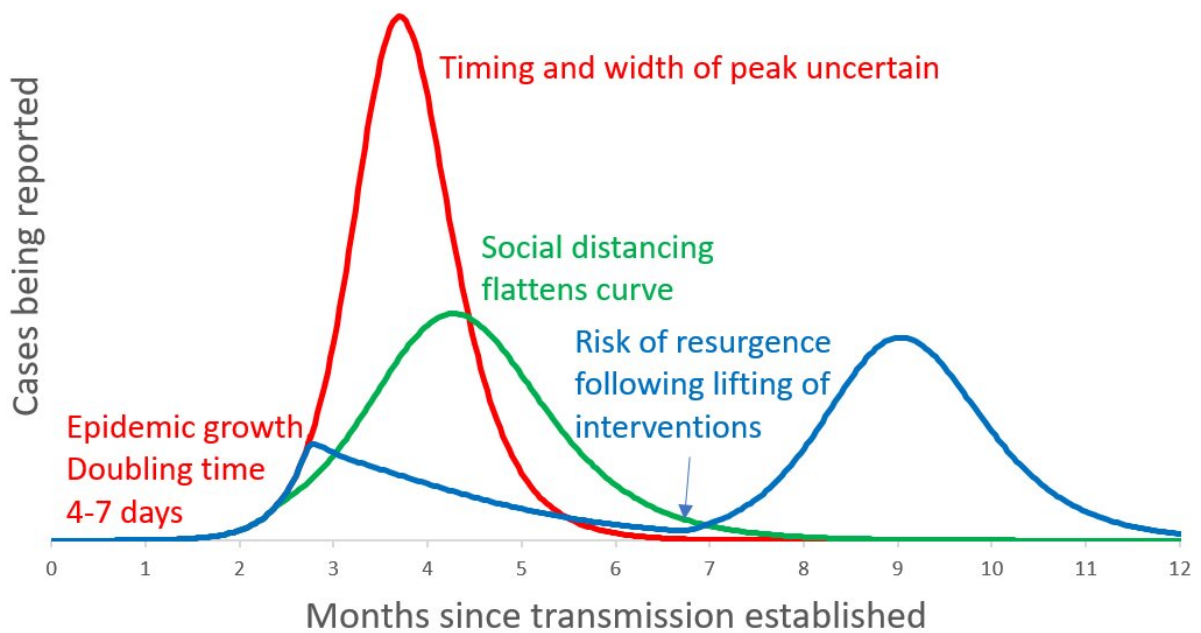


Individual response to COVID-19 'as important' as government action

March 6 2020



Rate of infection with different measures in place, NB not quantitative predictions but robust qualitative illustrations Credit: Reprinted from The Lancet, 10.1016/S0140-6736(20)30567-5, Anderson et al., Figure 1, How will country-based mitigation measures influence the course of the COVID-19 epidemic?, Copyright (2020), with permission from Elsevier

How individuals respond to government advice on preventing the spread of COVID-19 will be at least as important, if not more important, than

government action, according to a new commentary from researchers at the University of Oxford and Imperial College London in the UK, and Utrecht University and the National Institute for Public Health and the Environment in the Netherlands.

As the UK moves into the "delay" phase of dealing with a possible COVID-19 epidemic, a new commentary, published today in *The Lancet*, looks at what we know so far about the new virus. The researchers, led by Professor Sir Roy Anderson at Imperial College and Professor Deirdre Hollingsworth at the University of Oxford's Big Data Institute, also suggest what can be done to minimise its spread and its impact.

Professor Hollingsworth said: 'Completely preventing infection and mortality is not possible, so this is about mitigation. Our knowledge and understanding of COVID-19 will change over time, as will the response. High quality data collection and analysis will form an essential part of the control effort. Government communication strategies to keep the public informed will be absolutely vital.'

Vaccine development is already underway, but it is likely to be at least a year before a vaccine can be mass-produced, even assuming all trials are successful. Social distancing is therefore the most important measure, with an individual's behaviour key. This includes early self-isolation and quarantine, seeking remote medical advice and not attending large gatherings or going to crowded places. The virus seems to largely affect older people and those with existing medical conditions, so targeted social distancing may be most effective.

Government actions will be important, including banning large events such as football matches, closing workplaces, schools and institutions where COVID-19 has been identified, and making sure that good diagnostic facilities and remotely accessed advice, like telephone helplines, are widely available. Ensuring the provision of specialist

healthcare is also vital. The researchers warn, however, that large-scale measures may only be of limited effect without individual responsibility. All measures, of course, will have an economic impact, and some stricter measures, such as shutting down entire cities, as seen in Wuhan in China, may be less effective in Western democracies.

The aim of these social distancing measures is to "flatten the curve" of the infection, shown in the green trace in figure 1 (attached), slowing the spread and avoiding a huge peak in the number of new infections.

Flattening the curve can avoid overwhelming health services, keep the impact on the economy to within manageable levels and effectively buy more time to develop and manufacture effective vaccines, treatments and anti-viral drug therapies.

Sir Roy said: 'Government needs to decide on the main objectives of mitigation—is it minimising morbidity and associated mortality, avoiding an epidemic peak that overwhelms health-care services, keeping the effects on the economy within manageable levels, and flattening the epidemic curve to wait for vaccine development and manufacture on scale and antiviral drug therapies. We point out they cannot achieve all of these—so choices must be made.'

The researchers highlight that wider support for the health service and health care workers during an epidemic is vital in any case—during the Ebola epidemic in 2014-15, the death rate from other causes like malaria and childbirth rose sharply due to overwhelmed [health services](#). The number of deaths indirectly caused by Ebola was higher than the number of deaths from Ebola itself.

While much has been made in the media of a number of "superspreading" events, where one infected individual has inadvertently spread the disease to many others, the authors warn that there are

superspreading events in every epidemic, and care should be taken not to make too much of these.

Containing the spread of an infectious disease relies on keeping the "reproduction number", R_0 , the number of people infected by each infected person, below 1, when the pathogen will eventually die out. If R_0 rises above 1, i.e. each infected person infects more than one other person, the pathogen will spread. Early data from China suggests that the R_0 for COVID-19 could be as high as 2.5, implying that in an uncontained outbreak, 60% of the population could be infected. There are many unknowns in any new virus, however, and with COVID-19, it is not currently clear how long it takes for an infected person to become infectious to others, the duration of infectiousness, the fatality rate, and whether and for how long people are infectious before symptoms appear. It is also not currently clear if there are cases of COVID-19 which are non-symptomatic.

In comparisons with influenza-A (usual seasonal flu) and SARS, it currently seems likely that the epidemic will spread more slowly, but last longer, which has economic implications. Seasonal flu is generally limited by warmer weather, but as it is not known if this will affect COVID-19, the researchers say it will be important to monitor its spread in the Southern Hemisphere. Researchers will continue to collect and analyse data to monitor spread, while ongoing clinical research into treating seriously ill patients is also necessary.

One of the main priorities for researchers and policymakers will be contact tracing, with models suggesting that 70% of people an individual has come into contact with will need to be traced to control the early spread of the disease. The authors say other priorities include shortening the time from symptom onset to isolation, supporting home treatment and diagnosis, and developing strategies to deal with the economic consequences of extended absence from work.

Author Professor Hans Heesterbeek from the Department of Population Health Sciences at the University of Utrecht said: 'Social distancing measures are societally and economically disruptive and a balance has to be sought in how long they can be held in place. The models show that stopping measures after a few months could lead to a new peak later in the year. It would be good to investigate this further.'

More information: *The Lancet* (2020). [DOI: 10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5) , [www.thelancet.com/journals/lan ... \(20\)30567-5/fulltext](http://www.thelancet.com/journals/lan/article/S0140-6736(20)30567-5/fulltext)

Provided by University of Oxford

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