

Face Coverings in Organized Sports During COVID-19

2/26/2021

Executive summary

This report was developed in collaboration with an advisory group coordinated by the Minnesota Department of Health (MDH). Participants on the group included physicians in sports, pediatric, and pulmonary medicine. Other experts include epidemiologists and a former collegiate athlete.

COVID-19 is a serious illness that can lead to demonstrated changes to the heart and lungs, even in asymptomatic and mild cases; COVID-19 can also lead to other severe outcomes including death. Executive Orders issued by Governor Tim Walz, and related MDH guidance, currently require the use of facial coverings (masking) for most sports. This requirement was developed with the following considerations:

- Face coverings are an effective tool to reduce COVID-19 transmission during sports activities, especially indoors.
- The Centers for Disease Control and Prevention (CDC) and the American Academy of Pediatrics (AAP) recommend that most athletes wear face coverings when playing sports.
- Serious injury or medical problems have not been linked to face covering use in sports.
- Face coverings do not interfere with oxygen levels or trap carbon dioxide (CO₂).
- Face coverings can be worn safely with most helmets.
- Several states require face coverings during sports.

Most sports can accommodate face coverings for athletes during competition if fitted properly. However, MDH guidance includes exceptions for water sports, wrestling, gymnastics, and cheerleading, which are based on recommendations from the American Academy of Pediatrics (AAP). The decision around some of these exemptions is challenging, as certain exempt sports (such as wrestling) create a high risk of COVID-19 transmission. Athlete health and safety is a primary concern, and the AAP recognizes that face coverings in these exempt sports may pose choking hazards and impair vision. MDH continues to assess the best approach for these sports based on the most up-to-date research and information.

MDH guidance also allows other practical and medical exemptions. Athletes can remove the face covering for outdoor sports where physical distancing greater than 6 feet can be maintained. Athletes may also be exempt if they have certain medical conditions or disabilities that make it difficult to tolerate wearing a face covering, but MDH cautions that these exemptions should only be granted after each athlete consults with a licensed medical provider who is qualified to diagnose the condition at hand. Exempt athletes should be aware that they may not be able to participate without a face covering or may have to wear alternative protection and comply with different rules. Each venue, sports team, and sports organization is responsible for determining whether they can safely accommodate exempt athletes and teams and athletes may choose not to accept the risk of playing with those who cannot wear face coverings.

MDH report on wearing face coverings in sports during the pandemic

From the beginning of the pandemic, Governor Walz has focused on the emerging data and weighed three key priorities when making decisions: preventing serious illness and death by controlling the spread of the virus; limiting the impact on the state's economy; and supporting the overall well-being of Minnesotans. This report addresses:

- The impact of COVID-19 on the health of Minnesotans.
- How COVID-19 spreads and risk factors for increased spread.
- Risk factors affiliated with increased spread of COVID-19.
- The spread of COVID-19 among sports participants.
- Effectiveness of face coverings in preventing the transmission of COVID-19.
- MDH guidance requiring face coverings while participating in sports activities.
- Concerns, experiences, and common misconceptions with wearing a face covering during sports activities.
- Similar actions in other states.

COVID-19 is a highly transmissible and deadly disease that threatens the health and safety of all Minnesotans. SARS-CoV-2, the virus that causes COVID-19, spreads through respiratory droplets and aerosols released into the air when people who have the infection breathe, talk, shout, sing, laugh, cough, or sneeze.

When people participate in sports activities, risk factors for increased transmission are often present. Between June 1, 2020 and Feb. 13, 2021, case investigations conducted by the Minnesota Department of Health (MDH) identified more than 11,000 COVID-19 cases where the person had participated in or attended a sports activity. These people reported either playing in or attending sporting events during their incubation period (the 14-day period between their exposure and when they started to show symptoms) or during their infectious period (when they would have been likely to spread COVID-19 to others). MDH investigations also identified 398 outbreaks involving sports activities during this same

period. An outbreak is defined as two or more cases on the same team or in the same sports program with symptom onset or specimen collection date within 14 days of one another. To be included in an outbreak, a case must have no known links to reported cases or outbreaks in other settings (e.g., household contact transmission). Further, we expect that this data represents only a small fraction of actual transmission because not all cases are tested, identified, reported, or reached, and people do not always disclose their activities.

Over the course of this pandemic, many scientific studies conducted have shown the effectiveness of face coverings in reducing the transmission of COVID-19. Due to the substantial risk of COVID-19 transmission associated with sports, Governor Walz has issued executive orders that require people to take safety precautions to reduce the spread of COVID-19, including wearing face coverings while participating in organized sports. Intercollegiate and professional athletes are permitted to remove their face coverings in certain circumstances only if they can meet a rigorous testing program that requires each athlete to be tested a minimum of two to three times per week, depending on the type of sport. Intercollegiate and professional associations and organizations typically have programs that exceed these requirements. They have the resources and ability to institute and enforce more stringent rules to mitigate transmission of COVID-19.

Organized sports are a vital part of society and contribute to our well-being. The face covering requirements for organized sports strike a balance between preventing the spread of the virus and ensuring that these activities can continue. Several other states have similarly recognized that sports activities are at high risk for COVID-19 transmission and require safety precautions to reduce that risk, including face coverings.

MDH and its advisory group recognizes that the World Health Organization (WHO) does not recommend wearing a mask during exercise but notes that this recommendation predates the current research. ([Mask use in the context of COVID-19: Interim Guidance \[https://apps.who.int/iris/rest/bitstreams/1319378/retrieve\]](https://apps.who.int/iris/rest/bitstreams/1319378/retrieve)). The WHO based this recommendation on studies examining the use of medical grade masks, particularly N95 respirators, which are designed to form a much tighter seal than cloth face coverings and are not recommended for use in sports (see list of the citations WHO used at the end of this document, page 17). The weight of authority rejects the WHO recommendation and demonstrates that face coverings can be safely worn during sports. The WHO also cautions that face coverings should only be removed during physical activity if participants can follow “other critical public health measures” such as maintaining at least 1-meter distance and limiting the number of participants. MDH recognizes that many of these critical measures are simply not possible during sports activities, which often bring many children together in close proximity. Minnesota’s sports-related face covering requirements address these realities, target legitimate safety concerns, and reduce the potential for transmission in high-risk environments.

The impact of COVID-19 on the health of Minnesotans

People infected with COVID-19 can experience a wide range of illness, from having no symptoms or very mild symptoms to severe life-threatening illness requiring hospitalization. Some cases of severe illness also result in death. A growing number of COVID-19 survivors are suffering from longer-term health problems that stay with them far beyond the period of their active infection, even after asymptomatic and mild infections. While the risks of severe illness and death are higher for older people and those

with certain underlying health conditions, severe illness and death also occurs in young, healthy people. Young people can also develop longer-term health problems. Indeed, there is a growing number of studies and media reports of youth, including athletes, suffering from a variety of health problems including myocarditis (inflammation of the heart muscle) and multi-system inflammatory syndrome after their infection with COVID-19.

How COVID-19 spreads and risk factors for increased spread

SARS-CoV-2, the virus that causes COVID-19, is primarily spread through respiratory droplets or respiratory aerosols. This means that aerosols (small droplets or particles) can sometimes linger in the air for minutes to hours and may be able to infect people who are further than 6 feet from the person with COVID-19 or after the ill person has left the room. Exhaling with increased force or frequency increases the amount of these respiratory droplets in the air and increases the distance that these airborne particles travel. The virus may also be spread when infected people contaminate a surface with the virus that is then touched by other people who transfer the virus to mouth, eye, or nose tissue.

There are several risk factors associated with increased COVID-19 transmission. Whenever people are gathered, the risk of contracting COVID-19 increases if people are:

- Not wearing face coverings.
- In close contact repeatedly or for long durations of time.
- Gathered indoors or in an enclosed space.
- Gathered spaces where ventilation is poor.
- Breathing heavily (increased force or frequency) during exercise, speaking, laughing, singing, cheering, or shouting.

Any one of these factors increases the risk of spread and more than one factor compounds the risk of an infectious person transmitting the disease to others. In addition, COVID-19 variants – which may increase transmissibility and reinfection potential -- are generated during infections, so keeping infections down may reduce virus mutations.

The virus can be spread by infected people who do not have symptoms of COVID-19. After exposure to the virus, it can take up to two weeks for people to develop symptoms – but not everyone who is infected has obvious symptoms of COVID-19. People who are infectious but not experiencing symptoms are estimated to be responsible for more than 50% of COVID-19 transmission. The prevalence of asymptomatic COVID-19 transmission has created significant challenges in stopping the spread of the virus and has created the need for all people to wear face coverings, socially distance, and frequently wash their hands.

The spread of COVID-19 among sports participants

During sports, the risk of transmission is increased by physical contact (e.g., tackling, checking); face-to-face contact; and heavier breathing caused by physical exertion, intensity of play, yelling, screaming, and spitting. The risk of transmission increases when sports are played indoors, particularly in settings with

low relative humidity (dry air) or without good airflow, as virus particles can linger in the air for longer periods of time. These are all factors that should be considered when deciding to participate in sports.

People participating in sports activities are also usually together for an extended time (putting on and removing equipment/uniforms, practice and game time, transportation to and from events). In addition, social networks involving athletes and teams add another layer of transmission risk, especially if public health recommendations (i.e., social distancing, face coverings) are not followed closely before and after games. Sports activities often involve large numbers of people including athletes, coaches, and team managers, putting more than athletes at risk.

Effectiveness of face coverings in preventing the transmission of COVID-19

Guidelines for face coverings have evolved during the pandemic, as a growing number of scientific studies have shown the effectiveness of face coverings in reducing the transmission of COVID-19. The best available evidence shows that consistent wearing of face coverings reduces the transmission of COVID-19 by preventing respiratory droplets that carry the virus from being exhaled into the air by infectious people, including those who do not have symptoms and do not know they are infectious. Face coverings also offer protection for wearers against becoming infected. Most young people are at a lower risk for serious COVID-19 disease and may have either mild symptoms or no symptoms. But face coverings are just as critical for people who are not at risk of serious disease because they can spread the virus to their family members, friends, classmates, teammates, and others who may be at greater risk of severe or prolonged illness and death.

Executive orders and related guidance requiring face coverings while participating in sports activities

Due to the risk of COVID-19 transmission associated with sports activities, Governor Walz issued executive orders that require athletes to follow safety precautions and related MDH guidance when participating in organized sports. These orders and guidance require face coverings, including in practices and competition, and more information is available at [Frequently Asked Questions About the Requirement to Wear Face Coverings](https://www.health.state.mn.us/diseases/coronavirus/facecoverfaq.html) (www.health.state.mn.us/diseases/coronavirus/facecoverfaq.html).

The benefits of wearing face coverings to prevent the spread of COVID-19 are well documented. A scientific brief prepared by CDC lists more than 40 studies documenting the experimental and epidemiological evidence supporting community use of face coverings to prevent the spread of COVID-19. The AAP recommends the use of face coverings in sports and these recommendations are supported by several health care providers throughout Minnesota. Their use is also supported by the data from a recent national study of face coverings worn by high school athletes conducted by the University of Wisconsin that found face covering use to be associated with a decreased incidence of COVID-19. The study found that, in general, those sports with the highest incidence of COVID-19 were found to have the greatest benefit from reported face covering use.

MDH has detailed guidance on the use of face coverings in sports. See [COVID-19 Sports Practice and Games Guidance for Youth and Adults](https://www.health.state.mn.us/diseases/coronavirus/sportsguide.pdf) (www.health.state.mn.us/diseases/coronavirus/sportsguide.pdf).

This guidance includes safety exemptions that are consistent with AAP recommendations, and provides flexibility for athletes who wear helmets to wear face shields that are specifically designed to protect against splashes, sprays, and aerosols. In addition, athletes are exempt if they are unable to wear a face covering due to a medical condition – a determination that should be made in consultation with a qualified and licensed medical provider.

MDH recognizes that it does take time for people to acclimate to face coverings and there are some key considerations to help athletes effectively wear face coverings during any sport:

- Wear a face covering that fits snugly against the sides of the face. This will prevent it from slipping and interfering with vision. Athletes may have to try a variety of face coverings to find one that fits properly.
- Before using a face covering in competition, athletes should acclimate to wearing a face covering during practices by starting out with less intense workouts and building intensity as they become comfortable wearing the face covering.
 - Parents can help their child adjust to wearing a face covering during sports by having the child practice at home doing drills or gentle exercise while wearing a face covering.
 - Parents should talk to coaches about plans for gradual workouts and practices to acclimate athletes to wearing face coverings at the start of a season.
- CDC recommends using two or more layers of tightly woven, washable, breathable fabric when making a cloth face covering. Athletes could consider a face covering made of a moisture-wicking material. Many athletic wear companies make face coverings specific for exercise and sports.
- Bring extra face coverings to practice so athletes can replace wet or soiled face coverings.
- Face-covering guidance does allow for people to remove their face covering if they are having trouble breathing. If an athlete needs to take their mask off, they should take a break from play, and find an area where they can sit down and be physically distanced before removing the face covering.
- Athletes should stop activity if they are feeling overly fatigued, dizziness, headache, muscular weakness, or drowsiness.

MDH tracks reported issues

MDH is committed to tracking any complications or injuries that athletes experience while wearing a face covering during sports.

Since the state began requiring face coverings during sports, MDH has worked with the Minnesota State High School League and other youth sports associations to discuss strategies to acclimate athletes to wearing face coverings during sports, to share overall experiences, and to monitor any increase in injury reports.

Parents have reported symptoms such as fatigue, dizziness, shortness of breath, and other non-specific symptoms that are associated with initial use of a face covering and exercise. These have been reported

to youth sports organizations and to MDH. Accounts of respiratory distress may be consistent with panic attack or vocal cord dysfunction, both benign problems that are self-limited and can be overcome with practice using a face covering. More information on VCD is at [What are Vocal Cord Dysfunction \(VCD\) and Inspiratory Laryngeal Obstruction \(ILO\)? \(www.thoracic.org/patients/patient-resources/resources/vocal-cord-dysfunction.pdf\)](http://www.thoracic.org/patients/patient-resources/resources/vocal-cord-dysfunction.pdf).

MDH requests to be notified if a person has an injury possibly linked to face covering use while playing a sport. Injury reports can be sent to health.Sports.Covid19@state.mn.us. For injury reports, MDH requests permission from the parent to obtain medical verification from a health care provider.

Addressing common concerns

Some information about use of face coverings during sports activities is misleading and false. MDH has addressed common concerns around sports and face coverings below.

Wearing a face covering does not make asthma worse.

The American College of Allergy, Asthma, and Immunology emphasizes there is no evidence that wearing a face covering makes asthma worse and people with asthma may falsely assume they should not be wearing a face covering. Licensed medical providers can assist their patients with providing the most accurate and up-to-date information regarding face coverings and sports participation.

Wearing a face covering does not raise the carbon dioxide (CO₂) level in the air you breathe.

A CO₂ molecule is small enough to easily pass through any cloth face covering material. The CO₂ completely escapes into the air through a cloth face covering when a person breathes out or talks. In contrast, the virus that causes COVID-19 is much larger than a CO₂ molecule, so it cannot pass easily through a properly designed and properly worn cloth face coverings. Some people may feel out of breath or dizzy/lightheaded when they first start exercising with a face covering until they acclimate to wearing one, but this is not due to CO₂ retention. Dizziness or lightheadedness is most likely caused by breathing too fast (hyperventilation syndrome) with the mask on and reducing the body CO₂ levels; this may also be accompanied by numbness around the lips and in the fingers and toes. This is a benign and self-correcting problem that will disappear as the athlete learns to compete with the mask on.

Face coverings can be worn in cold weather.

In cold weather, face coverings may become wet from breathing, snow or other precipitation, and may freeze. It is especially important to have one or more replacement face coverings during cold weather. Scarves and other headwear such as ski masks and balaclavas used for warmth are usually made of loosely knit fabrics that are not suitable for use as face coverings to prevent COVID-19 transmission, but they can be worn over a face covering for warmth and will help keep the face covering in place.

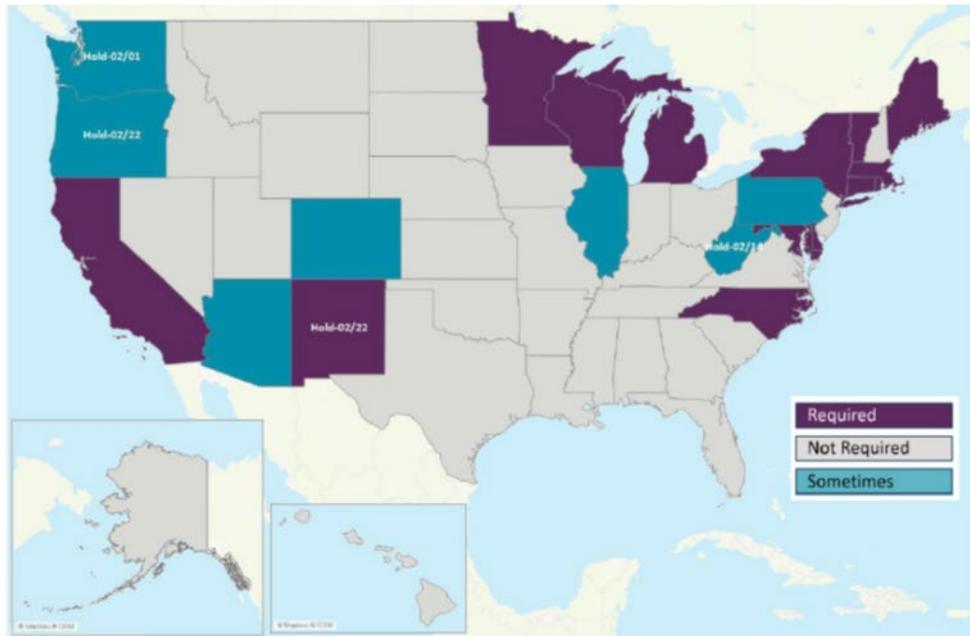
Fogging of glasses can be limited by wearing a face covering that fits closely over the nose or has a nose wire to help reduce fogging. An antifogging spray made for eyeglasses may also be useful, and taping the top of the face covering across the nose will also stop the air leak and reduce fogging.

Face coverings should be replaced when wet.

If face coverings become wet, they should be replaced with a dry face covering. A wet face covering may seem harder to breathe through, may be less efficient at filtering virus particles, and vents more around the edges. If a reusable face covering becomes wet, it should be put in a sealed plastic bag until it can be washed.

Face coverings mandates in the United States as of Jan. 27, 2021

Several other states recognize sports activities as high risk for COVID-19 transmission and require face coverings during practices and games as a public safety precaution.



a. Sports are not open for the 4 states marked with "Hold". However, all 4 will have a partial or full mask mandate

Minnesota data

COVID-19 sports-related cases and outbreaks in Minnesota

From a report dated Feb. 18, 2021 with a timeframe between June 1, 2020 – Feb. 13, 2021.

Total number of confirmed COVID-19 cases with sports activities listed – 11,606

Case data was pulled on Feb. 18, 2021 for cases with specimen collection date from June 1, 2020 to Feb. 13, 2021. These are people who reported playing or attending sports activities (during their incubation period, infectious period, or both) to public health during their interview. It does not necessarily mean they were exposed to COVID-19 during sports activities.

Age Range	Case Numbers
0-4	71
5-10 (~grades K-5)	844
11-13 (~grades 6-8)	1,051
14-18 (~grades 9-12) Cases since Aug. 1	3,098 2,945
19-24	1,270
25-34	924
35-44	1,617
45-54	1,432
55-64	710
65+	589

Number of household contacts recommended to quarantine – 22,012

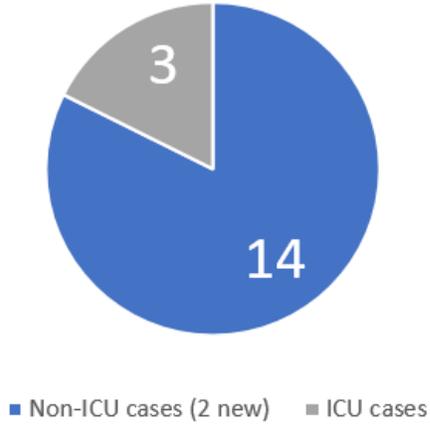
This number refers to the number of household contacts who have been recommended quarantine as a result of being exposed to these sports-related cases. The household contact count is an undercount as it does not include social, workplace, or sports-related contacts who also may have been recommended quarantine depending on exposure.

Median: 21 years old
Range: 1 to 95 years old

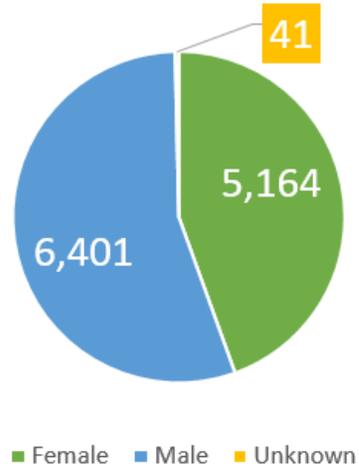
For 14- to 18-year-olds:
These are the ages of cases at the time of illness onset or specimen collection date.

Note: some 18-year-olds might be in college; likewise, some 19-year-olds might still be in high school. These groups estimate grade levels by age.

Hospitalizations (Ages 0-18)

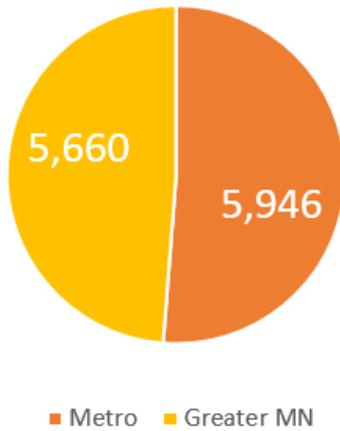


Gender of Cases

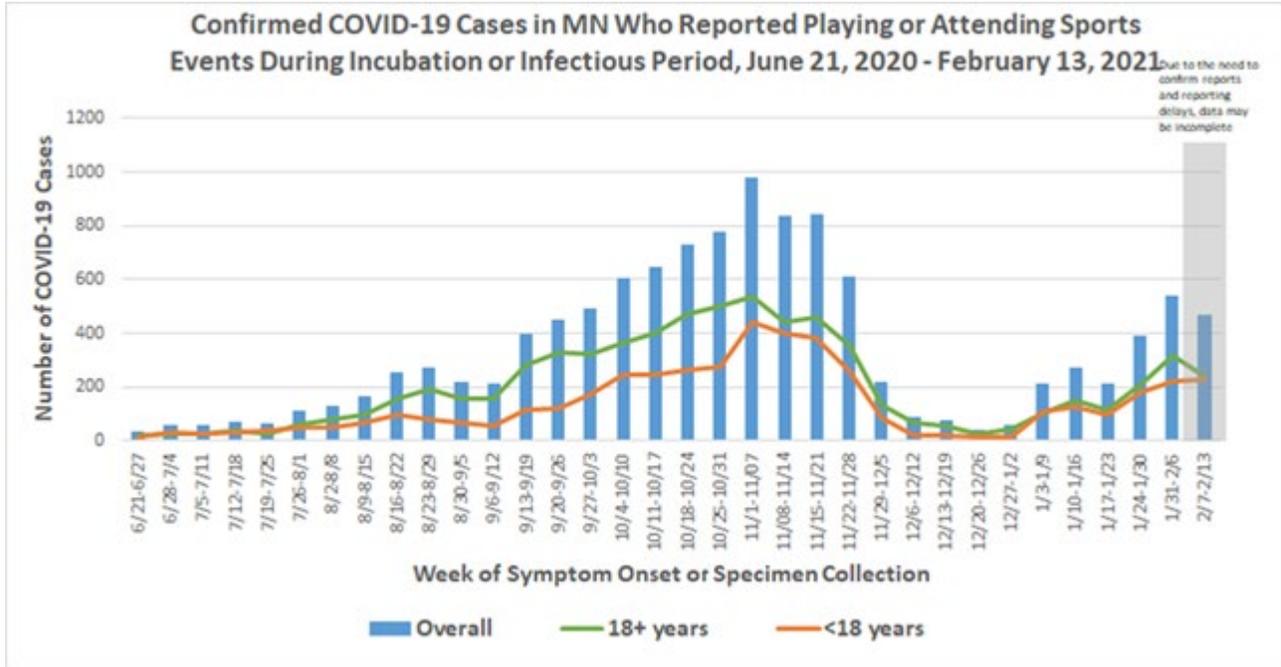


Including one case with unconfirmed COVID-19 status per MDH but reported as having COVID-19 in the media.

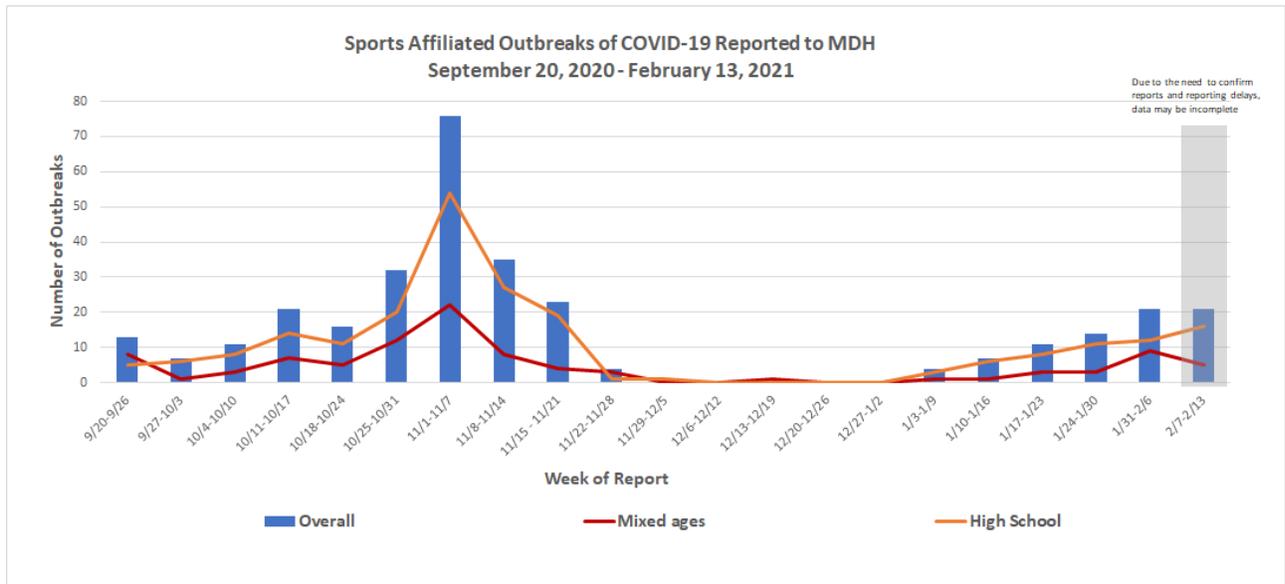
Residence at time of reporting



Confirmed COVID-19 cases in Minnesota who reported playing or attending sports events



Sports affiliated outbreaks of COVID-19 reported to MDH



Outbreak summary

COVID-19 outbreaks involving sports activities in Minnesota

Report Date: February 18, 2021

Timeframe: June 1, 2020 through February 13, 2021

	Elementary or Middle	High School*	Adult	Mixed Ages**	Total
Sport					
Baseball	1	2	4	---	7
Basketball	13	38	7	---	58
Cheer	---	2	---	---	2
Cross Country	---	2	1	---	3
Dance	1	6	2	---	9
Diving	---	1	---	---	1
Equestrian	---	---	1	---	1
Football	1	50	8	1	60
Golf	---	---	5	---	5
Gymnastics	2	4	---	---	6
Hockey	32	58	11	9	110
Lacrosse	---	1	---	---	1
Martial Arts	---	---	1	---	1
Multiple	---	2	---	---	2
Soccer	1	13	3	---	17
Softball	---	---	1	---	1
Swimming	---	3	1	---	4
Tennis	---	1	---	---	1
Track & Field	---	---	3	---	3
Volleyball	4	74	1	3	82
Weight Training	---	4	---	---	4
Wrestling	---	13	7	---	20
Total	55	274	56	13	398

* "High school" outbreaks include both club-based and high school

** Outbreaks categorized into a "mixed ages" group involve cases from multiple age groups

Notes:

- There have been 2,074 cases associated with these outbreaks. The average outbreak size is five cases.
- These data are preliminary and subject to change.
- Outbreak is defined as two or more cases on the same team or in the same sports program with symptom onset date or collection date within 14 days of one another. The cases have no known epi-links to reported cases or reported outbreaks in other settings (e.g., household contact transmission).
- Outbreak tallies may decrease if the outbreak classification is changed to 'not an outbreak' based on new epidemiologic data. Declassifying an outbreak to 'not an outbreak' is typically done when other exposures (e.g., household contacts who are confirmed cases, social contacts, connection to a known outbreak in another setting) are determined to be more likely in that situation.

References and supplemental reading

Journal articles on the longer-term health impacts of COVID-19 on youth (MIS-C or myocarditis)

1. Kim JH. Screening Athletes for Myocarditis with Cardiac Magnetic Resonance Imaging After COVID-19 Infection—Lessons From an English Philosopher. *JAMA cardiology*.
2. Starekova J, Bluemke DA, Bradham WS, Eckhardt LL, Grist TM, Kusmirek JE, Purtell CS, Schiebler ML, Reeder SB. Evaluation for Myocarditis in Competitive Student Athletes Recovering from Coronavirus Disease 2019 With Cardiac Magnetic Resonance Imaging. *JAMA cardiology*. 2021.
3. Brito D, Meester S, Yanamala N, Patel HB, Balcik BJ, Casacang-Verzosa G, Seetharam K, Riveros D, Beto RJ 2nd, Balla S, Monseau AJ, Sengupta PP. High Prevalence of Pericardial Involvement in College Student Athletes Recovering From COVID-19. *JACC Cardiovasc Imaging*. 2020 Nov 4;S1936-878X(20)30946-3. doi: 10.1016/j.jcmg.2020.10.023. Epub ahead of print. PMID: 33223496; PMCID: PMC7641597.

Media reports on the longer-term health impacts of COVID-19 on youth (MIS-C or myocarditis)

4. Century freshman Evenson now winning frightening battle with COVID-19. *Post Bulletin*, December 22, 2020: <https://www.postbulletin.com/sports/hockey/6812498-Century-freshman-Evenson-now-winning-frightening-battle-with-COVID-19>
5. New Sports Guidelines for Young Athletes After Covid-19. *New York Times*, December 4, 2020: <https://www.nytimes.com/2020/12/04/well/family/youth-sports-covid.html>
6. Wayzata High School senior back home after 10 days in hospital from COVID-19 complications. *KSTP Eyewitness News*, November 11, 2020: <https://kstp.com/news/wayzata-high-school-senior-back-home-after-10-days-in-hospital-from-covid-19-complications-november-11-2020/592215/>
7. Long Recovery Ahead for Minn. Teen Who Contracted Rare COVID-Related Syndrome MIS-C. *CBS Minnesota*, November 10, 2020: <https://minnesota.cbslocal.com/2020/11/10/minnesota-teen-battles-back-after-contracting-rare-covid-related-syndrome-mis-c/>

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10. Ilari Kuitunen , Mikko M. Uimonen & Ville T. Ponkilainen (2021): Team-to-team transmission of COVID-19 in ice hockey games – a case series of players in Finnish ice hockey leagues, *Infectious Diseases*: <https://www.tandfonline.com/doi/full/10.1080/23744235.2020.1866772>

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12. Murray MT, Riggs MA, Engelthaler DM, et al. Mitigating a COVID-19 Outbreak Among Major League Baseball Players — United States, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:1542–1546.
<https://www.cdc.gov/mmwr/volumes/69/wr/mm6942a4.htm>
13. Brlek A, Vidovic S, Vuzem S, Turk K, Simonovic Z. Possible indirect transmission of COVID-19 at a squash court, Slovenia, March 2020: case report. *Epidemiol Infect.* 2020; 148: e120. Published online 2020 Jun 19. doi: 10.1017/S0950268820001326. PMID: PMC7327185.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7327185/>

Media reports on COVID-19 sports outbreaks

14. A hockey practice led to 89 COVID-19 cases. Ice sports say they're staying vigilant. CBC Ottawa, December 20, 2020: <https://www.cbc.ca/news/canada/ottawa/ottawa-hockey-covid-19-sports-outbreak-1.5849017>
15. College Sports Has Reported at Least 6,629 Virus Cases. There Are Many More. *New York Times*, December 11, 2020: <https://www.nytimes.com/2020/12/11/sports/coronavirus-college-sports-football.html>
16. This Sport Is a 'Way of Life.' In a Pandemic, It's Also High Risk. *New York Times*, December 9, 2020: <https://www.nytimes.com/2020/12/09/nyregion/youth-hockey-nj-covid.html>
17. Youth sports have been hit with few coronavirus outbreaks so far. Why is ice hockey so different? *Washington Post*, December 4, 2020:
<https://www.washingtonpost.com/health/2020/12/04/hockey-covid-transmission-outbreaks/>
18. CDC: How Indoor Sports Like Ice Hockey Can Become Covid-19 Coronavirus Outbreaks. *Forbes*, October 17, 2020: <https://www.forbes.com/sites/brucelee/2020/10/17/cdc-how-indoor-sports-like-ice-hockey-can-become-covid-19-coronavirus-outbreaks/?sh=41500897f9ba>

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