

# CONTRIBUTION OF COVID-19 DEATHS TO INCREASING DEPOPULATION IN RUSSIA

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## ***Background***

The COVID-19 pandemic has resulted in higher rates of excessive mortality. Negative mortality trends are observed all over the world and this is enough to substantially affect survival rates [2]. Russia is not an exception, since the second quarter of 2020 the mortality rates have been demonstrating growth.

Big cities and countries' capitals are undoubtedly better equipped to combat COVID-19 compared to the rest of their countries due to more developed and well-equipped medical facilities. At the same time big cities are densely populated areas. That's why inhabitants of big cities and countries' capitals are at higher infectious risk due to intensive migration flows, close contacts and difficulties in provision of "social" or, more correctly, "physical" distancing.

***Purpose*** – to estimate impact of the pandemic on components of demographic dynamics.

**Materials and methods.** The authors used the Rosstat short-term data on monthly dynamics in births and deaths including deaths from COVID-19 and other causes for January-December, 2020 and January-March, 2021 for Russia as a whole and Moscow.

## ***Results***

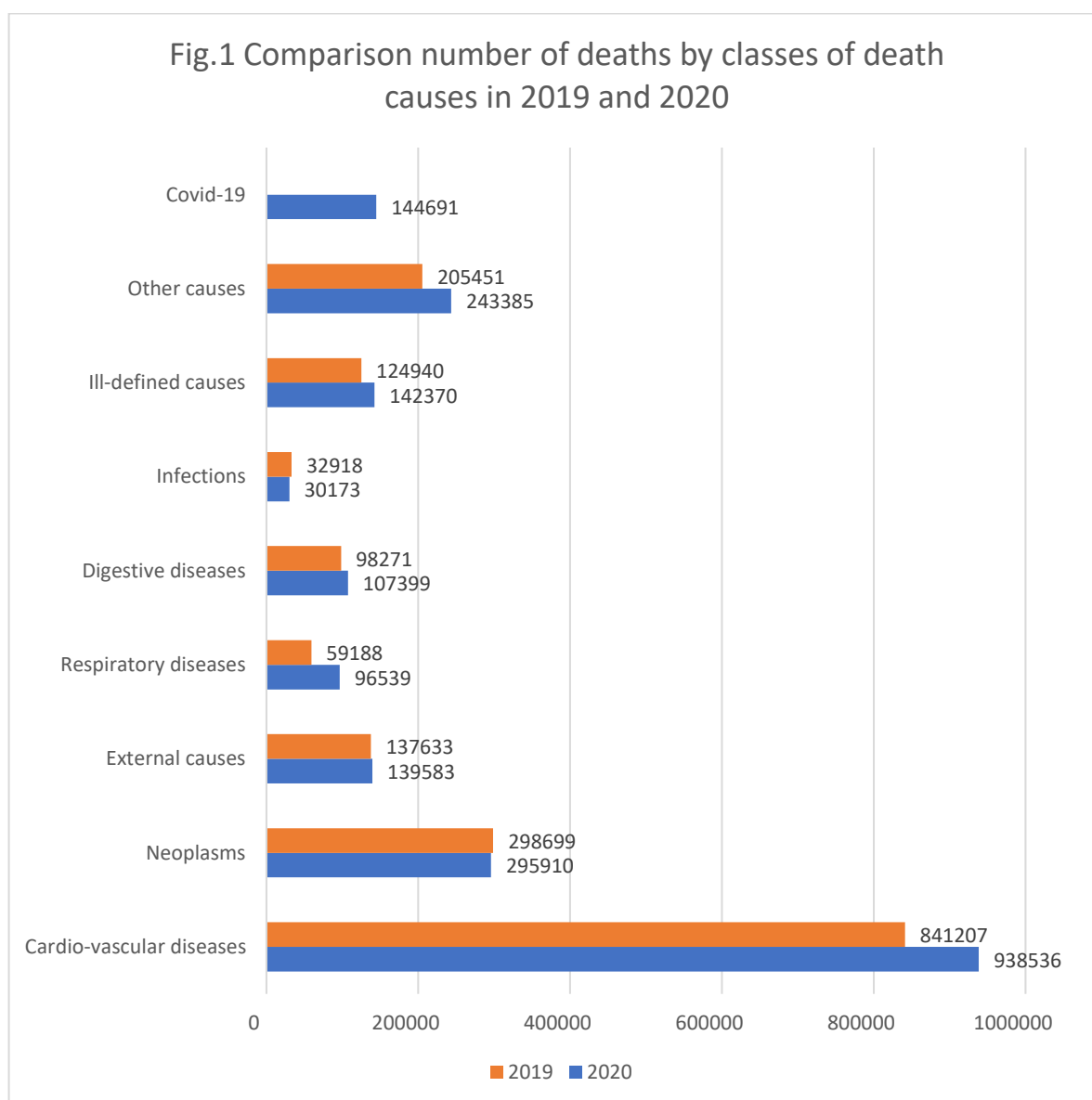
In 2020 the crude mortality increased in Russia by 19.2% compared to 2019 or from 12.3‰ to 14.6‰. Against the background of the increasing mortality rates, the birth rate reduced from 10.1‰ to 9.8‰ and depopulation deepened. The natural population decline in 2020 was -4.8‰ in 2020, compared to -2.2‰ in 2019.

The dramatic mortality growth was accounted for not only by COVID deaths but also by increased number of deaths from other causes. According to the Rosstat

data, the share of deaths caused by COVID-19 in the total number of deaths occurred in 2020 equaled to 6.8% or in absolute figures – added up to 144691 lives lost.

The year 2020 compared to 2019 showed an increase in the absolute number of deaths in almost all classes of diseases, with the exception of neoplasms and infectious and parasitic diseases (deaths from covid-19 were allocated to a separate category) (Fig.1).

The total number of deaths due to cardiovascular diseases increased by 4.0%. Also, the number of deaths from the main causes in this class of diseases increased: by 15.0% from ischaemic heart disease, by 6.9% from cerebrovascular diseases, and by 4.5% from acute cerebrovascular accidents.



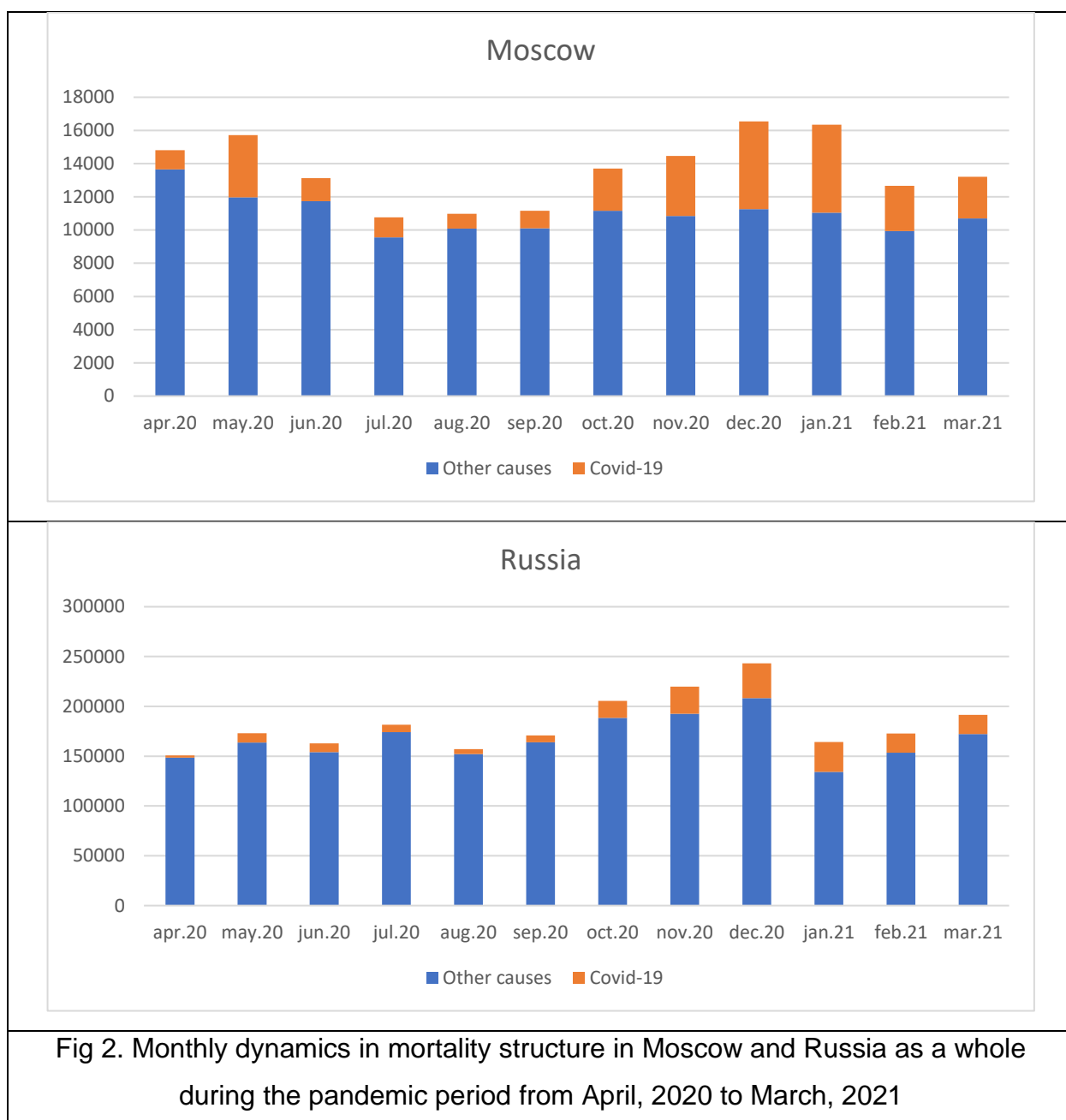
A substantial increase in the number of deaths is observed in the class of respiratory diseases (by 63.1% or by 37351 additional deaths). The number of deaths from pneumonia more than doubled – by 2.43 times. We could also see the increased number of deaths from digestive diseases, ill-defined causes and other causes. A negligible reduction is observed only in the class of neoplasms.

Moscow as the Russia's capital and the biggest city in the country has been most affected by the pandemic. Fig.2 demonstrates monthly dynamics in the absolute number of deaths in Moscow and Russia as a whole. Charts show that in general dynamics in deaths during the period January, 2020 – March, 2021 was similar, while in Moscow in April-June 2020 there was an "explosive" increase in the number of deaths against the background of a relatively smooth increase in Russia as a whole.

Comparison of the deaths' absolutes since April, 2020 until March, 2021 with the same numbers for the previous year shows that the highest levels of excess were recorded in Moscow in May-June 2020 compared to the same months of 2019 (57.16% and 41.53%) and in November-December 2020 (+48.63% and 56.72% above the level of 2019), as well as in January 2021 compared to January 2020 (+49.79%).

At the same time, in Russia as a whole increase in the number of deaths was rather smooth, and the highest excess in the number of deaths for 2020 over the same figures for the previous year 2019 was registered in November-December 2020 (+55.57% and 63.06% respectively).

The excess mortality, both in Moscow and in Russia as a whole, was mainly due to deaths from coronavirus infection (Fig. 2). Included are deaths from COVID-19 (as the main cause of death) and deaths when COVID-19 was not the main cause of death, but had a significant impact on the development of fatal complications of the disease.



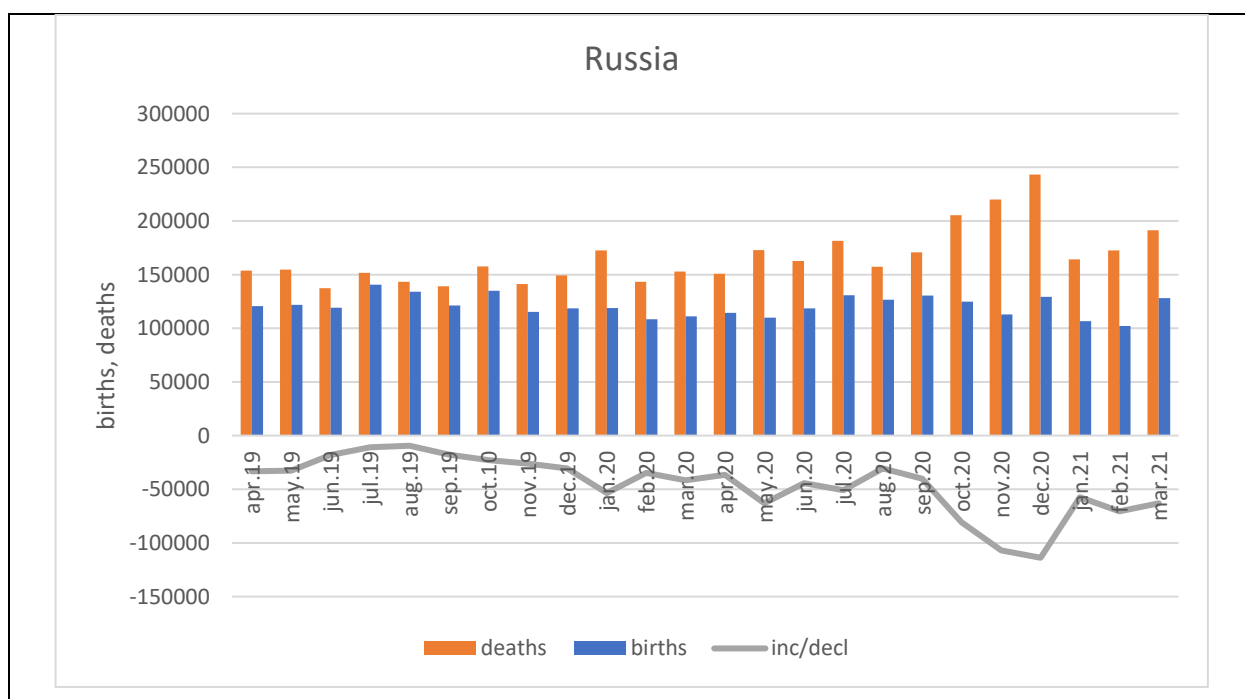
As mentioned above, due to high population density, congestion of the public transport system and other features and problems associated with the capital's status, it was Moscow that took the brunt of the pandemic in Russia. So, if the share of coronavirus infection in the structure of mortality in the country as a whole ranged from 1.4% to 18.2% in different months, then in the capital these indicators were more serious – from 7.9% to 32.4%.

When comparing the monthly number of deaths from COVID-19 with the number of excess deaths compared to the same periods of the previous year, it turns out that in Moscow the share of coronavirus infection in additional deaths ranged

from 62% to 98% in different months, while in Russia as a whole – from 22% to 65%.



It seems necessary to analyze and compare monthly dynamics in the births and deaths absolutes from April, 2019 to March, 2021, because it allows to estimate the role of the COVID-19 pandemics in increasing depopulation in Russia and its capital Moscow (Fig.3).



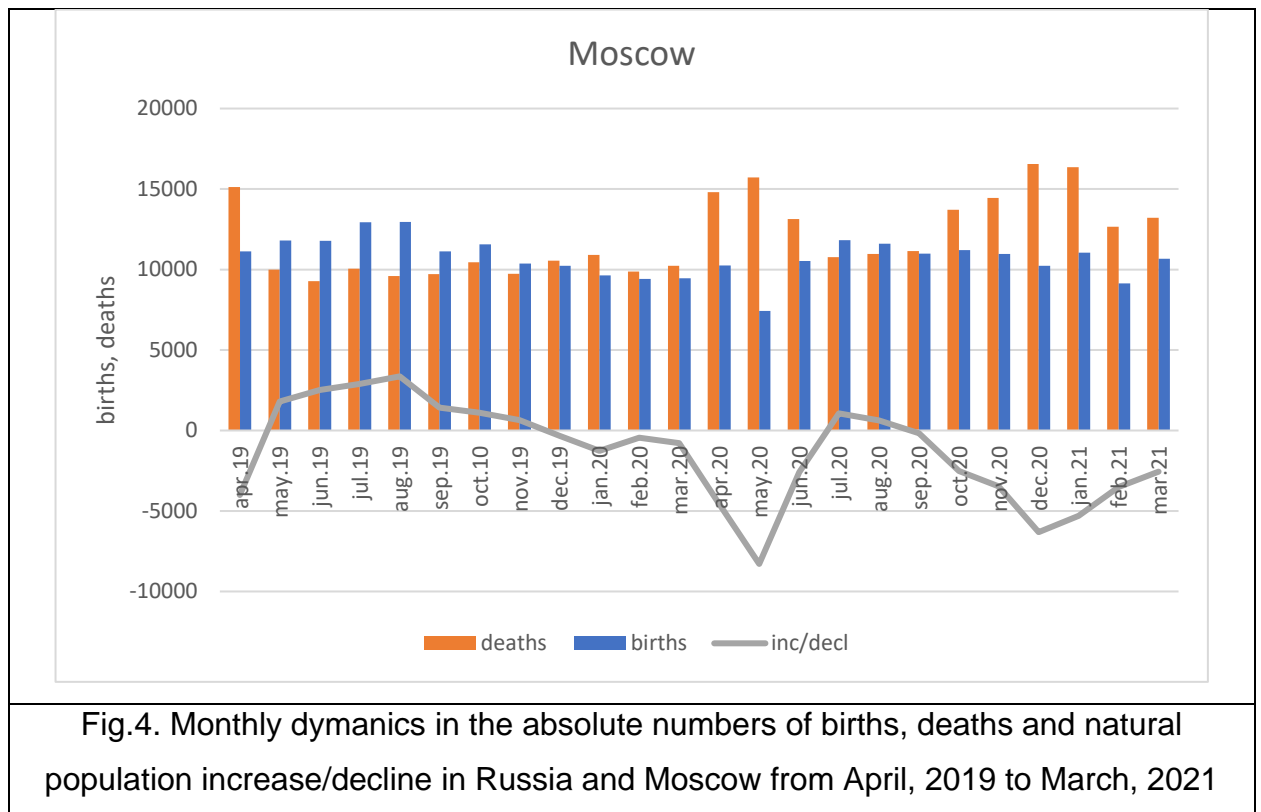


Fig.4 shows that during the whole study period depopulation of different intensity was observed in Russia as a whole. During the same period in May-November, 2019 and July-August, 2020 there was a natural population increase in Moscow. The most substantial levels of natural population decline both in Russia and in Moscow were primarily conditioned by peak numbers of death and, to less extent, by reduced numbers of births.

The increase in excess mortality during the pandemic has negatively affected the positive dynamics in the natural population growth achieved in 2019, which was replaced by its decline (Fig. 4).

### ***Discussion***

Situation with excess mortality in Moscow is not unique. Many countries and capital cities faced such problem. In general, it was found that mortality in 2020 is higher than during previous years which undermines the idea that many people who died from the virus would have died anyway [1, 2]. In March, 2020 more than twice the typical number of New Yorkers died. That total for the city includes deaths

directly linked to the novel coronavirus as well as those from other causes, like heart attacks and cancer [3].

Cities of central and eastern Europe have suffered high excess mortality in the autumn and winter period; Sofia (112.5%) and Warsaw (103.8%) had the highest weekly excess mortality rates, however, their rates were much lower than those cities and regions affected during the spring, for example, Madrid (452.0%), Barcelona (266.0%) and London (228.4%) [4].

According to the Dutch national statistics office the number of deaths in the Netherlands increased at the highest rate since World War Two this year due to the coronavirus pandemic. Up to end of December, 2020, around 162,000 deaths were reported in the country of 17 million this year, 13,000 more than would have been expected in a regular year. Around 9,000 people more than normal died during the first wave of the COVID-19 infections between early March and early May while more than 6,000 extra fatalities have been reported since the start of the second wave mid-September. A total of 770,400 people in the Netherlands have tested positive for COVID-19 since the start of the pandemic. More than 11,000 patients are known to have died from the disease. The actual number of infections and fatalities is likely to be significantly higher, as a shortage of testing and lab capacity meant only seriously ill patients were tested during the first months of the pandemic [5].

COVID-19 is currently responsible and will be indirectly responsible later for deaths due to less medical treatment of other diseases. Those who should have lived a long life will be among the dead. The long-term health prospects of the COVID-19 survivors are yet to be studied and may affect the nature of mortality in the future. In general, this means that there are multidirectional factors at work. And the most effective way to measure the impact of coronavirus infection on long-term mortality trends is to carefully study excess mortality and continue monitoring in the coming months and years.

### ***Conclusions***

In 2020, Moscow for the first time ever in the past years registered a population decline, in Russia as a whole the population loss substantially increased.

Judging by the first quarter of 2021, the problem will rather worsen than only persist. The source of population decline was, first of all, increase in the number of deaths, and, to a lesser extent, reduction in the number of births. Along with those who died from COVID-19 as the underlying (primary) cause, mortality from almost all causes (except for neoplasms) increased, including due to those cases when COVID-19 was an accompanying disease. Since health care in the pandemic conditions was constrained for people with other diseases, it can be expected that the consequences of this will affect the scale and nature of mortality in the future.

### ***References***

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