

# Project Overview

## January 11, 2018

[Project web site: www.emsfatigue.org](http://www.emsfatigue.org)

# An Amazing Partnership to Improve Safety in EMS!

- National Highway Traffic Safety Administration (NHTSA)
  - Office of Behavioral Safety Research
  - Office of Emergency Medical Services
- National Association of State EMS Officials (NASEMSO)
- University of Pittsburgh (Pitt)
  - P. Daniel Patterson, PhD, NRP, Principal Investigator
- Institutes for Behavior Resources, Inc. (IBR)

Contract Number DTNH2215C00029

# Population of Interest

EMS personnel or similar worker groups, defined as shift workers whose job activity requires multiple episodes of intense concentration and attention to detail per shift, with serious adverse consequences potentially resulting from a lapse in concentration.

# November 2015 – November 2017

## The Fatigue in EMS Project

### PHASE 1

Develop Evidence-Based Guideline (EBG) for fatigue risk management in EMS

### PHASE 2

Test the impact of one or more evidence-based recommendations in an experimental study

### PHASE 3

Develop a biomathematical model tailored to EMS shift scheduling and make freely available



EMS is setting the bar: *There is no equivalent effort from any other high risk industry/occupation to improve worker fatigue.*

# Phase 1 Methodology Paper

## Published Spring 2017

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### EVIDENCE-BASED GUIDELINES FOR FATIGUE RISK MANAGEMENT IN EMS: FORMULATING RESEARCH QUESTIONS AND SELECTING OUTCOMES

P. Daniel Patterson, PhD, NRP, J. Stephen Higgins, PhD, Eddy S. Lang, MDCM, CCFP,  
Michael S. Runyon, MD, MPH, Laura K. Barger, PhD, Jonathan R. Studnek, PhD, NRP, Charity  
G. Moore, PhD, Kathy Robinson, RN, EMT-P, Dia Gainor, MPA, Allison Infinger, MSPH,  
Patricia M. Weiss, MLIS, Denisse J. Sequeira, BS, Christian Martin-Gill, MD

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Patterson et al., 2017 PMID-27858581

## Question #

## Research Questions That Guided Systematic Reviews

- 1 Are there reliable and valid instruments for measuring fatigue among EMS personnel?
- 2 In EMS personnel, do shift-scheduling interventions mitigate fatigue, mitigate fatigue-related risks, and/or improve sleep?
- 3 In EMS personnel, does the worker's use of fatigue countermeasures mitigate fatigue, mitigate fatigue-related risks, and/or improve sleep?
- 4 In EMS personnel, does the use of sleep or rest strategies and/or interventions mitigate fatigue, mitigate fatigue-related risks, and/or improve sleep?
- 5 In EMS personnel, does fatigue training and education mitigate fatigue, mitigate fatigue-related risks, and/or improve sleep?
- 6 In EMS personnel, does implementation of model-based fatigue risk management mitigate fatigue, mitigate fatigue-related risks, and/or improve sleep?
- 7 In EMS personnel, do task load interventions mitigate fatigue, mitigate fatigue-related risks, and/or improve sleep?

# Phase 1 Methods

Research Question	Literature Screened / Reviewed
1	1,257
2	21,670
3	1,401
4	4,656
5	3,817
6	2,777
7	3,394
TOTAL	38,972



# Results of Phase 1

## Five recommendations

1. Recommend use of reliable/valid instruments
2. Recommend shifts <24-hours in duration
3. Recommend access to caffeine
4. Recommend allowing naps during shifts
5. Recommend education/training in sleep/fatigue

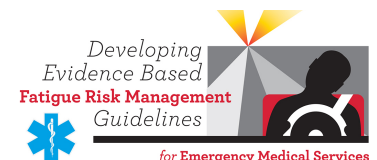
15 total peer-reviewed papers

# Evidence Based Guidelines for Fatigue Risk Management in Emergency Medical Services:

<http://tandfonline.com/doi/full/10.1080/10903127.2017.1376137>



[www.emsfatigue.org](http://www.emsfatigue.org)



<http://tandfonline.com/action/showAxaArticles?journalCode=ipecc20>



# Adoption & Evaluation

## 1. Recommend use of reliable/valid instruments

**Goal:** Assess fatigue/sleepiness of EMS personnel with reliable/valid survey instrument(s) quarterly (4 out of 4 quarters annually).

**Performance Measure:** Demonstrated use of reliable/valid fatigue and/or sleepiness survey instruments to measure and monitor fatigue in EMS personnel on at least a quarterly basis.

See Patterson et al. at

<http://tandfonline.com/doi/full/10.1080/10903127.2017.1376134>

# Adoption & Evaluation

## 2. Recommend shifts <24-hours in duration

**Goal:** 100% of shifts are less than 24 hrs in duration.

**Performance Measure:** Percent of all shifts that are less than 24 hrs in duration.

See Patterson et al. at

<http://www.tandfonline.com/doi/full/10.1080/10903127.2017.1376135>

# Adoption & Evaluation

## 3. Recommend access to caffeine

**Goal:** 100% of shifts with access to caffeine.

**Performance Measure:** Percent of all shifts where EMS personnel have access to caffeine.

See Temple et al. at

<http://tandfonline.com/doi/full/10.1080/10903127.2017.1382624>

# Adoption & Evaluation

## 4. Recommend allowing naps during shifts

**Goal:** EMS personnel are provided with access to, and permission to take a nap while on duty in 100% of extended shifts (i.e.,  $\geq 12$  hours) and shifts taking place overnight.

**Performance Measure:** Percent of all shifts where EMS personnel are provided with access to and permission to take a nap on duty.

See Martin-Gill et al. at  
<http://tandfonline.com/doi/full/10.1080/10903127.2017.1376136>

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# Adoption & Evaluation

## 5. Recommend education/training in sleep/fatigue

**Goal:** 1) 100% of EMS personnel have received fatigue education and training as part of new employee orientation/training; and 2) 100% of EMS personnel have received fatigue education and training within the previous two years.

**Performance Measure:** Percent of EMS personnel who have: 1) received education and training to mitigate fatigue and fatigue-related risks during new employee orientation/training; and 2) received education and training to mitigate fatigue and fatigue-related risks within the previous two years.

See Barger et al.at

<http://tandfonline.com/doi/full/10.1080/10903127.2017.1362087>



# Summary

- Five recommendations based on the best available evidence
- Tremendous flexibility with implementing recommendations

# November 2017 – December 2018\*

## The Fatigue in EMS Project

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# Contract Timeline for Aim 1 and 2

- November '17 to May '18 develop and pilot test the intervention and recruit EMS agencies
- May '18 enroll EMS agencies and start data collection
- Nov/Dec '18 complete data collection\*

# \*Possible Impact Phase 2 Deadline

- To avoid overburdening the public with federally sponsored data collections, the Paperwork Reduction Act (PRA) of 1995 requires that U.S. federal government agencies obtain Office of Management and Budget (**OMB**) **approval** before requesting or collecting most types of information from the public.
- Study *likely to be* delayed beyond 2018.

# Study Population

- Recruit & enroll diverse EMS operations
  - All ground-based operations
  - Include fire-based EMS operations
  - Moderate sized (minimum of 50-300 employees)
  - Nationwide recruitment
  - Representation in all major Census regions
  - Goal enrollment n=30 total EMS operations

# Phase 2-The Proposed Intervention

- ***“Take 10 for Sleep Health”***
- 10 modules
- Online delivery method
- Each module no longer than 10-minutes
- Topics covered: Circadian rhythms, Sleep Health, Sleep Timing and Sleep Hygiene, Dangers of Fatigue, Strategic use of naps, Strategic use of caffeine, Strategic use of exercise, Negative effects of sleep deprivation, and more.

# Our desired Longer Term Outcomes

## Goals for the EBG Project overall:

- Fewer EMS personnel that report fatigue while at work.
- Fewer EMS personnel classified with poor sleep quality.
- Fewer fatigue-related negative safety and performance outcomes (e.g., ambulance crashes).
- Increased number of EMS organizations that have formal fatigue risk management programs with strategies that are informed by the evidence.

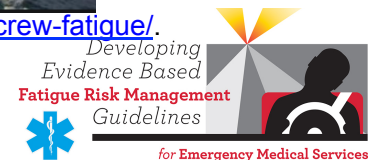
# Phase 3 – Fatigue Modeling Tool for EMS - 2019

Similar Models Used Everyday in Aviation, Rail, Maritime,  
Trucking....



Source: Aviation: <http://www.cos-mag.com/ohs-laws-regulations/34098-transport-canada-proposes-new-rules-on-flight-crew-fatigue/>.  
Rail: <http://calgaryherald.com/business/local-business/cp-rail-union-at-odds-over-worker-fatigue>.  
Trucking: <https://www.wsj.com/articles/independent-truckers-tell-court-e-logs-violate-constitutional-rights-1459444146>

[www.emsfatigue.org](http://www.emsfatigue.org)





# Expert Panel

Expert Panel Name	Area of Expertise	Institution
Hans Van Dongen, PhD	Sleep Medicine / Fatigue	Washington State University
John Violanti, PhD	Fatigue Expert	University of Buffalo
Daniel Buysse, MD	Sleep Medicine Physician	University of Pittsburgh
Douglas Kupas, MD	Emergency Medicine / EMS	Geisinger Health System
Frank Guyette, MD	Emergency Medicine / EMS / Air-Medical	University of Pittsburgh
Joe Penner	EMS Administration	Mecklenburg County EMS
Ron Thackery, JD	EMS / Risk Administration	AMR
David Becker, MA, EMT-P	Fire / EMS	Columbia Southern University / IAFC
Bradley Dean, MA, NRP	Field Provider / Clinician	Rowan County EMS
George Lindbeck, MD	State EMS Medical Director	Virginia State Office of EMS / Univ. of Virginia
Dennis Eisnach	Consumer Representative	None / Retired

***The guideline development group should be multi-disciplinary and balanced, comprising a variety of methodological experts and clinicians, and populations expected to be affected by the guidelines. (IOM, 2011)***

## Research / Project Team

Name	Institution
Daniel Patterson, PhD, NRP	University of Pittsburgh, Department of Emergency Medicine
J. Steve Higgins, PhD	NHTSA
Anthony Fabio, PhD	University of Pittsburgh, Graduate School of Public Health
Eddy Lang, MDCM	University of Calgary, Emergency Medicine
Patricia Weiss, MLIS	University of Pittsburgh, Health Sciences Library
Laura Barger, PhD	Harvard Medical School, Division of Sleep Medicine
Matthew D. Weaver, PhD	Harvard Medical School, Division of Sleep Medicine
Christian Martin-Gill, MD	University of Pittsburgh, Department of Emergency Medicine
Michael Runyon, MD	Carolinas HealthCare System, Department of Emergency Medicine
Jon Studnek, PhD, NRP	Mecklenburg EMS
Allison Infinger, MSPH	Mecklenburg EMS
Charity Moore, PhD	University of Pittsburgh
Denisse Sequeira, BS	University of Pittsburgh, Department of Emergency Medicine
David Hostler, PhD, NRP	University of Buffalo, Department of Exercise & Nutrition Sciences
Jennifer Templin, PhD	University of Buffalo, Department of Exercise & Nutrition Sciences
Kathy Robinson, RN	NASEMSO

# Summary

- **Evidence Based Guidelines for Fatigue Risk Management in Emergency Medical Services:**  
<http://tandfonline.com/doi/full/10.1080/10903127.2017.1376137>
- **All Published Materials (Supplement):**  
<http://tandfonline.com/action/showAxaArticles?journalCode=ipec20>
- **Project Website:** [www.emsfatigue.org](http://www.emsfatigue.org)

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