Health and social service use among old people in the last 2 years of life

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Abstract This study focuses on differences in health and social service use in the last 2 years of life among Finnish people aged 70–79, 80–89, and 90 or older and on the variation in service use in the various municipalities. The data set, derived from multiple national registers, consists of 75,578 people who died in 1998–2001. The services included hospitals and long-term-care facilities, use of regular home care, and prescribed medicines. General hospital and public long-term care were the services most commonly used: general hospitals for younger age groups and public long-term care for older groups. The number of inpatient days in hospital was lower with increasing age, but older age groups used long-term care more frequently. Men had more hospital inpatient days than women, but women used more long-term care. The number of hospital inpatient days increased rapidly in the last months of life, almost doubling in the final month. Days in public long-term care increased regularly in the last 2 years of life. Variation in both hospital and long-term care by municipality was remarkable. The results indicate that, among people aged 70 years and older, age is a major determinant of care in the last 2 years of life. The variation in the use of care by municipality and the differences between men and women deserve more detailed analysis in future.

Keywords Last years of life · Health and social care · Use of care · Ageing · Older people · Register study

Introduction

There is a general understanding that people use more health and social care services in the last months and years of their lives than earlier, and that old people use more care than the young and middle-aged. Results, however, vary from one study to another by the type of care, the length of the period considered before death, and the time of the study. Also, the use of and demand for care preceding death is changing with practices in health and social care, and with increasing longevity in various populations. In this study, we examine the use of health and social care among old people in the last 2 years of their life in Finland, using register data covering both institutional and outpatient health and social services for the whole population. In particular, the focus is on the differences between age groups in old age.

At the beginning of the Twenty-first century, about 70% of all deaths in Finland and 67% in the US occurred among persons aged 70 years or over (Statistics Finland 2006, personal notification; Kochanek et al. 2004). The proportion is expected to increase as a result of the population ageing and of the rapidly increasing life expectancy for those of both younger and older ages in particular. Several studies indicate that both age and closeness to death influence the need for care in older people. The likelihood of co-morbidity and functional decline increases with age, and, thus, need for services differs by age group. However, epidemiological studies indicate that old people who are dying experience a steeper decline in functional status than do same-age survivors (Guralnik et al. 1991; Wolinsky

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et al. 1996), and among older people, the oldest are more likely to experience a longer period of disability before death (Lunney et al. 2003). Also, functional decline before death differs by age, being greater with more advanced age at death (Guralnik et al. 1991).

A limited number of studies have concentrated on old people's use of services in their last years of life; most of these have focused on costs of services. The studies vary according to the services included in the analysis. Most studies have included hospitalisation (e.g. Brameld et al. 1998; Seshamani and Gray 2004; Wilson and Truman 2002), but many have considered physician's visits and home care also (e.g. Lubitz and Prihoda 1984; Bird et al. 2002; Hoover et al. 2002), and some have included support services (e.g. Mukamel et al. 2002). The results indicate that the use and costs of acute health care are greater in younger old people than in the most elderly (Shugarman et al. 2004; Seshamani and Gray 2004), but these differences more or less disappear or are even reversed when long-term care as well is taken into account (Hoover et al. 2002; McGrail et al. 2000). The follow-up time in relevant studies has varied from the last 3 months to the last 24 years of life, but most often service utilisation has been followed for the last year. The results indicate that the effect of closeness to death appears mainly in the last 2 years of life. Health care expenditure has been reported to increase most rapidly in the last 6 or final 3 months of life (e.g. Yang et al. 2003; Zweifel et al. 1999). Mukamel et al. (2002) found that health care service use increased 7 months before death; the largest increase was in the final month.

Few of the previous studies have examined both hospital care and outpatient care. Also, most studies have been based on either administrative (e.g. Bickel 1998; Bird et al. 2002; Gaumer and Stavins 1991) or survey data (e.g. Brock et al. 1996), relying on self-reports or reports by the next of kin, which may be susceptible to recall problems. In Finland, one of the major advantages in health services research is the availability of comprehensive national registers that are based on provision of both health and social services, and are considered reliable.

In Finland, municipalities, 431 in number in the year 2006, are responsible for organising health and social services for their residents. The municipalities may provide services themselves or in co-operation with other municipalities, or they can purchase them from private providers or other municipalities. These services are funded mainly by taxes, but also partly by user fees. In addition to this public service provision, the private sector produces about one-fifth of all health and social services. The proportion of private services, however, varies according to the type of service, being largest for dentists and outpatient care physicians, and very small for hospital care (3.6% for all hospital days in Finland, according to Hein et al. 2005). National health

insurance, which usually covers all people regularly living in Finland, provides partial reimbursement for the costs of private services, including prescribed medicines also. Medication is included in the user fees for institutional care.

Primary health care is provided by municipalities at health centres that also have hospital beds and provide both acute and long-term care. Specialised health care is produced by the municipalities via district and central hospitals owned by 20 hospital districts that are joint organisations. These districts form five university hospital districts, providing the most specialised health care. Municipalities and hospital districts have wide autonomy in organising the services, and there are differences between municipalities with regard to practices and also provision of care. Local service patterns influence social and health care usage and, to some extent, are also likely to affect the impact of age and time to death on service use.

In this study, the focus is on age differences in health and social service use in the last 2 years of life among people aged 70 years and older. The study is part of a more comprehensive project on 'Costs of Care Towards the End of Life' (COCTEL). The detailed research questions are:

1. To what extent does use of different health and social services in the last 2 years of life differ between age groups 70–79, 80–89, and ≥ 90 years? Here, we are interested in both, the proportion of people who used different services and the service quantities they used.
2. How does the use of different health and social services vary with time to death (starting from 24 months preceding death), and how is age associated with this variation?
3. Are the possible age differences in social and health service use in the last 2 years of life maintained even if the variation in service organisations among municipalities is taken into account?

Methods

Data

The basic population of this study consists of all people who lived in Finland and died between 1998 and 2001 at the age of ≥ 70 years. The sample was identified from the Central Population Register (Statistics Finland). The study population consisted of two subgroups:

1. all those who died at the age of 70 or older in the year 1998 and
2. a random sample (40%) of all people living in Finland who died in 1999–2001 at age 70 or older, taken on those who were alive at 31 December 1997.

The total sample consisted of 75,578 decedents. Their service use was studied for the time period of 2 years before death (not two calendar years but 730 or 731 days until death).

The data were combined from five registers, maintained by Statistics Finland, the National Research and Development Centre for Welfare and Health (STAKES), and the Social Insurance Institution of Finland (SII). All records in these registers contain the individual's unique social security number, which makes it possible to link records within the register and to information in the other registers. The same personal ID is used for all social and health care purposes. The registers are introduced in brief here, and Table 1 describes the information from each that is used in this study.

The Causes of Death Register of Statistics Finland contains basic demographic characteristics; dates and places of birth; and dates, causes, and circumstances of death.

Table 1 Registers and variables used

Register	Variables	
Statistics Finland		
Causes of death register	Age	Age of death
	Gender	1 = man, 2 = woman
	Date of death	
	Municipality of residence	
STAKES		
Care register for health care	Type of hospital	University hospital
		Central hospital
		District hospital
		Private hospital
		Health centre (inpatient departments)
	Date of admission	
	Date of discharge	
Care register for social welfare	Type of institution	Residential home
		Housing with 24-h assistance for older people
	Date of admission	
	Date of discharge	
Home care census	Clients of regular home care	
Social Insurance Institution		
Prescription database	Medicines by prescription	ATC code
		Date of medicine purchase

The Care Register for Health Care of STAKES covers all hospitals in Finland. It contains data on the provider of hospital services and on the patient, admission, discharge, diagnoses, and care received. The Care Register for Social Welfare, also maintained by STAKES, registers the care episodes of residents in all long-term-care institutions in Finland, since 1996. The register contains data on the provider of service, client, admission, and discharge to care, as well as on the services and care received. These two registers also include census information for those care episodes that continue beyond the end of each calendar year. The Home Care Census has been conducted since 1995; it is performed 1 day every second year in November. It includes clients of regular municipal home care, and services they have received in the previous month. The register contains information on the provider of service, client, admission, and discharge to care, and on the services and care received.

The prescription database of the Social Insurance Institution covers prescribed medicines for which non-institutionalised people have claimed reimbursement from the SII. The database includes ATC code (Anatomical Therapeutic Chemical classification system), date of purchase, costs, and the SII reimbursement received. The prescription database covers 97% of all purchased prescribed outpatient medicines for which reimbursement has been provided (Klaukka 2004).

The ethics committee of the Pirkanmaa hospital district discussed the research plan and concluded that they did not object to the research being undertaken on ethical grounds.

Discrepancies were found for 0.2% of admissions; there were inpatient days after the date of death or the same admission was recorded twice. These admissions were removed from the data. Corrections were made to 0.15% of admissions. Most of them concerned admission dates that referred to the same admission but differed between the census and discharge data; in these cases, the admission date from the discharge data was replaced by the admission date from the census data.

Measures

In this study, the data include (1) inpatient days in hospital, (2) days in long-term care, (3) regular home care (at least once a week), and (4) use of prescribed medicines. Hospitals include university hospitals, general hospitals (including central, district, and private hospitals), and inpatient departments of health centres when the patient remains in care for less than 90 days. Long-term care includes care in residential homes, housing with 24-h assistance for older people, and inpatient departments of health centres in cases where the patient stays for 90 days

or more. Long-term care is divided into public and private care; all three categories are included in public care, but only residential homes and housing with 24-h assistance for older people are provided privately also. Home care includes both home nursing and home help.

Service use was analysed for age groups 70–79, 80–89, and ≥ 90 years (age at death), separately for men and women. Data were analysed also in 5-year age bands but are reported in 10-year strata because the results were quite similar in the two classification schemes. We present, first, the proportion of subjects who had used various services and, second, the quantity of services used (care days or number of medicines), with the latter calculated for only those who had used the service in question. Use of medicines is reported as the number of different prescribed medicines (ATC codes to an accuracy of seven characters; pharmaceutical ingredient) purchased. Home care is described only as the proportion that received regular service; the number of home care visits in the last 2 years of life was not available. The service use was calculated for 24 months before death in each age group and for men and women separately. The months were calculated individually as 24 times 30 or 31 days before death. The last month was deemed to end on the day of death.

To study the influence of municipal differences, the services were analysed in two categories: hospital care and long-term care. One very small municipality had only one person in the data. In one municipality (184 persons in these data), services were organised differently from those in all other municipalities, definitions of hospital and long-term care were different, and there were considerably more hospital inpatient days than in other municipalities. These two municipalities were excluded from these analyses.

Analysis

To ensure that the sample is representative of the basic population, its age and gender distributions were compared to those for all deaths at the age of 70 and over in the study years 1998–2001 in Finland, using the data from Statistics Finland.

Chi-square tests were performed to test differences between age groups in the proportions of subjects who had used services. Since the distributions of all study variables were strongly skewed or bimodal, medians and upper and lower quartiles are presented instead of means and standard deviations. Kruskal–Wallis tests were performed to find out if there are differences between the three age groups in the quantity of services used, and Mann–Whitney *U* tests were done for analysing more exactly, which age groups differ in respect of the quantity of services used. All analyses were performed with the SPSS statistical software package (version 12.0.1).

Results

Descriptive

In the sample there were 30,786 (40.0%) men and 44,792 (60.0%) women. The average age at death was 82.1 years, 80.0 for men and 83.5 for women. Age distribution by gender is shown in Table 2. The age and gender distribution of the sample followed the distribution of all deaths in the age groups ≥ 70 in Finland in those years, and the distribution did not vary according to the year when people had died. This was also true separately for those deaths occurring in the 40% sample of people in 1999–2001.

The proportion of service users in different age groups

Service use in the last 2 years of life varied considerably between different groups. Of all subjects, 4.7% (1.4–8.8% in different age and gender groups) did not use inpatient days at all in their last 2 years of life, while 13.9% spent at least their two final years of life in some institution. Thus, the minimum number of inpatient days was 0 and the maximum was 731. The most frequent place of care was a general hospital for men aged 70–89 and women 70–79 years old and was public long-term care for men aged ≥ 90 and women aged ≥ 80 years (see Table 3). Use of university and general hospitals was less frequent for older age groups, but long-term care increased with older age

Table 2 Sample characteristics ($n = 75,578$)

Age group	Study sample				All deceased 1998–2001			
	Men		Women		Men		Women	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
70–79	15,591	50.6	13,398	29.9	28,345	50.6	24,118	29.5
80–89	12,348	40.1	22,242	49.7	22,389	40.0	40,591	49.7
≥ 90	2,847	9.3	9,152	20.4	5,286	9.4	16,982	20.8
Total	30,786	100.0	44,792	100.0	56,020	100.0	81,691	100.0

Table 3 Any use of services and medicines, by age and gender, in the last 24 months of life

	Men			Women		
	70–79	80–89	≥ 90	70–79	80–89	≥ 90
Hospital inpatient care	86.5	85.9	79.1	85.7	78.8	65.8
University hospital	32.1	23.9	16.9	32.2	21.9	13.7
General hospital	65.1	62.7	51.7	62.4	54.2	39.5
Health centre ^a	46.9	53.5	53.5	47.5	48.4	43.1
Long-term care	26.1	46.0	64.1	36.5	60.1	77.8
Public long-term care	23.6	40.8	57.0	33.8	54.8	70.7
Private long-term care	4.0	8.3	10.6	5.0	9.2	11.7
Home care	11.2	18.9	21.8	16.7	22.2	18.6
Medicines	89.8	84.7	75.0	86.8	76.6	60.0

All results as percentages

Results of χ^2 tests: Among both men and women the differences between age groups for each service type were statistically significant ($P \leq 0.001$). The only exceptions were hospital inpatient care, where the difference between men of 70–79 and 80–89 years of age was not statistically significant, and health centres, where there was not a statistically significant difference between men 80–89 and ≥ 90 years old or women 70–79 and 80–89 years old

^a <90-day stay in an inpatient department of a health centre

classification. Use of inpatient departments of health centres was slightly different from that of other hospitals or long-term care; age differences were quite small, and service use tended to be more common among 80 to 89-year olds than other age groups. The proportion of subjects spending any days in long-term care more than doubled from the youngest to the oldest age group. Use of private long-term care was minor. A greater proportion of men than women had spent inpatient days in hospital, whereas women had used more long-term care.

The proportion that did not use any hospital care was higher in older age groups. About 20.9% of men and 34.2% of women aged ≥ 90 years did not have any hospital inpatient days in their last 2 years of life. The proportion that did not use long-term care was much lower in older age groups—for men, it decreased from 73.9% in the age group 70–79 years to 35.9% in the age group ≥ 90 years, and for women from 63.5 to 22.2%, respectively.

All told, 18.0% of subjects had received regular home care in their last 2 years of life. The proportion of home care clients tended to be higher in older age groups, but among women the use of these services was highest in the 80–89 age group. This could be due to the large proportion of institutionalised women in the oldest group. Those aged 90 or more constituted the only age group in which men received more regular home care than women.

Of all subjects, 80.4% (with a 60.0–89.8% spread among age and gender groups) had purchased at least one prescribed medicine in their last 2 years of life. The proportion was lower in older age groups, and the decrease by age group was steeper among women than men. The majority (62.5%) of those who had purchased no prescription medicines spent the last 2 years of life in some

institution, and information about their medicine use was not available for this study.

The quantity of services used

The medians and quartiles of inpatient days and prescribed medicines for men and women in the three age groups are described in Table 4. Only those who had at least one inpatient day in the respective service type, or at least one medicine purchased in the last 2 years of life, are included. For all hospitals combined, and for university hospitals and general hospitals as groups, the number of inpatient days was lower for older age groups among both men and women. Differences between age groups for all service categories were statistically significant. For health centres, inpatient days increased from age group 70–79 to age group 80–89, but differences between age groups 80–89 and ≥ 90 were not statistically significant. Also, for long-term care there was a gradual increase in the days in care from the youngest to the oldest age group.

For those who had used long-term care, the number of days in care was usually high. It was higher in older age groups and much higher for women than men.

The number of medicines purchased was lower for older age groups. The numbers of separate medicines purchased were large: 54.4% of those who bought any prescription medicines bought ten or more different ones in the last 2 years of their life.

A quite small proportion of old people accumulated a large proportion of both hospital and long-term-care use; e.g. 10% of ≥ 90 -year olds accounted for 66% of hospital inpatient days in that age group. In the youngest age group considered (70–79 years), hospital inpatient days

Table 4 Inpatient days and number of medicines, by age and gender, in the last 24 months of life. Median, lower, and upper quartiles of those who had at least once used the service type

Age group	70–79 years Median (quartiles)	80–89 years Median (quartiles)	≥ 90 years Median (quartiles)
Men			
Hospital inpatient care	32 (13, 61)	30 (13, 59)	27 (10, 52)
University hospital	13 (5, 27)	9 (3, 19)	5 (2, 14)
General hospital	18 (7, 37)	14 (6, 29)	11 (5, 22)
Health centre ^a	19 (8, 40)	24 (10, 47)	25 (11, 47)
Long-term care	253 (110, 576)	324 (120, 651)	415 (150, 703)
Public long-term care	235 (111, 560)	279 (115, 635)	387 (135, 704)
Private long-term care	153 (23, 399)	223 (34, 487)	322 (96, 565)
Medicines	10 (6, 16)	10 (6, 14)	8 (5, 12)
Women			
Hospital inpatient care	34 (13, 65)	28 (11, 57)	23 (8, 49)
University hospital	13 (5, 28)	8 (3, 17)	6 (2, 12)
General hospital	18 (7, 37)	12 (5, 26)	9 (4, 19)
Health centre ^a	23 (9, 45)	28 (12, 51)	27 (12, 50)
Long-term care	353 (134, 686)	444 (166, 717)	621 (277, 730)
Public long-term care	321 (129, 683)	402 (151, 718)	601 (229, 730)
Private long-term care	263 (52, 481)	326 (77, 585)	374 (142, 647)
Medicines	11 (7, 17)	10 (7, 15)	9 (6, 13)

Results of Mann–Whitney *U* tests: In both men and women, the differences between age groups for each service type were statistically significant ($P \leq 0.001$). The only exceptions were private long-term care, where the difference between men of 80–89 and ≥ 90 years of age was statistically significant ($P \leq 0.01$), and health centres, where there were no statistically significant differences between those aged 80–89 or ≥ 90 , among either men or women

^a <90-day stay in an inpatient department of a health centre

distributed most evenly, with 10% accounting for 46% of inpatient days. In the 80–89 group, 10% accounted for 56% of the inpatient days. Days in long-term care distributed most evenly in the oldest age group.

The median number of hospital and long-term-care admissions (analysis not shown) was quite small, ranging from 1 to 3 in different services. Still, over 40% of subjects in the two younger age groups and 33.6% in the ≥ 90 group had at least five admissions for the combined group of services. The maximum number of admissions was 136. The number of admissions was lower for older age groups. Differences between age groups were statistically significant in hospital admissions.

Variation of service use with time to death

The next step in our analysis was to examine the use of services according to the time to death. In these analyses, the whole study group was included. Number of hospital inpatient days increased rapidly in the last months of life (see Fig. 1), and it almost doubled in the last month. In university hospitals, the number of inpatient days among the youngest age group started to increase approximately 1 year before death, and in the older groups for men

6 months and for women 4 months before death. In general hospitals, the increase occurred at an accelerated rate in the five or six final months. Use of inpatient departments of health centres peaked about 4 months before death for both in men and in women. There were no remarkable age differences in use of health centres, by month.

The number of days in public long-term care increased quite regularly over the 2 years, but the increase stopped in the last 2 months of life for all age groups (see Fig. 2). Also, it is quite likely that use of these services was rising already before the 2 years started, especially in the women of the oldest age group. For private long-term care, the number of days increased but then started to decrease towards the end of life—for men about half a year and for women 1 year before death.

The order of the age groups in terms of care use did not change in the 2 years prior to death; younger people used more hospital care and older ones used more long-term care the whole time. The differences between age groups remained similar for long-term care throughout the 2-year period, but in hospital use differences did see an increase towards the end of life.

Although service use was considerable in the last month of life, 10.5% of the whole study group did not spend any days in inpatient care in the last month of their lives.

Fig. 1 Average monthly use of hospital care by time to death in different age groups (hospital types are on different scales)

Fig. 2 Average monthly use of long-term care by time to death in different age groups (public and private care are on different scales)

Service use by age group and municipality

There is some variation in the exact manner in which municipalities in Finland arrange health and social services for their residents. Therefore, we wanted to explore the possible effect of the municipalities' different practices on our results that indicate a lower number of hospital days

but higher number of days in long-term care as age increases in the last 2 years of life. To do this, we calculated means, medians, and 5 and 95% percentiles of days in hospital and days in long-term care by age group for the 429 municipalities. In this analysis, the age-group-specific mean for each municipality served as a unit of observation. The results for men and women were combined (see

Table 5). The results were essentially the same as for the analyses where individuals were used as observation units. The number of inpatient days in hospital was lower for older age groups and the number of days in long-term care much higher in older age groups. However, the variation in inpatient days between municipalities was quite high for hospital inpatient days and even higher for days in long-term care.

Discussion

The aim of this study was to assess differences between age groups in health and social service use in the last 2 years of life, and to describe the variation among municipalities. We found marked differences between the 70 to 79-year olds, 80 to 89-year olds, and ≥ 90 -year olds in both the proportion of people who had used services and the quantity of use. The results suggest that inpatient days in hospital decrease with age but days in long-term-care institutions increase. Similar results have been obtained in previous studies. Brock et al. (1996) studied days of care in the last 90 days of life among old people. The number of hospital days decreased slightly with age, but days in a nursing home increased dramatically. In a German study, Bickel (1998) found that, with increasing age at death, the use of residential homes and ambulatory services rose steeply, whereas the probability of hospital treatment decreased with advancing age. Also a recent Canadian study (Menec et al. 2007) showed that very old individuals (85+ years old) were more likely to be cared for in long-

term-care institutions and less likely to be hospitalised than younger olds.

The major differences in health and social service use between age groups once again indicate that neither in research nor in practice should old people be considered to be a single group; rather, even the population aged ≥ 70 years includes many groups whose use of services is different. The same has been found earlier, such as by Long and Stevenson Marshall (2000), whose entire study population was 75 years or older and had a functional disability but where the older age groups were treated less intensively than the younger. There are several possible explanations for these differences. Causes of death differ somewhat from one age group to another, and some diseases are more associated with disability and also with need of services. However, it is also possible that, regardless of need, older age groups may have fewer admissions to inpatient hospital care than younger ones because they are less lightly admitted and less intensive care is given for them (see e.g. Levinsky et al. 2001).

In this study, 80% of old people had bought prescribed medicines in their last 2 years of life. This result is quite similar to that of a Swedish study (Jørgensen et al. 2001), where 78% of community-dwelling people ≥ 65 years old had at least one prescription item, although that study considered old people generally, not only those who were in their last years of life. In our study, 43.8% of the sample had bought ≥ 10 medicines, which is many more than Jyrkkä et al. (2006) reported: 28% of old people had used this many medicines. However, unlike such earlier work our study included all different medicines in the last 2 years of life, and not all of these were necessarily used at the same time. The variation of medicine use by time to death could not be studied here.

In our study 11–22% of old people had used regular home care in their last 2 years of life. The proportion is quite similar to that in the study of Grabbe et al. (1995), where 19.5% of decedents had received formal home care. They found that among other characteristics, older age and being female were significantly associated with the use of formal home care. In our study the results were similar, except in the oldest age group (≥ 90 years), where a bigger proportion of men had received regular home care than women, and women had used less home care than women in age group 80–89 years. Less use of home health in the oldest age group (85+ years) has been reported also by Bird et al. (2002).

The change in service use towards the end of life varied between the service types. Hospital use tended to increase rapidly in the last months of life, the same has been found in previous studies (e.g. Mukamel et al. 2002; Klinkenberg et al. 2005; Menec et al. 2007). The number of hospital inpatient days began to rise earlier for the youngest age

Table 5 Means, medians, and 5 and 95% percentiles of the municipal averages of days in hospitals and long-term care by age group ($n = 429$)

	Mean	Median	5 and 95% percentiles
Hospitals ^a			
70–79 years	38.9	37.6	23.7, 59.9
80–89 years	33.5	31.6	19.3, 55.0
≥ 90 years	22.6	21.3	7.2, 42.3
Long-term care ^b			
70–79 years	105.3	104.4	28.3, 175.5
80–89 years	210.0	216.1	98.2, 316.6
≥ 90 years	354.9	357.0	128.9, 555.1

^a Inpatient days at a university hospital, general hospital, and health centre for those who had <90 inpatient days at a health centre in the last 2 years of life

^b Days at a residential home, in housing with 24-h assistance for older people, and at a health centre for those who spent ≥ 90 inpatient days in a health centre in the last 2 years of life

group than for older groups. Roos et al. (1987) also found that closeness to death influences health and social care service use among the oldest age groups over a shorter period. In our figures days in long-term care decreased in the last months of life. Some of the residents of long-term care have been moved elsewhere for the last period of their lives. The transitions between different care units and the pathways of care will be analysed more in detail in future. The use of home care and prescribed medication could not been analysed by time to death like hospital and long-term services.

Average service use seems to be quite high in the last years of life, but there are also people who do not use the services at all. For example, Gaumer and Stavins (1991) reported that almost 10% of Medicare beneficiaries did not use Medicare services in the 90 days before death. McCall (1984) found that 26% of Medicare beneficiaries did not have any inpatient stays in the last year of life, which is a lot more than the corresponding figure in this study (4.7%). According to Diehr et al. (2002), the oldest are most likely not to be hospitalised, a finding echoed in this study.

Possible differences between municipalities in ways of organising the care of old people do not seem to remove the differences between age groups. Still, variation among municipalities was large in terms of both hospital and long-term care. The factors that have led to this variation could not be analysed in this study.

Our sample included 100% of those who died in Finland at the age of ≥ 70 in 1998 and 40% of those of this age who died in 1999–2001. The sample represents well all Finnish people who died at this age. The data had some discrepancies, and 0.2% of the admissions had to be removed as a consequence. That is a very small proportion, however, and does not cause remarkable underestimation in the results. Keskimäki and Aro (1991) studied the accuracy of the Finnish hospital discharge register (now the Care Register for Health Care) by comparing register data to corresponding medical records. The accuracy of dates of admission and discharge was 96%. The data used in this study were based mainly on these dates of admission and discharge, and can be considered reliable. A clear weakness in our study is that not all services available to old people were included. In particular, lack of data about primary care and the limited register for home care prevent drawing a comprehensive picture of health and social service use. Also, informal care, an important addition to formal care, could not be included in this study.

It seems that the 2-year period is long enough for determining how the use of health and social services changes towards the end of life. It is possible, though, that use of some services, such as public long-term care, begins to rise earlier than 2 years before death. However, most of the change is visible in this study.

Differences in service use between men and women were not a research question in this study, but some interesting results were found in this area nonetheless. Older women spent more time in long-term institutions than men of the same age. This may be explained in part by the higher proportion of women who live alone; perhaps they do not receive as much informal care as men do. On the other hand, elderly women often have multiple disabilities (e.g. Lunney et al. 2003), creating a need for long-term care. Also, Lentzner et al. (1992) found that a larger proportion of women than men were severely restricted in all age groups in their last year of life. The difference between men and women in hospital inpatient days is also interesting, and is more difficult to explain.

In conclusion, the use of hospitals in the last 2 years of life decreased and the use of long-term care increased from the age group of 70–79 years to the age group ≥ 90 years. The differences between age groups were remarkable. Also, the types of hospitals differed for the different age groups. The older the person, the more likely he or she is to be cared for in public long-term care, and the less likely to receive care at a university hospital. The decline in days in long-term-care institutions suggests that these facilities have not been planned to take care of the residents until the end of their lives. Both the variation in the use of care by municipality and the differences between men and women deserve more detailed analysis in future.

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