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Commentary

Should high household attack rates change public health polices?

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The paper by Kuwelker et al [1] published in The Lancet Regional Health – Europe provides new knowledge to a number of important and still controversial issues in the COVID-19 response. It provides information that the secondary attack rate among children and adults are higher than previously reported, - which automatically leads to questions about the effectiveness of quarantine measures and school closures. The study also shows that serology is more sensitive than RT-PCR for detecting secondary infections, and lastly it shows the importance of having study protocols ready when a pandemic start.

In their study Kuwelker et al [1] report that children are as susceptible as adults in contracting the infection in an immunologically naïve population, reporting 48% attack rate among children 0-10 years in the households. The question is if these findings should affect measures around children. At the first phase of the pandemic, in March - April 2020 in Norway, there was little or no evidence available about the transmissibility of the coronavirus among children. On 12 March 2020, the government of Norway, like most countries of Europe, decided to close all schools and kindergartens since it was anticipated that children could effectively transmit the virus to others. This was partly built on knowledge from the spread of influenza, indicating a higher attack rate among children [2], and partly to be on the safe side when there was lack of evidence. The decision to close schools have shown to have serious consequences for health and well-being for many children, as summarized by a report from UNESCO [3]. In Norway's neighborhood, Sweden and Finland took another approach, and kept kindergartens and schools for the youngest children open. A study from England investigating the spread of SARS-CoV-2 after schools and kindergartens reopened in June - July showed that SARS-CoV-2 infections and outbreaks were uncommon in educational settings during the summer half-term in England [4].

A report from ECDC summarizes the conflicting evidence and states that children might play a role in the transmission of the virus, but they warn against the negative consequences of school closures [5]. A study from Iceland shows a positivity rate among children on 6,7% for children under 10 years of age as compared to 13,7% for those older than 10 years [6]. Another newly released study concludes that children under 15 have half the chance of being infected compared to adults, and are half as likely to spread the virus to others [7].

The study from Kuwelker et al [1] confirms findings from contact tracing that households are a main location for transmission, and that elderly are more likely to contract the virus. Some countries, as well as WHO, recommend quarantine and isolation preferably to be carried out outside people's home or household [8]. In a situation with relative low numbers of infected and quarantined contacts, this might be possible, but it seems like an unsustainable approach when there is high level of community transmission, or lack of access to such facilities. The question remains if it is possible to avoid transmission in a household together with an infected family member. It is likely that household crowding may influence the risk to household contacts, raising the question of a possible socioeconomic gradient. There is evidence showing that the adherence to isolation and quarantine measures are low [9]. These are indications which show some of the challenges in effectively containing the spread of SARS-CoV-2.

A recent systematic review of studies of household spread of SARS-CoV-2 found an overall secondary household attack rate of 17%, but with wide variation [10]. The present study reports a surprisingly high rate of 45%. We think there may be at least two explanations. Firstly, the authors used serology after 6–8 weeks to confirm infection among contacts. Thus, they avoided the limitations of wrong timing or poor sampling technique for PCR-testing which both could have lowered the yield of testing. Secondly, the study recruited participants very early in the epidemic in Norway when testing was not readily available. Those tested were probably likely to have had symptoms for some time before being tested, and thus have had ample time to infect household contacts. This was also a time when the advice to household contacts was not well developed. Regardless of this, the study confirms the risk to household contacts, and the importance of quarantining them.

Interestingly, among 70 of 179 contacts who were tested with RT-PCR because of acute illness, 16 had a negative RT-PCR, but had seroconverted by week 6–8. We believe this may be due to poor sampling technique or a later infection incident. For public health purposes and for rapid contact tracing, a RT-PCR test of contacts at about 4–5 days after exposure remains the best option. A serology test weeks later offers little advantages for disease control given the short generation time of SARS-CoV-2.

Public health decisions require a breath of knowledge and understanding of how findings from studies of microbiology and gene-

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expressions of the virus influences the spread of disease in societies and globally. To be able to control the ongoing COVID-19-pandemic, there must be close collaboration across medical disciplines, from laboratory medicine and infectious diseases to public health and other sectors of society, and between local, national, and global health authorities. Having research protocols at hand from the first positive SARS-CoV-2 sample was identified in Bergen, shows how rapid and well-conducted applied research help to guide public health decisions real time.

Author contributions

FF and PA contributed equally
Declaration of Competing Interests
FF and PA have nothing to disclose

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