13 APRIL 2020

Pre-empting possible negative behavioural responses to COVID-19 antibody testing to realise their potential benefits: SPI-B Note: 13 April 2020

Antibody testing has the potential to contribute to wider strategies to facilitate return to work and other activities in ways that do not increase infection.

This note describes some of the possible negative behavioural responses to COVID-19 antibody testing. It provides a basis for DHSC, PHE and others to anticipate these effects - including their mitigation – in preparation for antibody tests that perform to an acceptable standard.

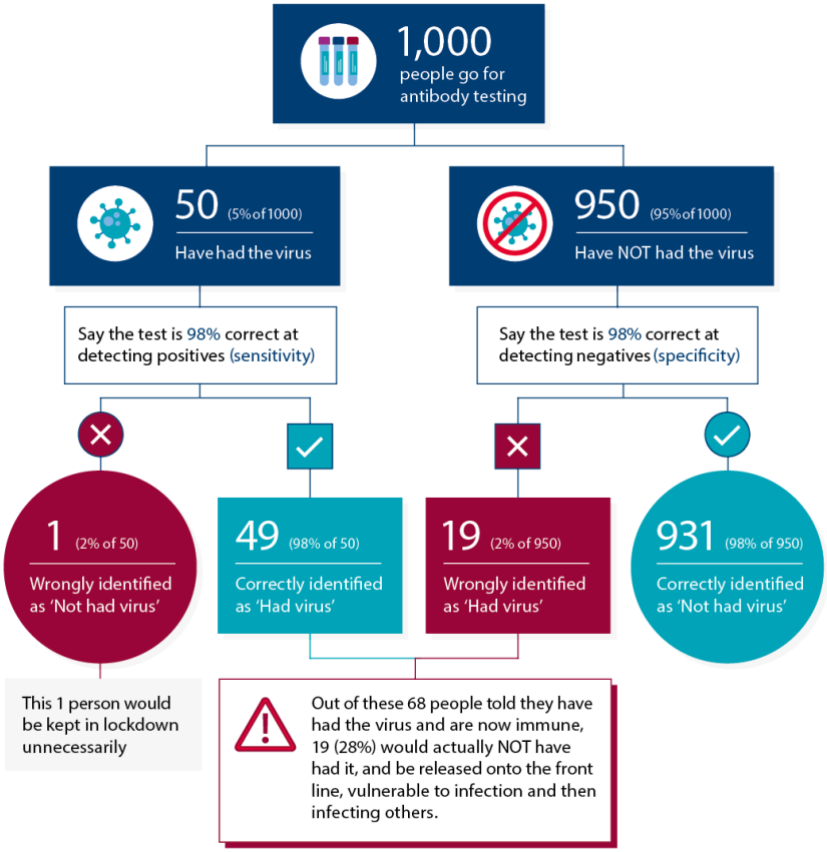
The note does not consider how tests might be made available nor to whom.

The likelihood of the responses we describe below is unknown but will be influenced by the performance of a test which depends on:

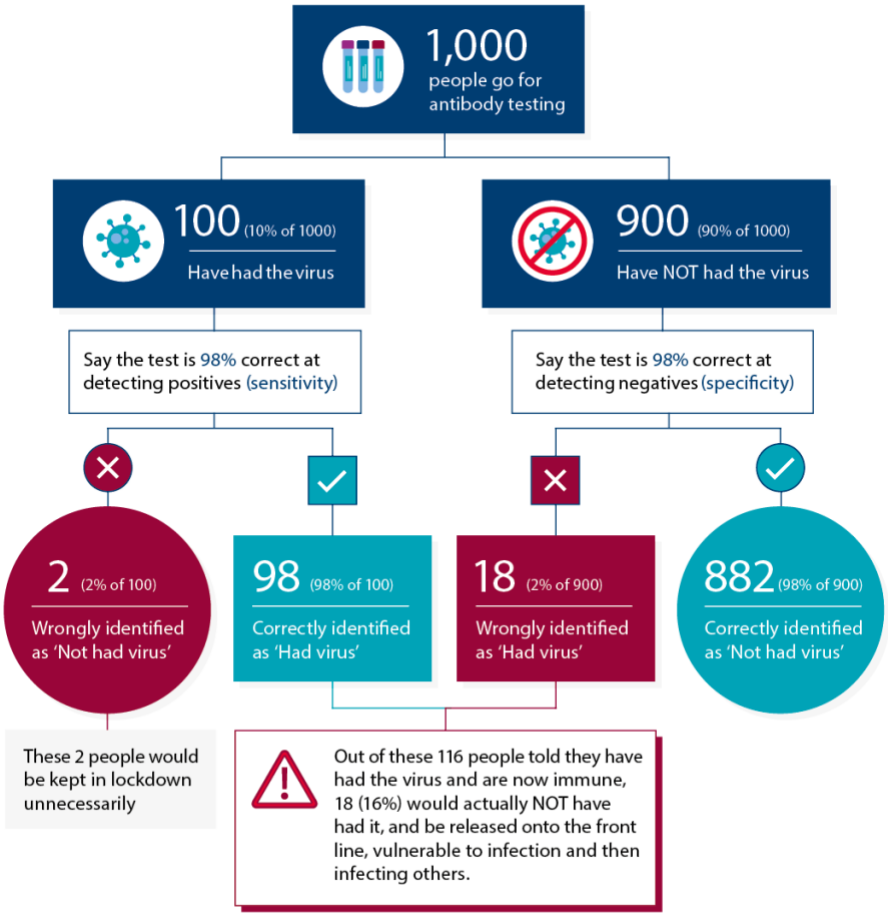
1. The proportion of those who have antibodies who test positive - sensitivity
2. The proportion of people without antibodies who test negative - specificity
3. The proportion of people in the population who have antibodies – prevalence

MHRA guidance (2020) sets the minimal acceptable level at >98% (within 95% confidence intervals) for both sensitivity and specificity for serological point of care tests. The performance of such a test is illustrated below for (a) 5% prevalence of infection and (b) 10% prevalence. *Infographics prepared by Alex Freeman, Winton Centre, University of Cambridge.*

(a) 5% Prevalence of Past Infection



[1](b) 10% Prevalence of Past Infection



Of particular concern is the proportion of those informed that their test result indicates the presence of antibodies when in fact they do not have antibodies:

(a) 5% Prevalence: **28%** = i.e. 1 in 4 who test "Antibody Positive" are actually without antibodies
(b) 10% Prevalence: **16%** = i.e. 1 in 6 who test "Antibody Positive" are actually without antibodies

*nb 99% specificity reduces these rates to **16%** (5% prevalence) and **8%** (10% prevalence).*

Possible negative behavioural consequences

1. Those testing Antibody Positive

(a) Failure to recognise and respond to symptoms of COVID-19

If those testing "Antibody Positive" believe they have no chance of becoming infected with COVID-19 in the future, they may fail to attribute future symptoms of cough or fever to COVID-19. This would prevent them from self-isolating when ill and increase the chance of them transmitting infection.

This may occur in all population groups, but would have more severe consequences for frontline health and social care workers, where failure to self-isolate may result in staff members infecting vulnerable patients and co-workers. Although in theory, staff should not attend work with fever even outside of a pandemic, in practice presenteeism can be high, particularly among healthcare workers [Webster et al 2019]

(b) Reduced adherence to transmission-reducing behaviours

Hand hygiene and other measures to reduce fomite transmission will remain important regardless of antibody status. Failure to take appropriate precautions could lead to transmission of the virus between people. There is some evidence from previous public health crises that misunderstanding test results can affect adherence to risk-reducing behaviours. During the 2001 US anthrax attacks, some postal workers given a negative nasal swab result for anthrax incorrectly believed that this meant they had not been exposed to anthrax. Some then cited this as a reason for not adhering to their course of prophylactic antibiotics [Stein et al 2004; Williams et al 2001].

Lower adherence to risk-reducing behaviours such as hand hygiene may occur in all population groups, but is likely to be less problematic for frontline health and social care workers for whom hand hygiene is well established routine clinical practice.

(c) Seeking increased exposure to COVID-19 at work

Some testing "Antibody Positive" may actively volunteer to take on activities at work with high exposure to COVID-19. This might include customer-facing roles or tasks within health or social care that involve greater contact with COVID-19 patients. This would be particularly problematic if the test result was incorrect. Conversely, volunteering to take on higher risk duties may be a valid position given a good understanding of the uncertainties inherent in the test result. As testing is rolled out and teams start to become aware of who has and has not received an "Antibody Positive" test result, there will be a need for employers to develop a fair policy to balance the tensions that may be at play.

While this risk is present for all organisations involving higher and lower risk activities, the issue is likely to prove particularly challenging for frontline health and social care staff.

2. Those testing Antibody Negative

(a) excessive avoidance of social contact

People informed that they have not yet had the virus may respond by reducing social contact in order to minimise their chances of becoming infected. This will not be a threat in terms of infection

control, but could lead to adverse psychological and social outcomes for individuals. If avoiding social contact includes not going to work, the implications become more serious (see below).

This issue applies across all population groups.

(b) avoiding return to work or specific activities at work

It is possible that people told they have not yet had the virus may feel more vulnerable and wish to avoid specific activities at work that pose a risk to their health, or seek to avoid attendance at work entirely.

While this risk applies across all occupational groups, it may lead to particular issues for frontline health and social care workers, where high risk tasks may be more common. In some contexts, seeking to avoid high risk tasks may be a valid option, depending on the availability and willingness of other staff to perform these duties. This links to the possibility of other staff accepting additional risk (see above) and of potential discrimination (see below).

3. Discrimination by Employers

Some employers may discriminate on the basis of antibody status. This might include not permitting those testing Antibody Negative to return to work, or only taking on new staff with Antibody Positive test results. Work may also be allocated among employees based on test status with, for example, customer-facing work being allocated to those who have tested Antibody Positive. In some circumstances this may be appropriate, but in others this might constitute adverse discrimination.

This risk applies across all occupational sectors.

4. System Gaming

If a test result is a requirement for a resumption of work, a range of strategies to 'game' the system may arise. These include people deliberately seeking out infection or attempting to purchase a fake test result, commercial organisations selling unapproved tests, or approved tests becoming available through private organisations at prices that make them unavailable to most.

Assuming that health and social care workers will be provided tests for free from their employer, this risk is likely to be more relevant to other sectors.

References

MHRA https://www.gov.uk/guidance/guidance-on-coronavirus-covid-19-tests-and-testing-kits#advice-for-manufacturers

Stein BD, Tanielian TL, Ryan GW, Rhodes HJ, Young SD, Blanchard JC. A bitter pill to swallow: nonadherence with prophylactic antibiotics during the anthrax attacks and the role of private physicians. Biosecurity and bioterrorism: biodefense strategy, practice, and science. 2004 Jul 1;2(3):175-85.

Webster RK, Liu R, Karimullina K, Hall I, Amlot R, Rubin GJ. A systematic review of infectious illness presenteeism: Prevalence, reasons and risk factors. BMC Public Health 2019; 19:799.

Williams JL, Noviello SS, Griffith KS, Wurtzel H, Hamborsky J, Perz JF, Williams IT, Hadler JL, Swerdlow DL, Ridzon R. Anthrax postexposure prophylaxis in postal workers, Connecticut, 2001. Emerging infectious diseases. 2002 Oct;8(10):1133.