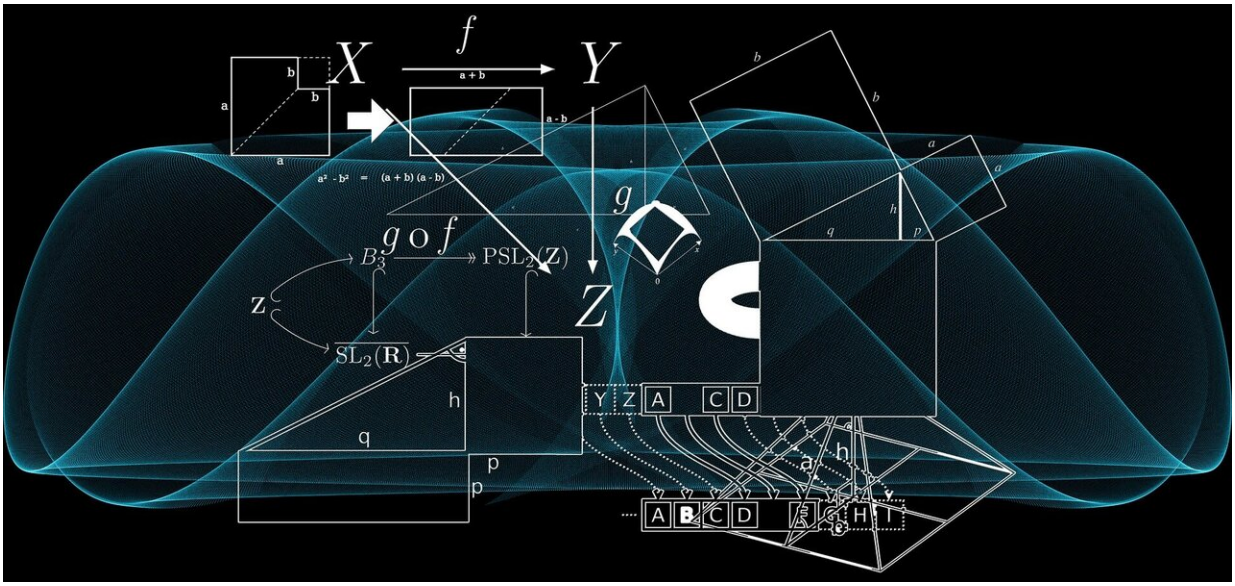
Mathematical modelling vital to tackling disease outbreaks

October 17 2019



Credit: CC0 Public Domain

Predicting and controlling disease outbreaks would be easier and more reliable with the wider application of mathematical modelling, according to a new study.

The study was conducted by researchers at the University of Waterloo, University of Maryland and Yale's School of Public Health.

In addition to the main findings, the study also concluded that modelling

involving the information from multiple medical and public health sources, such as microbiologists, immunologists and epidemiologist, would be most informative for public health planners in contemplating intervention strategies.

"Mathematical models of disease spread can be hugely beneficial in understanding and controlling infectious diseases," said Chris Bauch, a professor in Waterloo's Department of Applied Mathematics. "There are certain challenges that have to be overcome when attempting to use mathematical modelling, for example, if you want to impact policy, you have to involve the policymakers at every step in the process."

"Good data is also needed to carry out the objectives of modelling and to best control infectious diseases."

Bauch conducted the research with Meagan Fitzpatrick, a professor at the University of Maryland, and Jeffrey Townsend and Alison Galvani, both professors at Yale's School of Public Health.

The researchers also explained how mathematical models could help in understanding how ideas, opinions, and beliefs about vaccines spread through social networks allowing for the formulation of interventions that might convey the facts to the population and better support vaccination choices.

"It is very important for researchers who are constructing mathematical models to collaborate with health authorities who are informing and helping to manage the outbreak response," said Bauch of Waterloo's Faculty of Mathematics. "Firstly, it will be easier to get the required data; secondly, it will ensure the model is geared towards questions those on the frontline need answers to, and finally, it will help foster trust in the modelling process.

"Another area in which mathematical modelling can prove useful is in combating vaccine hesitancy. As the access to vaccines become less of a problem worldwide, vaccine hesitancy will perhaps become the most important barrier to ensuring high vaccine uptake."

The study, titled Modelling microbial infection to address global health challenges, authored by Fitzpatrick, Bauch, Townsend, and Galvani, was published recently in the journal *Nature Microbiology*.

More information: Meagan C. Fitzpatrick et al. Modelling microbial infection to address global health challenges, *Nature Microbiology* (2019). DOI: 10.1038/s41564-019-0565-8

Provided by University of Waterloo