

Symptom-based contact tracing is likely to reduce adherence to advice to quarantine in comparison to test-based approaches

SPI-B Note [draft presented to NERVTAG 26 April, revised and endorsed by SPI-B 29 April 2020]

- 1) In the paper of questions to NERVTAG (discussed on 26 April), item 1 asks SPI-B “to comment on behavioural aspects of the different policy choices. It has been argued that, due to high false +ve rate, quarantine of contacts based on self-diagnosed cases may undermine confidence in contact tracing system and result in poor adherence with advice [to quarantine].”

There is no directly relevant literature or data, but there is a relevant theory

- 2) We have conducted a review of medline with the search terms (“false alarm” OR “false positive” OR “specificity” OR exp Sensitivity and Specificity/ OR “accuracy”) AND (“contact tracing” OR exp Contact Tracing/) AND (“quarantine” OR exp Quarantine/ OR “isolation” OR exp Patient Isolation/ OR “adherence” OR “compliance” OR exp Compliance/). This found no relevant studies.
- 3) A rapid review requested by SPI-B on factors associated with the uptake of health-related apps also found no published evidence on level of, and factors influencing, uptake and/or engagement with COVID-19 digital contact tracing apps (1).
- 4) We are unaware of any unpublished data on this issue. It is possible that the relevant PHE and NHSx teams may have some. Note, however, that polling about hypothetical future scenarios comes with caveats, both in terms of the representativeness of people who take part in online polls and the usefulness of intentions in predicting behaviour (2).
- 5) To answer the question, we have therefore considered it from a theoretical perspective. Protection Motivation Theory is well researched theory within health psychology that applies in this case. The theory fits well to the context of a pandemic (3 ,4) and other major public health incidents (5).
- 6) In brief, the theory proposes that people are more likely to engage in a protective behaviour if they believe that:
 - a. there is a high likelihood that they (the individual) may be affected;
 - b. the consequences of exposure are severe;
 - c. the behaviour they are being asked to perform is effective;
 - d. there are few costs associated with the behaviour;
 - e. the behaviour is one which they can enact.

A high rate of alerts which are not related to COVID-19 may reduce adherence.

- 7) If a symptoms-based approach to contact tracing is adopted, this will substantially increase the number of alerts that are triggered. There are multiple reasons why someone may choose to use the 'report symptoms' function of the app. This includes:
 - a. the presence of symptoms caused by COVID-19;
 - b. the presence of symptoms caused by other circulating respiratory viruses;
 - c. the presence of symptoms relating to, or exacerbated by, anxiety (6);
 - d. a desire to request a test for other reasons, including concern from and for loved ones, pressure from an employer to provide a test result, worry about a potential exposure, worry about interacting with other people who are vulnerable and high health anxiety (7, 8).
- 8) At present, DHSC polling data suggest that only around 70% of the population list both cough and fever as among the most common symptoms of COVID-19. We assume that a symptoms-based approach will educate people about the symptoms they need to report and will ask them what symptoms they are experiencing. If this is not the case, the number of false reports will be even higher.
- 9) If people are aware that the system is based on symptom reporting rather than on a positive test result, they will expect there to be false positives and may be less likely to believe that an alert represents a genuine risk that they have been exposed to a COVID-19 case. In other words, it will reduce the perceived likelihood that an exposure has occurred. This can be expected to reduce motivation to adhere to quarantine in comparison to an alert based on a test result. There is evidence from other public health crises that the perceived likelihood of exposure is associated with uptake of various protective behaviours (3, 5).
- 10) It may be possible to take steps to mitigate this. Well-designed communications which focus on, for example, the reliability of the system, the importance of adherence and the benefits to society of adherence may promote greater adherence. Legal enforcement may also be possible, together with other measures.
- 11) Because a symptom-based approach will increase the number of alerts that are generated, this increases the risk of an individual being asked to quarantine multiple times. This will increase the costs associated with the behaviour (economic costs, and a broad range of other costs such as imposing a burden on others, and disrupted social roles). Even where motivation to adhere is high, the additional costs associated with a symptoms-based approach may reduce the capability of someone to adhere on multiple occasions. Socio-economic considerations have already been shown to be important in the COVID-19 pandemic, with lower household income and perceptions about financial compensation being associated with ability or intention to self-isolate (9, 10). Multiple requests may also pose a particular problem to those who have limited opportunity to adhere (see 11) – for example, people in shared households or hostels).
- 12) An additional risk arises relating to trust and legitimacy. If the majority of requests to quarantine generated by any contact tracing system are false positives, then the disruption to people's lives may be seen as being the result of an ineffective system. Perceptions of

trust and legitimacy may suffer as a result and generalise beyond this particular aspect of pandemic management. This may in turn affect adherence (e.g. 3).

Conclusion

- 13) A symptoms-based approach to contact tracing, as opposed to an approach based on cases confirmed by testing, is likely to result in lower adherence to advice to quarantine.
- 14) There is no basis on which to estimate the magnitude of this effect.
- 15) Whether the reduction in adherence is offset by the benefits gained by contacting people earlier in the process is a valid question. It is not one we can answer.
- 16) It is worth noting the wider context in which the app may be used and its potential to undermine engagement in other methods of contact tracing. How different parts of the strategy fit together is important

References

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