

# The influence of social determinants on the use of prevention and health promotion services: Results of a systematic literature review

## Der Einfluss sozialer Determinanten auf die Inanspruchnahme von Maßnahmen der Prävention und Gesundheitsförderung in Deutschland: Ergebnisse einer systematischen Literaturrecherche

### Abstract

**Background:** The following analysis aims to determine whether differences in the use of prevention and health promotion services in Germany can be attributed to health inequality between different social status groups measured by education, occupation and income and where certain improvements can be made in health promotion and prevention efforts and research to reduce those differences.

**Methods:** A systematic literature search was conducted using MedPilot to identify relevant articles published between 1998 and 2010 in the Medline, Medizinische Gesundheit, CC Med, Deutsches Ärzteblatt and Sozialmedizin (SOMED) databases, the Hogrefe, Karger, Krause and Pachermege and Thieme publisher databases, the Cochrane Database of Systematic Reviews (CDSR), the Cochrane Database of Abstracts of Reviews of Effectiveness (DARE), and the Cochrane Central Register of Controlled Trials.

**Results:** A total of 23 empirical studies on the topic of “prevention, health prevention and social inequality” met the criteria for inclusion in the review. 20 of the 23 reviewed studies provided relatively clear evidence of a significant association between higher social status and greater use of prevention and health promotion services. According to the reviewed studies, gender tends to have a greater effect on the use of prevention and health promotion services than characteristics of vertical social inequality. No studies were found dealing with tertiary prevention or using qualitative methods to explore their research questions.

**Conclusions:** Overall, the review shows that there is sufficient evidence for the relationship between social status and the use of prevention and health promotion services and that this association is both significant and relevant. There are, however, a few “blind spots” in research on this topic, such as a lack of studies on tertiary prevention, especially with regards to prevention and health promotion services use among men, as well as general studies on health promotion among men and women. There is also a lack of published intervention studies demonstrating how to better reach the socially disadvantaged.

**Keywords:** social determinants, education, occupation, income, prevention, health promotion, systematic review

### Zusammenfassung

**Hintergrund:** Der vorliegende Beitrag untersucht den Einfluss sozialer Determinanten auf die Inanspruchnahme präventiver und gesundheitsförderlicher Leistungen in Deutschland. Damit soll ein Beitrag zur Beantwortung der Frage geliefert werden, warum Morbidität und Mortalität so stark nach sozialen Statusmerkmalen (Bildung, Beruf und Einkom-

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men) eines Menschen differieren und wo im Bereich der Gesundheitsförderung und Prävention mögliche Verbesserungs- und notwendige Forschungspotentiale bestehen.

**Methoden:** Hierzu wurde mittels Medpilot eine systematische Literaturrecherche für den Zeitraum 1998–2010 in den Datenbanken Medline, Medizinische Gesundheit, CC Med, Deutsches Ärzteblatt, Sozialmedizin (SOMED), Hogrefe Verlag, Karger Verlag, Krause und Pachermegg Publikations-Datenbank, Thieme Verlag, Cochrane Database of Systematic Reviews (CDSR), Cochrane Database of Abstracts of Reviews of Effectiveness (DARE), Cochrane Central Register of Controlled Trials nach empirischen Untersuchungen zu dieser Thematik durchgeführt.

**Ergebnisse:** Zusammenfassend lässt sich sagen, dass 20 der 23 so gefundenen empirischen Untersuchungen eindeutig signifikante Effekte hinsichtlich einer Zunahme der Inanspruchnahme präventiver oder gesundheitsförderlicher Leistungen mit zunehmendem sozialen Status, drei Studien zeigten keine eindeutigen Ergebnisse. Es zeigte sich, dass das Geschlecht überwiegend größere Effektstärken hinsichtlich der Inanspruchnahme von Maßnahmen der Prävention und Gesundheitsförderung zeigt als Merkmale der vertikalen sozialen Ungleichheit. Es wurden überwiegend Maßnahmen der Sekundärprävention untersucht und es konnte keine Studie gefunden werden, welche sich mit Tertiärprävention beschäftigt oder eine qualitative Methodik bei der Untersuchung der Forschungsfrage angewandt hat.

**Diskussion:** Insgesamt kann festgestellt werden, dass der Zusammenhang zwischen einem eher niedrigerem sozialen Status und der eher geringeren Inanspruchnahme gesundheitsförderlicher und präventiver Leistungen als hinreichend belegt, signifikant und relevant angesehen werden. Trotzdem gibt es noch einige „blinde Flecken“ in der Forschungslandschaft in diesem Gebiet: So fehlen Studien im Bereich der Tertiärprävention, speziell für den Bereich der Prävention und Gesundheitsförderung bei Männern sowie allgemein Studien im Bereich der Gesundheitsförderung bei Männern und Frauen. Es fehlt zudem an publizierten Interventionsstudien, die zeigen, wie sozial Benachteiligte besser erreicht werden können.

**Schlüsselwörter:** soziale Determinanten, Bildung, Beruf, Einkommen, Prävention, Gesundheitsförderung, systematische Literaturrecherche

## Introduction

This review investigates the impact of social factors on the use of prevention and health promotion services in Germany and, in doing so, attempts to help answer the questions as to why there are such strong differences in morbidity and mortality based on individuals' social status characteristics (e. g. education, occupation, income) and where certain improvements can be made in health promotion and prevention efforts and research to reduce those differences.

In social epidemiology research, social inequality primarily encompasses horizontal inequalities (age, gender, marital status, nationality) and vertical inequalities (occupation, education, income). This study focuses on vertical inequalities – that is, on the differences in individuals' education, occupation and income characteristics. (For in-depth studies analyzing horizontal inequality, see [6], [53], [38], [43]). These characteristics are also referred to as socioeconomic characteristics and are often combined to an index in order to describe an individual's

social status [20], [36]. In this review, the terms social status and social class are used synonymously since although the concept of social class differs in theoretical meaning from that of social status, it can also be seen as a categorized form of social status [18]. In addition to the individual indicators *education*, *occupation*, and *income*, each with their various limitations and strengths (for an overview, see [14], [36]), this review also explores gender-related differences in services use, since significant differences between women and men have been found in previous research.

Social inequality leads to unequal distribution of health chances in populations. For example, the mean difference in mortality between members of the upper and lower social classes can range from four to ten years [46]. Already in the early 1970s in Great Britain, Marmot identified a typical phenomenon of modern industrialized countries: a social class gradient in health, such that the higher the social position, the better the health of a person [35]. This gradient, which he termed a “status syndrome,” means that not only the lowest social class is at

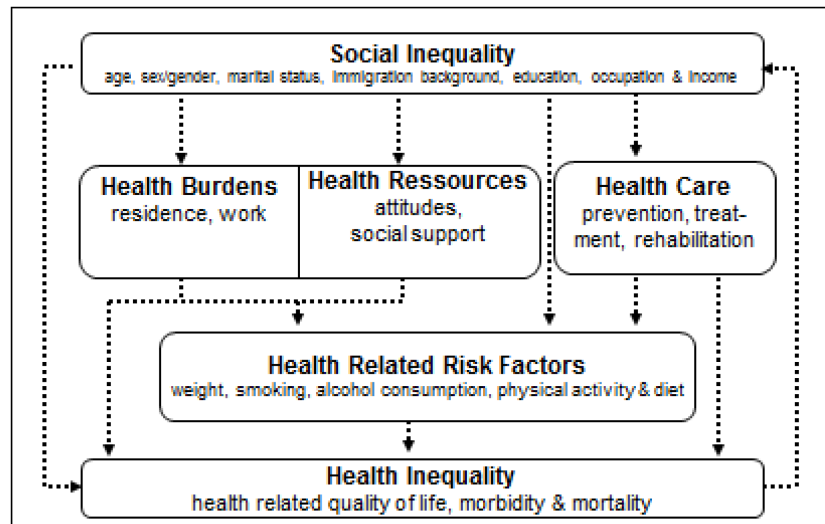


Figure 1: A complete recursive model of social and health inequality (based on [36] and modified by the authors)

a disadvantage or that the poorest of the poor is affected. Rather, it implies that the gradient in health, in the form of an inverse gradient, cuts across society as a whole [33], [34], [46].

Other groundbreaking studies conducted by [4], [15], and [23] in the U.S. observed that the distribution of relevant chronic diseases and the risk for premature death follow a social gradient as well: the higher the social status of a population group, the lower the group's morbidity and mortality. Evidence for this gradient has been provided in all industrialized countries, in which such studies have been conducted [9], [31], [33], [46]. Even though the size of the inequalities between classes may vary, international research has shown that in all European countries premature death rates become increasingly higher as we move down the social status scale. The fact that there are indications that these inequalities are increasing [32] shows just how relevant they are today. The finding that the mean difference in life expectancy between members of the highest income group and lowest income group in Germany is 8.4 years for women and 10.8 years for men [27] clearly illustrates how relevant this issue is for health policy and science in Germany in particular.

Those most impacted by social status-based health inequalities are young children and middle-aged adults. Fewer inequalities are observed during adolescence and old age [26]. There are also differences between genders. Men's health seems to be more impacted by social status – measured at least in terms of level of education, occupation and income – than women's health [5]. Noticeable differences have also been observed in the magnitude of social inequality in health between countries, even within relatively homogeneous regions, such as European countries [32]. For instance, whereas social disparities have been found to be lower in Southern European countries, these disparities are greater in Eastern European countries. Disparities have also been found with regard to different diseases: Among low status groups, there are considerably higher (twice as high or higher) risks for heart attack, stroke, chronic liver disease,

angina pectoris (in women), diabetes mellitus (in women), chronic bronchitis (in men) and osteoporosis (in men). These groups are also at a greater risk (i.e., have at least a significantly increased likelihood) for: hypertension and depression; high cholesterol, chronic bronchitis, bronchial asthma, arthrosis and osteoporosis (in women); and angina pectoris, heart failure, diabetes mellitus, chronic renal failure and arthritis (in men). Less pronounced social disparities can be also observed for most types of cancer, gastrointestinal diseases and neurological disorders. A limited number of diseases are more prevalent in higher than in lower social classes. These include allergies and breast cancer [46].

In Germany, medical sociological research on this topic got a late start because restrictive data regulations had limited the amount of available data and because the field of medical sociology did not catch up with international developments until late. Since 2000, however, the topic has been examined in more depth and detail in extensive collective volumes of articles [17], [36], [40], [57]. Although various sociological models can be drawn upon to explain social differences in morbidity and mortality [19], Mielck's model for explaining health inequality [36] is probably the most comprehensive (see Figure 1). According to the model, less knowledge (e.g., obtained through schooling or professional training), less power (e.g., position in the occupational hierarchy or control over the work content, intensity and processes of others), less prestige (e.g., how society regards the occupation) and less money (income and wealth) lead to greater health burdens at one's place of residence or work, to fewer coping resources, to poorer medical care and to less healthy behavior. This, in turn, increases the risk for illness and premature death. At the same time, the model identifies other direct pathways between social and health inequality, such that illness can lead to a social "downgrade" and such that there are also direct relationships between physical and social characteristics (e.g., the parameters of the immune system or blood pressure). Despite this, not all dimensions of social inequality are

of course influenced by dimensions of health inequality and vice versa.

This review aims to determine whether differences in the use of prevention and health promotion services in Germany can be attributed to health inequality between different social status groups. So far, no other systematic reviews have been conducted to determine if any such association exists despite the fact that there have been many complaints about the tendency of prevention efforts to focus on the middle class.

In the following section, a brief description of the German health care system will be given. Only an overview of the system will be provided due to its complexity and especially given that the system is subject to constant change owing to current medical and economic developments as well as associated political decisions and legislative amendments. Following the overview, the results of the systematic review will be presented. The findings of the reviewed empirical studies on socioeconomic differences in the use of prevention and health promotion services will be synopsised in tables and briefly analyzed in consideration of systematic viewpoints. The final section will discuss the review's findings as well as the limitations and strengths of the review methods.

## Fundamental characteristics of the German health care system with a focus on health promotion and prevention

In Germany, the health care system forms the third pillar of the social welfare system alongside pension and unemployment insurance. The main tasks of the German health care system include health maintenance and promotion as well as the prevention and treatment of illness. The state's job is to provide the proper regulatory framework facilitating the exchange, negotiation and coordination processes needed for respective institutions to allocate funds [45]. Compared to other countries, Germany has an above-average number of physicians, dentists, physical therapists, nursing staff and hospital beds. Approximately 4.3 million people – nearly 9% of the nation's workforce – were reportedly either directly or indirectly employed in the German health care sector [1].

Funding for the German health care system is primarily provided through insurance contributions. Nine out of ten German citizens – approx. 70 million people – are members of the country's nearly 150 statutory health insurance funds. Only ten million are covered by private health insurance funds. The cornerstone of the German statutory health insurance system is the solidarity principle. According to this principle, insurance contributions are based on an insured individual's level of income rather than the individual's gender, age or risk of illness. In the case of private health insurance, premiums depend on the number of services covered by the particular insurance

policy and the overall health status, gender and age at entry of the policyholder [37].

Inpatient care in Germany is delivered in preventive, curative and rehabilitation health facilities. Funding for both hospitals and rehabilitation facilities is provided by public, private or non-profit sources. The increasing focus of hospitals on economic efficiency is placing new demands on nursing staff, other therapeutic professions and physicians. Although prevention strategies are becoming just as important as health promotion strategies, overall expenditures for prevention, health promotion, health protection, health information and education, screening and health care services make up a mere 0.5–3% of the nation's health budget [55]. Prevention and health promotion are interventions that achieve compression of morbidity. In Germany, the main participants in these efforts are the Public Health Service, the state business supervisory authorities, institutions providing occupational accident insurance and those responsible for occupational health and safety, as well as the health insurance funds.

According to the WHO [58], the term *health promotion* refers to a set of strategies and methods implemented at different societal levels in an attempt to increase peoples' health resources and potentials. Types of health promotion measures include: 1) those aimed at modifying and promoting individual health behavior and 2) those aimed at creating health-promoting environments (often referred to as the "settings approach") through, for example, organizational development, community development, policy development or health-related education measures. According to [50], "*prevention* (Latin *praevenire*: "to come before"), unlike health promotion, involves activities aimed at avoiding, lessening the likelihood of or delaying harm to a person's health." Prevention measures can focus on the behavior of individuals or groups (behavioral risk prevention) or can be geared toward modifying the biological, social or technical environment (environmental risk prevention).

As illustrated in Table 1 based on Leppin [29], prevention activities can also take place on three different levels (primary, secondary, and tertiary) depending on the time, objective and target of the preventive intervention.

The terms "prevention" and "health promotion" often used to be used synonymously. Recently, however, a differentiated view has come to be taken. The fundamental distinctions made between health promotion measures and prevention measures can be summarized as follows (Table 2): (Please note that this way of differentiating between prevention and health promotion is an ideal type and is, by all means, open to debate.) While health promotion measures tend to focus more on resources (e.g., health loci of control or social support), prevention measures are geared toward health burdens (e.g., vaccinations against certain diseases such as measles, mumps or rubella). Health promotion interventions tend to be designed and conducted by public health specialists without a specific problem, risk factor or disease in mind; that is, they usually promote health in general. Prevention

**Table 1: The differences between primary, secondary, and tertiary prevention based on the time, goal and target of the intervention (according to [29])**

|                             | <b>Primary prevention</b>             | <b>Secondary prevention</b>                            | <b>Tertiary prevention</b>  |
|-----------------------------|---------------------------------------|--|---|
| Time of the intervention    | Before the onset of the disease       | During the early stages of a disease                   | After manifestation / acute treatment of a disease                  |
| Goal of the intervention    | Reduce the incidence of diseases      | Prevent the progression or chronification of a disease | Prevent after-effects or relapses                                   |
| Targets of the intervention | Healthy people displaying no symptoms | Acute patients / clients                               | Patients with chronic impairments and individuals in rehabilitation |

**Table 2: Criteria for distinguishing health promotion from prevention**

| <b>Health promotion</b>            | <b>Prevention</b>                   |
|------------------------------------|-------------------------------------|
| – resource-oriented                | – burden-oriented                   |
| – non-specific                     | – specific                          |
| – health sciences                  | – medicine                          |
| – patient / citizen is more active | – patient / citizen is more passive |
| – focus: health                    | – focus: disease                    |

interventions, on the other hand, are performed by medical experts to counter specific diseases (see, for instance, the vaccination example given in the previous sentence). Health promotion measures encourage patients and citizens to play an active role in their own health. In the case of preventive measures, however, they play a more passive role when being protected from diseases.

## Methods used in the systematic review

Already in 2009, a systematic literature review was conducted to determine the extent to which social status characteristics are associated with the use of services within the entire German health care system [18]. 32 studies were identified as having been published between 2000 and 2008. According to the results of these studies, the overall level of health care provided to all social status groups in Germany is relatively high, and hardly any differences were found in the curative or rehabilitative care received across status groups. There were, however, marked differences with regard to the groups' use of prevention and health promotion services, suggesting that prevention and health promotion programs aimed at influencing individuals' use of such services, providing them with relevant health and disease information and impacting the way this information is

used must be tailored to less privileged social status groups in order to be at least somewhat better able to reduce existing health inequalities in the future. After all, a socially equitable health care system should be able to claim, in future, that it continues to contribute to the reduction of health inequality [18]. The findings of the 2009 review indicate that certain changes need be made to the German health care system. However, when making these changes, care should be taken to ensure that the same level of high-quality care continues to be provided to all social groups.

In light of the findings of the previous review, the present review only focuses on the use of prevention and health promotion services using search terms only in regard to the mentioned topics while the first review and its search terms were in regard to the medical system in general. On March 22, 2011, a new literature search was conducted using MedPilot to identify relevant articles published between 1998 and 2010 in the Medline, Medizinische Gesundheit, CC Med, Deutsches Ärzteblatt and Sozialmedizin (SOMED) databases, the Hogrefe, Karger, Krause and Pachermegg and Thieme publisher databases, the Cochrane Database of Systematic Reviews (CDSR), the Cochrane Database of Abstracts of Reviews of Effectiveness (DARE), and the Cochrane Central Register of Controlled Trials. The following combinations of search terms were used:



gesundheit\* AND deutsch\* AND (einkommen\* OR bildung\* OR beruf\* OR geschlecht\*) AND (prävent\* OR screening\* OR vorsorge\* OR gesundheitsförderung\* OR früherkennung\*) AND (inanspruchnahme\* OR nutzung\* OR besuch\*)  
OR  
health\* AND german\* AND (income\* OR education\* OR profession\* OR occupation\* OR gender\* OR sex\*) AND (prevent\* OR "early detect\*" OR "health promotion" OR screening\*) AND (utili?ation\* OR use\* OR usage\*)

Retrieved papers met the inclusion criteria if they were published in English or German and reported empirical findings.

## Results

After excluding duplicate hits, a total of 1,303 articles were independently screened by two of the authors. Following the same procedure used in the 2009 review, the articles were screened to identify empirical studies published in either English or German. In the end, a total of 23 empirical studies on the topic of “prevention, health prevention and social inequality” met the criteria for inclusion in the review. Table 3 presents the results of the systematic review. Only study findings pertaining to education, occupation, income and gender are listed. In many of the studies, additional factors were also found to be associated with prevention and health promotion services use.

As evidenced by the findings presented in Table 3, 20 of the 23 reviewed studies provided relatively clear evidence of a significant association between higher social status and greater use of prevention and health promotion services. (The results of the other three studies were not as conclusive as the others.) Evidence of this association was provided for almost the whole of Germany. Whereas only one study was conducted exclusively with men, three were conducted only with women. The majority of the studies examined secondary prevention measures. No studies were found dealing with tertiary prevention or using qualitative methods to explore their research questions.

## Discussion

The aim of this study was to examine social inequality in prevention and health promotion in Germany through a systematic review of literature. The choice of search terms played a major role in the review process. On the one hand, they had to be broad enough in order to identify all studies on the review’s topic; on the other hand, they had to be narrow enough to distinguish between relevant and irrelevant studies. Nevertheless, it is possible that some studies (e.g., unpublished studies) may not have been included. This should be taken into consideration when interpreting the review’s results.

Overall, the review shows that there is sufficient evidence for the relationship between social status and the use of prevention and health promotion services and that this association is both significant and relevant. There are, however, a few “blind spots” in research on this topic, such as a lack of studies on tertiary prevention, especially with regards to prevention and health promotion services use among men, as well as general studies on health promotion among men and women. There is also a lack of published intervention studies demonstrating how to better reach the socially disadvantaged. Recently, however, there have been concerted efforts in this area (e.g., by the German Federal Ministry of Education and Research). Studies on tertiary prevention measures may not have been identified due to the terms chosen for the literature search. It is possible that these types of measures are subsumed under the term “rehabilitation”. According to the reviewed studies, gender tends to have a greater effect on the use of prevention and health promotion services than characteristics of vertical social inequality. This is in part due to the greater public awareness of preventive measures for women (e.g., breast vs. prostate cancer early detection) and does not take into consideration the degree to which the offered measures are necessary and under which circumstances they were used. According to the Andersen model, all of the determinants of services use examined in this review (i.e., education, occupation, income and gender) may be categorized as individual factors [2], [3]. Contextual factors have only been examined in a few studies, the reason for this most often being that specific data on individual characteristics are not available. For this reason, studies such as that of [44] use data on average income in individual regions and not on individual or household income. This particular type of ecological analysis makes it difficult to derive causal inferences, particularly since the individual characteristic is not (cannot be) controlled for. Though in some Studies (e.g. [11]) some individual characteristics are controlled for (eg. school type attended) but other relevant variables (e.g. class size or financial resources of the school), are not. Although "type of school attended" is an individual characteristic for which data is collected from individual people, it must be assumed that schools constitute important contexts of influence on the use of prevention and health promotion services and that the “type of school attended” variable – along with other variables, such as class size, financial resources, teachers’ qualifications – is just a relevant characteristic of these contexts.

A noteworthy outcome of this review is the wide range of studies identified through the selected search strategy. Not only did the strategy identify studies on cancer screening and vaccination prevalence; it also identified one on the use of sunscreen. A (survey) study focusing only on physical activity was also found (and not excluded) [7]. A different search strategy probably would have identified numerous other studies exploring physical activity, though not explicitly within context of prevention

Table 3: A breakdown of the reviewed studies by area of interest, target population, region of study, and findings

| Author(s) & Year            | Area of interest                        | Population   | Region of study        | Findings   |
|-----------------------------|---|--|------------------------|--|
| Becker et al. 2007 [7]      | Health promotion                        | Adults aged 50–70  | Baden-Württemberg      | SES ↑ – HP ↑<br>People with higher levels of education tend to be more physically active. No sex-specific differences were found.  |
| Fridrici et al. 2007 [11]   | Health promotion                        | Adolescents  | North Rhine-Westphalia | SES ↑ – PP ↑<br>Girls consult the internet for information on health-related topics more often than boys. The type of school being attended has a significant impact on the use of online prevention courses (i.e., an e-learning module offered to complement a stress prevention training program as part of the intervention study).  |
| Horch & Wirz 2005 [16]      | Health promotion                        | Adults   | Germany                | SES ↑ – PP ↑<br>Women use all forms of media—with the exception of the Internet—more often than men to obtain health information.<br>The frequency of information use and the number of different media used are higher in the middle and upper classes than in the lower social class.  |
| Wanek 1999 [56]             | Health promotion                        | Employees  | Germany                | SES ↑ – HP ↑<br>Use of behavior-oriented health promotion programs is higher among women and salaried workers (versus hourly-paid workers).  |
| Kahl et al. 1999 [21]       | Health promotion & prevention           | Adults   | Germany                | SES ↑ – HP ↑<br>Bivariate analysis revealed use of health check-ups to be somewhat higher among men. No linear trends were found across the social class groups. Women and members of the upper class participated more often in cancer screening programs. Women and members of the middle and upper classes participated more often in health promotion programs.  |
| Richter et al. 2002 [39]    | Health promotion & secondary prevention | Adults   | North Rhine-Westphalia | SES ↑ – HP ↑ (W), SP ↑<br>Women undergo cancer screening exams more often than men. Men in the middle and upper classes took part in cancer screening programs more often than low social class men. In women, a social gradient in cancer screening participation was found for all age groups except the 70–79 age group; no social gradient was found in participation in health check-ups. Approximately four times more upper class women than low class women took part in a health promotion program. |
| Friedrichs et al. 2009 [12] | Primary prevention                      | Individuals insured through company-based health insurance funds | Germany                | SES ↑ – PP ↑<br>A higher level of education is positively associated with participation in bonus programs.   |

(Continued)

Table 3: A breakdown of the reviewed studies by area of interest, target population, region of study, and findings

| Author(s) & Year                     | Area of interest                 | Population             | Region of study               | Findings  |
|--------------------------------------|----------------------------------|------------------------|-------------------------------|---|
| Garbe & Büttner 2000 [13]            | Primary prevention               | Patients               | Europe                        | SES ↓ – PP ↓<br>Sunscreen is used more often by women and by people who do not work outdoors.   |
| Leyk et al. 2008 [30]                | Primary prevention               | Endurance athletes     | Germany                       | M – PP ↑<br>Men present to sports physicians for preventive check-ups more often than women.  |
| Knopf et al. 2008 [24]               | Primary and secondary prevention | Children & adolescents | Germany                       | SES ↓ – PP/SP ↑<br>Insufficient oral hygiene is associated with the male gender and low social status. Children of low social status are more likely to go in for a dental check-up less than once a year. 0–6 year olds of high social status are significantly less likely to take medication to prevent tooth decay.   |
| Bergmann et al. 2005 [8]             | Primary and secondary prevention | Adults                 | Germany                       | SES ↑ – SP ↑<br>Men go in for health check-ups slightly more often than women. Use of cancer screening services increases with higher social class. Women use cancer screening services more often than men. No gender differences were found in the uptake of flu vaccinations; an association found between flu vaccinations and social status was no longer present after controlling for overall health status. |
| Koller et al. 2009 [25]              | Secondary prevention             | Pregnant women         | Bavaria                       | SES ↓ – SP ↓<br>Attendance of prenatal check-ups is lower among unskilled and semi-skilled mothers with low occupational status and is somewhat lower in communities with a greater percentage of social assistance recipients.   |
| Born et al. 2006 [10]                | Secondary prevention             | Adults                 | Mecklenburg-Western Pomerania | SES ↓ – SP ↓<br>Men and less-educated people are groups at risk for insufficient use of dental services.  |
| Kamtsiuris 2007 [22]                 | Secondary prevention             | Children               | Germany                       | SES ↑ – SP ↑<br>Participation in screening programs increases with higher social status.  |
| Von dem Knesebeck & Mielck 2009 [52] | Secondary prevention             | Elderly adults         | Germany                       | SES ↑ – SP ↑<br>Higher social status is significantly associated with more frequent use of preventive check-ups.  |



(Continued)

Table 3: A breakdown of the reviewed studies by area of interest, target population, region of study, and findings

| Author(s) & Year                | Area of interest     | Population           | Region of study   | Findings   |
|---------------------------------|----------------------|----------------------|-------------------|--|
| Rieger et al. 1999 [42]         | Secondary prevention | Adolescents & adults | Saxony            | W – SP ↑<br>Women go in for dental check-ups more frequently than men. Use of dental services by 25–34 year olds decreases with lower social class. (The latter results are not broken down, however, by reasons for the dental visits.)   |
| Röckl-Wiedmann et al. 2002 [43] | Secondary prevention | Adults               | Bavaria           | SES ↑ – SP ↑<br>Level of education is positively associated with vaccination rates. Higher social class is associated with an increased likelihood of HIV testing, but not with use of screening services.   |
| Rückinger et al. 2008 [44]      | Secondary prevention | Women                | Bavaria           | SES ↓ – SP ↓<br>Districts of Bavaria with a lower average income have particularly low cancer screening participation rates. (Study participants were assigned to districts based on their postal codes.) Participation rates increase nearly linearly with increasing average income. |
| Sieverding et al. 2010 [47]     | Secondary prevention | Adults               | Germany           | SES ↑ – SP ↑<br>There are hardly any differences in the percentages of men and women having undergone a colonoscopy. Colonoscopy use is associated with higher income (in women) and higher education (in men).  |
| Sieverding et al. 2008 [48]     | Secondary prevention | Men                  | Germany           | SES ↑ – SP ↑<br>Use of prostate cancer screening (digital rectal examination and PSA test) is positively associated with education level and income.   |
| Sieverding et al. 2008 [49]     | Secondary prevention | Adults               | Germany           | SES ↑ – SP ↑<br>Use of FOBT is associated with education level, income and female gender.  |
| Simoes et al. 2009 [50]         | Secondary prevention | Pregnant women       | Baden-Württemberg | SES ↑ – SP ↑<br>Attendance of prenatal check-ups is lower among unskilled and semi-skilled mothers with low occupational status.   |
| Stock & Brenner 2010 [51]       | Secondary prevention | Elderly adults       | Germany           | SES ↑ – SP ↑<br>FOBT use is higher in women. Use of FOBT and lower gastrointestinal endoscopies is positively associated with education level and income. (The latter results are not broken down, however, by the eleven countries under study.)                                      |

SES = socioeconomic status; PP = primary prevention; SP = secondary prevention; HP = health promotion; W = women; M = men  
 SES ↑ = higher socioeconomic status groups; SES ↓ = lower socioeconomic status groups; PP/SP/TP ↑ = higher usage of preventive measures; PP/SP/TP ↓ = lower usage of preventive measures; all judgements were based on subjective interpretation of the authors

and health promotion. This example reveals one problem with the methods used in this review.

Another main limitation of the selected review methods, according to the authors, involves publication bias; that is, only significant results tend to be published. This may mean that studies finding no differences by social status were not published and therefore not identified during this review. As another form of publication bias, many publishers tend to prefer quantitative methods over qualitative methods. As a result, this review tends to capture only quantitative results. In addition, the search terms used in this review may have been too narrow, which means that papers which cover aspects of (tertiary) prevention, such as patient self-help groups or rehabilitation, but did not use one of the terms in our search strategy, were not identified. Another important limitation to this review is the time lag involved in empirical studies observing changes occurring in real life. Often, the time between planning a study and publishing its results can be months or even years. The question then needs to be raised as to the extent to which the methods in this review provide an accurate picture of the current state of health care in Germany. The review provides an update of the more general review from 2009 [18], confirming its findings. Including a number of additional study results, there is now a convincing body of literature that shows an association between social status and prevention/health promotion.

Despite its limitations, the review also has certain strengths. The analysis and discussion have a clear empirical basis. The design of the methods used in the review is also clear, understandable and for the most part objective. The results of the review could also serve as a baseline measurement for future comparison. In ten years, for example, a follow-up study could be conducted to determine whether health care inequalities have grown, remained the same or even been reduced.

Health care expenditures will continue to rise in Germany in the future. The country's aging population, coupled with its declining birth rate, is throwing the solidarity system more and more out of balance as older people often create higher expenditures yet contribute less to the health insurance system. The result is increasing health care costs that will have to be borne by a decreasing number of employed citizens unless extensive structural reforms are implemented. In light of the expected increase in the number of elderly and dependent citizens over the coming years, one of Germany's main tasks will be to expand existing prevention and outpatient structures. Additionally, health promotion and prevention services for the elderly will gain in importance alongside care and rehabilitation. A socially equitable health care system should be able to claim, in future, that it continues to contribute to the reduction of health inequality [18].

## Notes

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## Competing interests

The authors declare that they have no competing interests.

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