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Review

The demography and epidemiology of dementia

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ABSTRACT

Against the background of population ageing and the moving of the baby boomer cohorts into the highest ages, Germany will face a rising number of dementia cases. A brief summary of the past and future demographic development as well as a discussion of the explaining factors of the age-specific trajectory of dementia prevalence rates based on routine claims data from the public sickness fund AOK are given. A forecast estimates the future number of dementia cases in Germany in 2050. Seventy percent of the increase are due to the rising life expectancy, while 30% are the result of the changing age structure of the German population.

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1. Introduction

Increases in life expectancy will determine the future number of dementia cases. The ageing of the baby boomer cohorts will also contribute heavily to the number of dementia sufferers, while reductions in the prevalence of dementia are unlikely to have much impact on the total number of cases. We present these findings in this article, which focuses on future demographic developments in Germany, a country facing issues similar to those faced by many European and industrialized countries around the world. However, Germany stands out as a forerunner of population ageing in Europe, with one of the oldest populations on the continent (United Nations, 2011). We also present population-based estimates of prevalence rates of dementia up to the highest ages, and discuss the factors that may explain the trajectory of the age profile. Finally, we present different scenarios for future growth in the number of dementia cases, and estimate the separate effects of life expectancy, population ageing and dementia prevalence.

2. Demographic development

Demographic developments in Germany are primarily shaped by the ageing of the population. In recent decades, the main reasons for the changes in the age structure have been increasing life expectancy (Oeppen and Vaupel, 2002), followed by the effects of the continuously low birth rate, which has in turn resulted in an ever lower number of births (Preston et al., 1989). Meanwhile, living conditions and medical care have been improving and mortality has been declining, particularly among the old and

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oldest old (Christensen et al., 2009). Today an 80-year-old German woman has the same remaining life expectancy as her 75-year-old counterpart would have had 50 years ago. Her probability of dying at age 80 has more than halved. In 1871/81, life expectancy in Germany was 35.6 years for men and 38.5 years for women. By 2009/11, life expectancy had increased sharply for both sexes, to 77.7 years for men and 82.7 years for women (Statistisches Bundesamt, 2012a, 2012b). This remarkable upward trend in life expectancy was interrupted only briefly during this period, by the two World Wars and by the Spanish Flu in 1918. Previous research has shown that best-practice life expectancy across countries has been steadily increasing by three months per year for 160 years. There has been no deceleration in the increase in record life expectancy, and the rise has been steady and almost linear (Oeppen and Vaupel, 2002). Newer findings indicate that, when cohort rather than period life expectancy is considered, we see an even greater increase in record life expectancy, of more than five months per year (Shkolnikov et al., 2011). Germany follows this pattern, albeit at a lower level. Regardless of how it is measured, a further increase in life expectancy is expected for both the best-practice countries and for all other (developed) countries.

The natural decline in the German population started in 1972, and was only compensated for by international immigration. Since 2003, the deficit in the number of births has no longer been compensated for by migration, and the population has therefore been shrinking. The German Federal Statistical Office has forecast a further decline in the German population, from 81.7 million in 2009 to about 69.4 million in 2050, depending on the assumptions regarding fertility, mortality and migration (Statistisches Bundesamt, 2009). This reduction in population size is attributable primarily to the shrinking of the young and middle age groups, even as the share of older people steadily increases. In 2011, young people below the age of 20 made up just 18% of the total population, while 61% were aged 20 to 64, 21% were aged 65 or older, and 5.4% were the oldest old (aged 80+). The current and the future age structure of the country will be primarily shaped by the very large baby boomer cohorts, who were born between the mid-1950s and the mid-1960s. In the coming years, these cohorts will move into progressively higher ages (Fig. 1). They will reach retirement age between 2025 and 2035, and 10–20 years later they will reach the ages at which the risk of needing care and developing dementia increases. In 2050, one out of three people will be older than 65, and 15% of the total population will be aged 80 or older. In absolute terms, this means that the number of people aged 80 or older will increase from 4.4 million in 2011 to 10 million in 2050. The share of young people in the population will then be only 15%, and the share of middle-aged people in the population will be of about 52% (Statistisches Bundesamt, 2009).

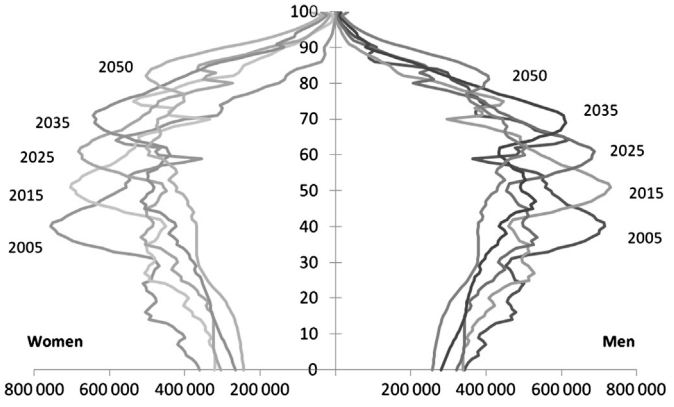

Fig. 1. Population projections.
Source: Federal Statistical Office, 2009

These demographic developments will have large repercussions for the future number of dementia cases, and, just as important, for the number of potential care providers. As the number of dementia cases is predicted to increase, Germany may face a severe shortage of formal and informal care providers in the near future (Doblhammer and Ziegler, 2010; Doblhammer et al., 2012; Schulz, 2010).

3. Prevalence of dementia

3.1. Data and method

In Germany, an important data source for dementia analysis—which has only recently become available—are routine claims data of the largest public sickness fund, the AOK. The AOK covers about one-third of the German population, and up to 50% of the population at higher ages (Schulz and Doblhammer, 2012). The data for each insured person contain information about ambulant (Section 295 (2), SGB V) and stationary (Section 301(1), SGB V) diagnoses and treatment. The estimates of the prevalence of dementia are based on the total AOK population. Dementia is coded on the basis of the ICD-10 classification (G30, G31.0, G31.82, G23.1, F00, F01, F02, F03 and F05.1). Two different data sources are employed: the dementia cases are used to derive the numerator, and the population at risk data are used to derive the denominator. All of the calculations are based on insured person-days, which are then transformed into person-years. Only valid dementia cases are included in the calculation. The internal validation procedure has been described in detail by Schulz and Doblhammer (2012). It consists of two steps, and only those diagnoses with a verified second occurrence are considered to be valid dementia cases. A case may be validated by co-occurring diagnoses by different types of physicians, concurrent diagnoses in the ambulatory and stationary sectors, or repeated diagnoses with at least two occurrences during a validation period. In terms of prevalence, the validation period consists of the period of analysis and the year before and after. We thus present prevalences for the year 2007 based on the validation period 2006–2008.

The data on the population at risk (denominator) contain the total number of AOK-insured person-days, aggregated by sex and age. The number of dementia cases (numerator) is based on total AOK claims data at the individual level. All plan members with at least one insured day between the first quarter of 2004 and the fourth quarter of 2008, and with a valid dementia diagnosis based

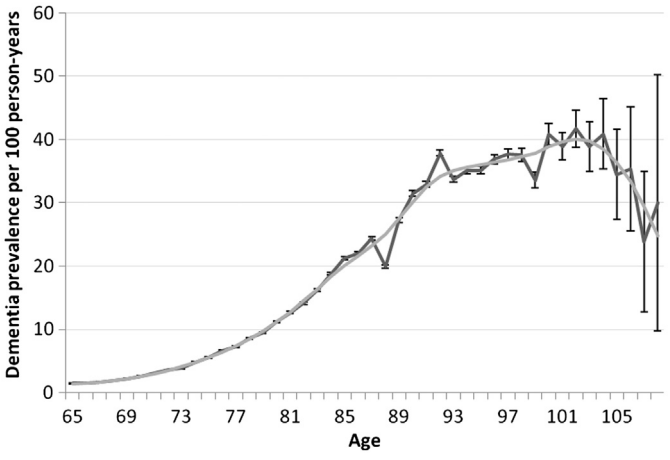

Fig. 2. Prevalence of dementia per 100 person-years and 95% confidence intervals for both sexes combined, smoothed by cubic splines, Germany 2007.
Source: AOK claims data, 2007