Eur J Population (2008) 24:347–362
DOI 10.1007/s10680-007-9144-4

Cohort Changes in the Incidence of Care Need in West Germany Between 1986 and 2005

Changement entre générations dans la transition vers la dépendance en Allemagne de l'Ouest entre 1986 et 2005

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Received: 15 May 2007 / Accepted: 9 October 2007 / Published online: 22 November 2007
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Abstract In Germany, the share of the older population has been continuously growing. Is the increase paralleled by a rising number of frail people, however? In search of an answer, we analyse the development of care need incidence in West Germany between 1986 and 2005 on the basis of longitudinal data from the German Socio-Economic Panel (SOEP). The results show a lower transition risk to care need for each successive cohort when all degrees of care need are taken into account. However, no change occurs when only severe care need is measured.

Keywords Care need · Education · Family status · Germany

Résumé En Allemagne, la proportion relative de personnes âgées ne cesse d'augmenter. Cette tendance s'accompagne-t-elle d'une élévation de la proportion de personnes dépendantes? Afin d'explorer cette question, nous analysons le processus de transition vers la dépendance en Allemagne de l'Ouest entre 1986 et 2005, à l'aide des données du Panel Socio-Economique Allemand. Les résultats indiquent une abaissement du risque de transition entre les cohortes les plus anciennes et les cohortes les plus récentes, quand tous les degrés de dépendance sont pris en compte. Toutefois, on n'observe pas de changement pour ce qui est de la dépendance la plus lourde.

Mots-clés Entrée en dépendance · Éducation · Situation familiale · Allemagne

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1 Introduction

The German population is ageing. Of the total population, 14% was aged above 60 in 1950 and only 1.0% was older than 80. By 2006, the corresponding figures had increased to 24 and 4.6%, respectively, and it is estimated to rise further, reaching 40 and 14.6% by 2050 (Statistisches Bundesamt 2006). However, the assumptions of the Statistical Office on life expectancy that underlie these projections must be seen as conservative. It is very likely that life expectancy in Germany of 2050 will be higher than currently assumed (Oeppen and Vaupel 2002).

Is Germany's population ageing inevitably accompanied by an increase in the number of frail people? Three hypotheses have been developed in response to the question: the expansion-of-morbidity hypothesis (Gruenberg 1977; Kramer 1980; Olshansky et al. 1991; Verbrugge 1984), the compression-of-morbidity hypothesis (Fries 1980), and the hypothesis of the dynamic equilibrium (Manton 1982). Neither a consistent pattern for countries nor for time was demonstrated. From recent studies, however, we know that a positive conclusion on the development of health in various countries can be drawn (Crimmins et al. 1989, 1997; Doblhammer and Kytir 2001; Robine and Romieu 1998). For an international review about disability trends among elderly people see e.g., Jacobzone et al. (2000); Robine et al. (2003); Waidmann and Manton (2000). While Jacobzone et al. (2000) project a compression of morbidity in OECD countries, Robine et al. (2003) point out that the levels of disability have changed, expressed in the decline of the most severe levels and in the increasing prevalence of the less severe levels. This would support Manton's dynamic equilibrium hypothesis (1982). However, many studies show that the results on disability levels and trends depend on the variable used (e.g., Unger 2006; Freedman et al. 2004; Doblhammer and Kytir 1999; Robine and Michel 2004).

Klein and Unger (1999, 2002) and Unger (2006) show for Germany that the growth in life expectancy is accompanied by an increase in absolute and relative disability-free years. This article explores the trends in the incidence of care need in West Germany over the 1986–2005 period, using data from the German Socio-Economic Panel (SOEP). From the various disability measurements, we chose self-reported care need as we want to specify people who are dependent on the help of other people. The development of care need has an enormous impact not only on the affected people but also on the health economy and on people who take on care responsibilities—family members and professional carers. Before 1995, care was primarily the responsibility of the family. Only in very severe cases did the state cover care expenses, financed by taxes (Theobald 2004). In April 1995, Long-Term Care Insurance (LTCI, *Pflegeversicherung—SGB XI*)) was introduced in Germany. It introduced allowances for home care and, in July 1996, allowance payments were extended to nursing home care. Of the German population, 90% are covered by public care funds and about 9% by private care funds. We thus need to be aware that our results may be influenced by the above changes, in terms of both the definition of care need and of the proportion of disabled people cared for at home and in institutions.

2 Data and Method

2.1 Data

We use data from the yearly SOEP panel study to analyse changes in the incidence of care need in West Germany between 1986 and 2005. The panel study started in West Germany in 1984, based on 5,921 households and surveying a total of 12,290 people aged above 16. In 1990, the panel was extended to include East Germany, adding 2,179 households and 4,453 people. The question on self-reported care need has been included since 1985. Our analysis time starts one year later, in 1986, however, as we want to analyse the incidence of care need. A total of 3,352 persons aged 60+ were observed in the 1986–2005 period. Of these, 1,511 (45%) were males and 1,841 (55%) were females.

The data from the SOEP consist of several samples: Sample A, "Residents in the FRG" and sample B, "Foreigners in the FRG" exist since the start of the SOEP in 1984. A sample for East Germany and refreshment samples were added later (Haisken-DeNew and Frick 2002). We limit our analyses to sample A.

In longitudinal data sets, panel mortality is an unavoidable problem. On the one hand, death results in natural panel attrition. On the other, there are many losses due to response refusal. The losses are problematic if they evolve from systematic non-response. It can be assumed that people that suffer severe ill-health are more often unable or unwilling to participate in the interview. Looking at the influence of ADL-disability on panel mortality in the SOEP between 1984 and 1999, Unger (2003) found only a small difference between healthy and disabled people (6.74 and 7.91% per year).

We assume that the influence of dropouts due to care need is less biased because the question on care need is included in the household questionnaire. On the one side, this is problematic because for households that have more than one member, it is not clear whether or not the information on care need is self-reported or constitutes a proxy-answer. It is difficult to estimate the differences from the way in which people in need of care or caregivers answer the question. Furthermore, the proportion of self-reported vs. proxy interviews is not known and the effect of a possible change in this proportion is hard to tell. This is because the direction of change is unclear (Freedman et al. 2004). On the other side, the information about care need is not lost for people in need of care who dropped out of the personal interview and who do not live alone since a household member still participates in the panel and fills in the household questionnaire.

All in all, 3,352 people spent 27,551 person-years during the analysis period. We included three time-constant and seven time-varying covariates in our model. The time-constant variables are cohort, sex and education. The cohorts are divided into five groups: persons born (1) 1893–1905, (2) 1906–1915, (3) 1916–1925, (4) 1926–1935 and (5) 1936–1944. Persons born in 1945 turned 60 in 2005; however, they cannot enter our data as healthy and at the same time transit to the unhealthy state. Thus the cohort born in 1944 is the youngest included. Education was grouped into three categories: (1) missing, (2) low education (with no school-leaving certificate or a maximum of 8/9 years of schooling) and (3) intermediate

or high education (with 10 or 12/13 years of schooling, with a certificate)[1]. The proportion of people who have no or just basic education is high. This is not surprising given that nearly all people completed their education before the expansion of education in the 1960s (Konietzka 1999). The time-varying variables are income, house-ownership, region, marital status, having a partner or children and the number of persons per household. 'Income' was measured as the imputed net equivalent personal income per annum. It was divided into about three equal groups: (1) below 10,000 Euro, (2) 10,000 to 15,499 Euro and (3) 15,500 Euro and above. To analyse regional differences, the states of Hamburg, Bremen, Berlin, Schleswig-Holstein, Niedersachsen, and Nordrhein-Westfalen were grouped into the region 'Northwest'; the states of Hessen, Rheinland-Pfalz, Saarland, Baden-Württemberg, and Bayern were categorized under the region 'Southwest'. Table 1 below displays the time spent (in %) in the corresponding categories for each variable.

The question available to analyse care need in the SOEP is the following: "Does someone in your household need constant care due to old age or illness?", a question that has been posed ever since the start of SOEP in 1985. If the answer was 'yes', a second question was put to the respondents, differentiating between five grades of care need: (1) errands outside the house, (2) running the household (including preparing meals and drinks), (3) daily tasks in the household, (4) simple personal care (dressing, washing, etc.) or (5) difficult personal care (getting in and out of bed, bowel movement etc.). The possible answer categories changed over time, however: from 1985 to 1990, categories 1, 3 and 5 were available, and since 1991 there have been four categories to choose from (1, 2, 4 and 5). For the purpose of our analysis, we used all of the degrees of care need (1 to 5). The changes in the answer categories in 1991 should have no influence on the analysis. This is because the general question if care need exists or not was asked first, and only then was the grade specified.

A disadvantage of the panel is that it only includes private households. We do not have information about people in need of care who live in institutions. This population is different from people in need of care in private households: usually they are older, have a more severe care need, and less often have a partner or children able to look after them when they are in need of care. Although the institutional population is not included in the SOEP, people who move to an institution are followed. However, this applies only to seven individuals of our sample (of whom four changed to the care-need status; the results did not change when we excluded them from the analysis). The number is very low and may be caused by a high dropout rate or a care-event occurring before moving into an institution. If a proportional sample had been included in the panel, we would have been able to explore whether or not a possible change in the risk of care is caused by a change in composition of private and institutional households. Between 1991 and 2005, the proportion of people in need of care in institutional homes increased only slightly, i.e., from 29 to 32% (Schneekloth et al. 1996; Statistisches Bundesamt 2007).

[1] The categories are classified according to the German school system: 8/9 years: *Volksschule* or *Hauptschule*, 10 years: *Realschule* (East Germany: *Polytechnische Oberschule*) 12/13 years: *Gymnasium* (East Germany: *Erweiterte Oberschule*).

Table 1 Person-years and time spent in % by characteristics of the respondents

Variable	Person-years	%
Cohort		
1893–1905	665	2%
1906–1915	4,135	15%
1916–1925	9,170	33%
1926–1935	9,772	36%
1936–1944	3,809	14%
Sex		
Male	11,729	43%
Female	15,822	57%
Marital Status		
Married	17,622	64%
Widowed	7,485	27%
Single	966	4%
Divorced	1,478	5%
Partner		
Yes	18,191	66%
No	9,360	34%
Children		
Yes	21,842	79%
No	5,709	21%
Household Size		
1 Person	7,817	28%
2 Persons	15,776	58%
3+ Persons	3,958	14%
Region		
Northwest Germany	12,870	47%
Southwest Germany	14,681	53%
Education		
Missing	712	2%
No/Low Degree	19,455	71%
Intermediate or high degree	7,384	27%
Income		
Low	9,439	34%
Medium	10,059	37%
High	8,053	29%
House-ownership		
Owner	15,899	58%
Tenant	11,652	42%

Source: SOEP, own calculations

2.2 Method

The event studied is the transition to care need, occurring the first time a person states being in need of care. People are censored when they are lost to follow-up or at the end of the survey period when they are still healthy. Due to the panel structure of the data, the cases are left truncated in 1986 for pre-1926 cohorts. Those who turned 60 after 1986 entered the study in the year they turned 60. As we started in 1986, we excluded prevalence cases, i.e., persons who were already in need of care in 1985.

An event-history analysis is applied to the longitudinal data. To measure the age-dependent hazard of care $\mu_0(x)$ multiplicative intensity-regression models are estimated. The process starts when people are healthy and at least 60 years of age. It ends when an event occurs i.e., when they become dependent on care. It ends without an event when people die, drop out due to panel attrition or when they are still healthy at the end of the observation period. To estimate the intensity of care need at age x, we use a Cox proportional hazard model of the form:

$$\mu(x) = \mu_0(x) * \mathrm{e}^{z_1\beta_1 + z_2\beta_2 + z_s\beta_s} \tag{1}$$

where $\mu_0(x)$ is the baseline hazard and β_i, $(i = 1, 2, \ldots, s)$ are the parameters of the covariates z_i. We also tried parametric specifications of the baseline hazard (Weibull, Gompertz). However, in both cases the fit of the model baseline hazard to the empirical hazard is not satisfactory. In addition, we estimated a logit model since all measurements are equally spaced with one-year time-intervals. We only present the results from the Cox-model that do not differ from the logit model.

The parameters are estimated by maximising the likelihood function. Survival functions are estimated with Kaplan–Meier survival curves. The differences in the survival function were tested with the log-rank test for equality of survivor functions and the Wilcoxon (Breslow) test.

3 Results

The incidence of care need is primarily a function of age (Fig. 1) and increases almost exponentially with age. This is true for both sexes up to age 84. Among males it decreases after this age whereas it continues to grow among females.

3.1 Kaplan–Meier Survival Function

Between 1986 and 2005, of the 3,352 people followed, 536 declared having become dependent on care. The most important finding is that the care need risk decreases for each successive cohort. This can be seen in Fig. 2, which shows different starting ages. The figure displays the Lexis diagram of the analysed cohorts together with the Kaplan–Meier survival curves. Below each graph is the corresponding Lexis-diagram. The graphs display the age over time each 10-year cohort contributed to the analysis. For example in Graph A2, Cohort 3 (born between

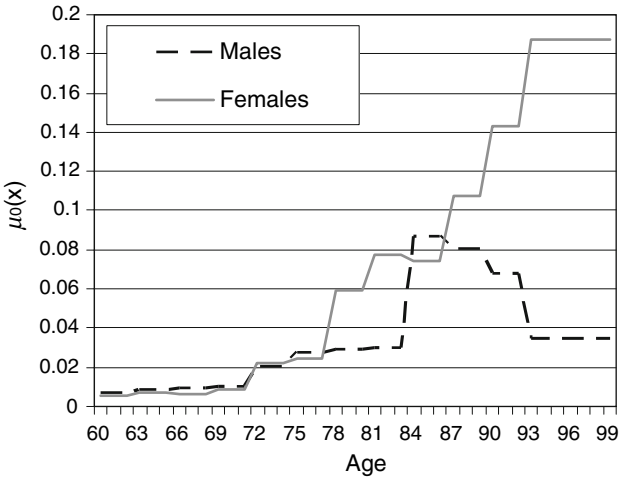

Fig. 1 The effect of age on the incidence of care need ($\mu(x)$) (occurrences divided by exposures) in the SOEP data

1916 and 1925) is already older than 60 in 1986. When the cohort entered the study in 1986, the age ranges from 60 to 71. In 2005, the cohort was 80 to 90 years of age. It is compared with Cohorts 4 and 5, who entered age 60 between 1986 and 1995 (C4) and 1996 and 2005 (C5) respectively. Graph B2 compares the same Cohort 3 with Cohorts 2 and 4. Here, the age of analysis starts at 70. The youngest birth cohort thus entered in 1986, the other cohorts reached age 70 by 1995. In 2005, this cohort was aged between 80 and 90. In each of the three graphs above the Lexis-diagrams (A1, B1, C1), the survival without care need is displayed for three cohort groups that have the same starting age of 60, 70 and 80 years, respectively. In A1, the youngest cohorts (3, 4 and 5, starting from age 60) can be seen, B1 shows the three middle cohorts (2, 3 and 4 from age 70) and C1 displays the oldest cohorts (1, 2 and 3 from age 80). We see that until age 80 (Graph 1a and 1b), successive cohorts have a better survival without care need, which is statistically significant (log-rank test for equality of survivor functions: $p_{1a} = 0.000$ $p_{1b} = 0.024$ $p_{1c} = 0.391$; Wilcoxon (Breslow) test: $p_{1a} = 0.000$ $p_{1b} = 0.035$ $p_{1c} = 0.662$).

3.2 Multivariate Survival Model

Table 2 presents the results of the multivariate model based on Eq. 1 where all covariates are included. A strong positive cohort effect can be seen: compared with Cohort C4, Cohorts C3, C2 and C1 have a 41, 37 and 33% higher risk of care need. The last cohort, C5, has a 42% significantly lower risk than C4. Each successive cohort has a lower transition risk (which is not significant for the oldest cohorts, C1). When cohort is included as a continuous variable (not displayed here), a 1.1% decrease in the risk of care need for each successive birth year can be seen; however, the decline is not significant at conventional significance levels

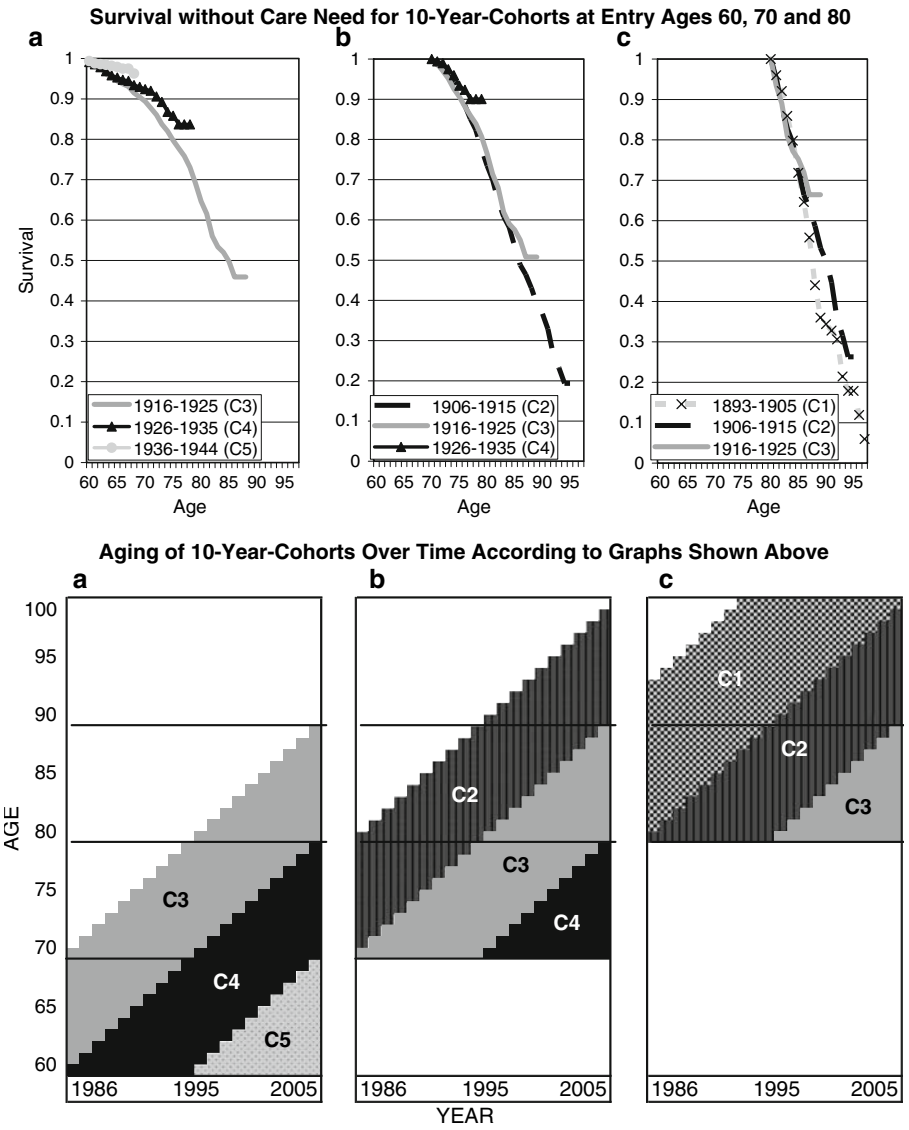

Fig. 2 Survival without care need for 10-year cohorts at entry ages 60, 70 and 80

($p = 0.20$). In addition to cohort, some of the other covariates included influence the risk of care need. Compared to individuals with no or low education, those who have a higher education have a 24% significantly ($p = 0.01$) lower transition risk. A low income increases the risk by 25% ($p = 0.03$) compared to individuals with a medium income. A high income no longer has a significant effect. Renting living space increases the risk by 43% ($p = 0.00$) compared to people who live in a house or flat of their own. Those never married have a 29% ($p = 0.33$) lower risk, the risk of the widowed is lower by 1% ($p = 0.96$), but for the divorced it is 22% ($p = 0.53$)

Table 2 Relative risk of care for people above age 60 in Germany 1986–2005

	Model 1	*p*
Cohort		
1888–1905 (C1)	1.33	0.29
1906–1915 (C2)	1.37	0.10
1916–1925 (C3)	1.41	0.02
1926–1935 (C4)	1	
1936–1944 (C5)	0.58	0.07
Sex		
Male	1	
Female	1.10	0.36
Marital status		
Married	1	
Widowed	0.99	0.96
Single	0.71	0.33
Divorced	1.22	0.53
Partner		
Yes	0.65	0.16
No	1	
Children		
Yes	0.79	0.03
No	1	
Household size		
1 Person	1	
2 Persons	1.60	0.00
3+ Persons	2.05	0.00
Region		
Northwest Germany	1	
Southwest Germany	1.03	0.70
Education		
Missing	0.64	0.19
No/low Degree	1	
Medium or High Degree	0.76	0.01
Income		
Low	1.25	0.03
Middle	1	
High	1.08	0.53
Home-ownership		
Owner	1	
Tenant	1.43	0.00
−2 log likelihood	6,761.68	

Source: SOEP

higher than the risk for married people. However, the results are not significant since the groups are very small. More important are the variables on the partner, on the children and on the number of people in the household: those who live alone have a 35% ($p = 0.16$) lower transition risk compared with people who live with a partner, and people with children have a 21% ($p = 0.03$) lower risk compared to childless people. The household size is very important, too: when two persons live in the same household, the risk increases by 60% ($p = 0.00$), and for three and more persons it rises by 105% ($p = 0.00$) compared to individuals who live alone. No significant difference in the care need transition is evident by sex and region.

In another model (not shown), we calculated a model that includes only the most severe degree of care need: (5) difficult personal care (getting in and out of bed, bowel movement etc.), which is available for all years. A total of 200 persons transited into this category during the analysis period. However, we do not find a significant change over time for successive cohorts.

4 Discussion

Our study shows a decrease in the risk of care need for younger cohort groups. Controlling for age, this means that successive cohorts have a lower transition risk to care need. This is the first study that analyses trends in care need in Germany on the basis of a longitudinal data set. Other trend studies on health in Germany have been conducted by Klein and Unger (2002) and Unger (2006). They have different definitions of disability from the SOEP, using data waves from 1984 to 1998 and from 1984 to 2003. Dinkel (1999) uses data from the German Microcensus and attests for West Germany an increase in active years between 1978 and 1995. All results are consistent, showing a positive development in active life expectancy.

What has caused the decline in the transition risk? One explanation may be that panel attrition is unequally distributed over cohorts. In particular, if younger cohorts experience higher panel attrition than older cohorts, the improvement in the transition risk may be primarily the result of this confounding effect. In order to explore this possibility, we looked at panel attrition in our data by cohort. We distinguished between dropout due to mortality and dropout due to other reasons. We find that younger cohorts have, as expected, lower mortality but also lower panel attrition resulting from migration and panel loss. Therefore, more frail people stay in the panel in the younger cohorts than in the older ones, so the reduction in the transition cannot be an artefact of panel attrition. On the contrary, the difference between the cohorts may even be larger than we have shown in our analysis.

To exclude the effect of the introduction of the Long-Term Care Insurance, we calculated another model using different period categories and still found a steady decrease in the transition risk, and not only for the reference period. Thus, the decrease does not seem to result from a policy effect.

The question arises whether or not real improvements in the health status occurred or whether diseases became less disabling thanks to medical advances and to the development of special assistive devices for daily living. Evidence exists for both factors. Firstly, the incidence of major disabling diseases has declined over the

past decades, e.g., for stroke (Carandang et al. 2006) or cardiovascular disease in general (Sytkowski et al. 1996). For the incidence of another disabling disease, dementia, no improvements have been found (Bickel 2003). However, not many trend studies exist so far and methodological problems might have influenced the results. Secondly, some studies (Robine and Michel 2004; Robine 2003) show that for several countries, the reported prevalence of chronic diseases is increasing, whereas reported functional limitation or severe disability is declining. One explanation for the contrasting trends may be that the management of severe diseases has improved due to medical advances. Additionally, Freedman et al. (2004) found an increase in the use of assistive devices for daily living, and this may have improved quality of life with moderate care need.

We find a transition risk to care need that is the same for males and females. From the literature, however, it is widely known that women spend a higher proportion of their lives with disability (e.g., Robine et al. 2003; Unger 2003). The higher prevalence of disability also translates into higher care need prevalence. Data from the Ministry of Health and Social Security and results from a study on care need in private households in Germany (Schneekloth and Leven 2002) show that in 2002, of the 1.3 million people in need of care at home, 64% were women. Using the SOEP data, the higher prevalence of women is confirmed (Doblhammer and Ziegler 2006). The higher prevalence, however, does not imply higher incidence rates, since women live longer than men. The literature often supports our results (Leveille et al. 2000); however, a recent meta-analysis shows that more often higher incidence rates for women are found (Doblhammer et al. 2007). After age 85, the incidence of care need continues to increase for females but it declines for males. One explanation is selection: whereas women survive for longer with frailty, men die earlier. Those who survive to high ages are usually fitter than average and therefore have a lower risk of becoming disabled. It is well known from the literature that being married is particularly beneficial to male health (Hu and Goldman 1990). Another explanation thus may be that men at these advanced ages still have a partner, while women are mostly widowed. We assumed that differences within the country (e.g., lower unemployment rates in southern Germany and the resulting higher prosperity, and a slightly higher life expectancy, especially in Bayern and Baden-Württemberg) results in differing transition risks. However, our study shows no difference between the North and the South of West Germany.

Socio-economic status is an important risk factor of disability (Doblhammer and Kytir 1999; Doblhammer et al. 2007; Klein 1999; Mackenbach et al. 1997; Mielck et al. 2000; Siegrist 1999; Unger 2003), so we expect that it also has important implications for the incidence of care need. We include several indicators in our analysis: education, income and home-ownership. All of the three indicators show a lower transition risk with increasing socio-economic status. People with intermediate or high education, who live in a home of their own and have a medium income have a risk that is significantly lower by 24, 30 and 19%, respectively, compared to people with low education or a low income or who rent their dwelling. This is consistent with other studies mentioned above. The social differences appear to be most distinctive between the ages 35 and 64, but they are still clearly seen in the retired population (Siegrist, 1999). Various reasons account for this fact. Groups

with a lower socio-economic status are faced with higher financial constraints, so they often live in below-average housing environments. They are more disadvantaged in terms of working conditions, have an unhealthier lifestyle (e.g., smoking, nutrition, alcohol, less exercise), and are exposed more often to socio-economic and psycho-social distress. Other authors have analysed education separately (Klein 1999; Mackenbach et al. 1997; Unger 2003). Most importantly, higher education seems to lead to a greater awareness of the importance of prevention and health. Healthier lifestyles, healthier nutrition, regular exercise and regular medical checkups are more common among higher educated people; smoking and excessive alcohol use are less prevalent.

Other important determinants of health at older ages are the family situation in terms of marital status, the household size, having a partner or having children (Gaymu et al. 2006; Unger 2003). Our results show no effect of the marital status, a protective effect of partners and children, and an increasing risk as the number of household members rises. Compared to people who live alone, people who live with one person or more than one person have a 63 and 128% higher transition risk to care need, respectively. Naturally, here the additional people in the household do not constitute risk factors of care need. Since the SOEP does not include the institutionalised population, the results indicate that patients have the opportunity to stay at home, where they are provided with care need as a family network exists that can support the ill person. As long as older people are healthy, they are better able to live at home independently. If they are in need of care, the presence of a partner, children or other relatives determines whether the elderly can rely on private care arrangements at home or whether institutional help is needed. This is reflected by the fact that the risk increases with a rising number of household members. The spouse is most often the main caregiver. If a person is living alone but has children, the latter are likely to take on this task (e.g., Bundesministerium für Familie, Senioren, Frauen und Jugend 2002; Wagner and Wolf 2001). This is a possible explanation for the stable risk of severe care need and the decreasing risk of less severe levels. Maybe the support situation has improved such that the more fragile persons are more often looked after at home. We do not find significant results for the marital status, however. The findings indicate a lower risk of the widowed and especially of those never married, whereas divorced persons have an increased risk. However, the number of divorced and single persons is small. These findings are inconsistent with a large number of studies. Generally, marital status differentials in mortality and morbidity show a lower risk for the married than for the unmarried. The advantage of the married is explained either by a protection hypothesis—married people have a better-ordered life, a healthier lifestyle and greater emotional balance and support resulting from having a partner (Klein 1999; Unger 2003)—or by a selection hypothesis, where healthier people are assumed to have better marriage opportunities (ibid.). Findings from Klein (1999), Klein and Unger (2002), and Unger (2003) for Germany do not show a very clear result, but they point towards a protection effect of (a longer existing) marriage. Brockmann and Klein (2004) attest both a selection and a protection effect for married people. Since the number of people in the household is controlled for, the results on the presence of a child or a partner may be real effects, reflecting the effects described for the marital

status. People with a partner or children have a 43% ($p = 0.07$) and 19% ($p = 0.04$) lower transition risk to care need than people without a partner or without children. An indirect effect of living with a partner or others may result from the positive influence of social networks, which are crucial in terms of support in case of care need. Analyses show that the social network becomes smaller with increasing age (Wagner and Wolf 2001) and that the proportion of relatives in this network becomes larger.

A large body of research shows that health and mortality are partly determined by the environment early in life (Barker and Osmond 1986; Bengtsson and Lindstrom 2001; Doblhammer 2004; Forsdahl 1977). Some authors even argue that the reduction in inflammatory exposure early in life is the driving force behind increasing life expectancy over the last century (Finch and Crimmins 2004). This claim, however, is strongly contested by others (e.g., Barbi and Vaupel 2005). In our analysis, the last cohort we observe is the 1944 birth cohort. The living standard has improved substantially since 1944. Infant mortality, a widely used indicator of the health environment early in life (Barbi and Vaupel 2005) has dropped to lowest levels. Thus, we expect that the health status of the future elderly will be even better than that observed today. Some reservations concerning future improvements in the health status have been raised due to an increasing prevalence of obesity (Olshansky et al. 2005), which may have a counter effect. A recent meta-analysis of disability risk factors shows (Doblhammer et al. 2007) that obesity increases the risk of disability but the study does not find an effect on mortality.

We need to acknowledge that it is not clear from our results whether or not the reduction in care need implies a compression of care need. The increase in life expectancy may lead to an increase in healthy life years and at the same time it may produce an even stronger increase in life years with care need. For a compression to take place, the healthy life years, however, have to increase not only in absolute but also in relative terms, which cannot be seen from our analysis. The costs of future demands for care need depend partly on future trends in health. However, a compression of morbidity is not necessarily accompanied by a compression of health care costs. Many studies show that it is not the chronological age but the last year of life that is the most expensive (Lubitz and Riley 1993; Yang et al. 2003; Zweifel et al. 1999). Thus, an ageing population does not have the highest influence on costs; the major driving cost factor is technological advancement (Cutler 2006; Niehaus 2006).

5 Conclusion

Our analyses show a decrease in the transition risk to care need for successive cohorts in West Germany. One drawback, however, is that only private households are included in the SOEP and that a differential selection effect into institutions over time cannot be excluded. Therefore, further research on the total population, including people who live in institutions, is needed.

Our results show positive effects for all of the three variables that measure socio-economic status. A high socio-economic status is associated with a good financial

situation, good housing conditions, a good working environment, little socio-economic and psycho-social distress and a healthier lifestyle. The overall improvement of the socio-economic situation for most people may therefore also lead to better health. Today's elderly were raised under better living conditions early in life and increasingly have higher education than previous cohorts. This will also apply to the elderly of the future. Higher education raises the awareness of the importance of healthy behaviour in the population. Fewer and fewer male cohorts participated in the war and are thus weakened by injury. Medical advances have improved the quality of life at all ages. The total number of people in need of care will rise as the elderly population increases. However, the number of people in need of care may increase more slowly than the total elderly population. The abovementioned factors appear to indicate that care risk in Germany is declining due to improved health, that the years gained in life expectancy are spent in good health, and that this trend will continue into the future.

Acknowledgements The data used in this publication, the German Socio-Economic Panel (SOEP), was made available by the German Institute for Economic Research (DIW), Berlin. The study is financed by "FELICIE: Future Elderly Living Conditions In Europe", a project carried out under the 6th Framework of the European Commission. We are very grateful to Michaela Kreyenfeld for her help with the SOEP data and to Gunnar Andersson and Roland Rau for useful comments and suggestions on previous versions of this article.

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