Lancet COVID-19 Commission Statement on the occasion of the 75th session of the UN General Assembly

The Lancet COVID-19 Commissioners, Task Force Chairs, and Commission Secretariat

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Executive summary

The *Lancet* COVID-19 Commission was launched on July 9, 2020, to assist governments, civil society, and UN institutions in responding effectively to the COVID-19 pandemic. The Commission aims to offer practical solutions to the four main global challenges posed by the pandemic: suppressing the pandemic by means of pharmaceutical and non-pharmaceutical interventions; overcoming humanitarian emergencies, including poverty, hunger, and mental distress, caused by the pandemic; restructuring public and private finances in the wake of the pandemic; and rebuilding the world economy in an inclusive, resilient, and sustainable way that is aligned with the Sustainable Development Goals (SDGs) and the Paris Climate Agreement. Many creative solutions are already being implemented, and a key aim of the Commission is to accelerate their adoption worldwide.

The origins of COVID-19 and averting zoonotic pandemics

The COVID-19 pandemic is the latest—but certainly not the last—emerging infectious disease, preceded by HIV/AIDS, Nipah, severe acute respiratory syndrome coronavirus, H1N1 influenza, Middle East respiratory syndrome coronavirus, Zika, Ebola, and others. These diseases are zoonoses, resulting from pathogens being transmitted from animals to humans. To protect against zoonoses, we require new precautions, such as ending deforestation and protecting conservation areas and endangered species. The origins of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are yet to be definitively determined, but evidence to date supports the view that SARS-CoV-2 is a naturally occurring virus rather than the result of laboratory creation and release. Research into the origins of SARS-CoV-2 should proceed expeditiously, scientifically, and objectively, unhindered by geopolitical agendas and misinformation.

The urgency of suppressing the pandemic

The COVID-19 epidemic can and should be suppressed through non-pharmaceutical interventions, including effective community health services, that cut transmission of the virus, to be followed by the introduction of effective and safe vaccines as rapidly as science permits. Countries should not rely on herd immunity by natural infection to suppress the epidemic. The disease and death that would accompany natural infection rates to reach herd immunity, typically estimated as 40–60% of the population infected, would be unacceptably high. Uncertainty also remains about the duration of acquired immunity from past infections.

The great divide in the outcomes of the epidemic has been the relative success of the Asia–Pacific region compared with western Europe and the Americas. The Asia–Pacific region has largely suppressed transmission and mortality (less than 10 deaths per million). Western Europe and the Americas have had very high transmission and mortality (several hundred deaths per million in several countries). Many low-income countries have suppressed the epidemic, such as Cambodia, Lao People's Democratic Republic, and Viet Nam.

To implement non-pharmaceutical interventions, we urge countries to scale up with all urgency their public health workforces, including epidemiologists, public health technicians, nurses, testers, contact tracers, and community health workers. Community health workers can contribute to controlling community spread and protecting vulnerable people in the community, particularly through testing, education on prevention and treatment, and education on the mental health effects of social isolation.

The vexing question of whether to close schools is perhaps the single most challenging non-pharmaceutical intervention. Schools can safely reopen when community transmission is low and school facilities and staff have been appropriately prepared. When it is not safe to open schools, countries and localities should aim to implement online education accessible to all students.

Health professionalism

One reason for failure to suppress the epidemic is a style of political leadership that has been called medical populism; Lasco has described political leaders as "simplifying the pandemic by downplaying its impacts or touting easy solutions or treatments, spectacularizing their responses to crisis, forging divisions between the 'people' and dangerous 'others', and making medical knowledge claims to support the above". Lasco makes three cases in point: the US President, Donald Trump, the Philippine President, Rodrigo Duterte, and the Brazilian President, Jair Bolsonaro.

We call on governments to prioritise advice from the professional public health community, working in cooperation with international agencies and learning from the best practices of other nations. All countries should combat decisions based on rumour-mongering and misinformation. Leaders should desist from expressing personal viewpoints that are at odds with science.

Addressing the inequities of the epidemic

The COVID-19 pandemic is bringing to light and exacerbating pre-existing social, economic, and political inequalities, including inequalities of wealth, health, wellbeing, social protection, and access to basic needs including food, health care, and schooling. The pandemic is bringing about a sharp increase in income inequality and jobs crises for low-paid workers. Health inequalities also pose major issues in this pandemic; as of December, 2017, half of the world's population did not have access to essential health services. Vulnerable populations (including the poor, older people, people with previous health conditions, people who are incarcerated, refugees, and Indigenous peoples) are bearing a disproportionate burden of the pandemic.

The abrupt shift to an online economy came in the context of a deep, pre-existing digital divide in high-quality digital access. We call on all relevant UN agencies to take concrete steps with the digital industry and governments to accelerate universal access to digital services, including public–private financing to extend connectivity to hard-to-reach populations.

Among the most urgent challenges of the COVID-19 pandemic are hunger and food insecurity for poor and vulnerable populations. The pandemic also poses great concerns for mental health, especially for lower-income populations, and there is high inequality in the provision of services for mental health, especially in lower-income and middle-income countries. The gender dimensions of COVID-19 must also be prioritised, in recognition of the documented increase in unplanned pregnancies for teenage and young women, and the increase in gender-based violence.

Data needs

The UN Statistical Commission, working with partner UN institutions and with national statistical agencies, should prepare near-real-time data on highly vulnerable populations and their conditions, with a special focus on infection and death rates, poverty, joblessness, mental health, violence, hunger, forced labour, and other forms of extreme deprivation and abuses of human rights. Urgent surveying should be undertaken to identify humanitarian needs and hunger hotspots, especially among the poor, older people, people living with disabilities, Indigenous peoples, women who are vulnerable, young children, refugees, people who are incarcerated, people working in high-risk jobs (eg, meatpacking plants or guest workers), and other minority populations (including ethnic, racial, and religious minorities).

Meeting the urgent fiscal needs of the developing countries

One of the characteristics of the global crisis is the sharp drop in public revenues at all government levels. The situation for developing countries will become increasingly dire as many countries find themselves facing rising social needs without the means to finance social services. Moreover, many developing countries currently do not have the kinds of social protection programmes that are most urgently needed at this juncture, such as unemployment insurance, income support, and nutrition support.

Some developing countries will require considerable international concessional financing (ie, grants and low-interest, long-term loans) from the international financing institutions, notably the International Monetary Fund, the World Bank, and the multilateral and regional development banks, as well as the orderly restructuring of their sovereign debts to both public and private creditors. Now, more than ever, is the time for countries to meet their commitments to providing 0·7% of gross domestic product as official development aid. Special efforts must be made to fight corruption, to ensure that new aid flows reach the intended beneficiaries.

Global justice in access to safe and effective vaccines, therapeutics, diagnostics, and equipment

The pharmaceutical industry and academic community, supported by governments, have undertaken a remarkable effort to develop new approaches for the suppression of the pandemic, including vaccines, therapeutics, rapid diagnostics, and treatment regimens. The introduction of new vaccines and therapeutics should follow rigorous testing and evaluation through all clinical phases and must not be subject to dangerous political interference.

In the early phases of the COVID-19 pandemic, there have already been breakdowns in the global health governance of vaccine development, even leading to the new term vaccine nationalism. Any new vaccine or therapeutic must be developed and implemented with a view to equitable access across and within countries. No population should be prohibited from accessing a vaccine because of cost or have its access predicated on its participation in clinical trials. We strongly support the multilateral initiative Access to COVID-19 Tools Accelerator to promote the universal, equitable access to COVID-19 vaccines, therapeutics, and other tools, and within that initiative, COVAX Facility, the vaccine pillar. Complementary approaches in support of this multilateral initiative would help to strengthen equitable access across and within countries.

Promoting a jobs-based green recovery

Economic recovery plans should support the transition towards sustainable and inclusive societies based on the SDGs and the Paris Climate Agreement. Public investment should be oriented towards sustainable industries and the digital economy, and should spur complementary private investments. Preventing a wave of bankruptcies among small and medium-sized businesses with viable prospects is an important priority. A major goal of the recovery should be an unprecedented commitment to

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reskilling and upskilling people, including the skills to prepare workers for the digital economy.

The EU Green Deal, long-term budget (2021–27), and new recovery fund marks an exemplary framework for long-term recovery, including mid-century goals on climate safety, energy transition, and circular economy, with a comprehensive €1·8 trillion budget. This approach can serve as an exemplar for other regions. In general, recoveries should be smart (based on digital technologies), inclusive (targeting lower-income households), and sustainable (featuring investments in clean energy and reduced pollution).

Multilateralism and the UN system

Global recovery will be greatly facilitated by cooperation at the regional and international level, both in controlling the epidemic and in adopting new green recovery programmes. We strongly urge the United States, EU, China, Russia, India, Mercosur, the African Union, the Association of Southeast Asian Nations, the Community of Latin American and Caribbean States, the Caribbean Community, and other nations and regional groupings to put aside rivalries and beggar-thy-neighbour policies (such as trade and financial sanctions) in favour of coordinated regional responses. Trade and financial sanctions, or other isolationist policies, and talk of a new cold war between the United States and China, are dangerous for global recovery and peace.

The COVID-19 pandemic hit during the 75th anniversary year of the UN. The indispensable role of the UN has been evident throughout the course of the pandemic to date, especially for the world's most vulnerable populations, and yet the UN system is also under attack and international law has been undermined. We strongly support the UN and call on all nations to honour the UN Charter and the Universal Declaration of Human Rights, and to contribute to the efficacy of the UN multilateral system, including through crucial financing of UN institutions. We call on the United States to reverse its decisions to withdraw from the WHO, the Paris Climate Agreement, the UN Educational, Scientific and Cultural Organisation, and the UN Human Rights Council.

We strongly support the unique role of the International Monetary Fund, the World Bank, and multilateral development banks in providing urgent financing and technical assistance for emerging and developing economies. We call on their shareholders to consider scaling up the already unprecedented efforts at securing larger financing for these countries through an increased allocation or more efficient use of special drawing rights, or through debt restructuring when needed. We also urge the more affluent shareholder countries to provide additional concessional resources.

We strongly support the indispensable role of the WHO in controlling the COVID-19 pandemic, and call on all nations to increase, rather than decrease, their funding support and political backing for the work of the WHO at this fraught time. In this regard, we also support the call for an independent analysis of the WHO response, to strengthen the institution and its central, unique role in global public health.

Future work of The *Lancet* COVID-19 Commission

The *Lancet* COVID-19 Commission will monitor the global progress in suppressing the pandemic and making an inclusive and sustainable recovery with a new set of metrics that it will regularly publish. The Commission Task Forces will consider in detail many of the complex issues already raised, including the best ways to promote decent jobs and sustainable development. The ten priority actions of the Commission are summarised in panel 1. The next scheduled Statement of the Commission will be in early 2021.

Introduction

The *Lancet* COVID-19 Commission was launched on July 9, 2020, to assist governments, civil society, and the UN institutions in responding effectively to the COVID-19 pandemic.[1] The Commission aims to offer practical solutions to the four main global challenges posed by the pandemic: suppressing the pandemic by means of pharmaceutical and non-pharmaceutical interventions; overcoming humanitarian emergencies

Panel 1: **Ten priority actions**

1. Origins: track down the origins of the virus in an open, scientific, and unbiased way not influenced by geopolitical agendas
2. Non-pharmaceutical interventions: suppress the epidemic through the proven package of non-pharmaceutical interventions, as accomplished by several countries including several in the Asia–Pacific region
3. Science-based policy making: base policy making on objective scientific evidence and stop politicians and others in positions of power from subverting clinical trials and other scientific protocols
4. Timely and consistent data: collect and publish timely and internationally consistent data on the state of the pandemic, including humanitarian and economic consequences
5. Justice in access to tools to fight COVID-19: ensure universal access to the tools to fight COVID-19, including test kits, therapeutics, and prospective vaccines
6. Emergency financing: secure access of developing countries to financing from international sources, especially from the International Monetary Fund and World Bank
7. Protect vulnerable groups: direct urgent protection towards vulnerable groups, including older people, people in poverty and hunger, women who are vulnerable, children, people with chronic diseases and disabilities, the homeless, migrants, refugees, Indigenous Peoples, and ethnic and racial minorities
8. Long-term financial reform: prepare for a deep restructuring of global finances, including debt relief, new forms of international financing, and reform of monetary arrangements
9. Green and resilient recovery: economic recovery will be based on public-investment-led growth in green, digital, and inclusive technologies, based on the Sustainable Development Goals
10. Global peace and cooperation: support UN institutions and the UN Charter, resisting any attempts at a new cold war

caused by the pandemic, including poverty, hunger, and mental distress; restructuring public and private finances in the wake of the pandemic; and rebuilding the world economy in an inclusive, resilient, and sustainable way that is aligned with the Sustainable Development Goals (SDGs) and the Paris Climate Agreement.[2,3] Many creative solutions are already being implemented, and a key aim of the Commission is to accelerate their adoption worldwide. A glossary of key terms for this Commission Statement can be found in the appendix (pp 1–8).

See Online for appendix

This initial Statement of the Commission marks the occasion of the opening of the 75th Session of the UN General Assembly on Sept 15, 2020.

Section 1: the origins of COVID-19 and averting zoonotic pandemics

1. The COVID-19 pandemic is the latest—but certainly not the last—emerging infectious disease, preceded by HIV/AIDS, Nipah, severe acute respiratory syndrome coronavirus, H1N1 influenza, Middle East respiratory syndrome coronavirus, Zika, Ebola, and others. These diseases are zoonoses, resulting from the transmission of pathogens from animal populations to humans.[4] Such diseases also result from the recombination of the pathogen's genetic materials within animal populations, as in the case of H1N1 and probably severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). These zoonotic events are becoming more frequent, probably because of the rising intensity of contact between humans and animal reservoirs, as the result of deforestation,[5] land degradation, poverty, food insecurity, and the uncontrolled encroachment of humans into new habitats.

2. To protect humanity from these zoonotic diseases, we need to put more emphasis on the One Health approach.[6] We require new precautions on many fronts: ending deforestation, respecting and protecting conservation areas and endangered species, intensifying the monitoring and surveillance for zoonotic events, and ensuring safe practices in the animal trade,[7] meat production, and markets.

3. The origins of SARS-CoV-2, the virus that causes the COVID-19 disease, are yet to be definitively determined, but the evidence to date supports the view that SARS-CoV-2 is a naturally occurring virus rather than the result of laboratory creation and release.[8] The possibility of laboratory involvement in the origins of the pandemic should be examined with scientific rigour and thoroughness, and with open scientific collaboration. It is extremely important that the research into the origins of SARS-CoV-2 should proceed expeditiously, and in a scientific and objective way that is unhindered by geopolitical agendas and misinformation. The origins of the virus must be understood, both to help end the current pandemic and to prevent the next one.[9] Baseless and uninformed allegations and conspiracy theories that are unbacked by evidence are detrimental to this cause.

Section 2: the urgency of suppressing the pandemic

4. The COVID-19 pandemic can be suppressed through non-pharmaceutical interventions (NPIs) that reduce the transmission of the virus, which should be followed by the introduction of effective and safe vaccines as rapidly as scientific advances permit. The core strategy of the world community should be to introduce a comprehensive set of NPIs in every country, provide urgent financial and humanitarian support during the pandemic, hasten the introduction of one or more effective vaccines on a globally equitable basis, and build back better, both in terms of pandemic preparedness and more generally in terms of sustainable development. Countries should prioritise prevention through NPIs and vaccines as soon as they are available, because the prevention of illness is always vastly less expensive and burdensome than treatment.

5. As of Aug 30, 2020, there had been more than 850 000 deaths and 25 000 000 confirmed infections due to COVID-19.[10] The actual numbers of deaths and infections are likely to be far higher; despite some progress, testing is still relatively low in most countries, and actual case numbers are likely to be substantially underestimated. In many countries and regions with the requisite data, excess deaths during 2020 compared with earlier years are far higher than are confirmed COVID-19 deaths.[11] Moreover, serological (ie, antibody) tests that show past exposure to the virus indicate that the actual number of infections has been many times higher than the infections confirmed by testing by polymerase chain reaction.

6. The burden of disease is far higher than deaths alone, as COVID-19 is increasingly understood to cause a number of chronic ailments and disabilities (eg, cardiovascular, neurological, pulmonary, and psychiatric illnesses).[12,13] In addition, the pandemic has unleashed a secondary crisis by disrupting the supply and demand for health services. Experts project an additional 1·4 million tuberculosis deaths during 2020–25,[14] up to 673 000 HIV deaths in Africa in 2020,[15] the possibility of an additional 1·2 million deaths of children younger than 5 years,[16] an additional 56 700 maternal deaths in a 6-month period,[16] and 80 million children at risk of vaccine preventable diseases because of disruptions caused by the pandemic.[17] Further, a WHO survey[18] of 155 countries on the effect of COVID-19 on the prevention and treatment of non-communicable diseases showed that health services have been disrupted, particularly for hypertension, diabetes, cancer, and cardiovascular emergencies.

7. In addition to addressing the SARS-CoV-2 virus itself, countries must respond to the mental health consequences of the pandemic, which are considerable and expected to persist. Rates of anxiety and depression are rising, and in the United States there is evidence of high levels of psychological distress and loneliness.[19]

Recent surveys, including in Belgium,[20] France,[21] and the United States,[22] reveal elevated levels and symptoms of depression and anxiety, along with substance abuse and suicidal ideation. Furthermore, COVID-19 appears to cause depression and cognitive disturbances (sometimes referred to as "brain fog") of unknown duration.[23]

8. The economic effects of this pandemic are unprecedented. 90% of countries are in recession in 2020, possibly exceeding the economic downturn during the Great Depression in the 1930s. The decline in work hours in the second quarter of 2020 was equivalent to 300 million full-time workers.[24] Remittance income, crucial to many low-income countries in Africa (eg, Ghana, Kenya, Nigeria, South Sudan), Central and South America (eg, El Salvador, Guatemala), and Asia (eg, Philippines), is expected to plummet by 20%.[25] Hunger is rising, with dire forecasts that at least an additional 83 million people—and up to 132 million people—might experience extreme hunger in 2020.[26] COVID-19 could push at least 71 million people into extreme poverty (ie, living on less than US$1·90 a day), assuming no change in in-country inequality.[27,28] Additionally, a 1% increase in the Gini coefficient of each country would translate into an extra 19 million people falling into extreme poverty.[29]

9. Uncontrolled epidemics come to an end when a sufficiently high proportion of the population has become infected, assuming that a bout of infection confers acquired immunity against a subsequent infection. At that threshold, known as herd immunity, new infections no longer set off a chain reaction. For COVID-19, most studies have put the threshold to reach herd immunity at 40–60% of the population.[30] If the acquired immunity from a past infection is lost over time, in months or years, herd immunity would also be time-limited.

10. Countries should not rely on the development of herd immunity to suppress the epidemic. The amount of disease and death that would accompany infection of 40–60% of the population would be unacceptably high, as would be the strain on health systems. With 7·8 billion people in the world, herd immunity would imply 3–5 billion people becoming infected, with many millions dead. Even if one country were to reach herd immunity, the pandemic would still be spreading elsewhere, thereby disrupting trade, travel, and supply chains of all countries.

11. With 25 million confirmed infections globally (as of Aug 30, 2020), confirmed cases to date are just 0·3% of the world population, far below herd immunity. Even if confirmed cases would constitute just a tenth of the actual infections (assuming that a high proportion of infections have not been tested), the global infection rate would be 3% of the world population. Seroprevalence studies that estimate the proportion of people infected by screening the population for antibodies confirm that rates of infection to date are rarely close to the herd immunity threshold, even in hard-hit countries such as Spain, where seroprevalence in early May was determined to be around 5%.[31]

12. The infection fatality rate (IFR) of COVID-19 is the proportion of infections that result in death from COVID-19. The IFR is different from the case fatality rate (CFR), which is the proportion of confirmed (ie, tested) cases that result in death. The CFR is much higher than the IFR, because the IFR includes in the denominator all infections, including mild and asymptomatic infections that are never tested and do not cause death. The CFR is observed in practice and the IFR is determined either by imputing the number of unconfirmed infections or through ex-post serological studies.

13. Both the IFR and CFR are specific to location because they depend on factors such as distribution of the population by age,[32] pre-existing health conditions, access to hospital facilities, and possibly other factors (eg, ambient air pollution,[33] nutrition). The IFR of COVID-19 is generally estimated to be in the range of 0·5–1·0% overall,[34] but to be very low for younger populations (about 3 deaths per 100 000 for people aged 0–19, 4 deaths per 10 000 for people aged 20–49, and 6 deaths per 1000 for people aged 50–69), and much higher for older people (5 deaths per 100 for people older than 70 years).[35] We note that reaching herd immunity at the low estimate of 40% of the world population and with IFR at its lower bound of 0·5% would still lead to a staggering 15·6 million deaths (based on a world population of 7·8 billion).

14. The high CFRs that have been measured in the United States and western Europe generally result from older populations, scarcity of intensive care units (ICUs) during peak infection rates, inadequate protection of care centres for older people, and relatively higher rates of ambient air pollution in hard-hit regions, such as northern Italy compared with southern Italy.[36]

15. Identifying the dominant modes of COVID-19 transmission is an urgent public health priority. There is growing consensus from the aerosol science and infectious disease communities that aerosol inhalation is a key contributor to COVID-19 transmission. The US Centers for Disease Control and Prevention (CDC) and WHO have widely communicated a narrowed scope of possible transmission routes, limited to large droplets expelled by coughs and sneezes, and contact with contaminated surfaces. However, this notion is based on an incorrect assumption that 5 μm particles settle out of the air within 2 m (6 ft). Basic aerosol physics shows that people shed an entire continuum of particles when they cough, sneeze, breathe, or talk. Some of these are very large particles that do settle out of the air quickly because of gravity (influencing the 2 m [6 ft] distancing rule), but the vast majority are smaller particles that stay aloft for between 30 min and several hours, and travel beyond 2 m (6 ft). Mitigating airborne transmission is especially crucial for reducing the risk of superspreader events. These events appear to occur mainly or exclusively indoors, although large outdoor events are often preceded or followed by indoor crowds at bars, pubs, and restaurants.

16. The evidence argues for a greater emphasis on building-level controls to reduce the risk of airborne transmission in indoor environments. More generally, a much better understanding of indoor environments and buildings is crucial to making decisions about when people can return to work, school, or other public spaces. Proper conditions indoors have the potential to reduce the spread of COVID-19; conversely, improper conditions, such as limited ventilation and filtration, can make indoor environments high-risk settings.

17. Suppressing the epidemic means that the number of active cases declines over time. Conceptually, the effective reproduction number, designated R, for a given population (eg, city, nation, world) signifies the average number of infections resulting from an infectious case. When R is 1, the number of active cases in the population tends to be stable: each infectious individual passes along an average of one new infection. When R is less than 1, the number of active cases in the population declines. When R is greater than 1, the number of active cases rises. On a conceptual level, suppression of the epidemic requires keeping R below 1 on a sustained basis.

18. Epidemiologists report daily estimates of R by country or subregion. These estimates are useful for assessing the direction of change of the epidemic, and yet we also note several limitations. Most importantly, R measures the change of the epidemic, not the rate of transmission, which is better measured by incidence: the number of new cases per million population per day. When R is 1, the number of active cases is unchanging from day to day, but that could be in the context of low incidence (few new infections per million per day) or high incidence (many new infections per million per day). Moreover, all estimates of R are fraught with error because they are based on confirmed (ie, tested) cases, not actual infections, which are a much larger number including asymptomatic and mild infections that are not confirmed by tests.

19. In the figure, we compare the dynamics of COVID-19 for the month of August, 2020, across 91 countries with sufficient data. We report four measurements of the pandemic. The first measurement is incidence: the number of newly confirmed cases per million population per day, averaged over the 31 days of August. The second is the mortality rate, measured as the deaths per million per day, averaged over the same period. The third indicator is the number of COVID-19 tests done in August relative to the number of new cases in August, which functions as a proxy measure for the scale of testing. Because each new confirmed case potentially has dozens of close contacts (eg, family members, workplace colleagues, shopkeepers), the number of tests per case should be in the dozens (or higher). It should be noted that the WHO testing guidelines refer to a related measure, the positivity rate (ie, the proportion of tests that come back positive), which they recommend should be less than 10%. A low number of tests indicates an inadequate scale of contact tracing. The fourth measurement is the average effective reproduction rate, which is the effective reproduction number averaged over the month, indicating whether the epidemic was rising or falling.

20. The countries in the figure are classified according to the number of new cases per day per million population, because this is the most straightforward measure of rate of transmission of the virus. We classify a country as being in suppression if there are 5 or fewer new cases per million population per day (in August), provided that the rate of testing is ample, which we define here as at least 20 tests per new case. We classify a country as having low transmission if there are 10 or fewer new cases per million population per day but the country is not in suppression. We classify a country as having moderate transmission with 10–50 new cases per million per day. High transmission is 50–100 new cases per million per day, and very high transmission is 100 or more new cases per million population per day.

21. 19 places achieved suppression in August: Taiwan, Province of China; Thailand; Viet Nam; Lao People's Democratic Republic; Cambodia; China; Myanmar; Malaysia; New Zealand; Uganda; Togo; Pakistan; Latvia; Luxembourg; Uruguay; Republic of Korea; Finland; Cuba; and Rwanda (figure). We note that ten of the 19 are in the Asia–Pacific region, the highest performing region globally. 11 countries incurred very high transmission: Bolivia; Spain; Kuwait; the United States; Argentina; Israel; Brazil; Bahrain; Colombia; Panama; and Maldives (figure). We note that six of the 11 countries are in the Americas.

22. The difference across countries in the rate of transmission of the virus is stark and remarkable, ranging from less than one new case per million population per day to several hundred new cases per million population per day. This enormous range underscores that countries with high or very high rates of transmission are failing to undertake sufficient NPIs to control the pandemic. The pandemic can be controlled, as shown clearly by the countries that have largely suppressed it.

23. As shown in the second column of the figure, countries also differ enormously according to the mortality rate, measured as new COVID-19 deaths per million population per day during August. Note that deaths per million is the product of (cases per million) × (deaths per case). Countries have high mortality rates when they have high rates of transmission of the virus (cases per million) and when they have high CFRs (deaths per case). As already noted, high CFRs result from several structural factors, including a high proportion of older people (aged ≥70 years) in the population, insufficient protection of care centres for older people from infection, a low number of ICU beds per population, poor treatment protocols and health-care coverage (eg, late diagnosis and treatment), high prevalence of pre-existing health conditions (eg, high blood pressure, pulmonary disease, diabetes), and contributing environmental factors (eg, high rates of air pollution).

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	Country	New cases per million per day (August)*	New deaths per million per day (August)*	Tests per case (August)*	ERR*
	Taiwan, Province of China	0·0	0·0	438·0	0·6
	Thailand	0·0	0·0	442·8	1·0
	Lao People's Democratic Republic	0·0	0·0	..	..
	Cambodia	0·1	0·0	..	0·3
	Viet Nam	0·1	0·0	..	0·8
	China	0·1	0·0	..	1·0
	Myanmar	0·3	0·0	937·9	0·8
	Malaysia	0·4	0·0	742·2	1·0
	New Zealand	1·2	0·0	3368·9	1·1
	Uganda	1·2	0·0	157·2	1·5
	Togo	1·8	0·0	44·8	1·1
	Pakistan	2·5	0·0	33·7	1·0
	Latvia	2·8	0·0	412·8	1·0
	Luxembourg	3·0	0·5	30·6	0·9
	Uruguay	3·2	0·1	183·1	1·1
	Republic of Korea	3·6	0·0	127·5	1·4
	Finland	3·7	0·0	473·8	1·2
	Cuba	4·0	0·0	110·9	1·4
	Rwanda	5·0	0·0	169·3	1·2
	Democratic Republic of the Congo	0·4	0·0	10·1	0·9
	Nigeria	1·7	0·0	10·2	1·1
	Côte d'Ivoire	2·5	0·0	14·0	1·0
	Hungary	5·3	0·1	108·1	1·2
	Tunisia	6·1	0·1	40·6	1·4
	Senegal	6·5	0·1	12·0	1·1
	Zimbabwe	7·2	0·3	12·4	1·2
	Estonia	7·6	0·0	115·9	1·2
	Indonesia	7·8	0·3	6·6	1·1
	Kenya	8·3	0·1	10·7	1·0
	Norway	8·5	0·1	191·8	1·3
	Japan	8·6	0·1	20·2	1·0
	Ghana	9·2	0·1	5·8	1·1
	Slovakia	9·5	0·0	53·7	1·2
	Ethiopia	9·7	0·1	14·2	1·2
	Lithuania	9·7	0·1	166·1	1·2
	Canada	10·9	0·2	115·2	1·1
	Slovenia	11·3	0·2	45·8	1·1
	Italy	11·4	0·2	66·0	1·2
	Australia	11·6	0·6	219·2	1·0
	Germany	13·0	0·1	116·9	1·2
	Belarus	13·8	0·4	66·4	1·1
	Bangladesh	14·8	0·2	4·7	1·1
	Turkey	14·9	0·3	56·1	1·1
	United Kingdom	15·5	0·2	168·1	1·1
	Denmark	17·6	0·0	307·9	1·3
	Ireland	17·6	0·1	79·3	1·4
	Greece	17·7	0·2	105·3	1·3
	Poland	18·4	0·3	31·9	1·2
	Nepal	21·4	0·2	23·5	1·3
	Iceland	21·5	0·0	80·0	1·1
	Bulgaria	21·8	1·1	30·0	0·9
	Portugal	21·9	0·3	70·6	1·2
	Austria	22·2	0·1	52·5	1·2
	Sweden	23·9	0·1	30·7	1·1
	Czech Republic	24·2	0·1	28·2	1·1
	Switzerland	25·8	0·1	33·9	1·2
	Singapore	26·7	0·0	36·1	0·9
	Islamic Republic of Iran	27·4	1·9	10·8	1·1
	Serbia	28·4	0·7	43·6	1·0
	Netherlands	30·3	0·1	38·3	1·3
	United Arab Emirates	30·7	0·1	214·8	1·0
	Morocco	33·3	0·7	19·8	1·3
	Russian Federation	34·4	0·7	53·3	1·0
	Saudi Arabia	37·3	0·9	42·2	1·0
	Ukraine	37·5	0·6	11·1	1·2
	Philippines	37·5	0·5	8·2	1·2
	Croatia	39·6	0·3	14·3	1·2
	Belgium	41·9	0·5	37·1	1·2
	Mexico	44·4	4·5	1·9	1·1
	France	45·2	0·2	46·0	1·3
	El Salvador	46·2	1·4	7·5	1·0
	India	46·5	0·7	11·8	1·2
	Paraguay	54·6	1·2	6·8	1·3
	Romania	61·6	2·1	16·0	1·2
	Kazakhstan	70·8	1·7	10·6	0·9
	South Africa	76·3	3·3	5·3	0·9
	Malta	80·9	0·2	75·8	1·3
	Iraq	88·3	1·8	5·6	1·2
	Qatar	90·2	0·3	15·6	1·0
	Chile	95·1	3·1	13·7	1·1
	Bolivia	110·7	5·7	2·1	1·1
	Spain	118·8	0·5	14·5	1·4
	Kuwait	136·0	0·6	6·1	1·0
	United States	145·0	3·0	15·8	1·0
	Argentina	158·6	3·6	2·4	1·2
	Israel	168·4	1·6	14·9	1·1
	Brazil	190·9	4·4	..	1·1
	Bahrain	198·7	0·8	24·6	1·1
	Colombia	202·1	6·1	3·3	1·2
	Panama	208·5	4·4	3·9	1·0
	Maldives	236·4	0·7	8·7	1·2

Suppression New cases per million per day ≤5; tests per case ≥20
Low New cases per million per day ≤10; not in suppression
Moderate New cases per million per day >10 to ≤50
High New cases per million per day >50 to ≤100
Very high New cases per million per day >100

Figure: **The COVID-19 pandemic in August, 2020, selected measures**
ERR=effective reproductive rate. *Data presented reflect an average for the period Aug 1–31, 2020; the complete COVID-19 dataset is a collection of the COVID-19 data maintained by Our World in Data, which is updated daily and includes data on confirmed cases, deaths, and testing, as well as other variables; data on the effective reproductive rate are from Marioli and colleagues[37] and can be accessed on the Tracking *R* platform.

24. Mortality rates vary by two orders of magnitude, from zero or near-zero deaths per million per day in the countries in suppression, to more than one death per million per day in the very high transmission countries (figure). To translate these numbers, the US death rate in August of 3·0 deaths per million per day signifies around

For **Our World in Data** see https://github.com/owid/covid-19-data/tree/master/public/data

For the **Tracking *R* platform** see http://trackingr-env.eba-9muars8y.us-east-2.elasticbeanstalk.com/

1000 deaths per day, and the Brazil death rate of 4·4 deaths per million per day signifies around 900 deaths per day.

25. The third column of the figure, reporting tests per new case, shows that most countries with high and very high transmission have very low levels of testing (with <20 tests per new case or even <10 tests per new case). This low level of testing is both cause and effect. Insufficient testing and tracing lead to high disease transmission, and high transmission overwhelms the limited capacity of testing and tracing.

26. The fourth column of the figure shows the direction of the epidemic. Even countries in suppression (ie, ≤5 cases per million per day) are vulnerable to new outbreaks, as indicated when R is greater than 1. At every level of transmission, from suppression to very high, there are some countries with transmission falling (R<1) and some with transmission rising (R>1).

27. The great divide in the outcomes of the epidemic has been the relative success of the Asia–Pacific region compared with western Europe and the Americas, with most of the rest of the world somewhere in between. The Asia–Pacific region has largely suppressed the epidemic or at least kept it to very low levels and low mortality rates (less than 10 deaths per million). Western Europe and the Americas have had very high spread of the epidemic and, in many cases, very high mortality rates (several hundred deaths per million). There are notable exceptions within each region. In western Europe, four of the five Nordic countries (all but Sweden) did relatively well in suppressing transmission and mortality rates of the virus. In the Americas, Canada outperformed the United States, and Uruguay and Paraguay outperformed their neighbouring countries.

28. We note that data limitations continue to hamper the proper measurement, and hence control, of the pandemic. All data on cases, deaths, tests, and R are fraught with errors in measurement, including under-testing and under-reporting, and different and changing definitions of COVID-19 deaths. Comparisons of testing data and serological (ie, antibody) surveys show that most cases of COVID-19, and notably cases that are asymptomatic or mild, are undermeasured and under-reported. Comparisons of reported COVID-19 deaths and excess mortality in a country during the same period compared with previous years imply that many COVID-19 deaths are not being reported as such. For all of these reasons, we emphasise the urgent need for improved and intensified data collection, more extensive testing in general, and coherence across countries in the science-based metrics of COVID-19 cases, deaths, and other epidemiological parameters (including behavioural parameters such as face mask wearing, physical distancing, contact tracing, isolation and quarantining, and other relevant data). We also note that politicians might aim to subvert transparent data reporting to suppress information on the extent of the epidemic or deaths due to COVID-19, and such efforts should be strongly resisted.

Panel 2: **Key non-pharmaceutical intervention checklist**

- Face masks
- Personal hygiene (eg, hand washing and covering sneezes and coughs)
- Physical distancing (ie, spacing)
- Banning large public events (eg, sports, arts and entertainment, and religion)
- Special protection of populations who are vulnerable in terms of health (eg, older people and people with comorbid conditions)
- Special protection of populations who are socially vulnerable (eg, children, people who are poor, people with disabilities, refugees, minorities, and Indigenous peoples)
- Special protection of congregate settings (eg, care centres for older people, nursing homes, prisons, worker hostels, and refugee camps)
- Testing (ie, rapid, comprehensive, and free, with follow-up on tracing and isolation)
- Quarantine and isolation at home when that environment is safe, and in public facilities when the home environment is inadequate
- Social support for those in isolation
- Safe schooling
- Safe workplaces
- Safe public transport
- Safe international travel (ie, bans and quarantines)
- Social protection (in terms of hunger, income, unemployment, and mental health)
- Public awareness, trust, and appropriate risk communication
- Community leadership and community health workers

Section 3: pathways to successful implementation of NPIs

29. The successful outcomes to date in suppressing the epidemic have been achieved by implementing a combination of NPIs that are designed to keep infectious individuals from spreading the infection to others in the population. Key NPIs are described in panel 2. These include actions by individuals (eg, wearing face masks, hand washing, physical distancing, avoiding large gatherings, and self-isolating in case of symptoms), by businesses (eg, ensuring safe workplaces with distancing of customers, protection of staff, better building ventilation and filtration, and monitoring for symptoms), and by governments (eg, testing individuals according to symptoms or close contacts with confirmed cases, quarantining in public facilities when self-quarantine or self-isolation is not feasible, ensuring safe working conditions for health workers and others including adequate personal protective equipment [PPE] and reasonable working hours, establishing restrictions on

international arrivals, moving education online when necessary, and banning large gatherings and events). In many cases, public health measures have been reinforced by mandatory regulations, restrictions, and lockdowns. An understanding of what influences individual behaviour and what the appropriate interventions are can help deliver more successful outcomes with or without mandatory regulations.

30. Taken as a whole, NPIs offer a package of measures that have proven sufficient to keep R below 1 while enabling the economy to function at a moderate level, albeit with the ongoing closure of some facilities and events and with reduced travel. The effective and timely implementation of NPIs also avoids excessive burdens on hospitals and other health facilities, and it enables continuity in the treatment of non-COVID-19 diseases. It is important to note that there are also effective mental health and social support interventions to preserve wellbeing, and that in countries where wellbeing stays relatively high, adoption of NPIs is greater.

31. In addition to NPIs to suppress transmission of the virus, special measures should be taken to protect vulnerable populations (eg, older people, people with previous chronic health conditions, people who are homeless, people who are incarcerated, frontline workers, refugees, migrant labourers). Among these measures, special attention should be given to preventing the spread of the virus in congregate residential settings, such as care centres for older people, prisons, refugee camps, detention centres, and worker hostels. Special support services should be directed to protect older people, people who are homeless, people living with disabilities, people with existing chronic health conditions, Indigenous peoples, and ethnic and racial minorities. These services should also be directed to people affected by increased rates of domestic violence and child abuse during the lockdowns.

32. NPIs should respect human rights and human dignity. Restrictions to human liberty should be limited, transitory, proportional, and clearly justified. The pandemic should not be an excuse for oppression, xenophobia, mass incarceration, or the mistreatment of migrants and minorities. One way to support this ideal is to include communities, Indigenous peoples, non-governmental organisations (NGOs), civil society organisations, faith-based organisations, and other stakeholders in the processes to design and implement NPIs. This initiative has the added benefit of building bridges between these groups and public health organisations, academia, and the private sector, increasing community solidarity, and building trust to respond to future health threats. A key initiative that helped the Republic of Korea to contain COVID-19 transmission was engagement with local governments, which were involved in testing and care.[38]

33. We note with satisfaction that many low-income countries have achieved sustained successes by deploying the NPI package to suppress the epidemic. Notable examples include Cambodia, Lao People's Democratic Republic, and Viet Nam, which had some recent experience in dealing with the severe acute respiratory syndrome epidemic, and Uganda, which has had extensive experience with the AIDS epidemic.[39,40] In these four countries, cumulative death rates have been held below one per million, compared, for instance, with more than 570 per million (as of Sept 2, 2020) in the United States. Effective public health implementation of NPIs requires rigorous management, professionalism, and social trust, rather than high budgetary outlays.

34. To implement NPIs effectively, countries should with urgency scale up their public health workforces, including epidemiologists, public health technicians, nurses, testers, contact tracers, and community health workers, to implement the package of NPIs efficiently, quickly, and with maximum coverage.[41] This scale-up might entail considerable reallocation of public spending, but we maintain that public health is the best investment for suppressing the pandemic and laying the foundation for sustainable development. New cadres of public health workers can be trained online, and can also carry out many of their functions online. WHO and other relevant UN agencies should intensify their work with national and local governments to implement urgently needed curricula, training materials in local languages, online courses, and other needs for rapid scale-up. Countries should further reaffirm their commitments to primary health care, as made in the Declarations of Alma-Ata (1978) and Astana (2018).

35. We urge special support for community health workers working within community health services as the key interface between the community and health facilities. Community health workers promote essential trust, local context, culturally sensitive interventions, and essential public health information for the community. Community health workers can contribute to controlling community spread and protecting vulnerable people, particularly through testing, education on prevention, and treatment. They can also address the mental health effects of social isolation. Community health workers are especially important for the successful implementation of behavioural changes in communities, for the trust needed to implement NPIs, and eventually for the high uptake of effective vaccines. Examples of effective and rapid scaling up of community health worker response can be observed in western Kenya, where 200 000 people in one district were covered by these efforts.

36. Because of the importance of community health services in prevention and medical intervention, all countries, particularly low-income countries, need to establish functioning community health services. To support this process during this COVID-19 emergency, we encourage the setting up of a global fund for integrated primary health care much like the Global Fund to Fight AIDS, Tuberculosis and Malaria, which facilitated a global response for meeting specific needs.

37. Broad lockdowns of the economy, as were implemented by the government in many countries, are emergency measures that are necessary when the pandemic is raging out of control with very high rates of incidence and when R is greater than 1.[42] In such an urgent context, the shutdown of workplaces other than essential operations causes a rapid decline in transmission and brings R down substantially. Yet the period of the lockdowns must be used efficiently to scale up longer-term NPIs that are key to keeping R below 1, even after lockdown is lifted. Many countries engaged in periods of lockdown but undertook insufficient efforts to instate necessary NPIs. As a result, when the lockdown was lifted, R soared above 1 again, and the epidemic reverted to its exponential upwards path. Insights from behavioural science can provide tools for communication with citizens, to encourage people to adopt safe behaviours during and after lockdowns, and for governments to feel more confident in implementing them.[43]

38. Government responses should be firmly grounded in a human rights perspective. Although lockdowns and similar measures are necessary, they must also be legal, proportional, temporary, and subject to judicial and parliamentary review. Parliaments should have a key role in ensuring that the voice of the people is heard and considered when designing public policy. Parliaments everywhere must be encouraged and supported to ensure that people's human rights are upheld and addressed when responding to the pandemic and when designing post-pandemic recovery plans.

39. The assurance of safe schooling is one of the most challenging NPIs.[44] Reopening schools should be prioritised over reopening less essential activities. Safety permitting, there is a strong case for on-site education rather than online education. Schools provide food, safety, nurturance, sociality, cognitive development, and education, resources permitting.[45] Student accountability and engagement are considerable concerns in remote learning environments. Additionally, it is more difficult for teachers to assess student learning, progress, and growth in the absence of in-person learning. On-site schooling and childcare also enable working parents to do their own work activities with their children presumably in safe hands. The risks of long-term school closures are tremendous.

40. There is currently limited evidence of widespread viral transmission within schools; evidence on their role in community spread is mixed. Within schools, there are examples of school-wide outbreaks when schools have opened during high levels of community spread and have not implemented strong risk reduction measures (eg, no face mask wearing, overcrowding, no ventilation). Other schools have stayed open without incident when stringent risk reduction measures were in place. As for their role in community spread, there is some suggestive evidence that school closures might have a role in reducing R, although studies have not been able to disentangle the effect of school closures from other interventions that occur simultaneously, such as more widespread NPIs and closures of other businesses. Opening schools when the epidemic in an area is not under control is unadvisable, as it is likely to be a short-lived policy, followed by rapid closure of facilities if many children and teachers are quickly infected. Teachers might also refuse to work unless assured of workplace safety.

41. A *Science Magazine* report[46] on schooling and COVID-19 in July, 2020, described ongoing uncertainty, but summarised the situation as follows: in areas where the epidemic is under control and schools take proper precautions (eg, physical distancing, small class sizes, face mask wearing, good indoor air quality), there is evidence that schools can safely reopen. In places where community transmission of the virus remains high, students and staff are more likely to bring COVID-19 into their classrooms. A prudent course of action is for schools to open when two conditions are met: low community spread and effective implementation of school-specific NPIs.[47]

42. When it is not safe to have children in school, all countries and localities should aim to implement distance learning, particularly through online education, or e-education. UN agencies, led by the UN Educational, Scientific and Cultural Organisation (UNESCO), UNICEF, and the International Telecommunication Union (ITU), should intensify cooperation with telecommunications industry and funding organisations, including the World Bank, to ensure universal access to online digital technologies for schools and students as needed.

43. Therefore, plans to open schools should be a priority once community transmission is under control, based on the incidence of cases, R, test positivity, and adequate overall testing with rapid results, to support the accurate measurement of these metrics. School facilities must also follow preventive measures, particularly social distancing, small class sizes, and mandatory face mask wearing. Some countries, such as the Netherlands,[48] have successfully reopened schools with the proper precautions once transmission rates declined.

44. A focus on safe air travel is extremely important. Airplanes are known vectors of disease, efficiently transporting infectious individuals across the globe and within countries. During the early stages of a pandemic, minimising air travel between regions can slow the introduction of cases to new areas. Within the airplane cabin, disease spread is limited by the environmental control system on airplanes, which provide localised ventilation and high-efficiency filtration, although sporadic cases have been reported. A challenge in ascertaining where a person was infected is that air travel nearly always includes other exposure locations (eg, subways and buses, time in airport, time in hotels) that cannot be separated from time on the airplane. Airlines and airports must implement and coordinate risk reduction strategies, including managing queues

efficiently to avoid overcrowding, wearing face masks, and improving ventilation and filtration conditions, particularly in high-density areas.[49]

Section 4: sources of recent failure in pandemic control

45. Several countries have persistently failed to suppress the epidemic, sustaining long periods of R above 1 and incurring some of the world's highest rates of infections and deaths per million population. As a proximate cause, these countries utterly failed to implement the basic package of NPIs that proved successful in other countries. In the United States, for example, the federal government undermined key decisions on business closures, face mask use, testing, contact tracing, and other NPIs, that were made by state and local authorities, who were themselves highly variable in their capacity to address the pandemic. Testing was also in chronically short supply, particularly after early failures of the federal CDC to provide working test kits to the states and local governments.

46. High inequality, which in turn exacerbates low social trust and polarised politics, is a major cause of failure of response to the pandemic.[50] It is no coincidence that the pandemic is soaring throughout the Americas, a region of high and chronic inequality. The United States is the most unequal economy of all high-income democracies, and Brazil is among the most unequal countries in the world.[51] We discuss the special vulnerabilities of people who are poor in section 5.

47. Another reason for failure to control the pandemic is a style of political leadership that has been termed medical populism, which Lasco has described as political leaders "simplifying the pandemic by downplaying its impacts or touting easy solutions or treatments, spectacularizing their responses to crisis, forging divisions between the 'people' and dangerous 'others', and making medical knowledge claims to support the above".[52] Lasco uses three case studies to make this argument: US President Donald Trump, Philippine President Rodrigo Duterte, and Brazilian President Jair Bolsonaro.[52] Not only does medical populism frustrate the implementation of NPIs, but it also stokes opposition to simple measures such as wearing face masks, and it breeds misinformation and rumour trafficking.

48. As a result of medical populism, the wearing of face masks has become increasingly politicised in several countries in Europe and the Americas, with some protesters demanding the freedom to dispense with the use of face masks. We emphasise that individuals do not have the right to infect others during a pandemic, and that wearing a face mask is therefore a matter of personal responsibility and legitimate public policy. We call on political leaders to emphasise the importance of society-wide use of face masks to suppress the pandemic.

49. We also call on all governments to prioritise advice from the professional public health community, working in cooperation with international agencies and learning from the best practices of other nations. All countries should learn from the success stories of countries that have suppressed the pandemic, or at least achieved very low levels of transmission (figure). Additionally, we call on all nations to combat the rampant rumour-mongering and misinformation that abounds on COVID-19, and we call especially on leaders to desist in expressing personal viewpoints that are at odds with the scientific and public health experts of their nations. We also warn against political leaders who are calling for unproven treatments that do not have supporting data and evidence, thereby politicising the process of drug and vaccine discovery.

50. The scarcity of quality research accompanying COVID-19 has been another source of failure in controlling the pandemic. This includes many poorly designed observational studies that cannot inform on whether a particular treatment is effective because the studies ignore the basic requirements for well designed randomised trials.[53] More generally, research needs to be better targeted, including more research on early-stage than late-stage treatments, with careful delineation according to age, gender, comorbidities, race, and other potentially important factors.[54]

51. Governments need to support more research on all aspects of the pandemic with public funds, even in the face of rising national debts. Both parliaments and the executive branch should be active in promoting research and development to fight this and future pandemics.

52. Shortages of key medical equipment and supplies (eg, face masks, ICU beds, chemical reagents for testing) also slowed the initial response to the pandemic and continue to hamper the response in many countries. Countries need to deploy urgent funding to procure needed supplies, and low-income countries continue to require emergency financing for this purpose. Pre-pandemic benchmarks of country preparedness have proved to be poor predictors of the response to COVID-19,[55] because these benchmarks did not have the specificity to predict policy responses and shortages of key supplies.

Section 5: addressing the inequities of the pandemic

53. The COVID-19 pandemic both reveals and exacerbates pre-existing social, economic, and political inequalities,[56] including inequalities of wealth, health, wellbeing, social protection, and access to basic goods and services (eg, food, health care, education). Within countries that have been badly hit by the pandemic, the poorest and most vulnerable communities are experiencing the worst economic and health consequences. The SDGs explicitly call for a reduction of these inequalities within and among nations (SDG 10), a goal that is even more important in the context of this pandemic.[2]

54. The COVID-19 pandemic is noticeably widening the gap between rich and poor, and is likely to bring about a sharp increase in income inequality.[57] In addition

to causing a public health crisis, the pandemic has caused an economic and jobs crisis worldwide.[58] Responses and efforts to suppress the virus will require deeper efforts to address income and wealth inequalities, and to ensure universal access to health, education, and social services. Workers in insecure, low-paid work without access to paid sick leave are more likely to keep working while infected, and to thereby contribute to the further spread of the disease.[59] Low-paid migrant workers living in poor and cramped conditions are also at greater risk, and account for a high proportion of COVID-19 infections in some countries.[60,61] Providing income support, better working conditions, and safe housing, and reducing inequality will help to suppress the spread of the pandemic.

55. The poor have far higher rates of infection and mortality than the rich because poorer communities have greater incidence of underlying chronic health conditions, such as pulmonary disease, cardiovascular disease, and diabetes, and the social determinants of health.[62] Those who live in low-income neighbourhoods are at higher risk of exposure to infection because many work in on-site essential jobs, and are also more likely to live in multigenerational households with greater risk for intra-household transmission. The rich have the means to move out of congested urban areas or to shelter more comfortably where they are. Richer populations can more easily work from home, afford PPE, and otherwise avoid infection, whereas the poor must circulate in the public to sustain themselves day to day, thereby risking transmission of the virus in lower-income communities.

56. Low-income communities suffer from inequalities of access to health care and access to medical supplies.[63] Health inequalities pose major issues in this pandemic, and according to WHO, as of December, 2017, half of the world's population do not have access to essential health services.[64,65] Investments in primary care are urgently needed to address basic health needs and the high prevalence of comorbidities, including undernutrition and HIV, which can put people at higher risk of morbidity from the pandemic.[66] Inequality of access to health services also concerns access to medical equipment and medication, most of which are manufactured in western countries and imported at high costs, or licensed under extortive intellectual property agreements.[67] Production of these items must be scaled up in underserved regions to meet local demand. Addressing health inequalities is crucial to achieving SDG 3 (universal health and wellbeing) and building the capacities of countries to respond to future public health crises.[2]

57. Health inequalities are also exacerbated by social inequalities of race, socioeconomic status, ethnicity, and gender.[68–71] In the United States, for example, COVID-19 has emerged as a major health disparity for people of colour. The CDC has documented the disproportionate effect of the pandemic on people of colour, and has identified five underlying reasons: discrimination; health-care access and use; occupation; education, income, and wealth gaps; and housing.[72] In the United States, COVID-19 is causing historic decimation of Hispanic communities across the south, African American communities in the southeast, and Native American communities in the southwest. The United States is not alone on this front. Across the G20 nations, there are rising cases of COVID-19 among people who are poor and living amidst wealth, a situation that has been called "blue marble health".[73]

58. The vulnerability of Indigenous communities to COVID-19 is worldwide. Throughout the Americas, more than 70 000 Indigenous people have been infected and 2000 have died, mostly due to inadequate access to care,[74] and this number is likely to be an underestimate. In response, Indigenous organisations have established their own networks and cooperation mechanisms, such as the Regional Indigenous Platform Against COVID-19. Protective actions are especially crucial for Indigenous peoples of the Amazon, where 223 Indigenous nations are at risk of extinction.[75] Effective responses must include the active involvement of Indigenous peoples, especially Indigenous women.

59. COVID-19 is the first pandemic of the digital era. Within just a few weeks, as countries across the world instated lockdowns and shelter-at-home directives, a large proportion of economic and social life in high-income countries moved from offices, shops, schools, and clinics to online platforms for working from home, e-commerce, e-schooling, and telemedicine. However, the abrupt shift to the online economy came in the context of a pre-existing digital divide both within and among nations.[76] The digital divide exists along inequalities of income and between high-income and low-income countries, as well as along the urban–rural divide,[77] for older populations,[78] and between professionals and those who do so-called essential work in lower-paid service industries.[79]

60. Higher-paid professional and managerial jobs shifted quickly online at the onset of the pandemic, maintaining pay and employment, whereas millions of lower-paid workers and informal workers with occupations that are performed on site (eg, retail, sanitation, care workers) were suddenly eliminated or furloughed. Therefore, in most cases, lower-wage workers have suffered more economically and in terms of health risk than have higher-wage workers. Much of the digital work in e-commerce, e-education, telemedicine, offices, and teleconferencing might shift online permanently.[80] This shift might lead to long-term jobs losses for on-site workers in shops, offices, schools, clinics, and business travel, and there is a high likelihood of future persistent unemployment. The inequalities between countries will become push factors for migration, putting individuals in fragile positions. Urgent measures are needed to accompany the transition and the deep changes in the labour market, including employment subsidies and other types of fiscal and policy support measures.

61. The same digital divide also applies for public services, including education and health care, where they have shifted online.[81–83] Those with high-quality digital access continue to obtain key services, whereas those without connectivity find themselves or their children excluded from basic services such as schooling.[84] This split occurs both within and among countries because of income inequalities and insufficient decent work. In addition, lower-income countries often have a much higher proportion of the workforce doing on-site work rather than online work than do higher-income countries.[85,86]

62. The most glaring illustration of economic inequality is the stark divide between the real economy (as measured by jobs and gross domestic product [GDP]), the stock market (which measures the expected future earnings of the listed corporate sector), and the online economy. Whereas US GDP declined by about 32% in the second quarter of 2020—the deepest decline since the Great Depression[87]—and consumer confidence is at its lowest level in 6 years,[88] the S&P 500 index has risen by over 50% since its pandemic low on March 23, 2020, powered especially by big tech, communications, and e-commerce.[89] American billionaires have had a rise in net worth of $434 billion from March to May, 2020.[90] The result is an utterly unprecedented rise of stock market wealth for a few individuals in the midst of an unprecedented rise of unemployment and destitution, whereby half a billion people globally could be pushed into poverty by the pandemic.[91] In this way, the financial markets have become disconnected from the labour markets.

63. Among the most urgent challenges of the COVID-19 pandemic are hunger and food insecurity for poor and vulnerable populations.[92] Decades of decline in hunger have reversed in recent years, and the pandemic has accelerated this worrying trend.[93,94] Many low-income, food-importing countries, especially in Africa, have been hardest hit by the COVID-19 pandemic, and the poor within those countries face rising food prices.[95] Even in the United States, hunger is an issue, and the US Census Bureau now estimates that one in six households with children is unable to meet current food needs.[96]

64. The COVID-19 pandemic poses great concerns for mental health,[97] especially for lower-income populations. Isolation, high stress levels, unemployment, and deprivation of basic needs contribute to poor mental health. There is high inequality of provision of services for medical health,[98] especially in lower-income and middle-income countries.[99] A CDC study[22] found that suicidal ideation and psychological distress is particularly high among essential care workers, Black and Hispanic respondents (compared to non-Hispanic white respondents), and young people in the United States. One effective solution is to rapidly train volunteers to staff crisis hotlines, to expand their capacity to respond to individuals, making help more accessible to disadvantaged communities.

65. The gender dimensions of the effects of COVID-19 must be considered in terms of economic, health, and wellbeing effects, because the pandemic presents gendered implications for clinical outcomes, economic and working conditions, education, and agency.[100]

66. The shift in resources towards addressing the COVID-19 emergency has led to changes in the availability and access of reproductive and maternal health services, which in turn has led to an increase in unplanned pregnancies for teenage and young women.[101,102] Although men and women are infected by COVID-19 to similar proportions, men appear to be more at risk for worse outcomes and death, independent of age.[103]

67. There has also been an increase in gender-based violence during the pandemic and the subsequent economic lockdowns.[104] Reports confirm that domestic violence against women and girls has risen by as much as 30% in some countries. Women's support services, such as shelters, are struggling to keep up with rising demand.[105] Urgent action is needed to consider and prevent all forms of violence against women in the COVID-19 pandemic, and to designate domestic violence shelters as essential services, while ensuring they are properly funded.

68. Women in many countries have higher rates of unemployment due to the recession than do men.[106] In addition, when schools close and children are at home, women shoulder a triple burden of frontline work, unpaid care work, and community work.[107,108] Women make up 70% of the global health workforce, putting them at greater risk of infection and stress from overworking.[109] There is an urgent need to develop policies and programmes using a gender lens.[110] In particular, women health workers need equal pay and meaningful participation in higher levels of health leadership.

69. Women are crucial agents of change, but great gender disparity remains in women's political participation. Female heads of state and government have been successful in addressing the pandemic, showing great leadership skills and making science-based decisions.[111] These leaders have shown outstanding wisdom and leadership in responding to COVID-19, and yet women represent less than a quarter of all elected politicians worldwide.[112] Recovery packages should also include new governance arrangements to boost women's political participation and include women in positions of power.

70. The UN Statistical Commission, working with partner UN institutions and with national statistical agencies, should prepare near-real-time data on highly vulnerable populations and their conditions, with a special focus on poverty, joblessness, mental health, violence, hunger, forced labour, and other forms of extreme deprivation and abuses of human rights. Urgent surveying should be undertaken to identify humanitarian needs and hunger hotspots, especially among people who are poor, older people, people living with disabilities,

Indigenous peoples, women who are vulnerable, young children, refugees, people who are incarcerated, people working in high-risk jobs (eg, meatpacking plants or guest workers), and other minority populations (including ethnic, racial, and religious minorities).

Section 6: meeting the urgent fiscal needs of low-income and middle-income countries (LMICs)

71. One of the defining characteristics of the global crisis has been the sharp drop in public revenues at national, provincial (or state), and local levels as a result of the collapse in economic activity and fiscal measures. Public debts around the world are rising rapidly, with budget deficits at historic levels as a share of GDP, particularly in high-income economies. The US federal government, for example, will run a budget deficit of around $3·7 trillion during 2020, about 16% of GDP.[113] The public debt–GDP ratio in high-income economies is expected to exceed 130% of GDP by the end of 2020, on the basis of the International Monetary Fund (IMF) June 2020 forecast, the highest ever recorded.[114]

72. The situation for LMICs will become increasingly dire because many countries are facing tight financing conditions. These countries will have to prioritise health care, social protection, and public investment to preserve lives and livelihoods and to avoid the risk of social crises. Fiscal space to do so is limited, however, because many LMICs were already facing debt sustainability concerns before the pandemic, with more than 30 countries in high risk of or current debt distress. Depending on the structure of their economies and their dependence on external flows (such as remittances), LMICs might be particularly vulnerable to the crisis.

73. Moreover, many LMICs do not have the kinds of social protection programmes that are most urgently needed at this juncture, such as unemployment insurance, income support, and nutrition support. These programmes must urgently be put in place and financed both domestically and internationally. Using digital technologies that enable governments to make e-payments directly to households, governments need to implement emergency direct transfer programmes to impoverished, hungry, and destitute households.

74. Such countries will require considerable international concessional financing (ie, grants and low-interest, long-term loans) from the international financing institutions, notably the IMF, World Bank, and regional development banks. Some of these LMICs will also need orderly restructuring of their sovereign debts to both public and private creditors. Now, more than ever, is the time for countries to meet their commitments to providing 0·7% of GDP as official development aid.[115] As international concessional funding is expanded, special efforts must be made to ensure transparency and to guard against corruption, to ensure that the new flows reach the intended beneficiaries.

75. We urge special attention to the least developed countries, small island developing states, landlocked developing countries, heavily indebted countries, and countries in humanitarian crisis or fragile situations as a result of such factors as environmental shocks or violent conflicts.

76. As governments take measures to respond to COVID-19, they might become vulnerable to claims by foreign investors under various investor–state dispute settlement clauses in trade and investment agreements, particularly in LMICs.[116] The Commission takes note of the proposals put forward by several unions, trade associations, and NGOs to address this legitimate concern.

77. Although countries have announced more than $11 trillion in fiscal measures (half of which consists of additional spending or revenue-reducing measures, and the other half consists of loans, guarantees, or equity injections by the public sector) to combat the COVID-19 emergency, most of these announcements have been in high-income or middle-income emerging economies.[117] Some countries, notably Germany, have increased their development assistance for COVID-19-related outlays in low-income and middle-income partner countries. The bulk of emergency financing for low-income countries has come from the IMF and the World Bank.

78. The IMF is at the centre of the global financial safety net. It has provided rapid access to emergency financing to countries that need it. IMF financing during the pandemic has so far totalled $87 billion for 80 countries.[118] The IMF's rapid credit facility (for low-income countries) has a 10-year maturity, zero interest rate, and 5·5-year grace period,[119] whereas the IMF's rapid financing instrument (for other countries) must be repaid within 3·25–5 years.[120] There are also smaller amounts of grant relief in the catastrophe containment and relief trust, to help low-income fund members to pay debts that are owed to the IMF.[121]

79. The World Bank Group is working to help countries to boost health spending, strengthen social safety nets, and maintain both public services and a thriving private sector.[122] They plan to deploy as much as $160 billion, including the frontloading of $51 billion worth of grants and highly concessional resources from the IDA19 replenishment. To deal with the health emergency, the World Bank deployed $6·3 billion to support 108 countries within 3 months. Other multilateral development banks have committed to adding another $80 billion to their response, bringing the total to $240 billion.[122,123]

80. In addition, the G20 extended debt relief during 2020 to low-income countries in the debt service suspension initiative, which in total could postpone payments of around $11·5 billion.[124] The implementation of the debt service suspension initiative is supported by the IMF and the World Bank. However, to date, several low-income countries have not availed themselves of this opportunity for various reasons, including fear of damaging their

credit rating. Further, for many countries, a temporary delay of payments will be insufficient to overcome this crisis and restore debt sustainability, so that some measure of permanent debt forgiveness will be needed.

81. Central banks have played a decisive role in preserving financial stability. In early March, as the number of COVID-19 cases increased rapidly in the north Atlantic region, global financial markets were faced with a sudden rush to liquidity and unprecedented volatility, affecting even the safest assets. The federal reserve system of the United States and major central banks (eg, European Central Bank, Bank of England, Bank of Japan) reacted quickly by providing liquidity and purchasing large quantities of assets. This helped to reestablish orderly global market conditions, including for emerging and frontier markets.

82. Other central banks in high-income economies and emerging market economies have followed suit, and have responded to the crisis in a forceful and flexible way through cuts in policy interest rates and an expansion of credit to combat the COVID-19 downturn. Success in these policies has reflected the credibility of central banks that has been earned through years of successful inflation targeting, which has now given them space for active monetary policies to fight depression-level downturns.

83. In this context, high-income economies and large emerging markets have been able to finance sizable budget support at rock-bottom interest rates, thereby maintaining or even expanding public services and social protection payments at the national level despite the severe decline in budget revenues. By contrast, low-income countries that have been shut out of international markets or are facing higher borrowing costs have been severely constrained in the provision of additional public services and social protection for those in need.

Section 7: achieving universal digital access as a key to inclusion

84. Digital technologies and online digital access are crucial to effective responses to the pandemic. As previously addressed, unequal digital access has greatly exacerbated inequalities. Online connectivity and literacy are essential for access to income transfers (eg, payments of emergency relief), e-schooling, telemedicine, working from home, e-commerce, e-payments, e-counseling for mental health, and other key needs. Online connectivity supports testing and contact tracing, monitoring of the epidemic, and accessing information and social support for individuals and families in need.[125] Digital access is also crucial for social connection during the pandemic.

85. We call on all relevant UN agencies, led by the ITU and UNESCO, with the support of the ITU–UNESCO Broadband Commission, to take concrete steps with the digital industry and governments to accelerate universal access to digital services, including new forms of public–private financing to extend connectivity to hard-to-reach populations.[126] We strongly support the UN Secretary-General's roadmap for digital cooperation, with the goal of achieving universal connectivity by 2030, and we urge its immediate implementation.[127]

86. UNICEF has recently estimated that a third of the world's schoolchildren were unable to access digital learning during the recent school closures.[128] We call on the Broadband Commission to intensify its work with UN agencies, led by UNESCO and UNICEF, technology companies, and the telecommunication industry, to ensure that online schooling is available to all learners as necessary during the duration of the pandemic.

87. Misinformation presents an increasingly difficult challenge in the digital world. In some respects, in the digital age it has become more difficult to access reliable and accurate information from legitimate sources. However, misinformation has always been an obstacle, notably in combating tobacco use and climate change. Today, misinformation threatens the effectiveness of a COVID-19 response,[129] especially with regards to vaccines and enforcement of NPIs, including the importance of face masks.

88. Privacy and security of personal information is of great concern, given that some countries are pursuing the use of extreme surveillance to track and quarantine COVID-19 cases and to reduce the spread of the disease. This technology is essential for short-term responses,[125] but it has important implications for privacy and human rights, and potentially dire consequences for freedom of speech and movement if these extreme measures were to remain in place in the long term and if they were used to track people for purposes other than suppressing COVID-19. We call on all stakeholders, especially technology companies, the telecommunications industry, and governments, to think creatively about how to combat the negative aspects of digital technology.

Section 8: global justice in access to safe and effective vaccines, therapeutics, diagnostics, and equipment

89. The pharmaceutical industry and academic community, supported by governments, have undertaken remarkable efforts to develop new approaches for suppression of the pandemic, including vaccines,[130] therapeutics, rapid diagnostics, new treatment regimens, and new equipment, including PPE.

90. Vaccines offer a potentially pivotal approach to controlling, and indeed ending, the COVID-19 pandemic.[131] Previously, vaccinations have contributed decisively to the control or elimination of infectious diseases, and there are reasons for optimism that effective vaccines are within reach for the SARS-CoV-2 virus that causes COVID-19. Nonetheless, many urgent public policy issues are involved in the development and use of a new vaccine, which must be scrupulously honoured and are in clear risk in this pandemic. This is especially the case since the first vaccines are likely to be only partially effective, and therefore pose many complications and risks in their initial deployment.

For more on the **Access to COVID-19 Tools Accelerator** see https://www.who.int/initiatives/act-accelerator

For more on **COVAX** see https://www.gavi.org/covid19/covax-facility

91. The vaccines under development will have varying levels of efficacy because of several unknowns. They might protect individuals against severe disease or death without preventing infection. They might work for some subgroups of a population but not others. They might pose differential risks to individuals according to age, gender, ethnicity, race, previous medical conditions, or other characteristics. They might have efficacy of varying duration and require repeated boosters.

92. Therefore, it is urgent for safety, public health, and public acceptance, that the introduction of new vaccines follows rigorous and sound testing and evaluation through all clinical phases, and that the introduction of new vaccines is not subjected to dangerous political interference. In this regard, we are concerned by the introduction in Russia of a new vaccine candidate without the completion of phase 3 trials for efficacy and safety, and without the publication of supportive data.[132] We are similarly alarmed at attacks on regulators, such as the recent accusations that the US Food and Drug Administration is delaying vaccine development for political reasons, rather than in the interest of human safety.[133] Such political interference in the operation of technical agencies is inexcusable and done for obvious political gain.

93. We are concerned about the emphasis and focus on new and unproven vaccine technologies, such as mRNA, DNA, and viral-vector technologies, which will be expensive and have not been shown to offer benefits (in terms of vaccine immunity or safety) over traditional and far less expensive inactivated virus, attenuated virus, and recombinant protein approaches. The former will be produced primarily by large multinational pharmaceutical companies, whereas the latter could be produced by members of the Developing Country Vaccine Manufacturers Network (DCVMN) and are more likely to provide vaccines to low-income populations and nations. Therefore, there is an urgency to better support DCVMN vaccine manufacturers to produce low-cost COVID-19 vaccines using traditional technologies, which are key to global access. Along these lines, there is a need for better acceptance of low-cost adjuvants with long-standing safety records, such as alum, which have so far been dismissed by major donors and international partners without scientific rationale.[134]

94. Any new vaccine or therapeutic must be developed and implemented with the view to equitable access across and within countries. No nation or population within a country should be prohibited from accessing a vaccine because of cost. No country should have its access predicated on its participation in clinical trials (some governments are pressured to host such trials in return for future vaccine access).

95. The 73rd World Health Assembly recognised immunisation "against COVID-19 as a global public good".[135] So-called vaccine nationalism,[136] in which individual nations tie up the intended supplies of future vaccines for their own use, is counterproductive because no one nation is safe until all are. Bilateral negotiations on future vaccine access are currently taking place under confidentiality agreements, with poor transparency in pricing.

96. We strongly support the multilateral initiative Access to COVID-19 Tools (ACT) Accelerator to promote universal, equitable access to COVID-19 vaccines, therapeutics, and other tools, and within that initiative, COVAX, the vaccine pillar. We urge all nations to join the ACT-Alliance and to honour its principles of fair sharing of new COVID-19 tools, but we emphasise that on the basis of current trends, COVAX will not be sufficient. Complementary approaches in support of this multilateral initiative would help to strengthen equitable access across and within countries. This modified advanced market commitment strategy comes with unique challenges, and it is unclear how such an initiative will be designed, deployed, and financially supported. Transparency in clinical trials, price negotiations, and research and development investments is of paramount importance for ensuring equitable and fair access to vaccines. In addition, countries should advance national strategies for local production, technological training, and innovation on vaccines, therapeutics, and diagnostics, to ensure universal access.

97. We support the efforts of the ACT Accelerator towards clear protocols for fairer rollout of new candidate vaccines, diagnostics, and therapeutics, including clarity on timing, monitoring of use, affordability, supply chains, personnel, and public communications. These factors will be urgent for public trust and uptake, and for repulsing the inevitable onslaught of false information and rumours on social media. Deliberate efforts to engage communities will be crucial to addressing mistrust. Responsible and cooperative behaviour among all of the key research and development areas, including the United States, China, Russia, India, the United Kingdom, and the EU, will also be essential. However, the voices of LMICs should also be enhanced in the governance arrangements.

98. The global vaccine community has so far been without adequate situational awareness to a rising anti-vaccine movement. The anti-vaccine movement has been amplified in the United States since 2015, when it pivoted to the political far-right. This movement has now driven down vaccine coverage to the point where measles re-emerged in the United States in 2019.[137] In 2020, the American anti-vaccine movement redoubled its efforts against COVID-19 vaccines and expanded its remit to campaign against face masks and contact tracing, thereby helping to promote the massive resurgence of COVID-19 in the southern United States this summer.[138] Also in the summer of 2020, the American anti-vaccine movement expanded its activities through a major demonstration in Berlin, Germany. There is urgency for the global community to combat the misinformation of this globalised anti-scientific effort. We urge an expansion of global efforts to combat anti-vaccine movements that are

based in the United States and Europe but have also begun to expand in Asia, Africa, and Latin America.

99. We note that although vaccine candidates are likely to begin implementation during 2021, their introduction will not mark the end of the pandemic or the end of the crucial need for NPIs. Early vaccines are likely to be rolled out gradually, as experts learn more about their efficacy among subgroups such as health-care workers, older people, and immunocompromised populations. The first vaccines are likely to be only partly effective and last for a limited duration, such that transmission of disease might continue even with increasing vaccine coverage. In addition, countries will need to put in place systems for the delivery of vaccines and ways to finance vaccine coverage and delivery. Even under the best circumstances, high levels of immunisation coverage will require years, not months. During that time, the pandemic will continue, as will the need for NPIs.

100. In general, the scientific community has produced accurate, trustworthy data and research through one of the most remarkable mobilisations in history, including a commitment to make more than 30 000 publications open access, or freely available to the public.[139] Continuing this unprecedented commitment to collaboration and transparency is key to ensuring that reliable sources of information continue to inform policy decisions at all levels.

101. Global health diplomacy should inspire cooperation between the scientific and political communities and strengthen global science diplomacy, to ensure that encompassing, holistic, cross-disciplinary perspectives and cross-border knowledge inform policy and decision making. Global science diplomacy is strategic to addressing not only this pandemic, but also other global challenges, such as the climate crisis.

Section 9: promoting a jobs-based green recovery

102. Aggregate demand income and trade will remain disrupted in the medium term (ie, the next 12–24 months). Uncertainty affects consumption and private investment. In many parts of the world, including Europe, Japan, and the United States, central banks do not have much leeway with interest rates at zero or even negative. Policies will be needed to support the financial system as non-performing loans mount, and fiscal packages will have to be financed by national debt. Many governments will benefit from borrowing costs that are at historical lows.

103. An important element for sustained global economic growth in the coming years will therefore be public investment, which provides an opportunity to accelerate the transformation of societies towards sustainable and inclusive growth. In turn, public investments in infrastructure, for example, will provide major support for private investments in new sustainable sectors, such as renewable energy, electric vehicles, and the digital economy.

104. Economic recovery plans should support the transition towards more sustainable and inclusive societies based on the SDGs and the Paris Climate Agreement.[2,3] Public investment should be oriented towards sustainable industries and the digital economy. Unlike in the 2008–09 financial crisis, which led to a sharp rise in carbon dioxide emissions when economic activity started picking up,[140] governments should use the COVID-19 health and economic crises to launch transformative actions that support decarbonisation and decouple economic growth from negative impacts on the climate and biodiversity. Carbon pricing and other mechanisms, including investment in clean energy infrastructure and policies to promote the development and deployment of key technologies, should be emphasised during the recovery. Subsidies to unsustainable industries should be progressively phased out.

105. Preventing a wave of bankruptcy of solvent small and medium-sized enterprises is an important priority. New forms of public–private partnerships might be needed to accelerate the green transition and the rollout of digital solutions and technologies, including those for public services. In the short term, it is crucial that governments strengthen social protection mechanisms and maintain (for long enough) the exceptional measures that have been introduced to support jobs and people who have lost their jobs. Although this approach will probably lead to sharp increases in public debt in many countries, fiscal retrenchment earlier than warranted would present an even greater risk of derailing the recovery, and could ultimately be more costly.[117] Governments should ensure full transparency, good governance, and costing of all fiscal measures.

106. Few global shocks have dealt such a pervasive blow to so many people's jobs, career and life prospects, and economic security. The long-term effects of this crisis will particularly affect young people,[141] who are more likely to be unemployed and working in informal jobs.[24] The world will be afflicted by high and pervasive unemployment for years to come, putting hundreds of millions of individuals at risk of poverty, financial insecurity, hunger, and mental health problems, including clinical depression and anxiety disorders. A major goal of the recovery, therefore, should be to ensure economic dignity for all, through robust social protection, and opportunities for meaningful workforce and community participation (which is also crucial to mental health). Development and implementation of criteria to assess whether post-COVID-19 stimulus packages integrate the essential aspects of equity, health, decarbonisation, and employment are strongly encouraged.[142]

107. A jobs-based recovery will require global cooperation and new forms of partnerships between the public and the private sector. Many of the hundreds of millions of jobs that have been eliminated during the pandemic will not return. Many businesses will have closed. Many activities will have shifted permanently

from the brick-and-mortar economy of offices, shops, schools, and clinics, to the online world of working from home, e-commerce, e-education, and telemedicine. Yet the new online world of work will also create new opportunities for skills and employment. A just recovery will require an unprecedented commitment to reskilling and upskilling people throughout working life, including skills to prepare workers for the digital economy. If the new digital economy is implemented justly and inclusively, there is an opportunity for more shared leisure time. The digital economy can be transformative, supporting not only decent jobs but also the green economy. For this change to occur, however, reskilling and retraining must be embarked upon at an unprecedented scale.

108. The restoration of work must be based first and foremost on making sure that workplaces are safe, diminishing the risks of transmission of the virus. Businesses, universities, and public health authorities should prepare clear guidelines on safe schools, offices, shops, construction sites, factories, transportation facilities, and sites of recreation and entertainment. These guidelines should include provisions for public hygiene, physical distancing, symptom monitoring, controls for safe and healthy indoor environments (such as increased ventilation and air filtration), and other measures of workplace safety.

109. To finance the green recovery, new methods of financing will be needed for LMICs, including new or more efficient allocations of special drawing rights,[143] increased debt relief, and a major scale-up of green financing from institutions such as the Green Climate Fund.

For more on the **Green Climate Fund** see https://www.greenclimate.fund

110. The EU green deal, long-term budget (2021–27), and new recovery fund marks an exemplary framework for long-term recovery, including mid-century goals on climate safety, energy transition, and the circular economy, together with a comprehensive €1·8 trillion budget.[144] This approach can serve as an exemplar for other regions of the world as they devise strategies to rebuild their national and regional economies. In general, recoveries should be smart (based on digital technologies), inclusive (targeting lower-income households), and sustainable (featuring investments in clean energy and reduced pollution). Investing in renewable energy, sustainable transport, and other policies that reduce air pollution exposure are of particularly urgent concern because fine particulate air pollution increases the risk of respiratory disease, heart disease, stroke, diabetes, and other conditions that are risk factors for poor outcomes from COVID-19. This form of air pollution also often disproportionately affects low-income and minority communities. Conversely, modernising energy systems can contribute to job creation and economic growth while also protecting the climate, but this requires public sector leadership and investment.

111. These economic transformations should be complemented by new metrics to measure progress and wellbeing. Measuing of growth in GDP alone will not help in monitoring a more inclusive and sustainable economy; rather, frequent, publicly accessible reporting is needed on SDG indicators, happiness and subjective wellbeing, and environmental performance.

112. Global recovery will be greatly facilitated by cooperation at the regional and international levels, not only in controlling the epidemic, but also in designing and adopting new green recovery programmes. We strongly urge the United States, EU, China, Russia, India, Mercosur, the African Union, the Association of Southeast Asian Nations, the Community of Latin American and Caribbean States, the Caribbean Community, and other nations and regional groupings to put aside rivalries and beggar-thy-neighbour policies (such as trade and financial sanctions) in favour of coordinated regional responses (such as those of the EU[145] and African Union[146]). Regional integration has enormous potential and benefits, from the possibility of regional debt relief negotiations to procurement agreements on equipment, tests, treatments, and vaccines. Trade and financial sanctions, other isolationist policies, and talk of a new cold war between the United States and China are deeply dangerous hindrances to global recovery and to peace itself.

Section 10: supporting the urgent role of UN institutions

113. The COVID-19 pandemic hit during the 75th anniversary year of the UN. Before the pandemic, the reinvigoration of the UN multilateral system was already being widely discussed, but the COVID-19 pandemic has raised scrutiny on the effectiveness of multilateral organisations.[147] A new culture of multilateralism is needed, based on strong leadership, collective action, and greater participation in multilateral decision making. The indispensable role of the UN has been evident throughout the course of the pandemic, especially for the world's most vulnerable populations, and yet the UN system has come under attack from populist politicians, and international law has been undermined. The United States has even taken the unprecedented and dangerous step of announcing its withdrawal from WHO at this crucial moment in world affairs.[148]

114. We strongly support the UN, and we call on all nations to honour the UN Charter and the Universal Declaration of Human Rights, and to contribute to the efficacy of the UN multilateral system, including through crucial financing of UN institutions. We call on the United States to reverse its decision to withdraw from WHO, the Paris Climate Agreement, UNESCO, and the UN Human Rights Council.

115. We strongly support the unique role of the IMF, the World Bank, and multilateral development banks in providing urgent financing and technical assistance for emerging and developing economies. We call on their shareholders to consider scaling up the already

unprecedented efforts at securing larger financing for these countries, through an increased allocation or more efficient use of special drawing rights, or through debt restructuring when needed.[149] We also urge more affluent shareholder countries to provide additional concessional resources.

116. We strongly support the indispensable role of WHO in controlling the COVID-19 pandemic, and we call on all nations to increase, rather than decrease, their funding support and political backing for the work of WHO at this fraught time. In this regard, we also support the call for an independent analysis of the WHO response, to strengthen the institution and its central and unique role in global public health.

Section 11: the work of the *Lancet* COVID-19 Commission going forward

117. This Statement summarises the views and recommendations of the *Lancet* Commission on COVID-19 on current key issues related to the worldwide pandemic as of mid-September, 2020. In the coming months, the Commission will develop a portfolio of COVID-19 metrics to track how the recommendations herein are being implemented, and will report on them quarterly. The metrics will cover four dimensions of the crisis: suppression of the epidemic worldwide through NPIs; transparency in the development of safe and effective vaccines and therapeutics; health systems response and access; and sustainable and equitable transformations, including effects on equity, labour markets, jobs, greenhouse gas emissions, and other environmental metrics.

118. The Commission will also consider recommendations on how to counter misinformation on science, not only with regard to COVID-19, but also concerning other related issues, including vaccines, biodiversity, and climate change.

119. The Commission recognises that the global pandemic raises a series of complex issues that are still evolving and that will need further timely evaluation, such as rising humanitarian and hunger crises; financing for the health response and economic recovery plans; the institutional and financial arrangements within the UN system for coordinated responses to risks regarding health, climate, and the economy; the future of education and work in a post-COVID-19 world; and the long-term physical and mental effects of the virus. The Commission is establishing specific task forces that will be releasing policy briefs and white papers in the coming months on these key topics.

120. The *Lancet* COVID-19 Commission will release its next Statement in early 2021, which will highlight the progress or regression in various aspects of its work and recommendations, with an updated analysis of the evolution of the pandemic.

121. The Commission will issue its final report in early 2022.

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Declaration of interests
LA reports a grant from the Global Happiness Council, during the conduct of this study. PD reports grants from Johnson & Johnson, II-XI, Swiss Re, and Reckitt-Benckiser, outside the submitted work; and reports collaboration with a range of governmental and academic organisations in China, including those targeted by conspiracy theorists as being the origin of COVID-19. PD's funding from the US National Institutes of Health was terminated at the request of the President of the United States on the basis of these conspiracy theories, and EcoHealth Alliance and PD's work on COVID-19 have been the target of numerous conspiracy-based attacks. PH and MEB collaborate in the development and testing of a low-cost COVID-19 vaccine for global health, which was recently licensed by Baylor College of Medicine to a commercial third party for scale-up and production. JB is employed by The *Lancet* Group. All other authors declare no competing interests.

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References

1 Sachs JD, Horton R, Bagenal J, Ben Amor Y, Karadag Caman O, Lafortune G. The Lancet COVID-19 Commission. *Lancet* 2020; **396:** 454–55.
2 UN. The 17 goals. https://sdgs.un.org/goals (accessed Sept 6, 2020).
3 UN Climate Change. The Paris Agreement. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (accessed Sept 6, 2020).
4 Everard M, Johnston P, Santillo D, Staddon C. The role of ecosystems in mitigation and management of Covid-19 and other zoonoses. *Environ Sci Policy* 2020; **111:** 7–17.

5 Zimmer K. Deforestation is leading to more infectious diseases in humans. Nov 22, 2019. *Natl Geogr Mag.*

6 Mushi V. The holistic way of tackling the COVID-19 pandemic: the one health approach. *Trop Med Health* 2020; **48:** 69.

7 Daszak P, Olival KJ, Li H. A strategy to prevent future epidemics similar to the 2019-nCoV outbreak. *Biosaf Health* 2020; **2:** 6–8.

8 Andersen KG, Rambaut A, Lipkin WI, Holmes EC, Garry RF. The proximal origin of SARS-CoV-2. *Nat Med* 2020; **26:** 450–52.

9 Matheson NJ, Lehner PJ. How does SARS-CoV-2 cause COVID-19? *Science* 2020; **369:** 510–11.

10 Johns Hopkins University and Medicine Coronavirus Resource Center. COVID-19 dashboard by the Center for Systems Science and Engineering at Johns Hopkins University. https://coronavirus.jhu.edu/map.html (accessed Aug 30, 2020).

11 Roser M, Ritchie H, Ortiz-Ospina E, Hasell J. Coronavirus pandemic (COVID-19). https://ourworldindata.org/coronavirus (accessed Aug 31, 2020).

12 Pero A, Ng S, Cai D. COVID-19: a perspective from clinical neurology and neuroscience. *Neuroscientist* 2020; published online July 25. https://doi.org/ 10.1177/1073858420946749.

13 Mallapaty S. Mini organs reveal how the coronavirus ravages the body. *Nature* 2020; **583:** 15–16.

14 Stop TB Partnership. The potential impact of the COVID-19 response on tuberculosis in high-burden countries: a modelling analysis. May, 2020. www.stoptb.org/assets/documents/news/Modeling%20Report_1%20May%202020_FINAL.pdf?fbclid=IwAR1I4py4vDnzh-DTxErv4abXNF1NC4Dv-6iRbByE0GJSIsOe1_Lzycg2Svg (accessed Sept 6, 2020).

15 UNAIDS. The cost of inaction: COVID-19-related service disruptions could cause hundreds of thousands of extra deaths from HIV. May 11, 2020. https://www.who.int/news-room/detail/11-05-2020-the-cost-of-inaction-covid-19-related-service-disruptions-could-cause-hundreds-of-thousands-of-extra-deaths-from-hiv (accessed Sept 6, 2020).

16 UNICEF. As COVID-19 devastates already fragile health systems, over 6,000 additional children under five could die a day, without urgent action. May 12, 2020. https://www.unicef.org/press-releases/covid-19-devastates-already-fragile-health-systems-over-6000-additional-children (accessed Sept 6, 2020).

17 WHO. At least 80 million children under one at risk of diseases such as diphtheria, measles and polio as COVID-19 disrupts routine vaccination efforts, warn Gavi, WHO and UNICEF. May 22, 2020. https://www.unicef.org/press-releases/least-80-million-children-under-one-risk-diseases-such-diphtheria-measles-and-polio (accessed Sept 6, 2020).

18 WHO. COVID-19 significantly impacts health services for noncommunicable diseases. June 1, 2020. https://www.who.int/news-room/detail/01-06-2020-covid-19-significantly-impacts-health-services-for-noncommunicable-diseases (accessed Sept 6, 2020).

19 McGinty EE, Presskreischer R, Han H, Barry CL. Psychological distress and loneliness reported by US adults in 2018 and April 2020. *JAMA* 2020; **324:** 93–94.

20 Vandevijvere R, et al. Troisième enquête de santé COVID-19: résultats préliminaires. *Sciensano* 2020; published online June. https://doi.org/10.25608/xkg3-xz50 (preprint).

21 Roscoät Ed. Mental health of the French population during the COVID-19 pandemic: results of the CoviPrev survey. June 19, 2020. https://eurohealthnet-magazine.eu/mental-health-of-the-french-population-during-the-covid-19-pandemic-results-of-the-coviprev-survey/ (accessed Sept 9, 2020).

22 Czeisler MÉ, Lane RI, Petrosky E, et al. Mental health, substance use, and suicidal ideation during the COVID-19 pandemic—United States, June 24–30, 2020. *MMWR Morb Mortal Wkly Rep* 2020; **69:** 1049–57.

23 Speth MM, Singer-Cornelius T, Oberle M, Gengler I, Brockmeier SJ, Sedaghat AR. Mood, anxiety and olfactory dysfunction in COVID-19: evidence of central nervous system involvement? *Laryngoscope* 2020; published online July 2. https://doi.org/10.1002/lary.28964.

24 International Labour Organization. ILO monitor: COVID-19 and the world of work. Fourth edition: updated estimates and analysis. May 27, 2020. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_745963.pdf (accessed Sept 6, 2020).

25 Quinn D. Sharp decline in remittances expected in 2020 amid COVID-19 lockdowns in top sending nations. June 22, 2020. https://www.pewresearch.org/fact-tank/2020/06/22/sharp-decline-in-remittances-expected-in-2020-amid-covid-19-lockdowns-in-top-sending-nations/ (accessed Sept 9, 2020).

26 As more go hungry and malnutrition persists, achieving zero hunger by 2030 in doubt, UN report warns. July 13, 2020. https://www.who.int/news-room/detail/13-07-2020-as-more-go-hungry-and-malnutrition-persists-achieving-zero-hunger-by-2030-in-doubt-un-report-warns (accessed Sept 6, 2020).

27 Mahler DG, Lakner C, Aguilar RAC, Wu H. COVID-19 could push 100 million people into extreme poverty, says World Bank. Jun 12, 2020. https://www.weforum.org/agenda/2020/06/world-bank-coronavirus-covid19-extreme-poverty/ (accessed Sept 6, 2020).

28 Frykholm A. Ending extreme poverty. June 8, 2016. https://www.worldbank.org/en/news/feature/2016/06/08/ending-extreme-poverty (accessed Sept 6, 2020).

29 The World Bank. Projected poverty impacts of COVID-19 (coronavirus). June 8, 2020. https://www.worldbank.org/en/topic/poverty/brief/projected-poverty-impacts-of-COVID-19 (accessed Sept 6, 2020).

30 Britton T, Ball F, Trapman P. A mathematical model reveals the influence of population heterogeneity on herd immunity to SARS-CoV-2. *Science* 2020; **369:** 846–49.

31 Pollán M, Pérez-Gómez B, Pator-Barriuso R, et al. Prevalance of SARS-CoV-2 in Spain (ENE-COVID): a nationwide, population-based seroepidemiological study. *Lancet* 2020; **396:** 535–44.

32 Davies NG, Klepac P, Liu Y, Prem K, Jit M, Eggo RM. Age-dependent effects in the transmission and control of COVID-19 epidemics. *Nat Med* 2020; **26:** 1205–11.

33 Comunian S, Dongo D, Milani C, Palestini P. Air pollution and Covid-19: the role of particulate matter in the spread and increase of Covid-19's morbidity and mortality. *Int J Environ Res Public Health* 2020; **17:** E4487.

34 WHO. Estimating mortality from COVID-19: scientific brief, 4 August 2020. Aug 4, 2020. https://apps.who.int/iris/handle/10665/333642 (accessed Sept 6, 2020).

35 Barriuso R, Perez-Gomez B, Hernan MA, et al. SARS-CoV-2 infection fatality risk in a nationwide seroepidemiological study. *medRxiv* 2020; published online Aug 7. https://www.medrxiv.org/content/10.1101/2020.08.06.20169722v1 (preprint).

36 Coker ES, Cavalli L, Fabrizi E, et al. The effects of air pollution on COVID-19 related mortality in northern Italy. *Environ Resour Econ (Dordr)* 2020; **4:** 1–24.

37 Marioli FA, Bullano F, Kučinskas S, Rondón-Moreno C. Tracking R of COVID-19: a new real-time estimation using the Kalman filter. *medRxiv* 2020; published online May 14. https://www.medrxiv.org/content/10.1101/2020.04.19.20071886v2 (preprint).

38 Jong-Wha L. What South Korea can teach the world about containing COVID-19. Aug 10, 2020. https://www.weforum.org/agenda/2020/08/south-korea-health-system-covid-19-coronavirus-pandemic/ (accessed Sept 6, 2020).

39 UN Sustainable Development Group. Policy brief: the impact of COVID-19 on south-east Asia. July 2020. https://unsdg.un.org/resources/policy-brief-impact-covid-19-south-east-asia (accessed Sept 6, 2020).

40 Biryabarema E. Uganda's tough approach curbs COVID, even as Africa nears 1 million cases. Aug 5, 2020. https://www.reuters.com/article/us-health-coronavirus-uganda-idUSKCN251159 (accessed Sept 6, 2020).

41 Althoff KN, Coburn SB, Nash D. Contact tracing: essential to the public health response and our understanding of the epidemiology of COVID-19. *Clin Infect Dis* 2020; published online June 11. https://doi.org/10.1093/cid/ciaa757.

42 Hsiang S, Allen D, Annan-Phan S, et al. The effect of large-scale anti-contagion policies on the COVID-19 pandemic. *Nature* 2020; **584:** 262–67.

43 Bavel JJV, Baicker K, Boggio PS, et al. Using social and behavioural science to support COVID-19 pandemic response. *Nat Hum Behav* 2020; **4:** 460–71.

44 Azevedo JP, Hasan A, Goldemberg D, Iqbal SA, Geven K. Simulating the potential impacts of covid-19 school closures on schooling and learning outcomes: a set of global estimates. June 18, 2020. https://www.worldbank.org/en/topic/education/publication/simulating-potential-impacts-of-covid-19-school-closures-learning-outcomes-a-set-of-global-estimates (accessed Sept 6, 2020).

45 UN Sustainable Development Group. Policy brief: education during COVID-19 and beyond. August, 2020. https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf (accessed Sept 6, 2020).

46 Couzin-Frankel J, Vogel G, Weiland M. Not open and shut. *Science* 2020; **369:** 241–45.

47 European Center for Disease Control. COVID-19 in children and the role of school settings in COVID-19 transmission. Aug 6, 2020. https://www.ecdc.europa.eu/en/publications-data/children-and-school-settings-covid-19-transmission#copy-to-clipboard (accessed Sept 6, 2020).

48 Dutch National Institute for Public Health and the Environment. Children and schools. Sept 2, 2020. https://www.rivm.nl/en/novel-coronavirus-covid-19/children-and-covid-19 (accessed Sept 6, 2020).

49 National Academies of Sciences, Engineering, and Medicine. Infectious disease mitigation in airports and on aircraft. Washington, DC: The National Academies Press, 2013.

50 Facundo Alvaredo LC. Thomas Piketty, Emmanuel Saez, Gabriel Zucman. World inequality report 2018. https://wir2018.wid.world/ (accessed Sept 6, 2020).

51 Schaeffer K. 6 facts about economic inequality in the U.S. Feb 7, 2020. https://www.pewresearch.org/fact-tank/2020/02/07/6-facts-about-economic-inequality-in-the-u-s/ (accessed Aug 31, 2020).

52 Lasco G. Medical populism and the COVID-19 pandemic. *Glob Public Health* 2020; published online Aug 11. https://doi.org/10.1080/17441692.2020.1807581.

53 Aronson JK, DeVito N, Ferner RE, Mahtani KR, Nunan D, Plüddemann A. The ethics of COVID-19 treatment studies: too many are open, too few are double-masked. June 30, 2020. https://www.cebm.net/covid-19/the-ethics-of-covid-19-treatment-studies-too-many-are-open-too-few-are-double-masked/ (accessed Sept 6, 2020).

54 Yang J, Zheng Y, Gou X, et al. Prevalence of comorbidities and its effects in patients infected with SARS-CoV-2: a systematic review and meta-analysis. *Int J Infect Dis* 2020; **94:** 91–95.

55 Global Preparedness Monitoring Board. A world at risk: annual report on global preparedness for health emergencies. September 2019. https://apps.who.int/gpmb/assets/annual_report/GPMB_annualreport_2019.pdf (accessed Sept 6, 2020).

56 Myers J. 5 things COVID-19 has taught us about inequality. Aug 18, 2020. https://www.weforum.org/agenda/2020/08/5-things-covid-19-has-taught-us-about-inequality/ (accessed Sept 6, 2020).

57 Devlin K, Moncus JJ. Many around the world were pessimistic about inequality even before pandemic. Aug 6, 2020. https://www.pewresearch.org/fact-tank/2020/08/06/many-around-the-world-were-pessimistic-about-inequality-even-before-pandemic/ (accessed Sept 6, 2020).

58 Organisation for Economic Cooperation and Development. OECD employment outlook 2020: worker security and the COVID-19 Crisis. July 7, 2020. https://www.oecd-ilibrary.org/employment/oecd-employment-outlook-2020_1686c758-en (accessed Sept 6, 2020).

59 Heymann J, Raub A, Waisath W, et al. Protecting health during COVID-19 and beyond: a global examination of paid sick leave design in 193 countries. *Glob Public Health* 2020; **15:** 925–34.

60 International Labour Organization. COVID-19: protecting migrant workers in the workplace. https://www.ilo.org/global/topics/labour-migration/WCMS_748791/lang--en/index.htm.

61 Subramaniam G. The compounding impacts of COVID-19 on migrant workers across Asia (Part 1). July 22, 2020. https://www.ihrb.org/focus-areas/migrant-workers/covid19-migrant-workers-overview (accessed Sept 6, 2020).

62 Finch WH, Finch MEH. Poverty and COVID-19: rates of incidence and deaths in the United States during the first 10 weeks of the pandemic. *Frontiers in Sociology* 2020; **5:** 47.

63 Baeten R, Spasova S, Vanhercke B, Coster S. Inequalities in access to healthcare. A study of national policies 2018. Brussels: European Commission, 2018.

64 Shadmi E, Chen Y, Dourado I, Faran-Perach I, Furler J, Hangoma P, et al. Health equity and COVID-19: global perspectives. *Int J Equity Health* 2020; **19:** 104.

65 World Bank and WHO. Half the world lacks access to essential health services, 100 million still pushed into extreme poverty because of health expenses. Dec 13, 2017. https://www.worldbank.org/en/news/press-release/2017/12/13/world-bank-who-half-world-lacks-access-to-essential-health-services-100-million-still-pushed-into-extreme-poverty-because-of-health-expenses (accessed Sept 6, 2020).

66 Williams S, Tsiligianni I. COVID-19 poses novel challenges for global primary care. *NPJ Prim Care Respir Med* 2020; published online Jun 18. https://doi.org/10.1038/s41533-020-0187-x.

67 US Food and Drug Administration. Safeguarding pharmaceutical supply chains in a global economy: hearing before the House Committee on Energy and Commerce, Subcommittee on Health. Oct 30, 2019. https://www.fda.gov/news-events/congressional-testimony/safeguarding-pharmaceutical-supply-chains-global-economy-10302019 (accessed Sept 6, 2020).

68 Bambra C, Riordan R, Ford J, Matthews F. The COVID-19 pandemic and health inequalities. *J Epidemiol Community Health* 2020; published onlin June 13. https://doi.org/10.1136/jech-2020-214401.

69 Joint Economic Committee. The impact of coronavirus on the working poor and people of color. 2020. https://www.jec.senate.gov/public/_cache/files/bbaf9c9f-1a8c-45b3-816c-1415a2c1ffee/coronavirus-race-and-class-jec-final.pdf (accessed Sept 6, 2020).

70 Galea S, Abdalla SM. COVID-19 pandemic, unemployment, and civil unrest: underlying deep racial and socioeconomic divides. *JAMA* 2020; **324:** 227–28.

71 UN Development Programme. Gender inequality and the COVID-19 crisis: a human development perspective. July 13, 2020. http://hdr.undp.org/en/content/gender-inequality-and-covid-19-crisis-human-development-perspective (accessed Sept 6, 2020).

72 Centers for Disease Control and Prevention. Health equity considerations and racial and ethnic minority groups. July 24, 2020. https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html (accessed Sept 6, 2020).

73 Hotez P. Blue marble health: an innovative plan to fight diseases of the poor amid wealth. Baltimore: Johns Hopkins University Press, 2016.

74 WHO. COVID-19 Virtual Press conference. July 20, 2020. https://www.who.int/docs/default-source/coronaviruse/transcripts/covid-19-virtual-press-conference---20-july.pdf (accessed Sept 6, 2020).

75 Red Eclesial Panamazonica, Coordinadora de las Organisaciones Indigenas de la Cuenca Amazonica. Impacto del COVID-19 en los pueblos Indígenas de la Cuenca Amazónica. Aug 25, 2020. https://drive.google.com/file/d/10_EIOJVeaFZ57PimLw4r_BnRxYFdYUhH/view (accessed Sept 6, 2020).

76 García-Escribano M. Low internet access driving inequality. June 29, 2020. https://blogs.imf.org/2020/06/29/low-internet-access-driving-inequality/ (accessed Sept 6, 2020).

77 Perrin A. Digital gap between rural and nonrural America persists. May 31, 2019. https://www.pewresearch.org/fact-tank/2019/05/31/digital-gap-between-rural-and-nonrural-america-persists/ (accessed Sept 6, 2020).

78 Seifert A. The digital exclusion of older adults during the COVID-19 pandemic. *J Gerontol Soc Work* 2020; **13:** 1–3.

79 The Lancet. The plight of essential workers during the COVID-19 pandemic. *Lancet* 2020; **395:** 1587.

80 Guyot K, Sawhill IV. Telecommuting will likely continue long after the pandemic. April 6, 2020. https://www.brookings.edu/blog/up-front/2020/04/06/telecommuting-will-likely-continue-long-after-the-pandemic/ (accessed Sept 6, 2020).

81 Singh GK, Girmay M, Allender M, Christine RT. Digital divide: marked disparities in computer and broadband internet use and associated health inequalities in the United States. *Int J Translational Medical Research Public Health* 2019; **4:** 64–79.

82 Li C, Lalani F. The COVID-19 pandemic has changed education forever. This is how. April 29, 2020. https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/ (accessed Sept 6, 2020).

83 Bakhtiar M, Elbuluk N, Lipoff JB. The digital divide: how Covid-19's telemedicine expansion could exacerbate disparities. *J Am Acad Dermatol* 2020; published online July 16. https://doi.org/10.1016/j.jaad.2020.07.043.

84 Organisation for Economic Cooperation and Development. Combatting COVID-19's effect on children. Aug 11, 2020. https://read.oecd-ilibrary.org/view/?ref=132_132643-m91j2scsyh&title=Combatting-COVID-19-s-effect-on-children (accessed Sept 6, 2020).

85 International Labour Organization. World employment and social outlook: trends 2020. Geneva: International Labour Office, 2020.

86 Organisation for Economic Cooperation and Development. Employment database—employment indicators. 2020. https://www.oecd.org/employment/emp/employmentdatabase-employment.htm (accessed Sept 6, 2020).

87 Cox J. Second-quarter GDP plunged by worst-ever 32·9% amid virus-induced shutdown. July 30, 2020. https://www.cnbc.com/2020/07/30/us-gdp-q2-2020-first-reading.html (accessed Sept 6, 2020).

88 The Conference Board. The Conference Board Consumer confidence index decreased in August. Aug 25, 2020. https://conference-board.org/data/consumerconfidence.cfm (accessed Sept 6, 2020).

89 Chavez-Dreyfuss G. The pandemic bull market: S&P 500 closes at record high. Aug 18, 2020. https://www.reuters.com/article/us-usa-stocks/the-pandemic-bull-market-sp-500-closes-at-record-high-idUSKCN25E1C0 (accessed Sept 6, 2020).

90 Frank R. American billionaires got $434 billion richer during the pandemic. May 21, 2020. https://www.cnbc.com/2020/05/21/american-billionaires-got-434-billion-richer-during-the-pandemic.html (accessed Sept 6, 2020).

91 Oxfam International. Half a billion people could be pushed into poverty by coronavirus, warns Oxfam. April 9, 2020. https://www.oxfam.org/en/press-releases/half-billion-people-could-be-pushed-poverty-coronavirus-warns-oxfam (accessed Sept 6, 2020).

92 UN Food and Agriculture Organization. Food security under the COVID-19 pandemic. 2020. http://www.fao.org/3/ca8873en/CA8873EN.pdf (accessed Sept 6, 2020).

93 UN Food and Agriculture Organization. The state of food security and nutrition in the world, 2019. 2019. http://www.fao.org/3/ca5162en/ca5162en.pdf (accessed Sept 6, 2020).

94 UN Food and Agriculture Organization. Keeping food and agricultural systems alive: analyses and solutions in response to COVID-19. 2020. http://www.fao.org/documents/card/en/c/ca8822en/ (accessed Sept 6, 2020).

95 UN Food and Agriculture Organization. Responding to COVID-19 food disruptions in Africa. 2020. http://www.fao.org/documents/card/en/c/cb0551en (accessed Sept 6, 2020).

96 Bauer L. About 14 million children in the US are not getting enough to eat. July 9, 2020. https://www.brookings.edu/blog/up-front/2020/07/09/about-14-million-children-in-the-us-are-not-getting-enough-to-eat/ (accessed Sept 6, 2020).

97 Cénat JM, Dalexis RD, Kokou-Kpolou CK, Mukunzi JN, Rousseau C. Social inequalities and collateral damages of the COVID-19 pandemic: when basic needs challenge mental health care. *Int J Public Health* 2020; **65:** 717–18.

98 Youn SJ, Creed TA, Stirman SW, Marques L. Hidden Inequalities: COVID-19's Impact on our mental health workforce. 2020. https://adaa.org/learn-from-us/from-the-experts/blog-posts/professional/hidden-inequalities-covid-19s-impact-our (accessed Sept 6, 2020).

99 Kola L. Global mental health and COVID-19. *Lancet Psychiatry* 2020; **7:** 655–57.

100 de Paz C, Muller M, Munoz Boudet AM, Gaddis I. Gender dimensions of the COVID-19 pandemic. Washington, DC: World Bank, 2020.

101 Ajayi A. I, Mwoka MM. The potential impact of COVID-19 on teenage pregnancy in Kenya. June 17, 2020. https://aphrc.org/blogarticle/the-potential-impacts-of-covid-19-on-teenage-pregnancy-in-kenya/ (accessed Sept 6, 2020).

102 UN. COVID-19 could lead to millions of unintended pregnancies, new UN-backed data reveals. April 28, 2020. https://news.un.org/en/story/2020/04/1062742 (accessed Sept 6, 2020).

103 Jin J-M, Bai P, He W, et al. Gender differences in patients with COVID-19: focus on severity and mortality. *Front Public Health* 2020; **8:** 152.

104 UN Development Programme. Gender-based violence and COVID-19. May 11, 2020. https://www.undp.org/content/undp/en/home/librarypage/womens-empowerment/gender-based-violence-and-covid-19.html (accessed Sept 6, 2020).

105 UN Women. UN Women raises awareness of the shadow pandemic of violence against women during COVID-19. May 27, 2020. https://www.unwomen.org/en/news/stories/2020/5/press-release-the-shadow-pandemic-of-violence-against-women-during-covid-19 (accessed Sept 6, 2020).

106 Barone E. Women were making historic strides in the workforce. Then the pandemic hit. June 10, 2020. https://time.com/5851352/women-labor-economy-coronavirus/ (accessed Sept 6, 2020).

107 Savage M. How COVID-19 is changing women's lives. July 1, 2020. https://www.bbc.com/worklife/article/20200630-how-covid-19-is-changing-womens-lives (accessed Sept 6, 2020).

108 McLaren HJ, Wong KR, Nguyen KN, Mahamadachchi KND. COVID-19 and women's triple burden: vignettes from Sri Lanka, Malaysia, Vietnam and Australia. *Soc Sci* 2020; **9:** 87.

109 Ghebreyesus TA. Female health workers drive global health: we will drive gender-transformative change. March 20, 2019. https://www.who.int/news-room/commentaries/detail/female-health-workers-drive-global-health (accessed Sept 6, 2020).

110 Organisation for Economic Cooperation and Development. Women at the core of the fight against COVID-19 crisis. April 1, 2020. https://www.oecd.org/coronavirus/policy-responses/women-at-the-core-of-the-fight-against-covid-19-crisis-553a8269/ (accessed Sept 6, 2020).

111 Taub A. Why are women-led nations doing better with COVID-19? May 15, 2020. https://www.nytimes.com/2020/05/15/world/coronavirus-women-leaders.html (accessed Sept 6, 2020).

112 Jezard A. Women make up less than a quarter of the world's politicians—but these countries are bucking the trend. Dec 1, 2017. https://www.weforum.org/agenda/2017/12/countries-with-most-female-politicians/ (accessed Sept 6, 2020).

113 US Congressional Budget Office. CBO's current projections of output, employment, and interest rates and a preliminary look at federal deficits for 2020 and 2021. April, 2020. https://www.cbo.gov/publication/56335 (accessed Sept 6, 2020).

114 International Monetary Fund. World economic outlook update, June 2020. June 2020. https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020 (accessed Sept 6, 2020).

115 Organisation for Economic Cooperation and Development. The 0·7% ODA/GNI target—a history. 2019. https://www.oecd.org/dac/stats/the07odagnitarget-ahistory.htm (accessed Sept 6, 2020).

116 Columbia Center on Sustainable Investment. Primer: international investment treaties and investor–state dispute settlement. May 31, 2019. http://ccsi.columbia.edu/2019/06/03/primer-international-investment-treaties-and-investor-state-dispute-settlement/ (accessed Sept 6, 2020).

117 Gaspar V, Gopinath G. Fiscal policies for a transformed world. July 10, 2020. https://blogs.imf.org/2020/07/10/fiscal-policies-for-a-transformed-world (accessed Sept 6, 2020).

118 International Monetary Fund. COVID-19 financial assistance and debt service relief. Aug 26, 2020. https://www.imf.org/en/Topics/imf-and-covid19/COVID-Lending-Tracker (accessed Sept 6, 2020).

119 International Monetary Fund. IMF rapid credit facility (RCF). April 9, 2020. https://www.imf.org/en/About/Factsheets/Sheets/2016/08/02/21/08/Rapid-Credit-Facility (accessed Sept 6, 2020).

120 International Monetary Fund. The IMF's rapid financing instrument (RFI). April 9, 2020. https://www.imf.org/en/About/Factsheets/Sheets/2016/08/02/19/55/Rapid-Financing-Instrument (accessed Sept 6, 2020).

121 International Monetary Fund. IMF executive board approves immediate debt relief for 25 countries. April 13, 2020. https://www.imf.org/en/News/Articles/2020/04/13/pr20151-imf-executive-board-approves-immediate-debt-relief-for-25-countries (accessed Sept 6, 2020).

122 The World Bank. World Bank Group President David Malpass: remarks at high-level event on financing for development in the era of COVID-19 and beyond. May 28, 2020. https://www.worldbank.org/en/news/speech/2020/05/28/world-bank-group-president-david-malpass-remarks-at-high-level-event-on-financing-for-development-in-the-era-of-covid-19-and-beyond (accessed Sept 6, 2020).

123 The World Bank. Amid multiple crises, World Bank Group refocuses programs and increases financing to $74 billion in fiscal year 2020. July 10, 2020. https://www.worldbank.org/en/news/press-release/2020/07/10/amid-multiple-crises-world-bank-group-refocuses-programs-and-increases-financing-to-74-billion-in-fiscal-year-2020 (accessed Sept 6, 2020).

124 The World Bank. COVID 19: debt service suspension initiative. June 19, 2020. https://www.worldbank.org/en/topic/debt/brief/covid-19-debt-service-suspension-initiative (accessed Sept 6, 2020).

125 Budd J, Miller BS, Manning EM, et al. Digital technologies in the public-health response to COVID-19. *Nat Med* 2020; **26:** 1183–92.

126 Broadband Commission for Sustainable Development. COVID-19 crisis broadband Commission agenda for action for faster and better recovery. 2020. https://broadbandcommission.org/COVID19/Pages/default.aspx (accessed Sept 6, 2020).

127 UN. United Nation's Secretary-General's roadmap for digital cooperation. June 2020. https://www.un.org/en/content/digital-cooperation-roadmap/ (accessed Sept 6, 2020).

128 UNICEF. COVID-19: at least a third of the world's schoolchildren unable to access remote learning during school closures, new report says. Aug 26, 2020. https://www.unicef.org/press-releases/covid-19-least-third-worlds-schoolchildren-unable-access-remote-learning-during (accessed Sept 6, 2020).

129 WHO. Immunizing the public against misinformation. Aug 25, 2020. https://www.who.int/news-room/feature-stories/detail/immunizing-the-public-against-misinformation (accessed Sept 6, 2020).

130 WHO. Draft landscape of COVID-19 candidate vaccines. Sept 3, 2020. https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines (accessed Sept 6, 2020).

131 Bartsch SM, O'Shea KJ, Ferguson MC, et al. Vaccine efficacy needed for a COVID-19 coronavirus vaccine to prevent or stop an epidemic as the sole intervention. *Am J Prev Med* 2020; published online July 15. https://doi.org/10.1016/j.amepre.2020.06.011.

132 Mahase E. Covid-19: Russia approves vaccine without large scale testing or published results. *BMJ* 2020; **370:** m3205.

133 Stracqualursi V. Trump, without evidence, accuses FDA of delaying coronavirus vaccine trials and pressures agency chief. Aug 23, 2020. https://www.cnn.com/2020/08/22/politics/trump-fda-coronavirus-vaccine/index.html vaccines (accessed Sept 6, 2020).

134 Hotez PJ, Corry DB, Strych U, Bottazzi ME. COVID-19 vaccines: neutralizing antibodies and the alum advantage. *Nat Rev Immunol* 2020; **20:** 399–400.

135 Seventy-third World Health Assembly. COVID-19 response. May 19, 2020. https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_R1-en.pdf (accessed Sept 6, 2020).

136 Kupferschmidt K. 'Vaccine nationalism' threatens global plan to distribute COVID-19 shots fairly. July 28, 2020. https://www.sciencemag.org/news/2020/07/vaccine-nationalism-threatens-global-plan-distribute-covid-19-shots-fairly (accessed Sept 6, 2020).

137 Patel M, Lee AD, Redd SB, et al. Increase in measles cases—United States, January 1–April 26, 2019. *MMWR Morb Mortal Wkly Rep* 2019; **68:** 402–04.

138 Hotez PJ. COVID-19 meets the antivaccine movement. *Microbes Infect* 2020; **22:** 162–64.

139 WHO. Global research on coronavirus disease (COVID-19) 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov.

140 Peters GP, Marland G, Quéré CL, Boden T, Canadell JG, Raupach MR. Rapid growth in CO2 emissions after the 2008–2009 global financial crisis. *Nat Clim Chang* 2012; **2:** 2–4.

141 Organisation for Economic Cooperation and Development. Youth and COVID-19: response, recovery and resilience. June 11, 2020. http://www.oecd.org/coronavirus/policy-responses/youth-and-covid-19-response-recovery-and-resilience-c40e61c6/ (accessed Sept 6, 2020).

142 Guerriero C, Haines A, Pagano M. Erratum: author correction: health and sustainability in post-pandemic economic policies. *Nat Sustain* 2020; **3:** 1.

143 Gallagher KP, Ocampo JA, Volz U. IMF special drawing rights: a key tool for attacking a COVID-19 financial fallout in developing countries. March 26, 2020. https://www.brookings.edu/blog/future-development/2020/03/26/imf-special-drawing-rights-a-key-tool-for-attacking-a-covid-19-financial-fallout-in-developing-countries/ (accessed Sept 6, 2020).

144 European Council. Special European Council, 17–21 July 2020. https://www.consilium.europa.eu/en/meetings/european-council/2020/07/17-21/ (accessed Sept 6, 2020).

145 European Union. Coronavirus response. September 2020. https://ec.europa.eu/info/live-work-travel-eu/health/coronavirus-response_en (accessed Sept 6, 2020).

146 African Union. Africa joint continental strategy for COVID-19 outbreak. 2020. https://au.int/sites/default/files/documents/38264-doc-africa_joint_continental_strategy_for_covid-19_outbreak.pdf (accessed Sept 6, 2020).

147 UN. Speakers call for reinvigorated multilateralism, stronger diplomacy to address global crises, as General Assembly marks International Day. April 24, 2019. https://www.un.org/press/en/2019/ga12140.doc.htm (accessed Sept 6, 2020).

148 Rogers K, Mandavilli A. Trump administration signals formal withdrawal from W.H.O. July 7, 2020. https://www.nytimes.com/2020/07/07/us/politics/coronavirus-trump-who.html (accessed Sept 6, 2020).

149 International Monetary Fund. Special drawing right (SDR). March 24, 2020. https://www.imf.org/en/About/Factsheets/Sheets/2016/08/01/14/51/Special-Drawing-Right-SDR (accessed Sept 6, 2020).