

Jörg Peter Vögele (*Heinrich-Heine-Universität Düsseldorf, Germany*)

<https://orcid.org/0000-0002-1252-8457>

[joerg.voegele@uni-duesseldorf.de](mailto:joerg.voegele@uni-duesseldorf.de)

Grażyna Liczbińska (*Adam Mickiewicz University, Poznań, Poland*)

<https://orcid.org/0000-0002-0922-4612>

[grazyna@amu.edu.pl](mailto:grazyna@amu.edu.pl)

## CHILD LABOUR AND HEALTH DURING THE INDUSTRIALIZATION IN WESTERN EUROPE WITH SPECIAL REFERENCE TO PRUSSIA

**Abstract:** Child labour is a controversial issue both in presentday as well as in past societies. In historical perspective, studies focus on the factory labour of children during the industrialization process. On the one hand, its contribution to the family income is mentioned as a potential positive effect on the living standard of the whole family, on the other hand reference is made to the permanent health risks for children working in the factories. Using qualitative sources, there were contemporary testimonies supporting both views. The present paper, therefore, uses a rather quantitative approach referring to the number of working days lost due to illness, anthropometric indicators such a height and weight, the results of draft examinations as well as mortality differences and cause-of-death rates from “accidents” in urban and rural areas during the nineteenth century. Available data do not provide clear evidence of direct harmful effects of child labour; many indications point to a neutral or even positive effect.

**Keywords:** child labour, child health, nineteenth century, Europe

<https://doi.org/10.14746/sho.2023.41.2.004>

### INTRODUCTION

Child labour has been a persistent and controversial issue both in the current view, especially with respect to the global south, as well as in historical perspective, particularly during the industrialization process. In general, it is not endorsed, at most it is tolerated in terms of its contribution to fami-

ly income, which is necessary in many societies in order to enable at least a minimal standard of living (see, for example, the current discussion about child labour in the Congolese artisanal small-scale cobalt mining). Strict opponents of the present-day child labour, on the other hand, regularly refer to the health risks for children and like to draw parallels with historical developments in modern Western industrial societies. Before child labour became less important due to rising living standards, changes in work organization and national legislation, industrialization, with its increased use of machines, is said to have made many commercial jobs literally child's play and led to increased exploitation of children, the consequences of which left their traces in the health status of the children.

The importance of family income and standard of living emphasizes Nardinelli (1990); the introduction of compulsory schooling is seen as a decisive influence by Weiner (1991); change in the organization of adult workers is mentioned by Bolin-Hort (1989); a changed attitude towards childhood by Cunningham (1995). On European legislation see Agahd (1904) and Kastner (2004). For an overview see Cunningham and Viazzo (1996); Hobbs, McKechnie and Lavalette (1999); Lieten and van Nederveen Meerkerk (2011); as well as Lavalette (1999); Humphries (2011), and Anderson (2018). For child labor in Germany see an exhibition by the Museum Industriekultur Osnabrück GmbH in collaboration with terre des hommes Deutschland, titled: *Kinderarbeit einst und jetzt* (2002) and Feldenkirchen (1981). For an overview see: Kocka (1990: 462–473), Wehler (1987: 254–258); Ritter and Tenfelde, (1992: 198–204). For the situation of working class children in general see: Flecken (1981). Documents and sources can be found in Quandt (1978).

The present contribution will present and discuss some qualitative and quantitative approaches to explore the interrelationship between child labour and health reaching from classic contemporary investigation to modern historical analysis. The geographical focus will be on Western Europe with special reference to the situation in Prussia.

## QUALITATIVE APPROACHES

In international historical research, the connection between child labour and health is therefore considered an indirect measure of the exploitation of children during industrialization. The literature is essentially limited to child labor as factory work. Agricultural activities and commercial

work by children outside of the factories are not taken into account. Both were considered by contemporaries to be much less problematic and for this reason are much poorer documented (see also Feldenkirchen, 1981: 3). This approach has a long tradition: In his classic report on "The situation of the working class in England" (Engels, 1845), Friedrich Engels pointed out the increasing deterioration of the health of children as a result of industrial work. This interpretation was adopted by Karl Marx in his analysis of the Industrial Revolution (Marx, 1867/1952: 192–196). In fact, there are countless indications of how factory work damaged children's health (see for example Hoppe, 1969; Adolphs, 1972; Lange, 1978; Herzig, 1983; Luxem, 1983; Hansen, 1987; Gernert, 1993). Children are said to have worked themselves to death or at least ruined their health. For example, the Düsseldorf government reported in 1825 that thousands of children – including four- to six-year-olds – had to work up to 14 hours a day:

Pale faces, dull and inflamed eyes, swollen bodies, bloated cheeks, swollen lips and nostrils, swollen glands in the throat, nasty skin eruptions, and asthmatic accidents distinguished these unfortunate creatures, who were early alienated from family life, and spent their youth in sorrow and misery, in terms of health from children of the same class who do not work in factories. Their mental and moral education correlated the same way (Anton, 1891/1953).

The following illnesses are repeatedly mentioned as typical occupational diseases of children: asthma symptoms, wasting, anaemia, blood spewing, hernias, chest pains, epilepsy, skin rashes, chicken breast, cough, colic, myopia, lameness, pulmonary tuberculosis, stomach and intestinal diseases, anthrax diseases, rheumatism, insomnia, tuberculosis, curvature of the spine or legs, crippling (Adolphs, 1972: 109–111; Hansen, 1987: 85; Luxem, 1983: 27–29, 50, 60–61; Engels, 1845: *passim*; Deutsch, 1914: 116–132).

The problem with this point of view is that throughout the nineteenth century there are also countless reports claiming the opposite, emphasizing the good treatment and good health of the children (Stockmann, 1989: 20; Kirby 2013). Favorable testimonials can even be found about the situation in the notorious textile mills. Here is an example: By decree of the Minister of Education von Altenstein to the district governor of Düsseldorf in 1824, the administration sent a questionnaire to the local mayors. When asked about the state of health of factory children in comparison to other children, the mayor of Ratingen – where the first continental factory "Cromford" had been founded decades before – replied: "It is not worse, but better. [...] The mostly walking and standing work in airy buildings

keeps the children healthy, those who don't work in them are sick from misery and begging" (Hauptstaatsarchiv Düsseldorf, F.A. Brügelmann Nr. 41, as cited in Stockmann, 1989: 16).

As late as 1888, for example, a factory inspector commented on child labour in Schleswig-Holstein factories:

With few exceptions, the local population has high wages and eats well. This is probably the reason for the mostly healthy appearance of the young workers in the larger factories, which are properly equipped. It is therefore justifiable to say that, apart from ethical considerations, there is no physical harm resulting from the employment of young workers in factories (as cited in Hansen, 1987: 83).

Even contemporary medical professionals were divided in their judgment, or as Derek Fraser put it: "...some eyes saw debilitated and deformed children, others saw alert and lively youngsters doing useful, healthy work" (Fraser, 1973: 13). On the one hand, this was certainly due to the fact that the working conditions differed considerably – depending on the industry, but also with regard to the work organization, for example in the model factories; on the other hand, inspections were often announced and the verdicts were ideologically or politically colored. The district physicians were dependent on the local authorities, and these in turn were politically and socially dependent on the local factory owners. So it is not surprising that even the extremely unhealthy work done by young people in the match factories was classified as harmless. Under the production conditions of the time, this work could lead to phosphorus necrosis of the jaw. In order to prevent a fatal outcome, the lower jaw had to be "surgically removed" (see Hansen, 1987: 85; Schlieben, 1898). After all, these individual descriptions were simply subjective views with a rather anecdotal character, which all in all remain inconclusive and are of little help for the historical analysis.

## QUANTITATIVE APPROACHES

Statistics on child labour offer a more systematic approach. However, the quality is often poor. The information presented is often selective and imprecise (e.g. with regard to age information). It is said that in Germany the peak of child labour occurred in the 1830s–40s, but some absolute figures are only available for the last quarter of the nineteenth and the beginning of the twentieth century. According to these statistics, the number

of children aged 12–14 working in factories under trade supervision was 21,158 in 1875 and rose to 27,485 by 1890; then falling again to 12,062 in 1908. In contrast, the number of factory working 12–16-year-old children increased continuously from 66,827 in 1875 to 452,317 in 1908 (Agahd, 1906: 821; Stieda, 1910: 731). The number of children under the age of 14 working outside the factories is estimated at 544,283 (Agahd, 1904: 2–3). In the light of such information, it can certainly be assumed that there were a considerable number of unreported cases, which most likely increased with the growing criticism of child labour and extended legal regulations (Kocka, 1990: 462). Substantiated and reasonably accurate estimates of the extent of child labour in the nineteenth century can only be made with extreme caution. There are therefore three alternative approaches in the research literature: The first draws on contemporary information about the proportion of children and young people in the total number of workers, which varied greatly depending on the industry and ranged, in 1895 for example, from 3.6 percent in mining up to 8.8 percent in the textile industry (Feldenkirchen, 1981: 27); a second approach focuses on the children’s contribution to the family income. This was generally higher than that of the mother and rose to up to 40 percent with the advancing age of the head of the family (Haines, 1979; Horrell and Humphries, 1995). A third relies on the results of the censuses, which thus allow a reference to the corresponding total population, but are only available for a few countries. Although the material is certainly very unreliable where precise figures were concerned, the extent and magnitude of child labour can at least be estimated. In this respect, the figures for England and Wales in the last quarter of the nineteenth century correspond to the current rates for many developing countries (Table 1).

Table 1: Percentage of working children in England and Wales, 1851–1911

Year Age	1851	1861	1871	1881	1891	1901	1911
Boys 5–9	2.0	2.0	0.8	-	-	-	-
Girls 5–9	1.4	1.1	0.7	-	-	-	-
Boys 10–14	36.6	36.9	32.1	22.9	26.0	21.9	18.3
Girls 10–14	19.9	20.2	20.5	15.1	16.3	12.0	10.4

Source: Census of England und Wales, as cited in Cunningham, 1996: 42.

Meanwhile, Polish historians have mentioned the cases of falsification of birth certificates of children and bribes for arranging the employment of a child to work in a factory (Bołdyrew, 2013). Even in the late nineteenth century in the Kingdom of Poland (Polish lands annexed by Russia) almost 5 percent of industrial workers were under the age of 12, while the group of 16 to 19 years old consisted twice as much (Bołdyrew, 2013).

The source situation is even worse when it comes to the connection between child labour and health – especially since a distinction has to be made here between direct damage and long-term consequences. For methodological issues and approaches on the effect of child labour on health in selected current populations (see Dorman, 2008: 29–46). In the following, systematic access options will be presented, which, however, are locally and temporally limited in each case, including an assessment of the health risks of child labour which can be derived from them.

The recording of working days lost due to illness offers a systematic approach. One of the most important sources on child labour, the 1819 “Report on the State and Condition of the Children Employed in the Cotton Manufactories of the United Kingdom” contains age-specific information on sick days for 1,806 workers of all ages compiled from 11 textile mills (Table 2). Overall, the differences were not very pronounced, but at least children had fewer lost days than all other age groups, so they tended to be healthier than older workers. However, this finding may reflect the long-term effects of child labour: Chronic complaints or infirmities caused by working as a child may only have manifested themselves at a later point in time in life. It also remains unclear whether and how the state of health of commercially employed children differs from that of non-employed children. Moreover, age-specific working contracts or dismissal practices might have influenced this compilation.

Anthropometric indicators allow an alternative approach to the problem. Data on people’s height and weight provide far-reaching information about environmental conditions and living standards. Some basic analysis attempts have been made for Germany (Wurm, 1982; Komlos, 1990; Baten, 1996). The classic relevant study, however, comes from the USA: Robert Fogel designed a curve for the height growth of men in the United States since the early 18th century, which shows astonishing mirror-inverted correlations with long-term mortality trends (Fogel, 1986). Thereafter, an increase in size of this selected population can be observed until the 1830s, then the size was decreasing significantly for several decades, only to begin to increase again in the 1890s. Corresponding results have been ob-

Table 2: Weeks lost due to illness in the British textile industry, (labour percent)

Age (years)	Weeks of illness			
	Less than 1 week	1-3 weeks	More than 3 weeks	Total (absolute)
< 10	89.2	5.4	5.3	93
10-14	79.8	8.4	11.8	574
15-19	78.9	6.6	14.5	427
20-29	76.5	9.8	13.7	417
30-39	81.4	8.0	10.6	199
40 and more	79.2	7.3	13.5	96
Total	79.5	8.0	12.5	1806

Source: *Minutes of evidence taken before the Lords Committee appointed to enquire into the state and condition of the children employed in the cotton manufactories of the United Kingdom (1819)*, as cited in Nardinelli (1990: 78).

tained for England by the working group led by Roderick Floud (Floud, Wachter and Gregory, 1990). In a similar study, W.P. Ward argued that infant birth weight provides an additional useful indicator of the mothers' overall nutritional status (Ward, 1993). His analysis of data from welfare maternity hospitals in five major Western European and North American cities (Boston, Dublin, Edinburgh, Montreal and Vienna) revealed dramatic declines in the nutritional status of poor women during the late nineteenth century. Sophia Nora Twarog came to similar conclusions when she discussed long-term changes in height during the second half of the nineteenth century in Württemberg with regard to information about the average state of health, infant mortality and life expectancy and noted various phases in which health conditions deteriorated (Twarog, 1993).

One of the best sources on child labour in this respect is the 1837 study by the factory inspector Leonard Horner (1785-1864) of the height of children working in the Manchester textile mills (Horners study is discussed in Tanner, 1981: 153-161). Horner found that the children employed in the factories were by no means smaller than corresponding age cohorts outside; on the contrary, factory children between the ages of 13 and 17 towered over their peers in Horner's national sample by as much as 3.7 to

6.2 centimeters (Nardinelli, 1990: 81; see also Kirby, 2013: 115). However, this may simply be a consequence of hiring practices: smaller children may simply have been deemed too young and sent home. A similar study based on data from 1843 on the height and weight of children in the Ghent cotton industry, on the other hand, comes to the conclusion that both values for the factory children were substantially below the average of a corresponding comparison group (De Herdt, 1996: 31). However, it remains unclear to what extent this can be attributed to factory work, since it was precisely the children from the poorest families who had to contribute to the family income through factory work. They probably already had a low birth weight and suffered from a low standard of living and poor environmental and living conditions from an early age.

The results of the Prussian draft lists were already considered by contemporaries to be a classic indicator of conditions in Germany. In the older literature, military considerations were often seen as driving child protection legislation. Liberals and conservatives debated for decades, whether protagonists of the school administration or of the military were more influential in the process leading to provincial parliamentary discussions and a first abolishment in 1839. Although this was probably not the case, since the number of recruits available was far higher than that actually required (Feldenkirchen, 1981: 13–14), a regional differentiation via the connection between the degree of industrialization and the proportion of those drafted unfit allows indirect statements to be made about the health consequences of working with children and young people. In fact, the average conscripts patterned as permanently incapable in the industrial districts in the years 1831–1862 were twice as high than in rural areas or the average for all of Prussia (Table 3). However, if one takes into account the temporarily unfit sampled, two predominantly agrarian provinces achieved higher values. All in all, the industrialized provinces actually made up a significantly higher proportion of conscripts in the same period,<sup>1</sup> so that there can be no question of health disadvantages for young people in the industrial regions, at least as reflected in the draft lists.

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<sup>1</sup> Westfalia 15,2% of the general inscription, Rhine Province 11,9%, Saxony 10%, Silesia 9%, Posnan 9%, Brandenburg 8,7%, Pommerania 8,7%, and (East-)Prussia 7,6% (*Zeitschrift...* 1864: 77).



Table 3: Draft examinations in Prussia on average for the years 1831–1862 (%)

	permanently incapable	temporarily incapable	permanently and temporarily incapable
Prussia (Province)	4.3	37.0	41.3
Posnan	3.8	27.8	31.6
Brandenburg	4.3	30.7	35.0
Pommerania	3.9	37.7	41.6
Silesia	3.8	29.2	33.0
Saxony	5.8	31.7	37.5
Westfalia	9.4	30.2	39.6
Rhine Province	10.9	34.0	44.9
Prussia total	5.6	32.4	38.0

Source: Feldenkirchen, 1981: 15.

Mortality is the classic systematic indicator of health conditions and their development during industrialization. Repeatedly, from contemporary literature to modern historical research, reference is made to the increased mortality of child factory workers.<sup>2</sup> However, there is no meaningful systematic numerical material available: information on mortality by occupation is usually without age differentiation; if age groups are specified, these begin at 20 years or higher (Prinzing, 1930/1931: 609–632). In addition, there is no information about the relevant population at risk – i.e. the number of workers – so that no accurate evidence of the impact of child labour on mortality can be provided from this material. Indirectly, therefore, the difference in mortality between town and country is often used as an indicator and the traditional urban excess mortality valued as proof of the harmfulness of industrial work. However, the level of urban mortality was determined by a variety of factors, ranging from living standards to urban environmental conditions (Vögele, 2001). For this reason, at least a differentiation of the data according to sex and age is substantial. This

<sup>2</sup> For example in the travelogue of the Geh.Reg.-Rat Keller about child labor in the Rhineland (1834), reprinted in Alt (1958: 197–212).

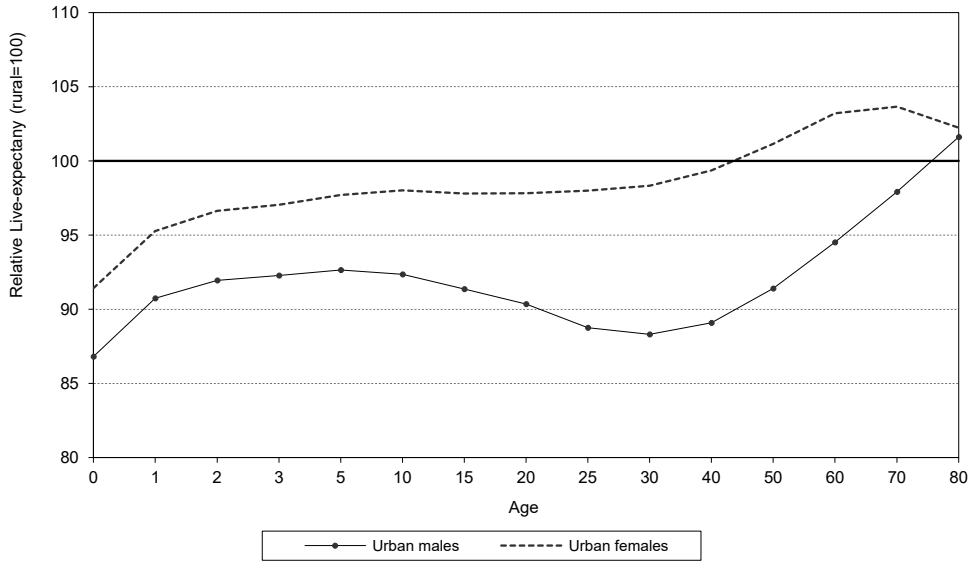
is possible using the Prussian statistics for selected years. Figure 1 therefore shows the relative life expectancy for females and males in town and country in Prussia in 1877.<sup>3</sup> It has to be kept in mind, however, that in industrializing regions many settlements remained country parishes in administrative and thus statistical perspective for decades despite their factories and growth. After that, urban excess mortality affected almost all age groups, but was particularly pronounced among males. Since, according to the survey on child labour ordered by the Reich Chancellor in January 1898, almost twice as many boys as girls under the age of 14 were in commercial employment (191,496 boys, 107,676 girls) (Abelsdorff, 1912: 592), the significantly lower life expectancy of male children could well be a consequence of increased commercial work whose negative impact also had a cumulative effect and consequently increasingly burdened the middle age groups of men (see also Imhof, 1981: 96; Spree, 1981: 252). From the age of 10 up to the older age groups, the gap between the life expectancy of men and women widened, so that it can certainly be stated that men were the primary victims of the urban-industrial world of life. Only after the turn of the century did the situation for the urban population – with a general increase in life expectancy – ease to a certain degree (Figure 2).

Another indicator is the cause-specific calculation of death rates from “accidents”, a category in the cause of death classification, which included essentially work or traffic accidents. For Prussia in 1877, the somewhat surprising picture emerges that this specific cause of death occurred less frequently in the urban communities when compared to the countryside, although the differences were minimal (Table 4): In the urban communities, a total of 4.2 people died per 10,000 living, while in the rural communities the number amounted to 4.3. In both urban and rural communities, males were particularly affected by this cause of death, with gender differences increasing with age. If one compares the age-specific mortality of men in urban and rural areas, it can be seen that the urban risk was higher from the age of five and increased both in absolute and relative terms with increasing age up to the age of 60. Urban-industrial gainful employment was evidently more dangerous than rural farming, but urban excess mortality was little pronounced in the age group 5–15. In rural communities,

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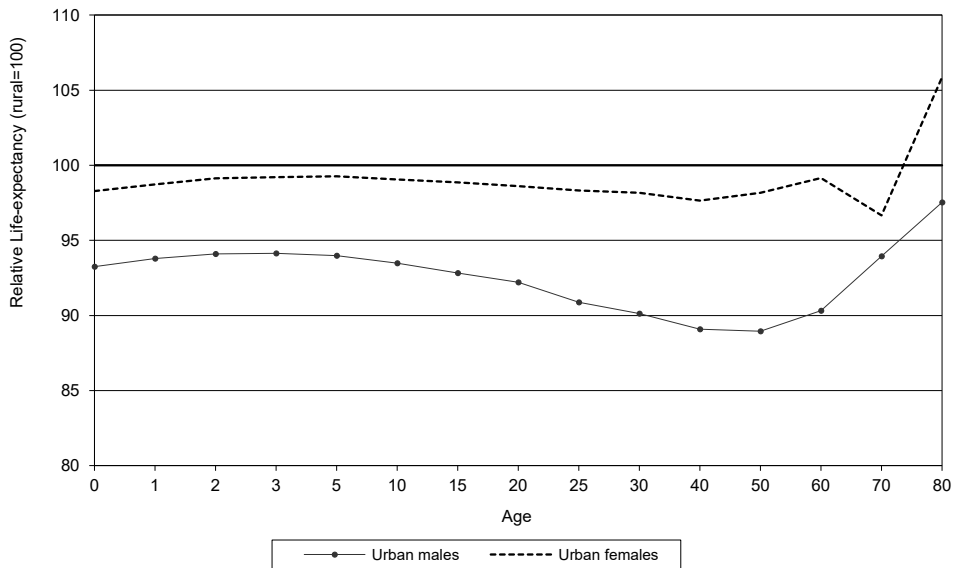
<sup>3</sup> The life expectancy in rural areas of Prussia was set equal to 100 for both women and men and the corresponding urban conditions were plotted relative to this and presented graphically (*Preußische Statistik*, 1879).

Figure 1: Relative Life-expectancy in Urban and Rural Prussia, 1877



Source: *Preußische Statistik*, 50 (1879).

Figure 2: Relative Life-expectancy in Urban and Rural Prussia, 1905



Sources: *Preußische Statistik*, 1907; 1908.

on the other hand, the age groups up to the age of five were at a higher risk; these age groups were much more unfortunate in rural areas than their urban counterparts. On the basis of this data, the conclusion is that there are no signs of a direct negative impact of paid child labour on health.

Table 4: Death Rates from “Accidents” in Prussian Urban and Rural Communities, 1877 (per 10,000 living)

Urban Communities								
Sex/ Age	0-1	1-5	5-15	15-30	30-40	40-60	>60	Total
male	2.2	5.6	3.3	5.8	9.2	10.3	10.1	6.8
female	1.7	4.1	1.1	1.2	1.0	1.5	3.5	1.7
Total	1.9	4.9	2.2	3.6	5.1	5.6	6.3	4.2
Rural Communities								
Sex/ Age	0-1	1-5	5-15	15-30	30-40	40-60	>60	Total
male	3.0	7.7	3.1	6.8	7.8	8.9	11.0	7.0
female	2.2	5.2	1.2	1.1	1.0	1.6	2.3	1.8
Total	2.6	6.5	2.2	3.8	4.3	5.2	6.5	4.3

Source: *Preußische Statistik, 1879*: 138-139.

## CONCLUSION

In summary, it can be said that all the different approaches (with indicators such as life expectancy, height and weight, weeks lost at work due to illness and number of work injuries) and the historical available data do not provide clear evidence of direct harmful effects of child labour; many indications point to a rather mixed, neutral, or even positive effect of child labour on health. In view of the enormous contribution of children to family income, these results appear to be quite plausible. It can probably even be assumed that the increasing income generated by the children even had an effect on the health of the parents or other members of the family via an increased standard of living for the family. Yet, that says, of course, nothing about the psychological and long-term physical consequences of child labour. Overall, the health risks, especially for men, in-

creased with age, since the great differences in living standards were not only determined by social class, but also by the different stages of the life cycle (Schomerus, 1979; see also Ehmer, 1988). After years of hard work under unhealthy conditions and in an unhealthy environment, the fate of an industrial worker was usually marked by a loss of his professional position with a simultaneous loss of income – a descent that could begin as early as around the age of 40. The result of the age-specific analysis, which found an increased risk of death particularly among the older male population in the cities, is therefore not surprising in any way. Signs of wear and tear and chronic diseases obviously went hand in hand with social decline, so that the age-specific distribution of the risk of death may also represent, to a certain extent, a class-specific component.

**Jörg Vögele** is Professor of Modern History. He studied History in Konstanz and Bristol, worked as lecturer in Konstanz, Research Fellow in Liverpool and Assistant Professor in Düsseldorf. From 2003 to 2015 he acted as Managing Director of the Institute for the History of Medicine at the University of Düsseldorf, since 2016 he is Deputy Director of the Department of History, Philosophy and Ethics of Medicine, University of Düsseldorf. He was a Fellow of the University of Liverpool and Visiting Professor at the Charles-University in Prague.

**Grażyna Liczbińska** is a human biologist. She is an associate professor at the Faculty of Biology, Adam Mickiewicz University in Poznań, Poland. Her main scientific interests are related to biology and demography of populations from the past, with a special emphasis on the impact of social inequalities and environmental stress related to biological and health status and social mobility, as well as positive and negative determinants of health. Currently, she is a PI of 3 projects examining the long-term social costs of adverse conditions in early life, the short- and long-term effects of the cholera epidemic in 1866, and the impact of the social, economic, and psychological well-being of the family on the biological and social condition of the offspring. She is a Committee Member to represent Poland in the COST Action CA22116, a Council Member of the European Society of Historical Demography, and a Board Member of the International Commission for Historical Demography.

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