



# THE FIRE PROTECTION RESEARCH FOUNDATION

## **Fireground Injuries: An International Evaluation of Causes and Best Practices**

### **PROJECT SUMMARY**

24 September 2009

**Background:** Firefighting has one of the highest occupational incident rates for injury and fatalities, a large number of which occur during fireground operations. An international comparison of fireground operations provides a unique opportunity to discover effective procedures for preventing injuries.

This study is based on the hypothesis that fireground injury rates will vary by department and country, and that lower injury rates will be associated with more extensive training as well as following high quality standard operating guidelines (SOGs). Based on NFIRS data, the majority of fireground injuries should fall under specific activities including handling charged hose lines, overhaul, extinguishing a fire using hand tools and carrying out ventilation with hand tools. The effect of training and SOGs incorporating best practices for the reduction of fireground injuries will be identified and distributed among fire departments to improve fire fighter health and safety.

**Project Goal:** The goal of this project is to evaluate for the association of training with lower fireground injury rates and to identify SOGs incorporating best practices. This is a three year international study partnering with fire departments in Australia (Melbourne), United Kingdom (Lancashire), and the United States (Columbus OH, Phoenix AZ, Washington DC, and two combination fire departments to be determined).

**Project Objectives:** The project involves the following objectives:

**Objective #1. Compare fireground injury rates by department.** Fireground injury rates, including travel to and from the fire and injury type (nature of injury, body part and activity), will be determined for the period 2004-2008. Adjusted injury rates will be calculated for specific fireground activities resulting in the majority of injuries; average overall rates for each department will be adjusted for hours of training on each of the selected fireground activities, general environmental conditions and fire fighter demographics using Poisson regression modeling. Analyses will be restricted to 1-2 family dwelling fires to minimize the confounding effect of differential construction types.

**Objective #2.** Evaluate the relationship between training and following SOGs among injured fire fighters. Fireground SOGs for each department will be obtained. Each department will prospectively collect data on a minimum of 150 injuries occurring during fireground operations. Data will be obtained for each incident using standardized National Fire Incident Reporting System (NFIRS) variables plus questionnaire responses collected from the injured fire fighters using the Behavioral Sequence Interview Technique (BSIT). The BSIT data fields will be customized to the fireground SOGs used by each department. Injuries will be classified as having occurred while not following SOGs or occurring despite following SOGs. Linear regression, based on transformed rates of injury, will be used to determine the contribution of hours of training on the extent to which injured fire fighters follow their SOGs.

**Objective #3.** Determine SOG best practices. Injury events occurring while following SOGs will be assessed for each department. Based on these data, best practices will be determined through a consensus based approach, using an international panel convened by the Fire Protection Research Foundation (FPRF) of the National Fire Protection Association (NFPA) and the Metropolitan Fire Chiefs Association. The results of the previous aims and determination of best practices will be incorporated into NFPA standards when possible and disseminated to the larger fire service community through publications, the FPRF website, presentation at the NFPA Annual Meeting, and presentation of the work at other fire service meetings.

**Implementation and Final Report:** The research program is being conducted under the auspices of the University of Arizona with assistance from the Fire Protection Research Foundation. A final report will be issued by 31 August 2012.