. Organisation for Economic Co-operation and Development. *Projecting OECD Health and Long-Term Care Expenditures: What are the Main Drivers? Economics Department Working Papers No. 477*. Paris: OECD, 2006. Available at: www.oecd.org/dataoecd/57/7/36085940.pdf
11. Economic Policy Committee and European Commission. *The 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008–2060)*. Brussels: EU, 2009. Available at: http://europa.eu/epc/pdf/2009_ageing_report.pdf

Implementing remote care in the UK: an update of progress

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Summary: In 2009 we reported in Eurohealth on the challenges of implementing 'remote care', the use of information and communication technology (ICT) to support health and social care remotely. We discussed the potential of these technologies both in the United Kingdom and elsewhere to transform the lives of the elderly and those with long-term chronic conditions. In this article, we report on recent UK developments, presenting findings from our research and examining implementation progress.

Keywords: Remote care, long-term conditions, ICT, telecare, United Kingdom

Due to a rapidly ageing population and the increased spread of chronic diseases, current care systems are increasingly seen as untenable. Linked to these concerns is the recognised value of preserving people's independence, including enabling older people to remain in their homes. One potential solution is to use technological

innovation to support people remotely in their own home or the wider community. Commonly called telecare or telehealthcare, remote care systems have been around for over a decade, with 8,000 published studies reporting on their impact.¹ Despite the technology appearing to work and positive user feedback, health and care

services have been slow to show that remote care implementation can result in a significant shift in care services from hospital to home. In the United Kingdom, we estimate that between 300,000 and 350,000 people use some form of remote care (not including traditional pendant alarms).

Remote care services can be split into two main types. Telecare is used for the monitoring of changes in an individual's condition or lifestyle, including emergencies, in order to manage the risks of independent living. Examples include

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