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County Youth Athletics Response to COVID-19 Pandemic

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Abstract

Problem: To ensure safe participation in youth athletics and prevent COVID-19 transmission during the COVID-19 pandemic, a suburban Midwestern County Department of Public Health (DPH) implemented *Youth Sports Guidelines* on October 14, 2020. This project aimed to identify level of adherence to precautions listed in the guidelines at six county public high school athletic events.

Methods: An observational descriptive study design was used to monitor guideline adherence at high school athletic events. Two observers tallied violations by participants and spectators to *Youth Sports Guidelines* at county public high school athletic events. Six high-frequency contact (basketball and wrestling) events and six low-frequency contact (swimming) athletic events were observed.

Results: Social distancing and mask wearing guideline violations made up 86% of total violations observed at all high school athletic events. Mask violations at high-frequency contact events (basketball and wresting) were significantly higher when compared to low-frequency contact events (alpha value of 0.05, $p = .046$). Social distance violations for low-frequency contact events when compared to high-frequency contact events were statistically significant (alpha value of 0.05, $p = .017$). This small study found no significant correlation between total observed guideline violations at high school athletic events and COVID-19 infection case rates.

Implications for practice: Frequent violations to DPH *Youth Sports Guidelines* were observed in this study. Results of this project may help direct guideline revisions and practice changes to COVID-19 precautions to ensure better compliance and prevent COVID-19 infection transmission in youth athletics.

The Missouri Governor issued a statewide “Stay Home Missouri” order on April 3, 2020, including guidance for social distancing and isolating from others, which closed all state public and charter schools and suspended athletics (MSHSAA, 2020; Office of Governor Michael L. Parson, 2020). After six months hiatus, high school athletics in Missouri were approved to resume activities beginning in September 2020 (MSHSAA, 2020). As winter sports season began in mid-November 2020, the average number of daily COVID-19 cases in a suburban Missouri county was 643, the highest daily average as of that date (St. Louis County Public Health, 2020a). The importance of tracking youth sports in real time is apparent following transmission of COVID-19 infection to more than two dozen individuals participating in a November 2020 California youth basketball tournament (Chan & Hanna, 2020).

Poor communities are at higher risk for COVID-19 infection and worse health outcomes compared to wealthy communities (Goyal et al., 2020). A recent cross-sectional study of 1,000 children tested at a pediatric drive-through/walk-up SARS-CoV-2 testing site concluded minority and socioeconomically disadvantaged children experience higher rates of COVID-19 infection compared with non-Hispanic white children from higher socioeconomic status (Goyal et al., 2020). Therefore, the focus of this project was the impact of the COVID-19 pandemic on youth sports in low-income area high schools determined by median annual household income <$67,000 and percentage of >28% student participation in free-and-reduced lunch (Table 1).

County public high school athletic activities resumed September 2020, following relaxed restrictions on in-person education and youth sports by DPH (Saint Louis County Government, 2020). As a consequence of physical contact associated with athletics,

concern for COVID-19 transmission among youth athletics brought an opportunity for study. In anticipation of competitive school youth athletics resuming, DPH published revised guidelines on November 18, 2020 outlining COVID-19 transmission prevention strategies, titled *Youth Sports Guidelines* (St. Louis County Department of Health, 2020b). Using these published guidelines, the purpose of this study was to evaluate adherence to the County Department of Health (2020b) *Youth Sports Guidelines* at high school athletic events. The aim was to identify level of adherence to County DPH *Youth Sports Guidelines* at 12 athletic events from six area high schools over a one-month period. The primary outcome measure was violations to County Department of Health (2020b) *Youth Sports Guidelines.* The study question was: during the COVID-19 pandemic, what is the impact of local DPH *Youth Sports Guidelines* on winter season athletic events in selected low-income public high schools?

Review of the Literature

A systematic search of the evidence was conducted using the computerized databases of CINAHL, Cochrane Database for Systematic Reviews, and PubMed. Keywords *COVID-19 disease*, *children*, *youth sports*, *prevention*, and *transmission* were used to guide the search. Results (n = 1,393) were filtered to include only research articles published between 2015 and 2020. A refined search was completed using Boolean operators for *COVID-19 disease AND children*, *COVID-19 disease AND youth sports*, *COVID-10 disease AND youth sports AND transmission*, and *COVID-19 disease AND children AND prevention*. The refined search generated 68 publications. Publications were included in this review if they reported research on and described COVID-19 disease in children, transmission of COVID-19 disease in children, youth

athletics and child health, and COVID-19 prevention strategies. Eleven articles met these criteria and were selected for inclusion in this review.

Children are often vectors of transmission for respiratory viruses (Falk et al., 2021). A systematic review of 2020 literature from China and United States concluded thirty-five percent of children are asymptomatic when infected with COVID-19 disease (Zimmerman & Nigel, 2020). Due to the asymptomatic nature of pediatric COVID-19 illness, careful consideration of precautions in youth athletics are necessary to prevent widespread transmission.

Since the start of 2020, literature on COVID-19 prevention in athletics has expanded due to resuming youth and profession athletic activities. A nationwide survey of high school athletic directors supporting 152,484 athletes reported face mask use was associated with decreased incidence of COVID-19 transmission among indoor athletics (Watson et al., 2021). A retrospective analysis of Major League Baseball precautions demonstrated safety protocols including frequent diagnostic testing of players and coaches, isolating persons with positive test results, mask wearing, social distancing, and playing without spectators has limited spread of COVID-19 between teams (Murray et al., 2020); this applies to youth because of the similar athletic activities and spectator environments. Research in schools support findings in athletic studies regarding successful transmission prevention strategies. A case study of 5,530 kindergarten through 12^{th} grade students and staff members from 17 schools in rural Wisconsin concluded mask wearing, social distancing, and 14-day quarantine following exposure reduced in-school COVID-19 transmission risk compared to community transmission risk (Falk et al., 2021).

Stay-at-home orders issued in the county halted competitive high school athletic events for six months (Saint Louis County Government, 2020) despite the emotional and mental health benefits of athletic participation (Committee on Physical Activity and Physical Education in the School Environment, 2013). A case study of parents and legal guardians of children ages 5-13 years in the United States concluded COVID-19 restrictions, such as the closure of schools and parks decreased physical activity and increased sedentary behaviors in school-aged and adolescent children (Dunton et al., 2020). A cross-sectional study of Finnish young men aged 20 to 35 years of age showed a correlation between participation in youth sports by the age of 12 years and positive mental health in young adulthood (Appelqvist-Schmidlechner et al., 2017). Therefore, a takeaway message is athletic involvement positively influences the physical and mental health of youth.

Youth athletics in the midwestern community resumed activities beginning in September 2020 (MSHSAA, 2020). DPH provided guidance on reopening youth athletics with publication of *Youth Sports Guidelines* on October 14, 2020. The guidelines outlined specific infection prevention practices for participation in high-, moderate-, and low-frequency contact indoor and outdoor sports. Guidelines included social distancing, facial coverings, physical contact, and sanitizing precautions for athletes, coaches, officials, and spectators.

Literature from 2020 identified the value of taking precautions to prevent COVID-19 infection transmission in the community. Four systematic reviews and retrospective reviews studying presentation of illness and transmission of COVID-19 in children and adolescents reported less severe disease and symptoms in children of all

ages than adults and most frequent disease transmission within families. Two systematic reviews with meta-analysis studying transmission precautions reported successful control of COVID-19 transmission using public health precautions, social distancing and facial coverings. More recent literature reports social distancing and facial coverings prevent COVID-19 transmission in youth athletics. Pre-pandemic research recognized the physical and mental health benefits of engagement in youth athletics, supporting sports participation. Location of literature in systematic reviews and retrospective analysis is largely based in China and United States. Due to recent introduction and ongoing effects of COVID-19 disease and vaccination, publication of results on successful treatment and eradication is to be determined.

Description of violations to County DPH *Youth Sports Guidelines* was the primary outcome of this project. A summative evaluation using the Johns Hopkins Nursing Evidence Based Practice (EBP) Model was used to guide this project to evaluate youth athletics during the COVID-19 disease pandemic. Summative evaluation provides information as to how the program met intended objectives and makes summary judgements (Rossi et al., 2019). The Johns Hopkins Nursing EBP Model guides synthesis and translation of evidence into practice (Dang & Dearholt, 2019). The study will utilize the model's three phases: *inquiry, practice,* and *learning. Inquiry* involves formulating questions and identifying areas for improvement, for example, questioning the use of COVID-19 disease transmission precautions in high school athletics. *Practice* is gathering the evidence of compliance to *Youth Sports Guidelines* at high school athletic events through program monitoring. Finally, *learning* is knowledge gained from translation of evidence into practice and will be displayed in a set of observations.

Methods

Design

The design used for this study was observational descriptive. Observational data were collected at high school athletic events to evaluate adherence of athletes, coaches, officials, and spectators to the *Youth Sports Guidelines.* The observational data provided information on as to whether or not *Youth Sports Guidelines* were implemented as published by DPH. County COVID-19 case rates and adolescent (aged 15-19 years) COVID-19 case rates within six selected school districts were recorded during the study period.

Setting

The study setting was athletic events at public high schools from six low-income zip codes in a midwestern suburban county with a population of 994,205 (United States Census Bureau, 2020). Low-income was determined by median annual household income (<$67,000) and percent of student participation in free-and-reduced lunch (>28%) (Table 1) (National Center for Education Statistics, 2020; United States Census Bureau, 2020). Athletic events observed were high-contact frequency sports, basketball and wresting, and low-frequency contact sport, swimming. Athletic events were observed in-person and via livestream by two observers.

Sample

A convenience sample of all attendees at public high school athletic events in the low-income zip codes were observed to collect occurrences of violations to *Youth Sports Guidelines*. Inclusion criteria were male and female athletes, coaches, officials, and spectators at athletic events held at public high schools from identified six low-income zip codes. “Participants” was used to define athletes, coaches, and officials. “Spectators”

were defined as parents, guardians, other family members, and anyone else in attendance but not participating, coaching or officiating in athletic event. Exclusion criteria were persons present not associated with the high school athletic event and athletic events not affiliated with the six low-income public high schools.

Procedures

A data collection instrument was designed using the key precautions outlined in the County DPH *Youth Sports Guidelines.* Inter-rater reliability was evaluated to assess the degree to which observers of the same phenomenon give consistent reports (McHugh, 2012) and agree on behaviors in violation of guidelines. Inter-rater reliability of 95% was achieved by the study's two observers after four pretests at a local retail company. During study data collection, two observers monitored 12 total high school athletic events for 30 continuous minutes. One observer monitored participants and one observer monitored spectators. When observers were not permitted to attend in-person, the event was monitored via livestream. COVID-19 infection rates from the six identified zip codes and school districts were recorded each day of an athletic event during the observation period. Formal complaints filed at DPH about youth athletic events were obtained and evaluated for trends.

To ensure anonymity, high schools were coded with letters A through F. Observers tallied violations, recording occurrences of social distancing of approximately less than 6 feet, team huddles, spectators congregating, improper use of facial covering, fist bumps or high- and low-fives, handshakes, shared equipment without disinfecting between each use or play period and sharing water bottles. Mask violations were recorded when facial covering was worn below nose, on chin, or if the participant did not replace a

fallen mask to proper position during a stop in play. Not all guidelines were observed in this study. Guideline precautions including frequent hand sanitization, not sharing coolers, washing jerseys daily, and daily health screenings of athletes and coaches were not included in the study. Observers followed all spectator guidelines during athletic events.

Data Collection/Analysis

Quantitative data were collected by observation using the data collection instrument adapted from *Youth Sports Guidelines*. Two observers monitored 12 total high school athletic events, six high-frequency contact events and six low-frequency contact events. County total COVID-19 infection rates and new COVID-19 cases (within a fourteen-day period) for 15 to 19-year-old residents in school districts of included high schools were recorded. Data were evaluated for correlations between guideline violations and COVID-19 infection rates. Frequency of violations between low-frequency and high-frequency contact athletic events were compared and evaluated for statistical significance. Complaints received by the DPH about precautions at youth athletic events were collected and evaluated by observers.

Approval Processes

Prior to the start of data collection, five levels of approval were obtained. Approvals were received from the student's doctoral committee, University of Missouri St. Louis (UMSL) Graduate School, County DPH, high school athletic directors, and by UMSL Institutional Review Board (IRB). Minimal risk was associated with this study due to the observational design for data collection. No identifying information was collected thereby minimizing any ethical concerns.

Results

Data were collected between January 11, 2021 and February 11, 2021. A total of 473 participants and 111 spectators were observed during the 33-day project period (Table 1). Mean number of participants observed was 39 persons (range 18-63 persons). Mean number of spectators observed was 9 (range 0-58 persons). Participating high schools did not allow spectators at athletic events until January 19, 2021 (SPHSAAA, 2021). After January 19, 2021 spectators were limited to two per student athlete, following *Youth Sports Guidelines* (St. Louis County Department of Public Health, 2020b). Number of spectators was lower than expected due to spectator restrictions consistent with SPHSAAA policy.

All six low-frequency contact athletic events were female varsity swimming competitions. Five of the high-frequency contact athletic events were male basketball games, both varsity and junior varsity, and one was male varsity wrestling match. Racial profile of the low-income high schools was Black (40.4%) and White (40.3%) (Table 1). Students of two or more races made up 5.5% of all high school students enrolled at high schools included.

For all events observed, mean number of total participant and spectator violations to *Youth Sports Guidelines* were higher at high-frequency contact youth athletic events (140.17) compared to low-frequency contact youth athletic events (119.00). A two-tailed independent sample *t*-test identified total number of violations was not statistically significant between high- and low-frequency contact athletic events based on an alpha value of 0.05, $t(10) = 0.92$, $p = .380$ (Table 2). High-frequency contact athletic events documented more participant mask violations than low-frequency contact athletic events.

Conversely, low-frequency contact athletic events documented more participant social distancing violations than high-frequency contact athletic events. Participant social distancing violations between high- and low-frequency contact athletic events reached statistical significant when evaluated using a two-tailed independent samples *t*-test, based on an alpha value of 0.05, $t(10) = -2.87$, $p = .017$. There was a statistically significant difference in participant mask violations between high- and low-frequency contact athletic events when evaluated using a two-tailed independent samples *t*-test ($p = .046$) (Table 2).

The highest number (531) of new daily COVID-19 cases in the Midwestern County was at the beginning of the project period on January 13, 2021. By the end of the project period, the county new daily COVID-19 case number was 204 on February 11, 2021 (Saint Louis County Government, 2021). Pearson correlation analysis identified no statistical significance between total participant and spectator violations and adolescent COVID-19 infection cases within the corresponding zip code's school district based on an alpha value of 0.05, $p = .622$. No significant correlation between county COVID-19 infection rates and total violations ($p = .678$). Statistical significance of correlations may be unreliable in small sample sizes such as in this project (n= 12).

Two formal complaints were received by the DPH about youth sports during the study period. Both complaints referenced noncompliance to *Youth Sports Guidelines.* One complaint stated lack of enforcement and penalty for violating precautions.

Discussion

Although precautions in *Youth Sports Guidelines* were implemented in Midwestern County high school sports, violations to the guidelines were observed during data collection. However, a systematic review and meta-analysis by Chu et al. (2020) found social distancing and face mask precautions prevent the spread of COVID-19 virus, implicating that adherence is important. Despite the conclusion by Chu et al. (2020), this present study found no correlation between the county new daily COVID-19 case rate and total number of *Youth Sports Guidelines* violations. Similarly, this study did not find a correlation between the adolescent (age 15-19 years) COVID-19 infection rate and total violations within the school district of the high school observed.

Spectators had only 13% of total observed social distancing and mask violations. The mean spectator social distancing violations (9.67) and mask violations (6.33) were significantly lower than participant violations. Due to limited spectator policies, spectator violations were minimal.

The most frequent occurring (80%) violation at low-frequency contact (female swimming) events documented was social distancing. This finding could be explained by restricted space in aquatic centers or acoustics in aquatic center making it difficult to verbally communicate. Some of the high school swim facilities were small and not conducive to social distancing. Student athletes at swimming events were noted to wear their masks until they were ready to enter the pool. Student swimmers replaced their masks almost immediately after exiting the pool.

Mask violations accounted for 44% of total *Youth Sports Guidelines* violations at male basketball and wresting events. Participants at high-frequency contact events were observed wearing face masks improperly, such as on their chin or not covering their nose.

During play, participants were noted to have their face masks fall below their nose. Participants were also observed pulling their face mask down when yelling or cheering. Hand greeting violations were more frequent at high-frequency contact events (143) than low-frequency contact events (13). Participants would use hand greetings such as high- and low-fives and fist bumps when points were scored or switching athletes in play.

Limitations to the study include the possibility of missed observations and short study period. The data collection instrument achieved inter-rater reliability of 95%, leaving a small possibility of user disagreement. Observers may have missed violations due to the number of total observed persons and fast-paced nature of the athletic events. Two of the twelve games were livestreamed with camera views on active play, limiting the ability to observe all participants and spectators. The short study period with twelve observed events led to limitations correlating COVID-19 infection rates and violations. School district COVID-19 rates include all persons aged 15-19 years, potentially inflating numbers by including students not enrolled at studied high schools. Spectator observations were also limited in this study. Athletic directors approved the observational study design and therefore may have alerted the participants to the observation, influencing results.

The study provides an objective assessment on the implementation of *Youth Sports Guidelines.* Study observations were limited to indoor athletic events. Results revealed guidelines were not followed with 100% compliance, as expected. Further qualitative study exploring barriers to adherence may help DPH understand reason for noncompliance and guide revisions necessary to improve compliance. Two youth athletics complaints were received by the DPH during the study period, both reporting

noncompliance and lack of enforcing precautions. Athletic directors were not observed enforcing guidelines. Revisions to DPH guidelines are recommended to include who is expected to enforce guidelines, how compliance will be tracked, and specify consequence of noncompliance. Recommendations for future studies include increasing the length of study period and studying summer season youth athletics. Further studies observing gender specific compliance to COVID-19 precautions and outdoor athletic events may produce valuable information.

Conclusion

High school athletic tournaments are associated with COVID-19 transmission (Chan, 2020). Strict implementation of preventative strategies such as facial coverings and social distancing can reduce risk of transmission. Preventative strategies outlined in *Youth Sports Guidelines* were not implemented as expected and may suggest the level of noncompliance to precautions in the community. If facial covering and social distancing precautions were adhered to at a level of 100% in youth athletics and in the community, the COVID-19 pandemic could have been better controlled.

Advanced Practice Registered Nurses (APRNs) play a pivotal role in public health education and disease prevention. APRNs can assist with improving compliance to infection prevention strategies in youth athletics by educating adolescents during sports physical on the impact of infection prevention strategies on COVID-19 transmission and proper mask wearing. APRNs can empower adolescent athlete patients to play their part in stopping the spread of COVID-19 by adhering to *Youth Sports Guidelines.*

References

Appelqvist -Schmidlechner, K., Vaara, J., Hakkinen, A., Vasankari, T., Makinen, J., Mantyaari, M., & Kyrolainen, H. (2018). Relationships between youth sports participation and mental health in young adulthood among Finnish males. *American Journal of Health Promotion, 32*(7), 1502-1509. doi:10 .1177/0890117117746336

Chan, S., & Hanna, J. (2020). *More than two dozen COVID-19 cases were traced to youth basketball at a California gym, health officials say.* Retrieved from https://www.cnn.com/2020/11/27/us/california-youth-basketball-tournaments-coronavirus/index.html

Chu, D. K., Akl, E. A., Duda, S., Solo, K., Yaacoub, S., & Schunemann, H. J. (2020). Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis. *Lancet, 395*(10242), 1973-1987. doi:10.1016/S0140-6736(20)31142-9

Committee on Physical Activity and Physical Education in the School Environment. (2013). *Educating the student body: Taking physical activity and physical education to school*. Washington, DC: National Academies Press.

Dang, D., & Dearholt, S. (2019). *Johns Hopkins nursing evidence-based practice: Model and guidelines* (3rd ed.). Indianapolis, IN: Sigma Theta Tau International.

Dunton, G. F., Do, B., & Wang, S. D. (2020). Early effects of the COVID-19 pandemic on physical activity and sedentary behaviors in children living in the U.S. *BMC Public Health, 20*(1): 1351. doi:10.1186/s12889-020-09429-3

Falk, A., Benda, A., Falk, P., Steffen, S., Wallace, Z., & Hoeg, T. B. (2021). COVID-19 cases and transmission in 17 K-12 schools – Wood County, Wisconsin, August 31-November 29, 2020. *Morbidity and Mortality Weekly Report, 70*(4), 136-140. doi:10.15585/mmwr.mm7004e3

Goyal, M. K., Simpson, J. N., Boyle, M. D., Badolato, G. M., Delaney, M., McCarter, R., Cora-Bramble, D. (2020). Racial/ethnic and socioeconomic disparities of SARS-CoV-2 infection among children. *Pediatrics, 146*(4), e2020009951. doi:10.1542/peds.2020-009951

McHugh M. L. (2012). Interrater reliability: the kappa statistic. *Biochemia Medica*, 22(3), 276–282. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3900052/

Missouri State High School Activities Association (MSHSAA). (2020). *COVID-19 updated.* Retrieved from https://www.mshsaa.org/resources/PDF/PostAugustBoardMeetingRelease-8520.pdf

Murray, M. T., Riggs, M. A., Engelthaler, D. M., Johnson, C., Watkins, S., Longenberger, A., . . . Khan, A. S. (2020). Mitigating a COVID-19 outbreak among major league baseball players – United States, 2020. *Morbidity and Mortality Weekly Report, 69*(42), 1542-1546. doi:10.15585/mmwr.mm6942a4

National Center for Education Statistics. (2020). *Search for public schools.* Retrieved November 21, 2020 from https://nces.ed.gov/ccd/schoolsearch/

Office of Missouri Governor Michael L. Parson. (2020). *Stay at home order.* Retrieved September 29, 2020 from https://governor.mo.gov/priorities/stay-home-order

Rossi, P. H., Lipsey, M. W., & Henry, G. T. (2019). *Evaluation: A systematic approach* (8th ed.). Thousand Oaks, CA: SAGE Publications, Inc.

Saint Louis County Government. (2020). *Youth sports and education update*. Retrieved from https://stlcorona.com/news/dph-covid-19-update-9232020/

Saint Louis County Government. (2021). *COVID-19 statistics*. Retrieved March 4, 2021 from https://stlcorona.com/resources/covid-19-statistics1/

Show Me Strong Recovery Plan. (2021). *School Districts*. Retrieved February 11, 2021 from https://showmestrong.mo.gov/data/public-health/school-districts/

St. Louis County Department of Public Health. (2020). *Youth sports guidelines.* Retrieved from https://stlcorona.com/dr-pages-messages/covid-19-safe-operating-protocols/youth-sports-guidelines/

St. Louis Suburban Public High School Athletic and Activities Association (SPHSAAA). (2021). *Updated spectator guidelines (1/11/2021).* Retrieved March 5, 2021 from http://stlouissuburbanathleticconference.org/all_athletic.php

United States Census Bureau. (2020). *QuickFacts*. Retrieved from https://www.census.gov/quickfacts/fact/table/US/PST045219

Watson, A. M., Haraldsdottir, K., Biese, K., Goodavish, L., Stevens, B., & McGuine, T. (2021). The association of COVID-19 incidence with sport and facial mask use in United States high school athletes. *MedRxIV.* doi:10.1101/2020.01.19.21250116

Zimmerman, P., & Nigel, C. (2020). Coronavirus infections in children including COVID-19: An overview of the epidemiology, clinical features, diagnosis, treatment and prevention options in children. *The Pediatric Infectious Disease Journal, 39*(5), 355-368. doi:10.1097/INF.0000000000002660

Table 1

High School Demographics and Event Information

High School	A	B	C	D	E	F
Area Demographics						
Median Household Income	$54,978	$66,686	$33,185	$60,969	$58,125	$61,274
Free-and-Reduced Lunch	100%	37%	100%	27%	29%	99%
Race/Ethnicity						
White	170	786	480	581	1,102	79
Black	1,022	586	759	90	152	590
Hispanic	37	205	393	41	66	32
Asian	5	62	33	114	72	5
American Indian/Alaska Native	0	2	7	0	4	3
Native Hawaiian/Pacific Islander	1	3	3	0	1	0
Two or More Races	73	114	121	46	57	24
Gender						
Male Athletic Events	1	1	1	1	1	1
Female Athletic Events	1	1	1	1	1	1
Contact Frequency						
High	1	1	1	1	1	1
Low	1	1	1	1	1	1
Total Number of Observed Persons						
High-Frequency Contact						
Participants	45	44	63	39	54	43
Spectators	8	58	0	0	5	5
Low-Frequency Contact						
Participants	29	42	27	34	35	18
Spectators	0	12	19	0	3	1
Total Violations						
Low-Frequency Contact Athletic Events	131	137	162	140	46	98
High-Frequency Contact Athletic Events	119	199	138	100	173	112

Note. Income reported from 2019 by United States Census Bureau (2020). Percent of eligible students in free and reduced lunch out of total student body. Race and ethnicity demographics and free and reduced lunch data reported by number of students enrolled in 2019-2020 academic year by National Center for Education Statistics (2020).

Table 2

Independent Samples t-Test for Violations by Contact Frequency in Low-Income High School Athletic Events

	High-Frequency Contact		Low-Frequency Contact				
	Mean	Standard Deviation	Mean	Standard Deviation	*t*- value	*p*- value	Cohen's *d*
Participant Social Distancing	35.17	31.49	85.00	28.51	-2.87	.017	1.66
Participant Facial Masks	51.17	29.12	19.50	13.98	2.40	.046	1.39
Total Violations	140.17	38.47	119.00	41.30	0.92	.380	0.53

Note. N = 12. Degrees of Freedom for the *t*-statistic = 10.