

Social Epidemiology after the German Reunification: East vs. West or Poor vs. Rich?*

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Summary

Objective: Social epidemiology has consistently demonstrated an association between socio-economic disadvantage and ill health. Seventeen years after reunification, economic disparities persist between former “East” and “West” Germany. We examine whether there are according health disparities and how they developed over time.

Methods: Secondary analysis of socio-economic and health data for Germany.

Results: Health disparities, for example in life expectancy, are decreasing between East and West. Throughout Germany, however, differences in living conditions and demographic trends are widening at city and county level. This development is easily missed when only East and West are compared.

Conclusion: Small-area analyses are required to disentangle the association between socio-economic inequalities and health in Germany. In such analyses, not only individual but also contextual (e.g. area level) characteristics need to be included. Contextual variables can be used to group smaller areas such as counties into clusters with similar properties. Thus, individual survey data can be linked with contextual characteristics while maintaining data protection and at the same time achieving sufficiently large case numbers. Concurrently, theoretical models explaining health inequalities need to be further developed so that they embrace contextual characteristics.

Keywords: Social epidemiology – Health inequalities – Social inequalities – Small-area analysis – Germany.

Former East Germany (German Democratic Republic, GDR) and West Germany (Federal Republic of Germany, FRG) were reunified in 1990, after having been separate states with differing political and economic systems for more than 40 years. Initially, most Germans were enthusiastic about reunification, and expecting more political freedom for former East Germany and economic prosperity for the country as a whole. Today, this enthusiasm has been replaced by a more sober view, at least as far as the economic situation is concerned. Seventeen years after reunification, Germans still speak about “the West” (comprising of the 11 “old” federal states of former West Germany with a total population of 65,68 million in 2004) and “the East” (comprising of the 5 new federal states on the territory of former East Germany, total population 16,82 million including Berlin). [1] Many Germans assume that Easterners (half-jokingly called “Ossis”) and Westerners (“Wessis”) differ in numerous respects, for example in their ability to tackle the challenges of a globalising economy or to value solidarity and human dignity in everyday life. [2]

There is broad agreement in the general population as well as among social scientists that the German reunification brought about major changes, not only in the East but also in the West. There is a striking disagreement, however, whether these changes are on balance positive or negative. This disagreement is evident even when the assessment is limited to economic changes. The sociologist Rainer Geißler (2006), for example, sees an “explosion of prosperity” in the East, [3] whereas the economist and journalist Uwe Müller (2005) calls the German reunification the “Super Maximum Credible Accident”; [4] and the influential German weekly *Der Spiegel* bemoans a “balance of horror in the East”. [5]

Public perception in Germany is characterized by a negative view of the socio-economic situation in the East. Inequalities between East and West are perceived to be large, and this is in line with measurable indicators such as a higher unemploy-

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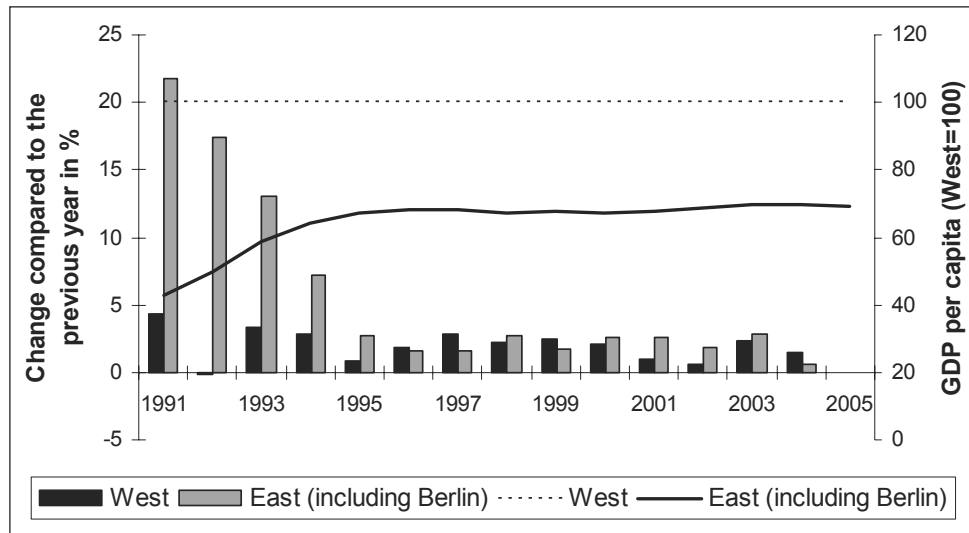


Figure 1 Gross domestic product (GDP) in the East and the West of Germany, 1991–2005. Black line: per-capita GDP in the East relative to the West (right y-axis), Bars: percentage change of GDP relative to the previous year (left y-axis). Source: Own figure, based on data from Statistisches Landesamt Baden-Württemberg 2006.

ment rate and lower mean income in the East, compared to the West. Social epidemiologists from many countries including Germany have repeatedly shown that persons of a low socio-economic status (SES; usually measured as low income, low occupational status or low level of education) are on average of poorer health and experience a higher mortality than persons of a higher SES. [6] Given the persisting socio-economic inequalities between the East and the West of Germany, one would also expect to find persisting – or even growing – health inequalities.

There may be an additional, albeit more speculative, reason for a health differential between the East and the West. Social epidemiology distinguishes between vertical inequalities, which describe the “top” and “bottom” in a society, and horizontal inequalities, which comprise differences, for instance in age, sex, marital status, lifestyle, or nationality. Both can contribute to health inequalities. [6] In view of the alleged differences between East and West, as well as between Easterners and Westerners, the question arises as to whether “East vs. West” constitutes an additional form of horizontal social inequality; more precisely, whether there exists a specific “situation East” as opposed to a “situation West”. By “situation” we here mean a combination of circumstances peculiar to the East and the West, respectively, independent of differences for instance in income. If such situations would exist, they may have additional potential to explain health inequalities between the East and the West.

Surprisingly, empirical data do not quite match expected health differentials. In the following we will demonstrate that health inequalities between the East and the West developed in a different way than social and economic indicators would suggest. We will then show that analyses at the level of the

two large geographic entities “East” vs. “West” contribute little towards a better understanding of the causes of health inequalities in Germany. We go on to illustrate that there is increasing disparity in the living conditions at small-area level throughout Germany, and that these differences are likely to affect the health status of the local populations. To analyse the resulting health inequalities, social epidemiologists will have to conduct small-area analyses, rather than studies comparing the East and the West. For this purpose, data on social, economic and demographic characteristics at the area or contextual level are needed. We will show that particular contextual patterns such as a high unemployment rate combined with declining population size can be found in the East *and* in the West. By linking area level characteristics with individual survey data it should then be possible to establish the respective explanatory power of the individual level variables and the contextual level variables. Concurrently, there is a need to further develop theoretical models explaining health inequalities. New models need to take into consideration not only the role of individual, but also of contextual characteristics.

East vs. West: Success or horror story?

To the German public, “East vs. West” means, primarily, “poor vs. rich”. Fig. 1 provides information on the annual per-capita gross domestic product (GDP), meaning the value of all goods and services produced in one year. The curve shows the GDP in the East relative to that of the West (scale on the right y-axis).

Since 1996, the GDP in the East has been stagnating at around 70% of the level in the West. [7] A rapid convergence seems

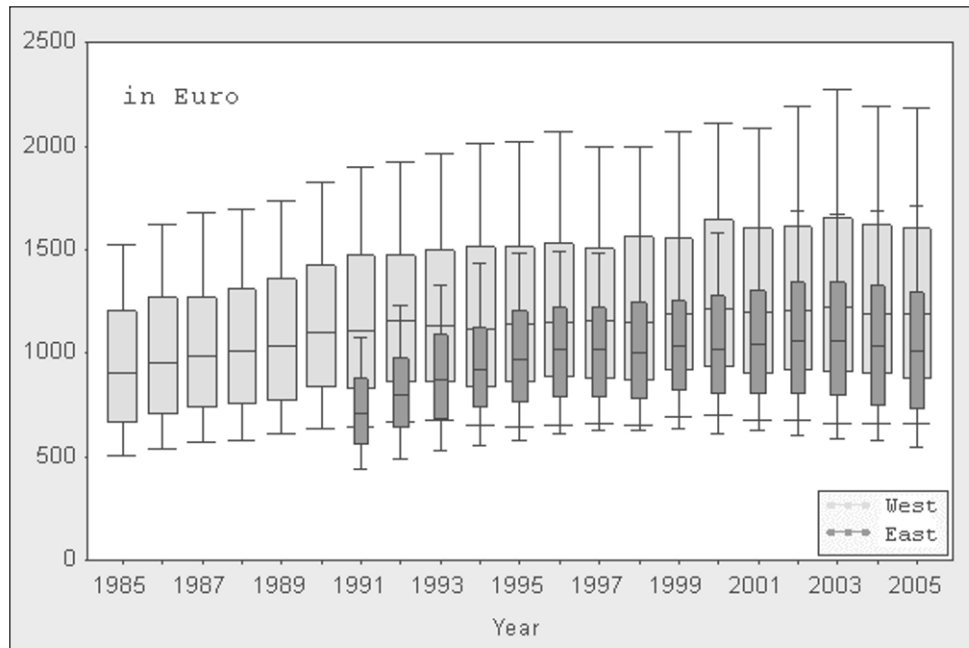


Figure 2 Mean household net equivalence income in the West (1985–2005) and in the East (1991–2005) of Germany. Box plots mark the 25th and 75th percentile; horizontal bars mark the 10th and 90th percentile, respectively, of the mean household net equivalence income. Source: Own figure, based on Statistisches Bundesamt 2006 according to data of the German Socio-Economic Panel (SOEP).

unlikely in the near future, given that there have been, and continue to be, substantial financial transfers from the West to the East, and that 4 out of the 5 new federal states are highly indebted. [4] The one exception is Saxony, the only federal state in the East with a new indebtedness well below the real economic growth.

The stagnation in the East had been preceded by a substantial increase in prosperity, however. The bars in Fig. 1 indicate the annual growth of the GDP in percent (left scale). Considering the lower starting point of the East, Rainer Geißler has described the initial phase as a “catching-up explosion of prosperity”. [3]

Incomes developed in a broadly similar way. Fig. 2 depicts the mean household net equivalence income, a measure of per-capita income modified according to household composition, in the West and in the East since 1985 and 1991, respectively. [1] At the bottom of the income range (10th and 25th percentile), real incomes in the East approached those in the West. Since 1996, the low incomes have been stable or declining, and the gap to incomes in the higher range (90th percentile) has been widening. In other words, income inequality has been increasing, and this happened both in the East and in the West. [8] Geißler has called this trend an “upwards differentiation” of incomes in the new federal states. [3] The stagnation at the bottom of the income scale is partly due to the high unemployment rate in the East, being around 18% in the time period 1997 to 2004, compared to around 9% in the West. [9] The high quota of long-term unemployment gave rise to a “historically new” social situation which is associated with low incomes as well

as with self-rated ill health. [10] Income inequality, however, is more pronounced in the West than in the East. [8]

Health indicators and living conditions in the East and in the West

Despite the persisting gaps in per-capita GDP and mean household income, health disparities between the East and the West have been decreasing in recent years. One striking example is life expectancy. [11] Fig. 3 shows that it has been increasing both in the West and in the East. The increase was even steeper in the East, leading to a convergence: Since reunification, the difference in life expectancy between the East and the West decreased from 2.8 years to 0.4 years for women and from 3.5 years to 1.5 years for men. [12] A large part of the rise in life expectancy in the East is due to a decline in cardiovascular mortality. [13]

Large inequalities at small-area level

While health indicators at the level of the two large geographic entities “East” and “West” converge, widening gaps in health and socio-economic indicators can be observed at small-area level throughout the country. With regard to health indicators, data are scarce and data availability decreases with increasing levels of geographic disaggregation. Nevertheless, there is evidence for substantial health disparities at levels below that

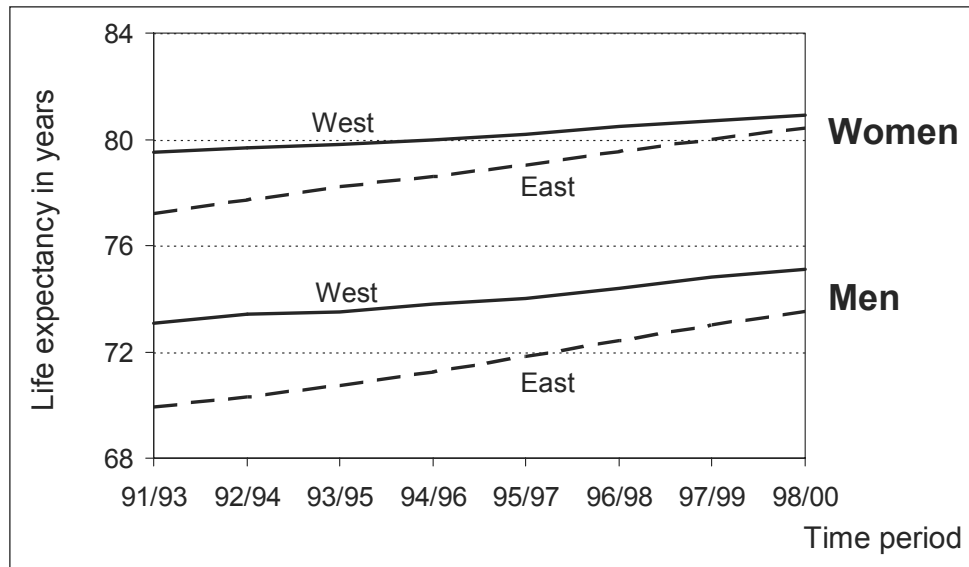


Figure 3 Life expectancy at birth in the East and the West of Germany, 1991–2000. Source: Own figure, based on Statistisches Bundesamt 2006.

of East vs. West. For example, Willich et al. found a north-east-southwest gradient in cardiovascular mortality at the level of the federal states; this gradient is not only present between the old and the new federal states but contains a marked north-south component as well. [14, 15] Angela Queste recently demonstrated similar trends for all-cause mortality at city/county level. [16]

Availability of data at city/county level is considerably better for socio-economic indicators than for health indicators, as we will show below. We will complement small-area socio-economic data with data reflecting local demographic dynamics, then discuss whether patterns in these data emerge that are specific for the East or the West, and finally examine what potential health consequences particular patterns could bring about.

Socio-economic indicators

Fig. 4 shows a breakdown of unemployment rates in Germany by city/county. It becomes immediately obvious that a comparison of unemployment merely at the level East vs. West would hide distinct and often substantial regional differences. [17] There are cities and counties in the West where unemployment rates are as high as in the East: Bremen, the conurbation of the Ruhr area (the former industrial heart of

Germany, comprising, among others, the cities of Essen, Duisburg, Oberhausen, Gelsenkirchen, Herne and Dortmund) as well as the Saarland¹. A comparison with other European countries shows that regional differences in the unemployment rate are particularly large in Germany. For example, Germany and France have broadly similar mean unemployment rates (11.2% and 9.5%). In Germany, however, they range from 5.8% in Upper Bavaria to 22.3% in Halle² while in France (excluding overseas departments), the range is only from 6.4% to 13.2%. [18]

Demographic indicators

The growing regional differences in Germany have a demographic aspect, in addition to the socio-economic aspect discussed above. Demographic changes occur not only in the East, but to begin with we will demonstrate how migration and changes in birth rates affect the demographic situation at the small-area level there.

The territory of the former German Democratic Republic (GDR) experienced substantial out-migration to the West since 1948, with only little in-migration. [4] Since reunification, more than 1.5 million people have, on balance, moved

¹ Note that the sizes of the areas displayed in Fig. 4 are not at all proportional to the respective population size. The Ruhr area (which does not include the large cities of Cologne and Düsseldorf) has a population of 5.3 million people whereas the whole federal state of Mecklenburg-Western Pomerania in the north-east of Germany has a population of only 1.7 million people.

² Data refers to the European territorial units NUTS 2 according to the “Nomenclature of Territorial Units for Statistics” (Nomenclature des Unités Territoriales Statistiques, NUTS) introduced by Eurostat. The NUTS 2 level comprises 254 regions EU-wide, 41 of them in Germany where they correspond to the administrative region “Regierungsbezirk”. France, in comparison, has 26 NUTS 2 regions, of which 4 are overseas departments. At city/county level (NUTS 3), unemployment rates span an even wider range, cf. Fig. 4.

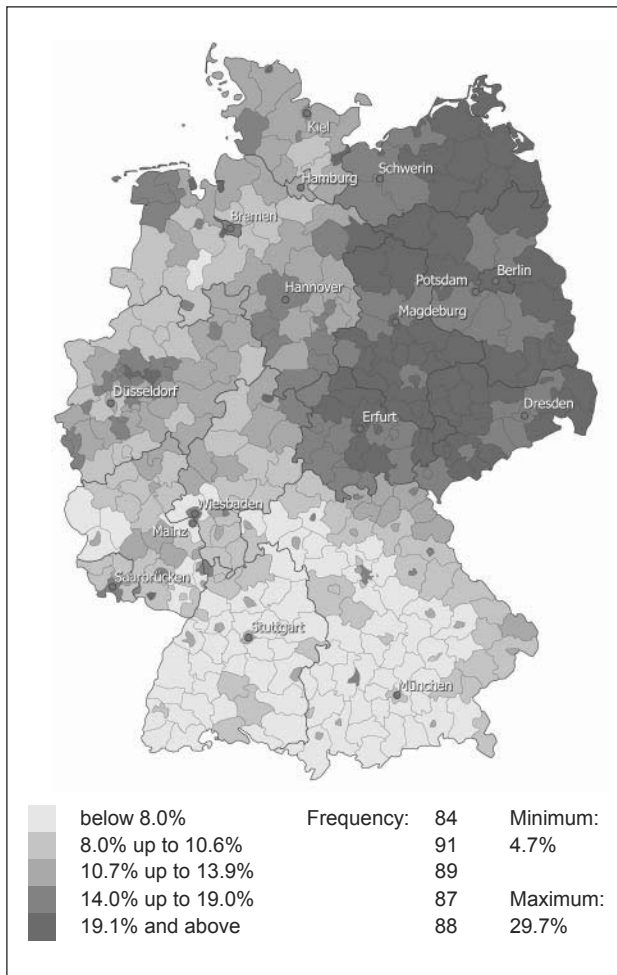


Figure 4 Unemployment rates in Germany at city/county level, 2005. Source: Atlas zur Regionalstatistik, Statistische Ämter des Bundes und der Länder 2006.

from the East to the West of Germany. Some of the consequences:

- The 13 largest cities in the East (excluding Berlin) had lost on average 10 % of their population by 2003. In Rostock, the loss amounted to 20 % or 50,000 people.
- According to demographic projections, the mean age of the population of Mecklenburg-Western Pomerania will reach 57 years by 2040. For comparison, the mean age in Germany was 41.8 years in 2003. [4]

It were particularly the young and the skilled, among them a high proportion of women, who migrated from the East to the West. Elderly people, persons in need of care and the low-skilled tended to stay behind, contributing to the high unemployment rate and the high proportion of recipients of social security benefits in the East. Another consequence of selec-

tive out-migration is the relative shortage of women between 18 and 29 years of age in the East: In the county Uecker-Randow, situated in the southeast of Mecklenburg-Western Pomerania, only 74 young women remain per 100 young men. [19] It seems at least plausible that this imbalance could lead to psychosocial disturbances and ultimately to manifest health problems.

In addition to the net out-migration there is a natural population decline due to a substantial decline in the total fertility rate (TFR; the mean number of children a woman will have during her reproductive period) in the East. The TFR declined from 1.5 at the time of reunification to 0.7 in 1994, before increasing again to 1.3. [19] The resulting shortfall in births in the East will lead to an additional birth deficit in the next generation because the cohort of women now entering reproductive age is small compared to previous cohorts, and it continues to shrink due to out-migration to the West.

The combination of a shrinking population together with a marked increase in the proportion of elderly and socially disadvantaged people is not limited to the East, however. In the West, people are moving out of the cities, often to the surrounding counties. The resulting population shift is particularly pronounced in the Ruhr area (see Fig. 5). The cities of the Ruhr conurbation will loose an additional 10% of their population until 2020, with many of the socio-economic consequences already visible in the East. Thus, a process is ongoing in the East *and* in the West that has been aptly described as a “redistribution of a shrinking population”. [20]

Thinning out of the infrastructure

The consequences of a shrinking population quickly become perceptible in the cities and counties thus affected. A decline in population numbers has negative effects on the current account balance of municipalities; the amount of local taxes, fees and dues collected decreases. Projections indicate that income tax payments in the Ruhr area will decrease by 3.8 % between 2000 and 2015 while they are expected to rise by 1.8 % in North Rhine-Westphalia (the federal state in which the Ruhr area is located) as a whole. With fewer inhabitants, the cities of the Ruhr conurbation will also receive less money from the financial compensation scheme for municipalities (“kommunaler Finanzausgleich”), resulting in a projected budgetary loss of an additional 125 million Euros. [21] Similar losses will occur in the shrinking cities and rural areas of the East.

When the population of a city or county shrinks, so does the budget of the local government. Municipal expenditures, however, cannot simply be reduced proportional to the population

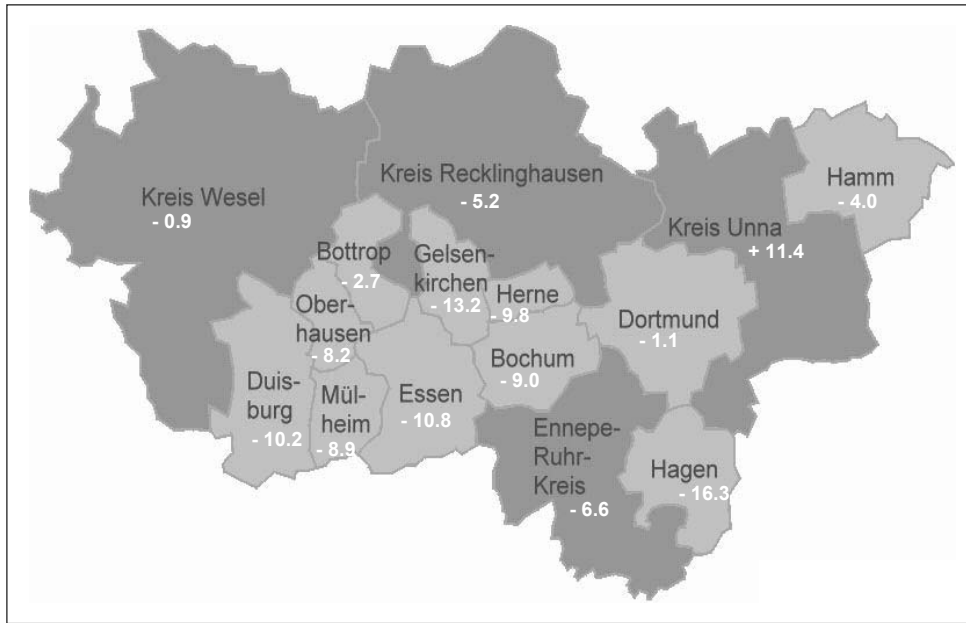


Figure 5 Projected population change in the cities and counties of the Ruhr area, Germany, 2002–2020, change in %. Light grey: cities, dark grey: counties. Source: Projekt Ruhr (unpublished): Bevölkerungsentwicklung in den Städten und Kreisen des Ruhrgebiets. Used with permission by Ms Andrea Hoppe. Data provided by Landesamt für Datenverarbeitung und Statistik des Landes NRW (LDS).

decline. One important reason is the fixed cost of technical infrastructure. In the East, many of the newly constructed water and sewage systems were over-dimensioned. It is not possible to simply partition-off a section of such infrastructure to reduce capacity, so the maintenance cost remains high even when utilization is low. [22] Moreover, an oversized sewage system has to be flushed regularly to avoid blockage and corrosion. Completely dismantling whole sections of municipal infrastructure would not only be expensive; in most cases, it would simply not be feasible because shrinking cities tend not to contract but turn into “perforated cities”. [23]

Declining population numbers could also have a negative effect on health care infrastructure, particularly in the rural areas of the East. [24] It is difficult, however, to find a scientifically sound indicator for such effects. The mean number of inhabitants cared for by one general practitioner (GP) provides at least a rough indication of the accessibility of health care in a region. In 2004, Brandenburg (located in the East) was the federal state with the second lowest density of GPs in Germany, with an average of 1,669 inhabitants per GP compared to the national average of 1,548 inhabitants per GP. The number of GPs in Brandenburg decreased from 1,701 in 1996 to 1,522 in 2004, which amounts to 11%. At the same time, the proportion of GPs aged 60 years or above increased from 10% to 31%. In rural counties of Brandenburg such as Prignitz or Uckermark this proportion is even higher. [25] In the future, it will probably become even more difficult to find young doctors willing to take over the vacant medical practices in rural areas.

So far, too few small-area analyses investigating the health effects of constellations, for example of shrinking populations

and thinned-out infrastructure, have been conducted. The example of the Ruhr area suggests that health effects indeed exist: In the Ruhr conurbation, men have a life expectancy at birth that is 1.3 years lower than the average of the federal state of North Rhine-Westphalia; for women, the difference is 0.9 years (time period 2002 to 2004). [26] In comparison, the differences between the East and the West of Germany were 1.5 years for men and only 0.4 years for women (see above). In the case of the Ruhr conurbation, the lower life expectancy compared to North Rhine-Westphalia does not derive from higher mortality rates in the oldest age groups. The excess mortality is highest in the age groups from 40 to 49 years that would usually still be economically active. [26]

Are there specific “social situations East” and “West”, respectively?

Living conditions in the East and in the West are becoming more equal and health inequalities at this level are disappearing. At small-area level, however, economic inequalities are increasing and populations are moving, often leading to population loss in former industrial centres and rural areas. In consequence, inequalities emerge at small-area level, with regard to the economic situation, to the social and health infrastructure and probably also to the human, social and educational capital. In this way, region-specific social situations are evolving, rather than one particular “social situation East” and one particular “social situation West”, respectively. In the rural areas of the new federal states, for example, a characteristic combination of factors can be identified. It comprises

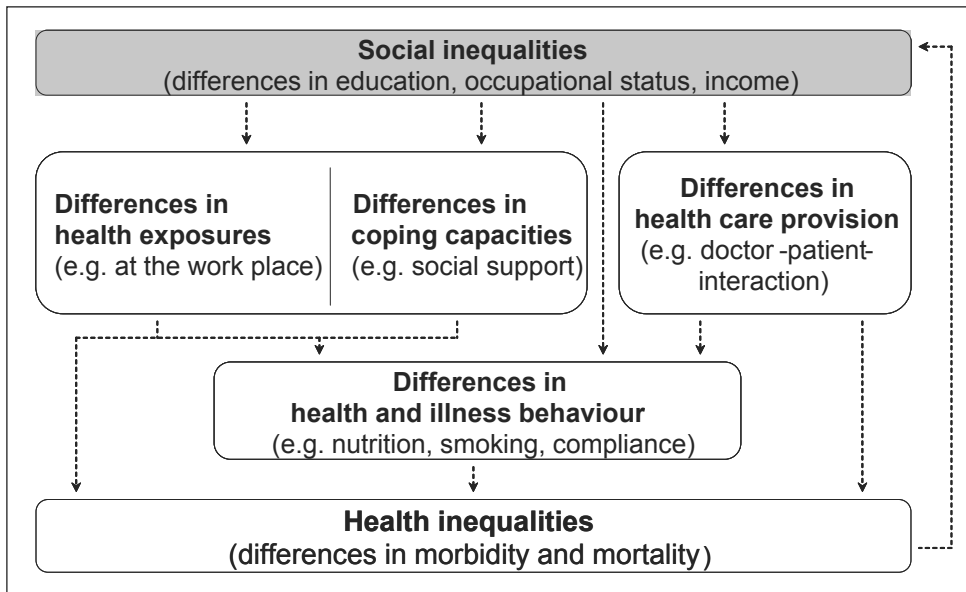


Figure 6 Mielck's explanatory model of health inequalities. Source: Mielck 2005, own translation.

population losses, a low women-to-men quota as well as a marked thinning out of local infrastructure with a restriction of services. Among the services affected are education, child care, administration, retailing, public transport and the provision of care by GPs. [19, 24] In the urban areas of the West, there are different factors or combinations of factors such as a high proportion of population with a low socio-economic status, combined with a high proportion of immigrants and a high income inequality. [19, 21, 27] The available evidence, however, does not support that there are specific “social situations East” and “West”, respectively.

Research needs in social epidemiology

The question regarding specific “social situations East” and “West” reveals knowledge gaps and research needs in social epidemiology. It is not yet clear how the concept of “social situation” can be standardised in the context of health and how it can be properly assessed, given its complexity. [6] Furthermore, it has long been proposed to link information on the social context (Siegrist uses the term “socio-ecological environments”) with individual-level data. [28] Some studies looking at health outcomes have already attempted to do this in Germany. [29] Still, there is a need to investigate which characteristics at contextual or small-area level affect the health status, *beyond* the individual socio-economic status. [28]

Andreas Mielck rightly criticises social epidemiological research in Germany for focusing too much on empirical data, at the expense of theory. Indeed, the research often focuses on

the description of health disparities, without then being able to explain its causes. When explanatory models are used, they are often not well differentiated or lack an empirical basis. [6] Back in 1993, Steinkamp observed that a theory-based conceptualization of the complex chain of causation spanning from social inequality to the individual, as well as a detailed understanding of its links, was missing. [30] He postulated factors which mediate between social inequality (the macro level) and ill health (the micro level). These factors are located at a meso level and comprise material as well as social conditions (see Fig. 6). Only some of these factors are known; often, they are complex constructs such as social support, which is considered to be an important determinant of health. Differences in social support are frequently used as an *ad hoc* explanation for inequalities in health but it remains unclear what part of the inequalities they can actually explain. [6] Most explanatory models of social and health inequalities such as the one by Mielck do not adequately take into consideration the growing disparities at small-area level in Germany. It seems plausible, however, that unfavourable constellations of regional economic, social and demographic factors have an influence on health which goes beyond that of factors at individual level. New or revised explanatory models are needed which embrace such contextual characteristics.

A practical consequence is that instead of comparing “East vs. West”, it seems more useful to identify and compare clusters of smaller areas with similar constellations of contextual factors. The work of Klaus Peter Strohmeier and colleagues at the Centre for Interdisciplinary Ruhr Area Research (ZE-FIR) of Bochum University, in collaboration with the North Rhine-Westphalian State Institute of Public Health (LÖGD)

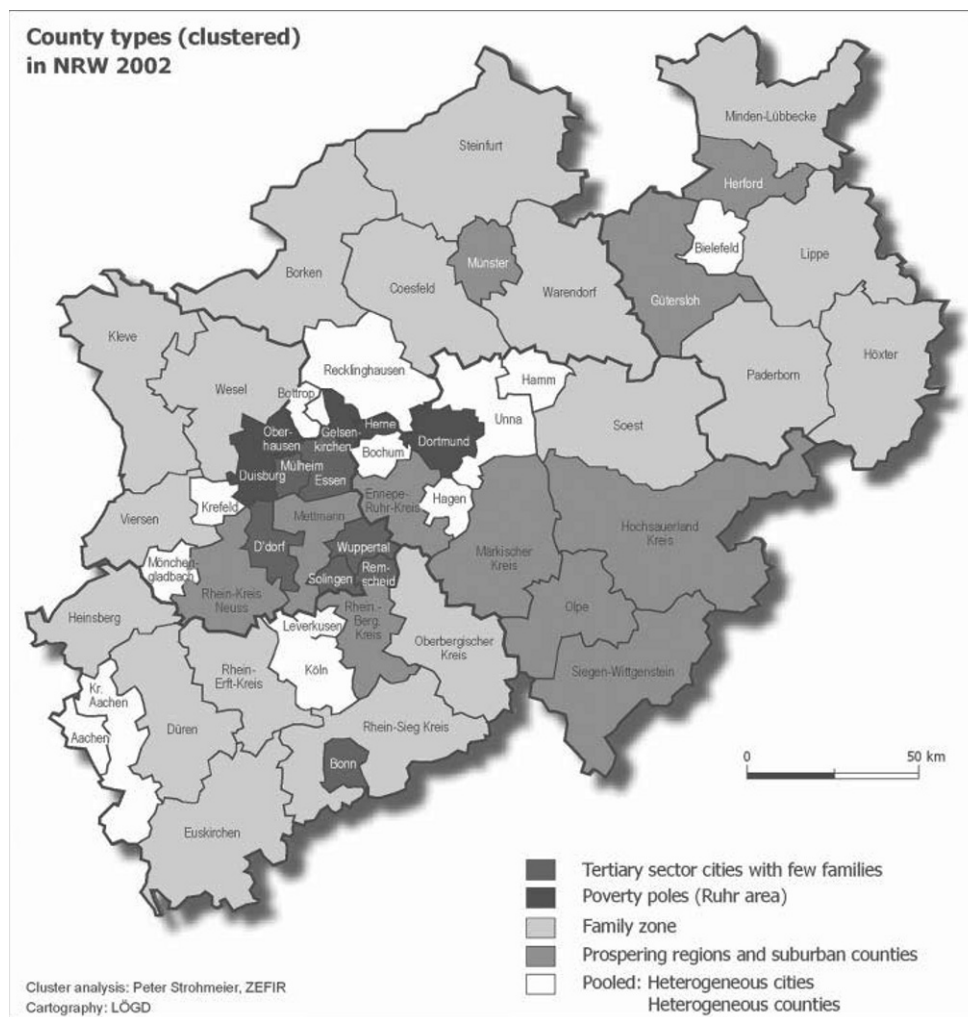


Figure 7 Clusters at city/county level in North Rhine-Westphalia (NRW), 2002. Source: LÖGD NRW. Based on Strohmeier et al. 2007.

in Bielefeld, shows how such clusters can be constructed. Using multivariate analysis the researchers pooled several factors at the level of the 54 North Rhine-Westphalian counties. [31] Fig. 7 shows five cluster types which have thus been identified, including a short description.

Jürgen Flöthmann and colleagues followed a similar approach when they identified “demographic types”, which are clusters based on small-area population forecasts. [32] It seems useful and feasible to further develop such clusters by including data on local economic performance and infrastructure. Data at small-area level is increasingly becoming available in Germany, e. g. at city/county level with the introduction of a catalogue of regional indicators (“Statistik regional”) in 1995. Angela Queste made use of this catalogue in an exemplary way in her small-area level analysis of all-cause mortality in Germany. She included three socio-economic indicators at city/county level: unemployment rate, proportion of high-school graduates and population density. [16]

Perspectives

An ecological approach generating clusters can be complemented by individual level data. Such data could be derived from the German Socio-Economic Panel (SOEP) or from telephone surveys on health. In this way it will be possible to perform multi-level modelling; by means of hierarchic models one can then assess which proportion of health inequalities is explained by individual-level variables, and which proportion by contextual level variables, respectively. [33] Furthermore, it will be possible to study interactions between these two levels. Provided the number of clusters is not too high, it will be possible to achieve sufficiently large sample sizes per cluster and at the same time comply with data protection rules. Similarly, theoretical models explaining health inequalities need to be further developed so they not only embrace individual but also contextual characteristics. This would greatly help to select appropriate variables to construct clusters.

Theoretically and empirically sound explanatory models could help to develop targeted interventions to reduce health inequalities, and to evaluate their effectiveness. The challenges due to regional population decline, in association with unemployment and increasing income inequality, would justify the effort. These problems are not limited to the East; similar tendencies can be observed in the former industrial cities of the West. Thus the new federal states could become model regions for an active and humane management of problems

concerning Germany as a whole, [4] while simultaneously helping to overcome the unconstructive “East vs. West” dichotomy.

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