Modelling results on the impact of COVID-19 testing in schools

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The COVID-19 global pandemic has had widespread health, wellbeing and economic impacts, both from the disease itself and also from the measures put in place to try to control it. By mid-April 2020, school closures had impacted 94% of the world's students, with the duration and impact of closures varying substantially by country[1]. As new variants rise and fall, it is vital to understand ways to minimise both educational and social disruption by keeping schools open while also reducing the spread of infection.

In The Lancet Infectious Diseases, Elisabetta Colosi and colleagues report modelling results investigating the impact of different potential testing strategies in French primary (ages 6-11) and secondary (in this study comprising ages 17-18) schools[2]. The results are informed by pre-pandemic data on contact patterns, collected via RFID tags (wearable sensors that detect proximity), and infection data from pilot screening trials in French primary and secondary schools. Colosi and colleagues use the infection data to estimate R in schools during the Alpha and Delta waves, informing transmission in an individual-based model of infections that is structured according to the contact pattern data. They conclude that weekly asymptomatic testing could reduce both infections and the number of missed days of school due to reactive class closures.

How do these results compare with other modelling of school-based testing for COVID-19? Previous work examining SARS-CoV-2 transmission amongst school pupils in the USA[3], Canada[4] and the UK[5,6,7] all find that asymptomatic testing can reduce school transmission. The range of independent studies in different countries at different times can give some confidence of a sound conclusion. However, it is very difficult to quantify such a reduction accurately and robustly. Comparisons between the studies are further complicated by the implementation of different potential strategies. In addition, schools in different countries under different circumstances might reasonably be expected to respond differently to the same measures.

One aspect that reduces our ability to make robust quantifications in this area is the lack of comprehensive data to inform modelling. A strength of the study by Colosi and colleagues is their use of detailed data on school contact patterns, which allows representative networks to be built using a data-driven basis. These data are one of the best sources of school contact patterns used in this type of study, and yet still have inevitable drawbacks as they are, by necessity, a study of particular schools and also represent pre-pandemic contact patterns. Another attempt to inform contact patterns has been made by Woodhouse and colleagues, who used structured expert judgement to construct their random contact networks.

In contrast to the detailed contact pattern data available to Colosi and colleagues, their data on school infections are sadly quite sparse (as they rightly acknowledge in the paper) as the data originate from a pilot study and were limited in fitting to the increasing phase of the epidemic. Modelling of SARS-CoV-2 transmission in UK schools has an advantage here, with long-term data on student and staff absences, as well as reported testing in the relevant age groups. These data have been used by ourselves (Leng and colleagues)[7] and by Woodhouse and colleagues[5] to parameterise and validate school-based models. Both groups agree with Colosi and colleagues that testing could have an important effect in reducing infections and schooldays missed.

In time, as more data become available in a wider range of circumstances, and modelling and analysis of existing data are published, a consensus may be reached on the magnitude of the likely effect of SARS-COV-2 testing strategies in schools. The work by Colosi and colleagues underscores the value of detailed epidemiological and social data obtained in similar populations to better inform future epidemic control policies.

References

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