Comment for Session 1 of RSS Meeting on R_0

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Main

I congratulate: Parag, Thompson, and Donnelly; Jewell and Lewnard; and Coffeng and de Vlas on their papers which highlight both the benefits and potential pitfalls associated with statistics such as the doubling time T_d and the basic reproductive number R_0 during the COVID-19 pandemic. As is appropriate for a methodological meeting, these papers focus on the choice of statistics themselves rather than the specific data sets on which estimates are based. In this brief comment, I would like to also highlight opportunities for innovative study design and mention specifically the value of accurate measures of infection prevalence.

During a pandemic, when the value of epidemiological information is much higher than at other times, there is an opportunity to gather novel population data which would otherwise be deemed too expensive. In the UK, there are a number of examples of community surveys, including the Office for National Statistics Coronavirus Infection Survey [Pouwels et al., 2021], Virus Watch [Hayward et al., 2020] and the REal-time Assessment of Community Transmission (REACT) [Riley et al., 2020]. REACT is a program of studies separated into REACT-1 [Riley et al., 2021] that collects self-administered nose and throat swabs [Riley et al., 2021] and REACT-2 that collects self-administered lateral-flow antibody tests [Ward et al., 2021].

Incidence and growth-rate estimates based on routine surveillance are subject to changes in the propensity of individuals to seek tests and in the ability of the system to supply those test [Omori et al., 2020]. Community surveys can help to overcome these issues. For example, in recruiting participants randomly from those registered for healthcare in England, the REACT-1 design attempts to reduce the impact of temporal variation when making growth rate estimates [Riley et al., 2021].

In addition to growth rates, population surveys of infection provide estimates of prevalence at national and regional scales that can be easily understood as measures of individual risk: measured swab-positivity is easily translated into odds of people in a community being infected. While doubling times and reproduction numbers are valuable as indicators of future changes in risk, it could be argued that their prominence in official UK government communications in the UK has led to their value in assessing current levels of risk being misunderstood.

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