

REPORT TO THE TWENTY-FIFTH LEGISLATURE

STATE OF HAWAI'I

2009

PURSUANT TO:

CHAPTER §321-33, SECTION 3, HAWAI'I REVISED STATUTES,
REQUIRING THE DEPARTMENT OF HEALTH TO SUBMIT A REPORT ON
SHAKEN BABY SYNDROME

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Introduction

Hawai'i Revised Statutes (HRS) Chapter §321-33 was enacted by the 2007 Legislature to address the problem Shaken Baby Syndrome (SBS), a form of severe child abuse. The purpose of HRS Chapter §321-33 is "to enable a hospital, including a public health facility, to provide information regarding SBS to parents of all newborns under its care."

Shaken Baby Syndrome is defined as an injury caused by the vigorous shaking of an infant or young child that may result in injuries, such as, subdural hemotoma, head injury, irreversible brain damage, blindness, retinal hemorrhage, eye damage, cerebral palsy, hearing loss, spinal cord injury, paralysis, seizures, learning disability, central nervous system injury, rib fracture or death.

In Hawai'i, there were 12 cases of SBS identified by hospitals over the five-year period 2003-2007, with the annual total of up to 4 cases per year. The statistics for same 5-year period show that there were 70 cases of intentional assaults on children under the age of 3 years leading to nonfatal head injuries, including SBS. In those same years, 8 children died of intentional fatal head injuries. About half of those children were infants. Almost two-thirds were male. The most commonly specified perpetrator was the male partner of the child's mother.

The Department of Health (DOH) recognizes that SBS is a serious condition that could be prevented if parents of newborns are educated regarding the harmful effects of a moment's violent loss of control. Prevent Child Abuse Hawai'i (PCAH) is the nonprofit organization willing to provide hospitals and public health facilities with written educational materials about the dangerous effects of SBS and the different methods of preventing SBS. Research by Dias, et al¹, demonstrated that a SBS education program for parents at the correct time (upon the birth of a child) decreased head injuries caused by shaking infants and toddlers by 47%. Their project included having parents sign a voluntary commitment statement reminding them of the dangers of shaking an infant and their commitment to refrain from that abuse.

The DOH also recognizes that SBS is one of many critical infant care issues that require prevention education and ongoing reinforcement by health professionals and community agencies. Since people learn in different ways, information is more effective when presented in a variety of methods and media, and through different venues. This parenting information and education should begin in middle and high schools, continue in the prenatal period and be ongoing throughout infancy into the early childhood years.

¹ Dias, MS, et al: Preventing abusive head trauma among infants and young children: A hospital-based, parent education program, *Pediatrics* 115(4): 470-477, 2005.

The DOH provides a report to the 2009 Legislature on the following (Act 216, Section 3):

1. Response to Section 3.1 that requests:

“Statistics on the number of hospitals, since this Act took effect (June 27, 2007), that have provided all parents of newborns with written educational information about the dangerous effects of shaken baby syndrome and the different methods of preventing shaken baby syndrome.”

- a. In August of 2008, surveys were conducted with key administrative, medical, nursing, social work, clinical education, and performance improvement staff from 13 different hospitals in Hawai'i. The survey asked whether the hospitals had provided parents of newborns any written educational information about the dangerous effects of SBS and methods of its prevention. Two-thirds of the 13 respondent hospitals have protocols in place to provide parents with information on SBS prevention.
- b. The survey (Attachment A) also included questions about SBS policies and staff training. As many as 85% of institutions surveyed did not have a formal written policy and 100% of respondents were open to developing one if provided with a recommendation or draft. Eighty-five percent were open to staff training assistance.
- c. As a result of survey findings, a recommended policy on SBS prevention was drafted by the DOH Advisory SBS Committee members and provided to all the participating institutions.

2. Response to Section 3.2 that requests:

“Statistics on the number of cases of shaken baby syndrome to see the results of providing this educational material to parents of newborns.”

- a. Although HRS §321 specifically pertains to SBS, the scope of this report was widened to include abusive and possibly abusive injuries of all types among Hawai'i children under 4 years of age. This approach will help mitigate the diagnostic and medical coding challenges presented by SBS. Also, it was felt that most cases of SBS result from a deliberate, assaultive act, and any prevention initiative that succeeds in reducing that type of behavior towards children should have a favorable impact on all types of injuries to all areas of the body.

Thus, this report describes the annual number of 4 types of fatal and nonfatal injuries among state residents less than 4 years of age. Diagnostic groupings were progressively widened to include:

- 1) Shaken baby syndrome (SBS)
 - 2) Traumatic brain injuries (TBI)
 - 3) Other types of head injuries (including TBI)
 - 4) Injuries to all areas of the body.
- b. Since the Statute was passed in June of 2007, this report does not include a statistical evaluation of the effectiveness of providing educational materials to parents. As noted above, most hospitals do not have written policies regarding SBS prevention, and of course a systematic approach at working with hospitals to address this issue and provide appropriate prevention programs has yet to be undertaken. In the meantime, Attachment B provides a description of fatal and nonfatal injuries due to SBS and other forms of child abuse over the 2003 through 2007 period. These data may serve as a rough baseline to track injuries related to abuse in the future.

3. Response to Section 3.3 that requests:

“Recommendations, including suggested legislation, on improving methods and policies necessary to provide for the safety of newborn children.”

- a. The DOH recommends that hospitals develop policies and appropriate prevention programs for SBS. A hospital-based policy regarding a parent education program targeting parents of all newborns has the potential to reduce the incidence of SBS and could save lives and reduce the costs of caring for victims of abusive head injuries. A voluntary commitment statement that parents sign promising to refrain from abusing their child to increase its effectiveness is a suggestion to be included in the policy.
- b. A system-level approach is recommended to create universal hospital coding systems and surveillance systems for diagnoses and classifications of traumatic brain injuries, other types of head injuries, and injuries to all areas of the body.
- c. At this time, the DOH does not recommend further legislation regarding the provision of SBS information in hospitals. The DOH will continue to work collaboratively with PCAH, hospitals, community stakeholders, and health professionals to develop and implement policies, and to provide information to parents on SBS, safe sleep position and environment, developmental milestones, infant care and safety, and other important issues.

Hospital Survey
(By Donna L. Ching, The Mahakea Group)

1. A survey was conducted in August of 2008 with key administrative, medical, nursing, social work, clinical education, and performance improvement staff from 13 different hospitals in Hawai'i. The survey asked whether the hospitals had provided parents of newborns any written educational information about the dangerous effects of SBS and methods of prevention. The hospitals surveyed were Castle Medical Center, Hilo Medical Center, Kaiser Moanalua Medical Center, Kapiolani Medical Center for Women and Children, Kauai Veterans Memorial Hospital, Kahuku Medical Center, Kona Community Hospital, Maui Memorial Medical Center, Molokai General Hospital, North Hawai'i Community Hospital, Queens Medical Center, Tripler Army Medical Center, and Wilcox Memorial Hospital. The survey also included questions about policies and staff training.

2. The survey findings on policy, procedures and educational materials provided by hospitals are as follows:

1. Does your institution have a written policy regarding educating parents of newborns on the prevention of Shaken Baby Syndrome (SBS) prior to discharge?

Value	Count	Percent
No	13	81.25%
Yes	2	12.50%
Unsure	1	6.25%
Total Responses:	16	

2. Whether you have a policy or not, would you like to receive recommended policy on SBS prevention measures?

Value	Count	Percent
Yes	16	100.00%
Total Responses:	16	

3. Does your institution currently implement any SBS prevention education program for parents?

Value	Count	Percent
Yes	10	62.50%
No	3	18.75%
Unsure	3	18.75%
Total Responses:	16	

4. Would you like to see a list of recommended SBS educational materials?

Value	Count	Percent
Yes	16	100.00%
Total Responses:	16	

5. Are you willing to share these with other institutions?

Value	Count	Percent
No	15	93.75%
Yes	1	6.25%
Total Responses:	16	

6. Have any of your staff had SBS prevention training?

Value	Count	Percent
No	13	81.25%
Unsure	3	18.75%
Total Responses:	16	

7. If yes, please indicate the kinds of training.

Value	Count	Percent
Pamphlet, flyer or written material	3	100.00%
Verbal counseling	1	33.33%

Video viewing	1	33.33%
Total Responses:	3	

8. Would you like assistance identifying SBS prevention staff training options?

Value	Count	Percent
Yes	14	87.50%
Maybe	1	6.25%
No	1	6.25%
Total Responses:	16	

- Based on the findings above, two-thirds of the 13 respondent hospitals have protocols in place to provide parents with information on SBS prevention. The additional 3 responses are from hospitals which had more than one person responding, but their answers were cross-checked for consistency.

However, without the benefit of access to charted documentation, we cannot necessarily infer with certainty that two-thirds of parents of newborns actually receive information on SBS prevention.

We know that as many as 85% of institutions surveyed do not have a formal written policy but that 100% of respondents were open to developing one if provided with a recommendation or draft, while 85% were open to staff training assistance.

As a result of this survey finding, a recommended policy on SBS prevention was drafted by the DOH Advisory SBS Committee members. It was provided to all the participating institutions and posted to the newly established *safebaby.tv* website.

- The hospital staff recommended personally reviewing the educational information with parents and stressing methods of preventing SBS in order to enhance retention of the information. They recommended that educational information be written at low literacy levels and translated into other languages. Financial support should be given to PCAH or other non-profit agencies that provide written educational information or should be printed by the hospitals themselves.

The staff suggested that the prevention information also be presented via radio, video, and TV for audio and visual learners. The SBS prevention message is important for all parents, but should be directed toward parents who are single,

have poor coping skills, are in strained relationships, and those who have a history of substance abuse, emotional problems and/or domestic violence.

The staff also recommended that the prevention message should be consistently taught in a variety of community-based settings such as in schools with teens, in the pediatrician's office, and at home visits by family support workers. The prevention message should include information on why a baby cries and the various methods of coping with the baby's crying and stress. Family strengths, support programs, assistance, and resources (i.e., telephone parenting advice or crisis hotline) should be emphasized and made available to parents.

**Data on Fatal and Nonfatal Injuries
Among Hawai'i Residents Less Than 4 Years of Age**
(By Dan Galanis, PhD, Epidemiologist, DOH, Injury Prevention and Control Program)

1. Although HRS §321 specifically pertains to SBS, the scope of this report was widened to include abusive and possibly abusive injuries of all types among Hawai'i children under 4 years of age. This approach will help mitigate the diagnostic and medical coding challenges presented by SBS. Also, it was felt that most cases of SBS result from a deliberate, assaultive act, and any prevention initiative that succeeds in reducing that type of behavior towards children should have a favorable impact on all types of injuries to all areas of the body.

Thus, this report describes the annual number of 4 types of fatal and nonfatal injuries among state residents less than 4 years of age. Diagnostic groupings were progressively widened to include:

- a. Shaken baby syndrome (SBS)
 - b. Traumatic brain injuries (TBI)
 - c. Other types of head injuries (including TBI)
 - d. Injuries to all areas of the body.
2. **Methods:** The data source for nonfatal injuries is the Hawai'i Health Information Corporation, which receives abstracts of all inpatient (hospitalization) and emergency department (ED) records in the state. Patients who died in the hospital or ED were excluded, as were non-residents. Also excluded were patients who were transferred to another hospital at discharge, to avoid duplicate counting. Injuries from these records were described under the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9CM) system, using the Barell Injury Diagnosis Matrix². Intent of injury was assigned using the CDC recommended framework³. Injuries of any priority diagnosis were included in analyses.

Fatal injuries were described using the death certificate database maintained by the Hawai'i State DOH. These data were coded using the ICD-10 system, which

² Fingerhut, LA, Aharonson-Daniel, L. Mackenzie, EJ, Ziv, A. Boyko, V. Abargel, A. Avitzour, M. Heruti, R. The Barell matrix, *Inj. Prev.* 2002; 8:259.

³ Recommended framework of E-code groupings for presenting injury mortality and morbidity data (February 1, 2007). Centers for Disease Control and Prevention, National Center for Injury Prevention and Control website. Available from: <http://www.cdc.gov/ncipc/whatsnew/matrix2.htm>.

does not contain a specific code for shaken baby syndrome. In lieu of specific codes, open text descriptions of the injuries were searched to identify deaths due to SBS, but this approach is limited and unreliable. Fatal TBI were defined per CDC guidelines⁴, and general head injuries by the S00 through S09 code series of ICD-10. Intent of injury was determined using the CDC injury mortality matrix⁵.

3. Shaken Baby Syndrome Findings:

- a. There were 12 cases of SBS coded at hospitals around the state over the 5-year period, with the annual total varying inconsistently from 0 to 4.
- b. All but one of the patients were admitted to hospitals. Eight of the patients were residents of Honolulu County; 3 were from the island of Maui; and 1 from the island of Hawai'i.
- c. All 12 were infants (under 1 year of age), and most (10) were males.
- d. All 12 patients ultimately had routine discharges to home.
- e. Most of the hospitalizations were long stays; 9 of the patients were admitted for 8 days or more, including 5 who were admitted for 24 days or longer. The average charge for each hospitalization was over \$80,600, while the single ED visit resulted in \$2,300 in charges.
- f. Unfortunately, information on the perpetrator was provided for only 3 of the cases: 2 were shaken by the "father, stepfather or boyfriend," and 1 by "grandparent." No further details were available on the remaining cases.
- g. There is no ICD-10 code in mortality records for "shaken baby syndrome," so the open text field "describe how injury occurred" on death certificates was searched for words or phrases that would describe this type of injury.
- h. None of the 14 fatalities coded as homicides or the 6 deaths of undetermined intent included such descriptions, although this information is often vague or missing. The closest possible case involved a death of undetermined intent in which the victim "died of subdural hematoma of uncertain etiology," although this was not specific enough to be considered SBS.

⁴ External cause of injury mortality matrix. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control website. Available at: <http://0-www.cdc.gov.mill1.silibrary.org/nchs/about/otheract/ice/matrix10.htm>

⁵ Marr AI, Coronado VG, eds. Central nervous system injury surveillance data submission standards---2002. Atlanta, GA: US Department of Health and Human Services, CDC; 2004.

4. Table 1: Annual number of fatal and nonfatal cases of shaken baby syndrome among infant to 3 year-old residents of Hawai'i, by intent of injury, 2003-2007.

Table 1	Year				
	2003	2004	2005	2006	2007
Nonfatal injuries					
ED visits	0	0	0	0	1
hospitalizations	4	2	3	0	2
total	4	2	3	0	3
Fatal injuries**					
homicides	0	0	0	0	0
undetermined intent	0	0	0	0	0
total	0	0	0	0	0

* Patients with ICD-9CM diagnosis code 995.55.

** Search of the open text field "describe how injury occurred" on death certificates.

5. Traumatic Brain Injury Findings:

- a. About 96% of the ED records for TBI had E-codes (and therefore, intent), compared to 91% of the hospitalization records. The following statistics, therefore, slightly underestimate the actual number of nonfatal cases in the state.
- b. There were 4 to 7 nonfatal cases of TBI from assaults each year in the state, most (70%) of which resulted in hospitalization.
- c. Most (23 or 77%) of the 30 patients were residents of Honolulu County; 5 were from the island of Maui; 2 from Hawai'i; and none from Kauai.
- d. Most (80% or 24) of the patients were infants, and two-thirds (67%, or 20) were males.
- e. As per SBS, most (67%) of the TBI hospitalizations were for a week or longer. Hospitalization charges ranged from \$3,131 to almost \$290,000, and averaged over \$71,000 per patient. Each ED visit resulted in over \$4,000 in charges.
- f. Information on the perpetrator was available only for 5 patients (16%): 3 were assaulted by the male partner of the child's parent or guardian ("father, stepfather or boyfriend"), and 1 each by the female partner of the child's parent, or the child's grandparent.
- g. Only 2 of the 14 patients who sustained TBI from injuries of undetermined intent were hospitalized.

- h. Patient age was more widely distributed as only 50% were infants, and there were nearly equal number of patients from Maui island (7), and Oahu (6). The remaining patient was a resident of Hawai'i; there were none from Kauai.
 - i. As per nonfatal cases, there were approximately double the number of fatal TBI from assaults (13 deaths) compared to injuries of undetermined intent (7).
 - j. More than half (62% or 8) of the 13 homicide victims were infants, and two-thirds (69%) were males.
 - k. Ten (77%) were residents of Oahu, 2 from Hawai'i County, and 1 from Kauai. There was no further information on the perpetrators from the death certificates. However, data from the attorney general and local newspapers indicated 3 of the victims were killed by their mothers, 2 by their fathers, and 2 others by the boyfriend of their mother.
 - l. There were 4 infants among the 6 victims of injuries of undetermined intent; the remaining 2 victims were 3 year-olds. Four of the victims were residents of Oahu, and 2 of the island of Maui.
6. Table 2: Annual number of fatal and nonfatal cases of traumatic brain injury among infant to 3 year-old residents of Hawai'i, by intent of injury, 2003-2007.

Table 2	Year				
	2003	2004	2005	2006	2007
Nonfatal injuries					
Assaults					
ED visits	0	1	3	3	2
hospitalizations	4	5	4	3	5
total	4	6	7	6	7
Undetermined intent					
ED visits	2	2	4	3	1
hospitalizations	1	0	0	1	0
total	3	2	4	4	1
Fatal injuries					
homicides	4	2	4	2	1
undetermined intent	0	3	0	3	0
total	4	5	4	5	1

7. Head injuries (including TBI) Findings:

- a. About 7% of the ED records and 8% of the hospitalization records for children treated for a head injury did not contain E-codes, and therefore, could not be characterized by intent.

- b. Among the 70 cases that were coded as assaults, there were equal numbers of children who were treated in the ED (35 patients) and who were admitted to hospitals (35). There were no clear trends in the annual number of cases, although there was an increase in the number of hospitalizations over the 2006-2007 period compared to earlier years (9 cases on average, compared to 6, respectively).
- c. Three-quarters (76% or 53) of the patients were residents of Oahu, 8 each from Hawai'i and Maui counties, and 1 from Kauai.
- d. Almost half (44% or 31) were infants, and a slight majority (63% or 44) were males. Less than half of these patients (43% or 30) had a TBI, although that proportion was increased (60%) among those who were hospitalized.
- e. The most common types of injuries were contusions and superficial injuries (57% of patients or 40), internal brain injuries (24%), and open wounds (16%).
- f. About half (54% or 19) of the children who were admitted had stays of less than 1 week. Each admission averaged almost \$63,000 in charges while average charges for each ED visit were \$1,570.
- 9. The most commonly specified perpetrator was the male partner of the child's parent or guardian ("father, stepfather or boyfriend") (13 patients), followed by the female partner of the child's parent or guardian (5 patients), and by the child's grandparent (2) or other relative (1). This information was either missing (36% or 25 patients) or coded as other/unknown (31% or 22) for the majority of patients.
- h. The number of children with nonfatal head injuries of undetermined intent actually outnumbered those who were victims of assaults (81 vs. 70). Unlike the assault-related injuries, however, almost all (93% or 75) of the 81 undetermined intent cases were ED visits.
- i. Proportionally more of these children were residents of Maui County (28% vs. 11% for assaults); two-thirds (67%) were residents of Oahu. Patient age was also more widely distributed, as only about one-quarter (27% or 22) were infants. Most (62%) of these patients had contusions or superficial injuries, and 27% had open wounds.
- j. The average charge for each hospitalization was over \$8,900 and \$677 for each ED visit.
- k. Eight children were killed by assaults that resulted head injuries, including the 6 who suffered TBI (Table 2) and 2 others killed in 2006. Half (4) of

the victims were infants, 2 were 1 year-olds, and 2 were 2 year-olds. Six were residents of Oahu, and 1 each were from Hawai'i and Kauai counties. Two were killed by their fathers, 2 by boyfriends of their mothers and 1 by their mother. No perpetrator information was available for the other 3 cases.

- I. The description of the victims of fatal injuries of undetermined intent is the same as that for TBI, as they are the same 4 victims.
8. Table 3: Annual number of fatal and nonfatal cases of head injuries (including TBI) among infant to 3 year-old residents of Hawai'i, by intent of injury, 2003-2007.

Table 3	Year				
	2003	2004	2005	2006	2007
Nonfatal injuries					
Assaults					
ED visits	7	12	6	5	5
hospitalizations	6	6	5	9	9
total	13	18	11	14	14
Undetermined intent					
ED visits	15	13	32	9	6
hospitalizations	1	1	1	2	1
total	16	14	33	11	7
Fatal injuries					
homicides	4	1	1	2	0
undetermined intent	0	2	0	2	0
total	4	3	1	4	0

9. Injuries of All Types Findings:
- a. Most (91%) of the ED records for children with nonfatal injuries had E-codes, but only 61% of the hospitalization records contained E-codes. It is therefore, possible the following statistics underestimate the number of hospitalizations by 39%, although there is no way to verify that assumption with these data.
 - b. An average of 23 children were treated for nonfatal injuries from assaults each year, with approximately equal numbers were treated in ED (11 patients per year) and admitted to hospitals (12 patients). There were no consistent trends in the annual number of any type of case.
 - c. About half of the patients (45% or 51) were infants, although that proportion was much higher among patients admitted to hospitals compared to those who were treated in ED (61% vs. 22%). Almost two-thirds (62% or 70 patients) were males.

- d. Three-quarters (76%, or 86) were residents of Oahu, 10 each from Hawai'i and Maui counties, and 7 from Kauai. Contusions and superficial injuries were the most common (45% of patients), followed by fractures (20%), and internal injuries (18%).
- e. Hospitalizations were relatively short, as 57% of patients were hospitalized for less than 1 week. However, each admission resulted in over \$52,000 in charges, while average charges for an ED visit was \$1,227.
- f. Information on the perpetrator of the injuries was missing (36% or 41 patients), or coded as other/unknown (34% or 38) for most of the cases. The most commonly specified perpetrator was the male partner of the child's parent or guardian ("father, stepfather or boyfriend") (19 patients), followed by the female partner of the child's parent or guardian (8 patients), and by the other relatives of the child (4) or the grandparent (2).
- g. There were more than twice as many nonfatal injuries coded as undetermined intent (271), compared to assaults (113). Almost all (95% or 257) of the former, however, were treated in the ED setting. The annual total varied inconsistently from 26 to 86 cases.
- h. Patient age was widely distributed, with highest numbers among 1 and 2 year-olds (62%, or 169 patients), although infants comprised most (79%, or 11) of the 14 patients that were admitted to hospitals.
- i. Most (70%) of the 271 patients were residents of Oahu. As per head injuries, a relatively large (23%) proportion of these patients were residents of Maui County. The average charge for each hospitalization was nearly \$15,000 and \$640 for each ED visit.
- j. More than half (62% or 8) of the 13 homicide victims were infants, and two-thirds (69%) were males. Ten (77%) were residents of Oahu, 2 from Hawai'i County, and 1 from Kauai.
- k. Data from the attorney general and local newspapers indicated 3 of the victims were killed by their mothers, 2 by their fathers, and 2 others by the boyfriend of their mother. There was no further information on the perpetrators from the death certificates.
- l. There were 4 infants among the 6 victims of injuries of undetermined intent; the remaining 2 victims were 3 year-olds. Four of the victims were residents of Oahu, and 2 of the island of Maui.

10. Table 4: Annual number of fatal and nonfatal injuries among infant to 3 year-old residents of Hawai'i, by intent of injury, 2003-2007.

Table 4	Year				
	2003	2004	2005	2006	2007
Nonfatal injuries					
Assaults					
ED visits	11	20	10	7	6
hospitalizations	13	15	7	12	12
total	24	35	17	19	18
Undetermined intent					
ED visits	45	46	83	59	24
hospitalizations	1	2	3	6	2
total	46	48	86	65	26
Fatal injuries					
homicides	4	2	4	2	1
undetermined intent	0	3	0	3	0
total	4	5	4	5	1

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