

# Flu reduction policies don't need to start at the beginning of an outbreak, study suggests

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It might be better to implement policies to reduce the impact of a flu epidemic a few weeks after the start of an outbreak rather than straight away, according to a new study that uses mathematical models to simulate the effects of different interventions. The research is published today in the online journal *PLoS Computational Biology*.

When an outbreak of severe influenza or another severe disease like Sars takes hold and grows rapidly, governments consider various "social distancing" measures to limit the impact of the outbreak, such as closing schools and public places, and placing restrictions on transport. However, the economic cost and societal impact of these measures mean that it is undesirable to use them for a sustained period of time. The US pandemic plan, for instance, mentions a maximum duration of 12 weeks for many transmission-reducing interventions.

Researchers at Imperial College London and Utrecht University used mathematical models to consider the effectiveness of short-term interventions and evaluate the best policies for a range of objectives, such as minimising the peak demand for public health services or minimising the social or [economic costs](#) of containing the outbreak. They also considered different constraints, such as a limited stockpile of treatments.

According to the results, an intervention starting a few weeks into the epidemic is almost as effective at containing both the size of the epidemic and the peak number of cases below a certain target as one that

starts at the beginning of the outbreak. The researchers conclude that because of the social and economic costs of imposing the policies for an extended period of time, it might be better not to implement social distancing measures straight away.

The study was co-authored by Dr Deirdre Hollingsworth, a Junior Research Fellow from the Medical Research Council Centre for Outbreak Analysis and Modelling at Imperial College London, and Dr Don Klinkenberg, from Utrecht University in the Netherlands.

"If it is not possible to eradicate an epidemic, it is often assumed that you need to deploy all of your mitigation options as soon as possible," Dr Hollingsworth said. "But we found that waiting a few weeks is as effective at achieving key public health aims as starting interventions immediately. If you take into account the impact that those policies will have on society, it might be better to hold back at the start.

"If you can only use an intervention for a limited period of time, then it's likely that there will be a resurgence of the epidemic after the intervention is lifted. This happened in a number of American cities after the 1918 pandemic. Waiting a few weeks before starting to implement containment policies can reduce this resurgence," added Dr Hollingsworth.

The study also found that the best policy strategy depended on the precise objectives to be achieved. In order to limit the peak prevalence of illness, weak interventions starting early are required. In order to minimise the total size of the epidemic, stronger measures are required but they can start later.

Dr Klinkenberg said: "National plans for dealing with pandemics set out various policy options, but there is rarely any clear statement of their objectives. Different objectives can conflict with each other, so it's vital

to set out your priorities.

"Epidemics are dynamic. If you intervene in an epidemic, you change the dynamics, and the effect might not be intuitive. This is why it's important to use mathematical models to simulate the effects of different policies."

Professor Sir Roy Anderson, Chair in Infectious Disease Epidemiology at Imperial College

London, and a senior author on the study, said: "Simple models of epidemics can exhibit

complex behaviours and it is important to understand these dynamic patterns when

designing optimal control policies. This is especially the case for influenza A epidemics that

move on a fast time scale of weeks and months as opposed to years".

**More information:** T.D. Hollingsworth et al. "Mitigation strategies for pandemic influenza A: balancing conflicting policy objectives" *PLoS Computational Biology*, 10 February 2011.

[www.ploscompbiol.org/doi/pcbi.1001076](http://www.ploscompbiol.org/doi/pcbi.1001076)

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