

# Firefighter Injuries Relative to Fire Response Characteristics

Kathryn E. Sinden RKin, PhD, Lakehead University

Amanda L. Lorbergs PhD, Western University

Joy C. MacDermid PT, PhD, Western University

Laura Deschamps, Lakehead University

February 21, 2018



Lakehead  
UNIVERSITY



FIREWELL

# Our Research Question

## OVERARCHING OBJECTIVE:

- To determine the relationship between specific fire response characteristics (e.g., firefighter personal attributes, personal protective equipment, action taken to manage fire) and firefighter injuries (e.g., cause, type) in Canada.

## Specific Research Questions:

- i. What are the firefighter injury characteristics including injury type, injury location, and length of absence from work associated with injury?
- ii. How do firefighter personal attributes (i.e., height, weight, years of service) relate to firefighter injury?
- iii. Does firefighter personal protective equipment (i.e., helmet, gloves, coat, face shield) worn during emergency response impact firefighter injury cause and type?
- iv. Do fire response characteristics (i.e., crew size, number of victims) impact firefighter injury?
- v. Does geographical placement of the fire service impact firefighter injury cause and type?

# What Did We Find?

## FIREFIGHTER SAMPLE

- 2025 injured firefighters with  $14.4 \pm 8.6$  years of service
- 12% ( $\leq 30$  years); 51% (31-45 years) and 37% ( $\geq 46$  years)
- BMI =  $27.3 \pm 3.6$  kg/m<sup>2</sup> (Overweight)

## FIREFIGHTER INJURY CHARACTERISTICS

- Most frequent reported *injury type* was 'injury to muscle, ligaments, joints' (45%); *injury location* was the 'head, neck or spine' (11%).
- Over 80% of injuries reported were categorized as "minor" (injuries requiring less than 1 day off work and / or in hospital) vs. "serious" (injuries requiring 16+ days off work and / or hospitalization for 3+ days).
- Longer absences from work appear to be associated with 'head, neck or spine', 'heart attack/stroke', 'bone injury or fracture'

## FIREFIGHTER PERSONAL ATTRIBUTES AND INJURIES

- Younger Firefighters ( $\leq 30$  years) reported more 'wounds, punctures, lacerations', 'asphyxia, respiratory conditions' and 'minor cuts and bruises' vs. middle aged (31-45 years) and older (46 years and older) firefighters
- Younger firefighters reported fewer musculoskeletal injuries vs. older firefighters (36% vs. 47%)

## PPE AND FIREFIGHTER INJURIES

- Less severe injuries reported when helmets and boots worn
- Serious injuries reported when boots, helmet and coat worn

## FIRE RESPONSE CHARACTERISTICS AND FIREFIGHTER INJURY

- Smaller initial and subsequent crew sizes may be related to more serious injury

# Implications and Next Steps

## IMPLICATIONS

- Musculoskeletal disorders (MSDS) represent an important injury burden among firefighters
- Firefighting is an aging workforce
- Differences in injury type and severity may exist across age-groups
- Firefighter PPE may be an important consideration in future injury prevention strategies
- Fire response characteristics (crew size and fire alarm operation) may impact injury severity (length of absence from work)
- Firefighter injuries may increase as the total number of injuries increases at the response

## NEXT STEPS

- Injury prevention programs for firefighters that target MSD prevention are warranted
  - Impacts on injury type and severity are required
- Contextualize new knowledge with our existing firefighter research partners to verify and incorporate with local data
  - Important as we continue with our research initiatives in development, implementation and evaluation of current evidence-based injury prevention programs.

# Acknowledgements

This work was supported by the Canadian Safety and Security Program, a federal program led by Defense Research and Development Canada's Centre for Security Science, in partnership with Public Safety Canada. Partners in the project include the Canadian Association of Fire Chiefs (CAFC), the Council of Canadian Fire Marshals and Fire Commissioners (CCFMFC), Public Safety Canada and Rhapsody Strategies Inc.

The authors would also like to thank Dr. Vicki Kristman, Lakehead University for her comments and contributions to data analysis.