COVID-19 contagion, information, and misinformation

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Abstract
The set of reactions being observed in the current coronavirus outbreak is similar to that in other epidemics: the Severe Acute Respiratory Syndrome, the swine flu H1N1 pandemic, and the Middle East Respiratory Syndrome. Indeed, progress has been made, such as increase in the speed of viral genome sequencing and vaccine development. However, the spread of misinformation also proceeds faster than at any point in history. The world should learn its lessons from this experience and explore appropriate alternatives.

We have seen this happen before – with SARS (Severe Acute Respiratory Syndrome) in 2002, with H1N1 swine flu pandemic in 2009, with MERS (Middle East Respiratory Syndrome) in 2012. A novel pathogen appears, the worst-case scenario is assumed, and some people focus on an existential life-or-death scenario allowing fear and panic to win over logic and reason. Not unexpected. It is not different now with the novel coronavirus, SARS-CoV, and the disease it causes, Coronavirus Disease-2019 (COVID-19).

General facts on SARS-CoV
Scientists understand from the genetic sequencing of the novel virus that it came from animals, as did the other problematic coronaviruses, SARS and MERS. As there was a cluster of early cases linked to a seafood market in Wuhan, which sold and slaughtered live wild animals for food, most people believe the likely source to be wild animals. The similarity of this virus to SARS suggests the source animal to be a bat, but there would have been an intermediary animal carrying the virus prior to infecting humans, which could have been civet cats, bamboo rats, or pangolins, according to a preprint (manuscript that has not undergone peer review) posted by Xiao et al.[1]

After more than 1,400,000 cases of COVID-19 worldwide,[2] what are still unknown about the virus outnumber the known. For example, it is known that the modes of transmission are via respiratory droplets from coughing or sneezing infected persons and contact with contaminated surfaces. There have been reports of airborne transmission in China; however, the World Health Organization (WHO) disagrees that it is a major driver of transmission.[3]

Some infected individuals may not develop any symptoms at all but the symptoms of the majority of the cases closely resemble those of the common cold[3] (dry cough, fatigue, and fever). Some may present with body malaise, sore throat, or nasal congestion. One out of six infected individuals develop difficulty in breathing and in rare instances, the infection may lead to mortality. Data thus far suggest that COVID-19 case fatality risk is around 1% (the figure is higher in Wuhan but lower in Singapore, South Korea, and Italy); this puts it somewhere between the 1957 influenza pandemic (0.6%) and the 1918 influenza pandemic (2%).[4] Current epidemiological results show that elderly persons and those with pre-existing medical conditions are at the highest risk of developing the severe form of the disease.[4]

Among what are not known include details on how this coronavirus causes the disease, interacts with proteins, or responds to seasonal changes and the damages it leaves a patient surviving the disease.[5] Coronaviruses, in general, baffle scientists.

However, given the current growth rate of cases, affected geographies, and high percentage of people who survive rather than die from the disease,[2] there is reason for optimism that the outbreak will taper off and not worsen.

Reaction to outbreak
Unfortunately, this novel coronavirus has spawned an "infodemic" – as coined by the WHO for the collection of theories of conspiracies, unsubstantiated claims, and phony cures surrounding COVID-19.[6]

Social media and some irresponsible health care websites have taken advantage of the predictable pattern of public anxiety. Misinformation (see e.g., Agence Press-France[7]) has become more than a distraction hindering an effective public health response. As they spread faster than the SARS-CoV itself[8] they exacerbate the outbreak by promoting "cures" or prevention methods for coronavirus, which are ineffective, non-evidence based, and may likely be dangerous. In Iran, at least 300 have died from methanol poisoning after an article saying methanol was a cure for COVID-19 became viral.[9]

The public health community and the world of medical science should effectively communicate facts and address feelings as a key part of communication and preparedness, rather than

dismiss them. For example, the message of the Singaporean Head of State did not only include giving concrete facts and actions to be taken, but also recognising people's fear and making people in control of their situation.[10] In fact the Singaporean government has won praise for its response to the outbreak and shown the world that good communication is an essential ingredient in pandemic response and preparedness. With over 1,400 confirmed cases as of April 7, 2020, Singapore has one of the lowest death rates (6 fatalities) in Southeast Asia.[2]

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Positive developments surrounding pandemic

COVID-19 has strengthened collaboration among scientists all over the world and triggered a faster working pace among them. Vaccine development is a long and complex process, often lasting 10 to 15 years: from identification of the genome sequence (at least one year) until several phases of clinical trials. With a sense of urgency, scientists were able to sequence the genome of the virus in a matter of weeks.[11]

Moderna, a biotech company based in Cambridge, Massachusetts, has already created an mRNA vaccine against SARS-CoV-2 that encodes a version of the viral spike protein.[12] Apart from Moderna, the Coalition for Epidemic Preparedness Innovations has also been funding development of an mRNA vaccine from CureVac, in Tubingen, Germany, a DNA vaccine from Inovio Pharmaceuticals[13] in Plymouth Meeting, Pennsylvania, and a protein vaccine from a research group at the University of Queensland in Australia.[14] At the end of February 2020, nearly 300 papers had already appeared on preprint repositories (bioRxiv and medRxiv) compared with 261 published in journals. Many scientists now welcome the new way of communicating study results due to the outbreak.[15] However, we should be cautious on how we interpret preprints as these publications have not endured scientific scrutiny from independent experts (peer review).

Measures to be undertaken at individual level

While waiting for antivirals and vaccines to be approved by regulatory authorities and be available widely, one can do the following:

1. Regular washing of hands. Doing so dramatically reduces chances of transmitting or contracting both respiratory and

Table 1. Recommended reliable sources of information on COVID-19

Organisation	Website
World Health Organization	https://www.who.int/emergencies/diseases/novel-coronavirus-2019
US Centers for Disease Control and Prevention	https://www.cdc.gov/coronavirus/2019-ncov/index.html
European Centre for Disease Prevention and Control	https://www.ecdc.europa.eu/en/novel-coronavirus-china
European Commission Coronavirus Response Team	https://ec.europa.eu/info/live-work-travel-eu/health/coronavirus-response_en
European Medicines Agency	https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19
The New England Journal of Medicine	https://www.nejm.org/coronavirus
Johns Hopkins CSSE COVID19 tracker	https://systems.jhu.edu/research/public-health/ncov/

diarrhoea-causing illnesses.[16,17]

2. Getting an influenza vaccination. Although it will not prevent infection from the novel coronavirus, it will lessen the number of people showing symptoms similar to COVID-19 and thus reduce the amount of people competing for hospital care.
3. Avoiding hoarding of masks. Indeed, masks offer some protection (by providing physical barrier). However, public health experts agree that the likelihood of being infected is higher through using the hands in touching things and then touching the face afterwards than not wearing masks.[18] Washing hands is still the most important prevention method. In addition, hoarding masks will diminish supply for medical professionals who actually need them while they treat the sick.
4. Getting facts right. In the digital era, everyone obtains information via the internet. However, care should be taken as dubious messages circulate on *WhatsApp* and other forms of social media. One should rather listen only to the advice of public health bodies, such as the WHO, the US Centers for Disease Control, the European Centre for Disease Prevention and Control, and local health authorities (Table 1).

Conclusion

The COVID-19 outbreak is a complex interplay among the contagion, information, and misinformation. The long-term challenge is how to improve our ability to respond to outbreaks. This is the very same challenge faced during the outbreaks of SARS, H1N1 swine flu pandemic, MERS, and other pandemics even decades before. Some things have already changed such as the advancement in science and technology including speed of information dissemination. However, we need to proactively address misinformation related to an outbreak as it might affect people's behaviour and put them in danger.

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Disclaimers

The opinions expressed in this article are the author's own and not necessarily shared by his employer or EMWA.

Conflicts of interest

The author is employed by Takeda Pharmaceuticals International AG, a company developing vaccines that tackles problems in public health including dengue, norovirus, Zika, and chikungunya.

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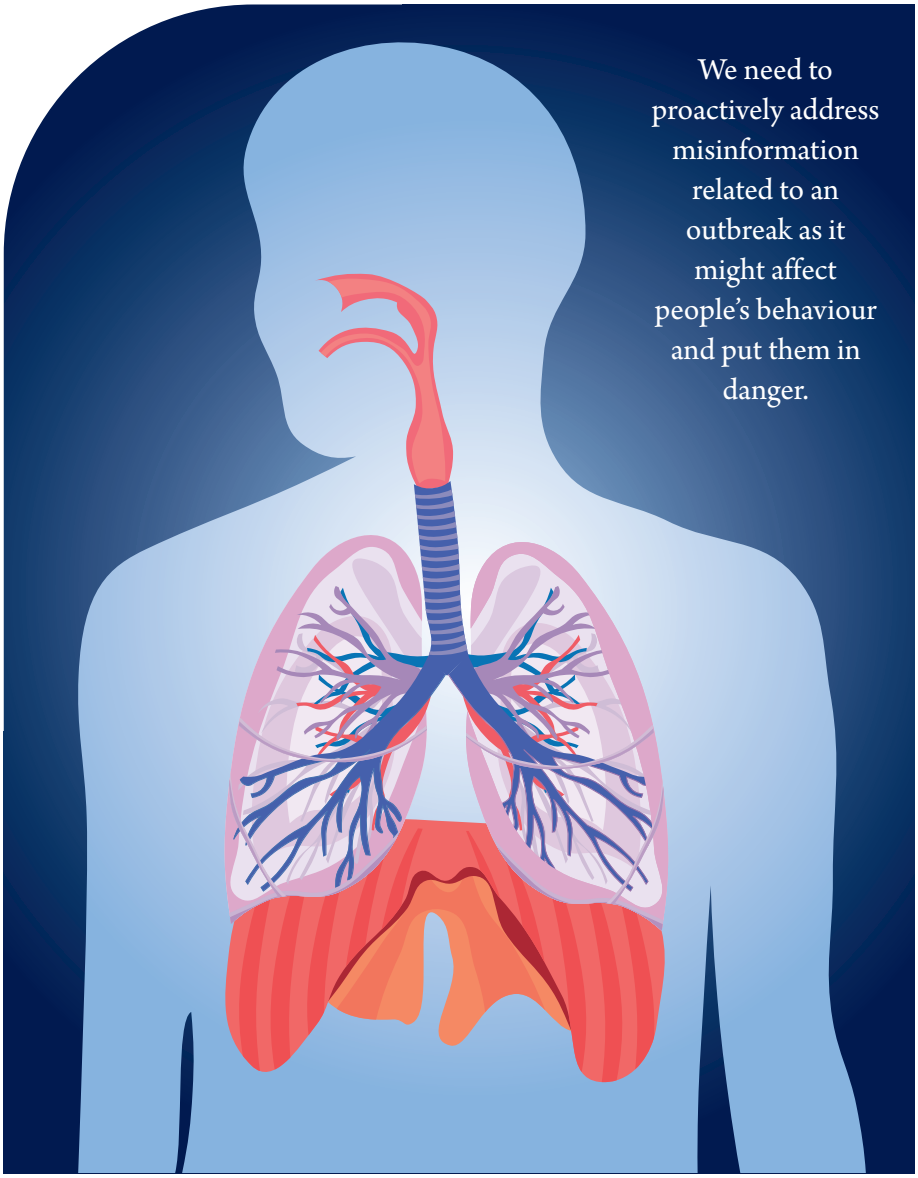

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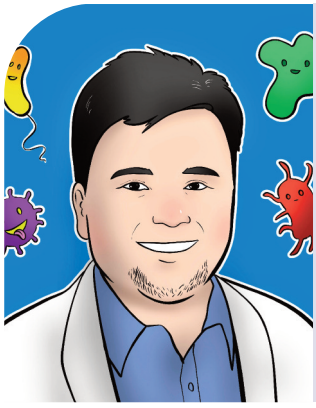

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