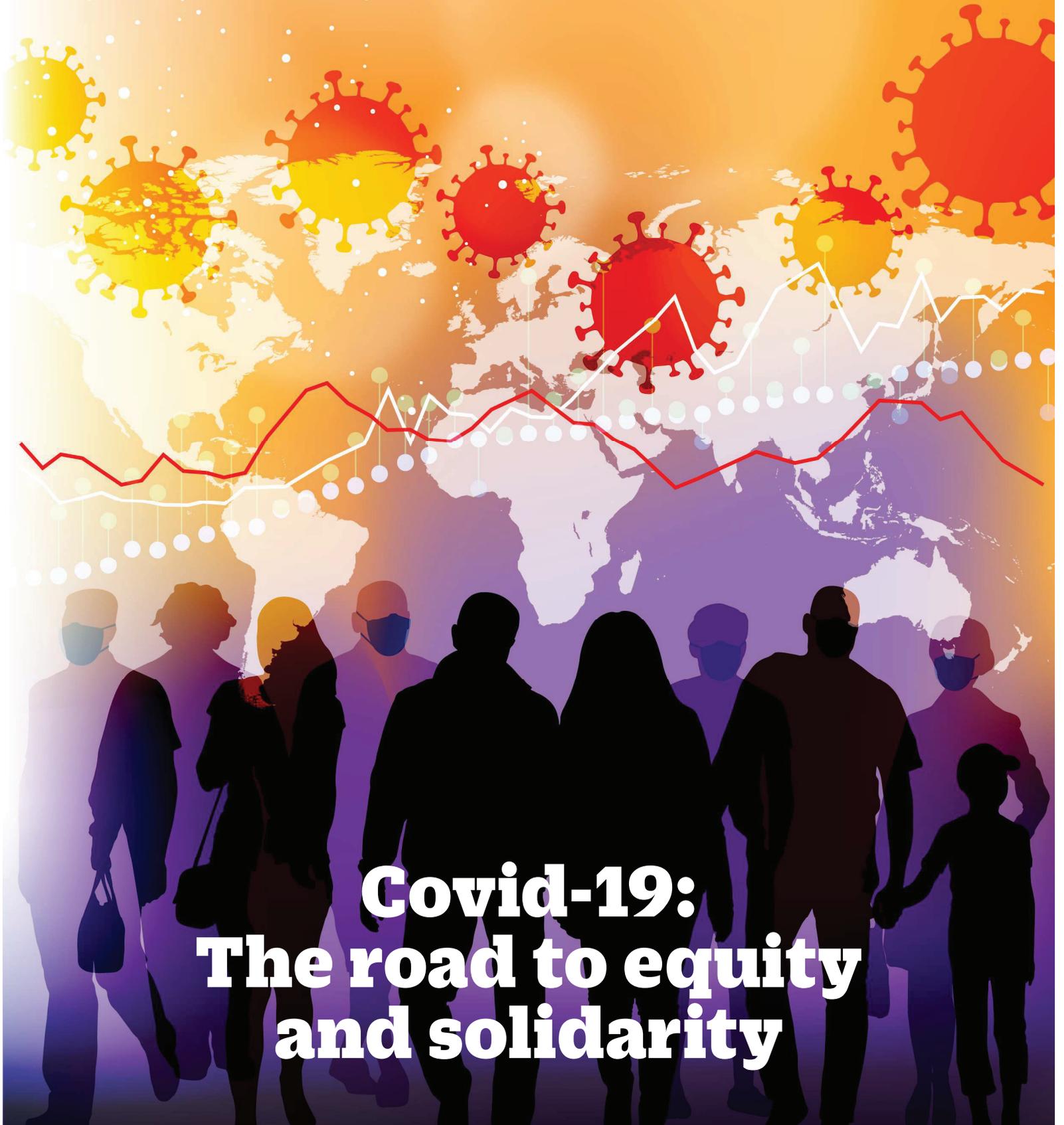


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# Covid-19: The road to equity and solidarity





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# Are overwhelmed health systems an inevitable consequence of covid-19? Experiences from China, Thailand, and New York State

Drawing on international experiences, **Viroj Tangcharoensathien and colleagues** argue that immediate extensive action to contain local transmission of new infectious diseases protects health systems from being overwhelmed

**I**n January 2021, a year after the covid-19 epidemic began in China, the number of active cases in the US (8.45 million) was placing significant strain on the US health system. This compared with just 443 cases in China and 4847 in Thailand. By 6 January 2021, the US had reported 21.8 million cases of covid-19 and 369 443 deaths, while China had 87 215 cases and 4634 deaths and Thailand 9331 cases and 66 deaths.<sup>1</sup> The cases per million population in the US (65 722), China (61), and Thailand (134), and the death rate per million (1113, 3, and 0.9, respectively) reflect large variations in responses to the epidemic.

Analysis of the responses in these three settings and comparison with the World Health Organization's recommended actions shows their effect on health delivery systems and provides lessons on how to protect health systems from being

overwhelmed by covid-19 and future emerging infectious diseases.

China and Thailand locate prime responsibility for outbreak management at central level and have a national homogeneous policy response with implementation through provincial authorities. However, the state federal system in the US has resulted in large variations in covid-19 responses across states. For this reason we have compared the two countries with one US state—New York State, which was the initial epicentre of the US epidemic. By January 2021, New York State with a population of 19.5 million had reported a total of 1 098 725 cases, with 38 879 deaths and 573 358 active cases.

## WHO recommended action

The value of WHO recommendations on covid-19 responses has been affirmed by countries' implementation experiences.<sup>2,3</sup> The responses can be categorised into three groups:

- Preventing local transmission through social and public health measures— notably use of face masks and physical distancing in public spaces,<sup>4</sup> testing to identify cases, contact tracing, quarantine of affected persons, treatment of severe cases, and preventing hospital acquired covid-19
- Ensuring and mobilising sufficient physical, human, and financial resources to perform public health functions and provide access to clinical services to minimise mortality while maintaining other essential health services
- Governance arrangements, especially whole government orchestrated actions on pandemic management and risk communication with citizens.

WHO recommendations on physical distancing and use of masks are based

on systematic review and meta-analysis.<sup>5</sup> Masks are not just for self-protection but also protect others by blocking respiratory droplets from infected asymptomatic people.<sup>6</sup> The high proportion of people with positive results who are asymptomatic—50-75% of those identified through population screening in Italy<sup>7</sup> and 78% in China<sup>8</sup>—supports the use of masks to prevent spread.<sup>9</sup> In a study in 20 614 asymptomatic healthcare workers, use of any mask reduced risk of infection compared with no mask use (odds ratio 0.58, 95% confidence interval 0.50 to 0.66).<sup>10</sup>

## Preventing local transmission

At the early stage of the epidemic, the Chinese and Thai governments applied public health measures,<sup>11</sup> notably the use of face masks (table 1).<sup>12</sup> Masks are mandatory in public spaces in China<sup>13</sup> but not Thailand, although its citizens have a high level of awareness and adherence. Physical distancing, hand hygiene, and improved ventilation in living spaces are enforced through a whole society approach with high compliance in China and Thailand; these practices varied across states in the US.

Thai and Chinese governments applied strict measures to test, trace, and quarantine, but practices in New York State were not as rigorous. Active case finding was guided by epidemiological evidence in Thailand and China but varies across states in US. Thailand has been training field epidemiologists since 1980,<sup>14</sup> and had over 1000 surveillance and rapid response teams nationwide, responsible for public health measures. It monitored citizens' preventive behaviour (use of face masks, hand hygiene, physical distancing) through weekly online surveys between April and December 2020 with results reported to the government and general public.

In New York State, the first covid-19 case was reported on 29 February 2020 and

## KEY MESSAGES

- Rapid increase in covid-19 cases seriously disrupts health delivery systems, creates stress in the health workforce, limits access to hospital services, and increases mortality
- Country evidence shows that infection of covid-19 can be contained at very early stage of the epidemic through public health measures such as use of face masks and physical distancing
- Cross-sectoral coordinated action and an effective test, trace, quarantine, and treatment system for covid-19 patients are also vital
- Effective governance is needed to ensure citizen adherence to public health measures and social interventions that are key to protect health delivery systems from disruption

**Table 1 | Summary of policy responses to covid-19 and their effect in China, Thailand, and New York State**

	China	Thailand	New York State
Use of face masks and physical distancing	Mandatory in public areas with high adherence	Voluntary and high adherence	Partial implementation with large variations across states
Restriction of domestic travel and social gatherings	No state of emergency introduced, but high compliance with stay at home policy	State of emergency declared; high level of compliance with stay at home	Belated state of emergency introduced two weeks after the first cases, resulting in large surge of cases
Restriction of inbound international arrivals	Mandatory test and state quarantine for all travellers	Mandatory state quarantine for all arrivals	US introduced international travel restriction
Test, trace, quarantine	Rigorous implementation and mandatory quarantine of positive cases	Scaled up laboratory capacity, strong capacity on surveillance and rapid responses, and mandatory quarantine	Initial limitation in laboratory capacity, contact tracing not rigorously implemented, self quarantine at home may not prevent spreading
Availability of PPE	Self reliance through local production	Initial shortage but rectified by scaling up local production	Critical shortage, reliance on suppliers from other countries
Treatment and access to care	Access is facilitated by universal health coverage, plus additional budget allocation; no supply side constraints when cases are brought under control	Universal coverage grants full access, plus additional budget allocation, treatment is free for all Thais and non-Thais	Federal government pays doctors and hospitals for the uninsured at Medicare rates but balance billing not allowed; long queues and limited access
Mobilising surge capacity and critical resources	Central government provides substantial resources to support Wuhan responses	Cases are few and within resource capacity of each province	Inadequate federal government support to state's mitigation efforts
Governance and public communication	Effective whole government approach; daily update and high trust in the population	Whole government responses led by prime minister, effective daily communication builds trust and gains citizen adherence to measures	Conflicting announcements between governor and mayor; generally inconsistent, insufficient, and confused public messaging in US
Effect on transmission	Local transmission contained to less than two digits by March 2020; volume of covid-19 patients did not overwhelm the health system	Local transmission contained to two digits by May 2020; case load did not disrupt health system	Daily cases contained to less than 1000 by June 2020, but the large number of patients disrupts health systems

the first death on 11 March.<sup>15</sup> The state's response was limited by its laboratory testing capacity and the initial guidance to focus testing on people with a history of exposure, as recommended by the Centers for Disease Control and Prevention (CDC). Information from its surveillance of emergency department visits showed influenza-like illnesses were on the rise, raising the spectre of community spread.<sup>16</sup>

New York State implemented the usual public health measures. A communications campaign emphasised hand washing and social distancing, which the city mayor modelled in his conduct of business. Public messages urged people to stay home if symptomatic (eg, fever and cough) and to seek testing if ill. A contact tracing system was implemented<sup>17</sup> with considerable support offered to people recommended to self-quarantine, though adherence is not known. New York's responses in term of contact tracing and quarantine were not as systematic and rigorous as in Thailand and China, as shown by the rapid spread of infection.

Population use of face masks was 95% in Thailand<sup>18</sup> and China.<sup>19</sup> Despite the US surgeon general and CDC advice that everyone should wear a mask, it was up to state and local governments to issue mandates, and not all did so. By July 2020, 72% of US states had mandated the use of masks in public places,<sup>20</sup> but on average, only 59% of US citizens reported always

wearing a mask when leaving home, with large geographical variation reflecting differences in disease risk and politics.<sup>21</sup>

On 13 March, with 95 confirmed covid-19 cases but far more suspected,<sup>22</sup> the New York mayor announced a state of emergency, limiting gatherings and urging work from home where possible. It was two full weeks after the first confirmed case before public health authorities acted to limit population movement by closing restaurants, bars, and schools. They also further limited public gatherings, effectively beginning an economic shutdown. The Thai government declared a state of emergency nationwide on 25 March, eight weeks after the first confirmed local transmission, which triggered prompt interventions such as a stay at home policy, physical distancing, scaled-up local private sector production of face masks and other protective equipment (PPE), closure of all public venues, and a curfew between 2200 and 0400 to prevent all social gatherings. Though China did not declare a state of emergency, the government encouraged a stay at home policy, discouraged mass gatherings, cancelled or postponed large public events, and closed schools, universities, government offices, libraries, museums, and factories.<sup>23</sup>

To respond to demand spikes for N95 and face masks and given the global shortage, the Thai private sector constructed a new factory in a month and supplied free N95 masks to health facilities. China also scaled

up daily production of N95 and non-N95 masks, from 13 000 and 5.86 million, respectively, in February to 5 and 200 million by April. China had 1266 certified PCR laboratories nationwide, while Thailand scaled up from 80 laboratories in April to 244 in September. The US had a critical shortage of face masks, including N95, as the country relied on contractors and suppliers from low and middle income countries.<sup>24</sup>

Although there are no comparable data on population movement, such as mobile device location across the three settings, China and Thailand introduced policies that discouraged domestic travel while practice varied across US states. New York State implemented travel restrictions that required quarantine on arrival to the state from certain jurisdictions. All three countries introduced restrictions on international travel (table 1). By June 2020, the infection had not spread to other provinces in China except for some small outbreaks in Beijing, Liaoning, and Xinjiang. Thailand stopped local transmission by 25 May 2020; subsequent infections have been mainly in international arrivals detected during the 14 day mandatory quarantine, though in December 2020 there was a second surge of local transmissions. New York State brought down the number of cases by the end of May 2020, but there were still around 1000 cases a day between June and September and cases rose again at the

end of the year, from 3000 cases a day in October to 12 000 in December.

### Mobilising resources

The Chinese government mobilised 346 medical teams—a total of 42 600 medical staff and 900 public health professionals—to support Wuhan city and Hubei province. Two new hospitals were rapidly constructed to provide an extra 2600 beds while 16 mobile cabin hospitals with 14 000 beds were designated for mandatory quarantine of patients with mild disease.<sup>25</sup>

Thailand's cases were similarly concentrated; the top 10 affected provinces had 87% of total cases, prompting the public health ministry to mobilise surge capacity of intensive care bed and specialists, though they were eventually not fully needed. Pressure on health facilities in Bangkok at the peak of the epidemic triggered the development, in consultation with stakeholders, of a “rationing protocol”<sup>26</sup> which was eventually not applied as demand for critical resources was small.

In New York City, mobilisation efforts were more fragmented. A non-profit organisation set up hospital beds in a convention centre and a medical tent in the city's Central Park. Volunteer health workers came from other jurisdictions. The public and private hospital systems sought to collaborate to rationalise access to critical resources such as intensive care beds and ventilators<sup>27,28</sup> when numbers of covid-19 patients rose exponentially and demand exceeded capacity.<sup>29</sup> Evidence shows lack of federal government support to the New York State's mitigation efforts, in a context of the politicisation of covid-19 responses in the US and conflict between New York Governor Cuomo and President Trump over the gravity of New York's situation.<sup>30</sup>

The Chinese local governments were responsible for financing the mandatory test and quarantine of international travellers. In China, the ministry of finance allocated \$23.8bn (£17.5bn; €20bn) by May 2020 to support local government response.<sup>31</sup> Since China has universal health coverage, the two social health insurance schemes paid treatment costs, while other costs were fully subsidised by the government. Similarly, the Thai government earmarked additional funding for free PCR tests for all suspected cases, personal protective equipment for specimen collection, and state quarantine for anyone with a positive result, regardless

of citizenship; treatment was fully covered by universal health coverage with no copayments. Though uninsured populations in the US were liable to pay for covid-19 treatment, the federal government paid doctors and hospitals for their care at Medicare reimbursement rates on condition that patients were not billed for the balance.<sup>32</sup> Some insurance companies waived copayment for insured members.<sup>33</sup> The upsurge of demand and supply side constraints in New York State resulted in long queues and probably affected ability to access treatment, unlike in Thailand and China where everyone who needed treatment had access.

### Governance and public communication

The Thai government established a Centre for Covid-19 Situation Administration to coordinate multisectoral actions. This whole government response was led by the prime minister.<sup>34</sup> Similarly, a whole government approach in China involved coordinated action by central and provincial governments.<sup>35</sup> Both countries used epidemic data and trends to inform policy responses; daily confirmed cases and deaths were publicly reported and risks communicated to gain citizens' trust and adherence to policy interventions. An international survey of public perceptions of government responses shows a high Chinese score (80.48 (SD 16.31) out of 100) and a much lower score in the US (50.57 (28.99)), though Thailand was not included.<sup>36</sup>

The US media, particularly print journalism, emerged as the most used source of public health data on covid-19. They reported overwhelmed public hospitals, overflowing morgues, and difficulty obtaining testing.<sup>37</sup> The conflicting announcements between the New York governor and the city mayor reflected a longstanding rivalry that was manifest throughout the initial surge in covid-19 cases.<sup>38</sup> The city faced failure of governance on many fronts: lack of federal government support to expand laboratory capacity and identify community spread, a state authority that seemed to compete with city public health structures, and reluctance of the city's political leadership to take actions that would change daily life, resulting in greatly increased hardship, especially in low income communities. There was inconsistent messaging on wearing masks, incongruent communications on risk of infection, and insufficient communications on the proper use of disinfectant against virus.<sup>39</sup>

By contrast, in both China and Thailand, strong and unified governance structures ensured consistent communications. For example, Thailand has no federal-state relationship and provincial governors were delegated full power for covid-19 management, with the municipality mayor a member of the provincial infectious disease control committee, chaired by the governor.

### Effect of covid-19 on health services

In China, between January and June 2020, outpatient visits were 21.6% lower and admissions 16.6% lower than in the same period in 2019.<sup>40</sup> Decline in use of health services was also reported in Wuhan as a result of travel restrictions and longer prescriptions for drugs for non-communicable diseases. Though the number of cases in Thailand was within the capacity of the health delivery system, the coverage of fully immunised children fell slightly, from 83% in the first quarter of 2020 to 79.9% in the second quarter. There was no interruption of lifesaving interventions such as antiretroviral treatment and dialysis, but outpatient visits fell nationally and in Bangkok.

The high case numbers in New York State led to much more severe consequences. Deaths from covid-19 rose to 800 a day, and around 23 000 confirmed and probable deaths were recorded before transmission began to decline. A disproportionate number of deaths occurred in black and Latino populations, who are over-represented in the lowest socioeconomic groups.<sup>41</sup> From 11 March to 2 May 2020, a total of 32 107 deaths were reported, 24 172 (75%) above the number expected in that period. Of these 24 172 deaths, 57% were in people with laboratory confirmed covid-19, 21% were associated with probable covid-19, and 22% were not directly linked to covid-19 but were probably the result of health system disruption.<sup>22</sup> On 1 July 2020, there were 295 984 active cases in New York, which clearly overwhelmed the health delivery systems and the capacity to maintain other essential health services, though data are unavailable on the consequences. Emergency medical services in New York City faced unprecedented challenges in finding beds for patients and high levels of stress and fatigue.<sup>42</sup> Surge clinics were set up to offload the emergency departments.<sup>43</sup>

### What can we learn?

Though the measures taken were similar across settings, large differences in the number of daily cases resulted from differ-

ences in timing of measures, coverage, and citizen adherence as well as in strength and unity of governance and leadership of multisectoral actions.

Effective government action at the early stage of the epidemic in China and Thailand successfully contained cases through synergies between public health and social interventions, and high levels of citizen adherence to personal protection. Evidence from other countries shows that effective and decisive leadership,<sup>44</sup> as well as transparency and accountability of decision makers, contributes to better containment.<sup>45</sup> The politicising of covid-19 and poor coordination between federal and state, and state and city governments impeded responses in the US compared with China and Thailand. Furthermore, universal health coverage in China and Thailand ensured full access to public health interventions and medical treatment.

Population adherence was a critical influence on the epidemic, and population and government attitudes and positions determined adherence. The US has much lower coverage of face masks than Thailand and China. The US libertarian values of emphasising personal liberty and disregarding official advice, and public discourse framing this public health measure as an infringement on personal liberty, meant the decision to wear a mask reflected a political position.

The rapid increase in virus spread and number of active cases significantly strained US healthcare, and US politics, leadership, and tense relations between states and federal government on managing covid-19 infections was reflected in the uncoordinated and ineffective responses in New York State. The experiences of these three settings show that timely and decisive policy decisions, effective and adequately funded public health and social measures, and citizen trust and adherence to these measures are critical elements of effective pandemic control.

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# Solidarity and universal preparedness for health after covid-19

**Göran Tomson and colleagues** argue that our ability to control pandemics requires global action to counter inequalities from demographic, environmental, technological, and other megatrends

**H**umankind has set a historical precedent in the past century with enormous social and economic transformations, advancement, and prosperity in many parts of the world. These have been supported by technological innovations, increased life expectancy, and changing governance from autocratic to democratic in many countries. However, socioeconomic disparities remain worldwide, limiting the achievement of the UN 2030 Agenda for Sustainable Development.<sup>1</sup>

An important reason for these disparities is that megatrends—activities, movements, or patterns that fundamentally alter individual, social, and technological behavioural structures—have never been so pervasive, explosive, or accelerated.<sup>2</sup> Megatrends such as demographic changes, global environmental change, power imbalances, and technological innovations are having long lasting effects.<sup>3</sup> Adding to these, gender inequality has failed to recognise and reward women's potential.<sup>4</sup> The scarcity of natural resources and increased consumption have reinforced the competition for global resources, further intensifying distribution inequities. Because of these inequities, the covid-19 pandemic has hit unevenly.

Automation after the industrial revolution transformed the labour market,

population growth caused increased urbanisation, while fossil fuels carbon emissions, urbanisation, and environmental pollution have accelerated the global threat of climate change and are still spiralling out of control. Demographic changes have led us to encroach on habitats of species that are hosts to viruses with pandemic potential and increased their opportunities to jump from one species to another.<sup>5</sup> Once new viruses have entered a human host, our interconnectedness resulting from urbanisation and mobility allow them to spread quickly and effectively. We witnessed this scenario in the initial phase of the covid-19 pandemic when the virus got a foothold on all continents within weeks of its first known occurrence in Wuhan, China.<sup>6</sup>

## Megatrends enabled covid-19 to hit unevenly

Covid-19 has had uneven global effect because of existing inequity. Figure 1 shows four megatrends that have created the vulnerabilities exacerbated by covid-19.

### Demography and context

The trajectory of the pandemic in different communities has been influenced by population characteristics. Virus transmission accelerated in households with cramped living conditions and those without basic sanitary infrastructure. Urbanisation has constrained prevention and mitigation efforts and increased vulnerability.<sup>7</sup> Ageing populations with a high prevalence of underlying conditions faced a high death toll, while younger populations in low and middle income countries were disproportionately affected by the socioeconomic consequences of lockdown and other public health measures.

Covid-19 has unveiled existing inequities to the extent that they can no longer be ignored. National strategies to combat the pandemic, such as lockdowns and sweeping restrictions on movement, have undermined global economic security, increased inequalities in access to resources, diminished the enjoyment of rights to healthcare, education, and

social protection, and exacerbated discrimination, gender inequality, xenophobia, and domestic violence.<sup>8</sup> The effects were mostly felt by populations often already excluded from healthcare and job opportunities, such as minority groups, indigenous populations, migrants, and informal economy workers, leading to their further isolation and unemployment.<sup>9,10</sup>

### Environmental change

Global environmental change takes a hefty toll on populations in low and middle income communities, such as droughts leading to diminished harvests and poor diets, heatwaves, lack of green spaces, high air pollution, and soil erosion. These changes further reinforced socioeconomic vulnerabilities at both local and global levels.<sup>11</sup> They have exacerbated morbidity and mortality and added burden to the overwhelmed health system dealing with covid-19.<sup>12</sup> Habitat destruction has also increased the spread of SAR-CoV-2.<sup>13</sup>

### Technological innovation

The covid-19 pandemic has highlighted differences in access to technological innovations. For example, research shows that half of the world's population, including 360 million young people, does not have access to the internet.<sup>14,15</sup> The “digital divide” reinforces socioeconomic vulnerabilities and adversely affects those with the least digital skills, such as elderly people.<sup>16,17</sup> School closures because of covid-19 have affected the learning of children without access to digital technology and online learning methods, affecting their health and wellbeing now and in the future.<sup>18</sup> When children are unable to access a safe school environment, school dropout rates often increase, children and adolescents experience higher levels of exploitation and violence, and their future employment opportunities are harmed.<sup>10</sup>

Although the burgeoning use of social media worldwide has provided opportunities to share validated information during the covid-19 pandemic,<sup>19</sup> it has also been a driver of false information, fuelling

## KEY MESSAGES

- The covid-19 pandemic has unveiled inequities and laid bare the growing crisis in global governance for health
- Global demographic and environmental trends have long-lasting effects on global health and created the vulnerabilities exacerbated by covid-19
- This interplay shows the need for solidarity within the global community to build resilient systems before the next pandemic
- A global, multisectoral governance mechanism is needed to create the conditions to support solidarity and universal preparedness for health

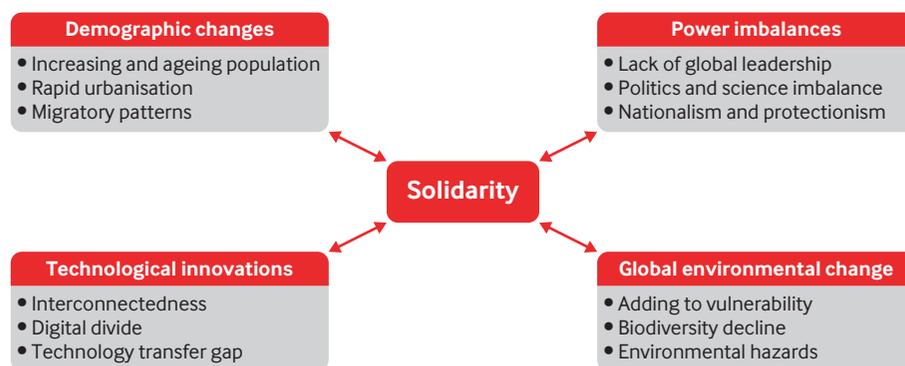


Fig 1 | Four megatrends creating vulnerability and the need for solidarity during covid-19

conspiracies and supporting detrimental social behaviours. However, social media use has also been important for increasing a sense of community and connection during lockdowns and movement restrictions put in place to slow covid-19 transmission.

**Power imbalances**

Over the past few decades, power imbalances have contributed significantly to inequities in health. Notably, many countries have effectively ceded power to international financial institutions and multinational corporations.<sup>20</sup> This reduced their capacity to meet population health needs, while private concentration of wealth and power grew considerably.<sup>20,21</sup> At the same time, the UN system has weakened—for example, the World Health Organization has seen its authority eroded, with a gradual reduction of financial support from all member states and threatened withdrawal by the US.<sup>22</sup> This has hampered international coordination and information exchange during the pandemic.

The trend towards increased nationalism and protectionism has amplified these effects.<sup>23</sup> We have seen politics often take precedence over science. Covid-19 has highlighted the conflict between medical and public health experts on the one hand and political decision makers on the other when expert advice is not aligned with political goals.<sup>24</sup>

The pandemic has exposed fissures and flaws in our societies that need to be amended so that the communities can build societal resilience before the next pandemic hits.<sup>25</sup> It has also laid bare the growing crisis in global governance for health to tackle these challenges to humanity. While there are mechanisms for supranational governance, arguably no single or combined supranational governance mechanism effectively

addresses the major determinants of health and the issues arising between science and politics.<sup>20</sup>

**Need for solidarity and universal preparedness**

The interplay between megatrends and covid-19 shows the need for structural responses to the systemic drivers of health and social inequities within and across countries. The pandemic should unite the entire global community to build societal resilience to cope with the next crisis.<sup>25</sup> It is a stark illustration of why solidarity and unity of action is required to mitigate or reverse the megatrends that have left the world vulnerable to the spread of disease. We believe solidarity is the key response strategy.

Solidarity is building on elements of “relationships among individuals, peoples, and states.”<sup>26</sup> It underpins global partnerships and is an essential component of efforts to realise all human rights, including internationally agreed development goals. Justice is a vital component of solidarity and requires governments to respect, protect, and fulfil the rights of citizens while contextualising their response to citizens’ different needs.<sup>26</sup>

Solidarity can also help control pandemics. With increasing population density, biodiversity loss, lack of sustainable agriculture practices, the digital divide, and global interconnectedness, we need to start being responsible to one another and the generations to come. Solidarity asks for respect and implementation of treaties that secure human rights, right to development, political rights, economic rights, accountability, and participatory action. We know that nobody is safe until everybody is safe.

Solidarity can be enacted through universal preparedness for health across geographical and generational borders

and socioeconomic groups. Universal preparedness for health is a cross-sectoral challenge that extends far beyond the healthcare sector. It goes beyond universal health coverage, which includes financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable medicines and vaccines.<sup>1</sup> Universal preparedness for health adds the “time” dimension, as being prepared is a global responsibility to avoid the next global emergency.<sup>27</sup> A starting point would be to revisit and strengthen the International Health Regulations sidelined in the covid-19 pandemic, but this is not enough to reduce the vulnerability created by megatrends that cut across sectors such as health, education, social protection, climate, and urban development.

Universal preparedness requires a trans-sectoral approach to mitigate the structural drivers of health and social inequities, including multidimensional poverty and discrimination. It requires tackling the increasingly important political determinants of health, such as the growth and influence of transnational corporations that dwarf the economic capacity of countries and international organisations.<sup>20</sup> Such an approach is not emphasised enough in current global health efforts.

Universal preparedness will therefore require a proactive use of resources to build societal resilience and reduce the structural inequalities that hinder development and perpetuate poverty. For example, social protection measures will be needed for those who are most vulnerable, such as those who are self-employed or in insecure work. More targeted support for people who have fallen behind and more equitable distribution of resources to meet people’s needs are essential. Universal preparedness for health requires changes to the global financing architecture to secure

sustainable funding, including domestic and international financing, which are key to safeguarding health and development outcomes.<sup>28</sup>

Stronger international and national collaboration through data sharing and research is critical for understanding and reducing structural vulnerabilities that have contributed to some groups being hit harder by covid-19. We must be better prepared with more evidence to inform how policies could adversely affect the most vulnerable society in terms of economic and social costs.

Being prepared also means investing in people. In addition to promoting population health through structural measures for social equality, universal preparedness requires stronger and more accountable people-centred health systems.<sup>29,30</sup> Fair and effective governance at both national and global levels, which engages multiple stakeholders, including citizens, in decision making is fundamental to modern democracies and to building solidarity.<sup>31</sup>

**Global governance to support solidarity**

Megatrends and their interplay with covid-19 present major challenges to the global community and require a multisectoral and internationally collaborative response. To support solidarity and universal preparedness in a post-covid world we must unite around a global, multisectoral governance mechanism that tackles the determinants of health at global, national, and local levels.<sup>31,32</sup> As the Lancet Covid-19 Commission suggests, global cooperation, social justice, sustainable development, and good governance are needed to rebuild with resilient health systems and global institutions and to transform economies based on sustainable and inclusive development. Global governance mechanisms would also overcome the profound challenges faced by multilateral institutions caught in the middle of big power politics during covid-19.<sup>33</sup>

The Independent Panel for Pandemic Preparedness and Response (IPPR) has an opportunity to go beyond reviewing how countries and WHO responded to covid-19 to propose such a global governance mechanism.<sup>32</sup> The Lancet Covid-19 Commission should do the same.<sup>33</sup> We need to be guided by the principles of the UN 2030 Agenda for Sustainable Development to mitigate the effect of megatrends that enabled covid-19 to exacerbate existing inequalities within and across countries.<sup>1</sup> Global collective action in support of solidarity and universal health

**preparedness is critical for a more resilient and inclusive post-covid world.**

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# Political economy of covid-19: extractive, regressive, competitive

The political economy of covid-19 reflects longstanding patterns of resource extraction linked to racial discrimination, marginalisation, and colonialism, write **Jesse Bump and colleagues**

**T**he common challenge of covid-19 has produced very different outcomes around the world, leading to many questions about the determinants of national performance and shortcomings in global performance. Problems of reporting and standards do not make precise comparisons easy, but few would disagree that the roughly 1400 deaths reported by South Korea, Thailand, and Vietnam together represent far better results than the roughly 700 000 deaths reported by Brazil, the United Kingdom, and the United States.<sup>1</sup> Adjusting these figures for population—the first group has about a third of the citizens of the second group—does not explain why covid-19 mortality differs by a factor of nearly 500. Neither typical proxy measures such as gross national income per capita nor national rankings on the 2019 Global Health Security Index have any meaningful association with performance on covid-19.<sup>2</sup>

The seeming uncertainty in the determinants of national achievement contrasts with the familiar pattern of subnational outcomes in places where covid-19 has taken hold: morbidity and mortality are far worse for indigenous people, migrants, black people, and other victims of racism, discrimination, and

marginalisation.<sup>3-6</sup> This pattern reflects underlying inequality in opportunity, education, wealth, and access to care, and in physical distancing policies that have forced people to rely on their own resources. The risks of economic disruption and disease transmission have disproportionately affected people in lower paid service sector jobs, where many already marginalised citizens find their employment. Domestically, the toll of covid-19 has been regressive, meaning that poor and marginalised people have suffered disproportionately more than rich people. Internationally, many countries have adopted a competitive attitude, competing against others for access to supplies or commercial advantage in pharmaceuticals.<sup>7</sup> This nationalistic competition is contrary to global interest and is likely to harm countries and citizens of the global south.<sup>7</sup> The countries most likely to be deprived of vaccines, medicines, and supplies are those with the least economic and political bargaining power.

## Colonialism and the political economy of extraction

To examine these patterns of covid-19 more closely is to ask about the political economy of the disease, which refers to the distribution of the effects of covid-19, the behaviour of nations, and the power relationships that these factors reflect. Overall, we interpret the broad patterns in the regressive distribution of disease and the competitive scramble for vaccines and supplies to indicate that the political economy of covid-19 is the political economy of extraction, following longstanding patterns of exploitation. Extractive relationships are fundamentally unequal and are the opposite of the collaborative fairness embodied in the general ideals and ethics of public health and in the specific calls for solidarity and cooperation made by the World Health Organization and nearly every country in a lengthy resolution at the 2020 World Health Assembly.<sup>8</sup> Where collaborative relationships are based on shared values, common benefits, and equitable progress, extrac-

tion is oriented around benefits for elite groups at the expense of others, divides society into the haves and have nots, and is defined by permanent inequity. Yet in many countries, the unequal toll of covid-19 has exposed extractive domestic economic structures that disproportionately disadvantage the same racial and ethnic groups that were exploited under slavery or colonialism, and revealed inadequacies in social safety nets. Covid-19 has provoked competitive, individualistic foreign policies as well. These attitudes are in opposition to public statements of solidarity and the advocacy of civil society groups and United Nation agencies for an affordable and universally available vaccine.<sup>9-11</sup>

Internationally, the political economy of covid-19 reflects global patterns of extraction that were established in colonial times, some of which have continued since colonised countries became independent, including some embodied in medicine and public health. These patterns have important consequences in three areas: they undermine solidarity, increase economic inequalities, and amplify other vulnerabilities. Colonialism was built on extraction and based on ideas of cultural superiority that made solidarity unthinkable for dominant countries.<sup>12 13</sup> These processes of colonialism and extraction and their effects explain much about the inequitable political economy of covid-19 and point to some possible remedies.

## Low solidarity

The so called global health model presumes a north to south diffusion of ideas and resources “based in large part on technical assistance and capacity building by the US, the UK, and other rich countries.”<sup>14</sup> The arrival of covid-19 suddenly made many of these countries with a strong presence in global health focus on their own domestic vulnerabilities. This domestic focus revealed another persistent colonial attitude: poor countries exist to serve rich ones. In an April 2020 French television discussion, one physician suggested that

### KEY MESSAGES

- Countries have had very different experiences with covid-19, raising questions about its political economy and the determinants of performance
- The burden of covid-19 follows extraction patterns dating from colonial times, with the worst outcomes suffered by marginalised people and poorer countries
- Competitive attitudes by some countries have undermined the international response
- Progress in public health requires governance reforms at multilateral institutions and international redistribution mechanisms

clinical trials should be conducted in Africa “where there are no masks, no treatments, no resuscitation.” This exploitative attitude was explained with reference to past HIV trials carried out in commercial sex workers “because we know that they are highly exposed and that they do not protect themselves.”<sup>15</sup> Although few in global health would agree with these attitudes, the emphasis of the health sector on diseases and biomedical factors is a continuation of the colonial preference to overlook its own extractive economic policies and negative effect on the environment and other social determinants of health.<sup>16</sup> By contrast, many countries in the global south have public health containment strategies developed through considerable experience with epidemic diseases including HIV infection, Ebola virus disease, Rift valley fever, and severe acute respiratory disease. Some African countries are pursuing inexpensive, effective strategies such as using community health workers for covid-19 track and trace.<sup>17</sup> However, in keeping with the old colonial pattern of the flow of knowledge from north to south, these ideas and strategies have struggled to gain visibility in mainstream global health discussions.<sup>18</sup>

#### Economic inequalities

The global economic disruption caused by covid-19 has harmed poorer people and poorer countries the most, particularly in Africa, pushing an estimated 100 million people into extreme poverty in 2020 and reversing more than two decades of progress.<sup>19</sup> Famines again threaten to affect countries across Africa and the Middle East as the virus destroys lives and livelihoods.<sup>20-22</sup> The World Food Programme estimates that the pandemic will force as many as 272 million people into acute food insecurity.<sup>23</sup> Avoiding additional damage to the economies of the global south will be possible only if new diagnostic tests, drugs, oxygen, and vaccines are made available in an equitable way. Many countries are collaborating to find solutions: Brazil, South Africa, and Egypt are among the 40 countries where vaccine trials are taking place. However, none of these countries has guarantees that they will receive a vaccine in any quantities, even though the trials are proving successful. The Covax facility<sup>24</sup> includes an advanced market commitment under which rich countries pay in first to help provide vaccines to low and middle income countries. However, the exact financial relationships that convert these resources into a subsidy for pharmaceutical industry research are unclear and thus

far have not included any details on ownership of intellectual property rights for any successful vaccines. Long term extractive relationships underpin these inequalities, including the capacity to negotiate payment ahead of time for vaccines. For example, Canada could afford to reduce the risk that some vaccines may not be proved efficacious and the risk of production delays by ordering five times more vaccine doses than it needed. On the other hand, nearly all low and middle income countries have been forced to wait in line to see what they can negotiate later, and wait for Covax to cover one fifth of the needed doses as it has pledged.<sup>25</sup> These are typical colonial relationships in which the resources of low and middle income countries are exploited by international private industry while their citizens remain dependent on the charity of rich countries.

#### Increased vulnerabilities

Colonial patterns increase vulnerability to covid-19 as well. Since the early 1900s, colonial industries such as mining have been linked to silicosis, tuberculosis, and other respiratory problems that increase vulnerability to covid-19.<sup>26-28</sup> Similarly, sugar production has been a historic mechanism for extracting wealth from the communities that produce it,<sup>29</sup> and products made from it, such as sugary drinks, alcohol, and many ultraprocessed foods, are risk factors for the exact comorbidities that contribute to worse covid-19 outcomes. About half of all covid-19 deaths recorded globally have occurred in patients with diabetes and hypertension and increasingly these products are sold in sub-Saharan Africa, Latin America, and India, creating new threats to health.<sup>30</sup> Some companies making these products are using the pandemic to build their brands using strategic corporate social responsibility by providing “essential support” in the form of meals and hospital equipment, especially in the global south where resources are scarce.<sup>31</sup>

#### Road ahead

The longstanding patterns of extraction, the resulting vulnerabilities, and the specific problems presented by covid-19 all point to the need for change. In nearly all instances, these are changes that governments have committed to in the past but have not actually pursued. For example, countries committed to achieving universal health coverage (UHC) for their population at the 2019 United Nations General Assembly. Domestic inequalities are made worse by the current absence of UHC in

many settings, which also impedes pandemic response since people excluded from healthcare because of cost and other barriers cannot seek care or self isolate when infected. Governments should prioritise pooled resources to provide full population coverage of a comprehensive package of health services, including vital public health services needed to prevent pandemics and basic primary healthcare needed to maintain wellbeing. Such coverage can be achieved only through progressive public financing. To be fair and effective, UHC must include marginalised groups, such as migrants, refugees, indigenous people, and people working in the informal sector. For those who have suffered most from extraction, including indigenous people, solutions must include enfranchisement with settlement of land rights and the provision of culturally appropriate services.<sup>32</sup>

Internationally, colonial patterns persist in many complex ways, although their consequences in systematically disadvantaging formerly colonised people and places is clear. The Commission on the Social Determinants of Health concluded in 2008 that health equity could not be achieved without dramatic redistribution of power and resources.<sup>33</sup> The geopolitics of the covid-19 pandemic have shown that much work remains to be done in this respect. In the past three decades our world has grown more unequal,<sup>34</sup> multinational corporations have flourished in a very deregulated global economy,<sup>35</sup> and even as millions suffer and die now, many very rich people have become even more wealthy during the pandemic.<sup>36</sup> Over the past few decades the planet’s natural resources—necessary to sustain all life—have been depleted to dangerous levels, threatening human and planetary health alike.<sup>37</sup> The common thread in these problems is the need for governance reform. Helpfully, the mechanisms that could be used to regulate the practices of transnational corporations have been described<sup>38</sup>: these include reporting, reviewing, monitoring, and managing conflicts of interest; stopping the revolving door between transnational corporations and governments; protecting whistleblowers; and restricting and requiring full disclosure of lobbying activities. Similarly, the Transnational Institute has proposed binding treaties to regulate transnational corporations.<sup>39</sup>

Governance reform at the multilateral institutions would help advance the participation and power of low and middle income countries, including those formerly colonised. This reform would diversify

the ideas and knowledge available for consideration and enable learning from the best examples, such as how African countries created a common marketplace to share access to scarce supplies at fair, fixed prices.<sup>40</sup> Or how Senegal engaged communities to increase communication, case detection, and coordination for physical distancing and other policies.<sup>41</sup> Traditional donor activities, which have included support of the African Centres for Disease Control, can still play a role, but more equitable governance of international institutions is a prerequisite for improving the global response to pandemics. Making international decision making democratic could support international collective action to empower WHO and assert the priority of health over commercial interests in international trade, and the joint pursuit of vaccines and other health technologies coupled with equitable distribution schemes. Some encouraging signs have emerged of progress towards these goals such as the ACT-Accelerator and the Covax facility, but the behaviour of some national governments (notably the US and UK) and powerful pharmaceutical groups is not fully supportive.<sup>42-44</sup> Most crucially, these competitive actions in relation to vaccines are just one example of how unequal political and economic power linked to colonisation create health inequities between nations. These health differences will be solved only with far reaching reform of global economic and political systems. In our view, making governance of multilateral institutions democratic would be a good first step to reform, including equalising the opportunity to serve on the UN Security Council, the Executive Board of WHO, and the other decision making bodies of the international governance system. As a step towards economic redistribution, G7 and G20 countries should cross subsidise vaccine purchases for low and middle income countries and ensure long term availability by enforcing compulsory licensing as they have already pledged to do through the World Trade Organization. The shared disaster of the covid-19 pandemic has drawn attention to the many regressive realities of our world, each one calling for immediate reform in the governance of global health. Without such measures, the unfair, extractive, and regressive patterns of the past will continue to plague the present.

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# International collaboration and covid-19: what are we doing and where are we going?

The mixed patchwork of achievements and mis-steps in responding to covid-19 show powerful nations are not living up to their commitment to solidarity and equity, argue **Jesse Bump and colleagues**

**T**he 19th century pandemics that followed the globalisation of commercial and military activities led to a series of sanitary conferences, at which countries agreed to fight infectious diseases by working together.<sup>1</sup> In the nearly two centuries since the Ottoman Empire convened the initial gathering,<sup>2</sup> formal collaboration in health has been institutionalised through the World Health Organization, founded in 1948 as the specialised agency of the United Nations and granted international responsibilities and a legal mandate over international public health matters such as the cross-border spread of disease.<sup>3,4</sup>

The covid-19 pandemic has once again shown the value of international cooperation and collaboration. Its importance is intuitive and widely supported. When the World Health Assembly convened in May 2020, member states

passed a resolution emphasising the need for solidarity, resource redistribution, and collective action.<sup>5</sup> Many individuals agree, and most want their countries to increase collaboration. A poll in 14 countries showed that about 60% of respondents believe that even greater international collaboration would further reduce the number of covid-19 cases.<sup>6</sup> And in public opinion polls the European parliament found that most citizens believed that their governments should show greater solidarity in the covid-19 era.<sup>7</sup>

## Logic of collaboration

The reasons for collaboration remain clear, logical, and have endured essentially unchanged from their original conceptualisation in the 1800s. Three of the most central are as follows. Firstly, the many ties between nations create collective health risks that are difficult to manage independently. The rapid spread of SARS-CoV-2 shows the close connections between countries, and the poorly managed economic and social costs are further evidence of their shared fate. Secondly, sharing knowledge and experience accelerates learning and facilitates more rapid progress. Information and knowledge on pathogens, their transmission, the diseases they provoke, and possible interventions are all areas in which researchers and public health professionals can benefit from the experience of others. Thirdly, agreeing on rules and standards supports comparability of information, helps establish good practices, and underpins shared understanding and mutual trust. All three reasons drive nations to collaborate and are reflected in their creation of WHO, a central authority, and its World Health Assembly (WHA), which serves as a forum for countries to share information, debate issues, and take collective decisions.

## Reality of collaboration in covid-19 pandemic

Despite the logical imperative to collaborate and the long heritage of attempts to do so, one year into the covid-19 pandemic

and transmission rages on, with nearly 100 million cases and over two million deaths by January 2021. The ongoing devastation has raised questions about the effectiveness of international collaboration in health and shone a powerful spotlight on WHO and other multilateral agencies with interests in disease control. Member states have ordered an inquiry into WHO's response,<sup>8</sup> and interim findings have been critical of the institution.<sup>9</sup>

Meanwhile, WHO has warned that vaccine nationalism by members states is leading to "catastrophic moral failure."<sup>10</sup> One of its independent oversight committees has added that the "rising politicisation of pandemic response" is a "material impediment" to WHO's work, and has warned that WHO cannot succeed without greater collaboration by member states.<sup>11</sup> These realities call for close scrutiny of collaboration in international health and demand fresh attention to its problems.

## Member states and collaboration at WHO

If international collaboration through WHO meets with criticisms on many fronts, then the next question is why. One of WHO's most crucial responsibilities is to notify its member states about the emergence and spread of infectious diseases, and it has been criticised for reacting too slowly at the beginning of the covid-19 outbreak in Wuhan, China.<sup>12,13</sup> Detailed reviews of the timing are available,<sup>14</sup> but some of WHO's initial actions seem to have been prompt. On 31 December 2019, WHO's China office picked up a media statement by the Wuhan Municipal Health Commission mentioning viral pneumonia. After seeking more information, WHO notified partners in the Global Outbreak Alert and Response Network (GOARN), which includes major public health institutes and laboratories around the world, on 2 January. Chinese officials formally reported on the viral pneumonia of unknown cause on 3 January. WHO alerted the global community through Twitter on 4 January and provided detailed information

## KEY MESSAGES

- Shared objectives draw nations to collaborate on international health challenges
- Poor performance against covid-19, however, reflects patterns of self-interested nationalism that undermine WHO and other international institutions
- Although these institutions have performed reasonably well, the pandemic reveals limitations in their mandates that reflect some member states' unwillingness to fully collaborate
- Addressing these deficits in collaboration is essential to resolving global collective action challenges, including covid-19, climate change, and non-communicable diseases
- Advance global health by ending the institutional fragmentation and budgetary manipulation that weaken WHO, strengthen its authority over trade and travel issues, and decolonise its governance

to all countries through the international event communication system on 5 January.<sup>15</sup> Where there were delays, one important reason was that national governments seemed reluctant to provide information.<sup>16</sup>

WHO is a manifestation of the advantages of cooperation and collaboration, and it consistently leads member states in ways that uphold its mission to advance the highest standard of health for all. In the pandemic, WHO has shown leadership in sharing information and in co-launching the Access to COVID-19 Tools (ACT) Accelerator, a global collaboration to accelerate development and equitable access to diagnostic tests, treatments, and vaccines.<sup>17</sup> WHO advocated for global financial solidarity by establishing the Covid-19 Solidarity Response Fund in April 2020 and the external independent WHO Foundation in May 2020.<sup>18 19</sup> In addition, WHO has produced a wide range of technical guidance together with cost estimates for responding to the pandemic,<sup>20</sup> decried vaccine nationalism, and exhorted its members to increase their solidarity.<sup>10</sup>

But WHO also exemplifies the reluctance of member states to fully trust one another. For example, member states do not grant WHO powers to scrutinise national data, even when they are widely questioned,<sup>21 22</sup> or to conduct investigations into infectious diseases if national authorities do not agree,<sup>23</sup> or to compel participation in its initiatives.<sup>24</sup> Despite passing a resolution on the need for solidarity in response to covid-19, many member states have chosen self-centred paths instead. Against WHO's strongest advice, vaccine nationalism has risen to the fore, with nations and regional blocks seeking to monopolise promising candidates.<sup>25</sup> Similarly, nationalistic competition has arisen over existing medicines with the potential to benefit patients with covid-19.<sup>26 27</sup> Forgoing cooperation for selfishness, some nations have been slow to support the WHO organised common vaccine development pool,<sup>24</sup> with some flatly refusing to join.<sup>28</sup>

The tensions between what member states say and do is reflected in inequalities in the international governance of health that have been exploited to weaken WHO systematically, particularly after it identified the prevailing world economic order as a major threat to health and wellbeing in its 1978 Health for All declaration.<sup>29</sup> WHO's work on a code of marketing of breastmilk substitutes around the same time<sup>30</sup> increased concern among major trade powers that WHO

would use its health authority to curtail private industry. Starting in 1981, the US and aligned countries began interfering with WHO's budget, announcing a policy of "zero growth" to freeze the assessed contributions that underpinned its independence and reorienting its activities through earmarked funds.<sup>31</sup> The result is a WHO shaped by nations that can pay for their own priorities. This includes the preference that WHO focus on specific diseases rather than the large social, political, and commercial determinants of health or the broad public health capacities in surveillance, preparedness, and other areas needed for pandemic prevention and management.<sup>32 33</sup>

#### Health cooperation at other multilaterals

As member states have constrained WHO, practical, economic, and ethical imperatives have led other multilaterals to embrace aspects of the health agenda. The World Bank, for example, has directly engaged with global infectious disease control through its pandemic emergency financing facility, supported by issuing "pandemic bonds."<sup>34</sup> When the first pandemic bonds were sold in 2017 as a mechanism for speeding financing, coronaviruses were mentioned specifically, along with five other viruses deemed most likely to cause a pandemic. The bond offering was oversubscribed by 200%, and would, the bank claimed, "channel surge funding to developing countries facing the risk of a pandemic" and "potentially save millions of lives."<sup>35</sup>

Even before the arrival of covid-19, the bonds were controversial in health circles because of their very high payout thresholds,<sup>36</sup> but with more expertise in finance than health, the World Bank persisted. As the covid-19 pandemic built in early 2020 many investors believed the bonds would pay out, but they did not.<sup>37</sup> The bonds were issued in two tranches, one of which was not eligible for payout until three months after the beginning of any outbreak, and both tranches had thresholds for mortality and spread, along with a requirement for exponential growth of cases in low income countries.<sup>38</sup> Essentially, the payout conditions required a pandemic to be well established before funds could be released, leading to wide condemnation.<sup>39</sup> When the bonds did pay out, the allocation for each country was capped at a maximum of \$15m (£11m; €12m). Too little, too late concluded many analysts.<sup>40</sup> Plans for future pandemic bonds were quietly abandoned.<sup>41</sup>

In other cases, major UN member states have found it easier to establish new organisations with narrowly defined missions than to strengthen or broaden WHO. Both Gavi the Vaccine Alliance and the Global Fund to fight AIDS, TB, and Malaria were established in the early 2000s around health priorities reflected in their names. Both institutions have governance structures that are more inclusive and flexible than the member states model of the UN agencies, and both are focused on areas of specific agreement among major donors.

Gavi is a public-private partnership for increasing vaccine access in low income countries, including through pooled procurement and advance market commitments.<sup>42</sup> The expectation of a vaccine for covid-19 suggested a clear role for Gavi, which co-leads the vaccine pillar of the ACT Accelerator, Covax.<sup>17 43</sup> Although Covax membership is optional, 189 countries have joined, including China, all members of the EU, and 92 low income countries.<sup>44</sup> The Covax facility should therefore be well placed to cross-subsidise vaccines for all low income countries, but uncertainty in its terms have led some to explore independent options.<sup>45</sup> Additionally, there are questions about whether Gavi's market focused perspective can manage the ethical and regulatory issues threatening equitable access and distribution at a time of nationalistic competition.

The Global Fund is a public-private partnership that emerged from uncertainty about how to raise and manage the unprecedented resources required to combat HIV/AIDS and disagreements about which diseases should be included and what organisation would be in charge of the funds.<sup>46</sup> With the arrival of covid-19, the Global Fund has sought to support eligible countries by allowing them to divert up to 5% of existing grants and allocating an additional \$665m for ad hoc requests to "reinforce the response to covid-19, mitigate the impact of the pandemic on HIV, TB, and malaria programmes, and make urgent improvements in health and community systems."<sup>47</sup> However, covid-19 reopens many questions about how global health initiatives are financed and delivered, including whether the Global Fund should be constrained to three diseases and how it should relate to WHO.

#### Shared future

The covid-19 pandemic painfully shows the reasons why nations are better off

when they cooperate and collaborate in health, and also reveals the hazards of their incomplete commitment to doing so. Member states have prioritised themselves by restricting WHO from meaningful oversight of national information and endangered global health security by competing for vaccines rather than allocating them equitably. The inability to verify national data or advance its own estimates is just one of the many crucial dimensions in which WHO is prevented from maintaining the primacy of technical competence over the self-interested obfuscations of some member states. WHO's independence is compromised also through the manipulation of its budget. The patchwork of institutions active in health reflects the limited, ad hoc agreement among powerful countries. Although generally global institutions have performed well in their missions, their often limited mandates leave the world's people inadequately protected from new threats. In a pandemic, the cost is expressed in lives and livelihoods. More than 10 000 people were dying daily at end of 2020,<sup>48</sup> and the world economy was forecast to lose \$5tn or more in 2020 alone.<sup>49</sup> The imperative of finding collaborative and collective solutions—solidarity—has never been more obvious, or more urgent, for covid-19, climate change, non-communicable diseases, and the many other pressing and grave challenges that hinge on collective action.

Meaningful international collaboration is a critical part of the road ahead and calls for immediate action in three areas. Firstly, member states must end the systematic weakening of WHO—end ad hoc institutional fragmentation in global health and end budgetary manipulation. Secondly, they must support the independence of WHO—increase its core budget and build its authority over trade and travel related issues, including compulsory licensure for pharmaceuticals. Thirdly, states must uphold fairness, participation, and accountability by granting WHO powers to hold members accountable, including for overcoming deficiencies in national data, and by decolonising its governance to address the undue influence of a small number of powerful member states.

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# Explaining covid-19 performance: what factors might predict national responses?

**Fran Baum and colleagues** discuss the factors that affected prediction of the success of national responses to covid-19 and will influence future pandemic preparedness

**C**ovid-19 has exposed and exacerbated existing flaws in public health systems around the world. Shredded social safety nets and underinvestment in healthcare systems, compounded by conflicts of interest, dismissal of scientific evidence, and failures of political leadership meant many countries were unprepared to deal with the covid-19 pandemic and vulnerable to the next one. Important lessons can be learnt from the various national responses to covid-19 to inform preparedness for future waves or the emergence of new pandemics or epidemics

The Global Health Security Index (GHSI), which measures preparedness for pandemics or epidemics, published its scores in October 2019, just before the covid-19 pandemic was declared.<sup>1</sup> The US and UK scored highest on the GSHI, but both countries have done spectacularly badly in response to covid-19, whether measured in deaths or economic damage. The Epidemic Preparedness Index,<sup>2</sup> also published in 2019, grouped countries into five levels of preparedness, and also placed the US and the UK and others that have fared poorly in the covid-19 pandemic in the highest categories. The GHSI and the Epidemic Preparedness Index are the only pandemic preparedness

indices that cover most countries and thus enable cross country risk assessment. However, both failed to predict national covid-19 preparedness. To understand how to assess pandemic preparedness more accurately, we specifically focus on the GHSI because it includes a wide range of measures and comprehensive country data collection.<sup>3</sup>

The GHSI takes account of qualitative and quantitative data intended to measure the capacity of 195 countries to deal with disease outbreaks. Based on an expert assessment of structures and processes, the GHSI includes indicators related to geopolitical considerations, national healthcare capacity, and political and economic risk factors. It assesses countries using 140 questions across six domains: prevention, detection and reporting, response, health system, compliance with norms, and risk of infectious disease outbreaks. Scores range from 0 to 100, and a higher GHSI score indicates better preparedness.

The 2019 GHSI report provided prophetic recommendations for “a fast-spreading respiratory disease agent that could have a geographic scope, severity, or societal impact and could overwhelm national or international capacity to manage it.”<sup>1</sup> The authors described “severe weaknesses in country abilities to prevent, detect, and respond to health emergencies; severe gaps in health systems; vulnerabilities to political, socioeconomic, and environmental risks that can confound outbreak preparedness and response; and a lack of adherence to international norms.”<sup>1</sup> The average overall GHSI score for the 195 countries assessed was 40.2 out of 100, and 51.9 for the 60 high income countries. Less than 7% of countries scored in the highest tier for ability to prevent the emergence or release of pathogens, and less than 5% of countries scored in the highest tier for ability to respond rapidly to and mitigate epidemic spread.<sup>1</sup>

After the US and UK, the Netherlands, Australia, Canada, Thailand, Sweden, Denmark, South Korea, and Finland were

the highest scoring countries on the GHSI. A higher GHSI score would be expected to be associated with lower measures of covid-19 burden. However, the GHSI was much less accurate when assessing individual countries. In April 2020 the GHSI score was positively associated with covid-19 cases and deaths, but not related to covid-19 testing rate. As at 19 October 2020, national cumulative death rates from covid-19 were positively related to GHSI score ( $r=0.35$ ,  $P<0.001$ ), indicating the persistence of the association (fig 1).

## Why didn't the GHSI predict national performance more accurately?

We propose 10 factors that may account for the failure of the GHSI to predict performance in the covid-19 pandemic and provide guidance for the development of a new index on preparedness.

### Limited consideration of globalisation, geography, and global governance

The GSHI measures the performance of individual nations. However, given the increasingly globalised and interconnected social and economic world, viruses can spread rapidly despite seemingly good preparedness. The GHSI did not consider the importance of geography. For example, islands nations such as Australia, New Zealand, and Pacific island states could close their borders in an attempt to prevent the virus from entering the country. Major air transport hubs in particular posed risks for increased disease transmission. The GSHI also did not consider the contribution of regional organisations (eg the European Union) or global organisations (eg the G20) to coordinating national responses. Failure to coordinate efforts to stem the spread and impact of the virus has yielded considerable chaos, including shortages of critical commodities such as personal protective equipment, poorly managed population movements, and lack of standardisation of key trade policies. Thus, disease control may be only as effective as practices within the poorest performing countries.<sup>4</sup>

## KEY MESSAGES

- The Global Health Security Index predicted that the world in general was not well prepared for the pandemic but did not predict individual country preparedness
- Ten factors seem to have contributed to the index failing to predict country responses, including overlooking political, economic, and social contexts and the role of civil society
- Future assessments of pandemic preparedness need to take these 10 factors into account by adopting a systems approach which enables a focus on critical system components

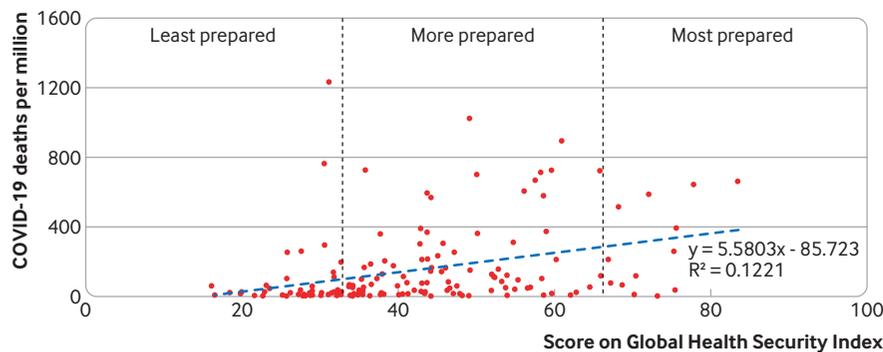


Fig 1 | Relation between Global Health Security Index score and number of covid-19 deaths up to 19 October 2020 (Our World in Data: <https://ourworldindata.org/coronavirus>)<sup>1</sup>

**Bias to high income countries**

Researchers in US institutions developed the GHSI, advised by a panel of international experts. Critics of the GHSI argued the experts’ emphasis on biosafety over other capacities reflects a bias to high income countries.<sup>4-6</sup> For example, there is tension between biosecurity focused, authoritarian approaches to public health and more comprehensive, social determinants driven, participatory and rights based approaches, which require effective community participation.<sup>7</sup> The pandemic has highlighted the importance of the latter and the need to involve a broad range of experts from different backgrounds, including civil society, to develop and implement an effective response to a public health crisis.

**Failure to assess health system capacity**

Nations with universal publicly funded health systems that were not financially distressed and had strong public health capacity seem to have been relatively well prepared for covid-19: these include Thailand, Vietnam, Australia, and New Zealand. Conversely, the pandemic highlighted the weaknesses of fragmented systems relying on for-profit healthcare providers, such as in the US. Covid-19 exposed fragile and chronically underfunded public health systems and weak pandemic preparedness activities. England outsourced testing and tracing to private companies with no relevant experience, which created a fragmented system separate from existing health service, university, and veterinary laboratories and from those experienced in contact tracing in local government or sexual health clinics. The tracing system in particular performed poorly, using a telephone based system that ignored the importance of the local knowledge of contact tracers, termed

“shoe leather epidemiology.”<sup>8</sup> The result was an ineffective and fragmented programme which hampered efforts to control the outbreak. These factors also highlight the importance of being able to draw on a well functioning public health system.<sup>9</sup> Vietnam, whose public health system emphasises care, solidarity, and community responsibility, has had low covid-19 cases and death rates although it scored low on the GHSI (50th place; score 49.1).

**Role of political leadership**

The GHSI measures trust in government, but it overlooked the role that political leadership and ideology plays in shaping public health responses.<sup>10</sup> The GHSI rated New Zealand lower than many other high income countries (35th place; score 54.0). Yet many praise Prime Minister Ardern’s strong political leadership during the covid-19 crisis, especially her empathic and clear communication to the public and evidence based response. By contrast, other leaders, including in the US and Brazil, failed to accept scientific public health advice, including mask wearing and social distancing, promoted unproved therapies, and criticised the World Health Organization. In the UK, rated second highest on the GHSI, the covid-19 response was hampered by the process of leaving the European Union, which dominated the attention of politicians and efforts of civil servants.<sup>11</sup> The perils of populist leaders in pandemic responses have been previously highlighted.<sup>12</sup>

Assessing political leadership and philosophy may risk politicising the index and opening it to criticism from countries with low scores. However, existing frameworks for assessing the quality of a country’s governance,<sup>13</sup> effectiveness,<sup>14</sup> and transparency can be drawn on.<sup>15</sup> Examples of poor governance during

covid-19 include the growing concern about corruption in the procurement of essential equipment and the absence of transparency when contracting with private companies.<sup>16</sup> Given the vital importance of trust during a pandemic, political leaders who promote transparent government are more likely to mount a more effective response.

**Importance of context overlooked**

Consideration of context is key to the accurate assessment of health interventions.<sup>17 18</sup> Yet to allow for cross country comparisons, indices often reduce complex systems to a standard set of measures that overlook important differences, such as dynamic political, economic, and social structures and systems<sup>6</sup>

The context can include the degree of centralisation of power. New Zealand and Vietnam have centralised governments, and both fared well in response to covid-19. Some federated states including India, the US, Belgium, Australia, and South Africa have pandemic responses that have varied in effectiveness across the country and point to the value of national coordination. Italy’s regional structure allowed it to largely contain the pandemic in the north of the country during the first wave.<sup>19</sup> However, this containment broke down in the summer as Italians went on holiday<sup>20</sup> and exposed weaknesses in the regional health infrastructure and preparedness in regions that had escaped the initial wave.<sup>21</sup> Future predictive work would benefit from a qualitative, context assessment of each country, informed by a range of expertise.

**Limits of national wealth as predictive factor**

The GHSI report noted a positive correlation between gross domestic product (GDP) (0.37) and GDP per capita (0.44) and the GHSI score.<sup>1</sup> But national wealth may not be the only or main determinant of health security. Lower income countries may allocate their scarce resources more appropriately and tailored to context.<sup>5 6</sup> In Rwanda, a strong health system, rapid lockdown, and effective contact testing and testing of staff at national borders and those working in public spaces, such as banks and bars, have kept cases low and no deaths have been recorded.<sup>22</sup> Similarly, despite Vietnam’s low GDP it has had a highly effective pandemic response. Such outcomes confirm earlier analyses that low income countries can use their resources efficiently and innovatively to achieve good health.<sup>23</sup>

**No examination of inequalities within countries**

The covid-19 pandemic has heightened pre-existing inequalities in many countries. Most nations reported minority populations being most vulnerable. In the US, black, Hispanic, and Native American people were more susceptible to infection, severe illness, hospitalisation, and death.<sup>24-26</sup> In Australia, recently arrived migrants faced greater risk,<sup>27</sup> while minority ethnic groups bore a high burden in the UK.<sup>28</sup> In South Africa most infection hot spots arose in high density, overcrowded settlements with poor access to water and other basic services and heavy reliance on cramped private taxi transport in the absence of any public transport.<sup>29</sup> In Brazil, social inequities and structural racism placed pregnant and postpartum black women at higher risk of death.<sup>30</sup> Everywhere, marginalised people and those living in precarious situations tend to fall through the cracks in the social safety nets, find it harder to isolate when required, and cannot avoid settings where the risks of infection are high. Marginalised people also face the risk of losing their jobs and housing, fail to qualify for social security, and face food insecurity. Future iterations of the GHSI should include measures of the scale and nature of inequalities within a country.

**Importance of social security provisions**

The covid-19 pandemic has highlighted the importance of social security provisions to protect people from losing their jobs and homes, yet the GHSI does not consider them in its assessment. Government support to people and businesses affected by covid-19 has been important. For example, in many high income countries, unemployment benefits and job and income support schemes have protected many from extreme poverty, whereas in most low and middle income countries such income protection does not exist. In India the absence of government support forced tens of thousands of migrant workers to return to their home villages. Some died and many faced police harassment and hunger. In many countries the availability of sick leave has been an effective public health measure as people without this provision have found it difficult to follow public health advice to self-isolate. Including measures of social protection would improve future indices.

**Civil society capacity not assessed**

The GHSI did not assess the capacity of civil society organisation to assist in pandemic responses. Social solidarity built on civil

society engagement can offer protection even where trust in government is weak. For example, in South Africa, Cape Town's community action networks are working to both ameliorate the consequences of lockdown and reduce local transmission. Using social media, they built local relationships based on trust and challenged divisive individualism by creating a collective consciousness for responses to covid-19 related issues.<sup>31</sup> Societies can also create political space for civil society and social movement activists to protest human rights abuses, which often increase under the cover of exceptional or emergency pandemic measures.<sup>32</sup> Future exercises should include civil society perspectives and their potential to respond to pandemics.

**Gap between capacity and its application not assessed**

Although the GHSI assessed the theoretical capacity of a country to respond to a pandemic it did not examine the actual capacity and willingness to respond. For example, the US scored high on applied epidemiology training programmes (indicators 2.3.1) but political intervention prevented the Centres for Disease Control and Prevention from applying epidemiological science to responses to the pandemic. A complex system is only as strong as its weakest point. Preparedness assessments based on system critical components discussed here work best.

**Conclusion**

The GHSI report accurately predicted that the world was not well prepared for a pandemic. However, the complex country responses to covid-19 and biases within the GHSI limited the accuracy of its predictions for specific countries. To strengthen the predictive capabilities of global indices, a diverse team of experts should be used to assess the complex set of factors that shape a country's capacity to respond.

Other vital indicators needed in future global indices to assess a country's likely capacity for a robust response to a pandemic include the extent of inequities in a country, the strength of social protection and public health response capacity, the geographic context, and exposure to globalisation. Qualitative assessment of a country's capacities in terms of its political leadership's willingness to accept scientific advice and the strength of its civil society to protect human rights and foster trust is also important. Existing measures of corruption and trust should be used in future indices. The need for cross border cooperation

and joint planning of future assessments of global pandemic preparedness point to the need to examine the capacity of supra-national organisations. The crucial lesson from the covid-19 pandemic is that an effective response does not rely just on a strong public health system but also requires a society that is fair and offers all its citizens and residents social and economic security.

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# Covid-19—a rehearsal to build a greener and healthier society

**Maria Nilsson and colleagues** argue that reducing the severe health risks from the climate crisis requires political commitment and funding like that mobilised to limit the spread of SARS-CoV-2

**T**he covid-19 pandemic is hopefully a short-lived global crisis adding to existing global challenges arising from human behaviour, particularly the ongoing environmental and climate crises. Strict measures to control SARS-CoV-2, the virus that causes covid-19, were introduced rapidly in almost all countries, showing that the global community has the ability to prioritise health. International collaborations set immediate priorities to control SARS-CoV-2, including mobilising large financial resources. National decision makers proved ready to make far reaching decisions about finances and restrictive measures, which were largely accepted by citizens despite initially limited scientific evidence on effectiveness.

This response is in sharp contrast to the insufficient political willingness to act on the climate crisis, with global carbon emissions continuing to rise, despite longstanding international agreement to reduce them. Although the covid-19 pandemic is an acute global health threat that needs immediate action, climate change is likely to be a larger global public health threat in the medium and long run.<sup>1</sup> If the world's greenhouse gas emissions and anthropogenic pollution

follow current trends, each additional unit of warming is projected to have primarily negative consequences for human and natural systems, including the upstream drivers of health.<sup>1</sup> Reflections on the covid-19 pandemic can inform and boost the development of the critical policies and action needed to overcome the existential environmental and climate change crises.

A healthy population is at the heart of most transformations needed to achieve global sustainable development. The guiding principle behind sustainable development is that humanity should meet the needs of today without compromising the ability of future generations to meet their needs.<sup>2</sup> Numerous challenges must be overcome to reach the UN sustainable development goals, which set out the priorities and resources required to facilitate global cohesive action.<sup>3</sup> These commitments for sustainability entail an uncompromising responsibility towards the world's young people,<sup>4</sup> which will be even more important as countries recover from the effects of covid-19.

## Environmental crisis and health in covid-19 context

Although human health improved substantially between 1950 and 2010, this gain was accompanied by global environmental degradation from climate change, loss of biodiversity, and reactive nitrogen and phosphorus being dumped on land and introduced into oceans and waterways. All of these threaten human health and the ecosystem services on which we depend.<sup>5</sup> By tackling climate change, reducing the degradation of our natural environments, and building climate resilient health systems, we reduce the risk of emerging zoonotic diseases, one of many health threats. However, only half of the countries surveyed by the World Health Organization have national climate and health plans.<sup>6</sup> The Carbon Disclosure Project reported that two thirds of cities surveyed are concerned that climate change will overwhelm their public health infrastructure.<sup>7</sup>

Climate change affects everybody, but some population groups are more

vulnerable than others (box 1). The effect of climate change intersect with other societal changes—for example, population ageing and urbanisation. Vulnerabilities will vary in different places.

The velocity and extent of climate change challenges the global health gains made over recent decades.<sup>8,9</sup> People who are vulnerable may be susceptible to relatively small changes in climatic conditions and their consequences.<sup>10</sup> Two examples of health risks needing higher priority in climate change adaptation and mitigation that may be particularly relevant in the covid-19 context are heat related mortality and respiratory diseases associated with air pollution.

Many different population groups are at risk of exposure to increases in temperatures, more frequent heat waves, and air pollution (box 2). Small children may be particularly vulnerable to the effects of climate change as their bodies respond differently to harmful exposures, they lack control over the environment, and they depend on care and protection from adults. Children's behaviour may also expose them to risks.<sup>10</sup> However, older adults have been exposed to air pollution from childhood and throughout their life, driven by fossil fuels and made worse by rising temperatures. Being exposed in childhood is a particular risk as the lungs are developing. It may lead to reduced lung function, and over time increase the risk of heart attacks and stroke.<sup>10</sup>

## KEY MESSAGES

- Reducing greenhouse gas emissions is mandatory for human health and well-being in both the short and long term
- The investments and resources put into recovery plans for covid-19 must support transformation to renewable energy sources and green development
- The health implications will depend on the level of investment in trans-disciplinary efforts to build health systems resilient to the prevailing environmental and climate crises
- Urgent global collaborative action in response to covid-19 must be replicated to improve planetary health and human wellbeing

## Box 1: Vulnerability to climate change<sup>8-10</sup>

- Particular individual sensitivity or inadequate operation of health and social systems increase vulnerabilities
- Among those most vulnerable are older people, children, pregnant women, migrants and other marginalised groups, people on low incomes, and those with pre-existing medical conditions that increase susceptibility
- The nature and type of hazard, the exposure, and the vulnerability of individuals determines the magnitude of health outcomes

**Box 2: Hazards of air pollution<sup>11-13</sup>**

- WHO estimates that more than 90% of the world's population breathes polluted air, with low and middle income countries bearing the heaviest burden
- Air pollution alone kills around 7 million people a year, including about 600 000 children aged under 5 years
- More than 40% of the world's population is exposed to high levels of household air pollution, mainly through cooking using polluting technologies and fuels
- Roughly two thirds of all deaths from outdoor air pollution result from fossil fuel combustion

In the context of covid-19, health challenges of already existing environmental and climatic change means a converging risk for older people, increasing the risk of morbidity and mortality due to cardiovascular and respiratory disease. The increased susceptibility may be explained by a lower reserve capacity physiologically, an immune system with a slower response, and a slower metabolism. Increased vulnerability may be related to poorer physical health, immobility, being in hospitals and nursing homes, and some commonly used medications.<sup>10</sup>

Potential underestimation of health risks related to heat means many more people are likely to be affected.<sup>10</sup> The Lancet Countdown report on climate change and health reported that heatwave exposure among older people was at a record high in 2019.<sup>7</sup> With prevailing policies, the world is projected to be up to 4°C warmer than in pre-industrial times by the end of the century,<sup>14</sup> increasing the risks to health in such a way that they are difficult to predict.

Environmental degradation also has a more direct connection to covid-19. Most recent emerging infectious diseases—and all those responsible for recent pandemics, including HIV/AIDS, SARS, and Ebola—have jumped from wildlife to humans, and the evidence suggests that covid-19 has done the same.<sup>15</sup> The conversion of natural habitats to human influenced ecosystems is recognised to increase the risk of new zoonotic disease in humans.<sup>16</sup> More generally, ongoing human damage to the natural environment creates a global commons challenge: the total damage is no individual's problem but each individual contributes. There seems to be an appalling lack of understanding of the systemic risks being created in the longer term.

Climate and other environmental changes are consequences of past development pathways. Five years ago, when publishing the planetary boundary framework,<sup>17</sup> Steffen and colleagues set out a safe operating space for humanity, stressing the need for a new model for continued development of human societies that maintains a resilient and sustainable earth system. If such a model is accompanied by changes in ecosystems and socioeconomic pathways, it may allow us to identify interactions that could substantially alter the burden of climate sensitive health outcomes, burdens for which health systems will have to be prepared.

The development choices made today will affect how the future looks.<sup>18 19</sup> Covid-19 is an opportunity to reflect on pathways for moving forward to be better prepared for the next pandemic and build the resilience needed to be able to make a real difference for current and future generations. In healthcare, there is a willingness and readiness to take large and rapid steps to cure acute illness. But there is less willingness for the slower work of preventing illness, even when it is supported by robust evidence and the human and economic benefits would be much greater over both the short and long term. This is illustrated by the slow progress in efforts to control the epidemic of tobacco related disease (box 3).

**Natural experiment**

The covid-19 pandemic can be viewed as a natural experiment, showing that social change is possible with rapid cohesive international action, priority setting, and mobilisation of financial resources. Government lockdown policies to prevent the spread of covid-19 reduced travel, industrial production, and energy generation, which in turn decreased the greenhouse gas emissions that drive climate change and the presence of air pollutants. In April 2020, daily global CO<sub>2</sub> emissions were 17% below the mean level in 2019, although levels rose again once restrictions were released.<sup>22</sup> A recent estimate from the Global Carbon project suggested a 7% fall in global CO<sub>2</sub> emission from fossil fuel and industry for 2020.<sup>23</sup> Despite this, Earth overshoot day—the date when nature's budget for the year is exhausted by humanity—was reported on 22 August 2020.<sup>24</sup>

After the global financial crisis in 2008-09, CO<sub>2</sub> emissions rapidly rebounded, mainly from large emission growth in emerging economies, a rapid return

**Box 3: Slow pace of prevention**

- The lower interest in preventing future disease is not new. The association between tobacco use, severe disease, and premature death was first shown in the 1950s, but it was more than 50 years later that the global Framework Convention of Tobacco Control was developed, accepted, and ratified by WHO member states. The price of this delay was high—costing the lives of 100 million people.<sup>20</sup>
- A lesson from tobacco control is the importance of protecting policy development from vested interest. The use of junk science and strategies to delay regulations and legislation has hampered national and global governance on climate change.<sup>21</sup>
- There is an obvious parallel here between the determination to prevent, handle, and treat covid-19 in the short term and the lack of commitment to decrease environmental and climate degradation and change, which is introducing more severe, major risks in the medium to long term.

to earlier levels of emission growth in developed economies, and an increase in fossil fuel carbon intensity.<sup>25</sup> The global community should learn from this and design covid-19 recovery plans that protect vulnerable groups, mitigate climate change, focus on meeting temperature targets set in the Paris agreement, reduce air pollution, increase the resilience of health systems, and strengthen opportunities for green development.<sup>26</sup>

With regard to climate change, solid evidence is available to guide a planned social change with “green” innovations and use of green technology as part of economic recovery. An immediate increase in transport and travel can be expected after the pandemic, but this needs to be based on energy sources that do not contribute to accelerated climate change. This will not happen without better public policy. Global subsidies for fossil fuel consumption increased in 2016-18 by 50%,<sup>27</sup> wasting taxpayers' money and driving up air pollution and carbon emissions. A substantial change can be achieved by governments switching subsidies to support the consumption and development of green energy and technology.

During the covid-19 pandemic researchers from many disciplines quickly joined forces to build knowledge and

find solutions. Scientific journals from a wide range of disciplines have given high priority to publishing articles related to covid-19. A similar combination of forces will be important to deal with future global challenges.

**Critical global health leadership and action at all levels**

Global health challenges require global leadership in which nations exchange information and strengthen cooperation. The covid-19 pandemic has once again shown the importance and need for global governance in meeting health challenges.

WHO has had a vital role in the covid-19 pandemic. The organisation also had an important role in the eradication of wild polio from the African continent in 2020, which is one of the largest public health successes since the eradication of smallpox. WHO now needs the support of member states to strengthen its ability to deal with future pandemics and health crises, giving it a broader mandate in collaboration with other UN environmental and development agencies. WHO's leadership in counteracting the environmental and climate crises is essential because, like covid-19, it requires short and long term policies, monitoring systems, and coordinated responses from national governments, the business sector, and the society at large.

The International Monetary Fund (IMF) has also had a key role during the pandemic, supporting financial order in member countries. Raising funds has not been the problem. Governments around the world in a few months deployed around \$10tn to respond to the pandemic.<sup>28</sup> They now have to invest continued funding wisely, putting green solutions at the forefront. The World Bank will also be important in supporting post-pandemic economic development and social progress in low and middle income countries. International solidarity, global collaboration, and global governance through our UN, development, non-governmental, and other organisations will be essential. Weak international partnerships reduce confidence and trust, resulting in fewer solutions and making it unlikely that the sustainable development goals will be achieved.

Climate change will affect the ability of health systems to function effectively, particularly when climate extremes are combined with existing and emerging health challenges, including outbreaks of infectious disease. Covid-19 has

highlighted weaknesses in health systems and put a spotlight on inequities that have long persisted but received insufficient attention. Without prompt and effective climate change action, taking vulnerabilities and inequities into consideration, the problems are projected to worsen considerably.<sup>8 10</sup>

Throughout the pandemic, national decision makers have proved willing to make decisions with far reaching consequences. We now have to make use of this crisis and implement actions to protect people and the planet. The commitments for sustainable development are a responsibility for decision makers at all levels. Action now will improve the health of current and future generations.

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# Covid-19 pandemic and the social determinants of health

**Lauren Paremoer and colleagues** call for action to create a fairer and more sustainable post-covid world

**T**he covid-19 pandemic has exposed the longstanding structural drivers of health inequities, such as precarious and adverse working conditions, growing economic disparities, and anti-democratic political processes and institutions. These important determinants of health have interlinked with class, ethnicity, gender, education level, and other factors during covid-19 to exacerbate existing social vulnerabilities in society.

Numerous warnings of the dangers of inequity have emerged over the past decades. The Alma Ata declaration convincingly argued that “health for all” could be achieved only through a New International Economic Order and people’s participation in decisions affecting their community’s health.<sup>1</sup> These principles were affirmed in the report of the Commission on the Social Determinants of Health<sup>2</sup> and the 2008 *World Health Report*.<sup>3</sup> The commission proposed “tackling the inequitable distribution of power, money, and resources” that drive systematic inequalities in health outcomes, and improving daily living conditions especially

for those in vulnerable circumstances.<sup>2</sup> Historically, the social determinants of health agenda has been influential in highlighting and reducing inequities,<sup>4,5</sup> and in relation to covid-19, academics and activists have called for a social determinants of health approach.<sup>6,7</sup>

From a social determinants of health perspective, global economic trends create enduring health hazards. These trends include the ballooning debt burden of low and middle income countries (LMICs), interpretations of the Trade-Related Intellectual Property Rights (TRIPs) agreement that undermine equitable access to medical technologies, and the pressure from the International Monetary Fund (IMF) on borrowers to implement austerity policies. These processes entrench the commercialisation of healthcare and constrain implementation of policies to reduce inequalities between and within countries. Additionally, the marginalisation of certain groups because of ethnicity, race, caste, migrant status, gender, class, or nature and conditions of work, for example, continues to undermine health.

Understanding what a post-covid world could look like necessitates an examination of key structural determinants that have contributed to the disproportionate effects of the covid-19 pandemic on marginalised and other groups, beyond the proximate drivers of the current crisis. Interventions to tackle systematically reproduced conditions of vulnerability would contribute towards a fairer and more sustainable world.

## **Precarious work and adverse working conditions**

The covid-19 pandemic has highlighted that precarious work and exploitative and adverse working conditions intersect with multiple factors, including ethnicity, migrant status, class, and gender, to influence which population groups are most exposed to covid-19 infection. People in precarious forms of work have limited access to sick leave and healthcare services and their often low wages mean they

cannot afford sufficient quality food, water and sanitation, and housing. They may also be hesitant to quarantine when they have covid-19 because they cannot afford to lose income and are unable to work from home. For example, major covid-19 outbreaks have occurred among meat workers globally.<sup>8</sup> Working conditions in slaughterhouses are hazardous to health even without a pandemic,<sup>9</sup> and covid-19 intensifies existing health risks. The physical configuration of slaughterhouses and communal housing and transport make social distancing near impossible.<sup>8</sup> Some workers’ immigration status makes them reluctant to join unions or challenge exploitative practices.<sup>10,11</sup>

In the US, people of colour make up 60% of warehouse and delivery workers and 74% of cleaning services workers.<sup>12</sup> Partly as a result of this, ethnic minorities have been over-represented among covid-19 cases and deaths.<sup>13</sup> A similar pattern has been seen in the UK, where the death rate from covid-19 is twice as high in black communities as in white communities.<sup>14</sup> The more severe effect of covid-19 among people in precarious work is starkly illustrated in India, where lockdown caused migrant workers to lose their income and forced their return to home villages. One estimate suggests at least 971 deaths occurred among migrant workers and their families because of starvation, financial distress, injury, suicide, police brutality, and lack of access to medical care.<sup>15</sup>

Globally, women constitute 70% of those employed in health and social work. They are often engaged in lower status and poorly paid frontline worker positions and are at a greater risk of covid-19 because of their working conditions, especially in LMICs.<sup>16</sup> For example, community health workers have undertaken covid-19 surveillance, contact tracing, and monitoring quarantine and isolation, along with their regular tasks.<sup>17-19</sup> Their work subsidises the public health system<sup>16</sup> yet they are paid irregularly and inadequately, and often do not have adequate personal protective equipment.<sup>17-19</sup>

## **KEY MESSAGES**

- The covid-19 pandemic has affected groups that face discrimination and historical injustices hardest
- Poor and exploitative working and living conditions have increased health risks and enabled inequitable distribution of income
- Support systems that should have been geared to respond to this crisis proved inadequate
- Many (mainly authoritarian) governments have used the pandemic to further undermine civil and human rights and promote extractivism
- A post-covid world must ensure equity, social justice, solidarity, and a shift in the balance of power and resources to people living in poverty and otherwise marginalised

Nearly 40% of employed women worldwide work in sectors that were hit the hardest during the pandemic, leading to a loss or reduction of their incomes.<sup>16,20</sup> These include the informal sector, arts, entertainment, and domestic services. The International Labour Organisation estimates that as of 4 June 2020, 55 million or 72.3% of domestic workers were at risk of losing their jobs, of whom 67.3% were migrant workers and therefore at higher risk.<sup>16</sup> From April 2019 to April 2020 women's employment fell by more than 16% even in Canada, Colombia, and the United States. Women are also estimated to be doing three quarters of the unpaid care work that has resulted from the closure of schools and childcare services during covid-19 and the increased care needs among older people.<sup>21</sup>

#### **Growing economic inequality and inadequate social protections**

The pandemic continues to widen income and wealth inequalities worldwide. The world's richest five billionaires enjoyed a 59% increase in their combined wealth between March and September 2020<sup>22</sup> at a time of higher global levels of unemployment, poverty, and debt.<sup>16</sup> Around 435 million women and girls will be living on less than \$1.90 (£1.40; €1.60) a day in 2021, with 47 million in poverty as a result of covid-19.<sup>20</sup> These growing economic inequalities are underpinned by weak regulatory control in financial and commercial markets, illicit financial flows, regressive taxation policies, and the increasing influence of transnational corporations in shaping national economies.

These increases in private wealth have corresponded to decreases in social wage (the goods, services, and payments that the state provides to all residents as a basic right). Combined with the commodification of food, land, seeds, and essential services, austerity policies that have reduced social protection measures have had a devastating effect on vulnerable groups and, during the pandemic, increasingly on the middle class. Social protection measures introduced during the pandemic, such as tax relief, cash transfers, unemployment benefits, and food and nutrition assistance, have mostly been inadequate as they have excluded or been inaccessible to those who need them the most, such as informal workers, migrants, young people, and displaced and indigenous populations.<sup>23</sup> An 82% increase in hunger levels is predicted as a result of the pandemic,<sup>24</sup> and the number of people facing acute food

insecurity is expected to double, especially in countries affected by conflict, climate change, and economic crisis.<sup>21</sup>

The pandemic is also being exploited to intensify extractivist approaches to economic development. For example, in India covid-19 was used as an excuse to reduce time for public consultation to push through weak environmental protection laws,<sup>25</sup> and in the US the extractive industry is exploiting the pandemic by lobbying the government to suspend fuel efficiency standards and environmental laws.<sup>26</sup>

#### **Restrictive measures and anti-democratic political processes**

Control measures to contain the pandemic have disproportionately affected women and girls. Restrictions on freedom of movement have severely disrupted sexual and reproductive health services<sup>27</sup> and could lead to an estimated seven million unintended pregnancies and thousands of deaths from unsafe abortions and complicated births globally.<sup>27</sup> Lockdowns have also led to a worldwide increase in domestic and sexual violence, especially affecting women from indigenous, migrant, or refugee backgrounds, women with disabilities, and those living in conflict settings.<sup>28</sup>

Some governments have used covid-19 to introduce anti-democratic measures such as closing down courts, increasing surveillance, and passing emergency laws that are repressive.<sup>29</sup> The UN special rapporteur on freedom of expression has raised concerns about the introduction of measures in Belarus, Cambodia, China, Iran, Egypt, India, Myanmar, and Turkey that restrict the free flow of information related to the pandemic and punish those distributing it.<sup>30</sup> Numerous governments have also introduced surveillance measures (mostly digital) to track covid-19 transmission that in future could be used to monitor other activities, including political dissent.<sup>31</sup>

While governments have used public health to justify restrictive regulations, they have not introduced regulatory measures on the private health sector that could increase access to covid-19 treatments, vaccines, medical technologies, and healthcare facilities. Such measures include price regulation, prioritisation of production of covid related treatments, and the introduction of progressive solidarity taxes. The pandemic has brought to the fore the negative consequences of fragile and commercialised or profit driven health systems, especially for vulnerable groups already experiencing inequitable

access to healthcare.<sup>32,33</sup> For example, in Australia, by the end of July 2020 there were five deaths in public care homes for older people compared with 900 deaths in privatised homes.<sup>34</sup>

#### **Building a fairer post-covid 19 world**

Covid-19 has crystallised the need to address the "toxic combination of poor social policies, unfair economics, and bad politics [that are] responsible for much of health inequity."<sup>32</sup> Countering this requires building solidarity to realise health for all. Since the Commission on Social Determinants for Health report, criticism of the unequal distribution of resources, power, and money has intensified.<sup>35</sup> We suggest six measures (box 1) to enable a more just and sustainable world following the covid-19 pandemic.

Policies and interventions to tackle vulnerability in living and employment conditions are critical. These include social protection programmes to reduce poverty and safeguard livelihoods, including for informal workers. Decent work conditions will protect paid and unpaid workers from health threats, including covid-19. Governments should institutionalise policies that value the contribution of social reproduction work, and compensate people (mostly women) for the unpaid social reproduction work they do on a daily basis. The conditions of health and social care workers can be improved with the provision of formal contracts, decent wages, and non-exploitative working conditions. More broadly, the interdependence of reproductive and productive work should be recognised through institutionalising measures such as childcare and breastfeeding facilities at workplaces, paid parental leave, occupational health facilities, and subsidised healthy meals at work.

Governments could also reverse rapidly growing inequities by implementing progressive taxation, including wealth taxes.<sup>36</sup> This would increase their ability to fund the public sector, including health and social services. Other measures include strengthening government administrative capacities to monitor and tax international financial flows.<sup>37</sup> IMF requirements for austerity measures in countries given loans for covid-19 should also be lifted as they undermine national governments' policy autonomy and may lead to a lost development decade.<sup>38</sup>

Initiatives for progressive social change should also be implemented, including affirmative action in education,

**Box 1: Measures to move towards a just and sustainable post-covid world**

- *Design and implement policies to remove vulnerability in living and employment conditions*—eg, public housing add ;? private rental controls; mandate against long term casual employment add ;? introduce progressive labour laws, universal employment guarantee programmes, universal basic income programmes, social security pensions, childcare at workplace, parental leave, and school meals
- *Implement progressive taxation and regulate illicit financial flows*—eg, national taxation policies that ensure high income earners pay most tax and making corporations pay tax in the countries they operate
- *Implement policies to address structural racism and discrimination against religious, ethnic, racial, and sexual minorities*—eg, establish national anti-discrimination organisations, workplace unconscious bias and anti-racism training; pass laws to prohibit racist attacks and discrimination; and implement affirmative action laws and policies
- *Strengthen public sector provision of healthcare and stop further healthcare privatisation and commercialisation*—eg, increase health budgets to at least 5% of GDP, finance the public health system to provide services rather than outsource, increase resources to areas and communities that are currently underserved, regulate private providers
- *Invest in human resources for health, including community health workers and those trained in public health infectious disease control*—eg, implement fair wages for all health workers, reduce use of short term contracts, train and recruit health workers from the local area to ensure retention
- *Democratise decision making about healthcare services and medical technologies at community, national, and global levels*—eg, include the community (especially those most affected) and people’s representatives in decision making structures, monitor and take action on possible conflicts of interest in health governance structures, implement laws supporting freedom of the press

employment, and political representation; laws against discrimination; and support for communities to build their capacities to organise against anti-democratic measures, inequalities, and racism.<sup>39</sup> This includes the implementation of laws and policies to ensure access to healthcare services is based on medical need rather than on ability to pay or social status and that services are tailored to recipients’ cultural, linguistic, and religious requirements.

Access to healthcare also remains hampered as the healthcare and pharmaceutical industries seek profits in a way that makes it unaffordable for many. Commercialisation is continuing under the guise of promoting universal health coverage, and in some countries, such as the UK, as a rationale for institutionalising an efficient response to covid-19.<sup>40</sup> Governments should instead work towards institutionalising and financing universal coverage through progressive taxation schemes and provide primary healthcare and services to everyone as conceptualised in the Alma Ata declaration<sup>41</sup> and by the Commission on Social Determinants of Health. Furthermore, the capacity and efficacy of the public sector as a provider of healthcare, especially to people from marginalised groups, should be strengthened, including by recruiting and training adequate numbers of health

workers and providing fair wages, social protection, and a conducive working environment.

Defending the principle that people have a right to participate in decisions about their health and in processes affecting it, including economic processes, is central to building solidarity for health for all. This means resisting global and national health governance processes that privilege organisations not subject to democratic oversight. For example, the privatisation of global health governance gives stakeholders with huge financial resources—such as philanthropic foundations, commercial consulting firms, and drug companies who are beholden to shareholders or governing boards — disproportionate power to define health priorities and solutions. Democratically elected governments are best placed to demand and support action on the social and economic determinants of health to prevent and manage future pandemics.<sup>42</sup>

The erosion of national autonomy is also echoed in international agreements such as TRIPS, which the most powerful states in the World Trade Organisation are interpreting in a manner that undermines equitable access to covid-19 medical technologies.<sup>43</sup> If global governance for health is to be meaningful, international trade agreements must promote the

public good rather than defend private interests. The pandemic also reiterates the urgent need for the binding instrument on transnational corporations and human rights that is currently being negotiated within the United Nations.

In conclusion, the covid-19 pandemic has exposed the health effects of long-standing social inequities and that vulnerability to disease is shaped by labour market structures, lack of social protection, and anti-democratic processes. The effect of these structural inequities on populations is mediated by intersecting social dimensions, including occupation, class, ethnicity, race, citizenship status, and gender. The pandemic has highlighted the unequal distribution of power and resources, and people are also using this moment to challenge these inequalities anew. Governments and the international community must take responsibility for rebuilding social protection and solidarity to protect populations from future health challenges, while civil society and social movements also have a role in holding decision makers to account.

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# Preventing the next pandemic: the power of a global viral surveillance network

**Dennis Carroll and colleagues** call for a global early warning system to detect viruses with pandemic potential

**T**he covid-19 pandemic has exposed failures to respond effectively to the emergence of a highly contagious and lethal microbial threat. Covid-19, however, is not the first pandemic this century due to an emergent pathogen and is unlikely to be the last. Over the past 20 years a number of high impact pathogens have emerged or re-emerged, such as three new coronaviruses—namely, severe acute respiratory syndrome (SARS) in 2003; Middle East respiratory syndrome (MERS) in 2012; and the current covid-19 pandemic (SARS-CoV-2). We have also seen several highly pathogenic influenza A viruses (eg, H5N1 in 2003; H7N9 in 2013; and the H1N1 pandemic in 2009), the Zika virus in 2016, and the continuing rise and spread of Ebola in West and Central Africa since 2013. All these pathogens have jumped from transmission among non-human animals to transmission among humans. During this century, the frequency of epidemics

and pandemics might continue to increase, driven mainly by demographic trends, such as urbanisation, environmental degradation, climate change, persistent social and economic inequalities, and globalised trade and travel.<sup>1-3</sup>

## Current systems are not equipped to deal with pandemics

Past epidemics with pandemic potential were mainly identified through an unusual cluster of severe cases or deaths in humans. This means of identification is weak, and is often missed by classic surveillance systems. Estimates suggest that 1.7 million viruses exist across 25 high consequence viral families, of which 500 000-700 000 are likely to be zoonotic. Few viruses are likely to have the ability to infect humans and even fewer the ability to spread.<sup>4</sup> Even if the likelihood of spreading is low, the impact, as illustrated by the covid-19 pandemic, might be disastrous and justifies investment in systems that can prevent such events.

Attempts to strengthen global health security over the past decade have been welcomed, but existing capacities, processes, and institutional arrangements, such as the International Health Regulations<sup>5</sup> and the Global Health Security Agenda,<sup>6</sup> have been insufficient to prevent events such as those caused by SARS-CoV-2. The experience of the covid-19 pandemic underlines the need to create global strategies, policies, and regulatory frameworks that deal directly with the multisectoral aspects of disease emergence and improve our collective ability to prevent, rapidly detect, and respond to, threats.

In addition to strengthening existing health systems, key to these efforts is building a surveillance system that spans wildlife, livestock, and human populations.<sup>7-9</sup> Such a system would use known geographical “hot spots”<sup>10 11</sup> for early detection of any viral transfer into human and livestock populations, and pre-emptively disrupt further transmission of the virus locally.<sup>12</sup> Pre-emptive action

would contribute to an enhanced ability to forecast future threats and enable early intervention.

## Examples of global syndromic and viral surveillance systems

Much can be learnt from ongoing surveillance systems.<sup>13</sup> For example, the global early warning and response system is a formalised monitoring and reporting platform for outbreaks of disease, established in 2006 by the World Health Organization, the Food and Agriculture Organization (FAO), and the World Organization for Animal Health (OIE).<sup>14</sup> This early warning system aims to combine the strengths of three organisations to enhance a public and animal health early warning system intended to reduce the incidence and effects of emerging infectious diseases in animals and humans. Partners from all over the world working in the animal and public health sectors share real time information on disease outbreaks; conduct rapid cross-sectoral risk assessments; and support the forecasting, prevention, and control of emerging diseases.

In addition, for over 50 years, WHO’s global influenza surveillance and response system has been monitoring the evolution of influenza viruses to inform the development of the annual influenza vaccine, and to serve as a global alert mechanism for the emergence of influenza viruses with pandemic potential.<sup>15</sup> This system with its national, regional, and global partners identifies and analyses influenza strains isolated from clinical specimens and conducts detailed characterisation of unusual virus isolates. This information and the web based data reporting and mapping system FluNet<sup>16</sup> provide information on circulating seasonal influenza viruses. FluNet is further supported by WHO FluID, a global platform for data sharing that integrates regional influenza epidemiological data into a global database.<sup>17</sup>

The 2009 H1N1 pandemic showed that real time monitoring for viruses without information on the severity and impact of

### KEY MESSAGES

- Covid-19 has exposed considerable weaknesses in the ability of global health systems to detect early, and respond effectively to, emergent pathogens
- An early warning system that detects new viral spillover well before it becomes a local outbreak is needed
- A global, risk based, multisectoral viral surveillance network would focus on detecting new “high consequence” viruses in humans and animals in hot-spots for emerging risks
- For sustainability of an early warning system, strong political commitment, a sound governance structure, and long term financing will have to be assured
- The opportunity exists to leverage political and financial support to establish and implement a global early warning surveillance network to detect emerging threats

the disease was inadequate for mitigating the effects on health of an epidemic. Therefore, from 2009, most influenza surveillance systems around the world started to include standardised case definitions for influenza-like illnesses and severe acute respiratory influenza, and real time modelling. Similarly, OFFLU, the name of the OIE/FAO network of expertise on animal influenza, was established in 2005 to collaborate with the existing WHO influenza network.<sup>18</sup> OFFLU promotes the collection, exchange, and characterisation of animal influenza viruses within the network and the sharing of such information more widely.

These collaborations are important examples of current surveillance operations, but nearly all are event based, syndromic in nature, or focused on a single pathogen. For example, the scope of the global early warning and response system concentrates on early detection of disease outbreaks and does not monitor the detection of emerging pathogens in animals and humans. The global influenza surveillance and response system and OFFLU are excellent examples of robust, multisectoral global viral surveillance systems, but they focus mainly on influenzas. In these systems, pathogens are predominantly detected and isolated from outbreaks. Apart from the West Nile virus and other arbovirus surveillance activities,<sup>19</sup> no formal system is in place in any country that routinely conducts active viral surveillance in humans and domestic animals combined with rapid clinical assessment for a list of priority emerging and re-emerging viral diseases.<sup>20</sup>

#### **The time for building a sustained, multisectoral global viral surveillance network is now**

The magnitude of the health and socioeconomic effects of the covid-19 crisis reinforces the need to establish a formal global surveillance network specifically to prevent pandemics. Such a network would conduct viral surveillance for the early detection of spillover from wildlife to livestock and humans well before development into localised outbreaks, and thus pre-empt high consequence epidemics and pandemics. Although such a formal network has never been set up, it would not necessarily constitute an entirely new undertaking. Rather, it would build on existing multisectoral surveillance operations, leveraging the systems and capacities that are already operational. These operations would be aligned through the adoption of standard-

ised protocols and a commitment to data sharing to inform a global database.

The network's focus on strategic sampling in wild animals, humans, and their livestock in predefined hotspot regions<sup>10 11</sup> would preclude the need to conduct viral surveillance worldwide. In practice, the latest diagnostic technologies would be required to detect early spillover in real time and to test samples for many viruses from priority pandemic viral families, and other new viruses originating from wild animals. In parallel, a globally agreed protocol and decision support tool would be needed to ensure the elimination of new viruses from infected humans and animals as soon as they were discovered. Technically, such an approach is feasible with rapidly evolving multiplex diagnostic methods and affordable next generation DNA sequencing technologies that enable a generic approach to virus identification, without a priori knowledge of the targeted pathogens, delivering a species/strain-specific result.<sup>21</sup>

A global viral surveillance network would become more efficient in detecting early viral spreading into humans as new genetic data of zoonotic viruses in wild animals from viral discovery projects, such as the Global Virome Project,<sup>4</sup> and associated metadata, are deposited in global databases. These data could also contribute to improved diagnostic reagents and their use through new, and more widely available, cost effective pathogen detection and sequencing devices. The targeting of proposed viral surveillance would also be enhanced with the refinement of current hotspots. These analytics, combined with bioinformatic tools, artificial intelligence, and big data, would help to prevent pandemics by progressively strengthening the capacity of a global surveillance system to improve infection and transmission dynamic models and forecast.

Establishing such a network for longitudinal surveillance has considerable challenges, particularly in under-resourced, hotspot regions, where basic health and laboratory capacities are weak. Technical and logistical challenges exist in designing sampling frames for viral surveillance, establishing mechanisms for information sharing about rare spillover events, training a skilled workforce, and ensuring infrastructural support across public and animal health sectors for the collection of biological samples, transportation, and laboratory testing. A regulatory and legislative framework would be necessary to deal with the

challenges of handling, standardisation, analysis, and sharing of large volumes of multidimensional data.

A formal surveillance network would also require its own governance mechanism and membership of public and private sector organisations, similar to the *Global Alliance for Vaccines and Immunisation*. It should also be fully aligned with existing United Nations structures, such as the FAO/OIE/WHO.<sup>22</sup> To ensure long term sustainability of the network, innovative financing strategies, such as a combination of endowment, grants, and contributions from financing institutions, member countries, and the private sector, will be needed. These investments should also be linked to incentives, especially for the global south, including technology transfer, capacity development, and the equitable sharing of information about new viruses detected through the global surveillance programme.<sup>23 24</sup>

The approach we describe is fundamentally different in scope and scale from syndromic, passive, or single pathogen surveillance from disease outbreaks, requiring the collaboration of multiple sectors and a strong political commitment from most countries in the global north and south. Although an integrated surveillance system is critical, ultimately, a multipronged, multisectoral approach will be necessary to prevent zoonotic transmission. Efforts must focus on dealing with the root causes of spread, reducing risky practices, improving livestock production systems, and enhancing biosecurity along the animal food chain.<sup>25</sup> At the same time the development of innovative diagnostics, vaccines<sup>26</sup> and therapeutic agents must continue.

The world is now well aware of the devastating health and socioeconomic impacts of the covid-19 pandemic. We have an opportunity to leverage political and financial support to establish and implement a global early warning surveillance network to deal with emerging threats in a sustainable way.<sup>23 24</sup> Coordination among international agencies, relevant national and regional partners across sectors, and financing institutions will be essential for the progress of such an important global initiative.

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