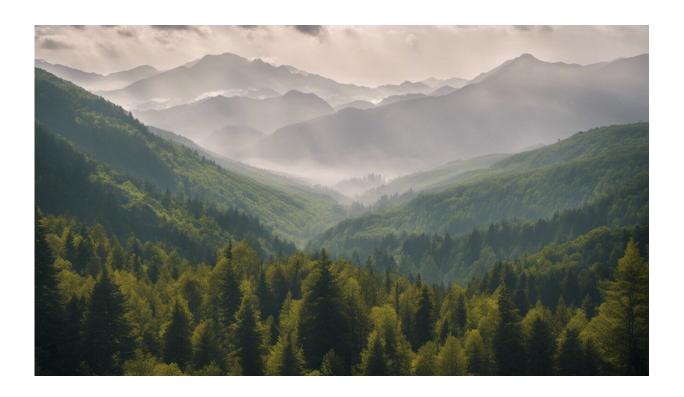# COVID-19 test results: What you need to know to understand them

May 25 2021, by Gabriel Recchia

Credit: AI-generated image ([disclaimer](#))

Testing has been vital during the pandemic. Negative COVID-19 test results have allowed people the freedom to work and travel, while positive results have been used to isolate infected individuals and protect the wider community.

But the main form of testing used—the lab-based method known as PCR testing—isn't perfectly accurate. False positives, where a test says someone has COVID-19 when they don't, are [thought to occur](#) between 0.8% and 4% of the time when people without COVID-19 are tested.

Estimates of the opposite—false negatives—vary wildly (which makes them uncertain). Anywhere from 1.8% to 58% of tests given to people who actually do have COVID-19 incorrectly yield a negative result, according to [one wide-ranging review](#).

However, whether or not you receive this kind of information when you take a PCR test depends on the policy of your health provider or government. This matters, because, as I and my colleagues have found, how this uncertainty about the tests is communicated influences how people understand their test results.

This in turn has the potential to influence decisions on whether or not to isolate. In a pandemic, this can have serious health consequences.

In our [study, we presented 1,744 UK residents](#)—sampled to be proportional to the national population with respect to age and sex—with a hypothetical scenario. Participants were told that a man named John has been feeling ill, and that based on his symptoms alone, a knowledgeable doctor believes John has a 50:50 chance of having COVID-19. So John dutifully takes a PCR test.

About half of participants were told that John had tested positive, and the other half that he had tested negative. We then showed each participant explanatory information from either the New Zealand Ministry of Health, the US Centers for Disease Control (CDC) or the UK National Health Service (NHS), or a modified version of the NHS message, or no message at all.

The original NHS guidance simply stated that "a negative result means the test did not find coronavirus," while the CDC and modified NHS guidance hedged somewhat. For example, the CDC guidance stated that "if you test negative, you probably were not infected at the time your sample was collected" and recommended that test recipients continue to take steps to protect themselves.

The New Zealand Ministry of Health was more explicit about [false positives](#) and false negatives and the difference between them. Its [guidance said](#) that while false negatives are rare in [laboratory studies](#), "it is important to remember that tests don't work as well in the real world." It then provided reasons why [false negatives](#) can occur. In contrast, it noted that it expected "very few (if any) false positive test results."

We found that people who read guidance without any hedging or discussion of false positives or negatives were the most likely to believe the test result couldn't be wrong. That is, they were most likely to believe that a positive result meant the hypothetical patient John had a 100% chance of having COVID-19 or that a negative result meant a 0% chance of him having it—which was not the case.

They were also more likely to "completely disagree" that John should self-isolate if he tested negative—even though in reality there was a chance he still had the virus. Given that we had described John as "feeling ill," ideally people would have said that he should stay at home regardless of his test result.

Uncertainty

The research points to the fact that how and whether uncertainty is communicated to us can change our beliefs and behavior in situations that can be a matter of life and death.

People writing guidance sometimes fear that highlighting major uncertainties may lead to loss of trust, and this is possible in some contexts. For example, [research](#) has found that reading about a scientific model that had extremely high uncertainty about the number of future COVID-19 deaths led to less trust in science than reading about one that seemed more specific. On the other hand, reading a specific prediction and then learning that it was considerably off also decreased trust.

Acknowledging and contextualizing uncertainty without overemphasizing it may provide a middle way. It can demonstrate trustworthiness, and by doing so, may help maintain at least some trust even when predictions or test results go wrong.

Thankfully, since our research was carried out, [the NHS website](#) has moved away from implying there is no certainty in PCR testing, updating its [guidance](#) to say that a negative [test](#) "does not guarantee you do not have COVID-19."

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