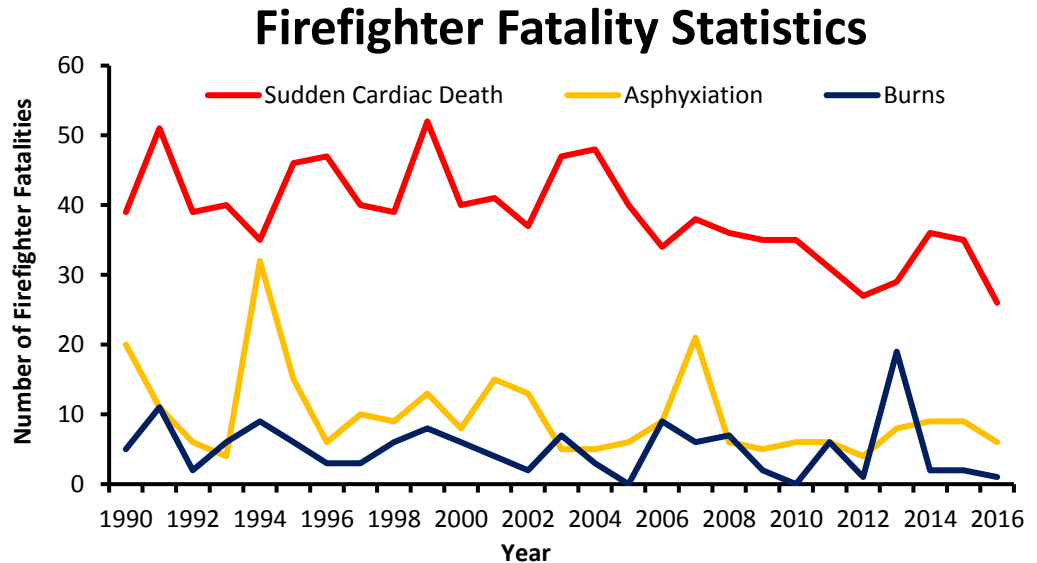




Potential Uses of ECG/EKG Monitoring

BACKGROUND AND MOTIVATIONS

- Sudden cardiac events (SCEs) are the leading cause of line of duty deaths in the US.
- There are approximately 20-25 nonfatal SCEs for every fatality.
- Many firefighters have decreased performance due to subclinical disease.
- Early identification of a SCE is important because 85% of damage to heart tissue happens within two hours of a blockage.
- ECGs have the potential to allow for prevention and early detection as well as an improved understanding of the triggers of SCEs.
- The SMARTER team sought to explore existing ECG technologies (The Wearable Advanced Sensor Platform (WASP), Equival, and AliveCor systems) to better understand usability, and develop recommendations for ECG use during firefighting.



CHALLENGES

- Using a monitor during activity, such as firefighting, is difficult because of motion artifact
- Developing a portable ECG system with arrhythmia detection notifications for real-time monitoring
- Determining what arrhythmias warrant attention during operations
- Determining proper ECG lead placement and a feasible way to adhere leads
- Determining who will review the data and how dysrhythmias will be handled if identified

KEY FINDINGS AND RECOMMENDATIONS

- All three systems examined were not currently suited for ECG monitoring during firefighting because of movement artifact.
- Current technology may be useful for ECG monitoring during rehabilitation.
- An arrhythmia detection algorithm that accounts for motion artifact is necessary for widespread adoption of real-time ECG monitoring.
- The algorithm must be able to differentiate between life threatening arrhythmias and other benign arrhythmias that would not warrant disruption of work activities.

