



## H45 Trends in the Certification of Choking-Related Deaths

Joshua Vandeburgh\*, Kalamazoo, MI 49007; Abigail Jacqueline Grande, MPH, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI 49008; Amanda O. Fisher-Hubbard, MD, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI 49007

**Learning Overview:** After attending this presentation, attendees will be more familiar with trends in the certification of choking-related deaths.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by identifying risk factors and/or other significant conditions that may contribute to choking-related deaths for complete, accurate death certification.

According to the National Center for Injury Prevention and Control, suffocation, including choking, was the fourth-leading cause of unintentional injury death in 2016.<sup>1</sup> A review of the literature reveals varied etiologies for unintentional death by choking/asphyxiation. Among those greater than 65 years of age, dementia, Parkinson's disease, and pneumonitis were often associated with death by choking on food.<sup>2</sup> In adults, choking is also associated with a variety of conditions, including alcohol intoxication, poor dentition, and dysphagia due to mental illness.<sup>3-5</sup> Although it may seem obvious that individuals with certain conditions, temporary or otherwise, would be more susceptible to choking, it is unclear how these are captured on the death certificate.

The goal of this study is to discern trends in the certification of choking-related deaths, particularly related to risk factors or other conditions that may have made individuals more susceptible to choking. The hypothesis is two-fold: the majority of decedents that die of choking will have a risk factor or contributing cause listed on the death certificate, and/or the decedents will be at the extremes of age.

This study used an electronic database of cases investigated by a medical examiner's office serving multiple counties in Michigan. A search was conducted for "chok\*" in *Part I* and in the *Injury Description* section of the death certificate. The search also included deaths that were categorized as "Asphyxia" with the cause of asphyxia listed as "food/drink." Cases that listed a *Part II* on the death certificate were noted. In addition, *Part I* of the death certificate was surveyed for choking risk factors, including toxicities and neurological disorders.

A total of 71 cases were identified, five of which were incorrectly categorized and one of which had an incomplete death certificate. The remaining 65 decedents ranged in age from 3 to 95 years, with mean and median ages of 62 and 64 years, respectively. Of these cases, the manner of death was certified as accidental in 62 cases; one death was certified as indeterminate due to a family's objection to an autopsy and two deaths were certified as natural. Food or drink was implicated in 57 cases (88%), while an object/other material was implicated in four cases (6%); the causative agent was not specified in four cases (6%). Of the 65 cases, 38 death certificates (58%) documented information in *Part II* and nine (14%) had possible risk factors for choking listed in *Part I b, c, or d*. The majority of *Part II* conditions included neurological/neurodegenerative diseases (17 cases, 45%), while a minority included toxicities (five cases, 13%); in 16 cases (42%), the conditions listed in *Part II* were unrelated to neurological disorders or toxicities. In 8 out of the 65 cases, a neurologic or toxicologic risk factor was listed in *Part I (a, b, c, or d)*. In one case, the medical examiner listed the same risk factor in *Part Ib* and *Part II*.

To summarize, only 30 decedents (46%) had a choking risk factor listed in the cause of death section of the death certificate (*Part I* and/or *II*). These decedents ranged widely in age, although most were 60 years of age or older. To conclude, the way in which choking-related deaths are certified lacks standardization.

### Reference(s):

1. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Web-based Injury Statistics Query and Reporting System (WISQARS): 10 Leading Causes of Death, United States, 2016, All Races, Both Sexes.
2. Kramarow E., Warner M., Chen L. Food-related Choking Deaths Among the Elderly. *Injury Prevention*. 2014;20(3):200.
3. Nikolić S., Zivković V., Dragan B., Juković F. Laryngeal Choking on Food and Acute Ethanol Intoxication in Adults—An Autopsy Study. *J Forensic Sci*. January 2011;56(1):128-31.
4. Berzlanovich A.M., Muhm M., Sim E., Bauer G. Foreign Body Asphyxiation—An Autopsy Study. *Am J Med*. 1999;107(4):351-5.
5. Aldridge K.J., Taylor N.F. Dysphagia Is a Common and Serious Problem for Adults with Mental Illness: A Systematic Review. *Dysphagia*. 2012;27(1):124-37.

### Choking, Asphyxia, Death Certification