H179 Accidental Residential Fire-Related Fatalities: A Seven-Year Study in a Forensic Autopsy Population (2010–2017)

Allison C. Klein, BA, University of Maryland Baltimore, Graduate School, Baltimore, MD 21201; Kelsey Mason, BS*, University of Maryland Baltimore, Baltimore, MD 21201; David R. Fowler, MD, Office of the Chief Medical Examiner, Baltimore, MD 21223; Mary G. Ripple, MD, Baltimore, MD 21223; Ling Li, MD, Office of the Chief Medical Examiner, Baltimore, MD 21223*

Learning Overview: After attending this presentation, attendees will learn the groups of people at risk for accidental fire-related fatalities, the conditions which predispose residences to fire, and the epidemiological implications for studying fire deaths.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by increasing its understanding of the risk factors and potential fire prevention measurements in fire-related deaths. It is also important for forensic investigators to document whether a fire or smoke detector was present or functional in any fire-related death investigation.

The majority of deaths from fire are accidental residential events, caused by smoking, electrical malfunctions, improper usage of faulty heating, and clothing igniting on fire from cooking accidents.[1]

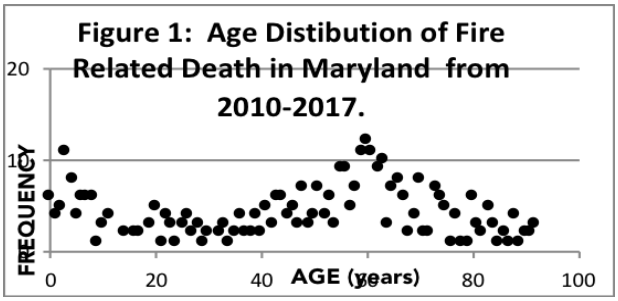
Using death records obtained from the Office of the Chief Medical Examiner (OCME) for the state of Maryland, a retrospective study was conducted on fire fatalities over a seven-year period (2017–2010). The OCME is responsible for conducting death investigations and certifying the cause and manner of unnatural and unexplained deaths, including homicide, suicide, unintentional injuries, deaths that are unattended, or sudden unexpected deaths in the State of Maryland. The data collected at OCME provides an invaluable source of data for identifying statewide epidemiological trends, which affect public health and, therefore, aid in the identification of at-risk groups.

This study revealed that OCME investigated 378 cases of fire fatalities over the ten-year period. Of those, 309 (81%) deaths were due to accidental fire, 19 (5%) deaths were homicides, and 18 (4.7%) cases were suicides. There were 32 (8.5%) deaths with manner of death undetermined. The male-to-female ratio was 2:1.4. The ages of the victims range from 9 months to 92 years, with an average age of 46.95 years. The age groups with the highest frequency of deaths were the elderly (>60 years old) and juveniles (<18 years old) (Fig 1). Many elderly individuals live alone and may not maintain electrical appliances as they should.[2] The isolation of elderly victims and the potential inability to ambulate quickly, or at all, constitutes two main reasons this population is at risk of fire death. Infants and juveniles must rely on assistance from others to escape fires unharmed. A lack of sufficient escape route planning may also contribute to the increased number of juvenile victims.

Of the 309 accidental residential fire deaths, 56 (18%) were caused by smoking. Six victims were smoking cigarettes while receiving oxygen therapy for cardiovascular and/or respiratory diseases. In approximately 8% of cases, the source of fire was attributed to electrical malfunction or heating sources. In addition, cooking implements left unattended were the source of 3% of deaths in the home.

One of the objectives of this study was to identify the presence and function of fire or smoke detectors. However, the data concerning fire alarm systems was often not recorded or unknown in the death investigation reports. It is important to document whether a fire or smoke detector was present or functional in any fire-related death investigation. Smoke alarms provide an early warning of a fire, giving people additional time to escape, and working smoke alarms reduce the risk of fire-related deaths.

Residential fire prevention efforts should target home safety education focused on the elderly and children to maximize survival for these at-risk groups. Education regarding the combustibility of smoking materials and the hazards of smoking on oxygen therapy must also be directed at those at risk and their caretakers. The development of easily maintained and technologically advanced fire and smoke monitoring systems could also aid in the prevention of fire death and aid in future epidemiological research.



Reference(s):

1. DiMaio, Vincent. 2001. *Forensic Pathology*. Boca Raton, Fl: CRC Press LLC.
2. Elder, Andrew T., Timothy Squires, and Anthony Busuttil. Fire Fatalities in Elderly People. *Age and Ageing* 25, no. 3 (1996): 214-216.

Fire Death, Elderly Victims, Accident