



Absence and Need for Fatigue Risk Management in Emergency Medical Services

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To cite this article: P. Daniel Patterson & Christian Martin-Gill (2018) Absence and Need for Fatigue Risk Management in Emergency Medical Services, Prehospital Emergency Care, 22:sup1, 6-8, DOI: [10.1080/10903127.2017.1380101](https://doi.org/10.1080/10903127.2017.1380101)

To link to this article: <https://doi.org/10.1080/10903127.2017.1380101>



Published online: 11 Jan 2018.



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INTRODUCTION

ABSENCE AND NEED FOR FATIGUE RISK MANAGEMENT IN EMERGENCY MEDICAL SERVICES

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PREHOSPITAL EMERGENCY CARE 2018;22:6–8

Fatigue in the Emergency Medical Services (EMS) workplace is widespread. Reports of fatigue-related events that involve ambulance crashes, personnel injury, patient death, and other negative outcomes are on the rise (1–7). There is growing evidence that greater than half of EMS personnel report mental and physical fatigue while at work (8). Half of EMS personnel report poor sleep quality and half obtain less than six hours of sleep per 24-hour period (8). More than one third of EMS personnel report excessive daytime sleepiness (9), and half report not getting the recovery they need between shifts (10). Workplace fatigue is a threat to EMS patients, personnel, and the public.

Received August 3, 2017 from Emergency Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania (PDP); Department of Emergency Medicine, University of Pittsburgh Pittsburgh, Pennsylvania (CM-G). Revision received September 8, 2017; accepted for publication September 11, 2017.

Work performed on this manuscript was supported with funding from the U.S. Department of Transportation, National Highway Traffic Safety Administration to the National Association of State EMS Officials (NASEMSO): contract/grant number: DTNH2215R00029. The views contained in this article are those of the authors and not necessarily those of the National Highway Traffic Safety Administration.

Authors PDP and CMG contributed to the conception of this work, drafting of the manuscript, and providing critically important intellectual content. Both authors reviewed and approved the final version and agree to be accountable for all aspects of the work.

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doi: [10.1080/10903127.2017.1380101](https://doi.org/10.1080/10903127.2017.1380101)

On January 30, 2013, the National EMS Advisory Council (NEMSAC) adopted an advisory that recommended the National Highway Traffic Safety Administration (NHTSA) Office of EMS and federal partners disseminate evidence-based information to aid the EMS community in efforts to develop fatigue risk management programs (11). In 2015, NHTSA announced a funding opportunity aimed at developing evidence-based guidelines (EBGs) for fatigue risk management tailored to EMS. After a competitive process, the contract was awarded to the National Association of State EMS Officials and academic research partners at multiple institutions led by investigators from the University of Pittsburgh's School of Medicine, Department of Emergency Medicine. The scope of work was divided into three phases. Phase 1: Develop EBGs for fatigue risk management in the EMS setting; Phase 2: Completion of an experimental study to test the impact of adopting one or more recommendations resulting from phase 1; Phase 3: Development of a biomathematical model tailored to EMS shift workers.

This Supplement to *Prehospital Emergency Care* is devoted to the completion of Phase 1. This collection of research and guideline documents is substantial and includes seven individual systematic reviews (including three meta-analyses), a methodological paper, and two documents that describe EBGs for mitigating fatigue. Also included are suggested measures that EMS organizations may use to evaluate the adoption of these recommendations. The principal intent of these documents is to guide the decision-making of local and state level managers and administrators as they create, modify, and execute local programs for mitigating fatigue in the workplace.

This research represents a significant contribution to the scientific, academic, and broader community of EMS personnel, employers, and stakeholders. There are no known fatigue risk management guidelines informed by multiple and simultaneously conducted systematic reviews and meta-analyses on inter-related questions with overlapping outcomes. The project

team of more than two-dozen investigators and staff completed seven systematic reviews (and meta-analyses where feasible), reviewing more than 38,000 records (including journal articles, book chapters, conference abstracts, and related documents) (12). While the project's focus was on the EMS workforce and environment, the seven systematic reviews assessed research that involved shift workers in all types of shift work settings. The inclusion of evidence from diverse shift work settings was essential, as the body of research on fatigue that involves EMS personnel is extremely limited. A guideline development effort that restricted the retained research to only EMS personnel would be of minimal use and potentially a waste of resources. The research retained for purposes of this project provided valuable, informative, and significant contributions to the expert panel's deliberations regarding the evidence.

NHTSA, the project's principal funding partner, deserves credit for supporting past projects that established a framework and opportunity for this project on fatigue in EMS to become a reality. The NHTSA Office of EMS and its partners across North America established a framework that helped this project be successful. Specifically, the creation of the Model Process for Prehospital EBGs (13), multiple clinical prehospital EBGs (14–18), and the National Prehospital Evidence-Based Guidelines Strategy (19) demonstrate a commitment to the creation of protocols, policies, and standard operating procedures informed by the best available evidence. The NHTSA Office of Behavioral Safety Research has a far-reaching history of fatigue-related research in high-risk operations that has helped to stimulate interest in the problem of fatigue in EMS nationwide.

We are unaware of any prior effort to create fatigue risk management guidelines for first responders based on the processes and procedures outlined by the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology (20). This scientific process is in-line with ongoing efforts to create more evidence-based guidelines to inform EMS systems (19), and follows recommendations from NEMSAC (21) and the Federal Interagency Committee on EMS (22). Furthermore, while GRADE has been used multiple times for the creation of clinical prehospital EBGs, this effort provides a novel application of similar robust methodology to answer operational questions that impact EMS administrators and personnel on a daily basis. To improve the quality and safety of EMS, operational decisions must be informed by a systematic review of all available evidence, like clinical questions are guided by robust evidence-based methods.

Previous pioneers in fatigue and sleep research laid a foundation outlining an ongoing battle between the operational needs of EMS work (readiness 24/7) and the natural biology of human sleep and circadian

rhythms (23). Shiftwork is here to stay, and we will never completely eliminate the fatigue problem (24). What we can do is effectively manage it (23,24). The body of scientific work contained in this supplement, and the evidence-based guidelines resulting from it, are an important step forward in helping the EMS community address the critical and ubiquitous problem of fatigue.

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