

Flash Fire Victims and Carboxyhemoglobin Concentrations: A Report of Ten Simultaneous Flash Fire Fatalities with Autopsy Findings¹

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After attending this presentation, attendees will understand the diversity of Carboxyhemoglobin (COHb) concentration findings in victims who die in flash fires. Further learning objectives include: (1) dealing with mass-casualty incidents in small, resource challenged rural jurisdictions; and, (2) the effect of safety standards, both in the United States and internationally, which influence bus and large truck-accident fatalities and injuries.

This presentation will impact the forensic science community by the presenting autopsy data on the ten people who died in a conflagration resulting from a collision of a motor coach bus vs. a tractor-trailer, big-rig truck at highway speed.

Motor vehicle collisions have been a leading cause of death and injury in the United States for decades. Injuries and deaths are typically caused by physical trauma, thermal injuries, toxic gases, or a combination of the three. Ten people died in a fiery conflagration on a late afternoon in perfect weather resulting from a collision between a motor coach bus filled with high school seniors and a big-rig tractor-trailer in Glenn County, CA. Travelling at highway speed, the tractor-trailer inexplicably crossed from the southbound lanes across an unfenced, flat median strip without protective vegetation into the northbound oncoming traffic lanes on Interstate 5, a major highway traffic corridor in the western United States. The drivers of both the truck and the bus died as well as eight bus passengers. The collision resulted in both traumatic injuries and thermal injuries from the ensuing flash fire which was suppressed within minutes by the local volunteer fire department. Complete autopsies were performed under the jurisdiction of the Glenn County sheriff-coroner on the nine victims who died at the scene. A tenth victim, who briefly survived, succumbed to his injuries hours later after having been flown to the University of California Davis Medical Center in Sacramento, CA. An external examination without complete autopsy was performed on that victim at the Sacramento County coroner's office. Of the nine autopsied victims, two died from severe traumatic injuries alone without elevation of COHb concentration, three died from inhalation of products of combustion without elevation of COHb concentration and with moderate traumatic injuries, two died from inhalation of products of combustion without elevation of COHb concentration and without significant traumatic injuries, and only two died with measurable concentrations of COHb – the first with 18% COHb concentration and traumatic injuries, the second with COHb concentration of 45% plus a Cyanide (CN) concentration of 4.17µg/ml and without traumatic injuries. The diversity of these autopsy findings within a cohort of victims dying together over a narrow time period support the fact that COHb concentration cannot be used as the sole criterion that a person was alive in a fire. Death in a flash fire results from the effects of a panoply of toxic compounds present in a flash fire including superheated gases.

Selected mass-casualty incident management issues arising in a small, rural county including triage, fire suppression, victim identification, body part identification, and disposition are examined. This presentation will further discuss fire and crash-related issues which would

diminish or mitigate flash-fire vehicular fatalities, including escapement, time to incapacitation, on-board fire suppression systems, fire detection, fire protection of vehicle passenger occupied areas and fuel tank/engine areas, and the epidemiology of fatal bus crashes. Current national and potentially global safety standards for motor coach busses and large trucks are reviewed. Regulatory agencies have a responsibility to ensure that established safety standards are continually updated, seizing upon opportunities to improve accident survivability to minimize injuries and deaths from motor vehicle collisions.

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