Transitions in health and social service system at the end of life

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Abstract This study focuses on the amount and types of transitions in health and social service system during the last 2 years of life and the places of death and among Finnish people aged 70–79, 80–89 and 90 or older. The data set, derived from multiple national registers, consists of 75,578 people who died between 1998 and 2001. The services included university hospitals, general hospitals, health centres and residential care facilities. The most common place of death was the municipal health centre: half of the whole research population died in a health centre. The place of death varied by age and gender: men and people in younger age groups died more often in general or in university hospital or at home, while dying in health centres or in residential care homes was more common among women or the very old. Number of transitions varied from zero to over a hundred transitions during the last 2 years. Number of transitions increased as death approached. Men and younger age groups had more transitions than women and older age groups. Among men and younger age groups transitions between home and general or university hospital were common while transitions between home and health centre or residential care were more common to women and older people. The results indicate that municipal health centres have a major role as care providers as death approaches. Differences between gender and age in numbers and types of transitions

were clear. Future research is needed to clarify the causes to these differences.

Keywords Transitions in health and social service system · Place of death · Last years of life · Register study · Ageing

Introduction

Most people use health and social services during the last years of their lives (Pot et al. 2009; Larsson et al. 2008; Forma et al. 2007). Towards the end of life, prevalence rates of disease and disability increase and more markedly in older than in younger people (Guralnik et al. 1991). With advancing age and higher rates of disability and disease the amount of health and social care needed during the period preceding death also increases (Lentzner et al. 1992; Mehdizaleh 2002). With frequent co-morbidity (Guralnik et al. 1991; Mehdizaleh 2002), the likelihood of moving between home and health or social care settings or between different care settings is likely to increase and often these people have complex pathways of care: they go through a combination of various health and social care processes (Mäntyranta et al. 2003). People with the same diagnosis may follow very different pathways of care and experience different numbers of transitions (Cohen and Pushkar 1999). This indicates individuality in care processes, possibly due to co-morbidity and other factors in life.

The final point in the pathway of care is the place of death. According to earlier research, most people prefer to stay at home until the end of life (Beccaro et al. 2006; Tang 2003), although there are also people who would rather die somewhere else, sometimes possibly because they do not want to be a burden on their families (Beccaro et al. 2006).

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Staying at home as long as possible is seen as a way to maintain control over one's life (Eloranta et al. 2008) and the quality of life (Tang 2003). The thought of moving away from one's own home to a care facility at the end of life may cause negative feelings (Lee 1997). Yet most older people in Europe and in North America die somewhere else than at home; nowadays dying is extensively institutionalized and hospitals and long-term care facilities are the common places of death (Ahmad and O'Mahony 2005; Fischer et al. 2004; Jakobsson et al. 2006; Klinkenberg et al. 2005; Van den Block et al. 2007; Wilson et al. 2001).

From the perspective of quality of life, different research findings describe the strengths and weaknesses of different places of death (Mezey et al. 2002), also illustrating the complexity of the concept of the quality of life at the end of life. Transitions may have a negative effect on the quality of life because transitions between settings include the possibility of medical errors or unnecessary treatments (Meier and Beresford 2008), and stress in a patient as consequence of changing location and facing difficulties in the continuum of care (Naylor et al. 2005). However, moving from home to a health or social care facility may be experienced in different ways due to amount and severity of disability (Thomese and Broese van Groenou 2006; Koponen 2003): to some people, it may represent losing some of their autonomy and thus be a negative change, while others may feel insecure when facing deteriorating health at home. In the latter cases moving into institutional care is often a positive or at least a necessary change. For the people themselves, it is not insignificant where they are treated. A familiar place of care is often preferred to an unknown care facility even if the waiting time is longer. (Hirvonen et al. 2006).

The structure and organization of social and health care services greatly influences the likelihood and nature of transitions between the places of care. In Finland, the municipalities are responsible for organizing health and social services for their residents although they do not need to produce these services themselves (see Ministry of Social Affairs and Health 2009). In the last decade some 80% of services for older people have been provided by the public sector (Vuorenkoski 2008). The responsibilities differ between the organizations: municipal health centres provide primary health care and also have inpatient wards where older people receiving long-term care constitute a major patient group. Central and regional hospitals offer specialized care. Among central hospitals there are five university hospitals which provide the most advanced specialized care (Ministry of Social Affairs and Health 2009). One of the main goals in Finnish policies for the elderly is to help older people to stay at home as long as possible and this is supported by formal home care. Residential homes and housing with 24-h assistance are also available (Ministry of Social Affairs and Health 2008).

To ensure the quality and effectiveness of services, well-functioning service chains are required and the different organizational levels should work closely together (Ministry of Social Affairs and Health 2008) but in practice people often meet organizational fragmentation, which may increase the number of transitions between places of care. Improving the integration and seamlessness of care is widely recognized as one of the main challenges in health and elderly care in Finland (Vaarama 2005; Valvanne 2005); more integrated care is also likely to improve client's quality of life (Pieper 2005).

Research on transitions between care facilities is considered critical because multiple transitions are likely to have a negative impact on old people's treatment and wellbeing (Naylor and Keating 2008). In order to maintain the quality of care and quality of life and to organize social and health services in a rational way it is important to have better empirical information of the pathways of care at the end of life.

Yet no extensive research information is available on the pathways of care that older people experience. In health care research, the notion of pathway most often refers to hypothetical optimal chains of treatment or places of care concerning specific individual medical conditions (Atwal and Caldwell 2002; Furåker et al. 2004; Koval and Cooley 2005; O'Donnel et al. 2005; Silvennoinen-Nuora 2004), and research concerning transitions mostly concentrates on certain specific patient groups (Burge et al. 2005; Cohen and Pushkar 1999; Van den Block et al. 2007). However, for most of older people, the decisions on services and the transitions between the places of care are not determined only by individual diseases but by multiple health conditions and disability.

The study is part of a more comprehensive project on 'Costs of Care Towards the End of Life (COCTEL)'. Earlier, we have reported results of utilization of health and social services (Forma et al. 2007, 2009). In this study, we focus on the places of death and the quantity and types of transitions between home and health or social care facilities, or between the care facilities during the last 2 years of life in people aged 70 years and older. The focus is on the last stages of life in old age, not on the treatment of specific disease.

The detailed research questions were:

1. What are the frequencies and types of transitions that people have between home and different care facilities during their last 2 years of life?
2. What are the most usual places of death for people who die at the age of 70 or older?
3. To what extent do places of death and the patterns of transition differ between genders and age groups for people aged 70 or over?

Methods

Data

This study is based on Finnish register data which include information on the utilization of health and social services in the whole country. In Finland, the coverage of population and health registers is exhaustive, and the data can be linked on the basis of the personal identification number. In this study, the sample was identified from the Central Population Register (Statistics Finland) and was linked together with the data from the Care Register for Health Care, the Care Register for Social Welfare and Home Care Census (National Research and Development Centre for Welfare and Health, from 2009 National Institution for Health and Welfare). Our research sample consisted of two subgroups:

1. all those who died in 1998 at the age of 70 or older, and
2. a random sample (40%) of all those who died during the period 1999–2001 at the age 70 or older.

The total sample consisted of 75,578 decedents of whom 44,792 (59.3%) were women and 30,789 (40.7%) were men. The aim was to ascertain the pathways of care including transitions between places and the places of death with a special focus on the last years of life of older people, not end-of-life care for any specific medical condition. Thus, all deaths irrespective of cause are included. The data are described more in detail in Forma et al. (2007).

Data include university hospitals, general hospitals (including central, district and private hospitals), health centres, both private or public residential care facilities (including inpatient wards in nursing home care and sheltered accommodation with 24-h assistance for older people), and home care including both home nursing and home help. The category ‘home’ includes both the individual’s own home with or without home nursing or home help, and living in sheltered accommodation without 24-h formal assistance. From these data, we could monitor admissions to and discharges from health or social care facilities, the duration of stays and also periods of time spent outside care facilities during the 2 years prior to death. Place of death was monitored by tracking the last transition and the place at the time of death.

Analysis

For the analyses, the data were divided into six subgroups: 15,591 men in the age group 70–79 years (20.6%), 12,348 men in the age group 80–89 years (16.3%) and 2,847 men in the age groups 90 years or older (3.8%); 13,398 women

in the age group 70–79 years (17.7%), 22,242 women in the age group 80–89 years (29.4%) and 9,152 women 90 years or older (12.1%).

By transition, we refer to a situation in which a person moves from one place to another, and spends at least one night there: transitions with duration of less than 1 day were excluded. The data were programmed so that transitions are actual moves from one location to another, not a change only of service provider without any change in location (see Burge et al. 2005). Transitions take place between home and health or social care facilities or between different care facilities. We studied the number of transitions during the time period 2 years before death.

Data were analysed using descriptive statistics. Places of death and transitions were studied in six gender and age groups. Distributions in places of death and transitions were compared using chi-square tests. Because of the right-skewed distributions, medians were used. Analyses were performed with SPSS (15.0) statistical software package.

Results

The place of death

For all age and gender groups studied, the most frequent place of death was municipal health centre, where almost half (48.2%) of our subjects died. The second most common place of death was general hospital (19.3%) and the third was private home (16.3%). About 10% died in residential care and only about 6% in university hospital.

There were differences between age groups and between men and women regarding the place of death. General or university hospitals and private home were more common places of death for younger than for older age groups and more common for men than women, whereas older age groups and women more often died in residential care or in health centres. Differences between genders were found in every age group (Fig. 1).

Transitions during the last 2 years of life

In the whole research sample, about 87% (90% of men and 86% of women) had one or more transitions either between home and care facilities or between care facilities during the last 2 years of life, while about 13% had no transitions but stayed in the same place during the whole period (Table 1). In the total sample, about 32% had 1–4 transitions, 30% had at least 10 transitions, and 14% at least 16 transitions during the last 2 years. The maximum was 168 transitions between different care facilities and home. The median number of transitions among those moving at least once was seven. The frequency of transitions

Fig. 1 Place of death among men and women at the ages of 70–79, 80–89 and 90 years or older (all results are given in *percentages*) Results of Chi-Square tests: in both men and in women the differences between age groups were statistically significant ($P < 0.001$). In each age group differences between genders were also statistically significant ($P < 0.001$)

increased as death came closer: between the 24th and the 19th month before death 36% (results not shown), but during the last 6 months as many as 73% moved between

settings. During the last 6 months about 50% of the whole group had 1–4 transitions, 20% had 5–9 transitions, and some 4% had 10 or more transitions (Table 1).

Staying the whole 2 years at home without any transitions was more common in younger age groups in both genders, and it was more common among men than women in each age group, whereas staying the whole time in a care facility without transitions was more common in older age groups and among women. Among women aged 90 years or older, every fifth spent the whole 2 years in the same care facility. Having over 10 transitions was less common in older age groups and among women, but even among the oldest women, where the number of transitions was the smallest, about 19% moved from one place to another at least 10 times during the last 2 years. During the last 6 months the same differences between gender and age persisted: it was more common for men and younger people to have a large number of transitions than for women and older age groups. Men and younger age groups more often spent the last 6 months at home, while 22% of men and 40% of women in the age group 90 years or older spent their last 6 months in a care facility.

Because many people moved many times between the same places, we calculated the proportions of different types of transitions of the total number of transitions in every age and gender group. In the whole sample,

Table 1 Number of transitions during 24 and 6 last months by age and gender (%)

Number of transitions <i>N</i>	Men			Men total 30,789	Women			Women total 44,792	Total 75,581
	70–79 15,591	80–89 12,348	90– 2,847		70–79 13,398	80–89 22,242	90– 9,152		
During last 24 months									
No transitions, 24 months at home	9.2	4.3	2.4	6.6	6.2	3.3	1.5	3.8	4.9
No transitions, 24 months in care facility	2.0	4.5	9.1	3.7	4.6	9.7	20.0	10.3	7.6
1	7.8	7.9	9.7	8.0	8.2	8.6	10.8	9.0	8.6
2–4	22.1	22.2	23.4	22.2	22.0	23.6	24.9	23.4	22.9
5–9	25.4	27.9	28.3	26.7	26.3	27.4	24.2	26.4	26.5
10–15	16.5	17.5	15.0	16.8	17.1	15.5	11.0	15.1	15.8
≥16	17.0	15.7	12.1	16.0	15.6	11.9	7.6	12.0	13.7
Median for those who had transitions	7	7	6	7	7	6	5	6	7
During last 6 months									
No transitions, 6 months at home	15.4	8.3	5.2	11.6	10.9	6.5	4.5	7.4	9.1
No transitions, 6 months in care facility	6.8	13.4	22.3	10.9	11.8	22.4	37.7	22.4	17.7
1	16.5	17.3	19.4	17.1	17.0	17.8	17.2	17.5	17.3
2–4	31.1	34.4	32.9	32.5	32.4	32.7	28.1	31.6	32.0
5–9	23.6	21.7	17.8	22.2	22.3	17.7	11.1	17.7	19.6
10–15	5.8	4.3	2.3	4.9	5.2	2.6	1.3	3.1	3.9
≥16	0.8	0.6	0.1	0.8	0.4	0.3	0.1	0.3	0.4
Median for those who had transitions	3	3	3	3	3	3	2	3	3

Results of Chi-Square tests: in both men and in women the differences between age groups were statistically significant ($P < 0.001$). In each age group differences between genders were also statistically significant ($P < 0.001$)

transitions between home and health centres were the most frequent (Table 2): 18% of all transitions were moves from home to a health centre, and some 16% from a health centre to private home. Transitions from home to a general hospital (15%) and from a general hospital home (10%) were also frequent. Moving between home and a care facility was more common than moving between care facilities.

The most frequent transitions varied somewhat between the age and gender groups. Among younger age groups and men a higher proportion of all transitions took place between private home and general or university hospital and back home than in older age groups and women. In older age groups and among women transitions from home to a health centre or residential care and back home were more typical, although the differences between the genders were less consistent than the differences between age groups. Transitions between health centre and residential care were more common among older age groups and women.

Transitions and the place of death

Next we examined the types and frequencies of transitions according to the place of death. Practically, all of those

who died in university hospital or in general hospital and 91% of those who died in health centres experienced at least one transition during the last 2 years of life (Table 3). Transitions were most rare to people who died in residential care or in their private homes, about 70% of them had transitions, meaning that about one quarter of them spent the whole 2 years in the same place. For those who had moved at least once, the median number of transitions was highest for those who died in a university hospital. Second highest median was for those who died in health centres. The median was lowest for those who died in general hospital, residential care or at home.

When we studied the proportion (%) of people who had different types of transitions (one or more), the most frequent transition during the last 2 years of life was that from home to the facility where death occurred. Yet, also other transitions were frequent, indicating the complex pathways to the final place of care. Regardless of the last place, transitions between private home and health centres were frequent, though for people who died in health centres they were most frequent. Over half of those who died in health centres also experienced a move from a health centre back home, and some 40% came to a health centre not directly from home but from a general hospital. For people who died in university or in general hospital, transition from

Table 2 Proportion of different types of transitions of all transitions between care facilities and home by gender and age group (%)

Type of transitions	Men				Women				Total
	70–79	80–89	90–	Total	70–79	80–89	90–	Total	
Home → health centre	14.6	19.4	21.5	17.1	15.3	20.2	20.6	18.6	17.9
Health centre → home	13.6	17.6	18.5	15.6	14.3	18.4	17.5	16.9	16.3
Home → general hospital	20.1	14.6	9.8	17.0	17.9	12.0	8.2	13.5	15.1
General hospital → home	15.6	10.2	5.8	12.6	13.2	7.3	4.1	8.7	10.4
Home → university hospital	8.3	4.5	2.7	6.3	8.4	4.0	2.5	5.3	5.7
General hospital → health centre	4.4	5.1	5.0	4.7	5.3	6.2	5.6	5.8	5.3
Home → residential care	3.2	5.5	7.9	4.5	2.8	5.6	8.7	5.1	4.9
Residential care → home	3.3	5.7	8.3	4.7	3.0	6.0	9.3	5.4	5.1
University hospital → home	6.2	3.0	1.4	4.5	6.1	2.2	1.1	3.4	3.9
Health centre → residential care	1.2	2.7	4.8	2.1	1.8	4.0	6.2	3.6	2.9
Health centre → general hospital	2.3	2.4	2.0	2.3	2.8	2.7	2.0	2.6	2.5
Residential care → health centre	1.0	2.2	4.1	1.7	1.6	3.4	5.4	3.1	2.5
University hospital → health centre	1.7	1.6	1.6	1.7	2.1	2.1	1.9	2.1	1.9
Residential care → general hospital	0.9	1.6	2.6	1.3	1.1	2.1	2.7	1.8	1.6
General hospital → residential care	0.7	1.3	2.0	1.0	0.9	1.4	1.8	1.3	1.2
Health centre → university hospital	0.8	0.7	0.4	0.7	1.0	0.7	0.5	0.8	0.8
University hospital → general hospital	0.7	0.4	0.2	0.5	0.7	0.3	0.2	0.4	0.5
Other ^a	2.1	1.5	1.4	1.7	1.7	1.4	1.7	1.6	1.5
Total	100	100	100	100	100	100	100	100	100

^a Other includes transitions between health care centres, nursing/residential homes, general and university hospitals, and from general hospital to university hospital, from university hospital or nursing/residential home, and from nursing/residential home to university hospital. In all groups less than 0.5% of transitions were between these facilities

Table 3 Proportions of people who experienced different types of transitions (%) and median number of transitions in the last 24 months by place of death

Place of death	Health centre	General hospital	University hospital	Residential care	Home
Percent of those who had transitions	90.5	99.4	100	71.7	69.7
Percent of people who experienced different types of transitions at least once					
Home → health centre	69.8	40.7	36.1	38.3	49.3
Health centre → home	57.3	39.7	38.1	33.3	56.9
Home → general hospital	45.6	84.1	25.3	24.3	52.4
General hospital → home	30.4	53.1	21.4	14.9	47.9
Home → university hospital	19.5	13.5	83.2	8.4	21.4
University Hospital → home	12.2	10.6	41.0	4.8	18.6
Home → residential care	16.9	10.6	8.7	47.8	11.4
Residential care → home	20.1	12.3	10.4	32.7	21.7
General hospital → health centre	45.8	22.0	5.0	19.6	17.0
Health centre → general hospital	19.3	25.0	2.7	6.3	7.3
Residential care → general hospital	8.3	11.1	2.0	24.9	3.6
General hospital → residential care	5.3	6.1	1.8	25.5	3.7
General hospital → university hospital	1.8	3.6	10.4	0.9	1.5
University hospital → general hospital	2.9	7.7	3.0	1.4	2.2
Health centre → residential care	16.3	7.3	5.6	58.6	7.4
Residential care → health centre	18.7	4.4	3.2	28.7	4.6
Health centre → university hospital	6.5	1.6	17.5	2.1	2.5
University hospital → health centre	16.8	3.3	18.8	7.2	7.2
University hospital → residential care	1.6	0.7	3.0	7.8	1.0
Residential care → university hospital	2.5	0.8	7.2	8.4	1.3
Median for those who had transitions	6	5	7	5	5

home to the hospital in question was clearly the most common. People who died in a general hospital also moved between general hospital and health centre; 22% moved from a general hospital to a health centre and 25% from a health centre to a general hospital. About every fifth and every fourth of those who died in university hospital moved between private home and general hospital. Those who died in residential care facilities had the most diversity in transitions, meaning that many of them had experienced several different transitions. Forty-eight percent were admitted into residential care facilities from their private homes, 59% had transitions from a health centre to residential care facility. Thirty-three percent moved from residential care facilities back home and 29% to a health centre. Approximately one-third of them also moved between home and health centre, and about one-fourth moved from home to a general hospital, and also about fourth moved from a general hospital to a residential care facility. For those who died at home transitions between home and health centre and home and general hospital were most frequent, but every fifth also moved between university hospital and home, from a university hospital to a health centre, or from residential care to home.

When the place of death was a residential care facility or private home, the number of transitions varied by age group: more people in younger age groups had transitions, and they also had more transitions than older age groups. For those who died in general hospital, in university hospital or in a health centre there were no clear differences in the proportion of people who had transitions or in the median numbers of transitions between age and gender groups. Regardless of the place of death, transitions between home and general hospital, between home and university hospital, between university hospital and general hospital and from health centre to university hospital, were more common among younger people. By contrast, regardless of the place of death, transitions between home and residential care facility, and residential care facility and general hospital, were the more common the older the people were. There were only few clear differences between genders in the same age groups; regardless of the place of death transitions between home and general hospital were more common among men, and transitions between health centre and residential care among women. When the place of death was a residential care facility or home, all types of transitions were more common among men than among women in the same age groups.

Discussion

In this study, we focused on places of care and transitions between care settings during the last 2 years of life in more than 75,000 people aged 70 or older. In this group, the number of transitions varied from zero to more than a hundred. Places of death also varied, but for the whole group, health centre was the most common place of death; almost half of all men and over a half of all women died in a health centre. It was also the most common place to move to or to move from. The importance of other places varied by age and gender: men and younger old people died in general hospital, university hospital or at home more often than women and the very old, while dying in a health centre or in a residential care facility was more common in women and the very old.

In Finland, health centres have an important role as the main providers of primary health care. The services include general practice doctors, health care nurses and acute and long-term in-ward care; in some health centres also geriatricians are available. Specialized care is provided by general hospitals and university hospital. (Vuorenkoski 2008). The official health policies prefer health centres to specialized care as providers of care and rehabilitation for old people (Ministry of Social Affairs and Health 1999). However, the care of a dying person differs from other types of care and requires a specific approach (Morrison et al. 2000; Pitorak 2003). Therefore, health centres are facing a very challenging professional task when organizing care ranging from respite care and rehabilitation to terminally ill patients in their final stages.

Differences in service structures and study designs make it difficult to directly compare the places of death in our study with the findings of others. It may be, however, that dying at home is less common in Finland than in some other European countries (Ahmad and O'Mahony 2005; Fischer et al. 2004). According to earlier findings, hospital is the most common place of death, and this was also true for Finland. Taken together, university hospitals, general hospitals and inpatient wards as hospital care in health centres, altogether 57.6 of the deaths occurred in a hospital.

Most of earlier studies on transitions at the end of life focus on the palliative care of cancer patients or have specific exclusion criteria, like excluding sudden deaths. Compared to a study with palliative care patients where the median number of transitions during the last 5 years was one (Burge et al. 2005), the number of transitions in our study seems high. Among people who experienced non-sudden death in Belgium (Van den Block et al. 2007) 26% had two or more transitions during the last 3 months; this is roughly within the same range as our study, where 56% of subjects had two or more transitions during the last 6 months. The Belgian study, however, covered all age groups.

In our study, the total number of transitions was high: 28% of people aged 70 or older had at least 10 transitions during the last 2 years of life, and 13% had more than 15. We did not have information about the causes of the transitions. Partly the numerous transitions may reflect active measures by service providers and their serious attempts to support older people's coping at home. Some of those admitted to care facilities and returning home could result from periods of respite care, specifically planned to support living at home. This would be in accordance with the guidelines of official Finnish policies on old age (Ministry of Social Affairs and Health 1999). We tried to estimate the number of respite care periods by calculating the proportion of several repeated admissions with equally long stays. According to this rough estimate, respite care would explain only about 1.2% of all transitions. One-night stays at home in the middle of a care period possibly indicating home leave from care, cover 3.9% of all transitions. It is plausible that to a large extent they are well justified and in the best interest of the older individual. However, at least in part, the large number of transitions and the complex pathways of care are likely to result from unclear areas of responsibility in social and health care. Information loss and communication problems between different agents (Hauser 2009; Meier and Beresford 2008) and unsuccessful discharges (Mistiaen et al. 1997; Naylor et al. 1999) may contribute to unnecessary moves between different settings.

Our findings reveal a great variety in the pathways of care during the last 2 years of life, and implicate multiple factors underlying these pathways. Younger old people and men had more transitions, especially from home to hospitals, and the place of death was more often general or university hospital than among women and the oldest age groups. The oldest group and women had fewer transitions and more often spent the whole 2 years in a care facility. The oldest women differed most from others in that they had fewer transitions and every fifth of them spent their last 2 years in a care facility. The results support those of earlier research on age differences: hospital care at the end of life is more common among younger age groups (Jakobsson et al. 2006); residential care and longer periods of institutionalisation at the end of life have been more common in the oldest age groups (Ahmad and O'Mahony 2005; Brock et al. 1996; Jakobsson et al. 2006; Larsson et al. 2008).

The variation between genders can be at least partly explained by gender differences in diseases and disabilities (Suominen-Taipale et al. 2006). It is obvious that the patient's diagnosis influences the places of death and number of transitions. Different diseases entail different care needs, e.g. dementia, functional limitations and depressive syndromes are found to predict the use of home

help services and institutionalization (Larsson et al. 2006). Older women are found to have higher prevalence of reported chronic conditions, and it is known that during the period preceding death older women have more problems in functioning than older men (Lentzner et al. 1992). Dementia, for example, is more prevalent among women (Brayne et al. 2006). In Finland in year 2001 almost 70% of all dementia patients in health and social services were patients in residential care (National Research and Development Centre for Welfare and Health 2007). These factors are likely to contribute to longer stays in residential care and fewer transitions, and also to the places of death among women.

Yet medical reasons are not the only factors influencing the pathways of care; social and psychological circumstances are also likely to be important. Living alone, having low income and being very old are associated with institutionalization, while being younger and having a spouse are associated with transition from institution to home (Martikainen et al. 2009). Men have been found to receive informal care and help more often in everyday life than women (Jylhä et al. 2007), which undoubtedly relates to the fact that men are less likely to live alone (Orfila et al. 2006, Suominen-Taipale et al. 2006) and have more often a living spouses as informal help: the probability of not being institutionalized is highest among people who have a spouse, and the relative protective effect of living with a spouse seems to be even stronger in men (Nihtilä and Martikainen 2008).

The major strength of this study is its use of large national registers and the use of personal identification numbers to identify every individual. Every citizen in Finland has a personal identification number as a personal code which remains unchanged throughout his/her life. This enables us to reliably monitor the personal data and individual use of care services from different registers. Our sample included register data on all of those who died in Finland at the age of 70 or older during 1998 and 40% of those of this age who died 1999–2001 and represents well all Finns who died at this age. The responsibilities of different health and social care organizations has not changed and the Finnish health and social service system has not experienced drastic reforms during the last decade (Vuorenkoski 2008) that would jeopardize the validity of our results. Aro et al. (1990) studied the accuracy of the Finnish Hospital Discharge Register by comparing register data with corresponding medical records. The dates of admissions and discharges were 96% accurate, while the speciality field of care was 91% accurate. The majority of problems in accuracy were due to insufficient recording by care professionals and inaccuracy of 1–2 days in exact dates of admissions and discharges. Since that time, the registers have not changed but with developing practices

the coverage and reliability are likely to have improved. In all, the coverage and reliability of the data are good.

A major weakness is that information about informal care is not available in our data. In addition medical history could not be included in this study. These are likely to explain a great part of the variation in transitions and places of death. With these two limitations, the findings of the study must be interpreted with caution. In future, analyses of the pathways of care according to the major causes of death on the one hand, and the different pathways leading to different places of death on the other could improve our understanding of the variation in the patterns of care at the end of life.

In conclusion, places of death and pathways of care in the last 2 years of life among people aged 70 or older are extremely variable and differ between age groups and genders. Some people spend at least the last 2 years of their lives in the same care facility. Most people experience several transitions during their last years and the frequency of these moves increases with approaching death. This means an increasing number of transitions between settings at a time when the patient is perhaps at the most vulnerable stage of his or her life. Although the transitions in part probably reflect an adequate response to diverse health and care needs, it is possible that they also indicate problems in the integration of care, in collaboration between different services, and in the competence of service providers to treat the multiple problems of old age. Better understanding of the factors underlying transitions are needed to evaluate their effects on the quality of the last years of life in old age.

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