Exercise facility outbreaks, COVID-19 interventions, COVID-19 precautions and safety measures, Vaccine acceptance and efficacy, and Nasal spray vaccine
COVID-19 Literature Review
Prepared by Eliana Burlotos, The Ohio State University
March 7, 2021

Topic: COVID-19 Exercise Facility Outbreaks

Title: COVID-19 Outbreak Among Attendees of an Exercise Facility – Chicago, Illinois, August-September 2020
Source: MMWR
Publication Date: February 24, 2021
Link: https://www.cdc.gov/mmwr/volumes/70/wr/mm7009e2.htm?s_cid=mm7009e2_w
Study Period: August 24, 2020 - September 1, 2020
Study Location: Exercise facility in Chicago, Illinois
Sample Size: 81 attendees
Summary: At an exercise facility in Chicago, COVID-19 cases were identified among 55 (68%) out of 81 attendees of in-person classes held during August 24-September 1. Forty-nine of the 55 cases were confirmed by real-time reverse transcription-polymerase chain reaction (RT-PCR) tests. There were an additional six probable cases among attendees with symptoms, but these probable cases had not taken a RT-PCR test or received a negative result. Furthermore, it was concluded that 43 of the 55 attendees (78%) with COVID-19 participated in multiple classes while potentially infectious. Of these attendees with COVID-19, 22 (40%) attended on or after the day of symptom onset. Data was gathered about in-class behaviors at the exercise facility. There were 58 exercise class attendees who provided information on in-class behaviors: 44 reported infrequent mask wearing. To enter the facility, masks were required, temperatures were taken, and symptom screening occurred; however, attendees were allowed to remove masks during exercise. Even though attendees were stationed ≥ 6 feet apart, SARS-CoV-2 was still transmitted at an exceptionally high rate. After receiving notification of an attendee’s positive test result, the facility closed for 13 days and informed all attendees about the possible COVID-19 exposure.

Key Findings Relevant to Ohio’s Response: Exercise facilities should require mask wearing, even during high-intensity activities while ≥ 6 feet apart, to reduce SARS-CoV-2 transmission.

Title: Community Transmission of SARS-CoV-2 at Three Fitness Facilities – Hawaii, June-July 2020
Source: MMWR
Publication Date: February 24, 2021
Link: https://www.cdc.gov/mmwr/volumes/70/wr/mm7009e1.htm?s_cid=mm7009e1_w
Study Period: June-July, 2020
Study Location: Three fitness facilities in Hawaii
Sample Size: N/A
Summary: The Hawaii Department of Health was notified of a symptomatic fitness instructor (instructor A) who received a positive RT-PCR test result for SARS-CoV-2. Instructor A taught classes at two fitness facilities in Honolulu before the onset of symptoms. The Hawaii Department of Health found 21 COVID-19 cases that were linked to instructor A. It should be noted that at the time of the outbreak, masks were not required in fitness facilities. On June 29, 4 hours before symptom onset, instructor A taught a 1-hour cycling class with 10 participants. No one wore masks while exercising. Instructor A received a positive SARS-CoV-2 RT-PCR test result the next day on July 1. All 10 participants of the cycling class received positive SARS-CoV-2 RT-PCR test results during July 2-6 (attack rate = 100%). All participants were symptomatic, including another fitness instructor (instructor B). Instructor B worked at a third facility. Instructor B’s symptoms started 4 days after his exposure on July 2. On July 1, instructor B personally trained 4 participants at this third facility. Among these
four participants, one received a positive SARS-CoV-2 RT-PCR test result. On July 2, 12 hours before symptom onset, instructor B taught 10 participants without wearing a mask. One more person, a caregiver, was present and exposed but did not participate. Nine participants and the caregiver received positive SARS-CoV-2 RT-PCR test results during July 6-8 (attack rate 91%). It should also be noted that the number of participants infected with SARS-CoV-2 might have been underestimated due to asymptomatic participants not receiving SARS-CoV-2 tests and some participants refusing testing. On July 22, 2020, Honolulu City and County amended emergency orders to require that all persons wear face coverings in fitness facilities, including during exercise.

**Key Findings Relevant to Ohio’s Response:** In order to reduce SARS-CoV-2 transmission in fitness facilities, staff and patrons must wear a mask. It is extremely important for facilities to enforce mask wearing during high-intensity activities. Facilities should also enforce physical distancing, improve ventilation, and remind staff and patrons to stay home when feeling ill. Lastly, conducting exercise classes outdoors or virtually could also reduce SARS-CoV-2 transmission.

**COVID-19 Literature Review**
Prepared by Elena McGoey, The Ohio State University
March 5, 2020

**Topic:** COVID-19 interventions (pharmaceutical and non-pharmaceutical)

**Title:** Choices in a Crisis---Individual Preferences among SARS-CoV-2 Vaccines
**Source:** The New England Journal of Medicine
**Publication:** March 3, 2021
**Study Period:** N/A
**Study Location:** N/A
**Sample Size:** N/A
**Summary:** This commentary discusses the nuances of individuals being able to choose which SARS-CoV-2 vaccines they receive. Arguments supporting individual choice include the principle of patient autonomy, the potential to increase vaccine acceptance through preference, and promotion of public trust through acknowledgement of vaccine variations. However, this commentary recommends restricting patient choice at least for this point in the pandemic in order to expedite vaccine distribution while ensuring equity and equanimity in the process.

**Key findings most relevant to Ohio’s response:** Policymakers and health systems can and should communicate to patients that they only need one choice of vaccine and reassure patients that all SARS-CoV-2 vaccines with authorized use have efficacy. The role of policymakers and health systems during this phase of the vaccine rollout should focus on promoting equanimity and being transparent with all tracking data. Health officials can help to prevent members of the public from adopting a narrow view influenced by the media (that overlooks the harms of delaying vaccination).

**Title:** Importance of non-pharmaceutical interventions in lowering the viral inoculum to reduce susceptibility to infection by SARS-CoV-2 and potentially disease severity
**Source:** PubMed
**Publication:** February 22, 2021
**Link:** https://pubmed.ncbi.nlm.nih.gov/33631099/
Study Period: N/A
Study Location: N/A
Sample Size: N/A

Summary: This commentary first reviews data that supports the link between the viral inoculum and disease severity. Non-pharmaceutical interventions (masks, social distancing, handwashing, and improved ventilation) may help to reduce an individual’s susceptibility to SARS-CoV-2 infection by reducing the viral inoculum when exposed to an infected source over time. Even as vaccines against SARS-CoV-2 are being distributed, non-pharmaceutical interventions need to be not only maintained but increased, especially in the U.S., until sufficient herd immunity is reached.

Key findings most relevant to Ohio’s response: As the efficacy of different types of facial coverings (like cloth masks) is being debated, investments should instead be made for production and distribution of high-quality surgical face coverings so that their availability is increased beyond the healthcare setting. Healthcare systems need to emphasize the importance of both non-pharmaceutical interventions for groups considered “lower priority” during the vaccine rollouts and continuation of non-pharmaceutical practices for susceptible groups or those who decline a vaccine. It is important to educate the public that after receiving a SARS-CoV-2 vaccine, non-pharmaceutical interventions should not be abandoned.
# COVID-19 Literature Review
Prepared by Anjali Prabhakaran, The Ohio State University
March 7, 2021

**Topic: COVID Precautions and Safety Measures**

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<th><strong>Title</strong></th>
<th>How effective is a mask in preventing COVID-19 infection?</th>
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<td><strong>Source</strong></td>
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**Summary**

This study conducted a review on the available literature regarding mask effectiveness and COVID-19 transmission. This paper looked at data on the characteristics of three different types of masks: surgical masks, air filtering respirators, and cloth masks, and examined how successful they were at providing both inhalation protection and exhalation protection. Based on the data, masks are necessary to prevent COVID-19 transmission given that the recommended social distancing range of 1-2m is shorter than the distance of droplet transmission (4m). For exhalation protection, both surgical masks and N95 masks are shown to be effective in reducing the spread of respiratory disease. For inhalation protection, air filtering respirators such as N95 masks are more efficient than surgical and cloth masks, though all types of masks do provide significant protection against COVID-19.

**Key Findings Relevant to Ohio’s Response**

As the public continues to be vaccinated, social distancing requirements and mask mandates are rapidly being lifted across the United States in several states. However, this article provides strong scientific evidence that continued mask wearing and social distancing are extremely effective for preventing COVID-19 transmission. The information provided in this article will be helpful for Ohio policymakers to recall when making decisions on statewide COVID-19 precautions.

| **Title** | As states loosen restrictions and variants spread, Fauci warns that the U.S. could be headed for yet another virus spike. |

As states loosen restrictions and variants spread, Fauci warns that the U.S. could be headed for yet another virus spike.
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**Summary**

Countless states across the United States are continuing to lift COVID-19 precautionary measures despite the recommendations of federal health officials such as Dr. Fauci. Texas, Mississippi, and South Carolina have lifted mask mandates to various extents, while Arizona has ended capacity limits on businesses and California has allowed the resumption of outdoor sports and live events from April 1st. However, though current case rates have plateaued at 60,000 to 70,000, this level of transmission activity still puts the United States at risk for another spike, as seen in Europe, which recently saw a their COVID-19 case rate increase by 9% following a plateau. Another risk involved with increased transmission, in addition to increased mortality and morbidity, is the risk of developing additional COVID-19 variants.

**Key Findings Relevant to Ohio’s Response**

This article emphasizes the importance of continuing to maintain COVID-19 social distancing measures and mask requirements. Without these safety measures, the time frame needed to reach herd immunity will be extended and infection and death rates will continue to rise. While Ohio has continued to be cautious and enforce public health measures, it is important that these measures continue to be enforced until cases drop below a certain threshold as determined by federal public health officials.
COVID 19 Literature Review  
Prepared by Amanda Seifferth, The Ohio State University  
March 5, 2021

Topic: Vaccine Acceptance and Efficacy

Title: What do Vaccine Efficacy Numbers Actually Mean?  
Source: The New York Times  
Publication Date: 03/03/2021  
Link: https://www.nytimes.com/interactive/2021/03/03/science/vaccine-efficacy-coronavirus.html  
Study Period: N/A  
Study Location: N/A  
Sample Size: N/A  
Summary: This article discusses the complex meaning of efficacy and its implications for the various Covid-19 vaccines. Authors define efficacy as the measurement of how much a vaccine lowers the risk of an outcome. 0% means there was no difference in risk between those who received the vaccine and those who received the placebo, whereas 100% means the risk of the outcome was completely eliminated through the vaccine. Johnson and Johnson found that their recently developed, one-dose vaccine achieved a 72% efficacy. Johnson and Johnson ran trials in 3 countries: the U.S., Latin America, and South Africa. Efficacy was highest in the U.S., likely due to higher prevalence of variants in the latter two countries. However, the Johnson and Johnson vaccine is still believed to generate a 64% efficacy against the South African variant. It is also believed to hold an 85% efficacy against severe illness, drastically mitigating the risk of hospitalization and death. In 2020, the FDA declared that Covid-19 vaccines must be comparable to the flu vaccine by achieving at least a 50% efficacy with a confidence interval reaching no lower than 30%. So far, each approved vaccine has achieved this, establishing a higher efficacy than the annual flu vaccine. Moreover, all 3 vaccines (Pfizer, Moderna, and Johnson and Johnson) significantly reduce the likelihood of severe illness.

Key Findings Relevant to Ohio’s Response: The true meaning of efficacy must be emphasized to the public. With the emergence of the recent Johnson and Johnson vaccine, there may be public hesitancy due to a 76% efficacy compared to Pfizer and Moderna’s 95% efficacy. However, it must be explained that a 76% efficacy does not mean that 14% of recipients will still get Covid-19. Rather, the vaccine will immensely reduce the likelihood of severe illness, and it will achieve higher protection than the annual flu vaccine.

Title: How to Stop Vaccine Hesitancy  
Source: ScienceDirect  
Publication Date: 11/21/2020  
Link: https://www.sciencedirect.com/science/article/pii/S026240792032025X?via%3Dihub  
Study Period: N/A  
Study Location: N/A  
Sample Size: N/A  
Summary: Researchers interviewed Heidi Larson, an anthropologist from the London School of Hygiene and Tropical Medicine and author of Stuck, a book about vaccine misinformation, to discuss her opinions on Covid-19 vaccine hesitancy. Larson identified several demographics less likely to accept a Covid-19 vaccine, including populations of lower income, populations of lower education, non-white individuals, and females. Moreover, she holds that the groups least trusting of the government, both in the U.S. and the U.K., are the least likely to receive a vaccine. She also details the top reasons for vaccine refusal. The primary cause she identifies is a lack of safety or the belief that the vaccine is “too new.” She also asserts that public health officials must distinctly
explain the reason behind rapid vaccine development. Many fear the safety and efficacy of rapidly developed vaccines. However, Larson emphasizes that public health officials must cite improved technology rather than shortcuts for the reason behind rapid vaccine production. Larson also acknowledges that technology sites, such as Facebook, could do a better job of combating misinformation. However, above all, she believes that public health experts must work to foster a more trusting relationship with the general public in order to increase vaccine acceptance.

**Key Findings Relevant to Ohio’s Response:** The recommendations of Dr. Heidi Larson have implications for Ohio policy. It is important that public health officials in Ohio clearly communicate the safety of the vaccine and the process of its development. It must be emphasized to the public that rapid development of the vaccine does not equate with poor quality/safety. However, public health officials must make it known that they are listening to the public’s concerns in order to establish a more trusting relationship.

**Title:** Quantifying the Impact of Public Perceptions on Vaccine Acceptance Using Behavioral Economics  
**Source:** Frontiers in Public Health  
**Publication Date:** 12/03/2020  
**Study Period:** June 2020  
**Study Location:** N/A  
**Sample Size:** 534  
**Summary:** In order to predict vaccine acceptance in the United States, researchers modeled various hypothetical vaccine acceptance scenarios resulting from varying public perceptions of vaccine efficacy. Moreover, they recruited online participants to engage in various behavioral economics-based activities in order to model vaccine acceptance under multiple circumstances. Such circumstances included the pace at which the vaccine was developed and the efficacy the vaccine achieved. Using an exponential demand function and linear mixed effect models, researchers concluded that a perceived 50% efficacy would result in 68.8% acceptance. However, acceptance would decrease to 58.8% with a rapidly developed vaccine. Moreover, they discovered that the minimum required efficacy rate grew 9 percentage points under rapid development scenarios. Researchers also identified specific demographics more likely to receive the vaccine under lower efficacies. These included individuals who had received the flu vaccine the past 3 years and males. Likewise, they were able to pinpoint more hesitant groups, including those holding more conspiracy beliefs and politically conservative individuals. Another interesting finding was that males and politically conservative people were less likely to alter their acceptance based on differing degrees of vaccine efficacy.

**Key Findings Relevant to Ohio’s Response:** Findings from this study indicate that, unsurprisingly, people who have a history of vaccine acceptance are more likely to accept the Covid-19 vaccine. Thus, communication strategies must target demographics who have historically rejected vaccinations. Public health officials must also emphasize the safety of vaccines despite rapid development. They should also explain the high efficacy of recent vaccines in order to decrease public hesitancy.
Topic: Nasal Spray Vaccine

Title: Nasal Spray COVID Vaccine Shows Promise in Animal Trials
Source: WebMD
Publication Date: January 19, 2021
Study Period: n/a
Study Location: n/a
Sample Size: n/a
Summary:

Rodents that were involved in this study were given two doses of the COVID-19 nasal spray vaccine. After the nasal vaccine, the rodents had antibody and T-cell responses that were strong enough to suppress SARS-CoV-2, the coronavirus that causes COVID-19. Additionally, the nasal spray vaccine reduced lung damage, inflammation, and disease severity in the rodents.

Study author and virologist Muhammad Munir of Lancaster University in England says, "We found that administering this vaccine through a nasal spray completely protected the animals from shedding the virus which causes transmission of the virus. This means the immunization of the upper respiratory tract through a nasal spray can prevent individuals from spreading the virus and developing infections elsewhere in the body."

The nasal spray vaccine is based on a common poultry virus called the Newcastle Disease Virus (NDV) which can replicate in humans but is harmless. NDV was engineered to produce the spike proteins of the SARS-CoV-2 virus to prime the body's immune system to attack the coronavirus.

Advantages to a nasal spray vaccine include it being noninvasive, triggering local immunity, and being an alternative for people who are afraid of needles or have blood clotting disorders. It would also provide a low-cost alternative for the developing world because it could be produced using existing worldwide infrastructure for seasonal flu vaccines, which already have a nasal spray vaccine in use.

Relevance to Ohio’s COVID-19 Response:

A nasal spray vaccine might not be practical for a state like Ohio, but it is still something that must be considered. According to study author Mohammed Rohaim of Lancaster University, "The scalability and economical production make this vaccine candidate suitable for low- and middle-income countries."

Topic: Vaccinating Kids Against COVID-19
Title: As trials ramp up, doctors stress need to vaccinate kids against COVID-19
Source: Science Magazine
Publication Date: February 23, 2021
Study Period: n/a
Study Location: n/a
Sample Size: n/a
Summary:

No COVID-19 vaccine has been authorized for use in children yet. Both of the messenger RNA vaccines that have been authorized for emergency use in the United States are in clinical trials for young people, with
initial results expected by summer. Another 3 vaccines, which use a harmless virus to deliver a gene for the same protein, are moving towards pediatric authorization. These include the AstraZeneca and Johnson & Johnson vaccines. Sinovac Biotech is testing its product on children in China aged 3-17.

For children, COVID-19 is still causing more deaths than influenza does in a typical season. More than 2,000 children and teenagers have developed a severe inflammatory syndrome that can cause critical illness and damage organs.

It is unlikely that the efficacy of COVID-19 vaccines will falter in adolescents, whose immune responses are like those of adults. In current trials, major companies are testing the same dosage in children that has been approved for adult use. With drugs, “You want to have a certain level in the bloodstream,” says Paul Offit, a vaccine researcher at the Children’s Hospital of Philadelphia who sits on a vaccine advisory committee for FDA. “So weight matters.” But for vaccines, which aim to trigger an immune response, the dose varies less—or not at all. The same dose of flu vaccine, for example, is generally given to 6-month-olds and 60-year-olds. However, if you get the same immune response at a lesser dose and it decreases side effects, then it would make sense to give children a smaller dose.

**Relevance to Ohio’s COVID-19 Response:**

When a children’s vaccine becomes available, it is important that there is a distribution plan so that herd immunity can be reached in a quick, safe, and equitable manner.