GBE KOMPAKT

ROBERT KOCH INSTITUT

Facts and Trends from Federal Health Reporting

Population ageing and its implications for healthcare

Key messages

- The proportion of elderly people (aged 65 and older) in the German population will rise from currently 21 % to 29 % in 2030.
- Population ageing leads to an increase in many chronic illnesses and in multimorbidity.
- More than half of people over the age of 65 suffer from one or more chronic illnesses.
- Demographic ageing has led to a sharp increase in the number of people being treated in hospitals, e. g. for a weak heart or prostate cancer.
- A demographically induced cost explosion in hospital inpatient treatment is (nevertheless) unlikely.

2/2012 3. Jahrgang

2012 is the European Year for Active Ageing and Solidarity Between the Generations. It will be marked by many activities in Europe aiming to make policymakers and interested parties more aware of the challenges of the demographic development and to identify the best ways to address them (European Union 2012).

The WHO's Health Day on 7 April 2012, with its motto »Ageing and Health: Good Health Adds Life to Years«, is also targeting the theme of healthy ageing. Growing old and being old does not automatically mean growing ill and being ill. However, the risk of falling ill does increase as we grow older. Population ageing leads to a higher incidence of chronic illnesses and multimorbidity (having several illnesses at the same time) and a greater need for nursing services, e. g. as a result of dementia. This edition describes what exactly population ageing is and what causes it. The implications of population ageing for healthcare are also explained using selected examples.

Why is the population of Germany ageing?

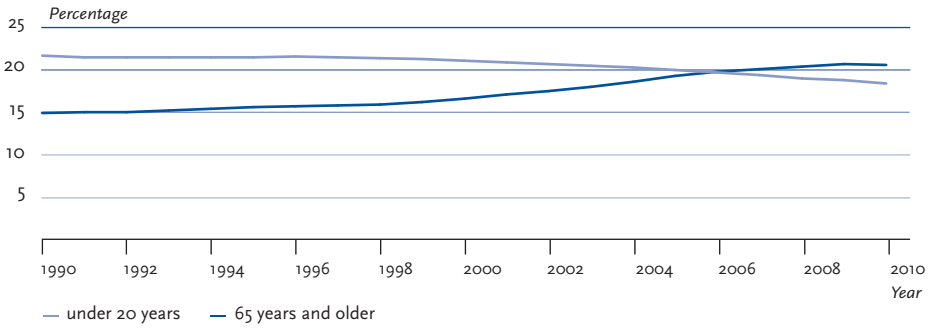
The average age of the German population has risen by 4.1 years to 43.6 years since reunification. At present a fifth of the population is 65 or older, compared to just under a sixth (15 %) in 1991. This phenomenon of a population's age structure changing in favour of older age groups (Figure 1) is referred to as population ageing. It must be distinguished from biological ageing, which every living thing and therefore every person experiences.

The public perception is that population ageing is a problem of the future. Yet it has already been evident since the 1970s. The ageing process will continue in the coming years, accelerating from about 2025 and continuing until 2040. The latest population projection by the Federal Statistical Office (version 2-W2) indicates that the proportion of elderly people (aged 65 and older) in the population will rise from the current 21 % to 23 % in 2020, and to 29 % in 2030 (Federal Statistical Office 2009).

The ageing of the population in a region has several causes; they include permanently low birth rates, a sustained increase in life expectancy, migratory movements, and given peculiarities in the age structure (Schwarz 1997).

Ever since the 1970s Germany has consistently had birth rates that are too low to replace the older generation. Another cause of ageing is rising life expectancy, which reflects both long- and short-term developments of health and morbidity, so that it can be regarded as the most general measure of the population's state of health. Life expectancy indicates how many more years a person of a certain age can expect to live on average under current mortality conditions (Table 1).

Figure 1
People aged 65 or older and under 20 as percentages of the overall population
Data basis: Statistisches Bundesamt (Federal Statistical Office), Population statistics



Life expectancy has risen by 8.5 years for female newborns and by almost 10 years for male newborns over the last 40 years. The gap between the life expectancy of female and male newborns, which had started to open up primarily from the middle of the 20th century, has been slowly closing since the 1980s.

Table 1
Development of mean life expectancy in Germany (years) by gender
Data basis: Statistisches Bundesamt (Federal Statistical Office)

	Life expectancy at birth		Further life expectancy from 65	
Period	female	male	female	male
1971/1973	74.1	67.6	15.3	12.1
1981/1983	77.1	70.5	16.9	13.2
1991/1993	79.0	72.5	18.0	14.3
2001/2003	81.3	75.6	19.6	16.1
2008/2010	82.6	77.5	20.6	17.3

Migration movements are age-selective, because the migration rate is particularly high or particularly low at certain stages of life (and hence age groups). Migration is particularly common when people are in vocational training or starting a family. On average migrants tend to be younger than the general population. Migration destinations have recorded migration gains in younger age groups, while the regions of origin have seen corresponding migration losses. For Germany as a country that has been recording migration gains from abroad for years, the effects of migration tend to slow down population ageing.

One of the reasons for demographic ageing in Germany that has been partially neglected up to now lies in the current age structure and its peculiarities. The numerical strength of individual birth cohorts varies greatly. These fluctuations are the result of historical events that have had a strong influence on the population. For example, the two world wars led to big dips in the age structure due to the number of war victims and sharp falls in birth rates. The birth rates rose again after the wars. Very high birth rates were recorded in 1959-1968. This generation, known as baby boomers, currently forms the numerically largest age group (Menning, Hoffmann 2009). As from 2025 the baby boomers will be reaching an age at which they will be retiring and when the risk of contracting a chronic illness begins to rise significantly.

The »ups and downs« of the birth rate and the resulting cohort strengths form a kind of wave motion. This is characteristic of population development in Germany. According to calculations by the Federal Institute for Population Research, this has contributed 69 % to population ageing in men and 64 % in women since 1991 (Scharein 2012).

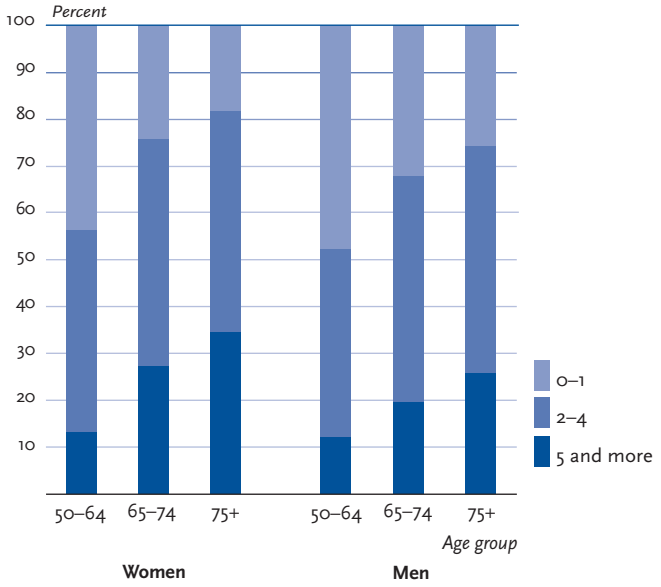
The individual risk of illness increases with age

People's individual risk of falling ill increases, the older they get; this also applies to the simultaneous occurrence of several chronic illnesses, known as multimorbidity (Figure 2). This picture is confirmed in a recent analysis by the Robert Koch Institute (Fuchs et al 2012). For example, only about one in five young adults have one or more chronic illnesses. Above the age of 65, however, more than

German Health Update (GEDA)

Data holder:	Robert Koch Institute
Objectives:	To provide up-to-date data on health-related issues, to analyse temporal developments and trends
Survey method:	Computer-assisted telephone interviews (CATI)
Population:	Residential population of Germany aged 18 and over
Sample:	21,262 women und men
Cooperation rate:	51.2 %
Survey period:	July 2008 to June 2009

Figure 2
Percentage of people suffering from several illnesses/complaints simultaneously by age and gender
Source: Fuchs et al. 2012
Data basis: GEDA 2009



half of all people suffer from (at least) one chronic disease (Figure 3).

The results of the 2008 German Ageing Survey show that the proportion of people in the 65-and-older age group who reported five or more diseases has declined (from 26 % in 1996 to 20 % in 2008). Conversely, the proportion of those with only one disease or none at all has gone up (Motel-Klingbiel et al 2010, Nowossadeck, Nowossadeck 2011).

The method of measuring multimorbidity by simply adding up the number of chronic diseases is increasingly being questioned, however. Unfortunately, to date there is no standardized method for measuring multimorbidity (Diederichs, Bartel, Berger 2011), so that there are no data for Germany that go beyond the simple addition method. However, research activities are ongoing with the aim of developing appropriate indicators (e. g. Holzhausen et al 2011, Diederichs, Bartels, Berger 2011).

Population ageing is associated with an increase in chronic illnesses

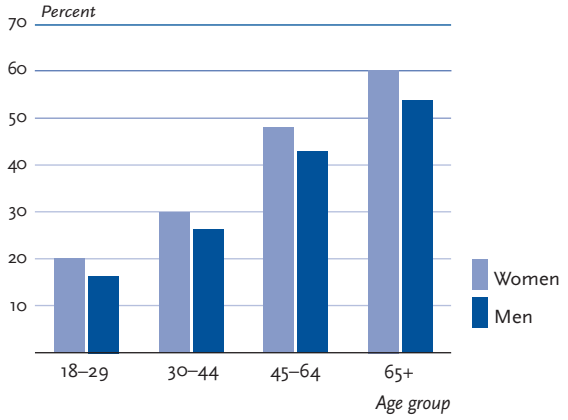
The combination of these two processes – i. e. »population ageing as a shift in the age structure in favour of older people«, and the »rising individual risk of illness as people grow older« – means that age-related chronic illnesses become more and more frequent in an ageing population.

These changes can only be clearly seen if data are available that have (a) been collected in the same way and (b) make it possible to make comparisons over longer periods of time. Population-based cancer registries provide such a data source; they contain information on the number of cancer sufferers, the number of new cases, and how these figures change over time. The Centre for Cancer Registry Data (ZfKD) at the Robert Koch Institute pools data from the whole of Germany that have been collected by the state (regional) cancer registries (Wolf et al 2011).

These data can be used to show in an exemplary manner how much influence is exerted on the development of the number of new cases of cancer by population ageing on the one hand, and the change in the individual disease risk on the other.

The most common sites of malignant neoplasms are the colon, the lung, the breast in women and prostate gland in men. Between 1999 and 2008 the number of new cases rose in all four of these sites, albeit to very different degrees (Table 2).

Figure 3
Percentage of people with at least one chronic illness, by age and gender
Data basis: GEDA 2009



The highest increases were in prostate cancer in men (+54 %) and lung cancer in women (+39 %). Population ageing is leading to an increase in the number of new cases in all the sites mentioned. With the exception of lung cancer and breast cancer in women, ageing effects are actually accounting for the biggest proportion of the total increase in the selected malignant neoplasms. Furthermore, the age-dependent increases are consistently higher in men than in women.

The increase in incidence may be caused by further factors in addition to population ageing and a changing individual risk of illness. Tumours are now being detected much earlier since the introduction of screening measures. This leads to an increase in the number of diagnoses, which is reflected in an apparent increase in the risk stated in Table 2, irrespective of how the risk has really changed (example: introduction of mammography screening between 2005 and 2008).

Table 2
Changes in the number of new cases of selected sites of malignant neoplasms 1999–2008 by gender
Source: RKI, Centre for Cancer Registry Data

Site	Gender	Overall increase (%)	of wich caused by population ageing (%)	of wich caused by change in risk (%)
Colon and rectum	female	0.2	11.1	-9.8
	male	21.4	24.6	-2.6
Lung	female	39.1	10.6	25.8
	male	0.1	25.0	-19.9
Breast	female	30.0	8.0	20.3
Prostate	male	53.7	27.3	20.8

Spectrum of illnesses treated in hospitals is changing

People with chronic illnesses are treated in different sectors of the health system depending on their needs. One of the most important sectors is inpatient care in hospitals. Taking the example of men, Figure 4 shows the age structure of cases treated in hospitals in 2000 and 2010. The shift in the population age structure is clearly influencing the age structure of the cases treated. The example of the baby boomers shows that they peaked in the age group from 30 to 39 in 2000. In 2010 this advanced to the 40 to 49 age group, albeit here with higher case numbers. It can be assumed that this peak will continue moving into older age groups as the baby boomers grow older.

Different diseases have different age spectrums, so that the effects that population ageing has on the number of people treated in hospitals also varies accordingly. An analysis of selected diagnostic groups since 2000 shows that, on the one hand, population ageing has led to a sharp increase in hospital treatments of certain illnesses (e. g. weak heart, prostate cancer, Table 3) (Nowossadeck 2012), while, on the other hand, it has led to only slight increases in the numbers of people treated for illnesses such as nonspecific back pain (IDC-10: M50-54). Furthermore, the treatment figures for some diseases have actually declined, despite population ageing (e. g. ischemic heart diseases). Overall, this analysis shows a change in the spectrum of diseases treated in inpatient care. A change in the disease spectrum can also be observed in outpatient care and in the structure of cause of death (Nowossadeck, Nowossadeck 2011).

A demographically induced cost explosion is not to be expected in the inpatient field

It is often feared that ageing societies lead to cost explosions for social insurance systems. The Federal Statistical Office has therefore conducted an analysis to investigate the future development of the cost of hospital care, being an institution of the health system with one of highest levels of spending (»hospital costs«). Two questions were explored: (a) is the development of hospital costs »a question of age«, and (b) what development can be expected for healthcare costs in hospitals up to 2030? (Noethen 2011).

The results show that hospital costs are high not only in old age, but on principle during the last year of a person's life. This corresponds with other studies based on health-insurance data (cf. overview in Kruse et al 2003). In other words, rising hospital costs are not solely an effect of ageing. Proceeding from these findings, the study predicted the purely demographically induced effect on the cost of treatment in hospitals up to 2030. Two scenarios were developed for this purpose (Noethen 2011). In a »status-

Figure 4
Number of men being treated in hospital, 2000 and 2010
Data basis: Statistisches Bundesamt (Federal Statistical Office), Hospital-diagnosis statistics

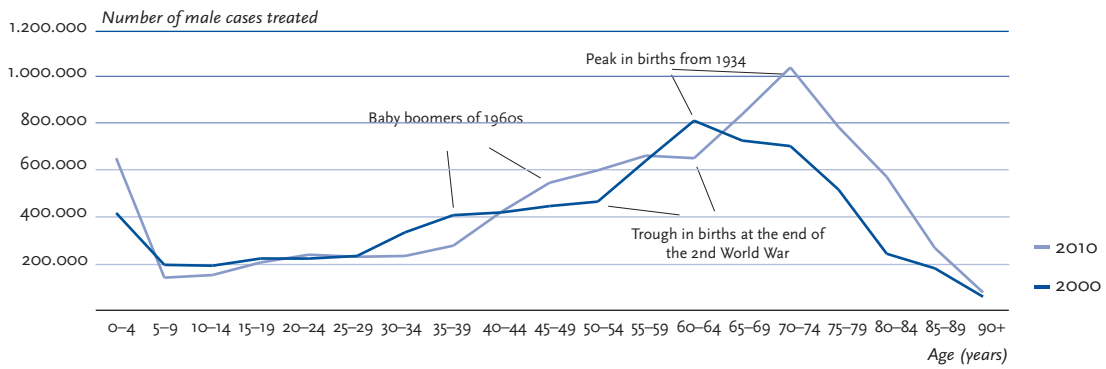


Tabelle 3
Change in the number of hospital treatments of selected diagnostic groups, 2000–2010, by gender
Data basis: Statistisches Bundesamt (Federal Statistical Office), Hospital-diagnosis statistics

					Women
Diagnostic group (ICD code)	Cases ('.000)		% change		
	2000	2010	total	caused by ageing	caused by risk
Colorectal cancer (C18–C21)	115	72	-37.3	9.7	-42.8
Lung cancer (C33–C34)	46	62	35.4	8.9	24.3
Malignant neoplasm of breast (C50)	251	140	-44.1	6.9	-47.7
Ischemic heart disease (I20–I25)	322	223	-30.6	10.9	-37.4
Heart failure (I50)	138	194	40.7	16.1	21.2
Arthrosis (M15–M19)	190	257	35.0	9.6	23.2
Other dorsopathies (M50–M54)	146	203	39.1	5.4	32.0
Mental and behavioural problems due to psychoactive substance use (F10–F19)	91	115	27.3	-0.6	28.0

					Men
Diagnostic group (ICD code)	Cases ('.000)		% change		
	2000	2010	total	caused by ageing	caused by risk
Colorectal cancer (C18–C21)	134	96	-28.6	20.1	-40.5
Lung cancer (C33–C34))	132	128	-3.2	18.8	-18.5
Prostate cancer (C61)	80	84	4.0	26.2	-17.6
Ischemic heart disease (I20–I25)	578	443	-23.4	20.0	-36.1
Heart failure (I50)	101	177	75.3	37.6	27.4
Arthrosis (M15–M19)	109	161	48.1	18.4	25.1
Other dorsopathies (M50–M54)	136	173	26.8	6.3	19.3
Mental and behavioural problems due to psychoactive substance use (F10–F19)	273	314	15.1	-1.6	17.0

quo scenario« all the conditions were kept constant except the demographic development. A second scenario allowed a shift in the probability of hospital treatment to an older age group parallel to the development of life expectancy (»compression scenario«, Table 4).

The results of the projection show that – under the assumptions made – treatment costs in hospitals can be expected to rise up to 2030 by just under 13 % (under the status-quo scenario) or 5 % (under the compression scenario). The increase is quite low for a period of 20 years. The marked hike in treatment costs for the 65-and-older age group is partly offset by a decrease among the under-65s.

A demographically induced »explosion« of hospital treatment costs is not to be expected according to these findings. Furthermore, the projection provides no information on cost increases due to the use of innovative medical techniques, or on how hospital costs will develop under the influence of prevention, changes in other sectors of healthcare, or other factors.

Discussion

The above exemplary analyses of the consequences of population ageing on healthcare show that it contributes to an increase in the number of cases of age-related chronic illnesses and to higher costs. However, the demographically induced effects are not very strong, and this is likely to remain the case for the next few years. If population ageing accelerates after 2025, stronger and growing effects can be expected. At the same time, a change in the illness spectrum looks likely, and the health system will have to structurally adjust to this.

The problem of multimorbidity will become increasingly important in view of the growing co-existence of physical and neurodegenerative diseases (e. g. dementia). The prevalence of dementia doubles every five years as a person grows older (RKI 2005). In addition, baby boomers born in the years after 1934 will be reaching the age of 80 in the next few years. Rising disease incidence must therefore be expected. Unfortunately, for various reasons data sources at the population level that could provide data on the current situation and the expected increase (such as mortality statistics or hospital-diagnosis statistics) currently provide no information on development trends in dementia (Nowossadeck, Nowossadeck 2011).

The challenges identified here become more significant when we realize that they will have to be overcome with a potentially declining workforce (Helmrich, Zika 2010). As a result of the shift in the age structure, in future more people will have to be looked after by the healthcare system, and there will be fewer people available to take on this task. This problem has been studied in relation to the nursing profession. In a projection, the Federal Statistical Office and the Federal Institute for Vocational Education

Table 4
Projection of hospital treatment costs up to 2030, by age group
Source: Noethen 2011

	2008	2030	Change
	€ bn	€ bn	%
Status-quo-Scenario	66,7	75,5	13,1
up to 64 years	34,3	30,8	-10,1
65 years and older	32,4	44,6	37,8
Compression scenario	66,7	69,8	4,6
up to 64 years	34,3	28,6	-16,6
65 years and older	32,4	41,1	27,0

and Training (BIBB) recently compared manpower requirements (based on the development of the number of people needing nursing care) with the number of employees working in nursing in the period up to 2025 (Afentakis, Maier 2010). The authors of the projection come to the conclusion that staff from other fields already have to be deployed in nursing today in order to meet the demand. Furthermore, if the present morbidity and care probabilities continue, it will no longer be possible to meet staffing needs in nursing occupations as early as 2018.

Demographic processes, including population ageing, are usually slow but sustainable. To cope with the challenges this involves, a variety of activities will be required – in medical research, improved healthcare, social and individual prevention, rehabilitation, and in resource allocation.

Although, as people grow older, physiological changes occur that are associated with a higher risk of falling ill, older people's health can be influenced positively in many ways (Wurm, Tesch-Römer, 2009). Diseases can be avoided or delayed, and their effects reduced, by health-promotion and preventive measures. In this way, preventive measures also contribute to maintaining people's independence in old age (Sass et al. 2010, Wurm, Tesch-Römer, 2009). Healthy ageing and health in old age are therefore key aspects of health-policy planning and measures. They are reflected, for example, in the national health targets of the cooperation network gesundheitsziele.de, which is funded by the Federal Government. The »healthy ageing« health target, which was drawn up in March 2012, contains recommendations for preventive and health-promotion measures in 13 relevant target fields. The measures aim to strengthen older people's health resources, for example through social participation, exercise and a balanced diet (www.gesundheitsziele.de).

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