

Interconnected Disaster Risks
2020/2021

COVID-19 Pandemic

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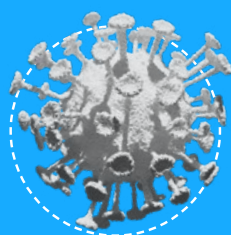
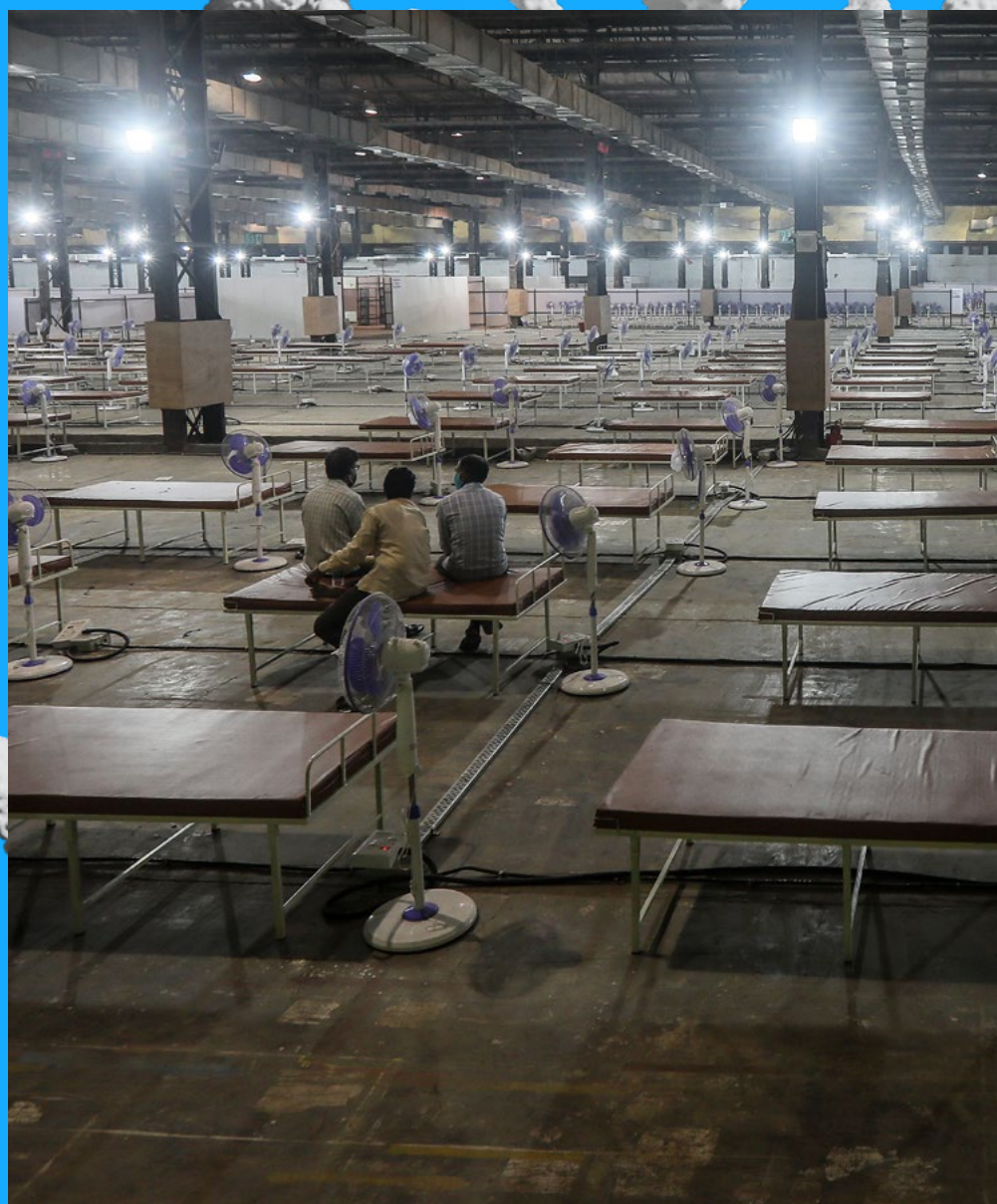


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1. Event

The coronavirus disease 2019 (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (WHO, 2021c). SARS-CoV-2 is spreading globally from human to human primarily through droplets of saliva or discharge from the nose, especially when an infected person coughs or sneezes (WHO, 2021c). Globally, 197,771,546 people had been officially infected as of 1 August 2021 (WHO, 2021a). Cases have been reported in nearly every country¹ of the world, turning COVID-19 into a pandemic. This pandemic has led to grave health, social and economic impacts and can be considered one of the worst crises in the last century (Sachs and others, 2020).

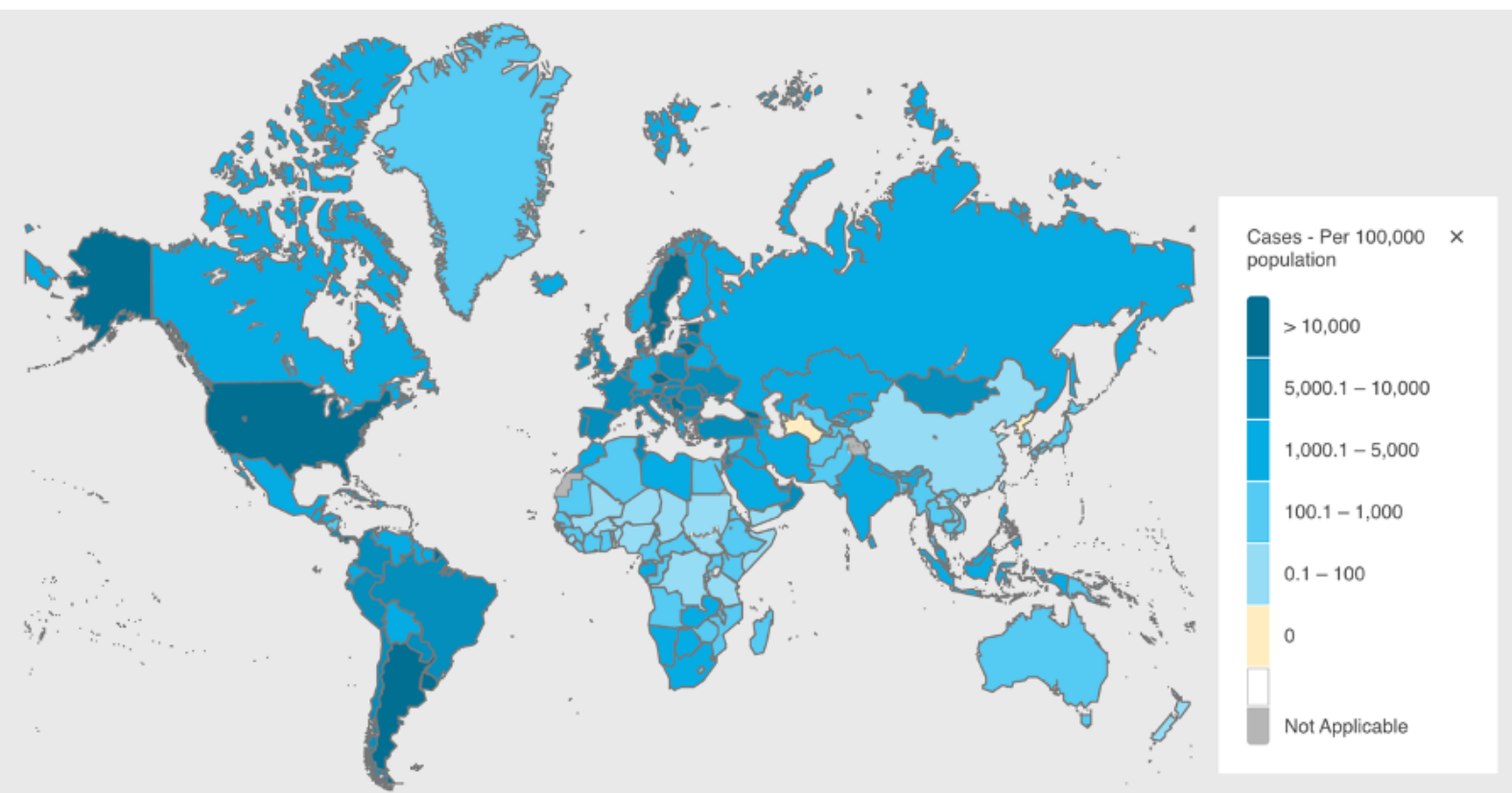


Figure 1: COVID-19 cases per 100,000 population, as of 1 August 2021 (WHO, 2021a).

¹ American Samoa, Cook Islands, Democratic People's Republic of Korea, Kiribati, Micronesia (Federal States of Micronesia), Nauru, Niue, Palau, Pitcairn Islands, Saint Helena, Tokelau, Tonga, Turkmenistan and Tuvalu reported no official cases as of 1 August 2021 (WHO, 2021a).

2. Impacts

While the majority of people infected with COVID-19 will only experience mild to moderate respiratory symptoms and recover without requiring special treatment, some people develop severe illness which can lead to long-lasting damage or result in death (WHO, 2021c). Elder people and those with underlying pre-existing medical conditions like cardiovascular disease, diabetes, cancer or chronic respiratory disease are especially vulnerable, and are therefore likely to develop a severe illness (WHO, 2021c). Globally, as of 1 August 2021, 4,219,573 deaths had been officially reported to the World Health Organization (WHO) (WHO, 2021a) (see Figure 2).

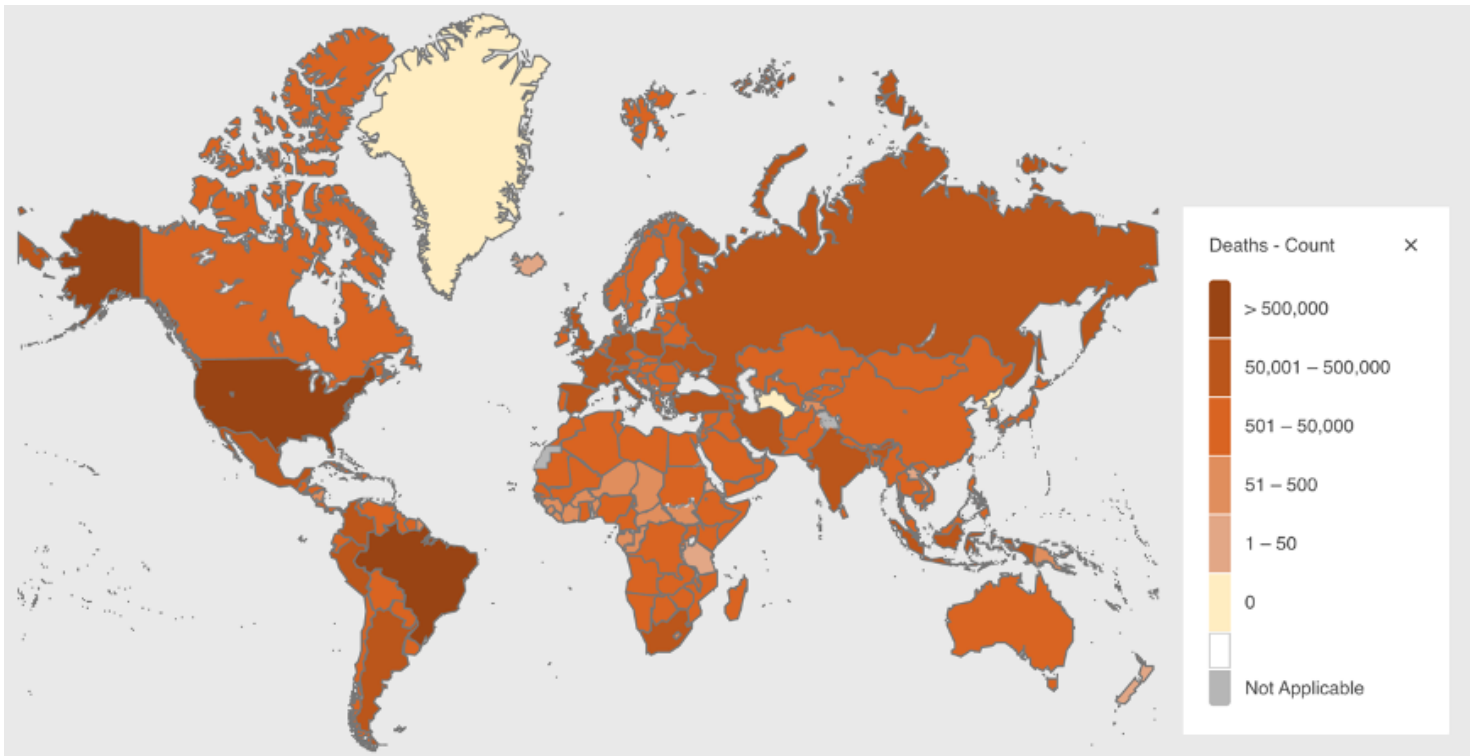


Figure 2: Total deaths due to COVID-19, as of 1 August 2021 (WHO, 2021a).

To prevent infections and slow down the transmission rate of SARS-CoV-2, most countries implemented non-pharmaceutical interventions, like social-distancing measures, school closures or bans on public events, referred to as lockdowns (Haug and others, 2020). Lockdowns suppressed the spread of the virus and prevented many direct impacts and deaths, but they also had wide-reaching societal effects, indirectly impacting the economy, social life and mental health (IMF, 2021; DISD, 2021; Pfefferbaum & North, 2020). Emblematic for some of those impacts are the following:

- Business closures and lockdowns led to a shrinkage of the global economy by 3.5 per cent in 2020 (IMF, 2021) and potentially pushed between 88 million and 115 million people into extreme poverty (World Bank, 2020). This increases financial vulnerability to future hazards (World Bank, 2020) and the need for social assistance and insurances (IMF, 2021).
- Closure of local markets and supply-chain interruptions led to increased food insecurity, mostly in Asia and Africa (FAO and others, 2021). According to the Food and Agriculture Organization of the United Nations (FAO) Food Price index (FFPI), food prices rose between May 2020 and May 2021 by around 40 per cent (FAO, 2021). Between 720 to 811 million people are projected to have faced hunger in 2020, around 118 million more than in 2019 (FAO and others, 2021). COVID-19 was not the sole reason for this increase but contributed to it (FAO and others, 2021).
- Travel restrictions led to the breakdown of the tourist industry (WTTC, 2021). While the travel and tourism sector contributed 10.4 per cent to global gross domestic product (GDP) in 2019, in 2020 this share decreased to 5.5 per cent. This amounts to 62 million lost jobs and an overall loss of around US\$4.5 trillion in the travel and tourism sector globally (WTTC, 2021).
- Group-size restrictions, including isolation, quarantines and stay-at-home orders, as well as the loss of family members and friends, potentially intensify emotional distress and mental health problems with alarming implications for emotional and social functioning (Pfefferbaum & North, 2020).
- School closures led to losses in learning with potentially long-lasting impacts for students and their countries: first estimates suggest that globally students in grades 1–12 affected by the closures might expect some three per cent lower income over their entire lifetimes, which would mean an average of 1.5 per cent lower annual GDP in affected nations for the remainder of the century (Hanushek & Woessman, 2020).



There are numerous other indirect impacts, of which most are as yet hard to quantify or predict. Looking at the effects of COVID-19 on the Sustainable Development Goals (SDGs), it becomes evident that the pandemic has led to a significant setback in achieving them, especially in low- and middle-income countries (LMICs) or population groups (Sachs and others, 2020). According to Sachs and others (2020), the pandemic had particularly severe impacts on five SDGs, including SDG 1 on poverty reduction, SDG 2 on food security, SDG 3 on good health and well-being, SDG 8 on decent work and economic growth, and SDG 10 on reduced inequalities. Of the remaining 12, eight SDGs are classified as mixed or moderately impacted, while for four SDGs (SDGs 12, 13, 14, and 15) the impacts are still mostly unclear (Sachs and others, 2020).

In addition to its devastating impacts, the pandemic exacerbated many other co-occurring disasters in 2020, leading to compounding negative impacts. These include the Beirut Explosion, Desert Locust Outbreak, Texas Cold Wave, Cyclone Amphan and the Central Viet Nam Floods (see main report, Chapter 3.1 – Deep dive into the interconnectivity of 10 disastrous events). Simultaneously, other disasters worsened the impact of COVID-19 as well. For example, destroyed health capacities after the Beirut explosion and cyclone Amphan lowered the capacities to respond to COVID-19 (see Technical Reports, Beirut Explosion and Cyclone Amphan). These compounding impacts often hit the most vulnerable the hardest (Phillips and others, 2020), while further heightening their vulnerability to future hazards (Kruczkiewicz and others, 2021).

3. Drivers

In view of these impacts, this section explores the main drivers that contributed to COVID-19.

Zoonotic disease emergence

SARS-CoV-2 most likely originated in wildlife before it adapted to humans as potential hosts and is therefore considered a zoonosis (Platto and others, 2020). 'Zoonotic disease' or 'zoonosis' are terms for all diseases that emerge in wildlife² first before transmitting to humans (Horby and others, 2014). These diseases account currently for roughly 60 per cent of all human diseases (Horby and others, 2014), although the emergence of new zoonotic diseases can be observed at an increasing rate (Han and others, 2016; Wilcox & Colwell, 2005; Marin Ferrer and others, 2020).

As ecological systems are very complex, it is impossible to predict when and under what circumstances 'crossovers' from animal microbes to humans can and will exactly occur. In most cases, however, they are caused by changes to ecological systems (Wilcox & Colwell, 2005; Jones and others, 2013). These changes are, in most cases, driven by anthropogenic activities such as the following (Platto and others, 2020; Jones and others, 2008):

Wildlife trade

The wildlife trade and hunting have been a frequent origin of zoonotic disease emergence: HIV, Nipah and Ebola virus are recent examples of it (Horby and others, 2014). Wildlife hunting in itself already exposes humans to direct contact with several forms of wildlife. In handling wildlife for food consumption or the exotic pet industry, many workers are exposed to living and dead wildlife (Dobson and others, 2020).

² There is still a debate on whether SARS-Cov-2 could have also been first transmitted to humans in the Wuhan Institute of Virology, a laboratory researching bat coronaviruses (Rasmussen 2021). Still, even if this hypothesis turns out to be correct it remains essential to discuss the risk of zoonotic disease emergence.

Intensified livestock farming

Over the past 50 years livestock farming strongly intensified, with serious implications for the risk of zoonotic disease emergence (Ritchie & Roser, 2017). Livestock increases the risk of new zoonotic disease emergence in three ways: firstly, the intensification of production intensifies the emergence risk, both in large-scale industrial farming and in (self-sustaining) small-scale farming (IPBES, 2020; Horby and others, 2014); secondly, animal markets' greater global complexity and intensity allow the spread of viruses via an infected animal or its meat across locations – live animal (or wet) markets especially can become a source of infection for livestock and humans if hygiene standards are not met (Horby and others, 2014); thirdly, as intensified livestock farming is often synonymous with an increased use of antibiotics, intensified farming creates the perfect conditions for the development of bacteria with antimicrobial resistance (Horby and others, 2014).



Ecological disruptions

Although the potential for emergence of a new disease is generally higher in areas with high biodiversity (especially mammal species) due to the higher number of potential hosts (Pigott and others, 2014; Han and others, 2016), the loss of biodiversity counter-intuitively also increases this risk (Horby and others, 2014; Jones and others, 2013). This contradictory relationship has multiple reasons, one of which is that some species are more likely to be zoonotic hosts than others, for example bats and rodents (Keesing & Ostfeld, 2021). As these species proliferate, especially in a human-dominated landscape, the risk of transmission strongly increases with biodiversity decline (Keesing & Ostfeld, 2021). There is, therefore, a clear positive relationship between biodiversity conservation and the reduction of zoonotic disease emergence (Horby and others, 2014; Keesing and others, 2010).

Many anthropogenic activities are responsible for a loss in biodiversity, but in the context of the emergence of zoonotic diseases most attention should be paid to deforestation. Deforestation increases the risk of a new emergence of zoonotic disease by reducing biodiversity, but also by forcing wild animals to stay in proximity to humans (Platto and others, 2020).



Global health security capacity

Health security capacity is the ability to reduce the risk and impact of health events that endanger populations; it encompasses prevention, detection and reporting, as well as rapid response, health system compliance with international norms, and the overall risk environment associated with biological threats (GHS Index, 2019). According to the Global Health Security Index (2019), no country was fully prepared for a pandemic outbreak in 2019. Considering the impacts of COVID-19, which are still rising as this report is being launched, this assessment proved to be true. The reasons for the observed shortcomings differ vastly across nations. Only a few deficiencies can be explained here that demonstrate how ineffective global health security capacities turned out to be for the COVID-19 pandemic.

Preparation

One aspect to highlight is the lack of basic supplies needed to respond to a health crisis around the world: a very limited number of nations had face masks or protective suits sufficiently stockpiled, and there was no international system in place to make them available for countries most in need (The Independent Panel for Pandemic Preparedness and Response, 2021). When this deficit materialized in April 2020, more than 70 countries imposed controls of some form on the export of medical supplies, making it even harder for many countries – especially for low- and middle-income countries (LMICs) – to meet fundamental safety requirements (Nkengasong, 2020). In the summer of 2021, a comparable shortage situation has arisen concerning medical oxygen in LMICs (WHO, 2021b).

Rapid response

According to the International Health Regulations (IHR) 2005, the most robust alert system currently for health crises is the declaration of the Public Health Emergency of International Concern (PHEIC) (WHO, 2016). In the case of COVID-19, the declaration came one month after the first cases of pneumonia of unknown cause had been reported to WHO and 19 countries had already confirmed cases of COVID-19 (The Independent Panel for Pandemic Preparedness and Response, 2021; WHO, 2021d). This delay poses the serious question over whether the current system is quick enough to prevent pandemics.

A quick alert system is only effective at preventing the outbreak of a pandemic if nations enforce strong response measures. A strikingly high amount of countries did not characterize COVID-19 as a 'pandemic', nor act upon it accordingly, until they had a significant amount of cases in their own territories, in March 2020 (The Independent Panel for Pandemic Preparedness and Response, 2021).

Already after the H1N1 influenza pandemic and the outbreak of Ebola in 2014, it had become clear that despite the existence of multiple organizations trying to respond to such a health emergency, strong coordination and cooperation in this field was lacking (Bloom & Cadarette, 2019; The Independent Panel for Pandemic Preparedness and Response, 2021). In the aftermath, WHO reacted by developing a new Health Emergencies Programme in 2016 to be internally better prepared for health emergencies. Yet a majority of recommendations made have never been implemented due to indifference by member states (Bloom & Cadarette, 2019; The Independent Panel for Pandemic Preparedness and Response, 2021).

Vaccination

The production, global distribution and acceptance of vaccines are essential to end a pandemic. COVID-19 Vaccines Global Access (COVAX) was launched in April 2020 with the goal of providing people around the world access to COVID-19 vaccines (Berkley, 2020). It aims at providing 2 billion doses by the end of 2021, enough to protect high-risk groups, especially vulnerable people, as well as healthcare workers on site (Berkley, 2020). Despite its development by WHO and the European Commission, and being backed by over 150 countries, administered vaccines have fallen short of COVAX's goal (Gleeson, 2021). Insufficient supply of vaccines in combination with the unwillingness to vaccinate will prolong the pandemic and become a core driver of further health impacts (Wake, 2021; Gleeson, 2021). As long as COVID-19 is not globally eradicated with the help of vaccines, new mutations might be developing in unvaccinated communities that could spread worldwide (Oxfam International, 2021).

International mobility

Over the past decades, the mobility connecting people all around the globe has significantly increased (Marin Ferrer and others, 2020). The total number of air passengers had risen drastically in the 40 years before the COVID-19 outbreak, from 648 million in 1979 to 4,396 million in 2019 (an increase of 578 per cent) (World Bank, 2021). Air transport plays an essential role in accelerating the spread of influenza to distinct geographical areas, and this holds true also for coronaviruses (Browne and others, 2016). However, imposing travel restrictions at national borders to limit the spread comes at a high cost, with negative economic and social impacts (Grépin and others, 2020). Considering these costs and the limited evidence on the effectiveness of travel restrictions, WHO did not advise implementing travel restrictions until it had issued the PHEIC on 30 January 2020 (Grépin and others, 2020). Looking back at the outbreak now, a review of studies suggests that travel restriction did help to slow down the global spread of the virus shortly after the outbreak, but the effect of travel restrictions has been short-lived (Grépin and others, 2020). Therefore, a driver of this particular disaster was the lack of an internationally-coordinated response in reducing mobility right after the outbreak, when it would have been the most effective. Once the virus did reach other countries, travel restrictions have become much less effective than local containment measures and behavioural changes (Chinazzi and others, 2020).

Despite the negative influence of COVID-19 on air transport, it is unlikely that the trend of increasing mobility will end or even reverse in the following decades. The 20 Year Passenger Forecast by the International Air Transport Association (IATA) in fact projects a global air passenger growth of 1.5 per cent and 3.6 per cent between 2021 and 2039 (2021).

4. Root causes

To reduce disaster risk systemically, one needs to search for root causes that fuel the discussed drivers of COVID-19 and the severity of described impacts. A disaster of the extent of COVID-19 has multiple root causes, but in this technical report only an emblematic selection is discussed. The chosen root causes directly contributed to the above-described drivers and are shared with other disastrous events (see main report, Chapter 3.2 – Deep dive into the root causes of 10 disastrous events).

Environmental costs and benefits undervalued in decision-making

The risk of zoonotic disease emergence is driven by anthropogenic activities, including wildlife trade, livestock farming and ecological disruptions, especially in the form of deforestation (as described in section 3 – Zoonotic disease emergence). These activities are partially rooted in decision-making processes that undervalue environmental costs when satisfying global demand pressures.

This can mean concretely that the global demand for meat and fur increases the risk of disease emergence due to facilitating profit-driven wildlife trade and hazardous livestock farming conditions (Borsky and others, 2020; Horby and others, 2014). In the last 50 years, global meat demand and production have more than tripled (Ritchie & Roser, 2017).

Wildlife meat is an important food source for some people, and the international demand for wildlife, like meat or exotic pets, can provide livelihood opportunities, especially for people in LMICs (Horby and others, 2014; Cooney and others, 2015). Wildlife trade can be sustainable and safe if it is, among other things, limited to species that are not threatened or endangered, and if general hygiene principles and sanitary standards are kept high along the whole value chain (Cooney and others, 2015; Stephen and others, 2021). This is often not the case; ongoing illegal wildlife trafficking networks entirely circumvent any form of disease prevention or management mechanism (UNEP, 2020).

Extensive deforestation and removal of valuable ecosystems are often caused by global supply and demand chains on which deforestation-risk commodities are traded (Ermgassen and others, 2020). Here, biodiversity loss is accepted as a necessary step for profit maximization and economic expansion (Platto and others, 2020; Moutinho and others, 2016). In this understanding, the importance of ecosystem services³ is drastically undervalued. The example of the Amazon rainforest shows how the root cause for deforestation and biodiversity loss can be found partially in global demand, primarily for meat and fodder, which is used to maximize profits without considering environmental impacts or costs (see Technical Report, Amazon Wildfires). At the same time, general economic expansion, urbanization or street net growth are also destroying and fragmenting habitat, drastically reducing biodiversity and carbon storage and leading to many impacts besides the increased risk of zoonotic disease emergence (RAISG, 2020).

Insufficient disaster risk management

COVID-19 has demonstrated how unprepared the world was for a pandemic of this extent. The low global health security capacity as presented in section 3 can be traced back to numerous root causes. In the following, three aspects of insufficient disaster risk management that are emblematic will be discussed:

Awareness

An essential element of disaster risk management is the perception of risk (see main report, Chapter 3.1 – Root Cause 2). Despite our recent experiences with the emergence of zoonotic disease, notably Nipah, Ebola and MERS (Horby and others, 2014), the perception of pandemic risk was such that it occurred too rarely and was considered too ‘distant’ for governments and institutions to have to prepare for (GPMB, 2020; The Independent Panel for Pandemic Preparedness and Response, 2021).

³ The concept of ‘ecosystem services’ encapsulates the benefits people receive from nature (see main report, Chapter 3.2 – Root Cause 3).

All scientific warnings about the danger of pandemics did not lead to a significant policy change nationally or internationally before COVID-19 (The Independent Panel for Pandemic Preparedness and Response, 2021). However, it was not only the underestimation of the risk of the occurrence of a global pandemic that led to a lack of preparation; it was also that the potential social and economic impacts of a pandemic had been fundamentally underestimated before COVID-19. Previously, the focus of pandemic preparation was on protecting people from direct adverse health effects, and little attention was paid to other societal aspects, such as the economy and education (GPMB, 2020). In other words, the potential cost of preparation was perceived as outweighing the potential impacts of an outbreak, and the potential impact of a global health crisis was underestimated. It is now apparent that those countries that experienced SARS-CoV-1 were more aware of the potential risks of a health crisis (GPMB, 2020). The lessons learned from SARS-CoV-1 are not fully transferable to SAR-CoV-2 because the former was better preventable as transmission mainly occurred after patients showed symptoms (Bell, 2004).

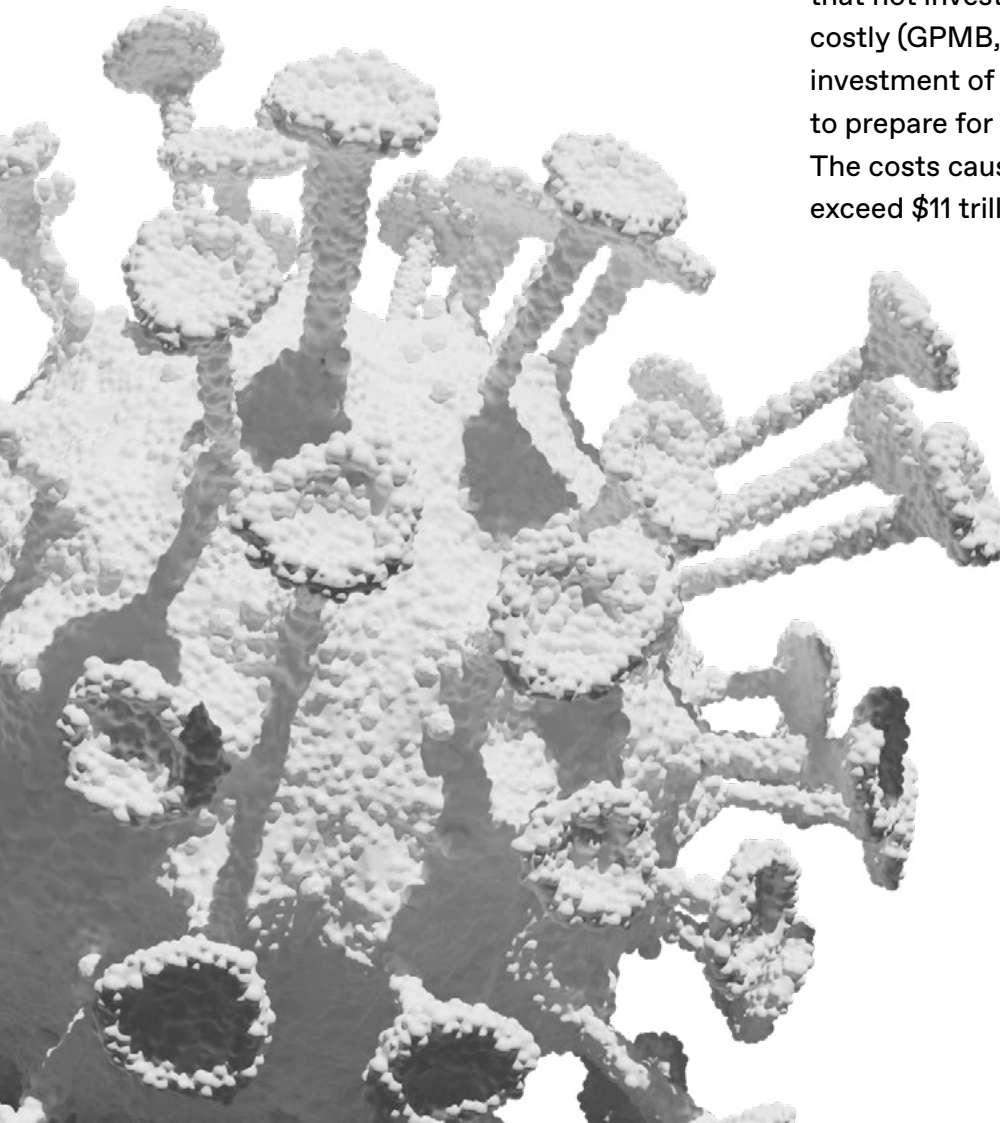
Trust in science and access to knowledge

At its core, disease prevention, like all forms of disaster risk management, relies on scientific research (Morris, 2020). However, academia was, and still is, facing two challenges that have proven to hamper science-driven processes during the pandemic: firstly, there has been an extraordinary amount of disinformation creating distrust in scientific knowledge (Zarocostas, 2020) and, secondly, it remains a challenge to communicate knowledge to both policymakers and individuals (Paakkari & Okan, 2020).

Misinformation, especially in times of a pandemic, can profoundly affect individual behaviour and disaster risk response, with a potential exacerbation of adverse impacts. For example, the false information that highly concentrated alcohol could disinfect the body and kill the virus led to the death of approximately 800 people across multiple countries (Islam and others, 2020). Misinformation and a lack of trust in science is not only dangerous on the individual level but can also reduce the effectiveness of policy responses to COVID-19 (The Independent Panel for Pandemic Preparedness and Response, 2021; Morris, 2020).

Funding

Before COVID-19, there was underinvestment in the preparedness and prevention of pandemics as global attention mainly focused on response financing (World Bank, 2019). Disease outbreaks are sporadic, and the perception of their importance similar to other high-impact, low-frequency events diminishes with time (Johnson, 2020; Funk and others, 2009). Furthermore, prevention might not be economically viable in the short term and could benefit people who are not those having to finance it (Morris, 2020). However, comparing the costs of needed measures to reduce the risk of a pandemic outbreak with the economic impacts of COVID-19 now demonstrates that not investing in prevention can turn out to be costly (GPMB, 2020; Dobson and others, 2020). An investment of \$5 per person a year is recommended to prepare for pandemics (Craven and others, 2021). The costs caused by COVID-19 are estimated to exceed \$11 trillion (GPMB, 2020).



5. Solutions

This chapter addresses solutions to the above-described drivers and root causes.

Reducing the risk of zoonotic disease emergence

Despite intensive research efforts, it remains challenging to predict where the next pandemic might originate (Han and others, 2016). Currently, it is estimated that only 0.1 per cent of the potential zoonotic viral risk has been discovered (IPBES, 2020). Therefore, it is crucial to reduce the overall risk of zoonotic disease emergence by addressing underlying causes, such as wildlife trade, livestock breeding and deforestation.

The wildlife trade needs to be reduced and controlled to ensure public safety (Dobson and others, 2020). At the same time, the wildlife trade provides a livelihood for many (for example, in China the industry is worth around \$20 billion and employs 15 million people) and is an essential source for traditional medicine and diets for many indigenous people (Dobson and others, 2020). Against this backdrop, all measures to combat wildlife trade need to be sensitive to ensure that a right to a traditional diet is granted and the adverse effects of measures are compensated (Dobson and others, 2020). As a starting point, the current monitoring conducted by CITES – a multilateral agreement to regulate international wildlife trade – should be extended beyond the legal international trade of wildlife. Both the domestic and illegal trade need to be monitored, or at least estimated (Borsky and others, 2020). However, before expanding monitoring activities the trade of wildlife could already be more strictly regulated in international trade agreements (Borsky and others, 2020).

Besides wildlife trade, increasing livestock farming has been identified as a driver of zoonotic disease emergence. Both drivers are partly rooted in globally high demand for animal products, most notably meat but also dairy products and fur. A global change in dietary patterns towards more sustainable, healthy consumption would reduce both drivers (Willett and others, 2019). Such changing of global demand pressures is a great challenge, regardless of what is in demand. In the context of meat demand, a mix of policies like certification programmes, taxing of meat consumption and livestock production or promoting more diverse responsible diets could alter demand patterns in the long run (IPBES, 2020). As an immediate short-term solution, the security and hygiene standards along the meat value chain should be increased and enforced. This includes ideas like introducing a mandatory ‘day off’ at animal markets, which could be used to clean the market thorough-

ly, or regulating the use of antibiotics in animal farming (Horby and others, 2014). However, it needs to be stressed that in implementing and enforcing these standards a cooperative approach together with (small-scale) farmers should be chosen to prevent an increase of illegal trade undermining the implemented standards (Horby and others, 2014).

The reduction of deforestation and other ecological disruptions could be achieved by mainstreaming the economic costs of biodiversity loss, climate change and pandemics into consumption, production prices and government budgets (IPBES, 2020). Direct forest-protection payments are highly effective solutions to reduce deforestation (Dobson and others, 2020).

Many more solutions on how to preserve biodiversity, including the promotion of protected areas and forest-protection payments, and the implementation of multilateral agreements to promote sustainable agricultural practices, are also relevant for reducing the risk of other disasters, including, for example, fire emergence in the Amazon rainforest (see Technical Report, Amazon Wildfires).

The opportunity for green recovery

The concept of green recovery has gained unprecedented popularity because of COVID-19. It describes the idea that the stagnation of economic activity can be used as an opportunity to restructure the economy and make it environmentally more sustainable (Gusheva & Gooyert, 2021). This can, for example, include measures for more sustainable mobility, support for green innovations and entrepreneurship, and the mainstreaming of climate and biodiversity into economic planning (Phillips & Heilmann, 2021).

Proponents of a green recovery argue that we should not hurry to get back to 'normal' as 'normal' is the root cause of the climate crisis. They argue that we face several crises and should prioritize those solutions that address more than one problem (Mukanjari & Sterner, 2020).

Currently, green recovery measures account for only two per cent of the \$14 billion in recovery and rescue-related COVID-19 spending (OECD, 2020). Furthermore, most green recovery measures focus on the energy and surface-transport sectors, while other sectors like agriculture, industry or aviation are building back with mixed or even negative impacts on climate change (OECD, 2020).

Enhanced disaster risk management

The emergence of new zoonotic diseases cannot be prevented with complete certainty. Therefore, we also need to find solutions for managing a pandemic after the disease has already emerged. We need to build better-prepared, resilient health systems and increase trust and funding in scientific processes.

Considering the described shortcomings of the current global health security capacity in section 3, five recommendations for immediate action can be derived: a) health systems need increased financing, b) the well-being of health workers needs to be guaranteed, c) global supply chains for medicine and products need to be transformed, d) health capacity needs to be improved to be able to deal with extreme demand spikes, and e) access to healthcare, including vaccines, needs to be granted to all (Haldane and others, 2021).

Increased international collaboration

The described shortcomings in section 3 show that there is direct potential for action in at least two areas:

- Implementation of a quick international alert system operating in a more preventative manner than the current PHEIC and supported by immediate action by most nations worldwide (The Independent Panel for Pandemic Preparedness and Response, 2021).
- The scale-up of COVAX to distribute vaccinations globally. This could be done by either delivering the vaccinations or sharing knowledge and building capacity to produce vaccinations in LMICs (Gleeson, 2021; Berkley, 2020).

Going beyond the solutions directly derived from the drivers discussed in this report, another solution would be to implement an intergovernmental panel on pandemic risk (Oppenheim and others, 2021). Such a panel could take over tasks in the immediate response by coordinating containment measures internationally or distributing medical supplies to locations where they are needed the most (The Independent Panel for Pandemic Preparedness and Response, 2021). Outside of an ongoing pandemic, this panel could monitor the implementation of measures to reduce the risk of zoonotic disease emergence and scale-up the research detecting pathogens with the potential to transmit to humans globally (IPBES, 2020).

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