SPI-M-O: Consensus view on the impact of school closures on Covid-19

Date: 17th March.

Probability statements are in line with the SAGE framework of language for discussing probabilities, appended to this document.

Background

1. SPI-M-O have considered the impact that school closures would have on curtailing the spread of Covid-19, to avoid NHS critical care capacity being breached.

2. SPI-M-O have previously given consensus views on school closures. These were given in "SPI-M-O: Consensus view on the impact of mass school closures on COVID-19", from 19th February 2020, and "SPI-M-O: Consensus view on the impact of mass school closures on 2019 Novel Coronavirus", from 10th February 2020.

General principles

3. There is clear evidence from the literature that school closures can interrupt the spread of respiratory viruses. These studies have tended to focus on pandemic influenza. In the 2009 influenza pandemic, the school summer holiday interrupted transmission to such an extent that the UK epidemic was split into two waves, with the second coming after their reopening in the Autumn.

4. The impact of school closures, as a stand-alone policy, on Covid-19 would be expected to be smaller than for influenza, because:

   - The relative role of children in transmission is likely to be smaller. In influenza pandemics, adults have some pre-existing immunity, so that a higher proportion occurs in schools.

   - The average time between symptom onset in primary and secondary cases (known as the serial interval) is longer than for influenza. As a result, schools would have to be closed for longer to have the same effect.

   - The reproduction number is estimated to be in the range 2.0-2.5, which is higher than influenza in 2009.

Assessment of the role of children in the transmission of Covid-19

5. There is still a great deal of uncertainty around the extent to which children have a role in the transmission of SARS-CoV-2. Based on estimates of people with subclinical infections, infected children could be an average of 25% to 75% as likely to transmit SARS-CoV-2 per contact than adults.

Assessment of whether national school closures would prevent NHS critical care capacity being breached

6. On 16th March, SPI-M-O's consensus view was that "it is unclear whether or not the addition of general social distancing measures to case isolation, household isolation and social distancing of vulnerable groups would curtail the epidemic by reducing the reproduction number to less than 1".

7. The uncertainty is primarily because it is fundamentally not possible to determine in advance the extent to which "general social distancing measures" will change contact patterns and therefore viral spread.

8. It is the consensus view of SPI-M-O that, accounting for the polices announced on 16th March, and in the absence of school closures, NHS critical care capacity is likely or highly likely to be breached in the short to medium term. The reproduction number is expected to be in the region of 1 but we do not know whether it will be higher or lower than that. The high degree of uncertainty is a result of not knowing how contact rates will change from 17th March, as well as the lack of clarity on current case numbers and the role of children in transmission.

9. It is almost certain that school closures will not make the epidemic worse, and that they would reduce both the epidemic peak and expected number of cases. Our best assessment is that they would reduce the reproduction number by between 10% and 20%. We do not know how likely it is that this will change the reproduction number from being above 1 to below 1.

10. Modelling from one group indicates that the difference between closing schools now compared to not reopening after the Easter holidays would be modest. Further work on this question will be presented at SAGE on 18th March.

Assessment of whether regional school closures would prevent NHS critical care capacity being breached

11. There may be a case for closing in schools in London ahead of those in the rest of the country; further work on this will be presented at SAGE on 18th March.

Assessment of the impact of partial school closures would prevent NHS critical care capacity being breached

12. Allowing schools to remain open for a small number of pupils would capture most of the benefit of closing them for the whole population. Given the high levels of uncertainty involved, it would not be meaningful to model the size of this effect.

13. Allowing exams to take place in otherwise closed schools would have only a marginal population-level impact on transmission.

Assessment of the impact of social distancing within schools

14. Some countries such as Singapore, have allowed schools to remain open whilst increasing social distancing within them. This is not something which could be meaningfully modelled.

Assessment of the impact of children being cared for by other people

15. In the event of school closures, some children may be cared for by older relatives, increasing the risk of transmission to those at higher risk of needing critical care. Although there is an elevated direct personal risk to older people who care for children, it is highly likely that on a population level, the health benefit of school closures would outweigh this disbenefit.

16. A rapid literature review by Brooks et al. has shown that whilst school closures do appear to reduce the number of contacts that children have outside the home, such contacts remain common. Were children to congregate in day-care settings during a UK COVID-19 epidemic, the impact of school closures would be lower. Past data are based on short duration closures in different contexts (e.g. different countries, different levels of risk perception). The impact of longer-term closures, different risk perceptions, concurrent interventions and official communication campaigns on patterns of behaviour are likely to be different and cannot be determined by modelling alone.

Duration of school closures

17. There will be a lag of around 3-4 weeks between the introduction of school closures and the impact being seen on critical care capacity. This is because there is an average of around 2 weeks between someone being infected with the virus and presenting in critical care, and because the impact of school closures on critical care isn't realised directly by children avoiding infection, but because this means that they do not go on to infect other people.

18. School closures would need to last several months to maintain the effect seen.

University closures

19. The impact of closing universities is expected to be relatively small, because university students are a relatively small proportion of the UK population (around 2.5 million)

Scope of modelling

The consensus statement has drawn on modelling work from LSHTM, Imperial and Warwick and are based on all educational establishments. The LHSTM and Imperial work includes universities, but the Warwick work does not. None of the modelling includes pre-school care.

Annex: SAGE framework of language for discussing probabilities