Week in Review: 18 – 22 January 2020

BRIEF19

A daily review of covid-19 research and policy.

RESEARCH BRIEFING

BinaxNOW antigen testing can be used in asymptomatic individuals. Is it ready for prime time?

A vital component of the public health response to covid-19, in addition to the ongoing vaccination process, is reducing transmission of SARS-CoV-2 between those who have not yet been vaccinated. Identifying sources of infection is imperative to achieve this goal, but as we have learned, those infected with SARS-CoV-2 can remain asymptomatic.

However, a possible breakthrough comes in BinaxNOW, a rapid antigen test that has received Emergency Use Authorization from the US Food and Drug Administration for testing those *with symptoms* concerning for covid-19. Now, a study published in the US Centers for Disease Control and Prevention's *Morbidity and Mortality Weekly Report* this week addressed how well the test performed among asymptomatic individuals. (Note: we have written a ***glossary*** below to clarify some the necessary but technical terminology used when comparing the performance of diagnostic tests). The important thing to realize is that antigen tests like BinaxNOW are not meant to diagnose SARS-CoV-2 infection but, rather, to determine whether person taking the test is *contagious*.

If one were to ask the wrong question (i.e. how does BinaxNOW fare in diagnosing a coronavirus infection), the test would appear only half as good as the PCR test in asymptomatic individuals. Six out of 10 individuals with symptoms who were positive by the PCR test were also positive by the BinaxNOW test. Three out of 10 individuals without symptoms who were positive by the PCR test were also positive by the BinaxNOW test. That all sounds unimpressive. But when you look at whether or not the samples taken from test subjects were able to grow "culturable virus," (i.e. enough to be contagious) suddenly BinaxNOW does much better. The researchers found that the BinaxNOW was positive in 92.6 percent of the specimens that also were able to create culturable virus among symptomatic subjects. This means that the rapid test found 92.6 percent of the contagious cases. Meanwhile, the number was 78.6 percent in samples taken from asymptomatic persons. And that's on a single test. Test regimens that instruct people to do more than one test before drawing any conclusion would mean that the devices might correctly identify even more, and maybe nearly all, contagious people.

So, as long as the BinaxNOW test is understood and used properly, it could lead people to safely conclude they are not contagious, allowing more freedom of movement. Other advantages over the PCR (which are often positive for days or weeks after covid-19 patients are no longer contagious include the fact that it can be performed in 15-30 minutes; it also costs less than the PCR test. One drawback of the study is that it was performed by healthcare professionals. But it is plausible that individuals could perform the swabs themselves at homes.

Regarding the BinaxNOW and its overall ability to diagnose *any* infection, the authors point out that the Binax test does not go as deep into the nose as the PCR test. That alone may explain the superior performance of the PCR. We also note that the testing methodology is different (i.e. they test for different parts of the virus). The authors, nevertheless, conclude, that the speed of the test may help identify asymptomatic carriers in the community despite its relative lack of sensitivity in detecting infections. They should *not* be relied on to rule out infection. And one

negative test is not enough, based on these data. Two or more in close succession would make the results even better. *21 January 2021*. *—Michael Chary, MD PhD*

How are the children doing during the pandemic? A brewing mental health crisis.

The direct effects of the covid-19 pandemic are hard enough for epidemiologists to measure. Keeping track of cases, hospitalizations, mortality, and the long-term symptoms among survivors takes tremendous resources. Measuring the secondary effects is an entirely different and, in many ways, more complex challenge. Such effects include the psychological strain put on the general population. Traditional social opportunities and ties have been significantly disrupted. Many people now finding themselves isolated and removed from the social nutrients previously taken for granted and that we almost unknowingly dependent on to "get by" in our carrying out our normal everyday life activities. Adolescents may be particularly vulnerable.

In a new research letter released today in *JAMA Pediatrics*, investigators in China surveyed a sample of 7,890 individuals aged 12-18 living in Wuhan, China during March 30-April 7, 2020, a time during which significant city-level health measures and social restrictions were in place. The data found that this diverse group of younger participants had significant rates of both anxiety (22 percent) and depression (25 percent). These rates were measured by using validated measures of depression and anxiety such as the Hospital Anxiety and Depression Scale.

When looking at the factors associated with related mental health symptoms, the authors found that anxiety and depression were closely associated with daily life under home restrictions among adolescents during the covid-19 pandemic period, especially with respect to "digital era" factors such as screen time and browsing information about covid-19. It is also important to emphasize that restrictions themselves are not the root of the problem. These restrictions are the safest response to them in areas where outbreaks are not sufficiently controlled. Rather, the problem is the virus. The mental strain on adolescents would likely be even worse if restrictions were lifted and death rates skyrocketed. Once the virus is gone, life will resume safely.

The takeaway? Younger individuals may be suffering similar rates of mental health stress during the pandemic as adults. It is important for caregivers and other adults who may be interacting with children and adolescents to take the time to check in and support this vulnerable group. And it must also be said that the digital entertainment Swiss Army Knife of an iPad and internet may be a double-edged blade. These devices provide important avenues for work, education, connectivity, and entertainment that can enhance our lives during this period. But they are also conduits to doomscrolling and other behaviors that can make the situation worse for some. More traditional social interactions and time to make deeper connections may have significant positive effects for the well-being of younger people during this unusually trying time. *19 January 2021*. *—Bernard P. Chang, MD PhD*

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Brief19 is a daily executive summary of covid-19-related medical research, news, and public policy. It was founded and created by frontline emergency medicine physicians with expertise in medical research critique, health policy, and public policy.