

# Stress and safety in EMS:

## How work-related stresses and fatigue relate to safety outcomes

Donnelly, E. A.<sup>1</sup>, Bradford, P.<sup>2</sup>, Hedges, C.<sup>3</sup>, Davis, M.<sup>2</sup>, Socha, D.<sup>4</sup>, & Winter, E.<sup>1</sup>

University of Windsor<sup>1</sup>; London Health Science Center- Southwest Ontario Regional Base Hospital Program<sup>2</sup>; Essex Windsor EMS<sup>3</sup>, Paramedic Chiefs of Canada<sup>4</sup>

### Introduction

Extant research has linked fatigue to safety-related outcomes in EMS personnel. Specifically, fatigue has been tied to an increased risk of paramedic injury, behaviors that may compromise patient and provider safety, and medical errors.

While fatigue has been linked to safety, little is known about how other types of workplace stress, including organizational stress (the stress of working in a particular organization) and operational stress (stress associated with the provision of EMS services), critical incident stress (stress associated with patient care), and post-traumatic stress symptomatology (PTSS) may influence patient and provider safety.

### Objective

The objective of this study was to assess how different types of workplace stress and fatigue may contribute to safety outcomes, including paramedic injury, behaviors that may compromise patient and provider safety, and medical errors.

### Methods

Data collection for this study is ongoing. Using an online survey, respondents reported levels of operational and organizational chronic stress, critical incident stress, post-traumatic stress symptomatology (PTSS), fatigue, safety outcomes and demographic characteristics.

T-tests and chi-square analyses were used to assess for significant differences.

### Results

These results are from the first wave of an online survey which was conducted with eight EMS services with a 41% response rate ( $n= 664$ ). In this sample, in the last three months:

- 75% of paramedics reported being injured
- 95% reported safety compromising behaviors
- 72% reported making at least one medical error

The odds of reported injury among fatigued paramedics was significantly higher (OR =2.8, 95% CI 1.9, 4.3), as were safety compromising behaviors (OR 5.3, 95% CI 2.1, 13.2), and medical errors (OR 1.5, 95% CI 1.1, 2.2).

Paramedic injury and safety compromising behaviors were significantly related to operational stress ( $p < .01$ ), organizational stress ( $p < .01$ ), critical incident stress ( $p < .01$ ) and post-traumatic stress ( $p < .01$ ).

In contrast, most of the stress variables (organizational stress, operational stress, critical incident stress, and PTSS) were not significantly related to medical errors.

Few significant differences were noted in safety outcomes by demographics (years in EMS, level of certification, gender). The only noted difference was respondents with  $\geq 10$  years in EMS reported making fewer errors (OR 0.6, 95% CI 0.4, 0.9).

### Limitations

- Non-experimental design
- Modest response rate
- Not generalizable
- Open to non-response, self report, and recall biases

### Conclusion

These findings indicate that fatigue, chronic organizational and operational stressors, critical incident stressors, and post-traumatic stress may influence patient and provider safety.

More investigation is needed to clearly elucidate the relative contributions of each type of stress on safety outcomes.

### Implications for Future Research

Early findings indicate that provider and patient safety may be influenced by a multiplicity of work-related stressors.

These results underscore the need for the development and validation of holistic, evidence-based interventions addressing the host of factors that may influence safety for both paramedics and their patients.

### Acknowledgements

The authors wish to gratefully acknowledge the grant funding provided by the Paramedic Chiefs of Canada, the support of Essex-Windsor EMS, and all the paramedics that participated in the survey.



University of Windsor



Paramedic Chiefs of Canada  
Chefs Paramédics du Canada



London Health Sciences Centre  
Southwest Ontario Regional Base Hospital Program

