COVID-19 Literature Review Group
Prepared by The Ohio State University

Variants of COVID-19, COVID-19 Vaccine Hesitancy, and COVID-19 Vaccines
COVID-19 Literature Review
Prepared by Kenya Moyers, The Ohio State University
June 30, 2021

Topic: Variants of COVID-19

Title: How Dangerous is the Delta Variant, and Will it Cause a COVID Surge in the U.S.?
Source: Scientific American
Publication Date: June 29, 2021
Study Period: N/A
Study Location: N/A
Sample Size: N/A

Summary: The Centers for Disease Control and Prevention (CDC) had identified the Delta variant, first discovered in India, as a variant of concern. Officials worry that the variant may lead to new COVID-19 surges in the United States, particularly in areas where a large proportion of the population have not yet been fully vaccinated. Studies suggest that the Delta variant is between 40-60% more transmissible than the Alpha variant, which was 50% more transmissible than the original strain first detected in Wuhan, China. Prior to the Delta variant, the Alpha variant was the most common in the United States. As of June 30th, estimates suggest that Delta is now the dominant variant. A study in Switzerland has indicated that the Delta variant may result in more severe cases. Hospitalization rates among patients with the Delta variant were about 85% higher than that of people with the Alpha variant. Due to a time lag between hospitalizations and death, there is not enough evidence to determine if the Delta variant is more deadly in comparison to other variants.

Vaccinations appears to provide good protection against the variant. However, one dose appears to offer less protection than it did against other variants. For example, studies have shown that 2 doses of the Pfizer vaccine was 96% effective in preventing hospitalizations among people infected with the Delta variant. One dose of Pfizer was about 33.5% effective against symptomatic COVID from the variant. Experts do not expect another nationwide surge in the United States similar to the previous year. However, they do anticipate localized outbreaks in places where vaccination rates remain low. Vaccination remains the best tool for combatting and preventing a Delta variant surge.

Key Findings Relevant to Ohio’s Response: Officials should continue prioritizing vaccination rates in communities where there are low rates of full vaccination. Incentives for vaccinations should target those ages 18-29, due to there being higher rates of vaccine hesitancy among that population.
Title: AZD1222-induced neutralizing antibody activity against SARS-CoV-2 Delta VOC
Source: The Lancet
Publication Date: June 28, 2021
Link: https://doi.org/10.1016/S0140-6736(21)01462-8
Study Period: N/A
Study Location: London, UK
Sample Size: N/A
Summary: This article discusses how the SARS-CoV-2 B.1.617.2 Delta variant of concern (VOC) continues to produce a sharp increase in COVID-19 cases in the United Kingdom (UK), with a current doubling time of 3·5–16 days, consistent with previous pandemic waves during 2020–21, and a sustained increase in the reproduction number (R) to 1·2–1·4. The ChAdOx1 nCoV-19 (AZD1222, Oxford–AstraZeneca) vaccine is the UK’s primary vaccine. In order to determine B.1.617.2 sensitivity to AZD1222-induced neutralizing antibodies (NAbs) and to compare this to our previous measurements of NAbs induced by BNT162b2 (Pfizer–BioNTech), researchers carried out a second initial analysis of Legacy study participants vaccinated with AZD1222. Results from their analyses confirmed that vaccine type was associated with decreased NAbTs, independent of SARS-CoV-2 strain, in two-dose vaccine recipients. In addition, researchers found that a previous history of COVID-19 symptoms was associated with increased NAbTs, independent of SARS-CoV-2 strain, in single-dose AZD1222 recipients. Overall, findings suggest that the correlation between NAbTs and vaccine efficacy in recent models continues to perform well across different vaccine types and SARS-CoV-2 variants (appendix p 5). The data reinforces the need to acknowledge the increased protection offered by a second vaccine dose as COVID-19 cases associated with the B.1.617.2 variant increases. Additional booster vaccinations may be needed, particularly for more susceptible groups that have received a vaccine that induces lower than average NAbTs.

Key Findings Relevant to Ohio’s Response: Public officials should continue encouraging the general public to receive both doses of the vaccine. For optimal protection against VOCs, people who have access to 2 dose vaccines (Pfizer and Moderna), should receive both doses. Single dose vaccines may not be as protective.
COVID-19 Literature Review
Prepared by Kenya Moyers, The Ohio State University
June 30, 2021

Topic: Vaccine Hesitancy

Title: Evidence-Based Strategies for Clinical Organizations to Address COVID-19 Vaccine Hesitancy
Source: Mayo Clinic
Publication Date: March 2021 (96(3):699-707)
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7772995/
Study Period: N/A
Study Location: N/A
Sample Size: N/A

Summary: This article focuses on reviewing, summarizing, and encouraging the use of interpersonal, individual-level, and organizational interventions within clinical organization in order to improve population adoption of the COVID-19 vaccine. Vaccine hesitancy threatens to undermine the success of COVID-19 vaccination programs. Factors associated with COVID-19 vaccine hesitancy mimic factors that are known to influence vaccine hesitancy for other vaccines. These factors include vaccine-related attributes, vaccine-related attitudes and beliefs, and political factors. The uncertainty about the immunology and virology of COVID-19, in addition to the rapid vaccine development, can be attributed to lack of confidence in the vaccine to the general public. Data from public surveys in the United States indicated that the influence of political factors on hesitancy wherein lack of trust in those endorsing vaccination, country of vaccine origin, and concerns about profit or political motives increase public mistrust as well. On the individual level, general mistrust of the vaccine and misperceptions about the severity of disease contribute to hesitancy.

Evidence-based efforts from social, behavioral, communication, and implementation science can inform clinical efforts at the interpersonal, individual, and organization levels to address COVID-19 vaccine hesitancy and support public health efforts. Interventions at the policy and community level do not directly address vaccine hesitancy, but they set the stage for interventions to address vaccine hesitancy within clinical organizations. Interpersonal-level interventions deal with the interactions between clinicians and patients. Effective interpersonal strategies that clinicians can use to increase vaccine uptake include making strong recommendations to patients and use of presumptive announcement-style language. Individual-level interventions focus on members of a healthcare team and patients. When combined with interventions at the organization and interpersonal level, individual-level educational interventions can enable health care teams to promote vaccination and optimize efforts to address hesitancy among patients. In order to offer recommendations to their patients, clinicians must be adequately educated about evidence supporting COVID-19 vaccination, such as information regarding vaccine efficacy, safety, and reactogenicity. Effective individual strategies include offering novel information about the disease and appealing to altruism and prosocial behavior. Lastly, organization-level interventions have been found to increase vaccination rates by supporting the work of clinicians or removing barriers to vaccination for patients. Strategies for these interventions include availability of standing orders for nursing visits, audit and feedback, reminder/recall systems, point-of-care prompts, and home visits. Overall, the use of evidence-based strategies to increase vaccination uptake provides health care systems with a road map to navigate vaccine hesitancy.

Key Findings Relevant to Ohio’s Response: Implementation of evidence-based strategies at the organizational, interpersonal, and individual levels in clinical organizations to increase uptake of COVID-19 vaccination is crucial in order to aid in the ending of the COVID-19 pandemic.
Use of mRNA COVID-19 Vaccine After Reports of Myocarditis Among Vaccine Recipients: Update from the Advisory Committee on Immunization Practices—United States, June 2021

Source: MMWR
Publication Date: July 6, 2021
Link: https://www.cdc.gov/mmwr/volumes/70/wr/pdfs/mm7027e2-H.pdf
Study Period: December 29, 2020 – June 11, 2021
Study Location: United States
Sample Size: Varies

Summary: After numerous reports of myocarditis and pericarditis in mRNA vaccine recipients, which predominantly occurred in young males after the second dose, the Advisory Committee on Immunization Practices (ACIP) called a meeting to review reported cases of myocarditis and pericarditis and discuss the benefits and risks of mRNA vaccinations in the United States. Since June 2020, ACIP has called 15 public meetings to review data on COVID-19 epidemiology and use of COVID-19 vaccines. The ACIP group reviewed clinical trial and post authorization safety data for myocarditis after receiving the mRNA COVID-19 vaccines. Myocarditis is more common among males than females, with incidence being highest amongst infants, adolescents, and young adults. As of June 11, 2021, approximately 296 million doses of mRNA COVID-19 vaccines had been administered in the United States, with 52 million being administered to persons aged 12-29 years old. 1,226 reports of myocarditis after mRNA vaccination were received during December 2, 2020-June 11, 2021. Among those reported cases, the median age was 26 years (range = 12-94 years), with median onset interval of 3 days after vaccination (range = 0-179). Among the 1,094 patients with number of vaccine doses received reported, 76% occurred after receipt of dose 2 of mRNA vaccine, both Pfizer-BioNTech and Moderna.

The Center for Disease Control and Prevention (CDC) and the Clinical Immunization Safety Assessment Project investigators reviewed the COVID-19 surveillance data to monitor and assess cases of myocarditis. The Vaccine Adverse Event Reporting System (VAERS) reported that the rates of myocarditis were 40.6 cases per million second doses of mRNA COVID-19 vaccines administered to males aged 12-29 years and 2.4 per million second doses administered to males aged ≥30 years. The reporting rates among females in the same age group were 4.2 and 1.0 per million second doses. In addition, ACIP reviewed an individual-level assessment in order to assess the benefit-risk balance of mRNA vaccines in adolescents and young adults. The benefit of the vaccine was the prevention of COVID-19 disease and associated hospitalizations, ICU admissions, and deaths. The risk of the vaccine was expected myocarditis cases after vaccination. ACIP identified that the benefits outweighed the risks, however the balance of benefits and risks varied by age and sex. The ACIP discussion concluded that 1) the benefits of vaccinating all recommended age groups with mRNA COVID-19 vaccine clearly outweigh the risks of vaccination, including the risk of myocarditis after vaccination; 2) continuing to monitor outcomes of myocarditis cases after COVID-19 vaccination is important; and 3) providers and the public should be informed about these myocarditis cases and the use of COVID-19 vaccines. Based on ACIP’s conclusion regarding the benefit-risk assessment on June 23, 2021, COVID-19 vaccination continues to be recommended for all persons aged ≥12 years under the FDA’s Emergency Use Authorizations (EUA).
Key Findings Relevant to Ohio’s Response: Based on ACIP’s conclusion regarding the benefit-risk assessment on June 23, 2021, COVID-19 vaccination continues to be recommended for all persons aged ≥12 years under the FDA’s Emergency Use Authorizations (EUA).

Title: Community-level evidence for SARS-CoV-2 vaccine protection of unvaccinated individuals

Source: Nature Medicine

Publication Date: June 10, 2021

Link: https://www.nature.com/articles/s41591-021-01407-5

Study Period: December 9, 2020 – March 9, 2021

Study Location: Israel

Sample Size: N/A

Summary: The Pfizer-BioNTech COVID-19 BNT162B vaccine is highly effective at preventing disease and infection at the individual and community level, which is critical for disease eradication, as demonstrated in clinical trials and real-world vaccination campaigns. However, vaccination may also increase transmission due to behavioral effects, as vaccinated individuals may not quarantine after contacting a patient with COVID-19 or may be less mindful of social-distancing measures. Therefore, it unclear whether, overall, vaccination reduces transmission at the population level, thereby conferring protection for those who are not vaccinated, such as individuals who are immunodeficient or those who are currently ineligible for vaccination. Overall, it has difficult to determine the effect of vaccination on community-level SARS-CoV-2 transmission due to highly fluctuating spatiotemporal epidemic dynamics. In order to address this issue, researchers focused their analysis on the vaccination rates and test results of 177 distinct communities with a presumed low-rate of natural immunization as inferred by a low fraction of individuals infected with SARS-CoV-2. The data source used consisted of the vaccination rates and test results (between December 9, 2020 to March 9, 2021) of members of Maccabi Healthcare Services (MHS), Israel’s second largest healthcare maintenance organization. Geographical communities were defined based on residence codes, with about 246 communities being identified as having a sufficient number of tests and people. Findings from the analysis indicated that the rates of vaccination in each community were associated with a substantial later decline in infections among a cohort of individuals aged under 16 years, who are unvaccinated. On average, for each 20 percentage points of individuals who are vaccinated in a given population, the positive test fraction for the unvaccinated population decreased approximately twofold. Researchers identified a strong negative association between vaccination rate at the community level and the risk of infection for unvaccinated members of the community. In addition, high vaccination rates were associated with lower infection rates at later time points among the unvaccinated cohort. Although the observed vaccine-associated protection of the unvaccinated population is encouraging, further studies are required to understand whether and how vaccination campaigns might support the prospect of herd immunity and disease eradication.

Key Findings Relevant to Ohio’s Response: Results from this study provide observational evidence that vaccination not only protects individuals who have been vaccinated, but also provides cross-protection to unvaccinated individuals in a community.