

# Dealing with pandemics


New Years' Speech

by the President of the Deutsche Forschungsgemeinschaft (DFG)

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I am very pleased to welcome you – as researchers and representatives of politics, science and business – to this New Year. This is now the third year of the pandemic and I hope that you were able to celebrate and enjoy this past Christmas and New Year with family and friends in spite of all the concerns and restrictions.

The New Year is set to confront all of us – including the academic community – with challenges both old and new:

- the pandemic is not over yet,
- new variants of the coronavirus will emerge,
- to some extent we have learned to live with it and are constantly adapting to the situation,
- yet at the same time we struggle to accept all this as normal,
- we're grateful for scientific findings and political decisions that point in the right direction,
- but we also miss life as it was before the pandemic,
- we catch ourselves being surprised at seeing people in films without masks, and
- we don't know how all this will ultimately impact on our children, our lives, our future.

It is this persistence of something we'd prefer to think of as transient that gives us a good reason to approach the topic of pandemics in general from a broader perspective. Even if you have devoted decades of your life to malaria and infection research like myself and have addressed many of the issues involved, this does nothing to mitigate the sheer force of their relevance today.

On the contrary, since the beginning of the pandemic, we at the DFG have dedicated all our efforts to facilitating the best research on all dimensions of the subject. And we are fortunate that a lot of these projects are able to build on many years of preliminary work and expertise. The DFG set up an interdisciplinary commission for pandemic research at an early stage, at the same time endeavouring to maintain academic careers and the productivity of all branches of research under these more difficult conditions.

Communication, research excellence, interdisciplinary collaboration and international cooperation are more important than ever. And interestingly enough, this is not entirely new. In fact, it is typical of individuals' and societies' response to the threat of infectious disease: it allows conclusions to be drawn about some of the basic parameters and underlying conditions of epidemics and pandemics, frequently resulting in sustainable strategies to combat them.

Since time immemorial, trust in the processes of rationality has been the most effective strategy against the spread of new infectious diseases. Or, to put it more succinctly: mankind's attempts to achieve cultural development and social prosperity worldwide have always hung by the thread of a methodically guided pandemic response. Robert Koch himself said in reference to what was then German New Guinea that malaria "lay like a poisonous breath over this beautiful, lush land". Interestingly, *mal aria* also means "bad air". And although suspected for centuries, it was not until 1902 that Ronald Ross provided proof that malaria is transmitted by mosquitoes.

The history of mankind is a history of starvation and infectious disease. Think of cholera – an ancient plague afflicting humanity that has still by no means been brought under control; its name is derived from the Hebrew *chaul rah*, which roughly translates as "fierce sickness". To this day, this disease is still capable of spreading and having a fatal impact in conditions of poor hygiene. As is the case with many other infectious diseases, its spread is also facilitated by international mobility and the global flow of goods. At the same time there is no effective vaccination, which is why the so-called eighth cholera pandemic is currently in progress around the world.

Malaria and cholera are examples of how, in addition to the development of vaccines and medicines, pandemic control can take place in day-to-day life – which is not something we have known only since the discovery of hygiene. However, every new pathogen requires specific protective measures. In addition, the course of the disease has to be understood and treatment options explored. And the more we know about the pathogen itself, the more targeted action we can take in combating it and halting its spread.

It is also true that the more consistently we respond to new epidemics based on scientific knowledge, the less room we leave for irrational interpretation. The plague is something we associate not just with disease and death but regrettably also with the grim attempt to find those who are supposedly responsible. What in fact causes the disease in this case is rats carrying fleas, and fleas infected with the bacterium *Yersinia pestis*. Incidentally, this was demonstrated in 1894 by the Swiss biologist Alexandre Yersin.

Scientific ignorance combined with social prejudice is indeed a diabolical mixture – and not only since the advent of fake news. In a current production by Theater Bonn entitled “Angst” (in German, that means “fear”), parallels are even drawn between the vaccination opponents influenced by conspiracy theories and the politically instrumentalised delusion of witch hunts in bygone eras.

Not only are pandemics a constant of humanity, so is the dichotomy that civilisation itself faces as a result of them: on the one hand irrational pseudo-explanations; on the other the methodical endeavour to view things analytically from a differentiated and to some extent abstract perspective. The latter approach was adopted by the famous physician Hippocrates, who first linked the occurrence of malaria in the *polis* states to certain seasons and geographical features around 400 BC. As an epidemiologist *avant la lettre*, he established a method for reliably predicting future outbreaks. It is not only doctors bound by his oath who carry forward this tradition: science as a whole is committed to his ethos of the conscientious search for knowledge. And thanks to progress in fundamental biomedical research, its continuous funding by the DFG and the support of policymakers, it is now possible to develop effective vaccines for new and ever-mutating pathogens swiftly.

Unfortunately, however we must also accept that the cycles in which epidemics and pandemics occur and have to be effectively combated are becoming increasingly shorter. On the one hand, this is due to the fact that we now perceive outbreaks more quickly and with greater precision than before. In the last two decades alone, there have been several outbreaks of measles and Ebola in Africa, as well as the Zika virus epidemic in South America and the outbreak of MERS coronavirus in Saudi Arabia – to name but a few. On the other hand, however, our globally interconnected and increasingly unnatural way of life in altered habitats increases our susceptibility to pandemics. In the last 20 years the familiar influenza has been joined not just by the COVID-19 pandemic but also the SARS pandemic, swine flu and bird flu.

Up until now it has been possible to counter each of these outbreaks fairly swiftly, based on a firm foundation of scientific knowledge. And it is our responsibility as researchers, research funders and policymakers to ensure that we always stay one step ahead of the next pandemic events. It will be crucial to reassess the risk factors relating to the emergence of pandemics and counteract the enormous burden on our ecological and cultural systems. This can be called pandemic preparedness, or it can be linked to the notion of resilience, but it can also be defined somewhat more broadly. By way of conclusion, I would like to attempt to do this based on three points.

From my point of view, it is essential to maintain a reservoir of knowledge in the life sciences and natural sciences, as well as in the humanities, social sciences and engineering sciences, so as to be able to tackle the challenges of the future. Certain priorities have to be set here. At the same time, however, the freedom and diversity of perspectives from a range of different disciplines has to be encouraged, along with the immense power of individual researchers' intrinsic curiosity and expertise. After all, this is where genuinely new insights emerge.

On the other hand, all of us – science, society, politics and business – need to communicate, explain, convince and engage in dialogue with each other more effectively, more openly and more efficiently. It is through such dialogue that we will be able to leverage existing resources and create synergy effects. Solidarity, trust and togetherness are absolutely crucial here – this applies in many instances, as is currently the case with vaccination. Individuals can only protect themselves effectively to a certain extent: lasting immunity ultimately derives from interaction between the individual and the collective. This is a fragile relationship.

And ultimately, in the light of the pandemic – which is both increasing and decreasing the distance between individual countries – we are seeing how important it is to think globally and act decisively in order to lay the foundations for pandemic prevention and management that is effective in the long term. Science and politics can tap into enormous potential here, not least by means of science diplomacy. The pandemic needs to be deprived of its boundless expanse – and yet the virus defies all illusions of isolationism. For this reason, we should not remain constricted to old borders but overcome these with a view to future viability: after all, this is what reflects the real conditions of our habitat Earth and will help preserve it for human beings, animals and plants. This once-in-a-century task requires scientific perception, political courage and orientation towards global cooperation.

The DFG has always stood for and promoted trust in scientific methods, the importance of free research and the added value that results from this for everyone: we embrace the philosophy

of keeping a cool head – even in times of social turmoil. And this is precisely what we will continue to dedicate ourselves to in the year that has just begun: in the alliance of science and the humanities, in dialogue with policymakers and in worldwide collaboration.

Thank you very much!