

Suffocation Related Injuries in Virginia, 2002-2006

Dear Injury Prevention Advocate,

Deaths and severe injuries resulting from suffocation can be devastating to families. The promising news is that as with so many of these types of injuries, they are in most cases preventable.

Currently there has been much discussion among experts as to the likelihood that many cases of suffocation among infants due to an improper sleeping environment are often difficult to discern from Sudden Infant Death Syndrome (SIDS). These fatalities are often very hard to accurately diagnose as the cases are emotionally difficult for all involved and therefore it is often challenging to gain a clear understanding of the situation and circumstances leading up to the death. The Centers for Disease Control and Prevention have developed uniform investigative guidelines, Sudden Unexplained Infant Death Investigation (SUDI), to assist those responsible for infant-death investigations increase the quality of these diagnoses. The guidelines can be found at www.cdc.gov/SIDS/SUID. However at this time, these guidelines are not being universally adopted.

This report is interesting in that it identifies a high-risk group for suffocation that tends to be overlooked. When victims of suffocation are discussed, the first images that usually come to mind are children. However, as this report highlights, data indicates that the elderly are often victims as well. More needs to be done in this area to better understand and to address this problem.

This report and previous reports are available for download at www.vahealth.org/civp.

Thank you for your efforts in preventing injuries in your community.

Sincerely,



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Introduction

Those who suffer a suffocation related injury run the risk of death or permanent brain damage caused by lack of oxygen or blocked airways. Suffocation is the 4th leading cause of unintentional injury death in the United States and Virginia. In 2004 in the United States, there were 14,043 deaths and an estimated 41,382 visits to an Emergency Room due to suffocation injuries¹.

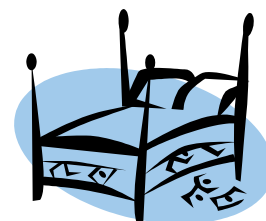
Case Briefs

Case One:

A three-month-old infant was placed on an adult-sized bed on a weekday morning while the infant's mother prepared the older children for school in another part of the home. The infant was sleeping when placed on the bed and was put on her back. Upon the mother's return, approximately one hour later, the infant was found wedged tightly between the bed and the adjacent wall. The infant was in a head-up position with the mattress at the level of the upper chest. At the time of her discovery, she was pale, not breathing and had no heartbeat.

Case Two:

An eighty-three-year-old man was an inpatient at a rehabilitation and nursing center following heart surgery. The patient also had leg weakness requiring a walker to stand. At approximately 6:30 am, the nursing staff found the patient sitting on the floor adjacent to his bed. His bed sheets were partially pulled from the bed as if he had slipped from the bed. The call button cord, which had been secured to the bed for ease of use, was firmly pressed against the front and sides of his neck. He was not breathing and did not have a heartbeat.



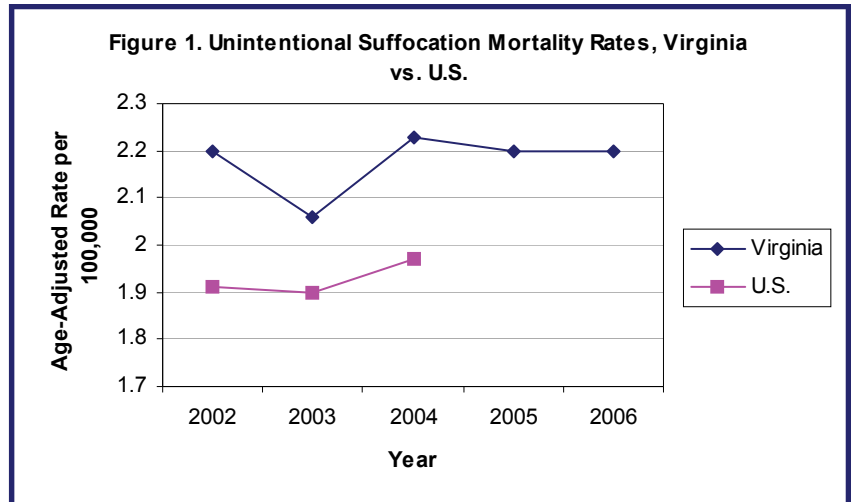
Virginia Suffocation Mortality

In Virginia, from 2002-2006, there were 1,583 deaths as the result of a suffocation related injury. Forty-eight percent were unintentional, 47% were suicides, 4.7% were homicides, and 0.3% were of an undetermined intent. Suffocation related suicides and homicides resulted from hanging, strangulation, or submersion.

Unintentional Suffocation Mortality

There were 760 unintentional suffocation deaths in Virginia from 2002-2006 for a five year crude rate of 2.03 per 100,000. Comparing age-adjusted rates from 2002-2004 (the most recent U.S. data available), Virginia unintentional suffocation rates were higher than U.S. rates².

Most suffocation related deaths were the result of the inhalation/ingestion of a foreign object or food (see Table 1). When combined they resulted in over 75% of all unintentional related suffocation deaths (66% from the inhalation/ingestion of a foreign object and 11% from inhalation/ingestion of food).



Infants less than one year old and elderly Virginians 75 and older had higher rates of unintentional suffocation death than any other age group (see Figure 1). Among the elderly 75 and older, 83% of deaths were due to the inhalation and ingestion of other objects (any object except food or vomitus) causing obstruction of the respiratory tract.

Suffocation is the leading cause of unintentional injury related deaths among infants under age 1. From 2002-2005, 79% of infant suffocation deaths occurred in a sleeping environment. Infants are especially vulnerable to suffocation because of their inability to lift their heads or extract themselves from tight places. Infants can easily suffocate in a sleeping environment when they become wedged or buried against a mattress, pillow, cushion, soft bedding, or when someone rolls over on them.*

The five year male mortality rate (2.22 per 100,000) was higher than the female mortality rate (1.86 per 100,000). The White, Non-Hispanic death rate (2.23 per 100,000) was higher than the minority death rate (1.55 per 100,000).



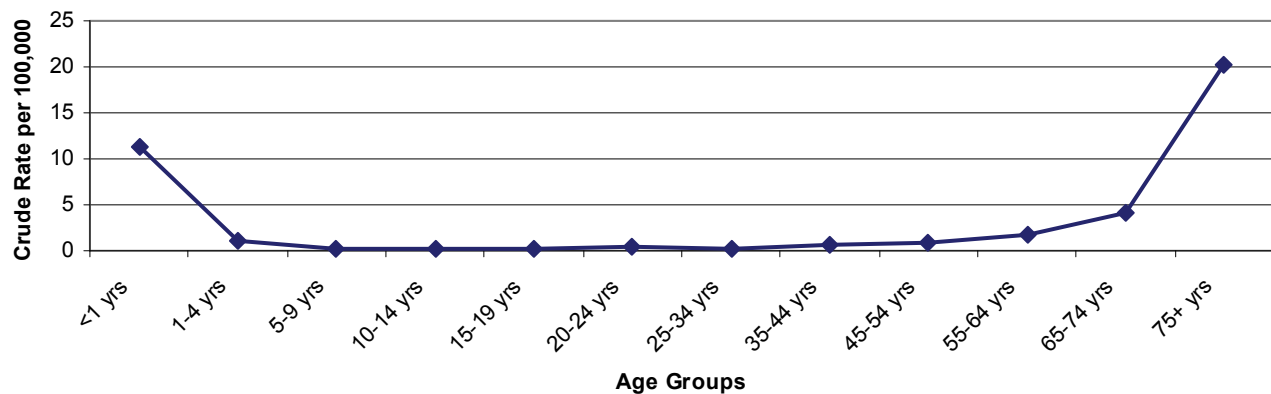
Sudden Infant Death Syndrome (SIDS)*

Suffocation related injury deaths among infants in this report do not include Sudden Infant Death Syndrome (SIDS). Despite this, it is estimated that around 900 deaths attributed to SIDS each year may actually be caused by suffocation due to soft bedding.³

Table 1. Number of Suffocation Deaths by Cause and Age Group, Virginia 2002-2006

Type of Suffocation Death	Age Groups												Total
	<1	1-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+	
Inhalation/Ingestion of Other Objects	4	3	1	0	2	5	5	12	19	44	78	334	507
Inhalation/Ingestion of Food	2	4	1	0	0	0	2	4	8	13	13	40	87
Suffocation/Strangulation in Bed	45	1	0	0	1	0	0	0	0	0	0	2	49
Other Hanging/Strangulation	1	8	1	5	1	2	2	8	3	2	1	0	34
Inhalation of Gastric Substances	0	0	0	0	0	0	0	1	6	6	1	18	32
Cave-In/Falling Earth	0	0	0	0	1	0	0	1	4	2	0	0	8
Confined/Trapped in Low O ² Environments	0	0	0	0	0	0	0	0	1	0	0	0	1
Other	5	4	1	2	0	2	5	7	3	4	2	7	42
Total	57	20	4	7	5	9	14	33	44	71	95	401	760

Suffocations are the leading cause of injury related deaths among infants less than one year old.

Figure 2. Unintentional Suffocation Mortality Rates by Age, Virginia, 2002-2006

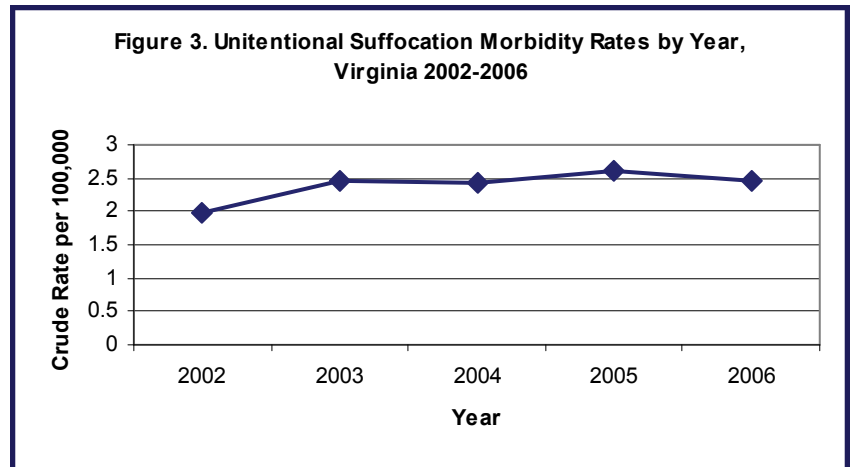
Virginia Suffocation Morbidity

During the same five year period (2002-2006), there were 1,015 hospitalizations related to suffocation injuries. The five year crude rate was 2.71 per 100,000. A majority (88%) of suffocation hospitalizations were unintentional. Eleven percent of hospitalizations were self-inflicted and 1% were assaults.

Unintentional Suffocation Morbidity

There were 893 unintentional suffocation related hospitalizations in Virginia from 2002-2006, accounting for 88% of all suffocation hospitalizations. The five year crude rate was 2.39 per 100,000. As seen in Figure 3, suffocation hospitalizations have increased over the five year period. From 2002 to 2006 unintentional suffocation hospitalization rates increased by 23%.

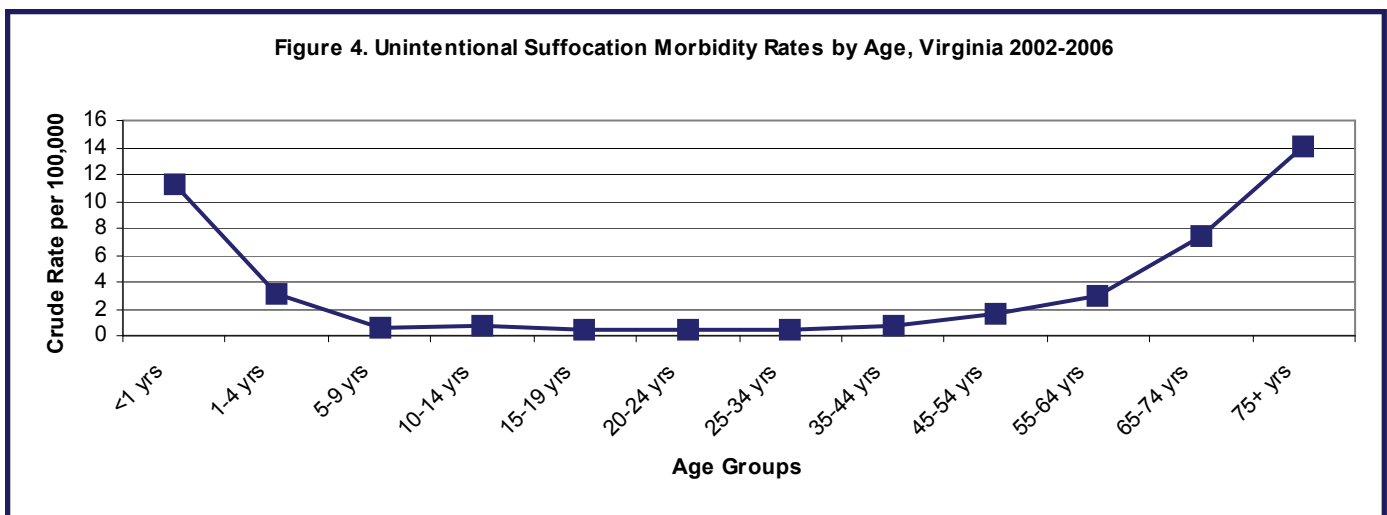
The average length of stay for an unintentional suffocation hospitalization was 6.4 days. These hospitalizations resulted in charges of more than \$23 million, with a median charge of \$12,104 per episode of care.



Most suffocation related hospitalizations were the result of the inhalation/ingestion of a foreign object or food. When combined they resulted in almost 100% of all unintentional related suffocation deaths (63% from the inhalation/ingestion of a foreign object and 36% from an inhalation/ingestion of food).

Suffocation hospitalization rates were highest among infants, 1-4 year olds, and the elderly 65 and over (see Figure 4). Among infants, 53% of suffocations were the result of the inhalation/ingestion of an object, while 45% were from food. Among children 1-4 years old, a majority (53%) of suffocations were due to the inhalation/ingestion of food, while 47% were from an object. Among the elderly 65 and older, 61% of suffocations were the result of the inhalation/ingestion of an object, while 38% were from food.

Overall, males and females experienced similar rates of unintentional suffocation hospitalizations, with 2.45 per 100,00 and 2.34 per 100,000 respectively. Similarly, there was little difference between hospitalizations for whites and blacks (2.56 per 100,000 and 2.46 per 100,000 respectively).



PREVENTION TIPS

Elderly Suffocation Tips

Little literature or research exists concerning suffocation and the elderly population. Of the information available, a common medical condition among the elderly called dysphagia (difficulty swallowing), is believed to play a role in elderly suffocation. Dysphagia can occur as the result of muscles weakening with age or from central nervous system problems such as stroke and Parkinson's disease.⁴ Dysphagia can make even simple tasks such as swallowing food or medication difficult. To reduce the risk of suffocation follow these tips:

- Avoid eating when not fully conscious (e.g. just awakening from sleep).
- Reduce environmental distraction.
- Select food with appropriate texture e.g. purees, thick (creamed soup) or semi-thick liquids (pureed fruit juices).
- Select appropriate utensils or feeding modules e.g. small straw, small spoon, enlarged-handle spoon, adapted chopsticks, scoop bowl, etc.
- Keep proper positioning (i.e. upright sitting, head in upright position and not tilted backwards).
- Oral-motor exercises can strengthen muscles and improve closure during swallowing, seek the advice from a physiotherapist, occupational therapist, speech therapist or other appropriate health professionals.
- Ensure good denture fit.
- Prepare food by slicing and dicing foods to manageable pieces, cooking vegetables, chopping up hot dogs, and not eating candies or thick, sticky substances such as peanut butter.



PREVENTION TIPS

Infant and Child Suffocation Tips

Infant Prevention Tips:

Most infant suffocations occur in the sleeping environment. To decrease the risk of suffocation, follow these prevention tips:

- Place an infant on his/her back on a firm, flat crib mattress in a crib with a JPMA (Juvenile Products Manufacturers Association) label indication that it meets national safety standards. Cover the mattress with a fitted sheet designed for use with a crib mattress.
- Remove pillows, comforters, stuffed toys, crib bumpers/pads, and other soft products from the crib.
- Use a sleep sack or swaddle to keep the child warm.
- Ensure that the crib has no missing, improperly placed, loose or broken hardware.
- Check the spacing between crib slats to ensure that the baby's body cannot slide through the opening. Crib slats should be no more than 2 and 3/8" apart (about the width of a soda can). Old cribs with missing slats pose a significant hazard.
- Ensure that corner posts are not more than 1/16 of an inch above the end panels. This will prevent a baby's clothing from catching on the post and leading to the possibility of strangulation. If the crib has a canopy, the corner posts should be at least 16 inches high.
- Before you put an infant to sleep in a used crib, check to be sure it has not been recalled.

Childhood Prevention Tips:

Children have a natural tendency to place food and objects in their mouths. This makes them even more susceptible to choking hazards. To reduce this risk follow these prevention tips:

- Do not allow children under 3 to eat small, round or hard foods, including hot dogs, hard candy, nuts, grapes and popcorn.
- To avoid choking, always supervise young children while they are eating, and keep small objects that are potential choking hazards out of their reach.
- Toys designed for older children should be kept out of the hands of little ones.
- Ensure that children play with age-appropriate toys according to safety labels. Inspect old and new toys regularly for damage. Make any necessary repairs or discard damaged toys.
- If a toy is smaller than 1 1/4 inches in diameter and 2 1/4 inches in depth, the toy should be kept away from children under 3 years of age. Perform a "no-choke" test at home for suspicious products. If the toy/small part can fit inside a regular toilet tissue tube, then it poses a choking hazard.
- Keep balloons out of the reach of children under 8 years old. Un-inflated balloons should always be stored out of reach of young children. An adult should always supervise when children in this age group play with inflated balloons. Always deflate and throw away balloons after use and discard balloon pieces immediately.
- Check the eyes and noses of stuffed animals to ensure they are properly secured. Inspect all toys regularly for damage.
- Keep cords and strings that could be strangulation hazards (those that are 7 inches or longer) away from children.
- Check the U.S. Consumer Product Safety Commission website (www.cpsc.gov) regularly to obtain information on recent toy recalls.



RESOURCES

- ◆ Division of Injury and Violence Prevention, Virginia Department of Health
www.vahealth.org/civp/
- ◆ Office of the Chief Medical Examiner, Virginia Department of Health
www.vdh.virginia.gov/medexam/
- ◆ Center for Disease Control and Prevention, National Center for Injury Prevention and Control
www.cdc.gov/ncipc/default.html
- ◆ Safe Kids USA
www.usa.safekids.org/
- ◆ Consumer Product Safety Commission: Neighborhood Safety Network
www.cpsc.gov/nsn/nsn.html
- ◆ National Safety Council
www.nsc.org/
- ◆ American SIDS Institute
www.sids.org

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2. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS). (2005) Available from URL: <http://www.cdc.gov/ncipc/wisqars>.
3. Safe Kids. Airway Safety: Protecting Kids from Choking, Suffocation and Strangulation. www.usa.safekids.org.
4. Dysphagia. National Institute on Deafness and Other Communication Disorders. www.nidcd.nih.gov/health/voice/dysph.asp.

The Virginia Injury Update has been prepared by the Division of Injury and Violence Prevention, Virginia Department of Health with assistance from the Office of the Chief Medical Examiner, Virginia Department of Health.

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