

# SUFFOCATION AND NEAR SUFFOCATION

*The Cochrans were excited about the birth of their son, Jacob, and thankful all had gone well during the pregnancy and delivery. They were careful to keep track of Jake's upcoming appointments with the pediatrician, made sure Jake rode properly restrained in an infant car seat and read all they could find about providing a stimulating environment for their child. Mrs. Cochran had felt a nostalgic connection with her own grandmother when she refurbished the crib that had been used through three generations in her family. Sadly, it was that same crib that claimed Jake's four month life. Mrs. Cochran found him one morning, lifeless, strangled with his head caught between the crib slats. Cribs manufactured today are engineered so that the space between slats will not allow a child's head to slip through. There is no regulation of older cribs salvaged from attics or donated to shelters, for example, to ensure they meet current safety specifications. Jacob's death was not a random accident. It was preventable.*

## Defining The Problem

Injury and death due to suffocation occurs as a result of either of two mechanisms. It may result when food or an object is ingested or inhaled and blocks the airway (choking). Suffocation also may result when external mechanisms hinder breathing, e.g., a plastic bag covers the nose and mouth, the chest is compressed, or in the course of hanging or strangulation. Further, both mechanisms of injury can be categorized as either intentional or unintentional. Because suicide and homicide will be dealt with elsewhere in this report, this section will focus on unintentional suffocation.

## Goal

### Reduce deaths caused by suffocation

HP 2010	3.0 per 100,000
OH 1998	3.98
US 1998	4.1

*Data source: National Vital Statistics System (NVSS), CDC, NCHS.*

## Data

Healthy People 2010 sets a national goal of no more than 3.0 deaths due to suffocation per 100,000 population, as compared to the 1998 rate of 4.1 deaths per 100,000. A specific goal has not been set for the subset of unintentional suffocation deaths. Of the baseline rate (4.1 deaths/100,000), 1.7 deaths occur as a result of unintentional suffocation. Clearly, the rate of unintentional deaths will need to be reduced in order to achieve the overall goal. Health goals related to reducing unintentional suffocation have not been formulated for Ohio. Since the rate of Ohio deaths due to injuries, in general, and suffocation, in particular, are similar to those of the nation, it is reasonable to set Ohio goals for 2010 at the same rates.

Figure 1 shows that, for the combined years of 1996-1998, the Ohio unintentional suffocation rate was below that for the United States as a whole. Figure 2 trend data shows that the Ohio suffocation rate has generally been close to but below that of the United States. (In recent years, the Ohio rate has exceeded that of the nation,

but this trend may be a function of small numbers.) Among the ten leading causes of unintentional injury deaths across age groups, suffocation has a bimodal distribution. It ranks first as a cause of death among infants in the US and Ohio. Its rank as a cause of death begins to drop for preschool and school-aged children reaching a low among the 15 - 24 year old group. It then becomes an increasingly more common cause of death as the population ages.

Racial comparisons show that the rates of unintentional suffocation for Whites and Blacks are similar. The number of deaths among other racial groups in Ohio is too small to measure during the years 1995-1998; however, in US data, certain Asian groups and Native Americans have higher rates of death due to unintentional suffocation than the general population. Males die from unintentional suffocation more than twice as often as females.

**Suffocation ranks first as a cause of death among infants in the US and Ohio.**

Injury prevention reports from other states have noted that a lack of standardized definitions in reporting suffocation deaths contributes to difficulties in understanding the true extent of the problem and its causes.

### **Contributors to the high rate of suffocation among children birth to 4 years**

Infants are totally dependent upon their caregivers for all their needs, including the safety of their physical environment. Rates of death due to Sudden Infant Death Syndrome (SIDS) have decreased since research demonstrated that infants placed on their back to sleep are at lower risk for SIDS. More recently, research has suggested that 30% of deaths attributable to SIDS may be due to suffocation by soft bedding. Since 1992, Ohio law has required that the death of any child potentially due to SIDS must be reported to the Coroner. He or she is required to perform an autopsy before determining SIDS to be the cause of death. It is equally important to conduct a thorough death scene investigation to determine whether bedding, co-sleeping with adults or wedging between the mattress and the bed frame may have caused strangulation/suffocation.

The work of the Consumer Product Safety Commission (CPSC) has led to the identification and modification of a number of products that have contributed to childhood suffocation. As injuries related to products are reported, the CPSC issues product recalls,

works to establish either voluntary or mandatory product standards and educates the public. Examples of products that increase the risk of strangulation/suffocation of children include crib slats too widely spaced, rattles and toy parts that can obstruct a child's airway, and cribs and playpens designed to collapse for easy transportation.

Toddlers are naturally inquisitive about their environment. Because they are orally oriented, they explore by placing everything in their mouths. Unfortunately, this includes objects frequently found in households that can be inhaled into a child's airway, but not as easily expelled. Food items are most often to blame. The CPSC, physicians and health care officials continually educate the public about keeping chunks of hot dogs, round candies and peanuts out of the reach of preschoolers. Non-food items also present a danger. Nearly one-third of children seen in emergency departments for nonfatal choking had inhaled coins, balloons and a variety of other small toy parts. While the CPSC has established mandatory standards banning spheres of certain sizes from toys for young children, advocates are currently working to alert parents to the dangers of small objects with surfaces that are even partially spherical.

### **Choking Hazards**



Louise has been having choking spells with increasing frequency over the past few years. At first it seemed she had trouble with her "afternoon tea" going down the wrong pipe. Then, she began to have difficulty with peanuts, soups – a whole variety of foods. Last week, she had a very frightening episode when a piece of roast beef seemed to go right down her lungs. She couldn't speak. She couldn't breathe. If it hadn't been for the neighbor who was visiting her performing a Heimlich Maneuver on her, she might have died. Today, Louise had a swallowing study done at the local hospital that confirmed she had lost the ability to coordinate her swallowing.

### Contributors to the high number of elderly individuals who suffocation

Among the adult population ages 15 – 64 years, suffocation as an unintentional cause of death is much less common than deaths due to motor vehicles, poisonings, falls and fire/burns. Employment is the major activity for individuals in this age category and the workplace an important site to consider. The US Department of Labor reports that, between 1995 and 2000, there were 254 occupational fatalities resulting from asphyxiation and suffocation. Ohio accounted for 5 of these deaths.

Unintentional deaths due to injuries ranks as the seventh leading cause of death among those 65 years of age and older in the nation and in Ohio (1995-1998). Suffocation ranks below falls, motor vehicle and other unspecified causes. Nonetheless, About 2,500 annual deaths to people aged 65 or older can be attributed to choking on food or nonfood material (Fig.7). Elderly individuals are at high risk for asphyxiation due to use of sedative drugs, diseases affecting coordination or mental function, or inhaled food and non-food items, usually as a result of under-chewed food. Canadian health officials encourage those who are caregivers for an older adult to learn the Heimlich maneuver, since there is evidence that use of the Heimlich in the choking individual does reduce mortality and morbidity. Careful attention to dentition and dental appliances, cautious medication management to minimize sedation and monitoring for the existence of swallowing disorders are suggested but as yet unproven measures to limit suffocation.

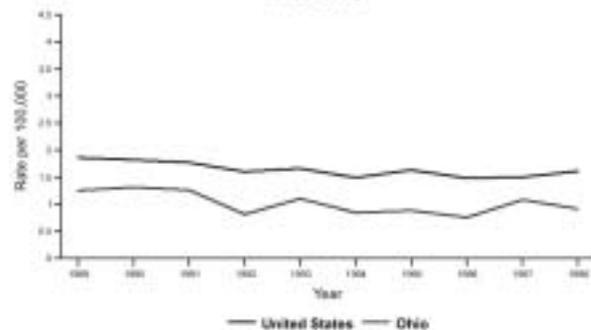
## Costs & Consequences

The Children's Safety Network estimated the following costs associated with unintentional suffocation deaths of Ohio individuals birth through 24 years of age, using NCHS data for the years 1993-1997. There were 0.6 unintentional suffocation deaths per 100,000 population. This resulted in 1,736 years of potential life lost (YPLL). Estimated lifetime productivity losses were \$21,547,385 and medical, legal and administrative costs associated with these deaths totaled \$470,431. Total costs for unintentional suffocation deaths were \$22,017,816. Healthy People 2010 reported that approximately 5,000 children aged 14 years and under are treated in hospital emergency departments for aspirating and ingesting toys and toy parts each year. The total annual cost of airway obstruction injury and death among children aged 14 and under exceeds \$1.5 billion. Children aged 4 years and under account for more than 60 percent of these costs.

Unintentional Suffocation Death Rates  
United States, 1996-1998



United States and Ohio  
1989-1998



## Policy Issues

For children, unintentional suffocating injuries and death occur primarily in the sleeping environment, or are due to entrapment in household appliances, choking on food or small objects and strangulation. The (federal) Child Safety Protection Act addresses choking hazards for children. The Ohio Revised Code (ORCS 3717.51) addresses standards for the provision of assistance to choking victims. During the 124<sup>th</sup> session of the Ohio General Assembly, HB 384 was passed and signed into law. It requires all schools to have someone on the premises who is trained in using the Heimlich maneuver to assist choking victims. Ohio law also established Child Fatality Review in all 88 counties and at the state level. The Ohio Administrative Code (OAC 3701-67-01) defines suffocation as an example of a “cause of death” to be included in this review. Multiple references to suffocation and choking are made in OAC rules being promulgated through the EMS Board as a result of HB 138 of the 123<sup>rd</sup> General Assembly.

## Existing Programs

The **“Back to Sleep” Campaign of the American Academy of Pediatrics** aims to educate parents and professionals alike about the advisability of placing infants on their back to sleep. While the campaign was started with the goal of reducing deaths due to SIDS, it also provides the opportunity to address the safety of the entire sleep environment. The National SAFE KIDS Campaign has chosen the area of suffocation deaths and injuries as one of its priorities. Ohio has a SAFE KIDS Coalition based in the Ohio Department of Public Safety.

The **National Institute for Occupational Safety and Health (NIOSH)** conducts investigations into deaths related to employment/occupation. Its extensive research agenda includes farm-related injuries to children and adolescents, as well as injuries and work-safety among migrant workers. It has developed safety education in regard to suffocation in grain silos, asphyxiation due to hazardous chemicals, mechanical suffocation and others. OSHA enforces regulations related to workplace safety.

The **Harborview Injury Prevention Center/ University of Washington** conducted an analysis of the effectiveness of various interventions aimed at preventing unintentional death due to suffocation. The authors suggested that legislation regarding the specificity of product labeling may be helpful in further reducing choking deaths. Specific educational interventions were found to be ineffective; while education given as part of an overall safety campaign and interventions allowing skills development (e.g., caregiver CPR) showed promise.

Recent research has suggested that 30% of deaths attributable to SIDS may be due to suffocation by soft bedding.



## Recommendations to Prevent Suffocation and Near Suffocation

### Target resources toward high-risk groups

1. Target interventions addressing unintentional suffocation among infants and toddlers and among individuals age 65 and older.

### Empower communities

2. Propose legislation requiring children's products sold in Ohio to conform to the safety standards of the Consumer Product Safety Commission and the ASTM (formerly the American Society for Testing and Materials). The resale of recalled products should be prohibited. (See the Children's Product Safety Act – Model State Legislation; [www.kidsindanger.org](http://www.kidsindanger.org))

### Expand training

3. Implement a public awareness and education campaign targeted towards professionals and parents focusing on the following messages:

#### Children

- Infants should not be put to sleep on waterbeds, sofas, soft mattresses, or other soft surfaces.
- Infants should be put to sleep on their back unless otherwise directed by physician.
- Avoid soft materials in the infant's sleeping environment.



- Bed sharing or co-sleeping may be hazardous under certain conditions.\* Parents who choose to bed share with their infant should not smoke or use substances, such as alcohol or drugs, that may impair arousal.
- Overheating and over-bundling should be avoided.
- Small objects, both food and non-food, should be kept out of the reach of young children.

#### Older Adults

- Caregivers should be encouraged to learn the Heimlich maneuver.

- \* It should be noted that the United States Consumer Product Safety Commission is on record as opposing bed sharing by an infant and an adult, particularly if there is more than 1 adult in the bed. Many cases of infant suffocation have been reported during bed sharing. However, it is recognized that a significant portion of the population practices bed sharing between mother and infant as a strategy to facilitate breastfeeding and that the presence of the father in the bed will be common. There are insufficient data to conclude that bed sharing under carefully controlled conditions is clearly hazardous or clearly safe.