

SHAKEN BABY SYNDROME & SUDDEN INFANT DEATH SYNDROME

Shaken Baby Syndrome

Of all types of physical child abuse, Shaken Baby Syndrome (SBS) is the most common cause of death and long-term disability in infants and young children. Though statistics are difficult to obtain, a 2003 American medical journal publication estimated that 1,300 children face severe to fatal head trauma each year and approximately 30 out of 100,000 children less than one year of age experience abusive brain injury (National Center on Shaken Baby Syndrome, n.d.).

SBS, also referred to as shaken impact syndrome or abusive head injury, refers to the “constellation of signs and symptoms resulting from violent shaking . . . (that impacts) the head of an infant or small child” (National Center on Shaken Baby Syndrome, n.d.). Accidental falls, such as those from sofas, changing tables, or fall in the arms of caretakers can cause trauma, but result in different physical symptoms than those due to SBS. In addition, activities “such as tossing in the air, bouncing on the knee, placing the child in an infant swing or jogging with them in a back pack, do not cause the brain, bone, and eye injuries characteristic of Shaken Baby Syndrome” (National Center on Shaken Baby Syndrome, n.d.).

Head injuries in young children are serious and differ from head injuries at a later age because infant’s heads are proportionately larger and heavier than in later life. A newborn’s head is 10-15% of its total body weight compared to 2-3% in the typical adult. By the age of 2, the brain is already at 75% of its total weight, though it remains immature, soft, and easily deformable. In addition, the skulls of young children are also thin, pliable, and are not yet fused, making them extremely vulnerable to forceful shaking (Case, n.d.).

Upon initial presentation at a hospital or doctor’s office, commonly reported symptoms that could lead

to a diagnosis of SBS in a child include lethargy, extreme irritability, decreased appetite, vomiting, no smiling, poor sucking or swallowing, rigidity, breathing difficulties, seizures, larger than normal forehead or head and bulging soft spot, inability to lift head, inability of eyes to track, unequal pupil size, and occasional bruises on arms or chest. After a medical examination using x-rays, CT scans, and MRI’s, several physical symptoms indicate the further possibility of SBS.

1. Subdural hemorrhage

The most common hemorrhage seen in SBS- Bleeding in the middle layer of the membrane covering of the brain

2. Subarachnoid hemorrhage

Bleeding in the innermost layer of the membrane covering of the brain

3. Retinal hemorrhages

Seen in 70-85% of SBS cases- bleeding in all layers of the retina and eye- requires an ophthalmologic consultation for correct diagnosis- traumatic retinoschisis is the type of retinal hemorrhage highly specific to SBS

4. Diffuse axonal injury

Tears in the brain which destroy nervous system function- due to acceleration-deceleration movement of the head in a rotational manner when shaken

(Case, n.d.; National Center on Shaken Baby Syndrome, n.d.)

Most SBS cases occur in children less than 2 years of age, but cases have been noted in children up to age 5 (National Institute of Neurological Disorders and Stroke, 2007). The average age of children with abusive brain injury is 5-9 months old (National Center on Shaken Baby Syndrome, n.d.). In general, approximately 25% of SBS victims die within several hours to a few days following the injury. Of those who survive, as many as 90% experience life-

long disabilities ranging from learning disabilities, impairment (cognitive, physical, visual, or hearing), cerebral palsy, seizures, paralysis, and vegetative states (Reece, n.d.; National Center on Shaken Baby Syndrome, n.d.).

In a 2004 study of 81 confirmed cases of SBS, 100% of the children had bleeding in the brain, 83% had retinal hemorrhages, 15% had other abuse injuries, 19% died from their injuries, 71% of the survivors faced impairments, and 10% of the survivors were diagnosed as “normal”. In the same study, 56% of the perpetrators of the abuse were the child’s father, 16% were the mother’s boyfriend, 15% were the mother, 5% were the babysitter, and 9% were other people (Reece, n.d.).

Education is the primary prevention tool for SBS. For example, crying is one behavior exhibited by young children that most often leads a caregiver to shake. A researcher in British Columbia began an educational program on normal infant crying called *The Period of Purple Crying*. This program is currently undergoing continued scientific testing, with results expected during 2008 (McIlroy, n.d.). Another education initiative is DADS 101. After noting that 79% of SBS perpetrators are males, the Child Abuse Prevention Center began the program in Utah during 1994. In addition to offering fliers and brochures, the program trains and educates fathers about basic care of babies, the impact of shaking babies, crying, and other topics (National Center on Shaken Baby Syndrome, n.d.[a]).

Education for caregivers other than parents is also a necessity. According to Texas Law, any licensed daycare that cares for children under 24 months old must participate in a minimum of one hour of annual training for the recognition and prevention of SBS (National Center on Shaken Baby Syndrome, n.d.[b]).

Sudden Infant Death Syndrome

Sudden Infant Death Syndrome (SIDS) is the “sudden death of an infant under one year of age, which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history” (National SIDS/Infant Death Resource Center, 2005). The majority of SIDS cases occur by the end of a child’s sixth month, with most cases occurring between 2-4 months old. SIDS deaths occur quickly and are usually associated with sleep and no signs of suffering. SIDS deaths are more likely to be reported in the fall and winter seasons and male infants are 30-50% more likely to

be affected by SIDS than females. SIDS affects families of all races and socioeconomic levels; though research indicates that African-American, Native American, and Alaskan American infants have consistently higher rates of SIDS than other ethnic groups (Hunt & Hauck, 2006; National SIDS/Infant Death Resource Center, 2005).

United States number of infant deaths, mortality rate, and rankings by ethnicity due to SIDS				
<i>Ethnicity</i>	<i>Year</i>	<i>Rank among causes of death</i>	<i>Number of deaths</i>	<i>Rate</i>
All races	2003	3	2,162	52.9
	2004	3	2,247	54.6
White	2003	3	1,173	50.5
	2004	3	1,240	54.0
Black	2003	3	627	108.8
	2004	3	642	110.9
Hispanic	2003	4	234	25.6
	2004	3	261	27.6
American Indian	2003	2	53	124.0
	2004	2	44	100.2
Asian	2003	3	61	27.7
	2004	4	55	24.0

(Mathews & MacDorman, 2007 and 2006)

Scientists currently believe that babies who die of SIDS experience a variety of risk factors that make them more vulnerable to normal infant stresses. Those risk factors include underlying physical defects or abnormalities, a lack of stability during the critical developmental period (the first 6 months of life), and a variety of environmental stressors, such as how and where the infant sleeps. In the mid-1990’s, a *Back to Sleep Campaign* was begun as an educational tool to reduce the risk of SIDS. This campaign recommended that infants be placed only on their backs when sleeping. The public showed some resistance to infant back-sleeping due to concerns about choking and sleep disruption (Carolan, 2000), but there has been a marked decrease in the incidence of SIDS since the beginning of the campaign in 1994. The decreasing prevalence of infant death and SIDS deaths during the last two decades is included in the chart on the following page.

U.S. Prevalence of SIDS compared to all sources of infant mortality				
Year	Infant Mortality Total	Infant Mortality Rate	SIDS Total	SIDS Rate
1990	38,351	9.2	5,417	1.30
1991	36,766	8.9	5,349	1.30
1992	34,628	8.5	4,890	1.20
1993	33,466	8.4	4,669	1.17
1994	31,710	8.0	4,073	1.03
1995	29,505	7.6	3,397	0.87
1996	28,419	7.3	3,050	0.78
1997	27,968	7.2	2,991	0.77
1998	28,325	7.2	2,822	0.71
1999	27,864	7.0	2,648	0.66
2000	27,960	6.9	2,523	0.62
2001	27,523	6.8	2,234	0.55
2002	28,034	7.0	2,295	0.57
2003	28,025	6.8	2,162	0.52
2004	27,936	6.7	2,246	0.55

(National SIDS/Infant Death Resource Center, 2006)

In 2005, the American Academy of Pediatrics released a policy statement that provided 11 guidelines to reduce risk factors for SIDS based on the latest scientific research (American Academy of Pediatrics, 2005).

1. Infants should be placed on the back during every sleep; stomach and side sleeping are not advised.
2. Use a firm sleep surface: Soft materials or objects such as pillows, quilts, comforters, or sheepskins should not be placed under a sleeping infant. A firm crib mattress, covered by a sheet, is the recommended sleeping surface.
3. Keep soft objects and loose bedding out of the crib.
4. Do not smoke during pregnancy and avoid exposing an infant to second-hand smoke.
5. A separate but nearby sleeping environment (preferable in the same room as the caregivers) is recommended. Because it is very dangerous to sleep with an infant on a couch or armchair, no one should sleep with an infant on these surfaces.
6. Consider offering a pacifier at nap time and bedtime: although the mechanism is not known, the reduced risk of SIDS associated with pacifier use during sleep is compelling.
7. Avoid overheating: The infant should be lightly clothed for sleep, and the bedroom temperature should be kept comfortable for a lightly clothed adult.

8. Avoid commercial devices marketed to reduce the risk of SIDS: Although various devices have been developed to maintain sleep position or to reduce the risk of re-breathing, none have been tested sufficiently to show efficacy or safety.

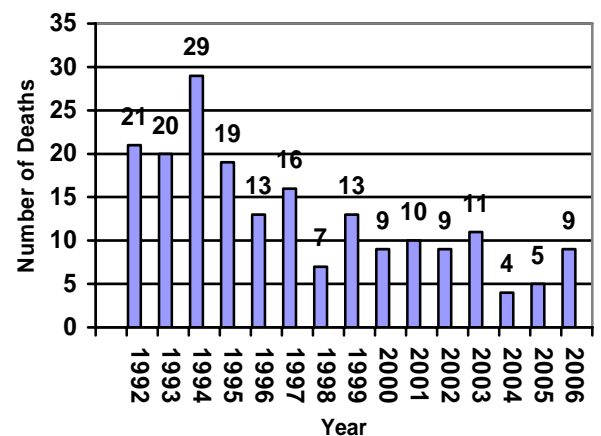
9. Do not use home monitors as a strategy to reduce the risk of SIDS.

10. Avoid development of positional plagiocephaly, or an asymmetrically-shaped head, by encouraging “tummy time” when awake and alternating back sleeping positions.

11. The American Academy of Pediatrics recommends continuing the Back to Sleep campaign: Public education should be intensified for secondary care-givers (child care providers, grandparents, foster parents, and babysitters). The campaign should continue to have a special focus on the black and American Indian/Alaska Native populations. Health care professionals in intensive care nurseries, as well as those in well-infant nurseries, should implement these recommendations.

In Texas, the third most common cause of infant death in 2000 was attributed to SIDS (Texas Department of Health, 2001), though rates have continued to drop since 1980. SIDS tends to affect African American children in Texas at an alarming rate: 1.7 per 1,000 live births as compared to 0.6 per live births for the general Texas population (Texas Department of Health, 2001). In Bexar County, the rate of SIDS has fluctuated from year to year, but has also declined, likely due to the educational campaigns.

SIDS in Bexar County



(San Antonio Metropolitan Health District, 2006); K. Ratcliff (personal communication for 2006 data only, October 15, 2007)

SBS/SIDS Resources in Texas

In addition to programs offered by hospitals, several non-profit organizations and research institutions in Texas focus primarily on SBS and/or SIDS. The Shaken Baby Alliance is based in Fort Worth and provides information and support to families of SBS victims (The Shaken Baby Alliance, 2007). In Houston, the Southwest SIDS Research Center was created in 1984 to advance research about SIDS and provide comprehensive care for children at high risk for the syndrome (Southwest SIDS Research Institute, n.d.). In Bexar County, the Center for Infant and Child Loss (a program of Any Baby Can San Antonio) provides information, education, and grief support for families touched by SBS and SIDS (Center for Infant and Child Loss, 2007).

References

- American Academy of Pediatrics. (2005). The changing concept of Sudden Infant Death Syndrome: Diagnostic, coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics*, 116(5), 1245-1255.
- Carolan, P.L. (2000). Potential to prevent carbon dioxide rebreathing of commercial products marketed to reduce sudden infant death syndrome risk. *Pediatrics* 105(4), 774-779. Retrieved October 15, 2007, from <http://pediatrics.aappublications.org/cgi/content/abstract/105/4/774?ck=nck>
- Case, M. E. (n.d.) *Pathology of abusive head injuries in infants and young children*. Retrieved October 8, 2007, from <http://dontshake.com/Subject.aspx?categoryID=27&PageName=articles.htm>
- Center for Infant and Child Loss. (2007). *Center for infant and child loss*. Retrieved October 15, 2007, from <http://www.infant-loss.org/>
- Hunt, C. E. & Hauck, F. R. (2006). Sudden Infant Death Syndrome. *Canadian Medical Association Journal*, 174(13), 1861-1869. Retrieved on October 12, 2007, from <http://www.cmaj.ca/cgi/content/full/174/13/1861>
- Mathews, T. J., & MacDorman, M.F. (2007). Infant mortality statistics from the 2004 period linked birth/infant death data set. *National vital statistics report*, 55(15). Retrieved on October 12, 2007, from www.cdc.gov/nchs/data/nvsr/nvsr55/nvsr55_14.pdf
- Mathews, T. J., & MacDorman, M.F. (2006). Infant mortality statistics from the 2003 period linked birth/infant death data set. *National vital statistics report*, 54(16). Retrieved on October 12, 2007, from http://thecommunityguide.org/nchs/data/nvsr/nvsr54/nvsr54_16.pdf
- McIlroy, A. (n.d.). *Understanding infant crying*. Retrieved October 12, 2007 from the National Center on Shaken Baby Syndrome Web site, from <http://dontshake.com/Subject.aspx?categoryID=13&PageName=ResearchOnCrying.htm>
- National Center on Shaken Baby Syndrome. (n.d.). *Medical facts*. Retrieved October 8, 2007, from <http://www.dontshake.org/Audience.aspx?categoryID=8&PageName=MedicalFactsAnswers.htm>
- National Center on Shaken Baby Syndrome. (n.d.[a]). *Dads 101*. Retrieved October 12, 2007, from <http://www.dontshake.com/Audience.aspx?categoryID=10&PageName=Dads101.htm>
- National Center on Shaken Baby Syndrome. (n.d.[b]). *Legislation: Texas*. Retrieved October 12, 2007, from <http://dontshake.com/Subject.aspx?categoryID=5&PageName=FutEffortLegislation.htm>
- National Institute of Neurological Disorders and Stroke. (2007). *Shaken Baby Syndrome information page*. Retrieved October 8, 2007, from <http://www.ninds.nih.gov/disorders/shakenbaby/shakenbaby.htm>
- National SIDS/Infant Death Resource Center. (2006). *Statistics*. Retrieved October 12, 2007, from <http://www.sidscenter.org/Statistics.aspx?fromparent=parent&id=6&heading=Statistics>
- National SIDS/Infant Death Resource Center. (2005). *What is SIDS?* Retrieved October 12, 2007, from <http://www.sidscenter.org/WhatIsSIDS.aspx?fromparent=parent&heading=WhatIsSIDS?>
- Reece, R. (n.d.). *What does the recent literature tell us about Shaken Baby Syndrome?* Retrieved from the National Center on Shaken Baby Syndrome Web site on October 8, 2007, from <http://dontshake.com/Subject.aspx?categoryID=27&PageName=articles.htm>
- San Antonio Metropolitan Health District. (2006). *Health Profiles 2005*. Retrieved October 12, 2007, from <http://www.ci.sat.tx.us/health/Profiles/hp2005/deaths/4.pdf>.
- The Shaken Baby Alliance. (2007). *About us*. Retrieved October 15, 2007, from <http://shakenbaby.org/aboutus/>
- Southwest SIDS Research Institute. (n.d.). *Southwest SIDS research institute*. Retrieved October 15, 2007, from <http://www.swsids.com/index.php>
- Texas Department of Health: Bureau of Vital Statistics. (2001). *Texas Child Fatality review teams: Biennial report 2000-2001*. Retrieved October 15, 2007, from http://www.childdeathreview.org/reports/TXState_00.2001.pdf