SPI-M-O: Statement on population case detection

Date: 9th September 2020. Update 11th September 2020

SIGNED OFF BY SPI-M-O CO-CHAIRS ON BEHALF OF SPI-M

Background

1. Members of SPI-M-O have previously contributed to a SAGE task and finish group on population case detection (PCD), sometimes referred to as "mass testing". Their advice has now been released[1]. This statement is in response to a commission from the National Institute for Health Protection asking for further advice on prioritising groups to target for PCD, and to estimate potential impacts of PCD on transmission rates.

2. SPI-M-O agree that the top priority should be to rapidly test symptomatic people and isolating their contacts. Testing symptomatic people is an order of magnitude more likely to identify someone infected with SARS-COV-2 than testing asymptomatic people in an outbreak area. **However, testing alone will not reduce transmission if people cannot or will not self-isolate, following the receipt of a positive test**. As the previous SAGE paper stated, population case detection would require superb organisation. Testing the population of England weekly would require in the region of 8 million tests to be performed per day.

3. It is critical that work is focused in ensuring people eligible for PCD take up these tests and are supported to self-isolate, if required, including using insights from behavioural scientists.

Prioritising for PCD

4. There are two potential uses for PCD. One identifies and isolates infected people more quickly than relying on symptomatic testing alone, as well as symptomatic people who would otherwise not present for a test; if done well, this has the potential to reduce transmission rates from their current level. The second is to allow time-limited greater social contact, such as entry to large gatherings based on a negative test result; this would not reduce transmission from its current level but could minimise the increase in

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[1] https://www.gov.uk/government/publications/tfms-consensus-statement-on-mass-testing-27-august-2020

transmission that would occur from allowing more social contact, if done successfully. This statement focusses on the former.

5. When determining which groups should be prioritised for mass testing, SPI-M-O advises that two factors are considered:

   a) The risk that people the group become infected

   b) The severity of the consequences of onward transmission, if people in the group become infected.

6. The results of a) should be determined by analysing the occupation and demographics of all those in the Test and Trace system, including those testing negative. It remains SPI-M-O's view that it is critical for occupation data to be routinely collected. Backward tracing should be used to identify the characteristics of individuals infected and the setting in which transmission occurred. There is clear evidence from the first wave of the epidemic that risk of infection was particularly high for health and social care staff. It is to be expected that risk factors will change over time, along with behaviours.

7. The consequences of someone becoming infected would be particularly severe if:

   i. They are in direct contact with clinically vulnerable people

   ii. They are likely to directly infect a high number of people (this will be usually closely correlated to the risk that they will become infected)

   iii. They have contact with a large number of people who are likely to have no or mild symptoms and are therefore unlikely to present for testing otherwise. This group would include teachers, as well as staff and students in higher and further education settings.

8. Those working in health and social care (including domiciliary care and affiliated visiting professions such as physiotherapists), care home residents, and informal carers should be the top priority for PCD, given they meet criteria i) and ii). There is also a case for including their frequent contacts, such as family members and informal carers. Other groups that should be considered as recipients for PCD are prison staff and other key public servants such as emergency services.

9. SPI-M-O have previously advised that people being discharged from hospital should be tested and continue to believe there is a strong case to do so, both to reduce onward transmission after discharge and as a surveillance mechanism for hospital outbreaks.

10. The Test and Trace system should be using backwards contact tracing to identify where people are infected and by whom. There should also be available data on the locations where clusters arise to support understanding of viral transmission risk factors.

Potential impact of mass testing on transmission rates

11. The impact of PCD on the reproduction number should be considered an incremental benefit on top of a well-functioning system for testing and tracing symptomatic cases and isolating their contacts. Grassly *et al* [2] have estimated that a perfect system for doing so could reduce the reproduction number by 47%. The paper from the SAGE task and finish group on mass testing also illustrates how the reduction in transmission can vary under different testing frequencies and time between testing and isolation.

12. The "ready reckoners" previously developed by SPI-M-O members (Ellen Brooks-Pollock, Leon Danon, and Angela McLean) and shared with SAGE and Cabinet Office have been extended to consider asymptomatic mass testing and are given in the figures below. These estimate the reproduction number (the vertical axis of each chart), considering:

    - Three different levels of reduction of transmission from "COVID-security" measures, such as facemask wearing and handwashing (the three different matrices of charts)

    - The proportion of non-household secondary infections of cases that are prevented from secondary contact tracing (denoted "CT", and given by the columns of the matrices of charts)

    - The frequency of mass testing, in days, of asymptomatic people (given by the rows of the matrices of charts)

    - The proportion by which social distancing policies reduce the number of contacts outside the home (the horizontal axis for each chart)

    - Whether schools and universities are open (represented by the coloured band).

13. These results are based on data but include numerous assumptions, so they should be treated with caution and cannot give precise predictions of the impact any policy for PCD. Nevertheless, they give important conclusions:

    - PCD without contact tracing and/or COVID security is unlikely to control transmission.

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[2] https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30630-7/fulltext

- Without COVID security and with 50% of secondary infections of asymptomatic people prevented by contact tracing, fortnightly testing is required (not shown in the figures below).

- With 25% COVID security and with 50% of secondary infections of asymptomatic people prevented by contact tracing, monthly testing is sufficient.

- With 50% COVID security and with 20% of secondary infections of asymptomatic people prevented by contact tracing, monthly testing is sufficient.

- Regular contacts are the main contributors to the reproduction number, tracing a fraction of new and infrequent contacts has a minimal impact on transmission.

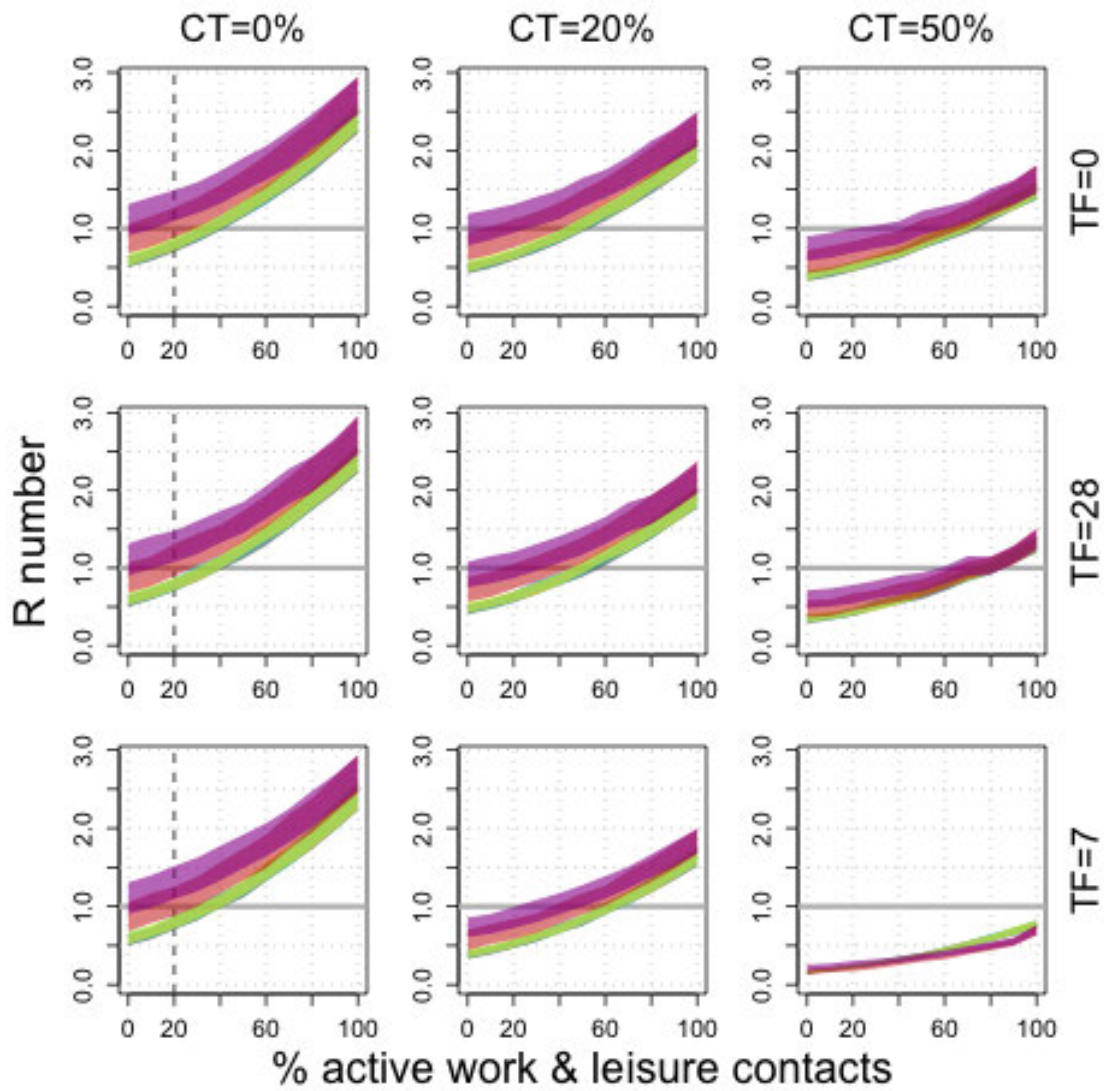14. The assumptions behind the paper are provided in a supplementary paper, annex 1.

■ Schools closed
■ Primary schools 1/2 open
■ Primary schools open
■ Primary & Secondaries open
■ Primary, Secondary & Universities open

Figure 1: The reproduction number when **COVID security = 0**, for different testing frequencies (rows), proportion of secondary infections of non-household contacts of cases prevented by symptomatic contact tracing (CT; columns) and proportion of pre-COVID non-household contact rates (horizontal axes)
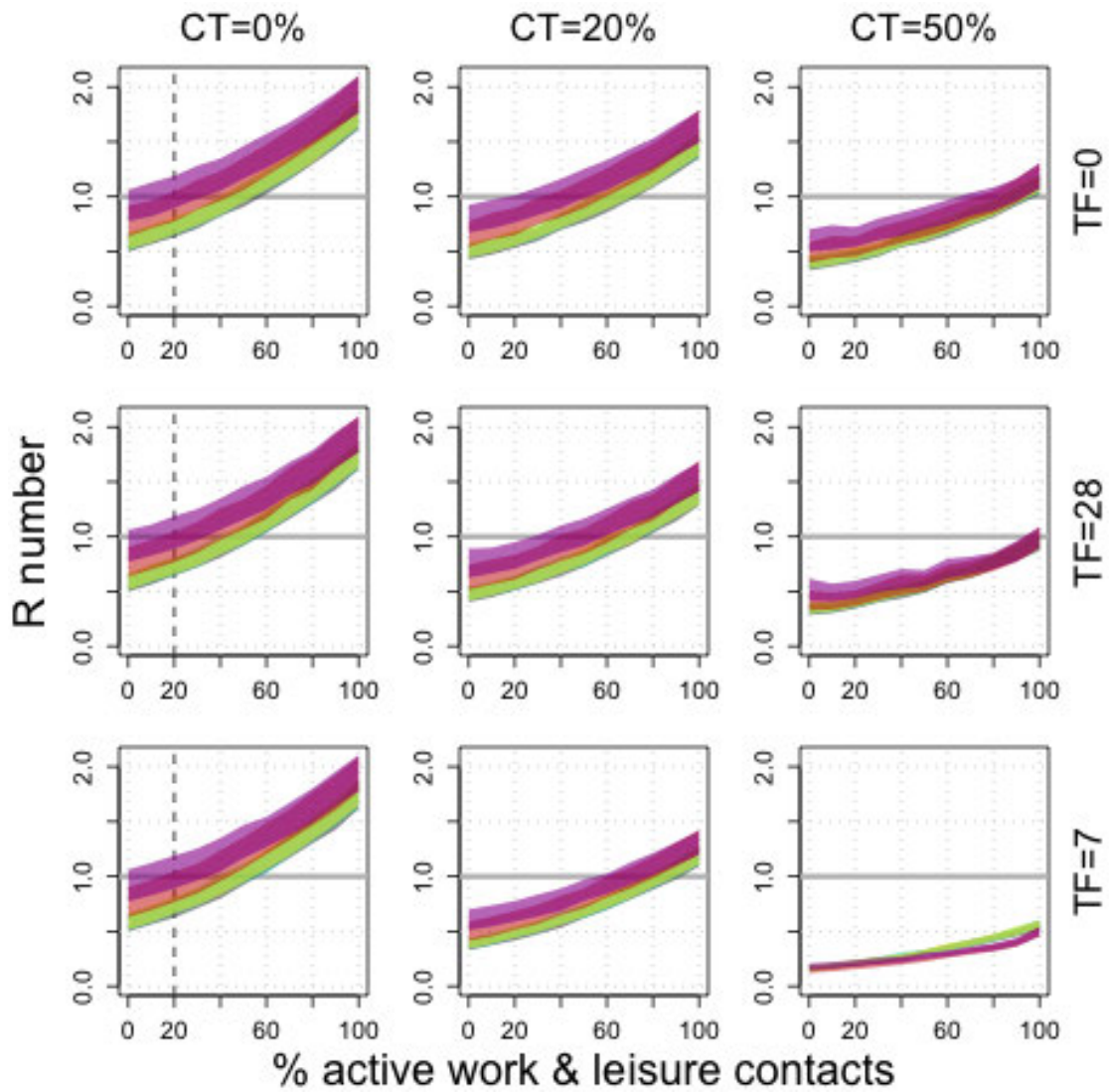
Figure 2: The reproduction number when **COVID security = 25%,** for different testing frequencies (rows), proportion of secondary infections of non-household contacts of cases prevented by symptomatic contact tracing (CT; columns) and proportion of pre-COVID non-household contact rates (horizontal axes)
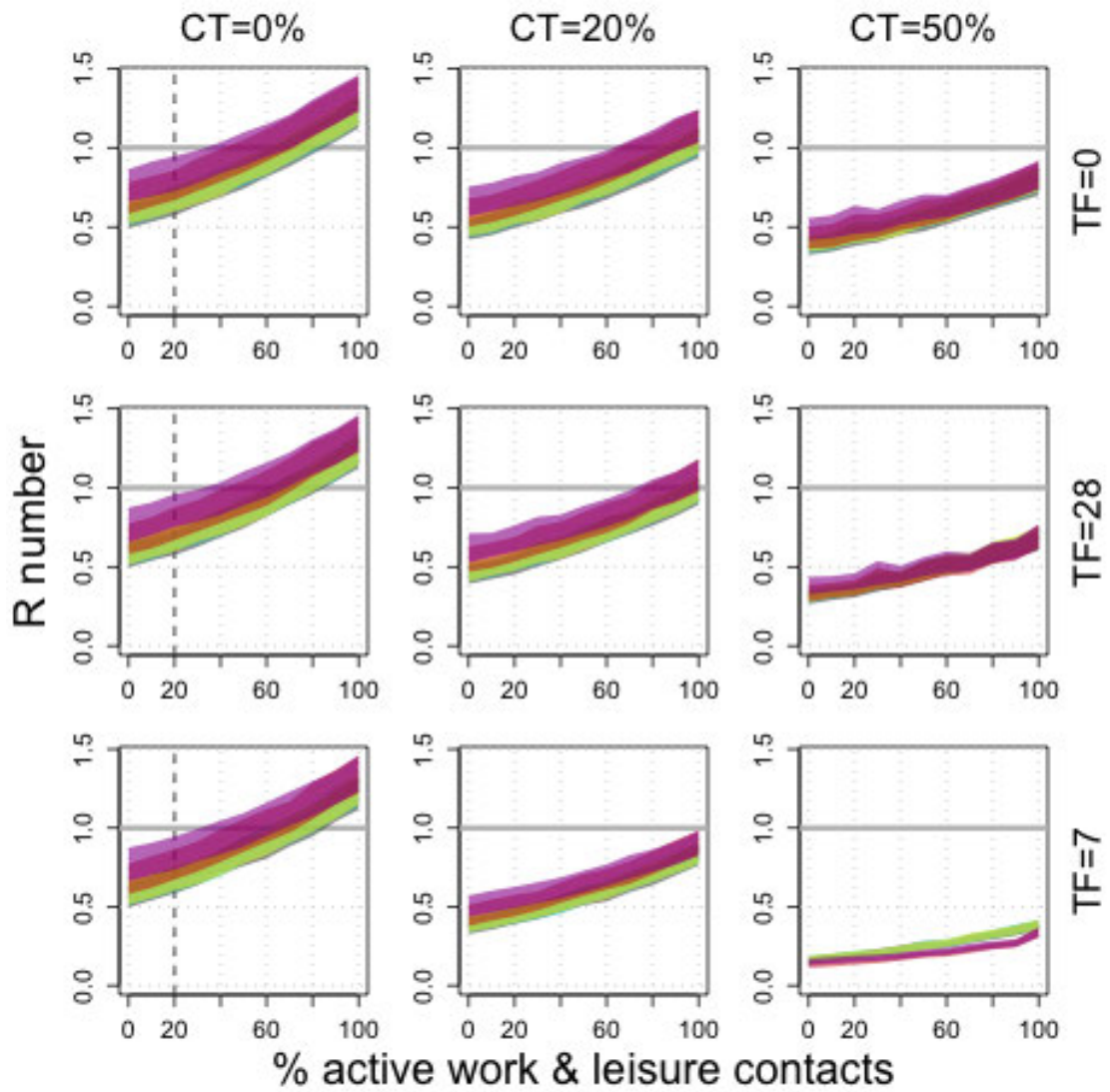
Figure 3: The reproduction number when **COVID security = 50%**, for different testing frequencies (rows), proportion of secondary infections of non-household contacts of cases prevented by symptomatic contact tracing (CT; columns) and proportion of pre COVID non-household contact rates (horizontal axes)