



Key messages

- ▶ Women and men with low incomes have a shorter life expectancy.
- ▶ The risk of certain diseases, e. g. heart attack, diabetes mellitus and chronic bronchitis, is higher among people living in poverty.
- ▶ People at risk of poverty are more often restricted in their daily lives by health problems.
- ▶ Risky health-related behaviour is more widespread among people living in poverty.
- ▶ Poverty is associated with less social support.
- ▶ The relationship between poverty and health has not diminished in recent decades.

Poverty and Health in Germany

Germany is one of the richest countries in the world and has extensive social-security systems. Even so, in recent years now people's standards of living have been observed to be diverging and the number of people affected by poverty expanding. Between 1998 and 2008 the percentage of people living at risk of poverty rose from 11 % to 14 %. Two trends are especially striking in this context. First, the risk of poverty in population groups that are already the most vulnerable e. g. the long-term unemployed and people with poor qualifications has increased disproportionately. Second, poverty making inroads far into the middle class (Grabka, Frick 2010; Goebel et al 2010).

Many studies now confirm that poverty affects health. Their research findings predominantly agree that many diseases, health problems and risk factors are more common among people who live in poverty. These people also give a poorer self-assessment of their general state of health and health-related quality of life; they also tend to be more prone to premature mortality (Mielck 2000; Richter, Hurrelmann 2009; Lampert 2011). Against this background there has been growing discussion in recent years about how the health of population groups affected by poverty can be improved and more social equity achieved in the field of health prospects (Rosenbrock 2006; Weyers et al 2007). One essential prerequisite for planning, implementing and evaluating political measures and practical projects are regularly available data on inequalities in health and their development over time (RKI 2005; BZgA 2010).

This study presents results and findings on the relationship between poverty and health in Germany; the data were collected under the Federal Health Reporting system and also form part of the Federal Government's reporting on poverty and wealth. The focus is on the findings of the 2009 German Health Update (GEDA) study, which forms an essential part of the Robert Koch Institute's (RKI's) health monitoring, which has been built up in recent years (Kurth et al 2009; RKI 2010). These findings are supplemented by the results of studies based on other data sources that are important from the point of view of health reporting.

Poverty reduces life expectancy

The data of the German Socio-Economic Panel Study (GSOEP) is an important source of information for analysing the relationship between poverty and life expectancy in Germany. The GSOEP is a longitudinal study that has been conducted every year since the mid-1980s by the German Institute for Economic Research (DIW); it aims to detect political and social changes at an early stage (Wagner et al 2007).

The GSOEP data make it possible to calculate relative mortality risks for certain population groups and – by also consulting the official period life tables – to

Definition of poverty risk

According to a convention agreed at the EU level in 2001, people are at risk of poverty if they live in a household that has a net equivalent income that is less than 60% of the mean value (median) of all households (BMAS 2008). The net equivalent income is defined as a household's net income after it has been weighted according to the household's size and composition. This takes into account the savings made by joint economies in a multi-person household and the different income needs of adults and children. Four income groups are distinguished in this booklet in addition to the at-risk-of-poverty group: 60% to under 80%, 80% to under 100%, 100% to under 150% and 150% or more of the average net equivalent income of all households (cf. Grabka, Krause 2005). The three middle groups are combined (60% to under 150%) for some analyses. In 2008, approximately 14% of the population were assigned to the poverty-risk group, about 67% to the three middle-income groups, and 19% to the high-income group (Grabka, Frick 2010; Goebel et al. 2010).

specify population-group-specific differences in life expectancy (Kroll, Lampert 2009). An analysis of the period from 1995 to 2005 on the basis of these data showed that women and men whose incomes were below the poverty line had a 2.4- to 2.7-fold higher risk of mortality than the high-income group (Figure 1). The GSOEP data make it possible to calculate relative mortality risks for certain population groups and – by also consulting the official period life tables – to specify population-group-specific differences in life expectancy (Kroll, Lampert 2009).

The average life expectancy at birth for women from the poverty-risk group is about eight years lower than that of women from the high-income group. In men, the difference is even higher at eleven years. Another striking finding is

that there are also differences between the middle-income groups, so that one can speak of a income gradient in life-expectancy. There are also marked income differences in further life expectancy from the age of 65 (Table 1).

The association of income and life expectancy can be observed not only on the level of individual people, but also at the spatial level. A recent study illustrates this using the 96 regional planning regions in Germany drawn up by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) (RKI 2009).

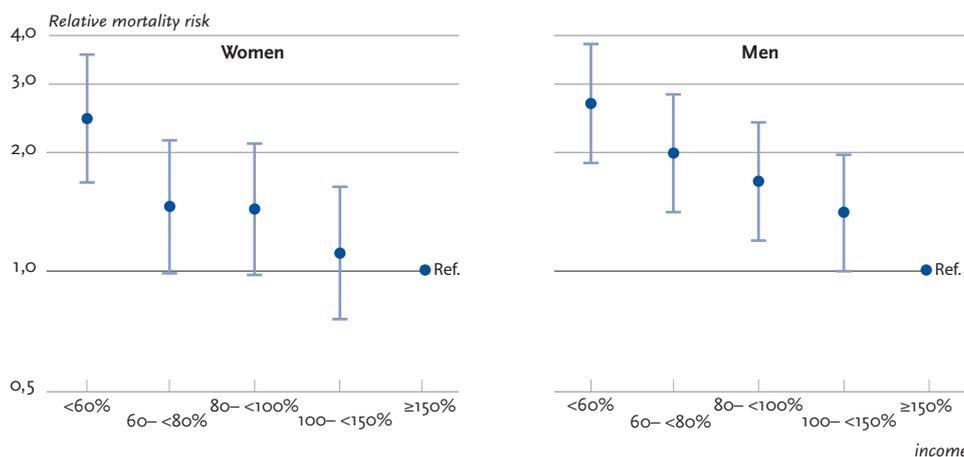
Table 1

Life expectancy at birth and from the age of 65 years by income (in years)
Data: GSOEP and period life tables from 1995-2005 (Lampert et al. 2007)

Income	Women		Men	
	at birth	65 and over	at birth	65 and over
<60%	76.9	16.2	70.1	12.3
60-<80%	81.9	19.8	73.4	14.4
80-<100%	82.0	19.9	75.2	15.6
100-<150%	84.4	21.8	77.2	17.0
≥150%	85.3	22.5	80.9	19.7
Total	81.3	19.3	75.3	15.7

As a general rule, average life expectancy at birth is highest in regions where the at-risk-of-poverty rate is low. The difference between the regions with the highest and the lowest at-risk-of-poverty rates is about five years in men and about three years in women. Small-scale spatial studies also indicate considerable socio-spatial differences in life expectancy, e.g. between different boroughs or neighbourhoods in large cities like Berlin and Bremen (SenGesUmV 2009; Freie Hansestadt Bremen 2006).

Figure 1
Relative mortality risk of 18-year-old and older women and men by income (reference group: people with a net equivalent income of 150% and more of the mean value of all households)
Data: GSOEP 1995–2005 (Lampert et al. 2007)



Enhanced risk of certain diseases among people living at risk of poverty

Initial findings on social differences in the distribution of chronic diseases were made as early as the mid-1980s in the German Cardiovascular Prevention Study (DHP) and the MONICA study, Augsburg. A higher incidence in socially disadvantaged population groups was reported especially for cardiovascular diseases, but also for some respiratory diseases and metabolic disorders (DHP Forschungsverbund 1998, Statistisches Bundesamt 1998). Analyses using data from the 1998 Federal Health Survey and the 2003 Telephone Health Survey, both of which were conducted by the RKI, have confirmed these findings (RKI 2005). A topical overview can be created using the data of the 2009 GEDA study, in which information was collected on the incidence and lifetime prevalence of about 20 chronic diseases (Table 2).

Table 2
Risk of contracting certain diseases (lifetime prevalence) in 45-year-old and older women and men from the low-income group relative to the high-income group
Data: GEDA 2009

Risk of disease	Women	Men
markedly higher (OR ≥ 2.00)	Heart attack	Heart attack
	Stroke	Stroke
	Chronic liver disease	Chronic liver disease
	Angina pectoris	Chronic bronchitis
	Diabetes mellitus	Osteoporosis
higher (OR < 2.00)	Hypertension	Hypertension
	High level of blood lipids/ cholesterol	Angina pectoris
	Chronic bronchitis	Cardiac insufficiency
	Bronchial asthma	Diabetes mellitus
	Osteoarthritis	Chronic renal insufficiency
	Osteoporosis	Arthritis
	Depression	Depression

OR=Odds Ratios. A statistically significant relationship is assumed based on an error probability of $p < 0.05$.

In the 45-and-over age range the GEDA data show that many of the diseases observed are more common in the at-risk-of-poverty group; these include heart attack, stroke, angina pectoris, hypertension, diabetes mellitus, chronic bronchitis, chronic liver disease, osteoporosis, osteoarthritis and depression. In women, a correlation can also be observed between poverty risk and bronchial asthma and high blood-lipid levels. In men, cardiac insufficiency, arthritis and chronic renal insufficiency are more common (in addition to the above-mentioned disorders) in the at-risk-of-poverty group.

For some chronic diseases, reliable conclusions cannot be drawn from survey data, because many patients die relatively quickly. This applies e. g. to lung cancer and several other cancers. Routine data from the statutory

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

health insurance companies can be used to analyse social differences in the distribution of cancers. Using data from the AOK Mettmann (local health insurance fund) on the period 1987-1996, for example, it was found that women and men at risk of poverty had an enhanced risk of lung, stomach and colon cancer (Geyer 2008a).

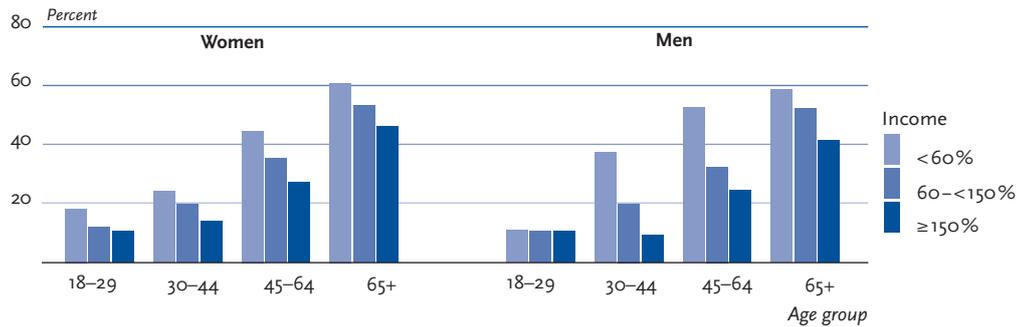
People affected by poverty report more health-related restrictions on their daily lives

Chronic diseases are often associated with functional restrictions that can make coping with everyday life and social participation more difficult and reduce the person's quality of life. Whether, and to what extent, chronic diseases affect people's everyday lives depends not only on the duration and severity of the illness, but also on their individual coping strategies and how much social support they receive.

The findings of the GEDA study show that people who are at risk of poverty are restricted by illness in their everyday activities more often than those in the middle and high-income groups. These differences begin to emerge from the age of 30 at the latest; in women they can even be observed as early as young adulthood (Figure 2). Statistical monitoring of the age effect shows that women in the low-income group are subject to twice the risk of being restricted by illness in coping with daily life compared to women from the high-income group (OR=1.99, 95% CI=1.64 to 2.42). In men, the corresponding ratio is even higher at 2.9:1 (OR=2.93, 95% CI=2.30 to 3.74).

Also interesting in this context are the data from the 2003 Telephone Health Survey, which allow a distinction to be made between physical and mental health problems, and between different areas of activity (Ellert et al 2005). Among other things one can observe that people have difficulties in performing their daily work because of physical health problems (»physical role function«), difficulties in performing normal activities at work or at school/university due to personal or psychological problems (»emotional role function«), and restrictions on normal contacts with family members and friends due to physical or mental problems (»social functioning«). In all three areas of daily life it can

Figure 2
Restrictions due to illness in the performance of everyday activities by income
Data: GEDA 2009



be said that women and men from the poverty-risk group are restricted much more often. Their risk of restriction is 1.6- to 2.8-times higher than those in the highest-income group (Table 3).

Poverty is reflected in people's health-related behaviour

Many chronic diseases and health problems can be attributed to risk factors related to health-related behaviour, e. g. smoking, lack of exercise or obesity. Although health-related behaviour depends on individual decisions and preferences, it is influenced by people's living conditions. It is therefore not surprising that there are also significant social differences in the distribution of these risk factors (Lampert 2010a,b).

The GEDA data show, for example, that 18-year-old and older women and men in the at-risk-of-poverty group are about 1.3 times more likely to smoke than women and men of the same age in the high-income group. And more than twice as many people in the at-risk-of-poverty group stated that they had not engaged in sport in the last three months before the survey. There is also a significant gender

difference in the association of income and obesity. The risk of obesity in women from the low-income group is 3.3 times higher than in the high-income group; among men this ratio is 1.6:1 (Table 4).

There is also evidence of differences between income groups in other aspects of health-related behaviour. It seems, for example, that people at risk of poverty have less healthy diets. This is exemplified by a higher consumption of white bread, fatty potato products and sausages. By contrast, lean meat, fish, fruit and vegetables are consumed less frequently in low-income families (Heindl 2007). Differences to the disadvantage of the at-risk-of-poverty group can also be observed in oral-health-related behaviour, accident prevention and the use of health information (Mielck 2000; RKI 2005).

The use of health services can also be regarded as a form of health-behaviour. The available studies suggest that people with low incomes make use of medical services more frequently in Germany (Janßen et al 2009). This finding should be seen in the context of the higher burden of disease in the poverty-risk group. When the differences in the people's state of health are taken into account, the

Table 3
Risk of restrictions in physical and emotional role functioning and social functioning in the low- and middle-income group relative to the high-income group among 18-year-old and older women and men (age-adjusted odds ratios with 95% confidence intervals)

Data: 2003 Telephone Health Survey

Income	Physical role functioning	Emotional role functioning	Social functioning
	OR (95%-CI)	OR (95%-CI)	OR (95%-CI)
Women			
<60%	1.57 (1.13–2.18)	2.65 (1.79–3.93)	2.37 (1.61–3.49)
60–<150%	1.27 (0.96–1.68)	1.59 (1.11–2.27)	1.62 (1.14–2.29)
≥150%	Ref.	Ref.	Ref.
Men			
<60%	2.42 (1.74–3.35)	2.84 (1.97–4.01)	1.77 (1.21–2.57)
60–<150%	1.30 (1.00–1.70)	1.34 (0.98–1.84)	1.17 (0.86–1.58)
≥150%	Ref.	Ref.	Ref.

Tabelle 4

Risk of tobacco use, lack of exercise and obesity in the low- and middle-income groups relative to the high-income group among 18-year-old and older women and men (age-adjusted odds ratios with 95% confidence intervals)

Data: GEDA 2009 (Lampert 2011)

Income	Tobacco use	Lack of exercise	Obesity
	OR (95%-CI)	OR (95%-CI)	OR (95%-CI)
Women			
< 60%	1.30 (1.10–1.53)	2.44 (1.09–2.84)	3.25 (2.58–4.09)
60–<150%	1.21 (1.05–1.40)	1.54 (1.34–1.76)	1.83 (1.47–2.27)
≥150%	Ref.	Ref.	Ref.
Men			
< 60%	1.35 (1.17–1.57)	2.20 (1.89–2.55)	1.55 (1.28–1.89)
60–<150%	1.14 (1.02–1.28)	1.54 (1.37–1.73)	1.41 (1.22–1.65)
≥150%	Ref.	Ref.	Ref.

lower-income group no longer uses medical services more frequently (RKI 2005). It has already been known for some time that people with low incomes use offers of prevention and health promotion comparatively rarely (Bauer 2005). This has been shown e. g. by studies on cancer screening (Scheffer et al 2006).

Poverty is associated with low social support

Another important factor in explaining the relationship between poverty and health is that people living in poverty are more frequently exposed to psychosocial stress. Against the background of a precarious income situation, experiences of exclusion in particular are subjectively perceived as stressful (Böhnke 2006). Whether such impairments damage a person's health depends not only on the duration and intensity of exposure to stress, but also on the person's resources for coping with it. In addition to certain personality traits – such as self-esteem, optimism and locus of control – social support is also of great importance. Numerous studies have shown that people who do not feel sufficiently supported by their social networks are more prone to illnesses and health problems (Berkman, Glass 2000).

In the GEDA study an instrument for the measurement of social support that has been coordinated at the European level was used. It comprises three questions on support with problems given by close relatives and friends, other people's concern and interest shown in the person's actions, and practical assistance from neighbours (Kilpeläinen et al 2008). The findings show that women and men from at-risk-of-poverty group more frequently experience a low level of social support than those from the middle- and especially the high-income group (Figure 3). These differences are clearly visible in all the age groups observed. Statistical monitoring of the age effect shows

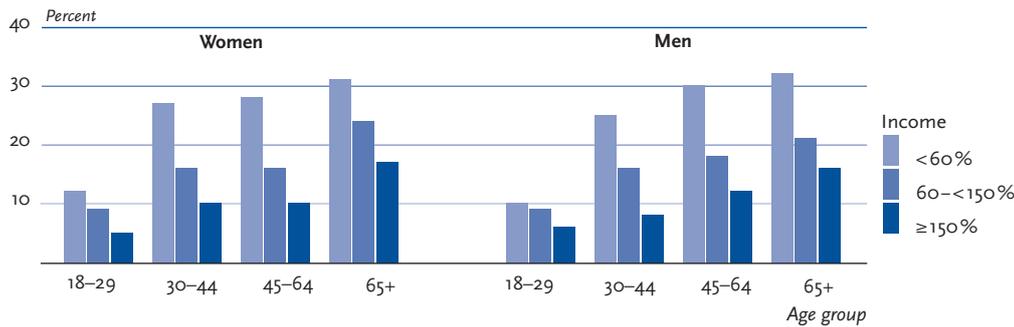
a 2.8-times-higher (OR=2.76, 95% CI=2.17 to 3.50) or 2.7-times-higher (OR=2.73, 95% CI=2.06 to 3.62) risk of a low level of social support among women and men from the low-income group compared to people from the high-income group.

The relationship between poverty and health has not diminished in recent decades

Several research projects have been conducted at European level in recent years that allow conclusions to be drawn on how the relationship between poverty and health has developed over time. An analysis of people's self-assessment of their general state of health, which incorporated the data from ten EU member states, came to the conclusion that the differences between income groups did not significantly narrow during 1980s and 1990s (Kunst et al 2005). In some countries, e. g. in the Netherlands, the differences were even observed to widen. In relation to the development of tobacco use, too, it has been shown that the social differences have proved to be either stable or have widened further in most countries (Giskes et al 2005).

Few studies have been conducted in Germany to date to examine the association of poverty and health in the light of developments over time and trends. The present findings provide no evidence to suggest any reduction in differences in people's state of health and health-related behaviour as related to income (Kroll 2010). A recent analysis on people's self-assessment of their overall health status, which was based on data on the period from 1994 to 2007 from the Socio-Economic Panel, tended rather to indicate an increase in the differences between the income groups (Kroll, Lampert 2010).

Figure 3
Low level of social support by income
 Data: GEDA 2009



Discussion

The research findings presented here indicate that poverty is associated with a poorer overall state of health, risky health behaviour, the risk of contracting certain diseases and a reduced life expectancy. For some outcomes, there are also differences between people with middle and high incomes, so that one can speak of social gradients of health prospects and risks of illness. In both women and men, these gradients are most pronounced in middle age. However, health disparities to the disadvantage of people with lower incomes can also be observed among young and old adults.

When classifying and evaluating the research findings on the relationship between poverty and health, it should be taken into account that income is only one, albeit a very important dimension of a person's socioeconomic situation. Additional factors that should be considered include a person's level of education, their employment status and professional position. Empirical studies in which people's circumstances are examined multi-dimensionally show, on the one hand, that income also influences health independently of the other dimensions of circumstances. On the other hand, they make it clear that health prospects are worst in the population groups where disadvantages cumulate, e. g. where a low income is combined with a low level of education and a poor professional position (Geyer et al 2008b).

Whereas the association between poverty and health can be regarded as empirically established, explaining it remains a major challenge (Mielck 2000; Bauer et al 2008). Three main explanation approaches have been pursued mainly; they relate to the health-related consequences of material disadvantages, to psychosocial stress and to health-related behaviour (Mackenbach 2006). Material disadvantages are indicated by reduced consumption and fewer participation opportunities – and the resulting standard of living. This also includes limited opportunities for investing in private social insurance schemes, e. g. in relation to old-age pensions, or cash-value life insurances. Psychosocial stress results among other things from processes of social comparison, experiencing exclusion, or worries about the future. Particularly relevant to health is chronic stress

that can be expected in the case of long-term poverty and a low level of social support (Stansfeld, Marmot 2002). The possible importance of health-related behaviour in explaining the higher risk of both illness and premature death among population groups at risk of poverty is shown by the empirical findings described above on tobacco use, lack of exercise and obesity. These and other behaviour-associated risk factors often occur together, which can aggravate the effects on health. In addition to the material disadvantages and reduced opportunities for social participation, it is probably specifically the psychosocial stress resulting from a situation of poverty that makes a healthy lifestyle difficult (Lampert 2011).

Explanations of the pathways between poverty and health generally assume that experiences of poverty have a negative effect on health. It is also conceivable that health problems might lead to a loss of income, e. g. through the loss of a job. Numerous international studies suggest that long-term illness can be a reason for unemployment and poverty (Blane 1985; RKI 2003). Up to now there have only been isolated studies on the relevance of income losses as a result of an illness to explaining the association of poverty and health. The findings of a study based on longitudinal data from the GSOEP suggest that, while a decline in a person's state of health can be reflected in income losses, the reverse effect, i.e. the impact of the loss of income on health, is much more clearly evident (Thiede, Straub 1997).

Based on research findings on the relationship between poverty and health, national programs and measures have been implemented in several European countries focusing on the social equality of health prospects. For example, an action program called »Tackling Health Inequalities: A Programme for Action« was initiated in the UK in 2003 which was supported by twelve ministries. Among other objectives it sought to reduce the mortality differences between the most disadvantaged and most privileged population groups by 10 % by 2010 (Department of Health 2003). In the same year a law called »Sweden's New Public Health Policy« was passed in Sweden concentrating on inter-sectoral and societal measures to achieve three broad overall objectives: reducing social inequality, creating a

healthy living environment, and promoting a healthy lifestyle (Agren 2003).

With regard to Germany it can be said that political efforts to reduce poverty and its effects on health have increased. This is reflected, for example, in the government's strategy for promoting children's health, one of whose main objectives is an equitable distribution of opportunities to ensure that children grow up healthy (BMG 2008). Moreover, the 2000 amendment of section 20 subsection 1 of Fifth Book of the German Social Security Code (SGB V) called on the statutory health insurance companies to also (and especially) finance schemes of primary prevention that contribute to reducing social inequalities in the field of health prospects (Arbeitsgemeinschaft der Spitzenverbände der Krankenkassen 2008). A cooperation network called »Health Promotion for the Socially Disadvantaged«, which is coordinated by the Federal Centre for Health Education (BZgA), is of great importance for the transfer of good practice. The network aims to improve collaboration in projects and initiatives of social-situation-related health promotion and to identify and promote examples of good practice based on defined quality criteria (BZgA 2010).

The task of Federal Health Reporting in this context is to report continuously on the relationship between poverty and health and to identify concrete approaches to both political interventions and practical projects. An improved pool of data will be available in this field in the coming years. The regular repetition of the GEDA study is building up a reliable foundation for analysing developments over time and trends. In addition, the Robert Koch Institute's health monitoring includes the »German Health Interview and Examination Survey for Adults« (DEGS), which is designed as a repeat examination to follow up the 1998 Federal Health Survey, and the continuation of the »National Health Interview and Examination Survey for Children and Adolescents« (KiGGS) as a cohort study (Kurth et al 2009). Both studies will provide not only current cross-sectional, but also longitudinal data, thus enabling more profound analyses of the mechanisms and processes responsible for the relationship between poverty and health.

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