
E85 A Medicolegal Death Investigation and Review of Inhalant-Related Deaths

*Christopher Ramos, MD**, State University of New York Upstate, Department of Pathology, Syracuse, NY 13202; *Abigail J. Grande, MPH*, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI 49008; *Prentiss Jones, Jr., PhD*, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI 49007; *Joseph A. Prahlow, MD*, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI 49007; *Theodore T. Brown, MD*, Kalamazoo, MI 49008

Learning Overview: After attending this presentation, attendees will understand a step-wise approach for the medicolegal death investigation of suspected inhalant-related deaths.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by emphasizing the importance of a thorough medicolegal death investigation of suspected inhalant-related deaths because forensic pathologists heavily rely on the investigative findings when opining cause and manner of death in these cases.

Inhalation-related deaths of gases and volatile products like hydrocarbons found in compressed air duster cans represent a small subset of drug-related deaths investigated by medical examiner offices. The medicolegal death investigation is critical in identifying possible inhalation-related deaths because many of these gases and volatile products are either not detectable on postmortem toxicology testing or are not included on routine postmortem toxicology testing. Therefore, the cause and manner of death in these cases heavily rely on a thorough medicolegal death investigation.

A review of the medical examiner database of deaths in western Michigan was completed over an 11-year time period, from 2009 to 2020. During this period, there were 26 inhalation-related deaths. The average age of inhalant-related deaths was 44 years (range: 21 years to 76 years), there were 17 males (65%) and 9 females (35%), and 25 (96%) were White and 1 (4%) was Black. The location of inhalant-related deaths was predominantly in the decedent's residence (17 cases, 65%), followed by far less-common locations, which included the hospital (2 cases, 8%), outside (2 cases, 8%), motor vehicle (1 case, 4%), camper (1 case, 4%), and motel (1 case, 4%). Two cases had limited information in the database, which did not include the location of death. Inhalants identified on toxicology testing or based on detailed review of the medicolegal death investigation and listed as the cause or contributing to the cause of death included: helium (9 cases, 35%); 1-1, difluoroethane (7 cases, 27%); nitrogen gas and nitrous oxide (2 cases, each); and dimethyl ether, chloroform, methane, butane, and hydrofluorocarbon not otherwise specified (1 case, each). The manner of death was opined suicide in 13 cases (50%), accident in 12 cases (46%), and undetermined in 1 case (4%). All of the helium deaths were opined suicide and all of the 1-1, difluoroethane deaths were opined accident.

Given the heavy reliance on a complete medicolegal death investigation in suspected inhalant-related deaths, this presentation proposes a step-wise approach for medicolegal death investigators to ensure forensic pathologists are best positioned to opine the cause and manner of death in such cases: obtaining a detailed history of medical conditions and social activities, including psychiatric history, risk-taking behaviors, and recent reported mental state and behavior of the decedent just prior to being found dead; speaking with the individual(s) who found the decedent to get the most accurate description of the undisturbed death scene; taking several photographs of the decedent with a focus on areas near the mouth and nose for residue, and also photographs of the area around the decedent, to include trash cans, closets, clothes, rags, plastic or paper bags, and adjacent rooms, if applicable; if identified, taking multiple photographs of the suspected gas or volatile product container so the forensic pathologist and toxicologist have an idea of what the decedent may have inhaled; and, if deemed necessary, saving the suspected gas or volatile product container for direct toxicology testing.

Inhalant, Investigation, Forensic