

# Rapid COVID-19 antigen testing for Safety at Work and Re-opening Societies and Economies

Current strategies for suppressing the transmission of SARS-CoV-2, the virus that causes COVID-19, are, in too many countries, not effective, resulting in repeated lockdowns with severe impacts on jobs and livelihoods. Progress on rapid antigen testing offers the real prospect of detecting when people are contagious and likely to infect others. Even with the global roll out of vaccines, widespread use of rapid COVID-19 tests, in addition to masks, distancing and other measures will be crucial to providing safer work environments as well as suppressing the spread of the virus.

Robust screening is essential to tackling any pandemic. The combination of high levels of asymptomatic infection, the fact that people are contagious before they have symptoms, and the logistics and expense of the most widely used method to date mean that the virus is spreading undetected.

## Polymerase Chain Reaction (PCR) testing

Polymerase chain reaction tests are a vital tool for diagnosing illness (and crime scene forensics and DNA fingerprinting), however they are not effective as a tool for screening in real time. By the time those who are able to access to PCR tests manage to get tested, they have likely been in the most highly contagious window of infection for some time. By the time they get a result, they may well be past that window. Because PCR picks up even traces of virus that persist long after the virus has passed, PCR tests also give positive results days or even weeks after the person is no longer a risk to others, meaning that many have to needlessly quarantine.

## Rapid Antigen Testing

These tests work by identifying the 'spike' proteins of the actual virus (antigens), in contrast with common PCR tests which detect RNA strands of the virus. Several recent efforts show promising results, including from Madrid, Oxford University/Public Health England, Germany and Slovakia, underlining their potential. The key indicators for such tests are sensitivity (the level of accuracy in detecting the virus) and specificity (the probability of false positives). The fact that sensitivity is slightly lower than PCR is advantageous given that rapid antigen tests show strong reliability in detecting when infected people are actually contagious, which PCR cannot reliably do.

Rapid antigen tests can be done using "lateral flow assay", similar to home pregnancy tests. Currently, they can cost as little as US\$1-5, however that cost could become lower with increased production.

The tests work by taking a swab from just inside the nostril (unlike swabs for PCR which have to be taken deep inside the nose). The swab is placed in a small tube of reagent chemical, and then a couple of drops are squeezed onto a paper strip which is held in a plastic casing. The result of the test appears within 15 – 30 minutes. Another version of the test involves putting the swab and a paper strip into the same vial of reagent.

## The tests could be used:

1. to create Covid-free spaces: eg for air travel, as is now happening at Rome Fiumicino Airport, entertainment and sporting venues and other places where people gather, including workplaces. Strip tests will be cheap enough to be used in schools and other places where frequent testing is necessary.

2. to control outbreak: testing just over half the population every 3-7 days (q 5 days) is sufficient to protect the other half, and rapidly drive  $R_0$  below 1 meaning that on average an infected person transmits the virus to less than one other person.

Even when vaccines are available, they reduce symptoms and prevent the development of Covid in the vaccinated person but we do not yet know whether they will prevent transmission. Strip tests will be very important in detecting those protected by vaccine but still contagious .

Of the various commercial antigen tests available, at least some of them have already shown sensitivity and specificity levels that are suitable to enable screening. At least one open source “recipe” for a rapid antigen test has been published on the internet.

The studies done to date have used “point of care” methodology – i.e. the testing is done at a specific place by qualified personnel. The tests can deliver results in 15 minutes, and do not require expensive machines such as are needed for PCR.

Professor Michael Mina, immunologist and epidemiologist at Harvard School of Public Health, and others are calling for mass production and distribution of paper-strip based rapid antigen tests which can be used at home or elsewhere. Widespread deployment of these tests, coupled with contagious people isolating, would enable transmission of the virus to be interrupted, and focused action where clusters of infection are identified. Thus, the pandemic could be brought under control. Workplaces, venues and other places which are shut down could re-open with high levels of confidence, and many lost livelihoods could be restored.

A Harvard study shows that there would be a 14x economic return on the investment required for mass screening.

Health authorities are beginning to roll out the tests, to be done at testing centres. An initial distribution of 600,000 is underway in England.

Unions will need to be prepared to engage in social dialogue and negotiation on this issue, to ensure the appropriate provisions and protections around sick leave, privacy etc. There is a strong case for unions, where possible in cooperation with employers and others, to advocate for investment in these tests to ensure quality and availability. Investment in production, with the right regulatory settings, will drive the cost of the tests down.

These tests alone will not be sufficient. They will need to be supported by a strong focus on existing measures.

In time vaccines are likely to play a major role in fighting the pandemic and Pfizer and Moderna have both announced their vaccines are 90-95% effective. However the timeline and logistics of a global roll out means that we must continue to have multiple approaches to controlling the spread of the virus.

Trade unions are supporting initiatives to ensure equitable global distribution and access for all to affordable vaccines, tests and treatments.

The ITUC and its affiliates are pushing for progress on access to these and on use of masks, social distancing, isolation of contagious people, paid sick leave etc., as well as real progress on social protection and investment in health and care.

### **Some References:**

[Short video explainer](#)

[“Bring the test to the people”](#)

[Costs of strip tests](#)

[Point of Care Antigen tests \(not yet peer-reviewed\)](#)

[Sensitivity and specificity of lateral flow tests](#)