COVID-19 Evidence Digest 04/02/21

New SARS-CoV-2 Variants — Clinical, Public Health, and Vaccine Implications (NEJM)

Bottom Line: The emergence of new SARS-CoV-2 variants highlight the need for rigorous surveillance, to identify these variants early on, for equitable distribution of current vaccines, and to prioritize creating updated vaccines to combat these new variants.

Details: Three new variants of SARS-CoV-2 have rapidly emerged and become dominant within their emergent countries. These include the United Kingdom B.1.1.7 (VOC-202012/01), South Africa 501Y.V2 (B.1.351), and Brazil P.1 (B.1.1.28.1) variants. The B.1.1.7 variant was first reported on December 14, 2020; the 501Y.V2 variant was first reported on December 18, 2020; and the P.1 variant was first reported on January 12, 2021. The B.1.1.7 variant was reported in 93 countries; 501Y.V2 variants reported in 45 countries; and the P.1 variants reported in 21 countries by February 22, 2021. The B.1.1.7 and 501Y.V2 variants have also been shown to be more transmissible compared to the older variants in those countries: the B.1.1.7 variant is about 43% to 82% more transmissible while the 501Y.V2 variant is about 50% more transmissible. These variants might also be associated with higher rates of mortality from COVID-19. The COVID-19 vaccines have also been found to be less effective against these emergent variants compared to the older strains as well. More recently, two new variants (B.1.427 and B.1.429) have emerged in California, and have been shown to be about 20% more transmissible. Thus, this highlights the importance of having good surveillance and early identification of new variants, equitable distribution of the vaccine, and the need to develop updated vaccines against new variants.

Key Takeaways:

- Vigilant surveillance and identification of new SARS-CoV-2 variants is critical to prevent further transmission, especially given that they are more transmissible and the current vaccines are less effective against them.
- Equitable distribution of the vaccines and updating the current vaccines to be effective against the new strains need to be prioritized.

Effectiveness of Elastomeric Half-Mask Respirators vs N95 Filtering Facepiece Respirators During Simulated Resuscitation: A Nonrandomized Controlled Trial (JAMA)

Bottom Line: Findings from a small non-randomized controlled trial suggest that elastomeric half-mask respirators (EMHRs) provided superior fit compared to N95 filtering facepiece respirators (FFRs) during simulated aerosolizing procedures like cardiopulmonary resuscitation (CPR).

Details: This is an un-blinded non-randomized control trial of 100 healthcare workers recruited from COVID-19 patient wards at a single institution between October 26, 2020 and November 4, 2020 who had been assigned and fitted for a model elastomeric half-mask respirator (EHMR) or N95 filtering facepiece respirator (FFR). Participants performed chest compressions on a mannequin with their assigned model in the presence of aerosolized denatonium benzoate for 2 minutes or when they reported detecting the bitter agent. A total of 0 out of 36 (0%) participants in the EHMR group and 18 out of 64 (28.1%) in the FFRs group report detecting the agent (risk difference: −28.1%; 95% CI: −39.1% to −17.1%). The agent was detected at a median of 69 seconds (IQR: 42-107 seconds) after the start of the procedure. There was no association between the detection rate and years of respiratory use, healthcare role, or FFR model. These

findings suggest that elastomeric half-mask respirators (EMHRs) provided superior fit compared to N95 filtering facepiece respirators (FFRs) during simulated aerosolizing procedures like CPR, which confirms previous research. Limitations of the analysis include that it was non-randomized, un-blinded and self-reported detection.

Key Takeaways:

- A total of 0 out 36 (0%) participants in the EHMR group and 18 out of 64 (28.1%) in the FFRs group report detecting aerosolizing agent (risk difference: −28.1%; 95% CI: −39.1% to −17.1%) during simulated CPR.
- These findings suggest that elastomeric half-mask respirators (EMHRs) provided superior fit compared to N95 filtering facepiece respirators (FFRs) during simulated aerosolizing procedures like CPR, which confirms previous research.
- Limitations of the analysis include that it was non-randomized, un-blinded and self-reported detection.

Interim Estimates of Vaccine Effectiveness of BNT162b2 and mRNA-1273 COVID-19 Vaccines in Preventing SARS-CoV-2 Infection Among Health Care Personnel, First Responders, and Other Essential and Frontline Workers — Eight U.S. Locations, December 2020–March 2021 (MMWR)

Bottom Line: Authorized mRNA COVID-19 vaccines from Pfizer-BioNTech and Moderna are effective for preventing SARS-CoV-2 infection in real-world conditions.

Details: A prospective cohort of 3,950 health care personnel, first responders, and other essential and frontline workers completed weekly SARS-CoV-2 testing for 13 consecutive weeks across eight locations throughout the US. Participants had no previous laboratory documentation of SARS-CoV-2 infection, and 75% of participants received either one or more doses of mRNA vaccine (Pfizer-BioNTech or Moderna) during the study period. The majority of participants (68%) received two doses and 12% received one dose. Among unvaccinated participants, 1.38 SARS-CoV-2 infections were confirmed by reverse transcription-polymerase chain reaction (RT-PCR) per 1,000 person-days. In contrast, among fully immunized (≥14 days after second dose) persons, 0.04 infections per 1,000 person-days were reported, and among partially immunized (≥14 days after first dose and before second dose) persons, 0.19 infections per 1,000 person-days were reported. This corresponds to an estimated mRNA vaccine effectiveness for prevention of infection of 90% (95% CI = 68%–97%) for full immunization and 80% (95% CI = 59%–90%) for partial immunization. Vaccine effectiveness should be interpreted with caution given the moderately wide CIs attributable in part to the limited number of post-immunization PCR-confirmed infections observed.

Key Takeaways:

- mRNA vaccines from Pfizer-BioNTech and Moderna were shown to be effective at preventing SARS-COV-2 in real world conditions for a cohort of healthcare personnel and other essential workers.
- Effectiveness rates of vaccines in this study were overall consistent with the vaccines' Phase III trial data, although they should be interpreted with caution due to low post-immunization rates of infection.

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Effect of Intermediate-Dose vs Standard-Dose Prophylactic Anticoagulation on Thrombotic Events, Extracorporeal Membrane Oxygenation Treatment, or Mortality Among Patients With COVID-19 Admitted to the Intensive Care Unit: The INSPIRATION Randomized Clinical Trial (JAMA)

Bottom Line: In a randomized controlled trial including 562 patients with COVID-19 requiring intensive care unit (ICU) care, there was no statistically significant difference in a composite of acute venous thromboembolism (VTE), arterial thrombosis, treatment with extracorporeal membrane oxygenation (ECMO), or mortality at 30 days between individuals receiving intermediate-dose anticoagulation and individuals receiving standard-dose prophylactic anticoagulation.

Details: VTE is a thrombotic complication found in patients with COVID-19, with higher incidence amongst patients who have COVID-19 and are critically ill. A multicenter, randomized trial with a 2 x 2 factorial design included patients admitted to the ICU with positive COVID-19 PCR test results within 7 days of hospitalization. Patients were randomized in a 1:1 ratio to receive intermediate-dose or standard-dose prophylactic anticoagulation with dose adjustments based on weight and creatinine clearance. Participants were expected to remain on therapy for 30 days. The primary efficacy outcome included a composite of acute VTE, arterial thrombosis, receiving ECMO therapy, or all-cause mortality within 30 days. Secondary efficacy outcomes included all-cause mortality, VTE, and ventilator-free days. Safety outcomes included major bleeding and severe thrombocytopenia (platelet count less than $20 \times 10^3/\mu L$). Logistic regression with odds ratio was performed for primary and secondary outcomes. Predetermined subgroups were defined and analyzed separately for 600 patients who underwent randomization and 562 patients were included in the final analysis. Median age of participants was 62 with median body mass index (BMI) of 27. There was no statistically significant difference in primary (odds ratio: 1.06; 95% CI: 0.76-1.48) or secondary outcomes between individuals receiving intermediate-dose and standard-dose anticoagulation. Additionally, there was no significant difference in major (odds ratio: 1.83; 1-sided 97.5% CI: 0.00-5.93) or non-major (odds ratio: 2.55; 95% CI: 0.92-7.04) bleeding events between groups. These trends were seen in subgroup analyses as well.

Key Takeaways:

- Standard-dose prophylactic anticoagulation dosing is non-inferior to intermediate-dose anticoagulation in patients with COVID-19 requiring ICU care.
- It is reasonable to use standard-dose prophylactic anticoagulation dosing in patients with COVID-19 who are hospitalized in the ICU.