SARS coronavirus 2; how many more examples do we need before the world commits to decisive action?

Silently and without fanfare, the virus transferred from its natural wildlife host into the first human. The resulting illness was not severe or clinically distinct, because respiratory infections are so common that cough and fever afflict many citizens every winter. Facilitated by coughing, the virus continued on its way, passing from person to person with a basic reproductive number of between 2 and 3. Only when it reached substantial numbers of frail, elderly people did it attract medical attention. Investigation into this latest outbreak identified a novel strain of virus from a family known to cause respiratory infection in humans and to readily infect other species of animals. There were no licensed antiviral drugs or vaccines specific for this strain, so public health officials had to apply the time-honoured technique of quarantine, first used in Venice in 1448, to bring the outbreak under control.1

That somewhat stylised opening paragraph could apply to influenza infection, but you are probably thinking about the novel SARS-CoV-2 virus that is currently causing the latest pandemic, killing senior citizens and precipitating unprecedented economic turmoil. Why do we seem to be so powerless in the face of such a microscopic entity and how can we prevent another catastrophe following the same path in years to come?

The first point to make is that we are not powerless; we have unprecedented knowledge, skill and technical resources that could be brought to bear on a novel pandemic virus. We have platform technologies for vaccine production where a key gene of the novel virus could be slotted into a genetic cassette to replace the equivalent gene in a virus backbone already known to be safe and effective for the prevention of similar infections. The problem is that the time taken is too long to be able to affect a current pandemic caused by a virus with a short incubation period. This is illustrated well by a report on the outcome of committing tremendous resources to make a vaccine against pandemic influenza that appeared in the spring of 2009.2 A vaccine was prepared, but only arrived just after the peak of the first wave of cases. The major delays were in producing reagents required for gaining conventional regulatory approval, followed by vaccine manufacturing capacity and bottling and labelling capacity.2 It should also be noted that the regulatory path for influenza vaccine is already shorter than for others, because it is based on assessing variation of a process that is already licensed for production of seasonal influenza vaccines.

If vaccines should be seen as a solution for controlling further infections once the pandemic has reached its peak, then antiviral drugs should be seen as a way of controlling the initial infection. We would need to have drugs that can inhibit several members of a virus family with the hope that the novel strain that emerges will retain susceptibility to this drug. Thus, targeting inhibition of a key enzyme needed for replication, such as the polymerase, would be a good starting point. We have the ability to design such chemicals, produce them in pharmaceutically acceptable forms, conduct clinical trials to show their safety and efficacy (using volunteers challenged with respiratory viruses if necessary) and to produce sufficient quantities to act as a stockpile in case infection arrives in the future.3 However, we choose not to do this because of the economic cost.

We need to make it clear to international leaders that standard economic assessments of cost are wrong. We should not be thinking of making a product and measuring its success by serial plots of drug sales displayed proudly on the wall of the office of the chief financial officer of the responsible company. Instead, we should focus on the value that the stockpile of drug has for the world community in terms of the reassurance it provides against the death and disruption that would otherwise be caused by a novel virus. For example, if such a stockpile had been made against SARS virus after 2003, it would have been ready to protect us against death from SARS-CoV-2. The money saved from preventing the current pandemic would have paid many times over for the cost of developing such a drug and stockpiling it. Those who make decisions at the international level should therefore be encouraged to think of the cost in terms of paying an insurance premium to provide reassurance against a future adverse event. We also need to anticipate and forestall adverse criticisms from the general press who are likely to complain about the cost of buying and storing a quantity of drug that may never be used; much as they did when oseltamivir stocks were procured following the 2009 influenza pandemic. We need to remind them that citizens do not complain when they reach the end of the year and have not had to claim on an insurance policy; no one says: “I wish my home had burned down, because that would have validated my decision to buy house insurance.”

Plenty of authoritative figures have made this case. In 2006, the International Monetary Fund produced a report on the likely financial consequences of a future influenza pandemic; only 3 years before the real thing occurred.4 Bill Gates gave a clear TED talk in 2015 which explained why we need to act to protect ourselves against the inevitability of future pandemics. This, coupled with an article in the New England Journal of Medicine,5,6 stimulated discussions that led enlightened groups to provide funds at the 2017 annual Davos meeting to form the coalition for epidemic preparedness innovations (CEPI).7 They have already commissioned research into vaccines and antiviral drugs against six infections (MERS, Lassa, Marburg, Ebola, Nipah, and Zika) with pandemic potential including a coronavirus.
Their vision was correct but, tragically for many, the next plague came too soon.

We cannot let this happen again. Now is the time for international collaboration to support CEPI and buy more insurance policies against representative members of more virus families that have the potential to cause future pandemics. This should be supported by increased surveillance of wild and domesticated animals to catalogue the viruses they harbour and monitor their rate of evolution as a way of providing early warnings about novel viruses with pandemic potential.

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