

Study makes the case for shorter quarantines—with 'judicious' testing

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When Yale researchers reported in December that a seven-day quarantine, coupled with carefully timed testing, could be as effective as a 14-day quarantine in preventing the spread of COVID-19, it attracted

widespread media coverage. In fact, the research, which was originally published as an online preprint, even helped shift public health recommendations.

In the study, researchers quantified the probability of virus transmission by studying the employees of an oil company that tests workers for COVID-19 before they enter an offshore rig following a seven-day quarantine. According to their study, which was recently published in the journal *Nature Communications*, testing during the sixth day of quarantine was highly effective at catching late-developing COVID-19 and in helping to reduce the spread of the virus.

In an interview, Jeffrey Townsend, the Elihu Professor of Biostatistics at the Yale School of Public Health and co-first author of the research, discusses the findings and what he believes the public should know about quarantines and testing.

For the study, you examined the effectiveness of one-week quarantines, which are about half of the standard quarantine. What did you find?

You can do as well or better than a 14-day quarantine with seven days of quarantine and testing on day six if you get the result on day seven. If you stay seven days in quarantine and have a negative result taken 24 hours before the final day, the chance of you passing on disease when you exit is lower than if you just stay 14 days in quarantine and don't have any test.

It turns out that the "entry" test [at the beginning of quarantine], which is actually fairly common, has almost a negligible value. For a very short quarantine it is certainly useful, but for a relatively longer quarantine an entry test does not significantly lower your probability of transmission.

The exit test [at the end of quarantine] is very valuable—and in general, as a rule of thumb, the later you can do your test, the better.

The CDC changed their official quarantine policy to 10 days from 14 based in part on your findings.

As long as people are doing a test late in the quarantine, I certainly think it's reasonable to do a 10-day quarantine. It's a bit of a confusing policy, because a 10-day quarantine increases risk compared to 14-day quarantine. I think what they're really trying to get at with the lower quarantine is that people are likely to be getting tests now in one way or another. But I think even better than 10 days without a test is a shorter quarantine of seven days if you get an RT-PCR [nasal swab] test at the end of day six.

One of the questions your study addresses is whether tests done too early in infection are likely to be negative. What did you find?

When you get infected, you have these very small, really dispersed droplets that land in your respiratory tract. At the very beginning of that infection, it's still a very low viral load compared to what you need to have in order for a swab in your nose to catch those viruses. Those viruses then replicate, and replicate, and replicate. And at some point, they're throughout all of the surfaces of your respiratory tract. And that's when a swab of your nose should catch them. The [RT-PCR] [test](#) is incredibly effective. If the virus is on the swab, it's going to find it. But it's going to take a couple of days for the virus to grow to a level where it's everywhere and you're going to actually get particles of [virus](#) when swabbing or sampling saliva.

What made oil rig workers a good sample for studying quarantines and testing?

There's not a whole lot of extra labor force on the rig. If you have the risk of an outbreak spreading across the rig and infecting people, the whole rig is going to have to be shut down. That is an incredibly, incredibly expensive proposition for the oil and gas industry. In order to prevent it, they're willing to spend a lot of money, which includes quarantining and testing any individual who is going to be heading out to a rig. On the other hand, they want to minimize the amount of costs they have to incur as they do it. They were very interested in knowing what combination of quarantine and testing would best suit their case. And it turns out that their case is the same as just about any case. All we really want to do with quarantine is prevent the possibility that someone gets through quarantine and then transmits to someone else.

More information: Chad R. Wells et al. Optimal COVID-19 quarantine and testing strategies, *Nature Communications* (2021). DOI: [10.1038/s41467-020-20742-8](https://doi.org/10.1038/s41467-020-20742-8)

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