
Social inequality – a forgotten factor in pandemic influenza preparedness

GLOBAL HELSE

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Reducing social inequality in health is at the core of international health work, but does not form part of the discussion on international preparedness plans for pandemic influenza. This is surprising given that influenza pandemic mortality rates are highest among those with the lowest socioeconomic status. This is not conducive to achieving the international goals of reducing social inequality in health and ensuring good health for all by 2030.

The World Bank's latest 'Global Crisis Response Platform' report claims that the most serious threats to human life and economic security are climate change, conflicts and pandemics (1). In recent years, several infectious diseases, such as Middle East respiratory syndrome coronavirus (MERS-CoV), Zika and Ebola, have been characterized as pandemic threats.

The Ebola epidemic in West Africa killed more than 11 000 people in the period 2014–15, and exposed failings in the global epidemic preparedness. In response, the Coalition for Epidemic Preparedness Innovations (CEPI) was formed recently (2). The aim is to produce vaccines, initially against the three aforementioned viruses, and then to conquer new local epidemic outbreaks.

During the launch of CEPI at the World Economic Forum in January 2017, the head of CEPI, Bill Gates, argued that the pandemic threat with the greatest potential to harm society and the economy was a new influenza pandemic [\(3\)](#).

The World Bank suggests that the annual cost of a new, less serious pandemic is USD 570 billion, which represents 0.7% of the global gross domestic product (GDP). A serious pandemic like the Spanish influenza of 1918–19 can cost as much as 5% of the global GDP, or almost USD 4 trillion [\(1\)](#). The Spanish influenza killed 50–100 million people [\(4\)](#); 5–10 times more than the number who perished during World War I.

Influenza pandemics past and present

Influenza pandemics have occurred 3–4 times every century since the 16th century, and have not been linked to fluctuations in the economy or conflicts [\(5\)](#). In the last century, in addition to the Spanish influenza, we also had the Asian influenza in the period 1957–58 and the Hong Kong influenza from 1968 to 1970. The last pandemic, in 2009–10, killed 200 000 people globally [\(6\)](#). The number of pandemic-related deaths per 1 000 inhabitants has fallen over time: 1918–19 (27–54), 1957–1958 (0.7), 1968–1970 (0.3) and 2009–10 (0.03) [\(4–6\)](#).

Who will be most at risk in a new influenza pandemic? A natural answer is young children, the elderly and people who are already sick, as is the case during the annual influenza epidemics. During pandemics, people who are already ill are vulnerable, but it is young adults who are affected the most [\(6–8\)](#). What about the socioeconomically disadvantaged? During the Spanish influenza pandemic, mortality rates differed considerably between high and low-income countries [\(9\)](#) and between the rich and the poor in towns with a large degree of social inequality. In Oslo, the highest mortality rate was among the working classes, those living in small flats and people on the east side of the city [\(10\)](#). In Chicago, it was the illiterate, the unemployed and those with the most cramped living conditions who suffered the highest mortality rates [\(11\)](#). During the 2009 pandemic, the mortality rate was 20 times higher in some South American countries than in Europe [\(6\)](#), and three times higher in the poorer parts of England compared to the affluent parts [\(12\)](#).

There is not much we can do to reduce the likelihood of a new pandemic. However, we *can* draw on historical experience to prevent social inequality in mortality rates during future pandemics.

Social inequality and global pandemic response plans

The European Union (EU), Norway, the World Health Organization (WHO) and the USA aim to reduce social inequality in health in a generation [\(13–17\)](#). The World Bank, the EU and the Centers for Disease Control and Prevention in the USA have adopted a ‘One Health’ strategy with a view to improving the preparedness for pandemic threats, with a particular focus on low-income

countries (18–20). The strategy is a transdisciplinary approach for the early identification, prevention and reduction of health threats to humans, animals and the environment. In addition to the aforementioned CEPI, the World Bank also launched a pioneering funding scheme – the Pandemic Emergency Financing Facility (PEF) in 2016 – aimed at the rapid prevention of the spread of pandemic threats in low-income countries (21). These measures can play an important role in the UN’s goal to eradicate poverty and ensure good health for all by 2030 (22).

In view of the international objectives of reducing social inequality in health and implementing measures to conquer pandemic threats that arise in low-income countries, it is striking that international documents do not address the question of how social disparities in mortality rates are to be reduced during the next influenza pandemic. This applies to the preparedness plans by WHO, the USA, Canada, Australia, the EU and its 28 member countries, Iceland, Norway, Switzerland, Turkey, Macedonia, policy documents by the World Bank, general sociodemographic projections, and plans to reduce the impact of pandemics on indigenous populations (23–30). The complete absence of discussion on social inequality in the pandemic response plan for England (12) has already been pointed out, but the failing in international pandemic plans is something that is only now coming to light.

Internationally, the biomedical target groups for pandemic vaccines are health workers, high-risk age groups, pregnant women and people with underlying diseases, while target groups defined on the basis of socioeconomic status are not mentioned (23, 27, 29)(29–31). However, indigenous populations are covered in pandemic plans for the USA, Canada and Australia in the same way as the biomedical target groups (29–31).

It is unclear why those who devise plans do not discuss how to avoid social inequality in mortality rates in the event of a new pandemic. Have the rich countries – who *have* prepared such plans – been most concerned about reducing social inequality in diseases that take the most lives in rich parts of the world, such as cardiovascular disease and cancer? Has this been at the expense of the interest in social inequality in infectious diseases that are rare or have little prestige, or which have been eradicated or have a low mortality rate in our part of the world? Could it be that those who devise pandemic plans consider influenza to be a disease which, beyond the biomedically defined risk groups, is random, and therefore socially blind? Is that the reason why there is little emphasis on research showing that social conditions have a bearing on who dies during a pandemic?

Need for transdisciplinary pandemic research and pandemic preparedness plans

Although several studies have shown social inequalities in pandemic mortality rates both 100 years ago and in 2009 (6), (9–12), more studies are needed on the biological and social mechanisms that drive the inequality. These may relate to poor nutritional status, concurrent illnesses, cramped living conditions

and a lack of understanding of or access to health advice/vaccination recommendations due to poor reading and writing skills. There is also a lack of studies that can reveal whether the mortality rate for the socially disadvantaged was higher due to a greater incidence of influenza or a higher mortality rate – or a combination of these.

The influenza models used in the pandemic plans often study the effects of earlier immunity, use of antiviral drugs, vaccination strategies and non-pharmaceutical measures such as the closure of schools and the isolation of infected persons. The pandemic outcome measures are usually incidence of infection, hospitalization, intensive care and death (27). However, international and national preparedness plans should be expanded such that these models also illustrate how nonpharmaceutical and pharmaceutical interventions can prevent social inequality in morbidity and mortality in new pandemics, thus saving lives and limiting social and economic losses. In this way, international health institutions and national public health institutes will also work to put social inequality in infectious diseases such as influenza on the agenda along with non-infectious diseases.

As part of the initiative, influenza researchers and pandemic groups at the international health institutions and national public health institutes – which normally consist of doctors or professionals with backgrounds in other health disciplines and science disciplines – should collaborate with or recruit pandemic historians and social scientists who research influenza pandemics. If medical and natural scientists, social scientists and historians work together to develop common issues, theories, frameworks and languages – including joint analyses and publications – this will generate more robust and tenable empirical and theoretical results than when they work individually (32). In order to conduct high-quality epidemiological research on the Spanish influenza, for example, it is not enough just to have a good understanding of the influenza virus, immunity and virulence; researchers also need to be aware of the historical context in which data was collected and produced, and take into account that the events of the time, such as World War I, may have affected the pandemic outcomes (33, 34). For example, the refugee camps in Europe, the Middle East and North Africa that sprang up during the recent migration and refugee crisis are at a high risk of becoming a breeding ground for the spread of disease if a new influenza pandemic were to break out today. A holistic research approach to historical influenza pandemics and transdisciplinary collaboration in the development of pandemic plans will mean more robust research and will have a long-term influence on the formulation of influenza pandemic preparedness policy.

Social conditions as an indicator for pandemic vaccines?

Based on the research showing that there are clear social disparities in the pandemic mortality rate (6), (9–12), it is natural to recommend changes in the vaccination policy on the basis of social conditions in addition to biomedical priorities for pandemic vaccination. This requires the development of good

social indicators. For Norway's part, the following groups are assumed to be at risk: those on long-term sick leave, disability benefit claimants and those with a reduced ability to work, i.e. people with complex social and/or health challenges. Other examples are people with a low level of education and low income (16). The health authorities in most countries currently translate the international biomedical recommendations for influenza vaccination into their own national context. The social conditions for recommending vaccination therefore need to be investigated and determined nationally. Globally, there is no doubt that prioritizing poor countries in relation to the distribution of scarce pandemic vaccines will have the greatest impact on reducing social and economic consequences.

Towards a paradigm shift in vaccination strategies against influenza?

In order to aid the international goals of reducing social inequality in health and ensuring good health for all by 2030, preparedness plans should be revised to reflect the need to avoid the socially unjust burden of disease in future influenza pandemics. A broader indication of influenza vaccination, based on both social and biomedical conditions, will have greater potential to reduce the risk of death than if only the biomedical indications are used. Such a change, where social conditions have implications for vaccination recommendations, would be a paradigm shift in the policy to combat influenza.

A transdisciplinary approach to the study of influenza pandemics and the preparation of preparedness plans, in which social and biomedical conditions are taken into account simultaneously, can also inspire research and formulation of policy that can help reduce social inequality in pandemic threats that are not related to influenza, thereby lessening the social and economic consequences.

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