Chapter 10.

DEATH IN THE CITY: A VIEW FROM 19TH CENTURY CHURCH REGISTERS IN NORWAY

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Introduction

This paper explores the causes of death in church book burial registers from Trondheim city in Norway during the late 19th century.¹ Whereas most studies on trends in cause specific mortality have focused on aggregate data, we shall provide a more in-depth analysis by using individual-level causes of death for the period 1866-1895. According to Norwegian Official Statistics (NOS), the crude death rate in Norway's three largest cities, Kristiania/Oslo, Bergen, and Trondheim drifted around 25 per thousand, and over time we see a stagnation in the mortality rate until the late 1890s at which time a marked and steady decline set in, only interrupted by the Spanish flu epidemic of 1918/1919. Trondheim was a quite deadly place for infants, with an infant mortality rate fluctuating around 150 to 160 infant deaths per 1000 live births until the late 1890s. The breakthrough of a consistent decline came at the turn of the 20th century.

In this paper we are particularly interested in reporting practices and trends in cause of death registration during a period characterized by urbanisation and industrialisation. Previous research has shown that individual causes of death significantly varied in terms of time and place regarding the way causes of death were recorded by priests or doctors as well as categorised by the authorities (Reid et al. 2015; Walhout 2010). Variations in the way the causes of death were recorded can be affected by the medical and church personnel responsible for reporting and recording, the likelihood of a doctor seeing a patient before

¹ This paper is a part of an ongoing research project about individual causes of death in Norway and the Netherlands. Part of the text, in which the dataset and the coding are described, corresponds with sections in our paper currently under review in *Social History of medicine*, entitled The Gendering of Disease. A century of classification practices regarding male and female causes of death in Norway and the Netherlands, 1839-1938.

death, medical knowledge and local terminology. This study provides a first careful evaluation of the causes of death through examination of local recording practices done by the priests and of age-specific profiles of individual causes. The explanations for the findings are considered in the context of medical infrastructure.

In the following pages, we first present the dataset and methods, followed by a description of the setting and results. The paper concludes with a short discussion and suggestions for further research.

Sources

The Trondheim database consists of individual level data transcribed from the church book register containing burials. It covers the period 1866 to 1895 from three different churches, namely Vor Frues kirke, Domkirken and Ila kirke. The 30-year period includes 11,146 deceased individuals (stillbirths are excluded), where 8,474 (76%) are registered with causes of death by the priest. In addition, the dataset provides information about sex, age, street address and occupation of the deceased. Occupations are only given for deceased men, or the father/husband of the deceased.

From 1820, the church register included a specific entry where the priest had to report, “if the death was caused by an infectious disease or in case of an accident”. An extensive revision of the register rules was introduced in 1877, stating that all causes of death had to be registered along with information about whether or not the doctor had visited the deceased prior to or upon death. Clearly, the church register had a two-fold agenda. In addition to being a register for sacral events dating back to the late 17th century, an early 19th century act instructed the church to report yearly numbers of births, marriages, and deaths to the authorities as the basis for vital population statistics. From 1866 onwards, these aggregates were replaced with nominative lists, providing a more accurate basis for statistical purposes. Causes of death were all along a part of the medical statistics – provided not only by the priest, but from 1853 also increasingly by the medical profession. By comparing the statistical reports from medical doctors and priests, an immediate impression is that priests to a much higher extent were present to determine the cause of death of the deceased, at least in the 19th century. Around 1860 only about 40 percent of all deaths in Norway were represented in the medical profession’s reports, increasing to around 80 percent in 1900 (Pedersen 2007).

Without doubt, these figures hide significant regional variations – and perhaps profound rural-urban differences. Previous studies on infant mortality in typical Norwegian 19th century rural areas reveal that doctors visited patients rarely, and that the registration of causes of death was for the priests to decide (Fure 2004; Jåstad 2003). This was mainly due to long distances to travel for the doctors. Around 1860, Norway had 315 doctors and the country was divided into 79 urban and rural districts. About 40 years later, the population had increased by 40 percent and 1138 doctors covered 158 districts (Schjøtz and Skaset 2003, p. 143). Still, in the rural areas, a medical doctor often had to travel several days if someone summoned medical help. In cities things were different. First, distance did not matter that much, and secondly, cities employed more doctors. For example, in 1880 the ratio of medical doctors per person in the rural districts around Trondheim was 1:4,700 compared to 1:1,200 in the city. With relatively easier access to medical help, we need to ask to what extent our causes of death echo the priest's medical knowledge, or if it was merely a duplicate of the medical doctors' death certificates.

A second matter, which pinpoints this question, is related to the Norwegian Health Law of 1860. This law directed every municipality to have a health commission in charge of health politics and campaigns. In rural areas, the main purpose was to educate people about better personal hygienic standards, while in the cities the focus was to eliminate the risk factors, which by contemporary observers was seen as critical. Hence, in the rural areas the appointed commission members consisted more or less of the same people that had been working on health related issues before the Law was introduced, that is to say the members from the civil service (teachers, police, priests and doctors). The composition in the cities underwent major changes. Here the commission's members reflected specialization within health and city planning and engineering, priests slowly losing their health related role (Schjøtz and Skaset 2003, pp. 45-46). Consequently, it is reasonable to believe that the medical profession in the cities at some point during the 19th century effectuated control over the registration of causes of death, and increasingly had a say on how they should be registered in the church registers. Such a development may be seen in Bergen (the second largest city in Norway) where causes of death rapidly disappeared from the church register from around 1880. Interestingly, this did not happen in Trondheim.

To what degree can we rely on the cause of death registration? Today we take for granted that medical tests or autopsies are the basis

for defining the cause of death, usually with great accuracy. A similar accuracy cannot be expected when interpreting historical records. The doctor or the priest might not have seen the deceased, and had to rely on descriptions given by relatives and neighbours, or for instance rely on the probability that the epidemic diseases that currently swept the area had taken yet another victim. In retrospect, we know that the Norwegian priests' registration of causes of death was gradually taken away from them. Some priests might have been satisfied with less responsibility, others might have been disappointed. The medical profession was in continuous development during the 19th century, and this can for example be viewed by the changing classification schemes for causes of death, the nosologies. Several scholars have discussed how changing nosologies affected the labelling of the causes of deaths.² In what way did the priest or doctor comply with these changes? In addition, the fact that both the priest's and the medical doctor's documentation of death causes had a statistical purpose, leads us to ask to what extent the development of classification schemes for death causes was influenced by the different areas of epidemiology.

Coding the causes of death

For coding and classifying the causes of death, we used a classification scheme entitled Cph1876+ (version 1.0 June/2016, cf Revuelta-Eugercious and Løkke (2016)). This classification is hierarchically structured, and concerns a rework of a system developed by medical historian Josep Pep Bernabeu (2003). As opposed to the standard tool for classifying diseases in current-day societies, the International Classification of Disease (ICD), our coding and classification tool leaves more room for specifically historical causes of death and older rationales.³ The 141 categories are clustered following an aetiology or mode of infection and transmission. It distinguishes between six main groups at the highest-level: (1) infectious diseases; (2) non-infectious diseases; (3) external caus-

² For an overview, see Reid et al. (2015).

³ See codes of ICD-10 on the webpage of the World Health Organization: <http://www.who.int/classifications/icd/en/> (visited 3 December 2017). Currently, a historical version of ICD is developed, see also: Alice Reid et al., 'Coding and classifying Individual Cause of Death Data from Scotland: the nineteenth century and beyond' and Maria Hiltunen and Sören Edvinsson, 'Classifying Literate Cause-of-Death information originating from Swedish Historical Parish Registers', papers presented at SHIP-workshop, 27 March 2018, Cambridge.

es; (4) older rationales; (5) ill-defined, and (6) not reported/blank. The first group includes five sub categories. First, infectious diseases transmitted mainly by air and direct human contact (summarised as airborne diseases) include infections typical of childhood, such as smallpox and whooping cough, infections in the respiratory system such as bronchitis, tuberculosis and other acute respiratory diseases such as influenza and pneumonia. The second group of infectious diseases includes causes of death indicating ‘water- and food-borne infectious diseases’. This group includes cholera, typhus and typhoid fever, acute digestive diseases such as diarrhoea and dysentery. The third group of infectious diseases refers to ‘vector transmitted infectious diseases (including human vectors)’ in which causes like puerperal fever, exanthematic typhus and yellow fever are placed. The fourth group consists of infectious diseases related to more vaguely described causes of death, for which it is impossible to determine to what extent the cause of death is related to one of the above-mentioned categories. Finally, a group was defined as ‘other specific infections’ including anthrax and tetanus.

The second main group of ‘non-infectious diseases’ includes sixteen subgroups, mainly subdivided into causes related to different parts of the body, such as the brain, lungs, stomach, the genito-urinary system, but also classifications such as deficiency diseases, perinatal pathologies and cancer. The third main group comprises all external causes of death: accidents, burnings, suicides, homicides, et cetera. The fourth main category, ‘older rationales’, refers to causes that are usually assigned as ‘ill-defined’ causes, like ‘malnutrition’, ‘sudden death’, ‘eclampsia’, ‘lack of breastfeeding’, ‘teething’, ‘oedema’ and ‘old age’. The importance of including these types of causes was emphasised in recent research, where the authors show that the increase in deaths caused by cardiovascular diseases in fact was a result of a rebranding of deaths from ‘old age’, and not a real increase (Reid et al. 2018, p. 330). Besides the four main categories of disease we also regrouped all causes of death that were either badly specified, ill-defined, illegible or ‘unknown’ causes. A final sixth group consists of not reported causes of death - when the original source contains a blank field.

Trondheim city

Depicting the 19th century, Trondheim had long been an administrative and religious centre for the north of Norway, the main seat of the County of Sør-Trøndelag and the Bishopric of Nidaros (from 990).

During the 19th century, the population in Trondheim increased more than fourfold: from 8,800 inhabitants in 1801 to 38,000 in 1900 (Danielsen 1958, p. 277–287). This increase included extensions of the city boundaries. Compared to population growth in the two other large cities of Norway (Bergen and Oslo), we see that Trondheim increased more than Bergen, but less than Oslo in relative terms (the latter from 9,000 in 1801 to 225,000 at the turn of the 20th century). A mix of birth surplus and immigration led to booming population growth. Consequently, at the end of the 19th century, one rarely found households where all members were born in the city.

The role of the town as an economic centre for the region was reinforced during the 19th century, when most of the goods entering and leaving the region passed through Trondheim. In 1880, the town was connected by railway southwards to Oslo and in 1882 eastwards to Sweden, and the opening of the Coastal Express ship route in 1893 made the optimists talking about making Trondheim “The Hamburg of the North”. Huge plans for extending the port facilities were on the drawing board. However, only parts of the plans were ever realized (Sandnes et al. 1995, p. 51–70).

Nevertheless, the growth in communication was accompanied by a marked increase in the town’s trade and industry. Originally, Trondheim had been a centre for exporting timber, fish and ore. Up to World War I fish exports increased particularly rapidly, but imports increased even more and both retail and wholesale trade flourished. In order to explain the background for these developments we must look beyond Trondheim. There was a major change at that time in the rural areas associated with the town. The agricultural system changed from a self-supporting economy to a cash economy and became dependent on having a market. The need for banking and goods such as fertilizer, seeds, farm machinery, building equipment and groceries increased rapidly. To a greater extent than before, Trondheim would send on its excess production, and at the same time it provided not only its own region but also parts of Northern Norway with goods and services (Sandnes et al. 1995, p. 55).

Already during the first part of the 19th century, great improvements were made concerning sanitary and hygienic matters. Water was piped under the town already in the 1850s, and from 1880 these were extended to also provide water inside houses. City development during this era of modernity, where political and economic ideas and prospects for future profit were decided and implemented at high speed, increased

social inequality and an increased awareness of such. One thing concerns access to water, where the majority of the city population had to wait until well into the 20th century, and the luxury of a warm bath and a shower was for the few to enjoy. Nevertheless, improvement of personal hygiene was a top priority for the *Sundhedskommission* (Health commission) during the last decades of the century, and related to their work, two public bathhouses were built. The bathhouses' popularity can be viewed from the medical doctor's report from 1903, where as much as 120,000 bath visits were registered in *Østre- and Vestre folkebad* during that year (Tretvik et al. 2007, p. 152). Another thing are the living conditions. The lower working class families clustered themselves in the eastern part of the city, their houses were small and draughty, and the living space sparse. Fertility control was still a future phenomenon, and from the 1900 census one gets the impression that about every house address in the city hosted lodgers.

The city center, where the families of the bourgeoisie (the patrician elite) and the upcoming middle classes lived, underwent changes too. While the patrician elite had built their fortune on export, the new wine in the city – the middle class – built their swelling assets through import. From 1880 a plan for disposal of sewage was carried out with sewage pipes, and many of the familiar 'city smells' disappeared. Having said that, in the last decades of the 19th century the city council received complains about the stench when farmers carried the open wagons with human excrements from the city's innumerable toilet bins (Sandnes et al. 1995, p. 37–50).

Despite economic growth and city expansion, the city census from 1885 reveals that no less than 215 pig houses and 97 barns existed within the city boundaries, with approximately 900 farm animals (Danielsen 1958, p. 14).

From 1860, with the *Sunnhedslov* (Law of health), yearly statistics are available on the population per medical doctor, midwife, dentist and assistant vaccinator, for the cities and the rural areas. In 1880, there were 19 medical doctors (1:1,200), 10 midwives (1:2,000) and two dentists (1:11,000) in Trondheim. It is clear, when looking at the figures for 1900, that the city authorities did not manage to follow up or improve consistently the medical coverage due to the enormous population growth that occurred during these two decades: 1:1,400 and 1:1,300 for medical doctors and midwives respectively.

Results

The Trondheim database contains 11,146 deceased individuals (stillbirths are excluded) from three different church book registers in Trondheim (Vor Frue Kirke, Ila Kirke and Trondheim Domkirke), where 8,474 (76%) of the registrations contain information about the cause of death. The raw data consists of 2,773 unique causes of death – including all types of spelling, which have been standardized and coded according to the Cph1876+ classification scheme. Of the 141 categories, 127 unique codes were used for the Trondheim data.

Figure 1. Total numbers of deaths from Norwegian Official Statistics (NOS), burials in Trondheim, and burials with registered causes of death, by year of death

Figure 1 shows the yearly total numbers of death from two different sources, the NOS and the church book register for the period 1866–1895. In addition we have made a distinction between burials with and burials without a registered cause of death. As we do not know the population at risk we present the numbers of deceased individuals per year. The grey line shows the total numbers of deceased for whom we have information on the cause of death; the yellow line represents the total

number of Trondheim deaths per year, and the orange line denotes the total number of deaths in the official statistics. The gap between the total number of deceased in the NOS and the church book register is due to missing transcribed data from the Bakklandet parish, which became part of the city in 1863. The trends are similar over time, except for a slightly increased gap during the last couple of years. Although we do not have a 100 per cent registration of causes of death, we observe that the number of cause specific Trondheim deaths more or less follows the pattern of the overall number of deaths. The exceptions are for a missing peak in 1877 and a pronounced gap in the years 1884–1887, which can be linked to an absence of causes of death in one of the churches: the Trondheim Domkirke. However, we have a full coverage for the period 1866–1875 and 1881–1883.

The peak of deaths in 1875 is related to pulmonary phthisis (tuberculosis), pneumonia and measles, and the 1881–1883 peak is related to pulmonary phthisis, pneumonia and acute bronchitis. The peak in 1889–1891 is mostly related to diphtheria and pulmonary phthisis, being the two really big killers in this period.

Figure 2. The distribution of individual classified causes of death according to Cph1876+ by year of death

Figure 2 shows the distribution of classified causes of death by year of death. Overall, the category of infectious diseases dominates. The relative numbers of non-infectious diseases and deaths due to external causes (accidents being the largest group) does not change much during the 30 years covered, which may indicate that the vast majority of the ‘not reported’ cases is due to infectious diseases. We should, however, not rule out that a part of the ‘not reported’ category includes an increase in the number of deaths due to non-infectious diseases. As expected we see a decline in the use of ‘older rationales’ from about 1883.

Figure 3. The numbers of classified causes of death by age group

Figure 3 shows the number of classified causes of death by age group. The distribution for the youngest age groups follows the expected pattern, with more infant deaths compared to children and adolescents. The number of deaths in age group 25–49 is high, but it is within an expected range since it comprises a wider age range than the younger age groups. The equally wide range age group of 50–75 forms the largest group. Interestingly, we see that some types of diseases are more pronounced in certain age groups than others.

Infectious diseases dominated child deaths (1–4 years), counting for about two-third of all deaths. A lower proportion of infec-

tious disease among infants indicates that infants were breastfed, and were to a much higher degree protected during the first year of life, but when the toddler was weaned, he or she became more exposed to infectious diseases. Among adults aged 25–49, infectious diseases were a major killer, causing about 45 per cent of all deaths. Some 25 per cent of all deaths in this age group were due to pulmonary phthisis.

Non-infectious diseases were most significantly related to adult deaths, and especially so for the age group of 50–74. The third group of age specific causes of death relates to ‘older rationales’, which will be discussed more thoroughly towards the end of the paper. Here we observe a clear clustering at both ends of the age distribution. Among infants, we find that 20 per cent of all infant deaths were registered with *konvulsioner/kramper/eclampsia* as the main cause of death. Among the elderly, the most frequently used older rationale was dying of ‘old age’. Assigning causes of death to the active part of society, the working population, apparently was a more straightforward task for the clergy.

Although deaths related to external causes formed a relatively small proportion of deaths in all age groups, we do find that this classification was more or less absent in ages up until 15 and for those who died at age 75 or older. This indicates that external causes often were related to a dangerous working environment, especially among men (Sommerseth and Walthout 2019). The fact that the proportion of ‘not reported’ causes of deaths is more or less evenly distributed across age groups, strengthens the assumption that the missing registration was not due to unknown causes, but rather that the priest decided not to register at all.

Figure 4 shows the nine (out of 36) most frequent causes of death by age group as percentage of total deaths per age group. The nine most frequent causes of death counted for about 75 percent of all deaths in age group 1–4 where airborne infectious diseases killed nearly 60 percent of the children. Airborne diseases were the main killer for ages 1–49. Cancer and tumours were the second most frequent causes of death in age group 50–74. Comparing the two oldest age groups, where ‘old age’ represents more than half of the nine most frequent causes of deaths (and 35 percent of all causes of death in this age group), the immediate impression is that the term ‘old age’ probably included cases of cancer/tumours as well as airborne infectious deceases.

Figure 4. The most frequent causes of death groups by age group.
Percentage of deaths in age group

Table 1

Total numbers of airborne infectious diseases causing death by age group

	0-1	1-4	5-14	15-24	25-49	50-74	75+	Total
Infections typical of childhood	0	1	1	0	0	0	0	2
Smallpox	0	1	1	0	0	0	0	2
Measles	23	42	9	1	1	0	0	76
Scarlet fever	23	161	53	6	3	0	0	246
Whooping cough	51	57	9	1	0	1	0	119
Diphtheria	17	103	93	31	5	0	0	249
Croup	10	85	18	1	1	1	0	116
Infections - respiratory system	22	6	3	2	6	15	10	64

	0-1	1-4	5-14	15-24	25-49	50-74	75+	Total
Throat infection	6	8	1	3	1	3	0	22
Rheumatic fever	0	0	2	7	9	1	0	19
Laryngitis	0	3	3	0	0	0	0	6
Bronchitis	150	130	13	5	18	107	75	498
Pneumonia	83	73	34	25	123	244	82	664
Pleurisy	4	2	2	4	4	5	1	22
Influenza	3	2	0	0	5	10	6	26
Tuberculosis	21	42	45	40	68	35	0	251
Tubercular meningitis	26	62	41	12	15	1	0	157
Pulmonary phthisis	9	31	84	256	497	259	27	1163
Total	448	809	412	394	756	682	201	3,702

Table 1 shows the total numbers of airborne infectious diseases causing death by age group. Among the infants, we see the typical childhood diseases, with measles, scarlet fever, whooping cough, diphtheria, and croup, though to a lesser degree than among older children. The main airborne disease that became fatal for infants was bronchitis. Once they survived the first year of life, we see an increase in the total number of children dying of airborne infections, scarlet fever and bronchitis being the two foremost causes of death. From age group 5–14 pulmonary phthisis (tuberculosis) was more than doubled compared to the younger age group, and the number of deceased rapidly increased until peaking in age group 25–49. The second largest airborne cause of death in this age group, was pneumonia. As previously mentioned, airborne infectious death causes experienced a relative decline in the oldest age group, compared to the young age groups, and we observe that the most substantial decline occurred for the pneumonia and pulmonary phthisis victims. Looking at the age pattern, and how the specific airborne infections are distributed throughout the life course, bronchitis shows a characteristic u-shape with its lowest level in age group 15–24. Pneumonia has a similar distribution, although not that steep. Tuberculosis, with no further specification, has a somewhat similar age distribution as pulmonary phthisis, with an increased number of deceased as

age increases until 25–49. A different pattern emerged among the tuberculosis meningitis victims, where the bacteria spread to the meninges, which are the membranes surrounding the brain and spinal cord. Here we observe a peak at age 1–4.

Figure 5. The total numbers of deaths in the three top causes of death classifications in the group ‘older rationales’, by five year periods 1866–1895. Norwegian in legend is explained in the text.

Figure 5 shows the total number of deaths from the top three causes of death in the group ‘older rationales’, namely ‘*kramper*’ or ‘convulsions/spasms/ecclampsia’, ‘concerning infancy’ and ‘old age’ (93 per cent), by 5 year periods. The classification system defined six historical terms that were used as causes of death ‘concerning infancy’. First, the broad category ‘concerning infancy’ is used as a code for terms like ‘*nyfødt*’ (new born). In Trondheim we only find one incidence where this code is used. Instead, 90 out of 103 were coded as ‘*atrophia infantilis*’. The Latin word ‘*atrophia*’ refers to either ‘atrophy’ or ‘wasting consumption’, a condition causing a person or a part of the body to become progressively weaker and emaciated. In Greek it means ‘lack of food’. The third code is ‘dentition’: teething. Some twelve infants were diagnosed with this cause of death. We found no cases of the following classification codes: ‘lack of breastfeeding’, ‘thrush’, and ‘lack of care’.

In the literature, '*kramper*' (the most used term) is described as one of the main 'old rationale' for deaths in infancy. The concept describes the deathbed, with a condition that could occur without any other sign of disease. Contemporary medicine related '*kramper*' to be caused by teething or if mothers breastfed during strong emotional disturbance (Løkke 1998). While about 38 percent of all infants' causes of death were registered as '*kramper*' until 1875, the expression gradually disappeared from the nomenclature towards the end of the period, although not entirely. About 9 per cent of infant deaths were registered as dying of '*kramper*' in the two last periods, respectively.

Of the 625 individuals dying of 'old age', '*alderdomssvakhet*' (old age weakness) was the registered term in 267 of the cases (43 percent) and '*alderdom*' in 206 of the cases (32 percent). For Denmark, Anne Løkke finds that '*alderdomssvakhet*' replaced the term '*alderdom*' with the implementation of a new nomenclature in 1876, and suggests that age as such was no longer a sufficient explanation of death. Instead, the deceased had to be struck by a weakness that distinguished him/her from others of the same age, but on the other hand didn't need any further explanation than age (Løkke 1998). We do not find a similar trend in Trondheim. Here, '*alderdom*' and '*alderdomssvakhet*' appears in the register from 1866, and are used throughout the period of study. The two terms even appear on the same page in the register, written by the same priest. The Latin term for old age, '*senectus*', was used 59 times (9.5 percent). The use of a Latin term in comparison with a vernacular term, did not differ according to sex, age or social class. Widows on poor relief (*fattiglem*) died of '*senectus*' as well as shipmasters.

Some 57 of the death causes classified as old age had an additional cause of death, though all of them had '*alderdom*' or '*alderdomssvækkelse*' as the primary cause of death. For example, a person could die of old age with an additional water or airborne disease, such as diarrhea or bronchitis.

Common for all three categories is the specific relation to age. While '*kramper*', 'Atrophia infantilis' and '*alderdomssvakhet*' refer to a physical ailment upon deathbed for a certain age group, '*alderdom*' is used as a cause of death implying that death was perceived as something expected for the age group without any further explanation.

Some preliminary conclusions

It is still too soon to draw well-founded conclusions from this analysis of disease classification in Trondheim city, but the following observations seem to be justified.

The various individual-level causes of death data registered in the church book registers appear to provide a way of describing the disease environment and the manner in which they varied and changed over time and across age groups.

The disease environment in Trondheim during the last part of the 19th century was dominated by airborne infectious diseases. Mortality appears to have been accentuated in Trondheim because of the effects of crowding so that infections and contagion could spread easily among a large and mobile population. The relatively low incidence of water and foodborne infectious diseases, such as diarrhoea and dysentery, indicates that the water pipes implemented already in the 1850s and from 1880 also inside houses, had some effect, in addition to the top priority on personal hygiene addressed by the city's Health Commission.

With access to individual-level causes of death data, we were able to relate specific disease patterns according to individual attributes. In this paper we have focused on the causes of death across age groups. We found that cause of death classification related to 'older rationales' had a clear clustering at both ends of the age line. In addition, airborne infectious diseases had a significant presence among children age 1–4, killing nearly 60 per cent.

Treated critically, the data generates interesting insights into the epidemiological history of a period where cause of death statistics from doctors was still scarce in most of the country. Medical doctors were mostly active in the cities, while 80 per cent of the population lived in rural areas where doctors rarely visited patients on their deathbed. This make cities excellent laboratories for comparative studies of causes of death provided by priests and doctors, which should be a task for future research.

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