

Causes of Death in Late Imperial Ekaterinburg, Russia. Burial Records, Database, Analysis

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Causes of Death in Late Imperial Ekaterinburg, Russia

Burial Records, Database, Analysis

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ABSTRACT

The end of the 19th century saw marked changes in Russia's demography. However, it was still a traditional society experiencing universal marriage and high birth and death rates. This paper analyzes mortality in Ekaterinburg, an early industrial city in the Urals, expanding rapidly economically and demographically in the late 19th century. We focus on the deaths registration system, who decided and grouped the death causes, what factors affected the procedures, and how we can use the main death causes to understand health conditions in late imperial Russia. We used Ekaterinburg Orthodox parish death records between 1860 and 1919, transcribed into the URAPP database, to analyze how the system of death registration including death causes, developed then. The Ekaterinburg clergy keeping the parish registers took on this task seriously: more than 99% of the death records contained death causes. Our analyses show that diagnosis precision depended on the parish staff, even though their medical knowledge was mostly inadequate. We used the ICD-10 system to encode death causes, distributing them between 15 main groups. As a result, we could identify 88% of all causes of death in our dataset. The most common among adult Ekaterinburgers were infectious diseases, tuberculosis claiming most victims. The second and third most common killers were fever with unspecified etiology called *Goriachka* and "old age". Since *Goriachka* declined along with an increase in respiratory diseases and tuberculosis death rates, the latter was likely the real cause, but disguised obsoletely as *Goriachka*. The diagnostics improved during the late 19th-early 20th century, when the revised nomenclature required a more professional and modern approach. We plan to extend our research after 1920 to study the centralized Soviet system. The social differentials we found between the city's parishes will be explored with new variables. Finally, to make the research more compatible, we plan switching to ICD-10h.

Keywords: Mortality, Causes of death registration practice, Historical causes of death, URAPP, Urals, Imperial Russia, Parish registers, Metricheskie knigi

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1 INTRODUCTION

The end of the 19th century saw marked transitions in Russia's demographic order. The first signs of decreasing mortality were noted by scholars already at the beginning of the 20th century (Novoselsky, 1916), later interpreted as the start of the epidemiological transition (Isupov, 2017). Generally, however, the demography reflected a traditional society with universal marriage and high birth and death rates. In terms of the latter, Russia was sadly leading among European countries (Kurkin, 1938; Patterson, 1995). Not only infant and child mortality, but also mortality in older age groups was high at the turn of the 19th century. Only 91,222 out of 100,000 30-year-old men still lived when 40, and only 78,987 out of 100,000 50-year-old women lived to become 60 years old — the worst rates in Europe (see Table 1).

Demographers traditionally used data from the European part of Russia, but even there regions had a more archaic demographic order than the Empire's average. One such region was Perm province in the Urals¹: while the mortality rate in the European part of Russia was 27.1‰ in 1911–1913, it reached 42.2‰ in Perm (Rashin, 1956, p. 189–191). This mining and metal producing region, whose economy tried to adapt to market requirements after the Great Reforms in the 1860s, had extreme mortality among both infants and working age males. Babies probably lost their lives due to local agricultural practices that required intensive women's work while pregnant and right after delivery, combined with a severe climate and archaic childcare practices (Bakharev, 2025; Bakharev & Glavatskaya, 2019, 2020). Male excess mortality was likely due to intensive and dangerous factory work (Golikova, 2005). The relatively high mortality in Perm province, including its two biggest cities Perm and Ekaterinburg, makes the study of death causes particularly important in order to understand local demographic patterns. Availability of individual level data sources on causes of death in late 19th and early 20th centuries Ekaterinburg allows deeper understanding of how the deaths were registered, who determined the death cause, what factors affected the procedures; what were the main death causes and how we can use these sources in mortality studies. It also allows analyses of how the situation changed over time and what factors affected these changes. The main aim of the current paper is therefore to focus on how the system of death registration and the nosology were developing in Russia; to study the reliability of Imperial Russian sources for death cause analysis; to employ our nominative URAPP database's potential to study what killed adults in Russian cities in the late 19th and early 20th centuries. We shall start by analyzing the changing Russian system of death registration and the attempts made by Russian scholars to classify the causes of death found in the *metricheskie knigi* (parish records).

Table 1 *Adult survival rates* in European Russia and selected European countries at the turn of the 19th century*

Country	Men				Women			
	20–30	30–40	40–50	50–60	20–30	30–40	40–50	50–60
European Russia ²	92,915	91,222	86,487	77,909	92,561	90,673	87,555	78,987
Hungary	92,315	91,804	87,445	78,897	90,845	90,049	88,387	79,995
Italy	93,482	93,063	90,065	83,278	92,994	92,058	90,910	85,718
Germany	94,197	92,049	86,880	78,176	94,405	92,361	90,416	83,347
Norway	90,431	91,802	90,328	85,550	93,465	92,286	91,481	88,254

Source: (Novoselsky, 1916, pp. 152–153).

Note: *By 100 thousand alive 10 years earlier.

2 THE RUSSIAN SYSTEM FOR CAUSE OF DEATH REGISTRATION

Russia had developed a system to register accidental death (including sudden deaths, maternal mortality, murders and suicides) since at least the late 15th century. The clergy usually initiated investigations to

1 The most eastern one in "European Russia".

2 Western Russian provinces, including among others contemporary Ukraine, Lithuania, Latvia, Estonia, Belorussia, Moldova.

prevent funeral services in case of suicide or murder. Relatives of the deceased person also applied to the archbishop with a request to get a burial certificate. The application letter (*chelobitnaya*) contained the basic information about the deceased — name, social and marital status, death circumstances if known and the cause of death. Among usual causes of death were death in fire, death in a fight from a knife attack, due to alcohol overdrinking, due to freezing or hunger, due to wild beast attacks, due to accidents while chopping wood, due to suicide, due to drowning — males often while fishing, females often while washing clothes in the river. Women often died during delivery. The archbishop's office issued a burial certificate (*pokhoronnaya pamiat'*) with information obtained from the application letter or additional investigation. Sometimes the certificates contained the age of the deceased person and date of death. The fact that the clergy charged payment for each certificate and therefore were personally interested in providing burial certificates, make historians assume that the documents should have a reasonable quality and be representative (Cherkasova, 2023; Cherkasova & Pshenitcin, 2019). Besides, death certificates played a crucial role in resolving inheritance litigation and justifying remarriage, making the application routine procedure at the time. Russian archives contain extensive collections of application letters and burial certificates dating from the late 16th to the 17th centuries. The 17th century application letters and burial certificates from the Vologda area (altogether 451 death records) show a variety of death causes, which we grouped into six categories. While up to 42% of the death causes are unspecified, 38% of the deaths were due to external causes (accidents and murders) and 20% due to some health conditions (see Table 2).

People in 17th century Vologda district, both clergy and lay, described the death causes with either the affected organ i.e., heart (32), mental disorder (6), abdomen (4); or with the symptoms: convulsions (21), weakness (7), fever (3).

In addition to the church system of death registration, the civil authorities surveyed settlements under their jurisdiction. The registrars had to record both properties and population in registration books (*perepisnye* and *dozornye knigi*). Since these surveys had fiscal purposes, they included information only on the male, taxable population — i.e., townspeople and peasants. Each new survey registered demographic changes in the household since the previous one and hence included information on deaths, which had happened in the household in between the surveys; occasionally with specific causes of death. The same principle was used in the *Revizkie skazki* — the census like tax revisions introduced later in the 18th century.

The plague epidemic of 1654–1655 brought major changes to this tradition. The central government began to include women, children and non-taxable groups in order to estimate the scale of the disaster. In addition, they started to register not just the changes on the household level, but individuals' names, social status and causes of death (Cherkasova, 2019; 2023). However, these surveys did not constitute a coherent national system, nor were they updated regularly.

Table 2 Causes of death as mentioned in the 17th century Vologda area documents

In Russian	In English	N (%)
Skoropostizhno	Sudden unspecified*	191 (42)
Neschastnyi sluchai	Accident	127 (28)
Bolezn'	Disease	75 (17)
Ubiistvo	Manslaughter**	44 (10)
V rodakh	In labor	11 (2)
Mertvorozhdenia	Stillbirth	1 (0)
Sum		451 (100)

Source: Own calculations based on Vologda application letters and burial certificates published by Cherkasova (2023, pp. 103–104).

Note: * Including two cases of "sudden death from old age" (*skoropostizhno ot starosti*) and four cases of children's sudden deaths. ** Including six deaths by executions.

The Russian population in the western territories seized by the Polish-Lithuanian Commonwealth experienced a strong pressure from Catholic and Lutheran missionaries. The Russian Orthodox clergy adopted the western practice of keeping birth registers, thus provided their flock with documentary evidence of their distinct Orthodox identity to hinder western proselytism. After returning under Russian rule in 1654, the Orthodox dioceses not only continued keeping parish registers but also spread the practice to other regions. In 1666–1667, the Russian Orthodox Church attempted to introduce the new parish-based system of vital events registration (*metricheskie knigi*) throughout the country, however without the secular authorities' support, but this attempt had limited success.

Tsar Peter I (1682–1725) approved the unified system of vital event registration in 1702. Therefore, the oldest registers created on the territory of modern Russia and preserved in Russian archives date back to 1703. However, the first laws about death registration did not specify the format of the records. Only in 1724, the Holy Synod³ ordered the priests to register the deaths according to a specific form, where they specified causes of death mainly in connection with epidemics, violent death or accidents. In cases when the priests could not identify the disease, they described symptoms or did not specify it at all. In her study of the Olonets province parish registers on deaths, Smirnova found that until 1800 there were only nine specific reasons mentioned in the sources as the cause of death: *starost* (old age), *chakhotka* (tuberculosis), *goryachka* (fever), *prostuda* (respiratory disease), smallpox, *krasnukha* (German measles), in labor, paralysis, scurvy. Up to 89% of all deaths, the Olonets priests registered without specifying a death cause (Smirnova, 2002, p. 197). Since 1809, cause of death registration became obligatory in the parish register on deaths, however while some Olonets priests improved their registration practice by updating their homemade nomenclature from nine to 36 different causes, others kept using unprecise expressions like "natural death", "by the will of God", etc. (Smirnova, 2002). The parish register form introduced in 1724 remained virtually unchanged until 1917 (Antonov & Antonova, 2006).

The quality of death cause registration in Russia improved during the 19th century, due to the improving science and education level, as well as the Russian medical care system's development, including autopsy. The list of possible death causes, mentioned in the parish registers, steadily increased, reaching 260 definitions in the late 19th century. Basic medicine teaching in Orthodox seminars was cursory until the late 19th century and its quality depended on the specific educational institution. The priests registered the cause of death based on information provided by relatives and their own medical knowledge and experience. They identified death causes either by the name of the organ affected or listed symptoms of the disease. We shall return to this point later when analyzing Ekaterinburg city's parish registers on death.

In the mid-19th century, the government started to demand the Church authorities to submit reports on mortality, but this was mostly data about deaths caused by highly contagious diseases (Otsolig, 1857, pp. 335–360), violent and sudden deaths (Shveikin, 1894). The Russian medical care system improved significantly after introduction of the *Zemstvo* — a self-governing elected county level institution that managed local affairs, including medical services and sanitation, public education and other socially important activities. *Zemstvo* doctors, especially in Moscow province, did a lot to improve the causes of death registration. They could have used ideas elaborated by Farr in England or Espin in the Swiss canton of Geneva about disease classification. However, since there was no commonly approved international nomenclature at the time they elaborated the Russian nomenclature with a list of 274 diseases, grouped into five classes in the 1870s (Markuzon, 1961; Troitskaya & Avdeev, 2018).

Successful application of this nomenclature contributed to the creation of a new all-Russian nomenclature of diseases, further elaborated by a group of doctors headed by Petr Kurkin at the Pirogov Medical Society in Moscow in 1894–1899. That helped to improve the Russian medical statistics (Belov, 2012; Skrydlov, 2022). Thanks to the introduction of Pirogov's new nomenclature of diseases, composed of 458 diseases grouped into 20 classes, the police and doctors began to include professional diagnosis in the death certificates, which improved the quality of the information in the parish registers as well (Troitskaya & Avdeev, 2018).

The Russian medical community used Pirogov's nomenclature for more than 20 years until the Soviet authorities introduced a new classification, similar to the International Classification of Diseases — ICD-3, throughout the country in 1920 (Starodubov et al., 2023). Later the Soviet Union participated in the development of ICD-4, but it took several decades of international cooperation before the country officially accepted the ICD system in the 1960s.

3 Holy Synod — the highest body of church-state governance during 1721–1917.

2.1 HISTORICAL CAUSES OF DEATH ANALYSIS IN RUSSIA

Even if Russian archives contain mortality parish records in abundance, studies of death causes in Imperial Russia are rather rare. Until recently, the scholars questioned the quality of the parish records, and expressed skepticism about using statistical methodology to analyze causes of death. The priests stating the cause of death in most cases described symptoms or named the organ affected. In addition, some conventional, historical terms were difficult to interpret. However, doctors used parish register data to analyze the epidemiological situation in some regions, computing death rates from known infections by sex, age and period specifics. For example Golikova's research on child mortality in late 19th to early 20th century Perm used the doctors' reports to analyze death rates from diarrhea, bloody diarrhea, whooping cough, measles, scarlet fever, diphtheria and smallpox by age, place and seasonality (Golikova, 2005).

Gradually the scholars elaborated methods to process the parish records' data on causes of deaths. Some selected diseases with conventional names or with obvious symptoms well known to everyone and easy to group. Koch, while analyzing what killed children in Tambov province during famines, used parish records with death registration from 1830 until 1912, which in addition to diarrhea, had clear diagnoses for infectious diseases like smallpox, cholera, scarlet fever, and measles as well as many unprecise causes of death. He distributed causes of death between four groups: 1. Convulsions; 2. Intestinal diseases; 3. Non-intestinal diseases; 4. Unknown diseases (Hoch, 1999).

Smirnova analyzed 19th-century Olonets province parish registers and concluded that only late 19th century records could be used as representative and reliable sources of death causes. Following contemporary knowledge and logic, she grouped all identifiable causes of death into distinct classes: pulmonary diseases; respiratory diseases; infectious diseases; intestinal diseases; brain diseases; and "unnatural" causes. According to her analyses, pulmonary and respiratory diseases were the main killers in Olonets province with its cold and damp climate. Smallpox claimed almost 7% of all deaths in the 19th century; there were also scarlet fever, measles, whooping cough and anthrax epidemics (Smirnova, 2002). Khabarova when studying causes of death in 19th century Sevastopol created a database that included data transcribed from the city's parish registers on deaths from 1815, 1817–19, 1821, 1824, 1865–66 and 1897. She did not group the causes of death but rather analyzed the whole spectrum of death causes mentioned in the source, except those mentioned less than five times — altogether 34 different diagnoses. She found an increasing variety of death causes in the sources, which became more precise and accurate already by the mid-19th century due to the famous Russian doctors practicing in the city during and right after the Crimean war (1855–1856). By the end of the 19th century all Sevastopol's records had precise diagnosis except several cases of catarrh with unknown etiology, *starcheskaya dryahlost* (senile decrepitude) and *starcheskaya marazma* (senile dementia). Tuberculosis was the most frequent cause of death for adults in Sevastopol' during the whole 19th century (Khabarova, 2008).

Masharipova in her study of mortality among Komi people in Tobolsk province used the concepts found in the sources from 1877 until 1918 (Masharipova, 2014a, 2014b). When analyzing 669 deaths among adult Komi she distinguished 45 different causes of death and found out that most Komi (40%) died from *starost* (old age), and *chakhotka* (tuberculosis) was the most usual mortal disease (28%) (Masharipova, 2014b, p. 156). Zhironov also used the concepts in parish records to analyze mortality in Khotetovo parish of Orel province in 1900–1917. According to his calculations, respiratory diseases were the leading cause of death among villagers aged 16 to 60, accounting for up to 35.9% of the deaths. Consumption accounted for one-quarter of all deaths in this age group. Third place went to maternal mortality and related complications (10.3%) (Zhironov, 2017, p. 103). Troitskaya and Avdeev used Vykhino parish registers from 1815 to 1918 to study the development of sex and age differences in causes of death. They grouped all the causes of death into 12 groups, eight of which they identify as infectious, cardiovascular, respiratory, neoplasms, digestive system, external causes, genitourinary system, maternal mortality. In addition, they used the source concept *starost* (old age) and *goriachka* (fever). Some causes of death that they could not group appropriately, they called "others" or marked as "unknown/unspecified". Their analysis proved that most Vykhino adult dwellers died from infectious, cardiovascular and respiratory diseases, while tuberculosis was the leader among the mortal infectious diseases for both men and women (Troitskaya & Avdeev, 2018, p. 41).

Some scholars used the ICD-10 as their basis for regional studies and grouped the causes of death depending on the specific research tasks. Such a strategy was used to analyze what were the reasons of death in 19th and early 20th century Barnaul city (Sarafanov, 2018), and Ekaterinburg city (Bakharev & Glavatskaya, 2020; Borovik, 2021; Glavatskaya & Thorvaldsen, 2020; Glavatskaya et al., 2021;

Zabolotnykh & Glavatskaya, 2017). In both cases, scholars not just created tables with causes of death, but transcribed all information from the nominative parish records into the databases for "The Population of Barnaul" and "Ural Population Project" (URAPP) respectively, with individual level data. The analyses of Barnaul data proved that registration of the death causes in the city became more accurate in the second half of the 19th century, especially for the age group from 16 to 59 when up to 98% of 8,891 analyzed death records included cause of death. Sarafanov distinguished 115 different causes of death grouped into 12 classes: infectious diseases, including intestinal diseases; external causes; respiratory organ diseases; cardiovascular diseases; digestive system diseases; developmental defects; diseases of the nervous system; non specified diseases; neoplasms; old age; others. Most frequent were infectious diseases, among which tuberculosis caused up to 34.5% of the deaths (Sarafanov, 2018, p. 53).

Unfortunately, all the above-mentioned studies used different principles of grouping causes of deaths by age, sometimes even creating gender specific classifications for causes of death. That does not make comparative studies of death causes an easy task. All of them failed to report the details of how the authors classified historical causes of death and grouped them in major classes. We shall explain the approaches we used to process the historical causes of death in Ekaterinburg's parish records separately below.

3 EKATERINBURG'S RELIGIOUS AND MEDICAL LANDSCAPES

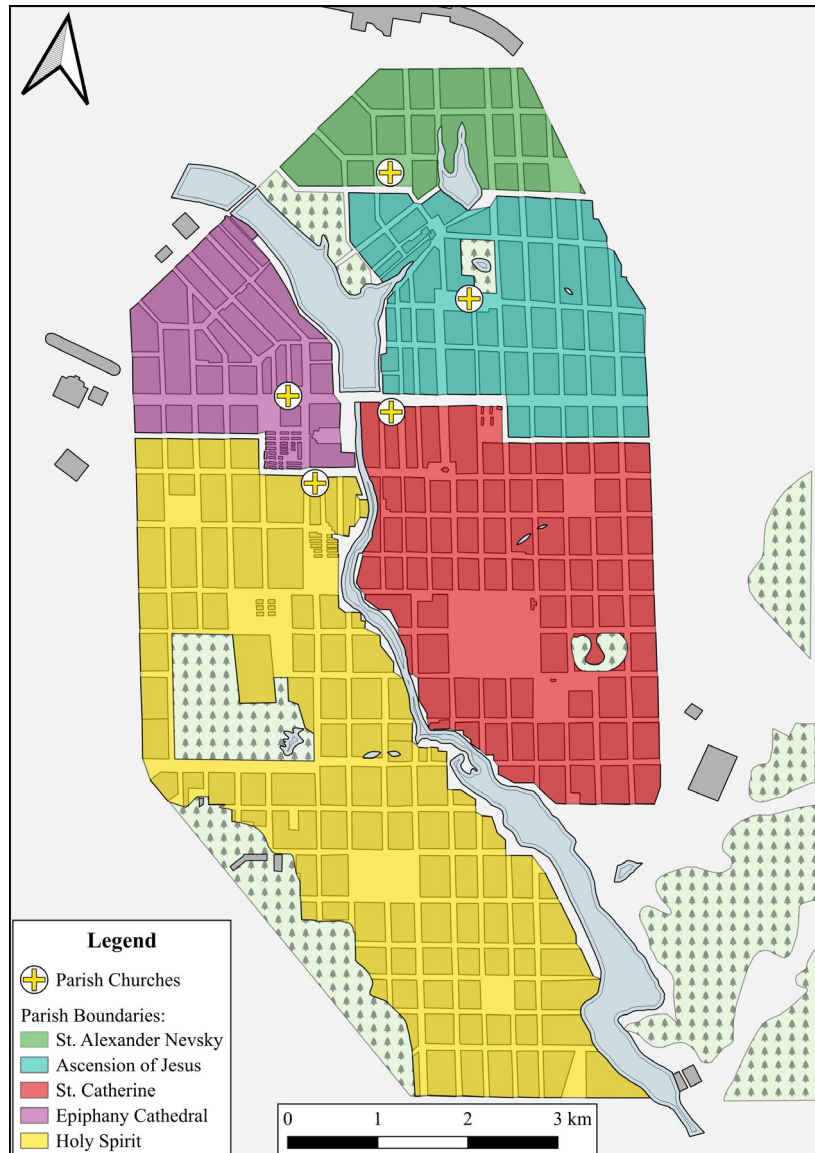
The study of mortality in Ekaterinburg warrants an introduction to the expanding economy and the ecclesiastical organizations responsible for the church records. At the turn of the 19th century, the city was rapidly developing from being the former mining capital in the Empire, into a multifunctional economic capital for the region. Its population increased from 21,403 in 1860 to almost 100,000 in 1913 (Bakharev & Zabolotnykh, 2020), was characterized by social and cultural diversity, as well as rapidly growing in-migration — of both peasants and skilled workers. Rapid growth, while positively affecting the economy, had negative consequences for the sanitary and medical conditions in the city, such as pollution of streets, shortage of drinking water, permanent crisis of the waste disposal, lack of medical facilities and skilled personnel. Despite Ekaterinburg's religious and ethnic diversity (Glavatskaya et al., 2019), over 90% of its population were members of the Russian Orthodox Church, assembled in five parishes: Epiphany Cathedral, St. Catherine Church, Ascension Church, Holy Spirit Church and St. Alexander Nevsky Church. The latter appeared after splitting the Ascension Church parish in 1897 due to the growing number of inhabitants around the rapidly developing railway station (see Figure 1).

Each church area had unique characteristics in terms of religiosity, socio-economic and demographic profiles. The main points of demographic growth were the northern St. Alexander Nevsky parish and the southern Holy Spirit parish with extreme in-migration. The St. Catherine and Ascension Church parishes had a mixed rural-urban character and average levels of social and demographic indicators. The parish of the Epiphany Cathedral stood apart as the most compact, stable and with relatively more parishioners enjoying high social status (Bakharev, 2020; Borovik, 2020). It also had the highest number and likely the highest proportion of medical workers among its parishioners (Glavatskaya et al., 2021, p. 233).

Russian Orthodox Church institutions dominated Ekaterinburg's religious landscape. However, the city also had three parishes of Old Believers⁴: one with their own priests and another two headed by lay leaders. The city had three churches belonging to *Edinovertsy*. These parishes of ethnic Russians consisted of former Old Believers and their descendants, who had agreed to the compromise proposed by the state in the 18th century: they had to subordinate to the diocesan bishops of the Orthodox Church but could still maintain their 17th century pre-reform liturgies and rituals. The city's non-Orthodox included four religious communities: Catholic and Lutheran churches erected in the city center in the late 19th century as well as a Synagogue and a Mosque located in private houses. Each of these congregations had official status and kept their own parish registers to record births, weddings and deaths.

4 Ethnic Russians that split from the State Church over the religious reforms in the 17th century. They kept pre-reform liturgies and rituals, did not obey the State and Orthodox Church authorities and were therefore persecuted by the State until 1905 Religious tolerance manifesto.

Figure 1

Orthodox parishes in Ekaterinburg in the early 20th century

Ekaterinburg's medical services improved from 1870 until the 1910s due to the zemstvo's activities and medical doctors' initiatives (see Table 3). Doctor A. Petrov, a professor from Saint Petersburg obstetric institute commissioned to Ekaterinburg, initiated the first city maternity home in 1877. Sponsored by local philanthropists, it was free of charge for the patients. There were eight midwives officially practicing in the city and many private doctors could help during delivery. Since the mid-1880s, the maternity home got its own building and became a specialized complex with a separate room for women preparing for delivery, another room for women in labour, and rooms for 12 mothers to remain after delivery under the doctors' attention. Later they added an ambulance and a gynecology department to the maternity home, which made it even more popular.

Ekaterinburg also had a hospital for children, founded in 1910. Doctor Nikolai Russkikh, employed by the Ekaterinburg zemstvo, attained national fame for fighting child and infant mortality. While working in Ekaterinburg, he studied European experiences of diminishing infant and child mortality and promoted this knowledge by cofounding the Society for fighting child mortality in Russia. He also edited the journal focusing on protection of maternity and infants. In general, Ekaterinburg had an elaborate network of medical facilities that surpassed most other Russian cities in both quality and quantity (Glavatskaya et al, 2018). The White Flower League — a society for fighting tuberculosis — operated in Ekaterinburg since 1912. Among other activities, they collected money to support patients who contracted the disease and organised annual public meetings on May 1st to promote knowledge about tuberculosis. A specialised clinic for tuberculosis patients started to operate in Ekaterinburg in December 1912.

Table 3 *Number of Medical Specialists and Institutions in Ekaterinburg*

Categories of specialists/institutions	1887		1912	
	Number of specialists/institutions	Residents per specialist/institution*	Number of specialists/institutions	Residents per specialist/institution*
Doctors**	20	2,000	41	2,500
Paramedics	11	3,500	16	6,500
Midwives***	23	1,700	20	5,200
Sum	54	700	77	1,300
Medical institutions****	10	4,000	30	3,400

* Numbers in this column have been rounded to the nearest hundred to facilitate comparison with international figures; ** Including dentists; *** Midwives and smallpox vaccinators; **** Including hospitals, maternity hospitals, dental clinics, laboratories, and pharmacies (Glavatskaya et al, 2018).

The presence of social institutions within the parish boundaries was of great importance for the mortality structure in each parish. For example, the Holy Spirit Church parish had an Almshouse, catering for elderly people from all over the city and its surroundings; St. Catherine parish had a Shelter for women, a prison and a Military Hospital.

4 CREATING THE DATABASE

The mortality data records are part of the Ural population project (URAPP).⁵ It has evolved from transcribing microdata about Ekaterinburg's religious minorities (Catholics, Lutherans, Jews, Muslims and Old Believers) into attempts to cover the whole population. The research experience of the group was work on the ethnoreligious minorities and after finding their nominative parish books in the State Archive of Sverdlovsk oblast' (GASO), we transcribed them into the URAPP database.

The ecclesiastical registration of vital events took place all over the Russian Empire until the October Revolution in 1917 or somewhat longer where the White troops prevailed. In Ekaterinburg, they regained power in July 1918 and lost it again to the Bolsheviks in July 1919. After that, a civil office established by the Bolsheviks gradually took over the registration. The parish registers had three common parts: baptisms/births, weddings and burials/deaths. The entries on burials provide names, gender, death date, age of the deceased and a death cause. In the case of children aged under 16, there is also information about the parents: their names, social standing/occupation, place of birth or origin and marital status. In addition, the records contain data on the priest conducting the funeral service and occasionally death certificate extracts verified by a doctor or police officer. Russian legislation regulated the parish registers and their accuracy. The religious community board had to check and verify the books frequently and religious leaders and communities were to be fined when any disorder was found in the records (Glavatskaya & Borovik, 2019). Even if these *metricheskie knigi* had a standardized format (see Figure 2), there were differences in how the cleric authorities recorded their parish members' deaths.

Table 4 *Ekaterinburg religious minorities' parish records on deaths in URAPP*

Parish	Denomination	Years	Burials
Assumption Chapel (Chasoven'nye)	Old Believers	1908–1919	125
St. Nikolai Chapel (Chasoven'nye)	Old Believers	1907–1919	194
Holy Trinity Church (Belokrinitskie)	Old Believers	1907–1926	347
St. Anna Church	Catholic	1898–1919	699
St. Peter Church	Lutheran	1886–1919	511
Synagogue	Jewish	1906–1917	219
Muslim Prayer house	Muslim	1891–1918	1,355
Total			3,450

5 For details, see Glavatskaya, et al. (2022).

Muslim parish books on deaths, containing 1,356 records, showing that tuberculosis was the most common cause of death among Muslims (Bobitsky, 2018). In both cases, we used ICD-10 to classify the causes of death. Later, we included Russian Orthodox parishes' records, first those for the period we already had data on minorities, and then extended the dataset gradually to the mid-19th century. The database now includes 39,976 records on the Orthodox Ekaterinburgers' deaths, out of which 17,080 records belong to adults — aged 16 years or more⁶ (see Table 5).

Unfortunately, we do not have a complete dataset of mortality records due to the loss of some Ekaterinburg parish registers. Even for the years when they are preserved, the entire number of death records do not match the city's annual statistics on mortality, which is higher. Thus, we unfortunately have only a sample of nominative sources covering in different years from more than a half to one third of the total adult mortality (see Table 6).

We also still miss some deaths registered in *metricheskie knigi* of the cemetery and prison churches, whose records have not been transcribed yet. Finally, police registered a few deaths of Baptists, Pentecostals, atheists and unidentified persons as well as the Old Believers until 1905.

We verified the information about the age at death among the adults in our sources between 1880 and 1919, and found it reliable with Whipple index averages of 123 among men and 132 among women. Most accurate were St. Alexander Nevsky parish records, which accumulated young male population (Glavatskaya et al, 2021).

Table 5 *Ekaterinburg Orthodox parish burial records in URAPP*

Parish	Years	Number of records	Adult records	
			N	%
Epiphany Cathedral	1880–1919	4,283	2,028	47.4
St. Catherine ⁷	1860–1862, 1864–1865, 1867–1869, 1872–1873, 1875, 1879–1881, 1883, 1885–1919	15,705	6,535	41.6
Ascension	1881–1884, 1889–1903, 1905–1919	8,281	3,303	39.9
Holy Spirit	1880–1898, 1900–1903, 1905–1915	8,392	3,939	46.9
St. Alexander Nevsky	1898–1919	3,315	1,261	38.0
Total	1860–1919	39,976	17,080	42.7

Table 6 *Number of deaths of Ekaterinburg residents over 15 years of age*

Source	1895	1905	1908	1911	Altogether
URAPP (Orthodox)	337	456	461	446	1,700
Official statistics (all denominations)	565*	717	1,241	1,203	3,726
Completeness	59.6%	63.6%	37.1%	37.1%	45.6%

Source: URAPP; *Medical reports, 1896, 1907, 1911, 1915*.

Note: *From 16 years old.

- 6 This was a conventionally recognized age of adulthood at the time, since according to the Russian law, those who reached the age of 16 could marry.
- 7 The high number of entries for the St. Catherine church parish is due to the private funding of transcription by Alexander Jusefovich — a descendant of St. Catherine parish members.

5 GROUPING THE CAUSES OF DEATH – EKATERINBURGS' ORTHODOX ADULTS

Almost all death records in the parish registers include cause of death. Only 0.2% of all records, made by the Orthodox church priests, have no statement about the cause, which indicates a high degree of responsibility among the Ekaterinburg clergy involved in the maintenance of parish records.⁸ Another 0.1% of the records in the dataset we failed to interpret because of the record's damage and illegibility.

Unless there was a doctor's diagnosis, the clergy determined the cause, guided by their knowledge gained in the seminary, personal experience and information provided by the deceased person's relatives. Police bailiffs certified a few cases of violent death, and doctors certified the few that occurred in hospitals.

To classify the causes of death, we used the ICD-10 system when possible, i.e., when the stated diagnosis coincided with the modern term or when the conventional historic term clearly corresponded to the modern. For example, tuberculosis was known in Russia under two conventional names: *chakhotka* (etymologically meaning weakness), and *bugorchatka* (tubercle). The term "tuberculosis" for the first time was used by priest Nikolai Krylov who certified the death of his colleague's son Veniamin Slovtsov in St. Catherine Church parish register in 1899. However, the other two obsolete terms were still in use until at least 1919. Altogether, we have 5,151 deaths caused by tuberculosis in our dataset, registered in 45 different ways: as a noun or as an adjective with specification of the affected organ, sometimes stressing the aggressive development of the disease.

Some records, even if not having a clear death cause, contained symptoms, which allowed our interpretation with a high degree of probability. One unclear case we managed to identify by crosschecking with other vital event records, linking the record of a young woman who died from *krovotechenie* (bleeding), with the baptism record of a baby she gave birth to a few days before dying. That allowed us to connect the cause of death with the childbirth. Twenty two cases in our dataset had several diagnoses listed one after another. In such cases, we chose the likely mortal one as the actual cause of death to allocate it to certain ICD-10 class. E.g., in case of "lobar pneumonia and typhoid fever" we assumed that typhus was the actual cause of death and "heart defect and scarlet fever" we classified as scarlet fever.

The level of medicine in the late 19th and early 20th century along with the general perception of average life expectancy did not require precise diagnostics of senior citizen deaths. As a result, the cause of death *starost* (old age) was quite common in the parish registers (altogether, there were 19 variant phrases). In some cases, the clergy being aware about the actual cause of death (i.e., tuberculosis, syphilis, accidents) would still add old age as the reason. For example in the death record of a 84-year-old man who died in 1907, the cause of death was stated as "from the consequences of a cold, expressed as progressive decline in cardiac activity due to old age" (URAPP). The youngest of those whose cause of death was simply registered as "old age" was the 46-year-old widow Agrippina Junikova who died in 1867 (URAPP). Barnaul city's parish register had a similar case when a 46-year-old woman died due to "old age" (Sarafanov, 2018, p. 56). Since there could be different diagnoses disguised under "old age" or *goriachka* (fever) — another frequent killer — we decided to keep these categories in the tables to study the dynamics and provide hypotheses about what the cause might actually have been.

There were also cases, which we could not attribute to any ICD-10 variant since the description in the sources was too general or unprecise: i.e., two women 70 and 71 years old died in 1906 from *slabost'* (weakness)⁹, while another 120 persons of different ages died *skoropostizhno* (suddenly). These we compiled as not identified (see Table 7).

The most common causes of death among Ekaterinburg's adult residents were infectious diseases of different etiology followed by the causes of death disguised under the "old age" concepts, third was diseases of the circulatory system, the fourth were diseases of the respiratory system, followed by diseases of the nervous system and by deaths caused by external factors. Other causes claimed less than 4% of all deaths (see Table 7).

8 The only exception are the Muslim parish books, where up to 13% entries contained no cause of death (Bobitsky, 2018).

9 These two might be coded in accordance to the system designed for historical causes of death, such as ICD-10h in the future, since this includes some forms of weakness as an "old age" cause.

Table 7 *Causes of death of Ekaterinburgers over 15 years old grouped according to ICD-10+*

Group name ICD-10 +	Variants	N	%
1 Certain infectious and parasitic diseases	154	6,647	38.9
2 Old age	19	3,797	22.2
3 Diseases of the circulatory system	115	1,330	7.8
4 Diseases of the respiratory system ¹⁰	167	1,014	5.9
5 Diseases of the nervous system	68	905	5.3
6 External causes of morbidity and mortality	482	793	4.6
7 Hydrops	3	630	3.7
8 Diseases of the digestive system	97	624	3.7
9 Neoplasms	59	548	3.2
10 Pregnancy, childbirth and the puerperium	32	214	1.3
11 Diseases of the musculoskeletal system and connective tissue	12	164	1.0
12 Diseases of the genitourinary system	40	137	0.8
13 Endocrine, nutritional and metabolic diseases	9	45	0.3
14 Mental and behavioral disorders	13	16	0.1
15 Not identified	28	156	0.9
16 No data		41	0.2
17 Damaged record		20	0.1
Total	816*	17,081	

Note: *External causes are not included.

Tuberculosis was the most usual killer among adult citizens: it claimed up to 77.5% of all the victims of mortal infectious diseases in late 19th and early 20th century Ekaterinburg. The second mortal infection was a fever with unclear etiology denoted as *goriachka*, followed by typhus. The other infections, including cholera, were responsible for less than 1% of the deaths in this group (see Table 8).

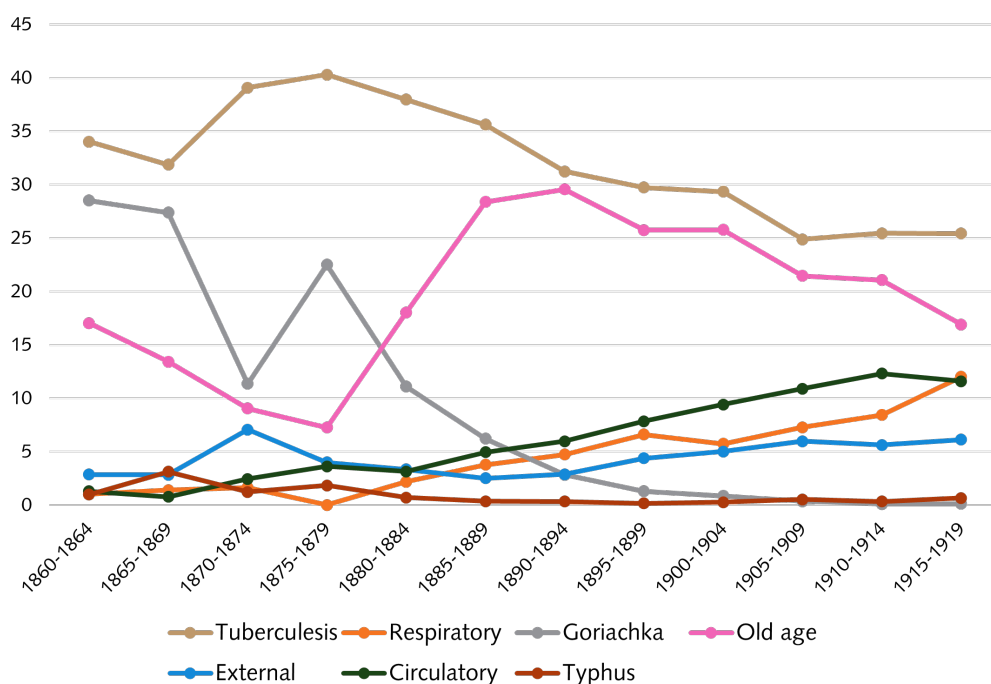
5.1 CAUSES OF DEATH AS LONG RUN OBSERVATION

We have transcribed data for St. Catherine parish from 1860 and for the other parishes — from 1880. To analyze the dynamics of death causes over the period until 1919 we used 5-year sub periods, which also helped us look for changes when military action started in 1914. As Figure 3 shows, tuberculosis kept its leading position during the whole observation period even if its rate declined since 1880s from 35% to 25% of all deaths. We may assume that efforts made by the city's medical staff to fight the disease, supported by the philanthropist and local intelligentsia brought positive result. The use of the obsolete term *goriachka* became less frequent from the 1880s, after the Pirogov's nomenclature introduction, and almost disappeared from the parish registers by 1919. However, "old age" — another unclear cause of death, even if less frequent in the registers since the 1890s, was still in common use. The proportion of circular system and respiratory diseases steadily increased, the latter especially during WWI and Civil war that followed its end. Proportion of those died from typhus also increased during this turmoil period.

10 This also include *vospalenie legkikh* conventional for pneumonia.

Table 8 *Certain infectious and parasitic diseases that caused deaths among adults*

	Cause in Russian	Certain infectious and parasitic diseases ICD-10+	N cases	%
1	Tuberculez	Tuberculosis	5,151	77.5
2	Goriachka	Fever	810	12.2
3	Tif	Typhus	387	5.8
4	Kholera	Cholera	59	0.9
5	Vospalenie	Inflammation of certain organ	51	0.8
6	Zarazhenie	Sepsis	33	0.5
7	Gepatit	Hepatitis	23	0.3
8	Rozha	Erysipelas	21	0.3
9	Skarlatina	Scarlet fever	21	0.3
10	Ospa	Smallpox	15	0.2
11	Difterit	Diphtheria	14	0.2
12	Kozhnaia infektsia	Skin infections	14	0.2
13	Peredajushiesya polovym putem	Sexually transmitted infections	13	0.2
14	Dizenteria	Dysentery	12	0.2
15	Zolotukha	Golden pox	11	0.2
16	Kor'	Measles	2	0.0
17	Vodoboyazn'	Rabies	2	0.0
18	Glisty	Helminthiasis	2	0.0
19	Sibirskaya yazva	Anthrax	2	0.0
20	Malyaria, Stolbnyak, Sap, Infectionnoe ostroe zabolevanie	Malaria, Tetanus, Sap, "Acute infectious disease"	4	0.1
Total			6,647	

Figure 3 *Most frequent causes of death, in Ekaterinburg's Orthodox parishes, relative numbers (%); before 1880 only St. Catherine parish data*

5.2 CAUSES OF DEATH BY PARISH

We found structural differences in the causes of death between the parishes. The relative "leaders" with respect to deaths from infectious diseases were St. Alexander Nevsky and St. Catherine parishes, and for non-infectious ones — Epiphany Cathedral. The highest proportion of deaths caused by "old age" was registered in the Holy Spirit Church parish, while deaths from external causes were most often recorded in the parish of the St. Alexander Nevsky Church (Glavatskaya et al, 2021).

To find the social factors influencing this pattern we analyzed deaths caused by tuberculosis and by excessive alcohol consumption in contrast to causes of death from diseases, where fatal consequences could be diminished by getting professional help. These are causes of death in connection with childbirth, or diseases, where diagnostics required a doctor's expertise, e.g., brain diseases. The analyses showed that the maternal mortality rate was lower in the Epiphany Cathedral parish. Perhaps the parishioners in this relatively wealthy congregation had the means and were ready to receive professional medical care, which saved women. Causes of death, where the diagnosis required physicians' involvement, were most often found also in the Epiphany Cathedral parish registers. The parishioners likely also benefited from having two hospitals within the borders of the parish. Deaths caused by alcohol consumption were more often recorded in the Ascension and Holy Spirit parishes.

The higher proportion of deaths from tuberculosis in the parish of St. Catherine Church may have been related to the location of a females' shelter, a prison and a military hospital within the parish boundaries with a concentration of socially vulnerable groups. The higher prevalence of male mortality from tuberculosis was likely due to the same reasons as in our days: smoking, crowded cohabitation in barracks with infection risk and neglect of one's own health.

6 REFLECTIONS AND DISCUSSION

Ekaterinburg at the turn of the 19th century was an early industrial city. After the Great Reforms in the 1860s it expanded rapidly both economically and demographically. The increasing role of non-family communities centering on church parishes accompanied the complex internal stratification of urban society. These were developing in the emerging urban micro districts of Ekaterinburg, each of which had its own socioeconomic and demographic specificity. Areas of growth included those inhabited by industrial workers, and the business districts of the elite. WWI, the 1917 Revolution and the ensuing Civil War interrupted this development. WWI brought influx of refugees from the Empire's western provinces and prisoners of war; the Revolution caused immigration and interrupted the established social institutions' activities.

We used Orthodox parishes' death records for the period between 1860 and 1919, transcribed into the URAPP database, to analyze how the system of death registration and registration of death causes developed during the late imperial period, trying to trace the changes in time and space and define the main causal factors affecting the changes. While being the main source on causes of death, the parish records are far from complete since some were lost. Another limitation of this source type is related to the political system changes in 1917. The ecclesiastical registration of vital events existed unchanged all over the Russian Empire until the October Revolution in 1917, when civil offices took the responsibility. In Ekaterinburg, the civil office worked just a few months, before the White troops during the Civil War regained power in July 1918 and lost it again to the Bolsheviks in July 1919. Some churches managed to keep their parish registers in between these events until March 1919, but it is not clear how many records are missing due to registration in the civil office registers. In this paper, we used only ecclesiastical parish registers, understanding that missing information affects the results, especially after 1917, when religious organizations lost their commission of vital events registration and the newly established civil office could not fulfill the task due to political turmoil and combats. One clear problem is that most deaths caused by typhus in 1919 likely occurred in hospital or typhus barracks and therefore did not appear in the parish registers.

The Ekaterinburg clergy involved in the maintenance of parish registers took on the task seriously: more than 99% of the death records contained the cause of death. The problem, however, was the lack of a nomenclature they could refer to when defining the cause of death until the 1880s and even later its use was not obligatory. The clerics' medical knowledge was in most cases inadequate.

Moreover, even if the legislation required the priests to keep the parish books, in actual practice, any parish clerk could perform the duty. Our analyses showed that precision of diagnosis depended on the parish staff' educational level. We used the ICD-10 system to code the death causes and distributed all the causes found in the parish records between 15 main groups: 13 from the ICD-10 plus those we could not identify and one, which the sources referred as "old age". The general perception about aging along with the low life expectancy resulted in active use of the old age concept as death cause even for people under 50 years old. Since there could be different diagnoses disguised under "old age", we decided to keep it as a separate category in the tables to see the development. As a result, we could identify 88% of all causes of death in our dataset using the ICD-10.

The most common cause of death for adult Ekaterinburg residents were infectious diseases, tuberculosis claiming most of the victims. In this way, Ekaterinburg did not differ from the Moscow region, Sevastopol or Barnaul (Khabarova, 2008; Sarafanov, 2018, Troitskaia & Avdeev, 2018). The second and third most common killers were fever with unspecified etiology disguised as *goriachka* and other diseases attributed to the old age category. Since the *goriachka* death rate declined along with a simultaneous increase in respiratory diseases and tuberculosis death rates, we can speculate that these were the most likely causes of death disguised under the obsolete folk term *goriachka*. Likely, the Ekaterinburg doctors' societal activity and implementation of Pirogov's nomenclature affected the diagnostics' accuracy positively. The less noted changes in using "old age" as cause of death could be explained by the fact that using the nomenclature was not obligatory in Imperial Russia and most of the clergy responsible for death registration were not competent to make precise diagnosis. The doctors focused their efforts on the vulnerable infants and on infectious diseases, which caused most of the high death rate. In addition, there was a shortage of medical workers in the city especially in times of war, when the combating troops mobilized doctors. As one result, the cause of death concept "old age" was still in common use.

We noted certain differences in causes of death registration between the parishes related to their location, socio-economic and demographic characteristics. Additional factors that influenced the mortality and causes of death structure within the parishes were the presence of social institutions, such as hospitals, prisons, almshouses, shelters, etc., which concentrated certain groups of people with high mortality.

Doctors residing in a parish might make a difference, for their presence likely spread medical knowledge, increasing the chances to get earlier and more accurate diagnostics and help for the parishioners. The diagnostics was definitely improving during the late 19th and early 20th century, when the introduction of Pirogov's nomenclature required a more professional approach and helped stop using some obsolete popular terms to diagnose infectious diseases.

7 FUTURE RESEARCH PROSPECTS

The limitations of the sources and the dataset we experienced while working on this paper define the main direction of future research that can allow deeper, more detailed and precise understanding of health and living conditions among Russia's provincial urban population. We based our study on the Ural Population Project (URAPP)¹¹ — the biggest individual level database on causes of death in Imperial Russia. The inclusion of the civil register into the dataset will provide more information on how the registration was changing and what was killing the city population after 1917. It will be particularly important to extend our research until after 1920 to see the results of implementing centralized nomenclature by the Soviet power. Our analyses showed the importance of the personnel responsible for the registration, thus including information about the priests would be of great interest. It may deepen our understanding of the development of medical knowledge and its actors, as well as the perception of death by Ekaterinburg's citizens at the time. We should combine all age groups to analyze how the system of death registration was changing by age, sex and other variables. Finally, to make the research more comparable with the other studies we should use the historic ICD-10h.

¹¹ It is still a work in process, but once finalized it should be accessible by scholars through official application to the Ural Federal University.

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