*Invited essay*

P | U | S

# Public understanding of science: Communicating in the midst of a pandemic

Public Understanding of Science
2022, Vol. 31(3) 282–287

DOI: 10.1177/09636625221089391
journals.sagepub.com/home/pus
SAGE

**Salim S. Abdool Karim**
Centre for the AIDS Programme of Research in South Africa, South Africa; Columbia University in the City of New York, USA

## Abstract

While Covid-19 created unprecedented transparency with real-time reporting across the globe, the pandemic's politically charged environment made public communication of scientific information particularly challenging. Scientists, as authoritative voices, were thrust into the public eye to explain the evidence amid uncertainty, a changing virus, distrust in government and concerns about their self-interest and hidden agendas. Honest communication that provides the public with enough easy-to-understand information to make up their own minds is essential during the pandemic; the public deserves nothing less.

## Keywords

Science communication, transparency, Covid-19 pandemic

Communication is an essential component of any pandemic response. Communicating science effectively to the public is almost always challenging and even more so during a pandemic. Covid-19 has created a particularly complex environment for communicating science as the pandemic response evokes visceral and passionate reactions, particularly when individual freedoms are being curtailed. Some of these reactions have included a flurry of conspiracy theories, amplified by unconstrained social media to create the 'infodemic', which is defined by the World Health Organization as 'too much information including false or misleading information in digital and physical environments during a disease outbreak'.

In the Covid-19 pandemic, the communication challenges were present right from the beginning in December 2019. Before the first reported cases of 'pneumonia of unknown cause' in the city of Wuhan in China were shared globally through a ProMed alert issued on 30 December 2019, Dr Li Wenliang, a medical doctor at the hospital in Wuhan, had shared a report about possible severe acute respiratory syndrome (SARS) patients on social media, leading to rumours of a deadly

**Corresponding author:**
Salim S. Abdool Karim, Department of Epidemiology, Mailman School of Public Health, Columbia University in the City of New York, New York, NY 10032, USA.
Email: Salim.AbdoolKarim@caprisa.org

SARS outbreak that spread rapidly on Chinese social media. The Wuhan police summoned and admonished Dr Wenliang for 'making false comments on the Internet about unconfirmed SARS outbreak'. Dr Wenliang, who had later died of Covid-19, received a posthumous apology from the authorities. These communications from a doctor on frontlines, initiated out of concern about the potential of the infectious agent to spread, came with a double-edged sword – the need to convey the seriousness of the situation without creating panic and pandemonium.

Since those first cases, Covid-19 had grown within 2 years to a colossal pandemic of more than 289 million cases and 5.4 million Covid-19-related deaths. Within 11 days of the first publicly reported cases of Covid-19, scientists in China had sequenced the virus and made its genetic code publicly available through twitter – a never-seen-before approach in science communication. The publication of critically important scientific data such as the code of a new organism would normally be published after extensive peer review in a highly prestigious journal. But the Covid-19 pandemic, right from the start, was setting a new standard for the speed at which new scientific information was being provided publicly without peer review. The genetic sequence of the virus revealed that the pneumonia outbreak was associated with a new coronavirus of probable bat origin, leading the World Health Organization to declare SARS-CoV-2 as a public health emergency of international concern on 30 January 2020 when there were just 98 cases in 18 countries outside China. This declaration was required to invoke the international health regulations and to convey the seriousness of the problem and its potential to become a global pandemic. Yet many countries adopted an ostrich approach, while others acted swiftly to take steps to share information about the pandemic and its public health measures. Worldwide communication was essential because the viral control measures included curtailing international travel.

When a new disease emerges and very little is known about it or how to manage it, it can cause extreme anxiety, panic and stigma. A similar reaction has been seen in other epidemics. In HIV, for example, because the initial cases of *Pneumocystis jirovecii* were among young homosexual men and linked cases, it led to the belief that HIV was a lifestyle-based illness and it was termed gay-related immune deficiency (GRID) or 'gay plague'. However, it soon became apparent that other populations such as blood donor recipients, people who inject drugs, female partners of men with AIDS and infants were also becoming infected, which challenged the initial preconceptions that HIV was a 'gay' disease. However, the lack of information on the causative agent of AIDS coupled with a lack of treatment and testing methods for the illness imparted great fear, uncertainty and stigma towards those infected. In the same way and for the same reasons, the first cases of Covid-19 experienced similar fear and stigma, but this time based on being Chinese, as China was being blamed for the pandemic by many, including presidents.

A significant difference between the communication challenges in AIDS and Covid-19 is the availability of the Internet and smartphones. Covid-19 information and misinformation can spread faster and wider with higher impact within a matter of minutes. The attacks and accompanying stigma related to Covid-19 accumulated more rapidly and were worldwide on social media platforms compared to the institutional stigma and discrimination experiences in the AIDS pandemic. However, the common feature of both pandemics was the way misinformation fed existing prejudice against certain groups, whether they were men who had sex with men in the AIDS pandemic or individuals of Chinese descent in the Covid-19 pandemic.

Given that the previous SARS outbreak in 2003 and Middle East Respiratory Syndrome (MERS) outbreak in 2012 were restricted to just a few countries and a few thousand cases, it was initially thought that the SARS-CoV-2 outbreak would be rapidly contained. However, it soon became apparent that SARS-CoV-2 was far more transmissible than SARS or MERS; infections spread like

wildfire and images of mass burials and overwhelmed health services in Italy and New York characterised the early part of the pandemic, fuelling fear and anxiety about SARS-CoV-2. In the midst of this kind of panic and anxiety, it is important to ensure that new information is conveyed rapidly but at the same time making sure that the uncertainty of the information is also communicated. To allay anxiety, the media sought authoritative voices to explain the pandemic and the actions that need to be taken in response.

Scientists became one of the sought-after 'authoritative voices' even though few had experience or training in media communications. Scientists, who usually convey information focussing on methodology, had to quickly learn to convey key messages in soundbites without oversimplifying or being reductionist. Some were out of their depth, some were overconfident know-it-alls and some rose to the occasion and even expanded their communication repertoire through Twitter messaging and medical blogs. In some countries, scientists became media celebrities and household names. This also created a new challenge where scientists were called upon to comment on Covid-19 policies and issues with strong political overtones. The line between scientific advice and political opinion can become blurred quite easily, and scientists had to tread this line carefully, and when they failed, in some instances, they lost the public's trust.

Globally, scientists had been thrust into prominent roles to provide scientifically sound advice. While advisory roles are normally backroom activities, Covid-19 has thrust this challenge into the public eye in the context of a politically charged environment. Furthermore, the rapidly evolving nature of the pandemic created a high level of scientific uncertainty, which is challenging to convey and incorporate into the advice by scientists. Provisional information can change as new evidence emerges and the interpretation of information can vary. This uncertainty became painfully apparent in the initial stages of the pandemic when conflicting messages were emanating on whether masks should be worn. In the face of uncertain evidence prior to June 2020, the World Health Organization did not provide recommendations on masks, leaving it to individual countries to decide, thereby fuelling the mask backlash in several countries. Arguments that masks were being promoted as a sign of government authoritarianism grew in the absence of compelling scientific evidence of their efficacy in controlling the spread of SARS-CoV-2. Trust in government, or the lack thereof, became an important aspect of communication right from these early stages of the pandemic. While trust in science was not uniform, the public was more willing to hear about actions that restrict their freedoms from scientists than politicians. But this was not uniform, especially in settings where scientists were viewed as politically partisan or promoting an agenda. While one set of messages tried to reinforce the importance of common purpose and the need to follow the prevention recommendations, another set of messages aimed to undermine social cohesion and sowed distrust in government action. Uncertainty in the evidence fuelled these flames of dissent.

Conflicting views often stemmed from uncertainty in the strength of the evidence to guide public health action and therapeutic approaches. Tentative evidence had to be carefully communicated in a way that it should not be misconstrued as definitive. It is difficult to explain to a public yearning for clarity that it can take many years for evidence to become definitive. But failure to communicate this uncertainty can undermine confidence in communicators when they need to flip-flop as new information overturns previous evidence.

This challenge is well illustrated by the following three examples of how the emergence of multiple new variants of SARS-CoV-2 overturned prior scientific opinions and advice. Some scientists erroneously promoted (e.g. Barrington Declaration) and even implemented (e.g. in Sweden) minimal restrictions so that the virus can spread freely to create naturally acquired herd immunity only to discover that new viral variants lead to reinfection by evading immunity acquired from past

infection. Some overconfident scientists prematurely declared that herd immunity had been reached after initial waves led to high seroprevalence (e.g. in countries like India, South Africa and Brazil) only to witness more severe subsequent waves due to new viral variants. Some scientists prematurely promoted early easing of public health prevention measures as vaccination rates rose, only to experience new outbreaks caused by new viral variants. For example, Israel released most of its restrictions when high vaccine coverage was reached, only to re-impose them in their response to a subsequent severe delta variant outbreak (The Guardian, 2021a).

The unpredictability of genetic mutations that lead to the creation of new viral variants, now named with letters from the Greek alphabet, has highlighted the uncertainties in our knowledge of SARS-CoV-2. The virus has turned out to be a rapidly changing foe creating wave upon wave of new infections. Even the world's most formidable weapon against SARS-CoV-2 – vaccines – has been challenged; clinical trials have demonstrated how the AstraZeneca-Oxford vaccine's efficacy in preventing clinical illness dropped from 70% against the Alpha variant to 10% against the Beta variant (Abdool Karim and de Oliveira, 2021). But the efficacy of some other vaccines, such as the Pfizer-BioNTech vaccine, have been less impacted by the variants (Abdool Karim and de Oliveira, 2021). These findings highlight the importance of conveying a degree of uncertainty in the efficacy of individual vaccines against each of the current and future variants until reliable data become available.

Another example of uncertainty in the Covid-19 epidemic is our understanding of how SARS-CoV-2 is transmitted. Initially, the evidence showed that the virus was predominantly spread by proximity and fomites/contaminated surfaces. The latter was based on the evidence that SARS-CoV-2 persisted on some surface for several days after contamination. However, subsequent evidence indicated the importance of aerosol and air-borne transmission and that fomites played a smaller role (Kampf et al., 2020; Port et al., 2021; Van Doremalen et al., 2020). Unfortunately, the messaging about the transmission of SARS-CoV-2 caused confusion and efforts and resources were misdirected to gassing, deep cleaning and even body spraying when it should have been a more balanced approach with adequate attention to ventilation and open air spaces.

Honesty is needed in conveying scientific uncertainty while ensuring that the key message is clear, both to policy makers and to the public. To illustrate this challenge, the following comment coveys uncertainty following the discovery of the beta variant with clarity on the action needed: '. . . while we haven't found if it is either more or less severe than the previous strain, it appears able to infect people more easily .... But right now, our priority is bending the (curve of the) second wave' (The Guardian, 2021b). This challenge in communicating uncertainty is compounded by opportunistic politicians and scientists, often sceptics of intrusive interventions, who disingenuously use hindsight to attack scientific advice and government decisions, which have often been made in the midst of high levels of uncertainty.

A valuable lesson in the Covid-19 pandemic is the importance of avoiding polarisation and conveying information in polemics. This may lead to the establishment of dogmas, and even as new evidence emerges, people remain dogmatic and unwilling to change. It is important to steer clear of self-interest or hidden agendas and to convey information in a way that people of all political persuasions and walks of life can understand.

Striking a balance in the level of information provided is also important. It is essential to avoid over-complicating the information but also not to simplify it to the point of patronising the audience. There is a fine balance between providing too much detail and getting bogged down in the details versus providing too little information and simplifying the information to such a degree that not enough empiric evidence is provided to support the message. It is important not to over- or

under-estimate the audience. Different audiences need different kinds of information, and the general public, for example, will require different information from policy makers.

The Covid-19 epidemic has been accompanied by an information explosion. Data from PubMed show that in just 20 months, there have been 394,660 Covid-19-related publications (PubMed/PubMed Central) and 6660 Covid-19-related trials registered in ClinicalTrials.gov. A further 19,125 Covid-19/SARS-CoV-2 preprints have been uploaded to pre-print servers like medRxiv and bioRxiv. Thus, new information is emerging all the time, and information that was appropriate last week may not be appropriate this week. This rapid accumulation of information requires timely and up-to-date communication.

The Covid-19 pandemic has also created a completely new standard for communicating in an epidemic situation. A very high level of openness and transparency has been the hallmark of information in Covid-19 epidemic. For example, numbers on testing, cases, deaths and vaccinations are available from almost all countries on a daily basis. Anyone can access the data and make comparisons across countries. This level of transparency was unheard of in other epidemics such as HIV, Ebola and tuberculosis. Importantly, the general public have been empowered to understand the data and epidemiological concepts that were previously restricted to ivory towers. With this new level of openness, individuals without the necessary skills and capabilities have been analysing data occasionally reaching incorrect conclusions, which then need to be challenged and corrected when communicated in public forums. Despite its problems, the Covid-19 epidemic has established a new path for health communication and is a precedent for future epidemics.

There have been many new lessons for communicating during a pandemic: the need for transparency, the need to ensure that the uncertainty of the evidence is communicated, of being honest about changing evidence and ensuring information is conveyed in a way that is understandable and interpretable. Striking a balance in the level of information provided is also important. The public needs and deserves agenda-free communication that provides them with enough easy-to-understand information to make up their own minds on what to do to control and mitigate the pandemic, nothing less.

## Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

## References

Abdool Karim SS and de Oliveira T (2021) New SARS-CoV-2 variants: Clinical, public health, and vaccine implications. *New England Journal of Medicine* 384(19): 1866–1868.

Kampf G, Todt D, Pfaender S and Steinmann E (2020) Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection* 104(3): 246–251.

Port JR, Yinda CK, Owusu IO, Holbrook M, Fischer R, Bushmaker T, et al. (2021) SARS-CoV-2 disease severity and transmission efficiency is increased for airborne compared to fomite exposure in Syrian hamsters. *Nature Communications* 12(1): 4985.

The Guardian (2021a) Israel restores indoor mask requirement after rise in COVID cases. Available at: https://www.theguardian.com/world/2021/jun/25/israel-resumes-indoor-mask-requirement-after-rise-in-covid-cases (accessed 1 March 2022).

The Guardian (2021b) Salim Abdool Karim: 'None of us are safe from COVID if one of us is not – We have mutual interdependence'. *The Guardian*, 101 January. Available at: https://www.theguardian.com/world/2021/jan/10/salim-abdool-karim-none-of-us-are-safe-from-covid-if-one-of-us-is-not-we-have-mutual-interdependence (accessed 1 March 2022).

van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, et al. (2020) Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *New England Journal of Medicine* 382(16): 1564–\.

## Author biography

Salim S. Abdool Karim, FRS, is a South African clinical infectious diseases epidemiologist. He is the Director of CAPRISA, an AIDS research centre in South Africa, and Professor of Global Health at Columbia University, New York. He is Vice-President for Outreach and Engagement of the International Science Council and a member of the WHO Science Council. He served as President of the South African Medical Research Council and Chair of the South African government's Ministerial Advisory Committee on Covid-19.