

Public Health challenges in the post-pandemic era. The effects on life expectancy and health systems

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The COVID-19 pandemic, which affected virtually every country in the World in early 2020, had a devastating impact on population health and health-care systems. Only World War I and the Spanish flu in 1918 have seen an increase of death rates equal to those of 2020.

The provinces of Piacenza in Emilia-Romagna, and Lodi, Bergamo, and Cremona in Lombardy Region, were the world's areas most affected by COVID-19, with a very high infection rate and mortality rate. The main reason that affected these areas is related to the SARS-CoV-2 infection that started to spread among the population several weeks before the health authorities were aware of the presence of cases in the community, which only happened on February 21st, 2020, with the first diagnosis at the Codogno hospital, located between the towns of Lodi and Piacenza (1).

The disease had, in the early stages, a very high case-fatality rate in the elderly and in patients with chronic diseases (2). Therefore it is clear that the populations with the most elderly subjects, such as Italy, have recorded the greatest absolute number of deaths. International data show that Italy has the high proportion of over-80s in Europe. This concept was studied in our epidemiological paper, published in *The Lancet Public Health* in May 2020 (3), where the authors demonstrated that Lombardy, the Italian region with the highest number of cases, actually had a mortality rate comparable to other European regions and metropolitan areas, affected massively by COVID-19, after standardization by age and by the beginning of the spread of the epidemic, which occurred, as known, at different times.

In absolute number, COVID-19 mortality up to the end of October 2022 in the EU was highest in Italy (179.000 deaths), France (171.000), Germany (154.000), Poland (117.000) and Spain (115.000). Outside the EU, over 200 000 died from COVID-19 in the United Kingdom⁴. Relative to population size, COVID-19 mortality rates have been the highest in Bulgaria, Hungary, Croatia, the Czech Republic, and Slovenia. They have been the lowest in Iceland and Norway, two States with a very low density of population.

Cross-country differences generally reflect variations in the population age structure, the timing and effectiveness of containment strategies, the take-up of COVID-19 vaccination in 2021, and differences in the capacity of health systems to treat COVID-19 patients.

The very high number of deaths from COVID-19 has affected the life expectancy of almost all countries in the world as well as the stability of their health services, due to a large and unexpected number of hospitalized patients, many of whom with severe clinical conditions. After 100 years of continuous increase in life expectancy at birth, 2020 saw a dramatic and unexpected reduction in most countries of the European Region.

The pandemic led to a sharp widening of the life expectancy gap across EU countries, as the fall in life expectancy was much greater in Central and Eastern European countries that already had much lower life expectancy before the pandemic than most Western and Northern European countries. The 2020 reduc-

tion was not followed, as expected, by a rebound in the following year (2021) in all countries, not only for the health effects of subsequent waves of SARS-CoV-2 but also for diagnostic delays and missed healthcare services during the most severe pandemic waves. Geographical inequalities in life expectancy are significant: the gap between those living in southern and northern regions reached almost three years in favour of the latter before the pandemic. This geographical gap is expected to narrow at least temporarily in 2020, as the COVID-19 pandemic had a greater impact on the northern regions (4).

As COVID-19 cases started to rise in early 2020 and hospitalization rates increased, health systems began to postpone non-emergency (elective) procedures to keep capacity available for COVID-19 patients, and to avoid elective patients being infected. This has subsequently led to longer waiting lists (number of people waiting for care) and waiting times (how long they must wait) in virtually all countries. The additional cumulated number of patients on the waiting lists due to COVID-19 is commonly referred to as the care backlog. With each delay in diagnosis and treatment possibly leading to worse health, prolonged recovery and decreased chances of survival, countries have been taking steps to address these growing care backlogs while maintaining dual delivery of COVID and non-COVID services (5).

Reductions in provision of services translates into unmet health care need. Eurofound data from April 2021 show that over a fifth (21%) of EU citizens had missed a medical examination or treatment in the previous year during the pandemic. The figure shows that common types of unmet need included hospital or specialist care, dental care, preventive screening or tests, and mental health care, plus vaccinations.

The backlog of medical appointments and treatments due to the COVID-19 pandemic has been a growing concern for the health care system. The drivers that increase the backlog are both on the supply-side and the demand-side. Low numbers of health workers, low productivity due to staff exhaustion, the extra cost of providing treatment safely, and weakened incentives for some cares are all major factors that contribute to

the backlog. On the demand side, new technologies, an ageing population, and the rising prevalence of chronic conditions, including long COVID, have all contributed to the backlog.

On the supply-side, steps to reduce the backlog include providing sufficient workforce and infrastructure, extra funding, and more efficient new technologies and digital solutions. On the demand side, fear of infection may reduce demand, although this may also increase unmet need. To reduce the backlog, it will be important to address both the supply-side and demand-side drivers that are contributing to the backlog (5).

To address the backlogs caused by the pandemic, three key strategies are being implemented. The first strategy is to increase the supply of workforce and staffing. This includes hiring new professionals with different skills, offering flexible recruitment, and training, and improving work conditions and compensation. The second strategy is to improve productivity, capacity management and demand management. This includes smoothing out elective surgical schedules, introducing tailored financial incentives, expanding access to telehealth, and carefully prioritizing patients. Lastly, the third strategy is to invest in capital, infrastructure, and new community-based models of care. This includes upgrading health facilities, investing in primary and community care, and expanding home care. These measures are essential for health system recovery and are key to overcoming the backlogs. In this view the National Recovery and Resilience Plans (NRRP) are the instruments which using Next Generation Europe funds will make countries more equitable, sustainable, and inclusive. The plan will help leaving behind the pandemic's economic and social impact and in this view Italy, Spain, and France (the three with the highest assignments) have the higher opportunities to meet the goals (6).

Unfortunately, achieving these goals is not always easy. As evidenced by our recent study, Italy is facing an emergency due to a shortage of active doctors, a problem which is projected to become worse in the next years due to retirements. And it remains a critical point until around 2030.

Despite important gains made in the health sector before the pandemic, there remain considerable challenges to be addressed. Clearing care backlogs quickly is essential to maintain these gains and prevent an increase in excess mortality. However, it is still unclear how much capacity is needed to care for COVID-19 patients, how much is necessary to reduce the backlog, and how many individuals remain with unmet health needs. Furthermore, the policies needed to reduce backlogs require an already over-stretched workforce, putting health workers at risk of burnout and absenteeism. Therefore, it is important to prioritize policies that support and protect health workers, as well as improve workforce planning and availability, which remain inadequate in many countries. When rationalizing health care delivery, it is essential to ensure that this does not lead to further inequalities in utilization and health (6).

In that sense the Special Issue aims to collect several national and international experiences by experts in the field of public health with different backgrounds such as medical doctors, medical directors, biologists, architects for public health, etc. The scope of this special issue is to offer an experience-based approach aimed at supporting the next frontiers of the public health disciplines for the healthcare 4.0.

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