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## The Demographic, Social, and Economic Aftermath of the Cholera Epidemic in Astrakhan in 1892

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### Abstract

Astrakhan, due to its location, was always considered to be a gateway of cholera to the Russian Empire. The aim of the following study is to assess demographic, social, and economic aftermath of the cholera epidemic, occurred in Astrakhan in 1892, maintaining historical and demographic methods of press analysis as a source, with an assessment of the demographic aftermath provided by the eyewitnesses of that accident.

The sources for the study were materials from pre-revolutionary sources. Contact analysis of the press to reveal the demographic estimations of eyewitnesses of the incident, i.e. experts of that time (medical workers, town governors, civil servants, military officers) in relation to the peculiarities of the epidemic development, as well as their subjective estimation of the demographic, social, and economic aftermath of the cholera epidemic were used.

The 5<sup>th</sup> cholera epidemic in Russia lasted within 1892–1894. The 1<sup>st</sup> wave was the deadliest. In 1892, mainly from May to November, more than 620 thsd people were infected and 300 thsd of them died. In 1893, there were infected 103 thsd people and 43 thsd people died. In 1894, the epidemic occurred on a smaller scale. By 1892, cholera caused 13 epidemics in Astrakhan. In 1892, cholera, causing an outbreak of morbidity in the Transcaspien region, ended up in Baku. The deterioration of the epidemiological situation in Astrakhan was facilitated by the mass departure of Baku residents on overcrowded ships, despite the denial by the authorities of the city of Baku of the presence of cholera. After the introduction of quarantine measures in Astrakhan, rumors arose among the population that in cholera hospitals, living people are put in coffins, sprinkled with lime, and buried. During the riots, medical personnel were killed, a cholera hospital was burned, and the infected were sent home. After the riots, there was a sharp increase in morbidity.

From the 14<sup>th</sup> of June to the 20<sup>th</sup> of September, 1892, in Astrakhan, more than 3 per cent of the city's population died from cholera, and for 10 thsd residents there were 480 cases and 316 deaths. This was the demographic maximum for the cholera epidemic of 1892. The assessment of excess mortality showed an increase in mortality by 278 per cent in June and by 555 per cent in July compared to these months in 1888–1894. Of all those admitted to the hospital in Astrakhan, about 73 per cent were laborers who were living in hostels (shelters); about 5 per cent were workers on ships, steamships, and barges; 12 per cent are artisans. The social composition by estates was the following: 1983 peasants, 316 soldiers, 262 burghers, 12 Cossacks (kazaks), 8 nobles, and 5 church servants. Natives of Astrakhan and the province accounted for about 11 per cent of cases, 89 per cent were seasonal migrants. Due to supermortality, many children were orphaned. The budget expenditures of Astrakhan to combat the epidemic amounted to 142 thsd rubles, including 33 thsd rubles went to the maintenance of troops who arrived to suppress the cholera riot. The cholera epidemic had a positive sanitary condition of cities, formed new habits of the population in terms of personal hygiene.

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## 1. Introduction

Cholera<sup>1</sup> has been affecting people for thousands of years. The ancient Sanskrit medical literature of 500-400 B.C. describes the symptoms of the disease. In the last two centuries cholera caused seven pandemics. The 7<sup>th</sup> pandemic is ongoing nowadays (Kanungo et al., 2022: 1429; CGS).

Cholera is considered to be native to the Ganges River delta in India (Cholera). Before the 19th century, beyond India cholera epidemics were observed in Persia in 1364-1376 and Arabia in 1761-1763. With the development of international relations and population migration, cholera caused the 1<sup>st</sup> pandemic lasting in 1817-1823, the 2<sup>nd</sup> pandemic lasted in 1826-1837, the 3<sup>rd</sup> in 1846-1862, the 4<sup>th</sup> in 1864-1875, the 5<sup>th</sup> in 1883-1896, the 6<sup>th</sup> in 1902-1925, and the 7<sup>th</sup> pandemic began in 1961 (Drankin, 1973: 5; Moskvitina, 2008: 22).

The spread of cholera was directly dependent on the development of transport communion. In the 1st pandemic, cholera vibrio reached Europe six years after the outbreak of the epidemic in India. In the 4th pandemic, cholera in a year reached some European countries, during the 5<sup>th</sup> epidemic within less than a year (Kovaleva, 1970: 2-3).

Cholera first appeared in the Russian Empire on the 10<sup>th</sup> of September, 1823, among the employees of the port of the city Astrakhan. But the disease did not spread further. The Astrakhan medical board at that time adhered to the miasmatic theory, believing that cholera arose due to "an unusual change in the local atmosphere" (Drankin, 1973: 13).

In 1830-1831, cholera vibrio spread throughout the Russian Empire. In two years, about 230 thsd people died. In 1830, Astrakhan again became the gateway of cholera's entry into the state. During 1823-1925 there were 55 "cholera years" in the Russian Empire. During these years, 5.5 mln people were infected with cholera and 2.3 mln died (Drankin, 1973: 7-9, 13).

The Volga waterway often played a decisive role in the spread of cholera throughout the Russian Empire. Astrakhan was a gateway for epidemics from Central Asia, Transcaucasia, and Persia. The infection was mostly transmitted through water, in which cholera vibrio got with the excretions of the patient. After its appearance in Astrakhan, cholera spread rapidly through the cities of the Volga region (Tsaritsyn, Saratov, Samara, Nizhny Novgorod, and etc.) (Henrici, 2020: 17).

Before the spread of railroads within the Russian Empire, the Volga River, and other navigable rivers used to be the main transportation routes. With the advent and expansion of the railroad network, their role in the spread of the 5<sup>th</sup> and 6<sup>th</sup> cholera pandemics increased significantly (Drankin, 1973: 15-16). In 1892, during the 5<sup>th</sup> pandemic the cholera pathogen was introduced from Persia and spread through Astrakhan to the Russian Empire, causing a "tremendous explosion" of disease (Henrici, 2020: 13).

## 2. Materials and methods

The aim of the article is to assess the demographic, social, and economic aftermath of the cholera epidemic, occurred in Astrakhan in 1892, on the basis of the historical and demographic methods of analyzing press materials as a source with the assessment of demographic consequences of eyewitnesses of that accident.

The objectives of the study are to identify the peculiarities of the spread of the cholera epidemic in Astrakhan in 1892 as one of the most significant ports of the empire in the context of population migration, to assess the demographic aftermath of the cholera epidemic in Astrakhan on the basis of eyewitness experience of experts of that period (medical workers, town governors, civil servants, military officers), to determine the impact of the epidemic on key demographic processes in Astrakhan, including mortality and population migration, to assess the effectiveness of measures to combat the epidemic in Astrakhan, and to assess the effectiveness of measures to combat the epidemic in Astrakhan.

The source basis of the study are the materials of pre-revolutionary publications, including periodicals, as "The News of the City of Astrakhan" (*Astrakhansky Vestnik*), "The Doctor" (*Vrach*), "The State News" (*Governmental Vestnik*), "The News about Finances, Industry, and Trade" (*Vestnik of Finance, Industry, and Trade*) in 1892-1894, which contain information about the cholera epidemic in Astrakhan and in the territory of the Russian Empire. The complementary materials describe the history of the cholera epidemic in Astrakhan in 1892.

The research conducts a content analysis of the press in order to identify the demographic assessments of eyewitnesses of the passed accidents, experts of that time (doctors, town governors, civil servants, military

<sup>1</sup> Cholera is an "acute diarrheal infection, severe forms of which are accompanied by acute watery diarrhea and potentially fatal dehydration" (CGS). It's caused by the bacterium *Vibrio cholerae*. "The way of spread is fecal and oral, realized through factors of household transmission (contaminated hands, household items), water, and food. A certain role play flies. The leading way of spread is via water routes" (Pokrovsky et al., 2009: 265). Cholera usually occurs in regions with inadequate access to fresh water (Kanungo et al., 2022: 1429). Incubation period lasts from two hours to five days (CGS). Cholera vibrio was discovered by F. Pacini in 1853 and by E. Niedzwiecki in 1872. Pure culture was distinguished and studied by R. Koch in 1883 (Pokrovsky et al., 2009: 264).

officers), regarding the peculiarities of the epidemic development, as well as their subjective assessment of the demographic, social, and economic aftermath of the cholera epidemic.

### 3. Discussion

Research about epidemics, including cholera, is presented in both internal and international scientific works. Studies about cholera were ordinary focused on describing the causes and characteristics of epidemics. Nevertheless, some studies have provided comprehensive assessments of the demographic consequences of cholera epidemics, including their impact not only on the overall scale of mortality, but also on its structure by age and ethnic groups. A special role is taken by the study of the relationship between the aftermath of epidemics and social and economic consequences for society.

Asa Briggs and L. Chevalier are considered to be the first researchers of the impact of cholera epidemics on European societies, who believed that epidemics exposed the accumulated social problems of society (Henze, 2011: 1-3). Russian literature notes the role of N.F. Gamaley, who investigated "chicken cholera", in the formation of microbiology in Russia (Mikhel, 2009: 11). Russian scientists G.K. Vasiliev and A.E. Segal noted that among epidemic diseases cholera takes an absolutely extraordinary place (Vasiliev, Segal, 1960: 243).

The most common area of research in the scientific literature is about the assessment the impact of epidemics. Primarily, about the demographic aftermath. For example, Ch. Rosenberg believed that cholera in the 19<sup>th</sup> century was the same epidemic disease as the plague in the 14<sup>th</sup> century. He finds similar symptoms of cholera and acute arsenic poisoning. Taking into consideration the USA as an example, he also noted that cholera had a lower mortality rate than other epidemics, claiming that a few Americans died from cholera, for every victim of the disease there were dozens of deaths from malaria and tuberculosis (Rosenberg, 1987: 4).

It is also worth noting the studies of social aftermath of epidemics. M. Pelling also compared the impact of cholera on society with the plague and believes that cholera caused only a short-term impact on society (Pelling, 2022: 346), disagreeing with Briggs and Chevalier (Henze, 2011: 1-3).

According to Ch. Rosenberg, "cholera became a stimulus to overcome centuries of government inertia and indifference to public health problems" (Rosenberg, 1987: 2). Frieden noted that the cholera epidemic of 1892 strengthened the position of physicians in the tsarist Russia (Frieden, 1977: 552).

British social historian Asa Briggs stated: "Cholera, wherever it appeared... mercilessly exposed the political, social, and moral shortcomings of society... It inspired not only sermons, but also novels and works of art" (Briggs, 1961: 76). K.A. Bogdanov believes that "the fight against cholera stimulated research not only in medicine, but also in statistics, cartography, and urban planning (primarily, in public water supply systems)" (Bogdanov, 2017: 375).

In addition, the scientific works note the political aftermath of epidemics. For instance, D. Davis and S. Henze believe that the crisis caused by the famine of 1891 and the cholera epidemic of 1892 served as a trigger for revolutionary movements in the Russian Empire" (Davis, 2018: 1-4; Henze, 2011: 1-3).

A whole area of research in the scientific literature deals with the peculiarities of cholera epidemics in the Russian Empire. Pre-revolutionary cholera epidemics were in focus of the following researchers: P.E. Ratmanov, K.S. Barabanova, A.M. Stochik, and S.N. Zatravkin (Ratmanov, 2008; Barabanova, 2015; Stochik, Zatravkin, 1995). For example, D. Davis highlights that Russia is one of the few states that faced such a prolonged and intense impact of cholera on society (Davis, 2018: 4). Sh. Henze, covering the cholera epidemic in Saratov in 1892, compares it to a medical, social, and economic catastrophe, claiming: "Russia was the first European country to be struck by cholera and the last to defeat it" (Henze, 2011: 1-3, 50). Russian scientists, G.K. Vasiliev and A.E. Segal, came to the conclusion that the measures against the epidemic, carried out by the tsarist administration in 1892, proved the failure of the fight against the disease. As a result, the tsarist government legalized the activities of zemstvo and city sanitary commissions, thus "reluctantly acknowledging" the importance of society in the fight against infections (Vasiliev, Segal, 1960: 275). K.A. Bogdanov notes that "despite the fact that cholera epidemics affected all strata of society in Russia, the historical study in Russian works of its social and cultural reception has barely begun" (Bogdanov, 2017: 377).

The scientific novelty of the study deals with the expansion of information about the cholera epidemic in the Russian Empire at the end of the 19<sup>th</sup> century via introduction of historical sources reflecting the peculiarities of the pandemic and its social, economic, and demographic aftermath on the basis of the methods of historical and demographic analysis, i.e. content analysis of the press.

### 4. Results

#### The features of the development of the cholera pandemic in 1892

Epidemics were often companions of wars. Cholera accompanied colonial wars in India and North Africa, and was observed during the Turkish-Persian wars and the Crimean campaign. Pilgrimage also played a significant role in the spread of cholera vibrio. It has been recorded that outbreaks in India occur every twelve years when the religious festival of the Brahmanists, Kumb Mela, is celebrated. On that days, up to 3 mln pilgrims performed ablutions in the sacred Ganges River, drank water, and prayed. The crowding, unsanitary conditions, and religious ceremonies created ideal conditions for the pilgrims to spread infection (Drankin, 1973: 25).

Cholera was brought from India to Kanadar in late March or early April, 1892. The pathogen then caused an epidemic in the city of Mashhad, which was 230 versts<sup>1</sup> from the Russian border. Mashhad was a religious center for Shiite Muslims, where Imam Riza was buried (Arustamov, 1894: 1-2). Every Shiite dreamed of being buried next to the Imam's grave. Due to this reason, "the corpses of many wealthy Shiites were sent right over to Mashhad, no matter how much and trouble it would cost" (Arustamov, 1894: 1-2).

There was a cemetery in downtown. The clergy received large sums of money for organizing funerals. It seems that muslims from India arrived to Mashhad and could bring infection (Arustamov, 1894: 1).

According to the Russian Consul to Mashhad, the cholera epidemic managed to kill 3-4 thsd people out of more than 120 thsd populated city. The Russian consulate in Mashhad lacked medical personnel who could have informed the Russian authorities and the border towns of the epidemic in time. As a result of untimely reporting, the measures that were taken against the appearance of cholera in Baku and Astrakhan were too late (Arustamov, 1894: 2-10).

On the 26<sup>th</sup> of May, first news about the appearance of cholera in Persia came to Astrakhan. It became known about a case of cholera in a village near the station Kaahka of the Transcaspiian railroad. Because of the possible introduction of the infection into Astrakhan, the Committee of Public Health was convened on the 29<sup>th</sup> of May and the 2<sup>nd</sup> of June, at which it was decided to introduce measures against cholera in the area of the Caspian Sea and on the wharves of the city. It was decided, as in 1890 (during the cholera in Persia and Turkey), to follow sanitary control of ships arriving at the nine- and twelve-foot roadstead. "Favorable (safe) ships" (free of cholera patients) were allowed through, and "unfavorable" ones were detained for quarantine (Grigoriev, 1893: 1-3). According to the instructions, if there was anyone infected or just suspected ones on board, all passengers had to be sent for a seven-day observance (Arustamov, 1894: 4).

There was a permanent quarantine camp in Baku, so passengers arrived from this city were provided with "clean certificates" that allow them to freely pass through (Grigoriev, 1893: 3). "In Baku, before the 11<sup>th</sup> of June, cholera nostras with a huge percentage of mortality was not yet recognized as Asian cholera" (Arustamov, 1894: 2). Panic began among the people. Every day ships from Baku arrived in Astrakhan with a large number of passengers "... on the way there were infected and dead among those who had fled, who were thrown into the sea, but they could be considered as dead from cholera, as they had left Baku, where officially there was no cholera at that time" (Arustamov, 1894: 4).

The steamship "Alexander", arrived from Baku to Astrakhan on the 12<sup>th</sup> of June, despite the status of safe, was on quarantine due to the death of a child and illness of some passengers. There were already five dead on the steamer on the 14<sup>th</sup> of June. A bacterioscopic testing of the intestines of a corpse exposed cholera. Thus, after the arrival of the steamship, all vessels traveling from Baku to Astrakhan were inspected (Grigoriev, 1893: 3).

After the official recognition of cholera diseases in Baku, the number of passengers arriving in Astrakhan only increased (Grigoriev, 1893: 3). Steamship companies and shipowners, taking advantage of the panic among the people, raised the fare, transported passengers even via cargo vessels. In addition, there was lack of medical personnel and disinfectants on boards. There was no food supply and "... they charched huge sums of money for lunches, even for boiled water" (Arustamov, 1894: 7). The price of boiled reached 10-15 penny (*kopecks*) per glass (Grigoriev, 1893: 6). The schooner "Evilina", which usually carried around 200-300 passengers, "... during cholera... took over 700 passengers who fled in panic" (Arustamov, 1894: 4).

After the "escape" from Baku by the 20<sup>th</sup> of June, more than 3 thsd people had crowded together on the nine-foot raid. There was no fresh water on the roadstead and they were afraid to bring provisions to the quarantine point. There were no more than five doctors and a few paramedics (OHJH, 1892a: 2). The government had to rent 16 steamships to transport provisions to the raid (MH, 1892i: 3).

Then, cholera vibrio began to spread along the main route of communication with Astrakhan, the Volga River (Arustamov, 1894: 10). In Tsaritsyn, Saratov, and Samara the epidemic manifested itself "... with much less violence" (Arkhangelsky, 1892: 15). Just within two months, the infectious agent covered eight provinces and regions in the Caucasus (the provinces of Baku, the Elisavetopol, Erivan, Tiflis, Stavropol, Dagestan, Tersk, and Kuban). In East, beyond the provinces of Astrakhan, Saratov, and Samara, the disease was observed in the provinces of Simbirsk, Kazan, Nizhny Novgorod, Vyatka, Orenburg, and Ural (Arkhangelsky, 1892: 15). "All efforts to stop the further spread of the epidemic are in vain and every day it seizes more and more new areas, passing from state to state and from province to province, and finally the cholera contagion, with its inherent Kochov's zapatovid bacillus, has already entered both capitals Moscow and St. Petersburg" (Arkhangelsky, 1892: 15). From May to November, the infectious agent spread throughout most of the territory of the Russian Empire.

<sup>1</sup> A verst (*versta*) is a former obsolete Russian unit of length defined as 3,500 feet.



**Fig. 1.** Distribution of the cholera epidemic by the provinces and regions of the Russian Empire in 1892 (Karta..., 189-)<sup>1</sup>

The 5th cholera pandemic in the Russian Empire lasted until 1894. In 1892, the first wave occurred from May to November, more than 620 thsd were infected and 300 thsd people died (Henrici, 2020: 13). Ordinary, there were 17.46 infected people per 1 thsd in the level of whole the state, 9.53 in Central Asia, 6.77 in Siberia, and 3.41 in the European part of Russia. The epidemic caused critical damage in the Caucasus, where the mortality rate was the highest, reaching up to 51.52 per cent (Mendelsohn, 1892: 439).

In 1891 there was a crop failure, which provoked famine in many regions of the Russian Empire (Mery..., 1891: 274). In sixteen "starving" provinces there were 60.7 infected per 10 thsd people, and the mortality rate was 46.3 per cent. In the remaining forty-four provinces there were 19.7 infected per 10 thsd people, and the mortality rate was 41.4 per cent. One of the most affected with cholera regions was the Astrakhan province, but there was no crop failure there (Henrici, 2020: 54-55).

In 1893, 103 thsd people were infected and 43 thsd died. The most affected were the provinces of Podolia, Kyiv, Orel, Volyn, Kursk, and Tula. In 1894, the epidemic occurred again, but with much less intensity (Gamaleya, 1905: 54).

After cholera spread throughout the Russian Empire, the pathogen caused an epidemic in European countries. In late August, 1892, cholera struck port workers and residents of Hamburg who drank unfiltered water from the Elbe River. In the neighboring town of Altona, whose population drank water from the same river but had a central sand filter, 259 people were infected and 112 died (Gamaleya, 1905: 54). However, most of them contracted cholera in Hamburg (Lukomsky, 1893: 14). At the end of the 19<sup>th</sup> century, many people did not believe in the contagionist theory, so cholera posed "riddles". That is why some of the inhabitants were infected and those who had water filters were not infected (Briggs, 1961: 79).

A week after the epidemic had spread through Hamburg, the highest daily number of infected people reached a thousand, and the highest daily mortality rate turned out to be 455 (Lukomsky, 1893: 14). "There was nowhere to put infected people; there was not enough strength to bury all the dead in time either. But... measures were soon taken to eliminate the inconvenience. A special detachment of 150 men with 60 two-

<sup>1</sup> Colors indicate the spread of cholera among civilians, while Roman numerals illustrate spread of cholera among military forces by months.

horse carriages was continuously engaged in the transportation of infected and corpses. In the period of the 20-29<sup>th</sup> of August, the detachment transported 2,335 patients and 1,068 corpses" (HMN, 1892: 949). Thus, 7,972 people were infected and 7,610 died, while the total population of Hamburg was 640 thsd people (Lukomsky, 1893: 14; HMN, 1892: 972).

In the 1890<sup>th</sup>s, the port of the city of Hamburg used to be one of the largest hubs in the world. In 1892, 54 thsd of Russian emigrated through it, mostly to North and South America (Ryazantsev et al., 2023).

Cholera was brought into British ports by personnel and passengers of the ships arriving from Hamburg. In early September it was diagnosed at Liverpool, Falmouth, Leith, and Grimsby (OHJH, 1892a: 2). In the town of Falmouth, sailors of a ship from Liverpool were put on trial for refusing to sail to Hamburg due to cholera (OHJH, 1892c: 2). In Denmark, the first victim of cholera was a member of the Aargus municipal council who had returned from Hamburg. The government imposed a strict quarantine (OHJH, 1892b: 2). The epidemic in Hamburg likely led to the spread of cholera to each continent, causing the 5<sup>th</sup> pandemic.

In late August, the European press concluded that the Hamburg authorities had deliberately concealed the cholera outbreak in the interests of trade. The Daily Telegraph announced: "This reckless act... has affected all the financial markets of Europe. The result has been damage to the cities... and they have paid the price of allowing the contagion to reach them... The authorities of Hamburg will pay dearly for their cowardice. Their trade will suffer enormous losses, and in addition it will be very difficult to paralyze this scourge when it has broken out in the city itself" (OH, 1892a: 2).

### **The measures against the cholera epidemic in Astrakhan**

Cholera caused epidemics in Astrakhan even before 1892. In 1823-1872, thirteen outbreaks were registered. During that time 33,5 thsd people were infected and 17,5 thsd died. During the epidemic of 1830, 10 per cent of the city's population died. Cholera, which was brought from Persia, caused epidemics five times, more than 13 thsd Astrakhans died. The other eight epidemics were brought from the Russian Empire's territory. The mortality reached about 4 thsd people (KVOH, 1892b: 2).

As the city was familiar with cholera, without waiting for the first cases, the Astrakhan City Council took anti-cholera measures (Dopolnenie..., 1892: 1-2). A cholera bureau was established under the city government to direct all actions to combat the epidemic (Grigoriev, 1893: 8). The city was divided into sixteen sanitary districts; beyond quarantine for ships arriving from cholera-unfavorable areas, brochures on cholera were distributed all over the city; a ban on the sale of kvass and ice cream was imposed; a ban on burial in churches of those who died from cholera; the sale and purchase of worn clothes was prohibited; cleaning of courtyards was allowed only during daytime with special permission of the sanitary-police supervision and observation of the process; immediate reporting of every cholera patient to a doctor or hospital; if a cholera infected patient did not have a separate room, he had to be admitted to a hospital (Grigoriev, 1893: 8; MH, 1892i: 2; MH, 1892a: 2; MH, 1892d: 3).

On the 14<sup>th</sup> of June, 1892, the first cholera patients appeared (Arustamov, 1894: 8). Local newspapers urged infected people over their dwellings to bring their belongings to the steam chamber for disinfection. While their belongings were being steamed, people were having bath. There were two type of showers (one with sulem solution and another one with warm soapy water). At that time apartments were being disinfected by medical personnel. The wealthy citizens had to buy disinfectants by their own expenses, while the poors were provided by the city (Address, 1892: 2). After taking a shower and disinfecting all belongings, tickets were issued, which had to be taken to the police department if the person was sent for treatment from there (MH, 1892v: 3). In three disinfection chambers in the city, 5,172 people were treated during the epidemic (MH, 1892aa: 2). A disinfection furnace was installed in the city to burn bed linen, clothes, and other things left by the cholera victims (MH, 1892o: 3).

The Sanitary Commission inspected the town for a several times. Sometimes, it was forced to carry out forced cleaning of yards, inviting the city sludge barrels, for the work of which money was subsequently collected (MH, 1892v: 3). Wealthy landlords, who did not fulfill the requirements of sanitary doctors to clean their yards, were fined by large sums (100 rubles or even higher) (MH, 1892z: 3). Some residents used their own money to buy sanitation barrels and pumping machines, cleaning their yards on a daily basis (MH, 1892y: 3).

By epy order of the city administration, signed promises were taken from the owners of commercial and industrial firms employing hired personnel, which forbade them to give their employees raw water and obliged them to have sufficient quantities of boiled water and tea, which were to be given free of charge during the business days (MH, 1892e: 2; Supplementary, 1892: 1). Tanks for boiled water were installed in the building of the city police local departments (MH, 1892g: 2). All police departments had medicines necessary for primary care of infected (MH, 1892f: 2). Summer gardens were required to have boiled water for the visitors (MH, 1892g: 2).

Some private companies took part in the fight against the epidemic. The trade firm "Sapozhnikov Brothers" limited the working schedule up to 7 hours per day and postponed the workers' debts payments until the 1<sup>st</sup> of October, (MH, 1892h: 2).

Prayers for deliverance from cholera were held in churches (MH, 1892h: 2). The press offered to inform the population about the fight against the epidemic through church officials. "People are more

trusting of piece of advice of the clergy than of various printed pamphlets and rules, which are usually attributed to the fabrications of physicians, who, due for their own profit, spread fear among the people" (MH, 1892g: 2).

Disinfectants, anticholera eye drops, and castor oil were run out of stock in drugstores. The prices on so-called Botkin and Inozemtsev's eye drops, borax, and carbolic, used in the treatment of cholera, increased by 40 per cent (MH, 1892m: 3). In late June, the medical inspector imposed a price ceiling on disinfectants until the special order (MH, 1892k: 3). Lemon prices also increased (MH, 1892h: 2).

One of the leading steamship company, The Caucasus and Mercury, operated on the Volga River, approved a request from the dean of the medical faculty of Kazan University about offering doctors work on company's steamships sailing on the Caspian Sea. The salary was 100 rubles per month, and medical staff was also provided with accommodation and travel expenses (OH, 1892b: 2).

Readings about cholera were periodically held among the city residents. Of particular interest to the visitors was so-called "cholera worm", the existence of which "... many of the common people certainly refused to believe" (Materialy..., 1892: 3).

Public baths (*kupalnya*) were closed after the request of the cholera bureau. The City Duma required to return the rent payments to the owners (MH, 1892w: 3).

One of the measures to prevent cholera was washing hands before having food and abolishing handshakes. "It has been proved that by shaking hands with acquaintances, one can catch not only "any stomach disease"... , but something even worse" (Mimohodom, 1892: 3).

The Astrakhan city administration approved rules according to which barbershops should had two separate rooms for men and women. Before the procedures, the hairdressing equipment had to be rinsed and cleaned, and the room had to be disinfected in the absence of customers (HMN, 1892: 1289).

The Ministry of Internal Affairs ordered bacteriologists doctors to investigate the cholera epidemic to Astrakhan (MH, 1892c: 3).

### **Cholera riots in Astrakhan**

The 1<sup>st</sup> cholera pandemic made clear that the disease was "contagious". Cities where the disease appeared were cordoned off by troops and provinces were separated by sanitary cordons (Gamaleyeva, 1905: 9). These measures created inconveniences and material losses for the population. Cholera was a new, unfamiliar disease that gave rise to rumors. On the one hand "this embarrassment of the population and deprivation of their freedom of movement", and on the other hand "the incomprehensible appearance of a deadly disease led the people to suspect that they were being deliberately poisoned" (Gamaleyeva, 1905: 10). This outlook of the population led to unrest in the Tambov, Kaluga, Minsk, St. Petersburg, and Novgorod provinces. There was a riot in the Arakcheev military settlements in Novgorod region, where doctors and officers were beaten. Similar riots were observed in Hungary, England (Birmingham and Manchester), France (Paris and Arles), and Spain (Gamaleyeva, 1905: 10).

The 5<sup>th</sup> pandemic also cholera riots. When the necessary quarantine measures were introduced, rumors arose among the population that the disease did not exist, in cholera hospitals alive people were put in coffins, sprinkled with lime and buried (HMN, 1892: 691). "... There was even a physician who, in daily press allowed himself to state the possibility of such cases..." (OMS, 1892: 2). The riots caused by the quarantine measures spread throughout the cities of the Russian Empire. In Baku, resident Persians appealed to the city administration with a request that "Russian doctors should not poison them" (HMN, 1892: 691). In Tashkent, locals were sure that doctors "... deliberately poison the infected people, and by hasty funerals trample on the Muslim faith" and organized riots in the city (HMN, 1892: 763). The Turkestan military district court sentenced the eight main perpetrators to death (HMN, 1893: 57). "In Balakhna, peasant Lukyanychev, while in a hotel, spoke various absurdities about cholera hospitals; for that General Baranov made him serve in a cholera hospital..." (HMN, 1892: 763). In Kazan, a peasant was arrested for a month for fake rumors about anti-cholera measures (HMN, 1892: 763).

In some cities there were riots with violence and kills. The first conflicts occurred in Astrakhan, later in Saratov, Pokrovskaya Sloboda, and Khvalynsk (HMN, 1892: 710).

On the morning of the 21<sup>th</sup> of June, news spread across Astrakhan: "... Kriushin residents are rioting... doctors are being beaten...". Eyewitnesses reported that a doctor and a paramedic wanted to take a woman with cholera symptoms to the hospital and disinfect her house. But a crowd began to gather outside the house, yelling that they were poisoned, and the doctors and paramedics should be beaten. The doctor heard the shouts and hurried away, while the paramedic stayed behind, so the crowd jumped on him and started to beat, trying to break the cholera wagon, as well. The number of people increased. They threw stones at cleanly dressed people in white, considering them to be medical staff (MH, 1892i: 2).

"More often the shouts were heard: "let's tear down the cholera hospital... There is no cholera... the doctors invented it to starve us... Let's destroy the hospital, let the people out"..."" (MH, 1892i: 2). Rumors that patients were being buried alive and that "the walking dead had their hands and feet tied" began to spread through the city. Cossacks patrols were riding through the city and tried to subdue everybody (MH, 1892i: 2).

At 3 p.m. the crowd approached the hospital for cholera infected. "A huge mass of rioters ... rushed into the hospital and beat its staff, dragged cholera patients out of the wards, who were immediately taken away and sent home by their relatives; the homeless patients were put under the branches lining the Kutum shaft. In the courtyard of the hospital and around it there was a real Babylonian mass with a boom, with whistling, with swearing, the rioters caught everyone who seemed to them to be involved in the hospital staff, and began to beat them with anything and anywhere" (MH, 1892i: 2).

One of the first victims was scientist, Dr. N.S. Sokolov, who was beaten and had his head broken in several places. The crowd, mistaking paramedic Popov for a doctor, killed him, then doused him with fuel oil, and disinfectants and set him on fire. Someone among the hospital staff saved themselves by changing into the costumes of the patients (MH, 1892j: 2).

The hospital was surrounded by soldiers and the Cossacks. The crowd did not respond to their requests to calm down and go home, the hospital was set on fire by the riots (MH, 1892i: 2). "The flames spread with terrifying speed, as the crowd did not allow to extinguish the fire, showering the firemen with a hail of stones... Around the burning buildings the rioting crowds indulged in merriment: whistling, shouting, singing, dancing, throwing up hats, etc. Only then did the excitement begin to subside when the hospital building was turned into ruins" (MH, 1892i: 2).

At 9 a.m. next day, a crowd gathered in front of the governor's house, which was cordoned off by troops and the Cossacks. The crowd was wondering, why did doctors bury alive patients? "Why are infected being grabbed with forceps? Why are infected taken to the hospital without the consent of relatives and family?" (MH, 1892i: 2). All that day glosary stores, shops, and taverns were closed. Local newspapers were not published next day. Cholera riots frightened doctors, some left the town. Those who remained were afraid to visit patients (MH, 1892i: 2).

On the 25<sup>th</sup> of June, the 1<sup>st</sup> and 2<sup>nd</sup> battalions of the 157<sup>th</sup> infantry Imeretian regiment were sent to Astrakhan (MH, 1892j: 2). Military patrols were stationed in different parts of the city. Doctors began to return to the city. "The doctors' rooms were crowded with those seeking medical help" (MH, 1892j: 2).

Three judicial investigators were assigned to investigate the street riots (MH, 1892j: 3). On the 19<sup>th</sup> of December, 1892, the sentence was announced by the military district court. 20 people were sentenced to death by hanging, 25 to hard labor from 12 to 20 years, and 1 defendant was sentenced to exile to Siberia for settlement. Nobleman Ivanov was sentenced to exile to the Tobolsk province with deprivation of nobility and state, 4 persons to detention for thirty months in correctional detention millitary centers, 25 persons to imprisonment in prison for a period up to eight months, three children were sent to a colony for young criminals (Prigovor..., 1892: 2).

The incidents of the 21<sup>st</sup> and 22<sup>nd</sup> of June demonstrated the lack of public trust in the state health care system. "A native distrust of the ordinaly people in hospitals, the baseless beliefs that in hospitals only people die, not recover" (Vam..., 1892: 3). Some residents did not consider cholera as a dangerous "contagious" disease, as they were selling and buying belongings of the people who had just died (MH, 1892j: 3). The number of cholera patients rapidly increased.

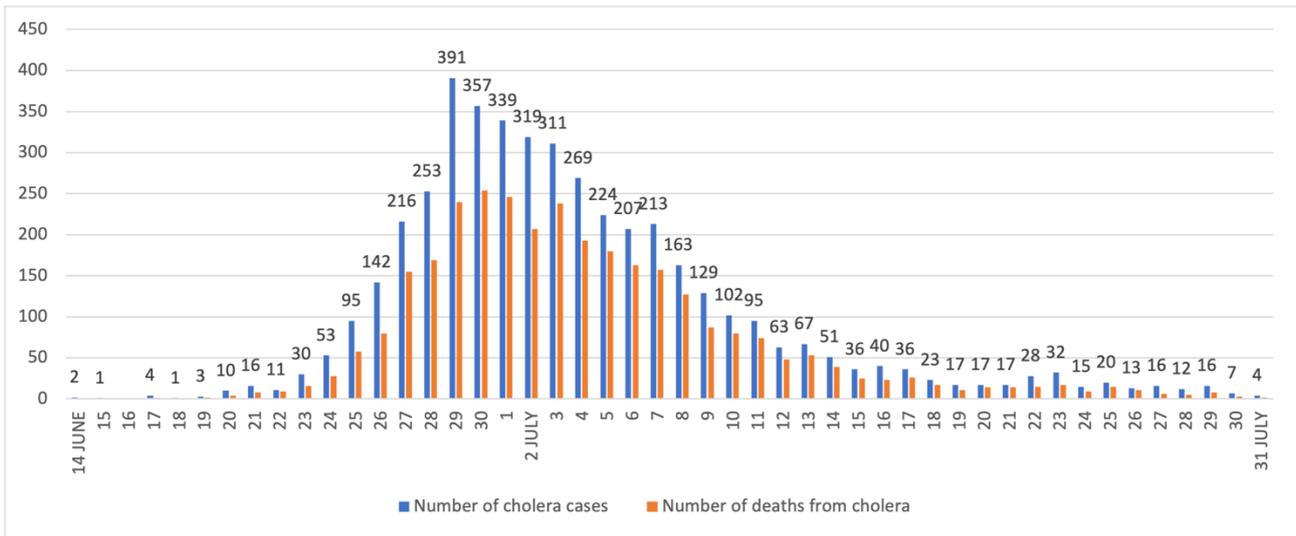
### **Demographic aftermath of the cholera epidemic in Astrakhan**

In the late 19<sup>th</sup> century, one of the features of the population of Astrakhan was its increased migratory mobility. "With the cessation of navigation more number of trades suspend or reduce their production, and with the opening of navigation they resume their bustling activity, requiring masses of workers flocking from different parts of the Astrakhan region, from other provinces of the Russian Empire, and even from Persia" (Svedenija..., 1895: I). In winter, Astrakhan was mainly inhabited by the permanent residents, while in spring and summer there was seasonal migration.

According to the census held on the 20<sup>th</sup> of January, 1891, the population of Astrakhan was 95.5 thsd people. The city was divided into 6 districts. The most populated was district No. 6 with 21 thsd residents, district No. 3 included 20 thsd people, district No. 5 – 18.4 thsd, district No. 4 – 14.4 thsd, district No. 2 – 10.7 thsd, and district No. 1 – 10 thsd. About 77 per cent of the total population were Russian, 13 per cent were Tatars, about 4 per cent were Armenians, and 2 per cent were Jews. The most educated were Armenians (54 per cent) and Jews (41 per cent), among the Russian population the share of educated people was 35 per cent, and among Tatars only 11 per cent. By the opening of navigation, the number of literate people was probably decreasing. Labor migrants mostly had a low level of education (Svedenija..., 1895: 2).

According to approximate estimates, the population of Astrakhan at the time of the epidemic was about 105 thsd people (Kursy..., 1892: 2). The epidemic started in the midst of seasonal works, probably migrant laborers, i.e. seasonal workers, were also in the city at that time.

After the cholera riots, there was an increase in the number of cholera patients. "In view of the huge inflow of patients to the cholera hospital" the medical staff did not have time to receive patients. Consequently, questions were raised in the press about the need to recruit free-practicing patients to the city hospitals (MH, 1892k: 3). The cholera epidemic in the city began on the 14<sup>th</sup> of June, 1892, with rare cases, reaching its peak ten days later. The peak was reported during two weeks, and then the number of infected people began to decrease, reaching its minimum within twenty days (Fig. 2) (Arustamov, 1894: 8).



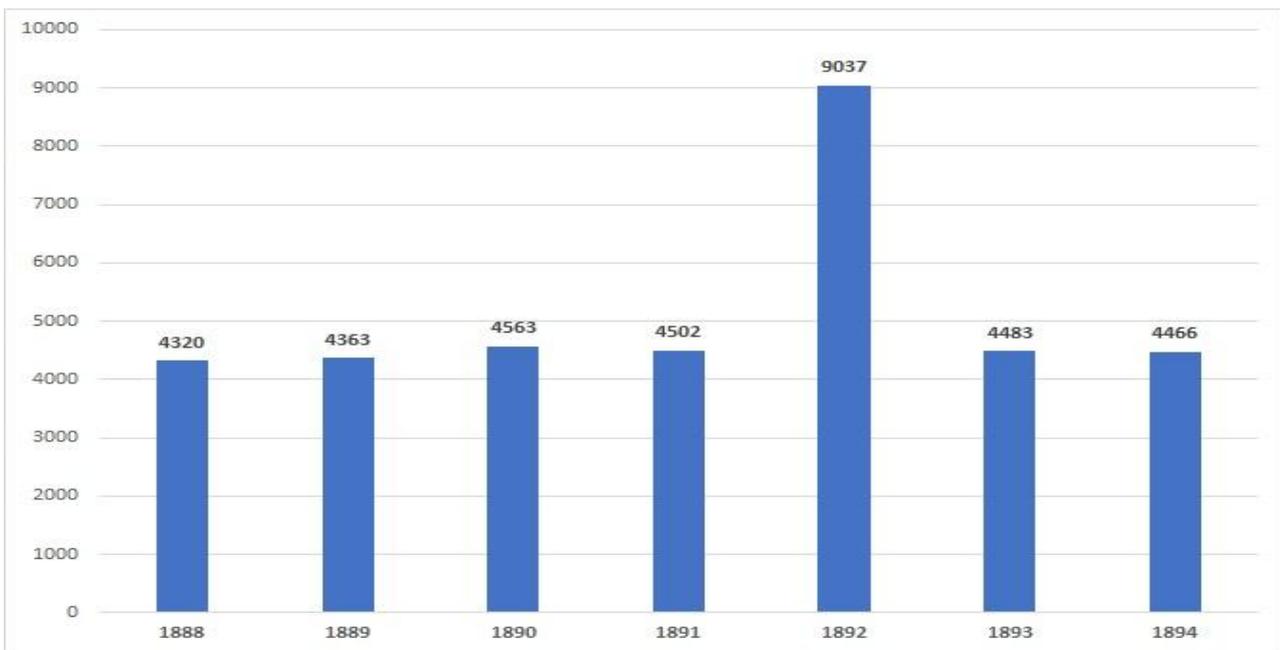
**Fig. 2.** Daily dynamics of the number of dead and infected in Astrakhan from the 14<sup>th</sup> of June to the 31<sup>st</sup> of July, 1892 (Arustamov, 1894: 8)

By the 17<sup>th</sup> of July, the cholera epidemic in the central part of the city had almost ceased (MH, 1892s: 3). By the 25<sup>th</sup> of July, the medical and sanitary staff was reduced to the previous (pre-cholera) norm due to the reduction of the disease rate (MH, 1892u: 3). By the 15<sup>th</sup> of August, a prayer service was held by the city clergy to mark the cessation of the epidemic. The night duty of medical staff at the cholera bureau was canceled. The number of people seeking medical help was "insignificant" (MH, 1892aa: 2).

By the 20<sup>th</sup> of August, the number of cholera cases had significantly reduced. "The disinfection chambers are almost empty, few people and things are disinfected" (MH, 1892ab: 2). Since the 14<sup>th</sup> of June by the 20<sup>th</sup> of September, about 3 per cent of the city's population died from cholera within three months of the epidemic in the city (Kursy..., 1892: 2).

There were 480 infected and 316 dead per 10 thsd residents of the city, 302 and 183 in Baku, 266 and 142 in Saratov, 14 and 8 in Moscow, 42 and 13 respectively in St. Petersburg (Obshhaja..., 1892c: 2).

In 1892, due to the two cholera months mortality significantly increased. An estimate of excess mortality showed an increase of 278 per cent in June and 555 per cent in July compared to these months in 1888-1894 (Fig. 3) (DCN, 1892: 94-95; DCN, 1893: 94-95; DCN, 1895a: 94-95; DCN, 1895b: 94-95; DCN, 1895c: 94-95; DCN, 1896: 94-95; DCN, 1897: 94-95). The share of men among the dead in June was 58 per cent, 57 per cent in July, and 53 per cent in August (DCN, 1896: 94-95).



**Fig. 3.** Mortality in Astrakhan in 1888-1894 (DCN, 1892: 94-95; DCN, 1893: 94-95; DCN, 1895a: 94-95; DCN, 1895b: 94-95; DCN, 1896: 94-95; DCN, 1897: 94-95)

All those among 2,586 patients enrolled the hospital in Astrakhan, about 73 per cent were laborers living in lodging houses; about 5 per cent were workers on ships, steamships, and barges; and about 12 per cent were artisans. The social composition was the following: 1,983 peasants, 316 soldiers, 262 burghers, 8 nobles, 5 church servants, and 12 Cossacks. The share of natives of the city and Astrakhan province amounted to about 11 per cent, and the remaining 89 per cent were seasonal migrants (Arustamova, 1894: 10).

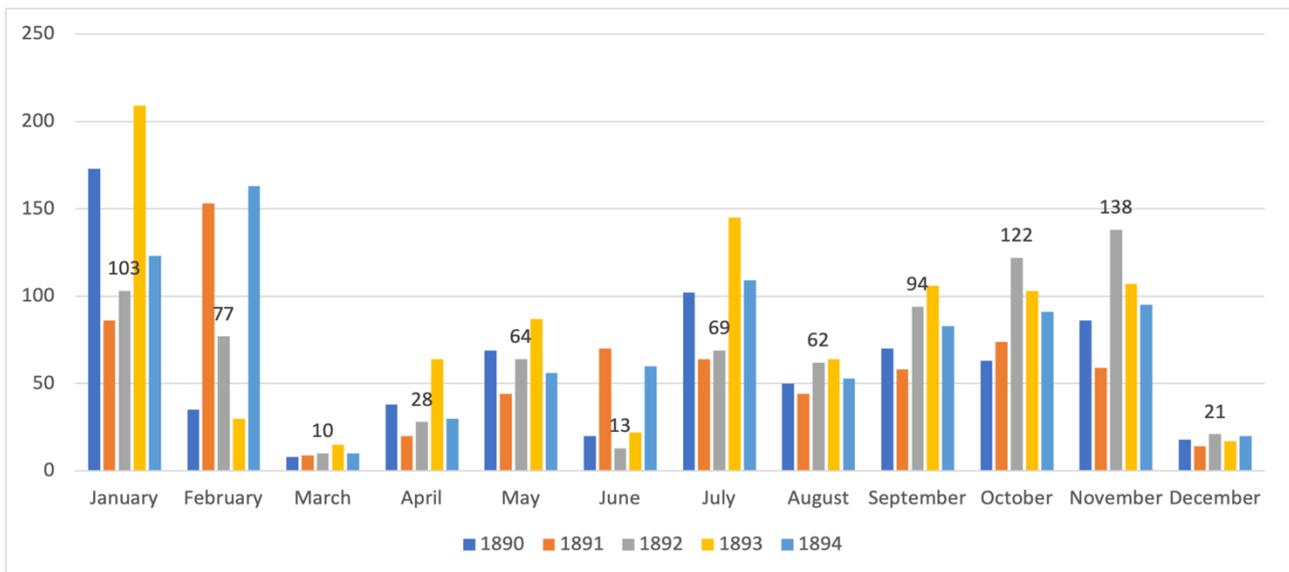
Taking into consideration the ethnic distribution of the dead, Russians died most of all, mainly immigrants; among Tatars who died, most of them were engaged in small-scale industry and day labor; among Persians, mainly hook workers; the poorest people among Jews, as well as Armenians did (MH, 1892v: 3).

The Tatars did not follow the doctors' recommendations, keeping drinking raw canal water and washing clothes in it, as well (MH, 1892l: 3). When the first cases of cholera appeared, the Jewish community purchased disinfectants and medicines. There were eight people on duty in the synagogue at all times. Their duties were to provide first aid to the infected ones. Six people (two of them stayed in the synagogue) visited infected in their apartments. One was engaged in disinfecting the room, another put up a samovar, the rest were engaged in rubbing the infected person with camphor or mustard alcohol (MH, 1892q: 2). Thus, for the whole epidemic, only 40 Jews were infected and six people died (MH, 1892z: 2).

Among locals, a high share of infected people was observed in the cooperage settlement due to the failure to comply with sanitary requirements (MH, 1892p: 3). A month after the epidemic, the population of the settlement began to heed the advice of doctors, sending infected into the hospital, did not drinking raw water, and observing sanitary requirements. Thus, the number of infected and dead rapidly decreased (MH, 1892r: 3).

The cholera epidemic affected the fertility rate. There were 350 births in March and 306 in April, 1893. This is the lowest monthly birth rate within that year. Moreover, the birth rate in March and April, 1893, was the lowest within 1888-1894. For instance, 440 people were born in March, 1892, and 450 in 1893 (DCN, 1892: 16-17; DCN, 1893: 16-17; DCN, 1895a: 16-17; DCN, 1895b: 16-17; DCN, 1896: 16-17; DCN, 1897: 16-17).

In addition, the cholera epidemic also affected the marriage rate. In June 1892, the number of registered marriages was the lowest for the period of 1890-1894 (Figure 4). October, November, and December, 1892, and January, 1893, accounted for the highest number of marriages registered within five years (DCN, 1895a: 56-57; DCN, 1895b: 56-57; DCN, 1896: 56-57; DCN, 1897: 56-57). It is likely that the number of marriages increased due to then postponed marriages during cholera psychological impact of the epidemic.



**Fig. 4.** Number of officially registered marriages in Astrakhan in 1890-1894 in monthly dynamics (DCN, 1895a: 56-57; DCN, 1895b: 56-57; DCN, 1896b: 56-57; DCN, 1897: 56-57)

The highest morbidity and mortality was among labor migrants, who lived in crowded hostels and lodging houses, mostly drinking raw water (MH, 1892p: 2). According to the press, migrants mainly came to work from villages. Whose people accustomed "... living and behaving inconsiderately with regard to food and drink" (MH, 1892p: 2). On steamships, where boiled water was provided free of charge, many workers drank raw water from kettles worn on their belts. When asked to observe sanitary measures, they replied that boiled water was untasty (MH, 1892w: 3). In Persia cholera was called the disease of the poor (Arustamov, 1894: 10).

Migrants did not fit well climate and weather conditions of the Astrakhan region. "Many of the migrations could not properly acclimatize here for even a few years, the temporary residents almost

invariably pay tribute to the local climate, due to illnesses of swamp fever and acute intestinal disorders. Some people positively cannot be healthy living in Astrakhan, so doctors recommend them to leave the city... " (MH, 1892p: 2). Thus, that all could also affect the morbidity among migrants.

The high mortality rate made a lot of children orphaned. The city administration provided buildings for the orphanage (MH, 1892m: 3). On the 4<sup>th</sup> of July, 1892, the orphanage was established (MH, 1892n: 3). The newspapers constantly wrote about the donations, and not only money was accepted, but also clothes, shoes, and underwear (Epidemija..., 1892: 1). By the 16<sup>th</sup> of July, due to the epidemic the number of orphaned children reached 60 (MH, 1892r: 2). And by the 21<sup>st</sup> of July, there were already 95 children (MH, 1892t: 3). Yet, despite the establishment of the orphanage, the number of homeless children of different ages rapidly increased (MH, 1892x: 3).

Living in villages peasants were informed about the impending cholera epidemic via three ways. Warnings about the disease were sent to the volosts, zemstvo doctors traveled around the districts, and information was published through newspapers (DH, 1892: 2).

In 1892, the number of infected and dead in the Astrakhan province per 100 thsd people was the highest (2,494 and 1,248 people respectively). The number of infected people reached 1,603 and the number of dead people 981 in the Baku province, 1,719 and 866 in the Saratov province, 64 and 33 in the Moscow province, and 286 and 83 respectively in the St. Petersburg province (Obshhaja..., 1892b: 2; Obshhaja..., 1892a: 2).

The population of the Astrakhan province was about 926 thsd people (Arustamov, 1894: 10). There were 5 doctors, 30 feldshers, and 15 midwives living in the rural areas of the Astrakhan province. There were no medical institutions, like rural hospitals, reception centers, or feldsher stations (MH, 1892b: 2). Given the number of medical personnel in the Astrakhan province and the illiteracy of the peasant population, it is not surprising that "... no one was afraid of the approach of the terrible guest. "God's willing", they decided..." (DCN, 1892: 2). At the same time, more educated people (landlords, Jews, and etc.) demonstrated another behavior buying medicines and trying to observe sanitary conditions (DCN, 1892: 2).

Beyond mortality, the cholera epidemic had an impact on migration processes. In early June, wealthy residents of Astrakhan started to leave for cities up the Volga River. The migration flows were increasing day by day (MH, 1892e: 2). By the 21<sup>th</sup> of June, emigration from Astrakhan took on a large scale, "the last steamers that departed were crowded with Astrakhan emigrants, mainly women and children" (MH, 1892h: 2). Cholera vibrio spread through migration of the population. Originally, people moved to Astrakhan from Baku. Then, after the outbreak of infection, the population of Astrakhan dispersed to the Upper Volga towns. Those who could not leave the city rented apartments and houses in suburb areas. "The prices for these improvised countryside houses (*dacha*) were increasing not by the day, but by the hour" (MH, 1892h: 2).

In late June, in addition to the middle and wealthy classes, despite high wages at forest and steamship wharves, migrant workers began to leave the city. "The steamboats were crowded with emigrants... Even the prospect of a considerable increase of then already high wages, promised by the employers, could not tempt migrants to stay in the town" (MH, 1892k: 3). Beyond these people, house workers were leaving the city, which caused an increase of labor price. The newspapers stated that there was no one to work (MH, 1892p: 3).

When the number of cholera infected people decreased, workers began to return to Astrakhan, as they could not find work in the cities of the middle Volga region, and a new wave of cholera epidemic appeared there (MH, 1892s: 3).

Due to the outbreak of the epidemic fishermen from the Saratov province arrived. "They flee on boats full of household belongings ... But the epidemic reached the survivors, so many of them were infected on the way, some of them died" (MH, 1892u: 3).

When the epidemic occurred, it was ordered to suspend the movement of settlers to the Caucasus and the Transcaspien region through Astrakhan, and steamship companies were notified about it (KVOH, 1892a).

Epidemics are important accidents in social life, which can be considered as social crises highlighting problems and shortcomings, the solution of which often leads to positive changes (Afanasyeva, 2016: 491). The rapid development of medieval cities with poor hygiene led to extreme pollution. A cesspool in the house of Johann Wolfgang von Goethe makes sense. It was a cellar equal to the size of a yard and in forty years it had never been cleaned. All five of the Goethe's then healthy siblings died between the ages of one and seven (Gamaleya, 1905: 13).

The decline in mortality in Western states in the 18<sup>th</sup> and 19<sup>th</sup> centuries was due more to social factors, such as better nutrition, use of soap, cotton clothing, ventilated housing, cleanliness and waste disposal, than to medical factors. These changes occurred largely under the influence of epidemics. N.F. Gamaleya claimed: "The fear of cholera has done more to cleanse the dwellings and cities of Western Europe than all the instructions of science and the necessities of dormitory life" (Gamaleya, 1905: I).

Ordinary, people turned to "healing remedies" in the form of amulets, tinctures, etc. for support. Repeated visits to epidemics allowed people to understand the cause-and-effect relationships and tried to prevent the appearance of the disease. It was largely due to cholera epidemics, since the transmission routes of the bacterium were linked to fresh water, sanitary conditions of dwellings, and personal hygiene, that for the first time in European states an epidemiological transition occurred, causing a decrease in mortality (Omran, 2019: 185).

Taking into consideration that the incidence of cholera was directly related to the sanitary condition, medical journals and the press in 1892 called for cleaning of the city to begin. In Baku, "... all sanitary duties are entrusted to the north wind" (HMN, 1892b: 691). In Moscow, according to the statement of the city head, after the outbreak of cholera in the territory of the empire, to clean the city by the 1<sup>st</sup> of August, it was necessary to remove 30 thsd barrels a day; in reality, only 9 thsd barrels a day were removed. The Moscow City Duma allocated 2 thsd rubles for sanitary measures, and 10 thsd rubles in St. Petersburg (HMNc, 1892: 711).

Cholera had an impact on science and medical practice. The epidemic destroyed entire theories that "... most people considered irrefutable" (Gamaley, 1905: 9). On the 6<sup>th</sup> of July, 1892, Prof. Roux's assistant at the Pasteur Institute, Russian Dr. V.A. Khavkin injected himself with an anticholera vaccine in his left side (KVOP, 1892c: 2). To prove the effect of the vaccine, Khavkin traveled to the birthplace of cholera in India, where he began to vaccinate locals (Lukomsky, 1893: 19). Before leaving, he was introduced to the heads of the British Medical Department in London (HMN, 1896i: 1232). By June 1894, he had immunized about 25 thsd people in India (HMN, 1894m: 1339).

The COVID-19 pandemic, which reduced life expectancy by several years in Russia and the whole world, also had a positive impact on the development of science. Vaccines against the new coronavirus infection were created in an unprecedentedly short period. For instance, the mRNA technology used in Moderna Inc. vaccine proved its effectiveness through the pandemic. The company has announced the development of vaccines against fifteen deadly diseases such as HIV, Ebola, Zika, and others (Moderna..., 2023). Whether Moderna Inc. finds a solution for at least one announced disease, it will become a significant contribution to increasing the life expectancy of the population.

The cholera epidemic managed to form new habits such as washing hands before having food, eliminating handshakes during outbreaks, drinking boiled water, and eating heat-treated food.

Epidemics caused economic damage. Astrakhan's expenses to fight against epidemic reached 142 thsd rubles, including 33 thsd for the maintenance of the troops that arrived to suppress the cholera riot (HMN, 1893l: 621-622). The costs of Nizhny Novgorod reached about 1 mln rubles due to the fair held in the city (Korrespondencija..., 1892: 619-620). The costs were justified, as the number of cholera cases and deaths per 10 thsd residents was 1.5 times lower than in Astrakhan (OVG, 1892: 2). The expenses against fighting cholera in Baku reached 105 thsd rubles (HMN, 1892a: 229-230).

Beyond the reduction of labor resources due to excessive deaths from cholera, trade and public life in Hamburg were stopped, what made thousands bankrupts. The city authorities had to distribute 400 thsd marks to those who left unemployed (HMN, 1892g: 996). Money collected in England was in favor of cholera victims in Hamburg (HMN, 1892h: 1105).

The USA declared a twenty-day quarantine for all arriving ships (not only from Germany), which caused losses to the countries of Western Europe. According to sanitary doctors' calculations, Hamburg's losses from stagnation in trade amounted to 30 mln marks (9,261 thsd rubles). In this connection, the public health journal "The Sanitary Record" stated how insignificant the cost of water filters and increased sanitary control would have been compared to the losses due to the epidemic (HMN, 1892g: 996). European states concluded that it was more profitable to take measures to control infections in advance.

Low number of infected people among the permanent residents of Astrakhan indicates knowledge of the importance of preventive measures gained from previous epidemics in the city. Educated part of society also was less infected, as they opr for doctors' piece of advice and used to live in better conditions than migrant workers.

## 5. Conclusion

Since 1823 to 1925 there occurred 55 so-called "cholera years" in Russia in total. During these years, 5.5 mln people were infected with cholera and 2.3 mln died. The 5<sup>th</sup> cholera epidemic in Russia lasted in 1892–1894. The first wave was the most deadly, from May to November, 1892, more than 620 thsd people were infected and about 300 thsd of them died. Astrakhan with its water connection with Baku, served as a gateway for the further spread of cholera throughout the Russian Empire, Western Europe, and America.

With the early coming news of the appearance of cholera near the border of the Russian Empire, the measures were taken in Astrakhan. On the nine- and twelve-foot roadsteads, observation and quarantine of then arriving ships from the places with cholera; a floating hospital was set up on the nine-foot roadstead. In the city itself the yards were cleaned, commercial and residential premises inspected, regulations on measures to protect against cholera vibrio were posted around the city, and a cholera bureau started its work.

Despite the taken measures to prevent the epidemic, the first cases of the disease were recorded on the 14<sup>th</sup> of June. The measures necessary to stop the spread of cholera caused rumors, mainly among the working class, claiming that the disease did not exist, hospitals did not treat it, but put live people alive in coffins, sprinkling them with lime. The rumors caused riots, which continued on the 21<sup>st</sup> and 22<sup>nd</sup> of June. The cholera hospital was vandalized and burned, one of the doctors was beaten and had his head broken in several places. A paramedic, mistaken for a doctor, was also killed, doused with fuel oil and disinfectants and set on fire. Some hospital workers saved themselves by dressing up in the costumes of patients. All after that, there was a sharp increase in the incidence of disease in the city.

Despite the establishment of a shelter for children who lost their parents due to the cholera epidemic, over time the number of homeless children in Astrakhan only increased. The morbidity provoked a mass migration of the population. People left mainly for cities located along the Volga River banks. Those who could not leave rented apartments and countryside houses in the suburb area.

The epidemic ended on the 20<sup>th</sup> September. Over 3 per cent of over 100 thousand people died during the three months of the epidemic. In 1892, mortality increased due to two cholera months. An estimate of excess mortality showed a 278 per cent increase in deaths in June and a 555 per cent increase in July. At the same time, a large proportion of the deaths (89 per cent) occurred among migrant workers, who were mainly from villages, lived very crowded, had a low level of domestic culture, and did not follow the piece of advice of doctors. That was a reason why in Persia cholera was called as a "disease of the poor".

The epidemic affected marriage and birth rates. In June, 1892, the number of marriages contracted was the lowest within 1890–1894. October, November, and December, 1892, and January, 1893, accounted for the lowest number of marriages contracted in five years. The birth rate in March and April, 1893, (nine months after the epidemic) was the lowest within 1888–1894.

The cholera epidemic influenced the sanitary condition of the cities, formed a new positive cultural and daily habits of the population. In the 5<sup>th</sup> cholera pandemic the Russian physician V.A. Khavkin, immunizing the population of India with an anticholera vaccine, proved the effectiveness of his discovery. The fear of death that cholera caused motivated progress in science, lifestyle, and positive changes in the predominantly urban environment. These developments led to a reduction of overmortality.

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