



September 2022

Attitudes Toward COVID-19 and COVID-19 Vaccinations Among Athletic Trainers

Stephen A. Cage

The University of Texas, acage@uttyler.edu

Paul McGaha

The University of Texas, pmcgaha@uttyler.edu

Monica Matocha

Texas Lutheran University, mamatocha@tlu.edu

Michelle Crum, PhD

The University of Texas, michelle.crum@uthct.edu

Cathy Fieseler

The University of Texas (retired), runmd@aol.com

See next page for additional authors

Follow this and additional works at: <https://nsuworks.nova.edu/ijahsp>



Part of the [Public Health Education and Promotion Commons](#), and the [Sports Sciences Commons](#)

Recommended Citation

Cage SA, McGaha P, Matocha M, Crum, PhD M, Fieseler C, Trail L, et al. Attitudes Toward COVID-19 and COVID-19 Vaccinations Among Athletic Trainers. The Internet Journal of Allied Health Sciences and Practice. 2022 Sep 26;20(4), Article 14.

This Manuscript is brought to you for free and open access by the College of Health Care Sciences at NSUWorks. It has been accepted for inclusion in Internet Journal of Allied Health Sciences and Practice by an authorized editor of NSUWorks. For more information, please contact nsuworks@nova.edu.

Attitudes Toward COVID-19 and COVID-19 Vaccinations Among Athletic Trainers

Abstract

Purpose: Following the beginning of the pandemic brought about by the novel coronavirus which causes COVID-19, the first COVID-19 vaccination received emergency use authorization in the United States of America in December of 2020. Current research has shown the authorized COVID-19 vaccines are safe and effective at preventing severe illness, hospitalizations and death have a good safety profile. Additionally, the side effects associated with these vaccines are typically mild to moderate while the protection against hospitalization and severe disease is substantial. (<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/adverse-events.html>). At the time of this study, there appears to be a paucity in the research related to the attitudes toward COVID-19 and COVID-19 vaccines among athletic trainers. The purpose of this study is to describe the attitudes toward COVID-19 and COVID-19 vaccines among athletic trainers. **Methods:** A total of 186 athletic trainers (age= 43 ± 11, years of certified experience = 20 ± 11) opened and completed the survey. Participants were sent an electronic survey via email that collected demographic information and assessed attitudes toward COVID-19 and COVID-19 vaccines. Data was downloaded and analyzed using a commercially available statistics package. **Results:** The majority of athletic trainers surveyed had received a COVID-19 vaccination at the time of this study (94.1%, n=175). Most athletic trainers also agreed that the health of their patients was more important than disruption of their competition season due to COVID-19 (82.3%, n=153). In general, the most common reason for vaccine hesitancy was the speed with which currently available COVID-19 vaccines were developed. **Conclusions:** The findings of this study show the majority of surveyed athletic trainers had received a COVID-19 vaccine. The primary reason for athletic trainers not receiving a COVID-19 vaccination appeared to be the speed at which the currently available COVID-19 vaccines were developed. Given the available information on the new mRNA COVID vaccines, this may indicate a lack of education on the development of the COVID-19 vaccines. As athletic trainers continue to work in day-to-day patient care, it is imperative to determine the best methods for educating athletic trainers on the potential benefits of COVID-19 vaccinations.

Author Bio(s)

S. Andrew Cage, EdD, LAT, ATC, is the Head Athletic Trainer and an Instructor of Health & Kinesiology at the University of Texas at Tyler.

Paul McGaha, DO, is an Associate Professor and Chair of the Department of Community Health at The University of Texas Health Science Center at Tyler, and Physician through UT Health East Texas Physicians.

Monica Matocha, DAT, LAT, ATC, is an Assistant Professor of Athletic Training at Texas Lutheran University.

Michelle Crum, PhD, is an Assistant Professor of Community Health at The University of Texas at Tyler.

Cathy Fieseler, MD, is a retired physician who previously served as the Team Physician for the University of Texas at Tyler.

Laurel Trail, MPA, LAT, ATC, is an Assistant Athletic Trainer at the University of Texas at Tyler through UT Health East Texas.

Brandon Warner, Ed.D., LAT, ATC, is the Athletic Training Program Director at Grand Canyon University.

Mitchelle Gallegos, MS, LAT, ATC, is an Associate Athletic Trainer at the University of Texas at Tyler through UT Health East Texas.

Authors

Stephen A. Cage; Paul McGaha; Monica Matocha; Michelle Crum, PhD; Cathy Fieseler; Laurel Trail; Brandon

J. Warner; and Diana M. Gallegos



The Internet Journal of Allied Health Sciences and Practice

Dedicated to allied health professional practice and education

Vol. 20 No. 4 ISSN 1540-580X

Attitudes Toward COVID-19 and COVID-19 Vaccinations Among Athletic Trainers

Stephen A. Cage¹

Paul McGaha¹

Monica Matocha²

Michelle Crum¹

Cathy Fieseler¹

Laurel Trail¹

Brandon J. Warner³

Diana M. Gallegos¹

1. The University of Texas
2. Texas Lutheran University
3. Grand Canyon University

United States

ABSTRACT

Purpose: Following the beginning of the pandemic brought about by the novel coronavirus which causes COVID-19, the first COVID-19 vaccination received emergency use authorization in the United States of America in December of 2020. Current research has shown the authorized COVID-19 vaccines are safe and effective at preventing severe illness, hospitalizations and death have a good safety profile. Additionally, the side effects associated with these vaccines are typically mild to moderate while the protection against hospitalization and severe disease is substantial. (<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/adverse-events.html>). At the time of this study, there appears to be a paucity in the research related to the attitudes toward COVID-19 and COVID-19 vaccines among athletic trainers. The purpose of this study is to describe the attitudes toward COVID-19 and COVID-19 vaccines among athletic trainers. **Methods:** A total of 186 athletic trainers (age= 43 ± 11, years of certified experience = 20 ± 11) opened and completed the survey. Participants were sent an electronic survey via email that collected demographic information and assessed attitudes toward COVID-19 and COVID-19 vaccines. Data was downloaded and analyzed using a commercially available statistics package. **Results:** The majority of athletic trainers surveyed had received a COVID-19 vaccination at the time of this study (94.1%, n=175). Most athletic trainers also agreed that the health of their patients was more important than disruption of their competition season due to COVID-19 (82.3%, n=153). In general, the most common reason for vaccine hesitancy was the speed with which currently available COVID-19 vaccines were developed. **Conclusions:** The findings of this study show the majority of surveyed athletic trainers had received a COVID-19 vaccine. The primary reason for athletic trainers not receiving a COVID-19 vaccination appeared to be the speed at which the currently available COVID-19 vaccines were developed. Given the available information on the new mRNA COVID vaccines, this may indicate a lack of education on the development of the COVID-19 vaccines. As athletic trainers continue to work in day-to-day patient care, it is imperative to determine the best methods for educating athletic trainers on the potential benefits of COVID-19 vaccinations.

Keywords: SARS-CoV-2, coronavirus, vaccination, COVID-19

INTRODUCTION

Coronavirus disease 19 (COVID-19) is a respiratory disease caused by a viral infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹ COVID-19 was first identified by researchers and healthcare professionals in late 2019 in Wuhan, China.¹ Since its identification, the disease has been shown to be highly infectious.¹ Symptoms of COVID-19 may include fever, dry cough, sore throat, fatigue, loss of smell, loss of taste, muscle and joint pain, shortness of breath, nausea, vomiting, and diarrhea.¹ Patients have developed potentially fatal pneumonia, septic shock, metabolic acidosis, and coagulation dysfunction in severe cases.² During the first several months of the COVID-19 pandemic, mitigation efforts centered around testing, contact tracing, enhanced hygiene, and the use of face masks or face coverings.³⁻⁶ Thus, the primary recommendations to mitigate the spread of COVID-19 had been targeted towards those non-pharmaceutical mitigation efforts.³⁻⁶ In December 2020, the mRNA BNT 162b2 (Pfizer) vaccine for COVID-19 received emergency use authorization from the United States Food and Drug Administration (FDA).⁷ On August 23, 2021, the FDA granted full approval to the mRNA BNT162b2 COVID-19 vaccine for individuals 16 years of age and older.⁸

Extensive research has been done on the mRNA BNT 162b2 vaccine and the 0(Moderna) vaccine. This research has shown that the mRNA BNT 162b2 and mRNA-1273 vaccines have been found to be very effective at preventing severe COVID-19 illness.⁹⁻²⁰ In addition to being effective at preventing severe illness, these vaccines have also been found to be safe as well. Several studies have reported that the adverse effects experienced with these vaccines are often mild, and the risk of adverse effects as a result of vaccination is lower than the risk of a serious medical event caused by COVID-19 infection.^{9,11,16,19,21} A study by Barda et al²¹ assessed the occurrence of adverse effects in 884,828 people in the United States of America who had been fully vaccinated with the mRNA BNT 162b2 vaccine. The researchers found that there was no elevated risk associated with most of the severe adverse outcomes that were examined.²¹ Although the vaccine was associated with a risk of myocarditis at a rate of one to five events per 100,000, it was noted that this risk was substantially lower than the risk of myocarditis associated with COVID-19 illness.²¹

One line of reasoning used by some individuals when determining whether or not to receive a COVID-19 vaccination is that natural immunity may be more potent than vaccine induced immunity.²² In response to this belief, a systematic review was conducted to determine how the immune response generated from COVID-19 vaccines compared to the immune response created by previous COVID-19 illness.²² The authors noted that natural immunity was at least as effective as vaccine induced immunity. However, the authors cautioned that this did not mean individuals should seek out infection to forego vaccination.²² Rather, they stated in no uncertain terms that vaccine induced immunity carried far fewer risks than COVID-19 illness without vaccine protection.²²

Even though COVID-19 vaccines have been shown to be effective and safe, vaccine hesitancy still exists among some populations.^{23,24} This hesitancy has even extended to healthcare professionals such as nurses.^{23,24} To date, there has been limited study on the attitudes of athletic trainers toward COVID-19 vaccinations and COVID-19 in general.^{25,26} Athletic trainers are called to perform patient-facing care, similar to nurses and other allied healthcare professionals. As such, this places them at an elevated risk of exposure and infection from COVID-19.²⁷ Athletic trainers are also at a higher risk for mental health concerns such as stress, anxiety, and depression as a result of providing healthcare during the COVID-19 pandemic.²⁸⁻³⁰ These issues make athletic trainers an important population to study as the effects of the COVID-19 pandemic are assessed. Furthermore, healthcare providers play a crucial role in influencing the uptake of various vaccinations.³¹⁻³³ This provides even more reason for needing to understand the feelings and opinions of athletic trainers toward COVID-19 vaccinations. Thus, the purpose of this study was to describe the attitudes toward COVID-19 vaccination and COVID-19 in general among athletic trainers.

METHODS

Design

This study was conducted using a cross-sectional design with an internet-based survey for data collection. This study was approved through The University of Texas at Tyler Institutional Review Board.

Respondents

Participants were recruited by emailing head athletic trainers of institutions of higher education and secondary schools using publicly available staff directories, the recipients were asked to forward the inviting email to any fellow athletic trainers they knew. Additionally, program directors for athletic training education programs were emailed and asked to forward the study invitation to their alumni databases and preceptors. A total of 186 athletic trainers (age= 43 ± 11, years of certified experience = 20 ± 11) opened and completed the survey. Demographic information for participants is presented in Table 1. All participants were informed of the survey's purpose and an informed consent question was used to obtain permission to include their data.

Table 1. Totals and percentages for participant demographic information.

Demographic Factor	Criteria	Responses
Sex	Female	103, 55.4%
	Male	82, 44.1%
	Non-Binary	1, 0.5%
Race	White	167, 89.8%
	Latino(a)	5, 2.7%
	Black or African American	5, 2.7%
	Asian	4, 2.2%
	Other	5, 2.7%
Highest Degree Earned	Professional Bachelors'	22, 11.8%
	Professional Masters'	46, 24.7%
	Post-Professional Masters' in Athletic Training	34, 18.3%
	Post-Professional Masters' not in Athletic Training	57, 30.6%
	Academic Doctorate	18, 9.7%
	Clinical Doctorate	9, 4.8%
Practice Setting	Secondary School	31, 16.7%
	College/University – Clinical	108, 58.1%
	College/University – Split Appointment	14, 7.5%
	College/University – Academic	29, 15.6%
	Emerging Settings	2, 1.1%
	Professional Sports	1, 0.5%
	Clinic/Hospital	1, 0.5%

Instrumentation

The survey used in this study was based on questions used in previous survey-based studies by the research team.^{25,26} The survey began with institutional review board information, the informed consent question, and demographics section. Other questions gathered information on whether the participants had been previously diagnosed with COVID-19, received a COVID-19 vaccination, and if someone close to them had been hospitalized or passed away as a result of COVID-19. Further questions gauged attitudes of participants toward COVID-19 vaccinations, and COVID-19 in general.

The survey consisted of 21 total questions. These questions included: one question obtaining consent to participate in the study, three fill in the blank and three multiple choice questions regarding demographic information, one multiple choice question about previous diagnosis of COVID-19, one multiple choice question on receipt of a COVID-19 vaccination, one multiple choice question regarding whether or not the participant had had someone close to them hospitalized due to COVID-19, one multiple choice question regarding whether or not the participant had had someone close to them pass away due to COVID-19, and nine multiple choice questions and one fill in the blank question related to attitudes toward COVID-19 vaccinations and COVID-19 in general.

Procedures

An email was sent to head athletic trainers of institutions of higher education and secondary schools using publicly available staff directories, the recipients were asked to forward the inviting email to any fellow athletic trainers they knew. Additionally, program directors for athletic training education programs were emailed and asked to forward the study invitation to their alumni databases and preceptors. Participants were asked to complete the survey as honestly and completely as possible. The email included an invitation to participate in a survey, and a link from a web-based survey company (Qualtrics Inc., Provo, UT) in September 2021. A follow up email was sent two-weeks after the initial invitation attempting to solicit further responses, and the survey was closed a week after the second email was sent.

Data Analysis

Information from participant responses was downloaded and analyzed using a commercially available statistics package (SPSS Version 28, IBM, Armonk, NY). A total of 186 athletic trainers consented to participate in the study. All 186 responses were included in the data analysis. Measures of central tendency (means, standard deviations, frequencies) were calculated where appropriate. Pearson Correlations were performed to assess relationships between age, experience, and attitudes toward COVID-19 vaccinations, and COVID-19 in general. Independent samples t-tests were performed to assess differences in attitudes between gender, participants who had or had not had someone close to them hospitalized due to COVID-19, and participants who had or had not had someone close to them pass away due to COVID-19. A paired samples t-test was performed to assess differences in responses to questions regarding concern over playing seasons and concern over patient health.

RESULTS

Receipt of a COVID-19 Vaccination

The majority of participants reported having received a COVID-19 vaccination (94.1%, n=175). A breakdown of vaccination status is included in Table 2.

Table 2. COVID-19 Vaccination Statuses

Statement	Responses
Received mRNA-1273 Vaccination	91, 48.9%
Received mRNA BNT 162b2 Vaccination	78, 41.9%
Received JNJ-78436735 (Johnson & Johnson) Vaccination	6, 3.2%
Unvaccinated	11, 5.9%

Attitudes Toward COVID-19

When asked about the impact COVID-19 had on those close to them, 40.3% of participants reported having someone close to them hospitalized due to COVID-19 (n=75). Additionally, 23.1% of participants reported having someone close to them pass away due to COVID-19 (n=43). The majority of participants agreed that symptoms related to COVID-19 were more severe than influenza (86%, n=160). Most participants also agreed that COVID-19 was more contagious than influenza (89.2%, n=166). Whether or not the participant had someone close to them hospitalized or pass away from COVID-19 did not have a significant impact on attitudes related to the seriousness or contagiousness of COVID-19.

Most athletic trainers also expressed some level of concern related to COVID-19 impacting the competition seasons of their patient populations (83.3%, n=155). However, the majority of athletic trainers agreed that the health of their patients was more important than disruption of their patients playing season (82.3%, n=153). When comparing strength of agreement, there was a significant difference between concern over COVID-19 impacting competition seasons (4.54 ± 1.30) and concern over patient health over COVID-19 impacting competition seasons (4.84 ± 1.37), $p = 0.037$.

Attitudes Toward COVID-19 Vaccines

The majority of participants agreed on some level that they felt the current level of FDA authorization for available COVID-19 vaccines was enough for them to be comfortable receiving a vaccination (88.2%, n=164). Most participants also agreed that they felt more confident in the mRNA BNT 162b2 vaccine after the FDA granted full approval (73.1%, n=136). Table 3 provides a breakdown of the questions on participants' attitude toward COVID-19 vaccines.

Table 3. Responses for questions on the attitudes toward COVID-19 vaccines.

Statement	Most Common Responses (%)
I feel comfortable with the current level of authorization for available COVID-19 vaccines.	Strongly Agree, 78 (41.9%) Agree, 55 (29.6%) Somewhat Agree, 31 (16.7%)
I am more confident in the mRNA BNT 162b2 vaccine now that it has received full FDA approval for individuals over the age of 16.	Agree, 63 (33.9%) Somewhat Agree, 51 (27.4%) Strongly Agree, 22 (11.8%)

When asked about reasons behind not getting vaccinated, the majority of unvaccinated participants stated they were concerned about how quickly the available vaccines seemed to be developed. Other comments, which are quoted from participant responses, regarding reasons for remaining unvaccinated included:

"I am currently breastfeeding my infant and wanted to wait until he either weaned or any of the vaccines gained FDA approval."

"I don't have hardly any risk factors and I've already recovered from COVID without any issues."

"I have had COVID twice and both times I experienced mild flu like symptoms and my immune response was adequate to fight the virus."

"Because I believe it is NOT a vaccine. Nothing in the ingredients make it a vaccine."

"I still have the COVID-19 antibodies from my COVID infection and believe my natural immunity is better than the vaccine."

"I do not trust the long-term safety of receiving the vaccine."

DISCUSSION

The purpose of this study was to describe the attitudes of athletic trainers toward COVID-19 and COVID-19 vaccines. Additionally, this study described the receipt of COVID-19 vaccines among this sample.

The majority of participants reported having received a COVID-19 vaccine at the time of the survey (94.1%, n=175). Among the participants who had not been vaccinated for COVID-19, the most common reasons included concern about how quickly the vaccines seemed to be developed, and the feeling that previous COVID-19 infection had given them sufficient immunity to severe illness. The athletic trainers who expressed hesitancy in receiving a COVID-19 vaccine are not an isolated group. Other allied healthcare professionals, such as nurses, have also expressed reservations regarding receiving a COVID-19 vaccine.^{23,24} When hesitancy towards receiving a vaccine is present, educating the involved stakeholders is critical.^{34,35}

Regarding the concern about how quickly the COVID-19 mRNA vaccines were developed, this may be due to a lack of understanding of the technology used to develop mRNA vaccines. While the mRNA BNT 162b2 and mRNA-1273 COVID-19 vaccines were developed in under a year, the technology used to do so has been around for significantly longer.⁷ In fact, mRNA vaccines and the technology to develop them have been researched at least as early as 2003.³⁶ Over the past two decades, further studies have been conducted to develop mRNA vaccines.³⁸⁻⁴² Based on this information, the technology used to develop the mRNA COVID-19 vaccines in actuality took closer to two decades to develop.

When considering the assertion that natural immunity is more potent than vaccine-based immunity, there are factors that warrant consideration. First, current studies have shown that the immunity obtained through COVID-19 vaccination is comparable to immunity obtained through COVID-19 infection.²² This suggests natural immunity does have a potentially protective effect against COVID-19 infection. However, the potential severe adverse effects of the currently available COVID-19 vaccines are generally less common and less severe than the potential severe adverse effects of COVID-19 infection.²² This underscores the increased risk of COVID-19 infection relative to COVID-19 vaccination. As such, researchers have emphatically advised against seeking out SARS-CoV-2 infection in lieu of receiving a COVID-19 vaccine.²²

This information suggests potential knowledge gap among some athletic trainers regarding COVID-19 and COVID-19 vaccines. While this study did not explore the potential for a knowledge gap, such a gap could negatively impact the number of athletic trainers receiving a COVID-19 vaccination. As allied healthcare professionals tasked with the fundamental responsibility to prevent injury and illness in their patients, athletic trainers owe it to their patients and their profession to fully examine the scientifically backed evidence supporting the use of COVID-19 vaccines. By approaching the matter from a more informed perspective, athletic trainers will be able to make educated decisions regarding their personal plans of care and while counseling patients on healthcare decisions.

In the current work environment, allied healthcare professionals are experiencing increasing amounts of stress, anxiety, and other mental health issues.^{25,28,43} This serves as another reason to attempt to encourage those athletic trainers who are hesitant about receiving a COVID-19 vaccine to fully educate themselves on the safety and efficacy of said vaccines. Any increase in the number of vaccinated individuals would positively impact the prevalence of severe illness related to COVID-19.⁹⁻²²

Limitations

A possible limitation of this study was the relatively low number of participants. While the total number of responses was similar to other survey-based studies conducted on allied healthcare professionals, an exhaustive and larger scale study would provide a more complete description of the attitudes of athletic trainers toward COVID-19 and COVID-19 vaccines.^{44,45} This study provides a framework for conducting such a study.

Recommendations for Future Research

There is a need for further research into the attitudes, moods, and behaviors of athletic trainers and other allied healthcare professionals related to the COVID-19 pandemic. A previous study investigated the attitudes and receipt of a COVID-19 vaccination among athletic trainers and suggested the majority of athletic trainers had or intended to receive a COVID-19 vaccination.²⁶ This study appeared to support the findings of this previous study. However, there is still a portion of the athletic training community that must be certain a fully educated decision is being made regarding vaccination against COVID-19. Considering the role of allied healthcare professionals in providing day-to-day patient care, it is important to continually assess the attitudes and intentions they hold regarding mitigation strategies during the COVID-19 Pandemic. The high vaccination rate among this cohort of athletic trainers might serve as a model for their patient population.

CONCLUSION

In conclusion, the majority of surveyed athletic trainers had received a COVID-19 vaccination at the time of data collection. The majority of participants also reported valuing their patients' health more than disrupting a competitive season when related to COVID-19. The primary reason for athletic trainers not receiving a COVID-19 vaccination appeared to be safety concerns regarding the speed at which the currently available COVID-19 vaccines were developed. Given the available information on mRNA vaccines, this may indicate a lack of education on the development of the COVID-19 vaccines. As athletic trainers continue to work in day-to-day patient care, it is imperative to determine the best methods for educating athletic trainers on the potential benefits of COVID-19 vaccinations.

REFERENCES

1. Zhong BL, Luo W, Mei LH, Zhang QQ, Liu XG, Li WT, Li Y. Knowledge, attitudes, and practices toward COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *International Journal of Biological Sciences*. 2020;16(10):1745-1752.
2. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet*. 2020;395:507-513.
3. Patel R, Babady E, Theel ES, Storch GA, Pinsky BA, George KS, Smith TC, Bertuzzi S. Report from the American Society for Microbiology COVID-19 International Summit, 23 March 2020: Value of diagnostic testing for SARS-CoV-2/COVID-19. *American Society for Microbiology*. 2020;11(2).
4. Ebrahim SH, Memish ZA. COVID-19 – The role of mass gatherings. *Travel Medicine and Infectious Disease*. 2020.
5. Zhang R, Li Y, Zhang AL, Wang Y, Molina MJ. Identifying airborne transmission as the dominant route for the spread of COVID-19. *Proceeds of the National Academy of Sciences*. 2020.
6. Eikenberry SE, Mancuso M, Iboi E, Phan T, Eikenberry K, Kuang Y, Kostelich E, Gumel AB. To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic. *Infectious Disease Modeling*. 2020;5:293-308.
7. Pfizer-BioNTech COVID-19 Vaccine EUA LOA reissued November 19, 2021. U.S. Food & Drug Administration website. Updated November 19, 2021. Accessed November 26, 2021. [Pfizer-BioNTech COVID-19 Vaccine EUA LOA reissued November 19 2021 \(fda.gov\)](https://www.fda.gov/emergency-preparedness-response-recovery/medical-products/updates-to-the-emergency-use-authorization-for-pfizer-biontech-covid-19-vaccine)
8. Comirnaty and Pfizer-BioNTech COVID-19. Vaccine. U.S. Food & Drug Administration website. Updated November, 23, 2021. Accessed November 26, 2021. [Comirnaty and Pfizer-BioNTech COVID-19 Vaccine | FDA](https://www.fda.gov/emergency-preparedness-response-recovery/medical-products/updates-to-the-emergency-use-authorization-for-pfizer-biontech-covid-19-vaccine)
9. Al K, Berman G, Zhou H, Deng W, Faughnan V, Coronado-Voges M, Ding B, Dooley J, Girard B, Hillebrand W, Pajon R, Miller JM, Leav B, McPhee R. Evaluation of mRNA-1273 SARS-CoV-2 vaccine in adolescents. *The New England Journal of Medicine*. 2021.
10. Anderson EJ, Roupheal NG, Widge AT, Jackson LA, Roberts PC, Makhene M, Chappell JD, Denison MR, Stevens LJ, Pruijssers AJ, McDermott AB, Flach B, Lin BC, Doria-Rose NA, O'Dell S, Schmidt SD, Corbett KS, Swanson PA, Padilla M, Neuzil KM, Bennet H, Leav B, Makowski M, Albert J, Cross K, Edara VV, Floyd K, Suthar MS, Martinez DR, Baric R, Buchanan W, Luke CJ, Phadke VK, Rostad CA, Ledgerwood, Graham BS, Beigel JH. Safety and immunogenicity of SARS-CoV-2 mRNA-1273 vaccine in older adults. *The New England Journal of Medicine*. 2020;383(25):2427-2438.
11. Baden LR, El Shaly HM, Essink B, Kotloff K, Frey S, Novak R, Diemert D, Spector SA, Roupheal N, Creech CB, McGettigan J, Khetan S, Segall N, Solis J, Brosz A, Fierro C, Schwartz H, Neuzil K, Corey L, Gilbert P, Janes H, Follmann D, Marovich M, Mascola J, Polakowski L, Ledgerwood J, Graham BS, Bennett H, Pajon R, Knightly C, Leav B, Deng W, Zhou H, Han S, Ivarsson M, Miller J, Zaks T. Efficacy and safety of the mRNA-1273 SARS-CoV-2 vaccine. *The New England Journal of Medicine*. 2021;384(5):304-416.
12. Barda N, Dagan N, Cohen C, Hernan MA, Lipsitch M, Kohane IS, Reis BY, Balicer RD. Effectiveness of a third dose of the BNT162b2 mRNA COVID-19 vaccine for preventing severe outcomes in Israel: An observational study. *Lancet*. 2021.
13. Dagan N, Barda N, Biron-Shental T, Makov-Assif M, Key C, Kohane IS, Hernan MA, Lipsitch M, Hernandez-Diaz S, Reis BY, Balicer RD. Effectiveness of the BNT162b2 mRNA COVID-19 vaccine in pregnancy. *Nature Medicine*. 2021;27:1693-1695.
14. Hall VJ, Foulkes S, Saei A, Andrews N, Oguti B, Charlett A, Wellington E, Stowe J, Gillson N, Atti A, Islam J, Karagiannis I, Munro K, Khawam J, Chand MA, Brown CS, Ramsay M, Lopez-Bernal J, Hopkins S. COVID-19 vaccine coverage in health-care workers in England and effectiveness of BNT162b2 mRNA vaccine against infection (SIREN): A prospective, multicentre, cohort study. *Lancet*. 2021;397(1725-1735).
15. Jabal KA, Ben-Amram H, Beirtui K, Batheesh Y, Sussan C, Zarka S, Edelstein M. Impact of age, ethnicity, sex and prior infection status on immunogenicity following a single dose of the BNT162b2 mRNA COVID-19 vaccine: Real-world evidence from healthcare workers, Israel, December 2020 to January 2021. *Eurosurveillance*. 2021;26(6).

16. Peretz SB, Regev N, Novick L, Nachshol M, Goffer E, Ben-David A, Asraf K, Doolman R, Levin EG, Yochay GR, Yinon Y. Short-term outcome of pregnant women vaccinated with BNT162b2 mRNA COVID-19 vaccine. *Ultrasound in Obstetrics Gynecology*. 2021;58:450-456.
17. Pegu A, O'Connell SE, Schmidt SD, O'Dell S, Talana CA, Lai L, Albert J, Anderson E, Bennett H, Corbett KS, Flach B, Jackson L, Leav B, Ledgerwood JE, Luke CJ, Makowski M, Nason MC, Roberts PC, Roederer M, Rebolledo PA, Rostad CA, Roupheal NG, Shi W, Wang L, Widge AT, Yang ES, Beigel JH, Graham BS, Mascola JR, Suthar MS, McDermott AB, Doria-Rose NA. Durability of mRNA-1273 vaccine-induced antibodies against SARS-CoV-2 variants. *Science*. 373:1372-1377.
18. Plishivili T, Gierke R, Fleming-Dutra KE, Farrar JL, Mohr NM, Talan DA, Krishnadasan A, Harland KK, Smithline HA, Hou PC, Lee LC, Lim SC, Moran GJ, Krebs E, Steele MT, Beiser DG, Faine B, Haran JP, Nandi U, Schrading WA, Chinnock B, Henning DJ, Lovecchio F, Lee J, Barter D, Brackney M, Fridkin SK, Marceaux-Galli K, Lim S, Phipps EC, Dumyati G, Pierce R, Markus TM, Anderson DJ, Debes AK, Lin MY, Mayer J, Kwon JH, Safdar N, Fischer M, Singleton R, Chea N, Magill SS, Verani JR, Schrag SJ. Effectiveness of mRNA COVID-19 vaccine among U.S. health care personnel. *The New England Journal of Medicine*. 2021.
19. Polack FP, Thomas SJ, Kitchin N, Absalon J, Gurtman A, Lockhart S, Perez JL, Marc GP, Moreira ED, Zerbini C, Bailey R, Swanson KA, Roychoudhury S, Koury K, Li P, Kalina WV, Cooper D, French RW, Hammitt LL, Tureci O, Nell H, Schaefer A, Uenal S, Tresnan DB, Mather S, Dormitzer PR, Sahin U, Jansen KU, Gruber WC. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. *The New England Journal of Medicine*. 2020.
20. Tartof SY, Slezak JM, Fischer H, Hong V, Ackerson BK, Ranasinghe ON, Frankland TB, Ogun OA, Zamparo JM, Gray S, Valluri SR, Pan K, Angulo FJ, Jodar L, McLaughlin JM. Effectiveness of mRNA BNT162b2 COVID-19 vaccine up to 6 months in a large integrated health system in the USA: A retrospective cohort study. *Lancet*. 2021;398:1407-1416.
21. Barda N, Dagan N, Ben-Shlomo Y, Kepten E, Waxman J, Ohana R, Hernan MA, Lipsitch M, Phil D, Kohane I, Netzer D, Reis BY, Balicer RD. Safety of the BNT162b2 mRNA Covid-19 vaccine in a nationwide setting. *The New England Journal of Medicine*. 2021;381(12):1078-1090.
22. Shenai MB, Rahme R, Noorchasm H. Equivalency of protection from natural immunity in COVID-19 recovered versus fully vaccinated persons: A systematic review and pooled analysis. *Cureus*. 2021;13(10).
23. Kwok KO, Li KK, Wei WI, Tang A, Wong SY, Lee SS. Influenza vaccine uptake, COVID-19 vaccination intention and vaccine hesitancy among nurses: A survey. *International Journal of Nursing Studies*. 2021;114(1).
24. Manning ML, Gerolamo AM, Marino MA, Hanson-Zalot ME, Pogorzelska-Maziarz M. COVID-19 vaccination readiness among nurse faculty and student nurses. *Nursing Outlook*. 2021;69:565-573. <https://doi.org/10.1016/j.outlook.2021.01.019>
25. Cage SA, Warner BJ, Mesman D, Gallegos DM, Warner LK, Goza JP. Attitudes toward and usage of face masks or face coverings among certified athletic trainers during the COVID-19 pandemic. *Research & Investigations in Sports Medicine*. 2020;6(5):565-569.
26. Cage SA, Warner BJ, Ballard B, Gallegos DM, Goza JP, Warner LK. Attitudes toward COVID-19 vaccination among athletic trainers in early 2021. *Research & Investigations in Sports Medicine*. 2021;8(1):693-696.
27. Sim MR. The COVID-19 pandemic: Major risks to healthcare and other workers on the front line. *Occupational and Environmental Medicine*. 2020;77(5):281-282.
28. Cage SA, Warner BJ, Mesman D, Warner LK, Gallegos DM, Trail LE, Tuell C, Goza JP. Attitudes and Moods Among Athletic Trainers Following Suspension of 2020 Athletic Season Due to COVID-19. *Research & Investigations in Sports Medicine*. 2020;6(3):523-527.
29. Shreffler J, Petrey J, Huecker M. The impact of COVID-19 on healthcare worker wellness: A scoping review. *Western Journal of Emergency Medicine*. 2020;21(5):1059-1066.
30. Mosheva M, Gross R, Hertz-Palmor N, Hasson-Ohayon I, Kaplan R, Cleper R, Kreiss Y, Gothelf D, Pessach IM. The association between witnessing patient death and mental health outcomes in frontline COVID-19 healthcare workers. *Depress Anxiety*. 2021;38:468-479.
31. Kundi M, Obermeier P, Helfert S, Oubari H, Fitzinger S, Yun JA, Brix M, Rath B. The impact of the patient-physician relationship on parental vaccine safety perceptions. *Current Drug Safety*. 2015;10:16-22.
32. Guarinoni MG, Dignani L. Effectiveness of the school nurse role in increasing the vaccine coverage rate: A narrative review. *Ann IG*. 2021;33(1):55-66.
33. Gilkey MB, Malo TL, Shah PD, Hall ME, Brewer NT. Quality of physician communication about human papillomavirus vaccine: Findings from a national survey. *Cancer Epidemiol Biomarkers Prev*. 2015;24(11):1673-1679.
34. Burke K, Schwartz S, Breda K. Don't hesitate, vaccinate! An influenza vaccine education program. *Nursing Forum*. 2019;54(4):553-556. <https://doi-org.libproxy.uncg.edu/10.1111/nuf.12369>
35. Navin MC, Wasserman JA, Ahmad M, Bies S. Vaccine educations, reasons for refusal, and vaccine education. *American Journal of Preventive Medicine*. 2019;56(3):359-367. <https://doi.org/10.1016/j.amepre.2018.10.024>

36. Zarci S, Arrighi JF, Ongaro G, Calzascia T, Haller O, Frossard C, Piguet V, Walker PR, Hauser C. Efficient induction of C8 T-associated immune protection by vaccination with mRNA transfected dendritic cells. *Journal of Investigative Dermatology*. 2003;121(4):745-750. doi: 10.1046/j.1523-1757.2003.12492.
 37. Carralot JP, Probst J, Hoerr I, Scheel B, Teufel R, Jung G, Rammensee HGG, Pascolo S. Polarization of immunity induced by direct injection of naked sequence stabilized mRNA vaccines. *Cellular and Molecular Life Sciences*. 2004;61(18):2418-2424. doi: 10.1007/s00018-004-4255-0
 38. Kyte JA, Kvalheim G, Lislud K, Straten PR, Dueland S, Aamdal S, Gaudernack G. T cell responses in melanoma patients after vaccination with tumor-mRNA transfected dendritic cells. *Cancer Immunology, Immunotherapy*. 2007;56:659-675. doi: 10.1007/s00262-006-0222-y
 39. Roesler E, Weiss R, Weinberger EE, Fruehwirth A, Stoecklinger A, Mostbock S, Ferreira F, Thahamer J. Immunize and disappear – Safety-optimized mRNA vaccination with a panel of 29 allergens. *Journal of Allergy and Clinical Immunology*. 2009;124(5):1070-1077. doi: 10.1016/j.jaci.2009.06.036
 40. Hosoi A, Takeda Y, Sakuta K, Ueha S, Kurachi M, Kimura K, Maekawa R, Kakimi K. Dendritic cell vaccine with mRNA targeted to the proteasome by polyupiquitination. *Biochemical and Biophysical Research Communications*. 2008;371:242-246. doi:10.1016/j.bbrc.2008.04.034
 41. Wong G, Gao GF. An mRNA-based vaccine strategy against Zika. *Cell Research*. 2017;27:1077-1078. doi: 10.1038/cr.2017.53
 42. Wong SS, Webby RJ. An mRNA vaccine for influenza. *Nature Biotechnology*. 2012;30(12):1202-1204. doi:10.1038/nbt.2349
 43. Son SM, Hong HN. Changes in the job commitment and social interaction anxiety among occupational therapists working in long term care hospital through the COVID-19 vaccination. *Annals of the Romanian Society for Cell Biology*. 2021;25(5):5691-5701. ISSN: 1583-6258.
 44. Usher R, Sapleton T. Occupational therapy and decision-making capacity assessment: A survey of practice in Ireland. *Australian Occupational Therapy Journal*. 2020;67:110-120.
 45. Stein Duker LI, Sleight AG. Occupational therapy practice in oncology care: Results from a survey. *Nursing & Health Sciences*. 2019;21:164-170.
-

APPENDIX: SURVEY FORM

Athletic Trainers Attitudes Toward COVID-19 and COVID-19 Vaccines

Q1 You are being invited to participate in a study about attitudes surrounding COVID-19 and COVID-19 Vaccines among athletic trainers by S. Andrew Cage. Your participation is completely voluntary, and if you begin participation and choose to not complete it, you are free to not continue without any adverse consequences.

If you agree to be in this study, we will ask you to do the following things:

You agree to have your survey answers included in data analysis.

Your data will not be shared with any other parties outside of the investigators. No identifying information will be included so that your confidentiality will be protected. This means that your survey responses will be entirely anonymous.

We know of no known risks to this study, other than becoming a little tired of answering the questions, or you may even become a little stressed or distressed when answering some of the questions. You are free to take a break and return to the survey to finish it, or, you can discontinue participation without any problems.

If I need to ask questions about this study, I can contact the principle researcher, S. Andrew Cage at scage@uttyler.edu, or 903-565-5545.

I have read and understood what has been explained to me. If I choose to participate in this study, I will click "I agree to participate" in the box below and proceed to the survey. If I choose to not participate, I will click "I do not agree to participate" in the box below.

I agree to participate (1)

I do not agree to participate (2)

Q2 Please enter your age to the nearest year.

Q3 Please enter your years of credentialed experience to the nearest year.

Q4 What is your gender?

Q5 What is your race? (Please select all that apply)

- White (1)
- Black or African American (2)
- American Indian or Alaska Native (3)
- Asian (4)
- Native Hawaiian or Pacific Islander (5)
- Hispanic, Latino(a), or Spanish (6)
- Other (please describe) (7) _____

Q6 What is the highest level of education you have completed?

- Professional Bachelor's Degree (1)
- Professional Master's Degree (MAT, MSAT) (2)
- Post-Professional Master's Degree in Athletic Training (3)
- Post-Professional Master's Degree not in Athletic Training (4)
- Clinical Doctorate (DAT, DPT) (5)
- Academic Doctorate (PhD, EdD) (6)

Q7 What is your current practice setting?

- Secondary School (1)
- College/University - Clinical (2)
- College/University - Academic (3)
- College/University - Split Appointment (4)

- Clinic/Hospital (5)
- Professional Sports (6)
- Emerging Settings (Military, Industrial, Performance Arts, etc.) (7)
- Other (Please Describe) (8) _____

Q8 The following questions are intended to describe your experiences with COVID-19. Please answer them to the best of your abilities.

Q9 Have you been diagnosed with COVID-19 at any point in the past 2 years?

- Yes (1)
- No (2)

Q10 Have you received a COVID-19 vaccination?

- Yes, Pfizer (1)
 - Yes, Moderna (2)
 - Yes, Johnson & Johnson (3)
 - Yes, Other (Please describe) (4) _____
 - No (5)
-

Q11 To what extent do you agree with this statement? I am confident in the level of authorization that has been awarded to COVID-19 vaccines in the United States.

- Strongly Agree (1)
- Agree (2)
- Somewhat Agree (3)
- Somewhat Disagree (4)
- Disagree (5)
- Strongly Disagree (6)

Q12 To what extent do you agree with this statement? I am more confident in the Pfizer vaccine now that it has received full FDA approval for individuals over the age of 16.

- Strongly Agree (1)
- Agree (2)
- Somewhat Agree (3)
- Somewhat Disagree (4)
- Disagree (5)
- Strongly Disagree (6)

Q13 If you have not received a COVID-19 vaccine, please share why you have not done so. If you have, please write "I have received the vaccine".

Q14 To what extent do you agree with the following question? In terms of general severity of symptoms, COVID-19 is just like the seasonal influenza disease.

- Strongly agree (1)
 - Agree (2)
 - Somewhat Agree (3)
 - Somewhat Disagree (4)
 - Disagree (5)
 - Strongly Disagree (6)
-

Q15 To what extent do you agree with the following question? In terms of general severity of symptoms, COVID-19 is worse than the seasonal influenza disease.

- Strongly Agree (1)
- Agree (2)
- Somewhat Agree (3)
- Somewhat Disagree (4)
- Disagree (5)
- Strongly Disagree (6)

Q16 To what extent do you agree with the following question? In terms of contagiousness, COVID-19 is just like the seasonal influenza disease.

- Strongly Agree (1)
- Agree (2)
- Somewhat Agree (3)
- Somewhat Disagree (4)
- Disagree (5)
- Strongly Disagree (6)

Q17 To what extent do you agree with the following question? In terms of contagiousness, COVID-19 is worse than the seasonal influenza disease.

- Strongly Agree (1)
 - Agree (2)
 - Somewhat Agree (3)
 - Somewhat Disagree (4)
 - Disagree (5)
 - Strongly Disagree (6)
-

Q18 Have you had someone close to you hospitalized with COVID-19?

- Yes (1)
- No (2)

Q19 Has someone close to you passed away from COVID-19?

- Yes (1)
- No (2)

Q20 To what extent do you agree with this statement? I am concerned about COVID-19 from the standpoint of my patient population's health.

- Strongly Agree (1)
- Agree (2)
- Somewhat Agree (3)
- Somewhat Disagree (4)
- Disagree (5)
- Strongly Disagree (6)

Q21 To what extent do you agree with this statement? I am concerned about COVID-19 from the standpoint of disrupting the competition season for my patient population.

- Strongly Agree (1)
- Agree (2)
- Somewhat Agree (3)
- Somewhat Disagree (4)
- Disagree (5)
- Strongly Disagree (6)

Q22 To what extent do you agree with this statement? I am more concerned about COVID-19 affecting the health of my patient population rather than affecting their competition season.

- Strongly Agree (1)
 - Agree (2)
 - Somewhat Agree (3)
 - Somewhat Disagree (4)
 - Disagree (5)
 - Strongly Disagree (6)
-