

Impact of Collegiate Football Games on Emergency Response Intervals: A Case Study of College Station, Texas (USA)

Christine Crudo Blackburn,^{1,2}  Mayra Rico²

1. Department of Health Policy and Management, School of Public Health, Texas A&M University, College Station, Texas, USA
2. USA Center for Rural Public Health Preparedness, School of Public Health, Texas A&M University, College Station, Texas, USA

Correspondence:

Christine Crudo Blackburn
Department of Health Policy and Management
School of Public Health
Texas A&M University
212 Adriance Lab Road
College Station, Texas 77843 USA
E-mail: cbblackburn@tamu.edu

Conflicts of interest: The authors report there are no competing interests to declare.

Keywords: college football; emergency response intervals; EMS; prehospital care

Abbreviations:

ALS: Advanced Life Support
CSFD: College Station Fire Department
EMS: Emergency Medical Services
HGW: home game weekend
MGE: mass-gathering event
NHGW: non-home game weekend
SEC: Southeastern Conference
TAMU: Texas A&M University

Received: February 20, 2024

Revised: April 15, 2024

Accepted: April 18, 2024

doi:[10.1017/S1049023X24000487](https://doi.org/10.1017/S1049023X24000487)

© The Author(s), 2024. Published by Cambridge University Press on behalf of World Association for Disaster and Emergency Medicine.

Abstract

Objectives: Little is known about how mass gatherings affect emergency response intervals. Previous research suggests that college football games increase ambulance transport intervals, but their impact on emergency response intervals is unexplored. This study examines how collegiate home football games in College Station, Texas (USA) affect emergency vehicle response intervals.

Methods: The study determined the impact of collegiate football games on emergency response intervals using incident data provided by the College Station Fire Department (CSFD). Home games during the 2021–2023 Texas A&M University (TAMU) football seasons were the period of interest. Responses for a 72-hour period (Friday–Sunday) on home game weekends (HGWs) and non-home game weekends (NHGWs) were included (n = 5,095).

Results: Response intervals on football HGWs were an average of 30 seconds faster than on NHGWs. Emergency vehicles were 16.5% less likely to respond from fire station locations on HGWs compared to NHGWs. There was also a 12.1% increase in the number of calls to campus locations and a 9.7% increase in calls to the local entertainment district on HGWs compared to NHGWs.

Conclusions: Home collegiate football games do not delay response intervals for emergency response vehicles. Further research is needed to determine if these findings can be reproduced in other communities.

Blackburn CC, Rico M. Impact of collegiate football games on emergency response intervals: a case study of College Station, Texas (USA). *Prehosp Disaster Med.* 2024;39(3):270–274.

Introduction

Texas A&M University (TAMU; College Station, Texas USA) ranked third in the nation for gameday attendance in 2022 with an average of 97,213 fans per game.¹ The university's five-year average game attendance sits at 84,455 fans per game.¹ The population of College Station, Texas is just over 120,500 people,² meaning the number of people in College Station swells on home game weekends (HGWs), creating the potential for increased stress on local health services.

Mass-gathering events (MGEs) have been shown to divert the needs of the local community in order to accommodate individuals attending the event.³ They can also lead to increased workloads for local Emergency Medical Services (EMS) and create “hotspots” in which most calls originate.⁴ Studies conducted in Europe found that major soccer tournaments have led to small increases in emergency department visits⁵ and increased medical costs incurred by the host city.⁶ Several studies have found, however, that staging EMS personnel or other medical professionals at the location of an MGE can reduce the number of ambulance transports.^{7–12}

There are few studies, however, that examine how MGEs impact external health services such as ambulances and hospitals.¹³ Additionally, there is limited research on how college football games affect community health services. Studies that have addressed the intersection of college football games and medical care primarily focus on the provision of medical care inside the football stadium.^{14,15}

Of those studies examining how college football games affect health services, one found that allowing alcohol sales in the stadium led to a decrease in alcohol-related calls to the local EMS service.¹⁶ Another study assessed how football games at West Virginia University

(Morgantown, West Virginia USA) affected transport to the local hospital and determined that transport intervals were longer on HGWs, demonstrating an impact of home college football games on access to health services for community members.¹⁷

While these findings lend important understanding to how MGEs can affect medical personnel and access to community health services, there remains a significant gap in the literature. No studies have examined how college football games affect emergency response intervals. Understanding the impact of home football games on emergency vehicle response intervals is critical because faster response intervals increase chances of patient survival.^{18–20} Previous research hypothesized that on-site staging of medical personnel is important because college football games are likely to lead to delays in EMS response,¹⁵ but this claim is yet to be investigated. This study aims to address this gap by examining how TAMU home football games during the 2021–2023 college football seasons were related to response intervals of emergency response vehicles from the College Station Fire Department (CSFD; College Station, Texas USA).

Methods

The CSFD is a municipal, fire-based 9-1-1 first response, Advanced Life Support (ALS), transport EMS system. This means that the EMS service is supported by the city government rather than a private or for-profit entity. The EMS service is integrated into the fire department, and it responds to 9-1-1 calls rather than scheduled transports. Additionally, as a first response EMS system, the ambulance is an initial responder rather than responding only if another responder such as fire or the police deem the ambulance necessary. As an ALS system, all ambulances in the CSFD have ALS capabilities. Lastly, CSFD transports their own patients, rather than relying on other ambulance services to do so.

A retrospective analysis was conducted of CSFD incident data for TAMU HGWs and non-home game weekends (NHGWs) from 2021–2023. Home games served as the period of interest and non-home games served as the control period to determine how home football games affect emergency response intervals. Call times, dispatch times, scene arrival times, dispatch locations, response areas, and game data, specifically whether the opposing team belonged to the Southeastern Conference (SEC), were collected for a 72-hour period (12:00AM Friday to 11:59PM Sunday) on HGWs and NHGWs during the 2021–2023 football seasons. During the study period, there were 20 HGWs and 20 NHGWs. Of the game weekends, 11 game weekends involved games against SEC opponents, which include flagship public universities with large student populations and are in-conference games for TAMU.

Incidents with response intervals of zero were eliminated from analysis, as were incidents that lacked timestamps for vehicle dispatched, vehicle enroute, and on-scene arrival. Only data on the first unit response were analyzed to determine emergency response intervals. This resulted in 5,095 incident observations utilized for analysis. Data were analyzed using STATA 17 (StataCorp; College Station, Texas USA). Descriptive statistics were performed to determine response intervals by calculating the difference between vehicle dispatch and vehicle on-scene arrival timestamps. Means were estimated and hypothesis tests performed using logistic regression models. For all tests, a $P < .05$ was considered statistically significant.

Game Weekend	Time
Dispatch time	–0.03 ^a
	(0.00)
Response Area	
<i>Outside City</i>	<i>Ref</i>
<i>Campus</i>	0.00
	(0.04)
<i>North Districts</i>	–0.02
	(0.02)
<i>Northgate</i>	–0.04
	(0.03)
<i>South Districts</i>	–0.01
	(0.02)

Blackburn © 2024 Prehospital and Disaster Medicine

Table 1. Dispatch Times for Home Game Weekends versus Non-Home Game Weekends

Notes: Cell entries represent logistical regression models with standard errors in parentheses. Times represented on a scale of 0–1 with 1 representing 1 full minute.

^a $P < .01$.

Game Weekend	Time
Response Time	–0.02 ^a
	(–0.0)
Response Area	
<i>Outside City</i>	<i>Ref.</i>
<i>Campus</i>	0.11 ^a
	(0.04)
<i>North Districts</i>	–0.01
	(0.03)
<i>Northgate</i>	–0.05
	(0.03)
<i>South Districts</i>	0.06
	(0.04)

Blackburn © 2024 Prehospital and Disaster Medicine

Table 2. Campus Stations Response Intervals on Home Game Weekends

Notes: Cell entries represent logistical regression models with standard errors in parentheses. Times represented on a scale of 0–1 with 1 representing 1 full minute.

^a $P < .01$.

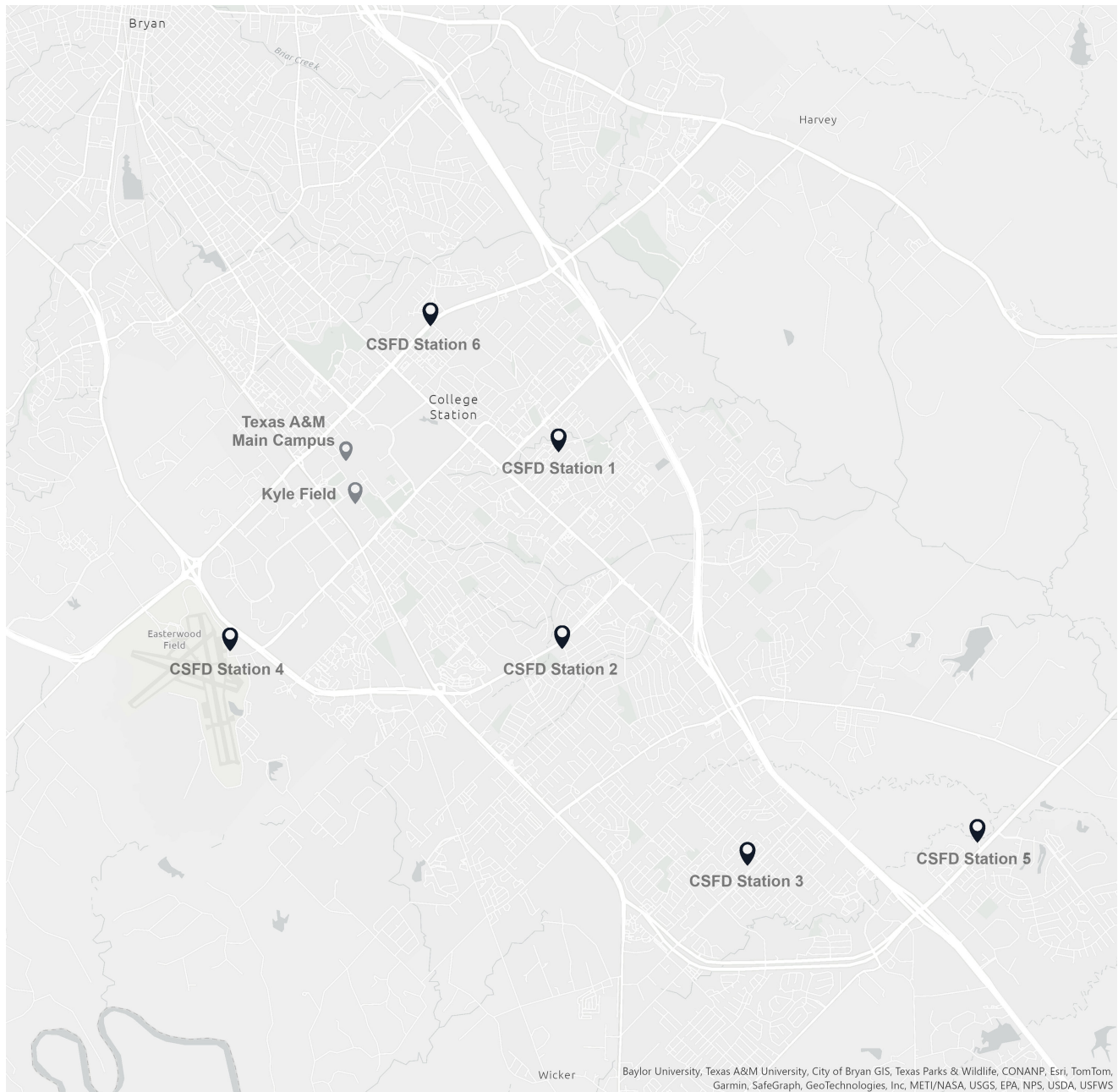
Results

Emergency Response Intervals

Average response time for HGWs was five minutes twelve seconds and response intervals on NHGWs was five minutes and forty-two seconds. When HGWs in which TAMU competed against an SEC opponent were compared to HGWs in which the opponents were not from the SEC, there was no statistically significant difference in response intervals.

Dispatch Intervals and Locations

Average dispatch intervals, defined as the time between the vehicle dispatched and vehicle enroute timestamps, was 2.4 seconds faster on HGWs compared to NHGWs (Table 1).



Blackburn © 2024 Prehospital and Disaster Medicine

Figure 1. Map of CSFD Locations.

Abbreviation: CSFD, College Station Fire Department.

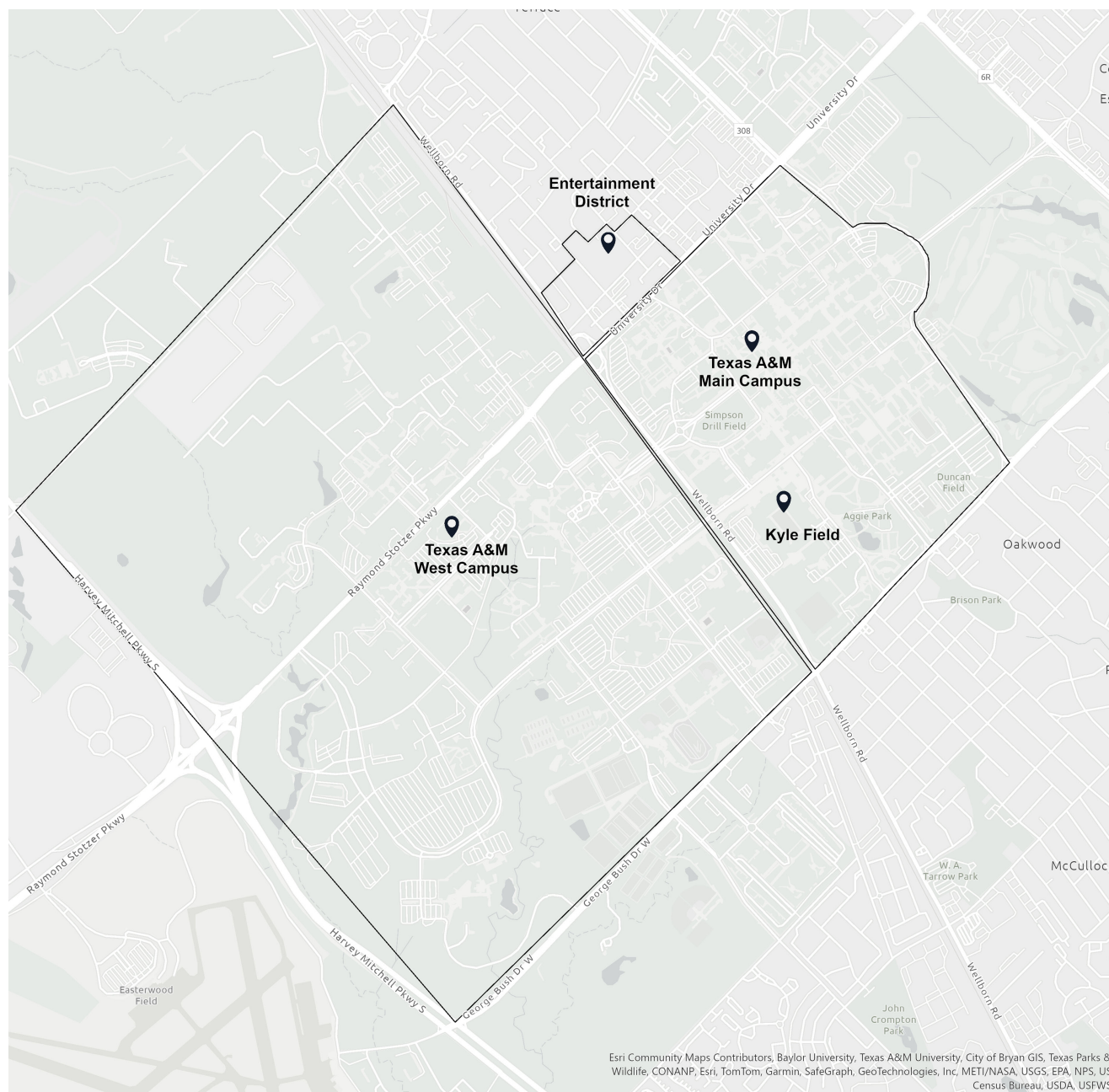
On HGWs, there was a 16.5% decrease in vehicles dispatched from fire department stations. Instead, vehicles often responded to a call from an “off-site” location (Table 2). On weekends in which the game was against an SEC opponent, vehicles were 21.1% less likely to be dispatched from fire department stations.

For vehicles dispatched from fire department stations on HGWs, response intervals were 43.8 seconds slower than those of units dispatched from non-station locations. On HGWs in which the game was against an SEC opponent, response intervals from station locations were 33 seconds slower compared to HGWs in which the opponent was not an SEC team.

Fire Station Locations

Differences in responses based on station location were also identified. Stations located near the university campus and those responding from off-site (ie, non-station) locations had response intervals 1.2 seconds slower than response intervals from stations located further from the university campus (ie, campus stations). On HGWs, however, stations near the university campus and responses from off-site locations had response intervals 0.48 seconds faster than stations located further from campus (Table 2).

These campus stations and non-campus stations are described in Figure 1. Additionally, campus stations had an average response time 0.86 seconds faster on HGWs than on NHGWs.



Blackburn © 2024 Prehospital and Disaster Medicine

Figure 2. Map of Texas A&M University Campus and Entertainment District.

Interestingly, campus stations responded more slowly to calls on campus on HGWs compared to calls outside of the city limits (Table 2).

Home Game Impacts on Response Area

Home football games affected the areas that emergency personnel responded to within College Station (Figure 2). On HGWs, responses to areas located on the TAMU campus increased 12.1% and responses to the entertainment district increased by 9.7%. When the game was against an SEC opponent, responses to areas on campus increased by 10.6% and responses to the entertainment district increased by 21.4% compared to game weekends in which the opponent was not an SEC team.

Discussion

The CSFD response intervals on HGWs were 30 seconds faster than response intervals on NHGWs. The faster response intervals suggest that MGEs do not necessarily impede emergency care access and suggests that assumptions in the literature are not supported. A potential factor of faster response intervals on HGWs compared to NHGWs may be the lower likelihood that emergency response vehicles will be dispatched from a fire station. These findings show that response intervals are *slower* on HGWs for response vehicles dispatched from fire stations, however response vehicles are dispatched less frequently from fire stations on HGWs. This suggests that the ability to respond more quickly on HGWs may be due to off-site dispatch locations. While all observations in

which response time was equal to zero were eliminated, it is possible that ambulance staging on HGWs contributed to the finding of faster response intervals.

It was found that response intervals at “campus stations,” or those located closest to the university campus, experienced significantly faster response intervals. This analysis showed that a greater percentage of emergency calls came from the university campus and the nearby entertainment district on HGWs compared to NHGWs. It was noted, however, that campus stations responded more slowly to calls from campus compared to calls outside the city limits on HGWs. This may be due to the fact that campus station locations are primarily on the northern boundary of the city giving them an increased ability to respond to requests for help from the neighboring city of Bryan. Conversely, this could indicate that the influx of people onto the physical campus at TAMU reduces response time for that specific response location, despite not having an overall impact on the surrounding community.

Limitations

This study has several limitations. Data on CSFD staffing or staging of emergency vehicles on HGWs compared to NHGWs were not known. Therefore, it is not possible to know what role

these played in response time outcomes. Additionally, this study only collected data from one community, meaning that the results of this study cannot be generalized to other communities. Despite this limitation, however, the study offers important insights into the effect of mass-gathering sporting events on community emergency care access.

Conclusion

These findings suggest that mass-gathering sporting events do not result in slower emergency vehicle response intervals. As discussed, the CSFD maintained emergency care access on HGWs and responded faster to emergency calls. This suggests that CSFD’s preparedness for HGWs and their understanding of call location trends may prevent delays and ensure unaffected emergency care access for the community.

Acknowledgements

The authors would like to acknowledge Stuart Marrs, Richard Mann, and the rest of the College Station Fire Department for sharing their incident data and taking the time to answer data-related questions. They would also like to thank Hannah Rochman and Alea Lockman for their guidance during data analysis.

References

- College Football News. College Football Attendance Rankings: 2023 CFN Five-Year Program Analysis. Published April 21, 2023. <https://collegefootballnews.com/rankings/college-football-attendance-rankings-2023-five-year-program-analysis>. Accessed January 15, 2024.
- US Census Bureau. QuickFacts – College Station city, Texas. Published July 1, 2023. <https://www.census.gov/quickfacts/fact/table/collegestationcitytexas/PST045223>. Accessed January 15, 2024.
- Martin-Gill C, William B, Barlotta K, et al. Hospital-based healthcare provider (nurse and physician) integration into an emergency medical services-managed mass-gathering event. *Amer J Emerg Med*. 2007;25(1):15–22.
- Koski A, Pappinen J, Kouvonon A, Nordquist H. Preparedness for mass gatherings: rescue and emergency medical services’ workloads during mass gathering events. *Scand J Trauma Resus Emerg Med*. 2022;30(1):15.
- Hughes HE, Colon-Gonzalez FJ, Fouillet A, et al. The influence of a major sporting event upon emergency department attendances: a retrospective cross-national European study. *PLoS One*. 2018;13(6):e0198665.
- Martinolli L, Tanyeli E, Hasler RM, et al. A million football fans in a city of 120,000 inhabitants – a nightmare for emergency medicine and disaster management? Euro 2008 and the “Orange wonder of Berne.” *Der Unfallchirurg*. 2011;114(1):35–40.
- Grange JT, Baumann GW, Vaezazizi R. On-site physicians reduce ambulance transports at mass gatherings. *Prehosp Emerg Care*. 2003;7(3):322–326.
- Boyle MF, De Lorenzo RA, Garrison R. Physician integration into mass gathering medical care. The United States Air Show. *Prehosp Disaster Med*. 1993;8(2):165–168.
- Castro-Marin F, Maher S, Navarro T, et al. Impact of a mass gathering alcohol sobering facility on emergency response. *Prehosp Emerg Care*. 2018;22(3):326–331.
- Kemp AE. Mass-gathering events: the role of advanced nurse practitioners in reducing referrals to local health care agencies. *Prehosp Disaster Med*. 2016;31(1):58–63.
- Spaepen K, Cardinas R, Haenen WAP, Kaufman L, Hubloue I. The impact of in-event health services at Europe’s largest electronic dance music festival on EMS and ED in the host community. *Int J Environ Res Public Health*. 2023;20(4):3207.
- Boyle MF, De Lorenzo RA, Garrison R. Physician integration into mass gathering medical care. The United States Air Show. *Prehosp Disaster Med*. 1993;8(2):165–168.
- Ranse J, Hutton A, Keene T, et al. Health service impact from mass gatherings: a systematic literature review. *Prehosp Disaster Med*. 2017;32(1):71–77.
- Shelton S, Haire S, Gerard B. Medical care for mass gatherings at collegiate football games. *South Med J*. 1997;90(11):1081–1083.
- Sampson CS, Maberry MD, Stille JA. Football Saturday: are collegiate football stadiums adequately prepared to handle spectator emergencies? *J Sports Med Phys Fit*. 2024;64(1):73–77.
- Ruehlmann D, Halbur C, Moylan C, Georgakakos P, Negaard M, House H. The impacts of alcohol sales in a college football stadium on healthcare utilization. *West J Emerg Med*. 2023;24(2):210–217.
- Bonasso P, Lucke-Wold BP, Riffon M, Long D, Wilson A, Knight J. The effect of sporting events on medical transport time at a Level 1 Trauma Center: a retrospective cohort study. *West Virginia Med J*. 2017;113(3):44–51.
- Holmen J, Herlitz J, Ricksten SE, et al. Shortening ambulance response time increases survival in out-of-hospital cardiac arrest. *J Amer Heart Assoc*. 2020;9(21):e017048.
- Blackwell TH, Kaufman JS. Response time effectiveness: comparison of response time and survival in an urban emergency medical services system. *Acad Emerg Med*. 2002;9(4):288–295.
- Byrne JP, Mann NC, Dai M, et al. Association between emergency medical service response time and motor vehicle crash mortality in the United States. *JAMA Surg*. 2019;154(4):286–293.