PINNACLECARE

Medical Intelligence Report

Date: August 18, 2020

Topic: Research Update on COVID-19

Efficacy of Face Masks

Scientists at Duke University in Durham, North Carolina released a study in *Science Advances* describing the efficacy of different types of masks to prevent the transmission of droplets while speaking. The researchers used a laser and camera to produce an optical detector of droplets released during normal speech. The amount of droplets released was compared to a speaker without any mask on.

The types of masks tested were:

- A three-layer surgical mask
- N95 mask with exhalation valve
- Knitted mask
- Two-layer polypropylene apron mask
- Cotton-polypropylene-cotton mask
- One-layer Maxima AT mask
- Two-layer cotton, pleated style mask
- 2-layer cotton, Olson style mask
- 2-layer cotton, pleated style mask
- 1-layer cotton, pleated style mask
- Gaiter type neck fleece
- Double-layer bandana
- 2-layer cotton, pleated style mask
- N95 mask, no exhalation valve, fitted

The fitted N95 and surgical mask had the lowest droplet count. The bandana and the neck fleece had the worst performance, and the neck fleece led to an increase in the droplets compared to no mask. The researchers propose that the fleece mask dispersed the larger droplets into a multitude of smaller droplets that may be airborne longer. The N95 with a valve was also less effective than expected because the valve opens with strong exhalations, which would decrease the protection for nearby individuals. The cotton masks were found to approach the performance of standard surgical masks.

Elevated Blood-Glucose Levels Promotes SARS-CoV-2 Replication

It has been observed that individuals with diabetes with uncontrolled blood-glucose levels are at higher risk of severe symptoms from COVID-19. Researchers found that elevated glucose levels and sustained metabolism of glucose by the cells led to increased replication of SARS-CoV-2 and increased cytokine production in cells from the innate immune system. Control of blood glucose may reduce the risk from COVID-19.

Use of E-Cigarettes Increases the Risk of COVID-19 in Individuals Aged 13 to 24 years

Researchers investigated the association between having symptoms for COVID-19 and getting tested or diagnosed for the disease with the use of cigarettes, e-cigarettes, combined use of cigarettes and e-cigarettes, sociodemographic factors, obesity, and complying with shelter-in-place orders. They found that diagnosis with COVID-19 was five times higher in individuals who reported than they had ever used e-cigarettes in the last 30 days and seven times higher in those who reported ever using conventional cigarettes and e-cigarettes in the past 30 days. Symptoms were 4.7 times for individuals who had used both forms of smoking within the last 30 days. When the other factors associated with COVID-19 were evaluated, the researchers found that African American/Black, Hispanic, other/multiracial, underweight, and obese participants were twice as likely to experience symptoms; lesbian, gay, bisexual, transgender, and questioning youth were 1.8 times more likely to have symptoms; and those not complying with shelter-in-place orders were 1.6 times as likely to report symptoms of COVID-19. The study was not designed to determine if smoking was the cause of the increases, but the association suggests that individuals in this age group may need to be screened and informed about the possible risks.

Clinical Trials to Test Potential Treatments for COVID-19

A clinical trial called I-SPY COVID organized by the COVID R&D Alliance, AbbVie, Inc., Amgen Inc., and Takeda Pharmaceutical Co. Ltd enrolled the first participants in a platform-based trial to test the effects of cenicriviroc, Otezla, and Firazyr on inflammatory response among severely ill, hospitalized COVID-19 patients who require high-flow oxygen.

Drugs being tested in the I-SPY COVID Trial

- **Otezla** suppresses inflammation caused by immune responses
- **Firazyr** improves pulmonary edema, or excess fluid in the lungs
- **Cenicriviroc** blocks cells from the innate immune system monocytes from moving to tissues, such as the lungs

A platform-based trial allows for faster testing due to a shared placebo group and shared protocols that make it easier to compare the results for different treatments.

The NIH has begun a trial, called the Adaptive COVID-19 Treatment Trial 3 (ACTT 3), to test remdesivir in combination with interferon beta-1a. They will test the efficacy of remdesivir with an injection of interferon beta-1a in 1000 hospitalized participants with lung involvement from COVID-19, including a need for supplemental oxygen, abnormal chest X-rays, or illness requiring mechanical ventilation. People with confirmed infection who have mild symptoms or no apparent symptoms will not be included in the study. Interferon beta-1a is a manufactured form of the naturally occurring type 1 interferon called interferon beta, which functions to stimulate the adaptive immune system and has been observed to be at low levels in people with COVID-19.

The NIH has also started a trial, called ACTIV-2, for people with mild cases of COVID-19 that do not require hospitalization for treatment. The trial will test the efficacy of an antibody-based therapy called LY-CoV555 from Eli Lilly and Company and AbCellera Biologics. The antibody is based on one that was isolated from a patient who had recovered from COVID-19. The drug is administered by IV infusion and the effects will be measured in 220 participants compared to a placebo.

CDC Clarifies Update of Isolation Guidance

The CDC recently updated their guidance on the length of time needed for isolation after a positive PCR-based test for COVID-19. As they have reported before, those with a positive test should isolate themselves from others for at least ten days after symptoms onset and until 24 hours after they no longer have a fever without the use of medications. The CDC updated sections where they described that people can continue to test positive for COVID-19 for up to three months. During this time, the individuals are not considered infectious as the positive tests are thought to occur from clearing of viral pieces from the body. The confusion was over a statement that retesting within three months after the initial infection is not necessary unless there are symptoms present.

Some media outlets described the new information incorrectly, suggesting that individuals were immune to reinfection with SARS-CoV-2 in the three months following infection and therefore did not need subsequent testing. The CDC clarified that their recommendations do not suggest that reinfection is not possible, as this has not been proven definitively at this point, but instead recovered individuals may continue to test positive after recovery for long periods, but do not require a negative test at the end of that period to prove they are no longer infectious.

References

CDC. Updated Isolation Guidance Does Not Imply Immunity to COVID-19. Published August 14, 2020. Accessed August 17, 2020 at https://www.cdc.gov/media/releases/2020/s0814-updated-isolation-guidance.html

Codo AC, Davanzo GG, Monteiro LB, et al. Elevated Glucose Levels Favor SARS-CoV-2 Infection and Monocyte Response through a HIF-1α/Glycolysis-Dependent Axis [published online ahead of print, 2020 Jul 17]. *Cell Metab*. 2020;S1550-4131(20)30365-X. doi:10.1016/j.cmet.2020.07.007

Fischer EP et al. Low-cost measurement of facemask efficacy for filtering expelled droplets during speech. *Science Advances*. Published August 7, 2020. Accessed on August 17, 2020 at https://advances.sciencemag.org/content/advances/early/2020/08/07/sciadv.abd3083.full.pdf

Gaiha SM, Cheng J, Halpern-Felsher B. Association Between Youth Smoking, Electronic Cigarette Use, and Coronavirus Disease 2019 [published online ahead of print, 2020 Aug 1]. *J Adolesc Health*. 2020;S1054-139X(20)30399-2. doi:10.1016/j.jadohealth.2020.07.002

NIH. NIH clinical trial testing remdesivir plus interferon beta-1a for COVID-19 treatment begins. Published August 6, 2020. Accessed on August 11, 2020 at https://www.nih.gov/news-events/news-releases/nih-clinical-trial-testing-remdesivir-plus-interferon-beta-1a-covid-19-treatment-begins

NIH. NIH clinical trial to test antibodies and other experimental therapeutics for mild and moderate COVID-19. Published August 4, 2020. Accessed on August 17, 2020 at https://www.nih.gov/news-events/news-releases/nih-clinical-trial-test-antibodies-other-experimental-therapeutics-mild-moderate-covid-19

PR Newswire. Members Of The COVID R&D Alliance And Quantum Leap Healthcare Collaborative Enroll First Patients In I-SPY COVID Trial. Published August 3, 2020. Accessed on August 17, 2020 at https://www.prnewswire.com/news-releases/members-of-the-covid-rd-alliance-and-quantum-leap-healthcare-collaborative-enroll-first-patients-in-i-spy-covid-trial-301104431.html