

REVIEW ARTICLE

Physician Wellness

Emergency physician risk of occupational mortality: A scoping review

Craig Goolsby MD, MEd^{1,2}  | Vidya Lala BS³ | Riley Gebner BS³ |
 Nicole Dacuyan-Faucher MPH^{2,4} | Nathan Charlton MD⁵ | Keke Schuler PhD^{2,4}

¹ Department of Military and Emergency Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA

² National Center for Disaster Medicine and Public Health, Rockville, Maryland, USA

³ School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA

⁴ The Henry M Jackson Foundation for the Advancement of Military Medicine, Inc., Rockville, Maryland, USA

⁵ Department of Emergency Medicine, University of Virginia, Charlottesville, Virginia, USA

Correspondence

Craig Goolsby, MD, MEd, Department of Military and Emergency Medicine, Uniformed Services, University of the Health Sciences, Bethesda, MD, National Center for Disaster Medicine and Public Health, Rockville, MD, USA.

Email: craig.goolsby@usuhs.edu

Funding and support: By *JACEP Open* policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article as per ICMJE conflict of interest guidelines (see www.icmje.org). The authors have stated that no such relationships exist.

Abstract

Background: Occupational hazards for emergency physicians are widely known, but the risk of work-related mortality is not clear. The COVID-19 pandemic generated new concerns about the risk of occupational mortality, particularly in the setting of inadequate personal protective equipment. The perception of increased risk generated ethical concerns regarding emergency physicians' duty to treat and employers' duty to protect their employees. We performed this scoping review to define prepandemic emergency physician occupational mortality.

Methods: We performed a scoping review of peer-reviewed publications from PubMed, EMBASE, and Cochrane databases in September 2020.

Results: Of the 747 unique articles identified in the 3 databases, 1 article met inclusion criteria and was included in the final analysis.

Conclusion: The baseline risk of occupational mortality for emergency physicians is not established in the scientific literature. Further study is needed to quantify risk, as this information would be useful to shape policy and ethical considerations.

KEYWORDS

duty to treat, emergency physician death, occupational mortality, occupational risk, workplace injury

1 | INTRODUCTION

1.1 | Background

Emergency physicians routinely face occupational safety hazards that differ markedly from those faced by workers in most other occupations, as well as those faced by most adults in everyday life. The

occupational hazards that emergency physicians face include the following: infectious disease, workplace violence, deleterious effects of night shifts, heightened risk of substance abuse, injury from driving while fatigued, and mental illness, among others.¹⁻³ These hazards can lead to morbidity and, in some cases, mortality.^{4,5} However, the actual risk of *occupational mortality* for emergency physicians is unclear.

Supervising Editor: Nathan Hoot, MD, PhD.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *JACEP Open* published by Wiley Periodicals LLC on behalf of American College of Emergency Physicians

1.2 | Importance

We performed this scoping review to assess the baseline, prepandemic occupational mortality risk for practicing emergency physicians. A clear understanding of emergency physician occupational risk and mortality is important for several reasons. Emergency physicians need to understand risk in order to make informed decisions about their own self-preservation and well-being in the workplace. Employers must understand the risks faced by their employed emergency physicians in order to enact policies that can mitigate those hazards and improve workplace safety. For example, the installation of metal detectors is inconsistent between hospitals nationwide.⁶ Without a clear understanding of risks, especially of the specific risk of occupational mortality faced by emergency physicians and other emergency department staff, there can be conflicting arguments made both for and against metal detectors. Would a better understanding of hazards and risk decrease turnover and improve well-being by allowing emergency physicians and employers to implement hazard countermeasures commensurate with the risk level?

1.3 | Goals of this investigation

Beyond facilitating hazard mitigation strategies for emergency physicians and employers, an accurate understanding of baseline occupational risk and mortality would inform important ethical considerations that affect society as a whole. Early in the COVID-19 pandemic, an inadequate supply of personal protective equipment (PPE) for health-care workers placed a spotlight on the balance between an emergency physician's duty to treat and the personal risk a physician should accept while performing work-related duties.⁷⁻⁹ Medical societies, such as the American College of Emergency Physicians (ACEP), issued statements that discussed the risks physicians face in general terms without supporting details. For example, on March 14, 2020 ACEP's president, wrote that, "as emergency physicians, we know the risks of our calling," without clarifying information about those risks.⁵ The pandemic forced an examination of such questions as how much additional occupational mortality risk should an emergency physician accept in the performance of his or her job, what duty does an employer have to protect physician employees from harm in the workplace, and what breaches of an employer's duty to protect emergency physicians might justify a physician's refusal to work.¹⁰ As the findings of this review show, we need further data to be able to answer questions like these.

2 | METHODS

2.1 | Design

We conducted a scoping review of peer-reviewed scientific publications according to an established framework, and results are reported according to the Preferred Reporting Items for Systematic reviews

and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.^{9,10} The study addressed the following research question: what was the pre-COVID-19 pandemic risk of occupational mortality for practicing emergency physicians?

2.2 | Selection of studies

We performed searches on September 16, 2020, using the following 3 databases: PubMed, EMBASE, and Cochrane. The inclusion criteria were peer-reviewed publications written in English, published in 2010 or later, and reporting mortality data of emergency physicians (including emergency medicine residents) in the United States. Studies were excluded if they were guideline publications, observational or descriptive reports, or did not provide quantifiable data.

We selected the 2010 cutoff date in order to understand the most current prepandemic baseline risk. We excluded older articles because they might overestimate risks that have modern mitigation available, such as postexposure prophylaxis for HIV exposure. Furthermore, older articles might not fully reflect current threats, like worsened gun violence. For this study, we opted not to consider suicides as an occupational mortality. This should not imply that mental illness, including posttraumatic stress disorder, depression, and suicide, are not occupational risks or causes of occupational mortality.^{1,2} Rather, it reflected our research team's concern about being able to classify accurately an emergency physician's suicide as wholly, partially, or not due to occupational exposure.

2.3 | Data extraction

Titles and abstracts were independently screened by 2 study team members, with a third study team member serving as a tiebreaker. Abstracts that met inclusion criteria underwent independent full-text review by 2 study team members with a third reviewer serving as a tiebreaker.

2.4 | Data synthesis

The literature search yielded a total of 747 unique articles (Appendix 1, Figure 1). After abstract screening, 102 articles underwent full-text review (Figure 1).

3 | RESULTS

One publication met criteria for inclusion in the final analysis. The single article included in the analysis discussed hospital-based shootings from 2000 to 2011.⁴ The study showed that nearly one third of all hospital shootings occurred either inside or directly outside the ED. Shootings inside the ED accounted for 70% of all ED-related events, and shootings in the ED parking lot, ambulance ramp, or outside walkways

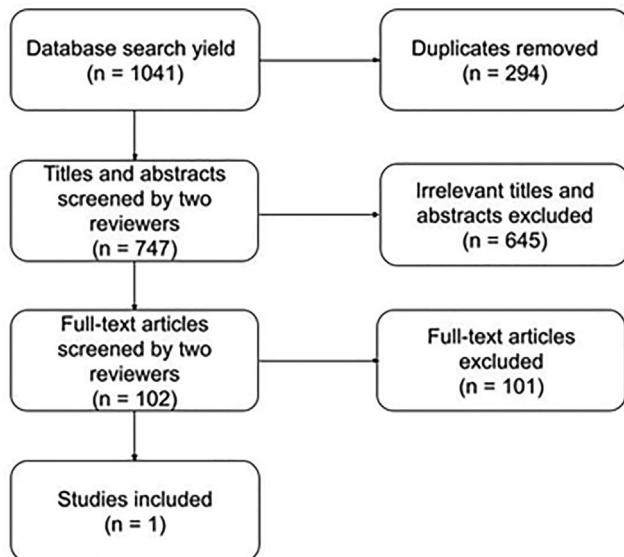


FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram

accounted for 30%. Of those injured and killed inside the ED, 1 person (3%) was a physician. The article did not specify if the physician killed in the ED was an emergency physician. For the purposes of this analysis, we assumed this physician to be an emergency physician.

4 | LIMITATIONS

This scoping review has several limitations. First, we included studies in scientific, peer-reviewed publications, and did not include information from grey literature sources. In designing the study methodology, we consulted several publicly available grey literature sources such as Occupational Safety and Health Administration and Centers for Disease Control and Prevention reports. We did not find data specific to emergency physicians and decided to limit the scoping review to the scientific literature that might address our questions about emergency physician mortality directly. As a scoping review, this study does not provide an assessment of the quality of included studies. Because there is only 1 included study this choice of methodology, this limitation likely had little practical impact. Finally, we limited our search to studies performed in the United States, and our results may not be generalizable to other countries.

5 | DISCUSSION

In this review, the baseline risk of occupational related mortality for emergency physicians could not be determined. Only 1 scientific article reported a physician occupational death due to work in the ED. Although the scientific literature did not contain information about pre-pandemic emergency physician occupational deaths, it is important to note that there are now multiple lay media reports of emer-

gency physicians dying from occupational exposure to COVID-19. For example, on April 9, 2020, Kaiser Health News reported the death of New York City-based Dr. Frank Gabrin, America's first emergency physician to die from COVID-19, and a July 2020 study reported 278 COVID-19 physician deaths globally.^{11,12}

The beginning of the COVID-19 pandemic raised ethical concerns regarding a physician's duty to treat patients when adequate PPE is not available and when an increased risk of occupational mortality likely exists. The ACEP 2017 *Code of Ethics for Emergency Physicians* states, "courage is the ability to carry out one's obligations despite personal risk or danger. Emergency physicians exhibit courage when they assume personal risk to provide steadfast care for all emergency patients, including those who are agitated, violent, infectious, and the like."¹³ Despite this code of ethics, before the COVID-19 pandemic only about half of physicians and nurses said they would report to work during an epidemic.¹⁴ Although emergency and acute care workers reported a greater likelihood of staying at work than other specialties, there is substantial variability in physicians' plans to work when faced with increased personal risk.¹⁴

Several studies provided useful background information about workplace-related threats in the ED, including violence, physical assault, sharps injuries, and infectious disease transmission. For example, data from 88 hospital shootings from 2012 to 2016 showed that 30.3% of the shootings happened in an ED, which equates to about 5.4 ED shootings per year during that time frame.¹⁵ In addition, about 78% of emergency physicians experienced at least 1 violent act over a 1-year period, with 21% of those incidents being physical assault.¹⁶ Beyond violence, a study showed that 55%–70% of emergency physicians experienced at least 1 needlestick, and that many (44%) of the 171 sharp injuries in an ED during a 4-year period were suffered by physicians.¹⁷ The risk of infection transmission among healthcare workers was also high during public health outbreaks (eg., the 2009 H1N1 pandemic, the SARS, and Middle East respiratory syndrome outbreak), underscoring the importance of proper PPE. During the first wave of the H1N1 pandemic, Kumar et al reported that 18.5% of ED healthcare workers were seropositive for H1N1.¹⁸ Multiple studies also report significant mental health risks to emergency physicians because of unique occupational stressors.^{1,2}

Although the scientific literature characterizes many of the occupational risks emergency physicians face, this study demonstrates a gap in knowledge about the specific threat of death from an occupational-related cause. A more detailed, granular understanding of the risk of an occupational-related death could help emergency physicians make difficult decisions when faced with future changing threats. For example, early in the COVID-19 pandemic, some emergency physicians faced difficult moral decisions about treating patients without adequate PPE. Knowing the pre-pandemic occupational mortality risk compared to the presumed increased danger from COVID-19, or another future threat, could allow emergency physicians to make informed decisions about how much additional personal risk they are willing to accept in performing their jobs. This knowledge could also allow employers and policymakers to understand the magnitude of danger faced by emergency physicians and how to prioritize mitigation strategies.

The baseline risk of occupational mortality for emergency physicians is not established in the scientific literature. Further study is needed to quantify emergency physicians' occupational risk. An understanding of typical risk would help emergency physicians, administrators, and policymakers understand increased risk during times of heightened risk. The information could help shape future policy decisions and ethical considerations.

ACKNOWLEDGMENTS

US Department of Defense grant to the National Center for Disaster Medicine & Public Health, titled "Core Support—National Center for Disaster Medicine and Public Health (NCDMPH)." This article is the opinion of the authors and not the official policy or position of the Uniformed Services University, Department of the Army, Defense Department, or US Government.

AUTHOR CONTRIBUTIONS

Study conception and design: CG, VL, RG, NDF, NC, KS. Acquisition of data: VL, RG, NDF, KS. Analysis and interpretation of data: CG, VL, RG, NC, KS. Drafting of manuscript: CG, VL, RG, NDF, NC, KS. Critical revision: CG, NC, KS.

CONFLICTS OF INTEREST

None.

ORCID

Craig Goolsby MD, MEd  <https://orcid.org/0000-0001-9929-8764>

REFERENCES

- Somville FJ, De Gucht V, Maes S. The impact of occupational hazards and traumatic events among Belgian emergency physicians. *Scand J Trauma Resusc Emerg Med.* 2016;24(1):1-10.
- Gallery ME, Whitley TW, Klonis LK, Anzinger RK, Revicki DA. A study of occupational stress and depression among emergency physicians. *Ann Emerg Med.* 1992;21(1):58-64.
- Dorevitch S, Forst L. The occupational hazards of emergency physicians. *Am J Emerg Med.* 2000;18(3):300-311.
- Kelen GD, Catlett CL, Kubit JG, Hsieh YH. Hospital-based shootings in the United States: 2000 to 2011. *Ann Emerg Med.* 2012;60(6):790-798. e791.
- Physicians ACoE. *Two Emergency Physicians in Critical Condition.* Physicians ACoE; 2020.
- Krywko DM. *Time to Put Negative Perceptions of Metal Detectors to Rest.* In ACEP Now. 2020.
- Centers for Disease Control and Prevention. *FAQs on Shortages of Surgical Masks and Gowns During the COVID-19 Pandemic.* Centers for Disease Control and Prevention; 2020.
- Medicine AAoE. *AAEM Position Statement on Protections for Emergency Medicine Physicians during COVID-19.* Medicine AAoE; 2020.
- Berger D. *Please Stop Calling Healthcare Workers 'Heroes'. It's Killing us.* The Sydney Morning Herald; 2020.
- Occupational Safety and Health Administration. *Workers' Right to Refuse Dangerous Work.* Occupational Safety and Health Administration; 2020.
- Gee A. *Baby, I Can't Breathe': America's First ER Doctor To Die In The Heat Of COVID-19 Battle.* Kaiser Health News. 2020.
- Ing E, Xu Q, Salimi A, Torun N. Physician deaths from corona virus (COVID-19) disease. *Occup Med.* 2020;70(5):370-374.

- American College of Emergency Physicians. *Code of Ethics for Emergency Physicians - Policy Statement.* American College of Emergency Physicians; 2017.
- Iserson KV. Must i respond if my health is at risk? *J Emerg Med.* 2018;55(2):288-293.
- Wax JR, Cartin A, Craig WY, Pinette MG. U.S. acute care hospital shootings, 2012–2016: a content analysis study. *Work.* 2019;64(1):77-83.
- Behnam M, Tillotson RD, Davis SM, Hobbs GR. Violence in the emergency department: a national survey of emergency medicine residents and attending physicians. *J Emerg Med.* 2011;40(5):565-579.
- Wilson SP, Miller J, Mahan M, Krupp S. The Urban emergency department: a potential increased occupational hazard for sharps-related injuries. *Acad Emerg Med.* 2015;22(11):1348-1350.
- Kumar S, Fan J, Melzer-Lange M, et al. H1N1 hemagglutinin-inhibition seroprevalence in emergency department health care workers after the first wave of the 2009 influenza pandemic. *Pediatr Emerg Care.* 2011;27(9):804-807.

How to cite this article: Goolsby C, Lala V, Gebner R, Dacuyan-Faucher N, Charlton N, Schuler K. Emergency physician risk of occupational mortality: A scoping review. *JACEP Open.* 2021;2:e12554.

<https://doi.org/10.1002/emp2.12554>

APPENDIX 1: SEARCH STRINGS

PubMed

("emergency medicine"[tiab] OR emergency department*[tiab] OR "emergency room"[tiab] OR emergency physician*[tiab] OR emergency doctor*[tiab]) AND (physician*[tiab] OR doctor[tiab] OR doctors[tiab] OR provider*[tiab] OR residents[tiab] OR "healthcare personnel" OR "healthcare workers"[tiab] OR "health care personnel" OR "health care workers") AND ("Accidents, Occupational"[mh] OR "Occupational Injuries"[mh] OR "Occupational Exposure"[mh] OR "Infectious Disease Transmission, Patient-to-Professional"[mh] OR "Workplace Violence"[mh] OR workplace death*[tiab] OR workplace infection*[tiab] OR "workplace violence"[tiab] OR homicide*[tiab] OR occupational hazard*[tiab] OR occupational accident*[tiab] OR occupational exposure*[tiab] OR transmission[ti] OR "disease transmission"[tiab] OR "infection transmission"[tiab] OR "transmission risk"[tiab]) AND english[lang].

Embase

(emergency-medicine OR emergency-department* OR emergency-room OR emergency-physician* OR emergency-doctor*):ab,ti AND (physician* OR doctor OR doctors OR provider* OR residents OR healthcare-personnel OR healthcare-workers OR health-care-personnel OR health-care-workers):ab,ti AND ("occupational accident"/exp OR "occupational exposure"/exp OR "disease transmission"/exp OR "workplace violence"/exp OR (workplace-death* OR workplace-infection* OR workplace-violence OR homicide* OR occupational-hazard* OR occupational-accident* OR

occupational-exposure* OR disease-transmission OR infection-transmission OR transmission-risk):ab,ti OR transmission:ti).

Cochrane

(emergency-medicine OR emergency-department* OR emergency-room OR emergency-physician* OR emergency-doctor*).ab,ti. AND (physician* OR doctor OR doctors OR provider* OR residents

OR healthcare-personnel OR healthcare-workers OR health-care-personnel OR health-care-workers).ab,ti. AND (workplace-death* OR workplace-infection* OR workplace-violence OR homicide* OR occupational-hazard* OR occupational-accident* OR occupational-exposure* OR disease-transmission OR infection-transmission OR transmission-risk).ab,ti. OR transmission:ti).