
NEBRASKA CHILD DEATH REVIEW TEAM
SPECIAL REPORT
on
SUDDEN INFANT DEATH SYNDROME CASES
JANUARY 1 – MARCH 31, 2005

May 31, 2005

Submitted by:

Joann Schaefer, M.D.
Chair, Nebraska Child Death Review Team
Deputy Chief Medical Officer,
Nebraska Health and Human Services System

The Child Death Review Team would like to thank the following individuals and organizations for providing the data that made this report possible:

Mark Miller, NHHSS / Data Management Unit
Stan Cooper and Jerry Fischer, NHHSS / Vital Statistics
George Kahlandt and Jeanette Harris, NHHSS / Economic Assistance Program
Lt. John Shelton and Chris Price, Nebraska State Patrol
Peggy Trouba, NHHSS / WIC Program
Julie Miller, NHHSS / Newborn Screening Program
Shirley Pickens-White, NHHSS / Office of Protection & Safety
Jan Heusenfeldt, NHHSS / Office of Family Health
Carla Becker, NHHSS / Data Management Unit
Pat Urzedowski, NHHSS / Child Care Licensing Section
County Attorneys from Buffalo, Dawson, Dodge, Douglas, Madison & Platte
Counties, and,
Medical Records personnel from Children's Hospital, Columbus Community
Hospital, Creighton University Medical Center, Faith Regional Health Center,
Fremont Area Medical Center, Good Samaritan Hospital, and the Nebraska
Health System

TABLE OF CONTENTS

Introduction	1
Findings	2
Demographics of SIDS Cases	2
Prevalence of Risk Factors for SIDS Deaths	4
Other Conditions & Exposures	6
Observed Pathology of SIDS Deaths	6
Classification of SIDS Deaths by Possible Confounding Factors	7
Temporal Patterns of SIDS in Nebraska	9
SIDS Risk in Winter 2004-2005	9
Discussion	10
Preventive Aspects of Deaths	10
Study Question 1 - Associated causes of death by autopsy?	11
Study Question 2 - Do the cases point to a trend?	12
Study Question 3 - Are current policies being followed?	12
Study Question 4 - Recommendations for public health intervention?	12
Final Comments	14
References	15
Members of the SIDS Review Workgroup	16
Attachment	17
Tables	
Table 1: Causes of Infant Death	2
Table 2: Demographics of 12 SIDS Cases	3
Table 3: Prenatal Conditions & Birth Outcomes of SIDS Cases	4
Table 4: Environmental Exposures	5
Table 5: Source of Nutrition for 10 SIDS Cases Receiving WIC Benefits	6
Table 6: Pathology Findings at Autopsy	7
Table 7: Classification of SIDS Deaths	8
Figures	
Figure 1. SIDS Cases by Month	9
Figure 2. SIDS Mortality, 1979-2004	10

INTRODUCTION

On April 1, 2005, the Nebraska Health and Human Services System's Chief Medical Officer, Dr. Richard Raymond, requested the Child Death Review Team to investigate recent newborn and infant deaths that had occurred since the beginning of 2005, particularly those attributed to Sudden Infant Death Syndrome (SIDS). The Team was asked to address the following questions:

- What were the associated causes of death by autopsy?
- Do the cases point to a trend?
- Are current policies being followed in the ruling of cause of death?
- Are there new recommendations based on these reviews for public health intervention strategies?

To answer these questions, staff worked with the HHSS' Data Management and Vital Statistics Units to identify all infant deaths that had occurred between January 1 and March 31, 2005. Because of delays in data entry related to HHSS' recent transition to electronic death certificates, this process involved searching through paper certificates on file in the Vital Statistics office; therefore it is possible that not all infant deaths and/or SIDS cases were identified¹.

For those cases whose official cause of death was SIDS, CDRT staff then sent out requests for the following information:

- Birth certificates for infants whose mothers were state residents at the time of their birth;
- Investigative reports from the County Attorneys of the counties where the child was a resident, as well as the county of death if different;
- Emergency room and medical reports from the hospital recorded on the death certificate;
- Ambulance run reports;
- Screening results from the Nebraska Newborn Screening Program;
- Nebraska criminal history checks from the Nebraska State Patrol on parents and other key adults noted in the investigative files received from the County Attorneys;
- Case files from the HHSS Office of Protection and Safety;
- Provider reports from the HHSS Child Care Licensing section, as appropriate;
- Case files from the HHSS Economic Assistance program; and,
- Data from the HHSS Women, Infants & Children (WIC) program.

¹ Any missed cases will be included in the CDRT's regular, annual review of child deaths.

Because of federal privacy laws, WIC data were obtained in aggregated form. All other data were available for individuals. Each assembled case file was reviewed by two or more CDRT members and staff and then summarized.

The Office of Protection and Safety had originally identified 16 deaths occurring in early 2005 as possibly being from SIDS. In the course of the investigation, an additional six SIDS deaths were discovered. However, seven of the original 16 infants were determined by autopsy and Emergency Department reports to have died from specific causes and were not included in further analyses. Of the 15 remaining SIDS cases, three occurred after March 31, 2005 and were also dropped from the analyses. This report thus discusses 12 SIDS deaths known to have occurred in the first quarter of 2005.

FINDINGS

To date, 42 infant deaths occurring between January 1 and March 31, 2005 have been reported to HHSS Vital Statistics. Of these, 12 were attributed to SIDS. This relatively small number of SIDS deaths limits the amount of analysis that could be done.

	<u>Number</u>	<u>Percent</u>
Birth Defects	15	35.7%
SIDS	12	28.6%
Prematurity	11	26.2%
Pneumonia / bronchopneumonia	1	2.4%
Birth asphyxia	1	2.4%
Alleged child abuse	1	2.4%
Motor vehicle crash	1	2.4%
	42	100.1%

DEMOGRAPHICS OF SIDS CASES

The 12 SIDS infants were residents of five Nebraska counties, with a majority from Douglas County (Table 2). There was a slight predominance of males (58.3%) over females. Over half (58.3%) of the infants were White, but all five major racial groups as well as Hispanic ethnicity were represented. The average age at death of the infants was 3.5 months, ranging from 1.4 to 8.8 months.

Table 2: Demographics of 12 SIDS Cases		
	<u>Number</u>	<u>Percent</u>
<u>Age</u>		
1 month	2	16.7%
2 months	6	50.0%
4 months	2	16.7%
5 months	1	8.3%
6-8 months	1	8.3%
Mean age	3.5 months \pm 2.0	
<u>Race</u>		
White (Non-Hispanic)	7	58.3%
African-American	3	25.0%
Native American	1	8.3%
Asian	1	8.3%
<u>Ethnicity</u>		
Hispanic	1	8.3%
<u>Gender</u>		
Male	7	58.3%
Female	5	41.7%
<u>County of Residence</u>		
Dawson	1	8.3%
Dodge	1	8.3%
Douglas	8	66.7%
Madison	1	8.3%
Platte	1	8.3%
<u>Maternal age</u>		
15-19	3	25.0%
20-29	6	50.0%
30-35	2	16.7%
Unknown	1	8.3%
Mean maternal age	24.5 yrs \pm 6.0	
<u>Plurality</u>		
Singleton	9	75.0%
Twin ²	2	16.7%
Unknown	1	8.3%

² The twins in this study were not related.

Nationally, SIDS deaths typically occur between 1 and 12 months of age, with a peak in months two and three. Deaths occur disproportionately to African-American infants. Among all infants, SIDS is the 2nd leading cause of death both in Nebraska and the U.S.

PREVALENCE OF RISK FACTORS FOR SIDS DEATHS

The “Triple Risk Hypothesis” for SIDS postulates three necessary conditions for SIDS: a physiologically vulnerable infant, a phase of rapid growth, and one or more external stressors (Filiano and Kinney, 1994). Although there are variations on and challenges to their original model, the concept that sudden infant death result from a combination of physiologic and environmental factors is useful when considering prevention (Guntheroth and Spiers, 2002).

Among the most widely studied markers of infant vulnerability are preterm birth and low birth weight, implying that not all physiologic systems were adequately developed at birth. All but one infant had been born to a Nebraska resident, and thus had birth information available (Table 3).

Table 3: Prenatal Conditions & Birth Outcomes of SIDS Cases		
	<u>Number</u>	<u>Percent</u>
<u>Baby known to be preterm (<37 wks)</u>		
Yes	6	50.0%
No	5	41.7%
Unknown	1	8.3%
Mean gestational age		
37.4 wks ± 1.9		
<u>Baby known to be low birth weight (<2500 grams)</u>		
Yes	5	41.7%
No	6	50.0%
Unknown	1	8.3%
Mean birth weight		
3,049 gm ± 612.6		
<u>Prenatal alcohol use (any)³</u>		
Yes	0	0
No	9	75.0%
Unknown	3	25.0%
<u>Prenatal tobacco use (any)²</u>		
Yes	4	33.3%
No	7	58.3%
Unknown	1	8.3%

³ As recorded on birth certificate. Birth certificates are widely considered to underreport alcohol consumption and, to a lesser extent, tobacco use during pregnancy. Alcohol consumption is not asked on Nebraska birth certificates beginning January 2005.

Exposure to tobacco smoke, sleeping position and sleep environment are the most commonly studied external or environmental risk factors for SIDS deaths. Having a smoker in the household, the position in which the infant was put to sleep, and the surface on which the infant was sleeping was obtained for most cases from comments in the law enforcement investigative reports (Table 4). Table 4 also provides comparative data on where infants sleep from two recent surveys, the National Infant Sleep Position Study (Willinger et al., 2003) and one conducted among low income mothers in the District of Columbia (Brenner et al., 2003).

Table 4: Environmental Exposures				
Nebraska SIDS Cases, 2005			NISPS⁴	Washington, DC⁵
	<u>Number</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
<u>Prenatal or household smoke exposure</u>				
Yes	5	41.7%		
No	1	8.3%		
Unknown	6	50.0%		
<u>Recent cold / respiratory infection</u>				
Yes	7	58.3%		
No	4	33.3%		
Unknown	1	8.3%		
<u>Sleep position</u>				
Back (supine)	3	25.0%		
Stomach (prone)	4	33.3%		
Side	1	8.3%		
Unknown	4	33.3%		
<u>Bed sharing at time of death</u>				
Yes	6	50.0%	12.8%	51.0%
with Mom	4			
with Mom & 3-yr sibling	1			
with Mom, Dad & 17-m sibling	1			
No	5	41.7%	*	47.5%
Unknown	1	8.3%	*	1.5%
<u>Where baby was put to sleep</u>				
Adult bed	4	33.3%	9.2%	49.2%
Bassinet / crib / playpen	4	33.3%	87.4%	48.5%
Couch	1	8.3%	0.2%	-
Cradle board on bed	1	8.3%	-	-
Floor (blankets & pillows)	1	8.3%	-	0.3%
Unknown	1	8.3%	-	2.0%

⁴ Values are for “usual” sleep practices of infants less than 7 months. Infants in this study had not died.

⁵ Values are for sleep practices of infants ages 3-7 months reported for the night before the interview. Infants in this study had not died.

* Values not reported.

OTHER CONDITIONS & EXPOSURES

- Mothers of three infants had some documentation of previous methamphetamine (meth) use; two admitted to investigators that they had used meth the day prior to the infant’s death. Only one caretaker is known to have received a toxicology screen after the infant’s death; the results were positive for meth.
- Four infants (33.3%) were in the care of a baby sitter or at day care at the time of death; eight (66.7%) were being cared for by their mother either alone or with another person.
- Five infants (41.7%) were from families with known recent or current involvement with the NHHSS Child Protection system. However, one of these was because of the parents’ involvement as juveniles themselves, rather than because of the care of the infant and/or siblings.
- Eight infants (66.7%) were from families who had recently received or were currently receiving some form of economic assistance from the state of Nebraska.
- Nine of the 12 infants had normal metabolic screens; three infants did not have results in the NNSP system.
- Among all infants, six (50.0%) were reported as being bottle fed, two (16.7%) were being weaned, and one (8.3%) was breastfed. Feeding type was unknown for three infants (25.0%).
- Seven families (58.3%) were actively enrolled in WIC at time of child’s death and had more detailed information on nutrition (Table 5).

Table 5: Source of Nutrition for 7 SIDS Cases Receiving WIC Benefits		
	<u>Number</u>	<u>Percent</u>
<u>Type of feeding</u>		
Formula fed	5	71.4%
Partially breastfed	2	28.6%
Fully breastfed (no formula received from WIC)	0	0%
<u>Type of formula</u>		
Standard milk based formula	5	71.4%
Standard soy based formula	1	14.3%
"Special formula" (higher calories, protein, vitamins, minerals).	1	14.3%

OBSERVED PATHOLOGY OF SIDS DEATHS

Autopsies were performed on 11 of the 12 cases. Of these, all reported petechial hemorrhages (small blood spots) on the heart, lungs and/or thymus gland. Eight cases (72.3%) had pulmonary and/or abdominal congestion. Both petechiae and congestion are commonly observed findings among SIDS cases.

Four infants received full toxicology screens for legal and illegal drugs; all results were negative. Two infants were tested for Influenza A and B, with negative results; two infants were tested for RSV (Respiratory Syncytial Virus), also with negative results. Two infants were resuscitated by Emergency Personnel but succumbed within 24 hours at the hospital (“Temporarily Interrupted SIDS”). Their autopsy findings were dominated by processes specific to their prolonged death, which are not included in Table 6.

Table 6: Pathology Findings at Autopsy of 11 SIDS Cases		
	<u>Number</u>	<u>Percent</u>
Petechial Hemorrhage (heart, lung, thymus)	11	100.0
Non-specific Congestion (pulmonary, abdominal)	8	72.7%
Intra-alveolar hemorrhage	1	9.0%
<u>Other Findings</u>		
Cerebral edema	1	9.0%
Bronchopneumonia	1	9.0%
Mild chronic bronchitis	1	9.0%

CLASSIFICATION OF SIDS DEATHS BY POSSIBLE CONFOUNDING FACTORS

Krous et al. (2004) have proposed a classification system for SIDS that acknowledges the diagnostic uncertainties that accompany many deaths. Based on the amount of documentation and the available findings, they propose four categories:

- Category IA SIDS: Classic features of SIDS present and completely documented; ... found in a safe sleeping environment, with no evidence of accidental death. Age more than 21 days and less than 9 months.
- Category IB SIDS: Classic features of SIDS present but incompletely documented; ... 1 or more of the following analyses was not performed: toxicologic, microbiologic, radiologic, vitreous chemistry, or metabolic screening studies.
- Category II SIDS: Category II includes infant deaths that meet category I criteria *except* for 1 or more of the following:
 - *Clinical*, including similar deaths among siblings or infants in the custody of same caregiver;
 - *Circumstances of Death*: Mechanical asphyxia or suffocation caused by overlaying not determined with certainty.
 - *Autopsy*: Abnormal growth and development, or marked inflammatory changes or abnormalities, not sufficient to be unequivocal causes of death.
- Unclassified Sudden Infant Death: “...deaths that do not meet the criteria for category I or II SIDS but for which alternative diagnoses of natural or unnatural conditions are equivocal, including cases for which autopsies were not performed.”

Finally, Krous et al. mention that “Postresuscitation Cases: Infants found in extremis who are resuscitated and later die (“temporarily interrupted SIDS”) may be included in the aforementioned categories, depending on the fulfillment of relevant criteria.” Table 7 classifies all 12 SIDS deaths according to the Krous et al. classification.

Table 7: Classification of SIDS Deaths		
	<u>Number</u>	<u>Percent</u>
<u>Category IB SIDS</u>	4	33.3%
• Not bed sharing	2	
• Bed sharing	2	
<u>Category II SIDS</u>	5	41.7%
<u>Unclassified Sudden Infant Death</u>	3	25.0%
• No autopsy	1	
• Bronchopneumonia	1	
• Vomit around face	1	

No cases fully met the Category IA definition of “classic features present and completely documented” as none had a full set of clinical analyses. Six cases met the Category IB definition which allows the absence of the laboratory screens; of these four (67%) were bed sharing.

The five deaths in Category II had an assortment of factors that either supported possible asphyxia or disqualified the Category I definition.

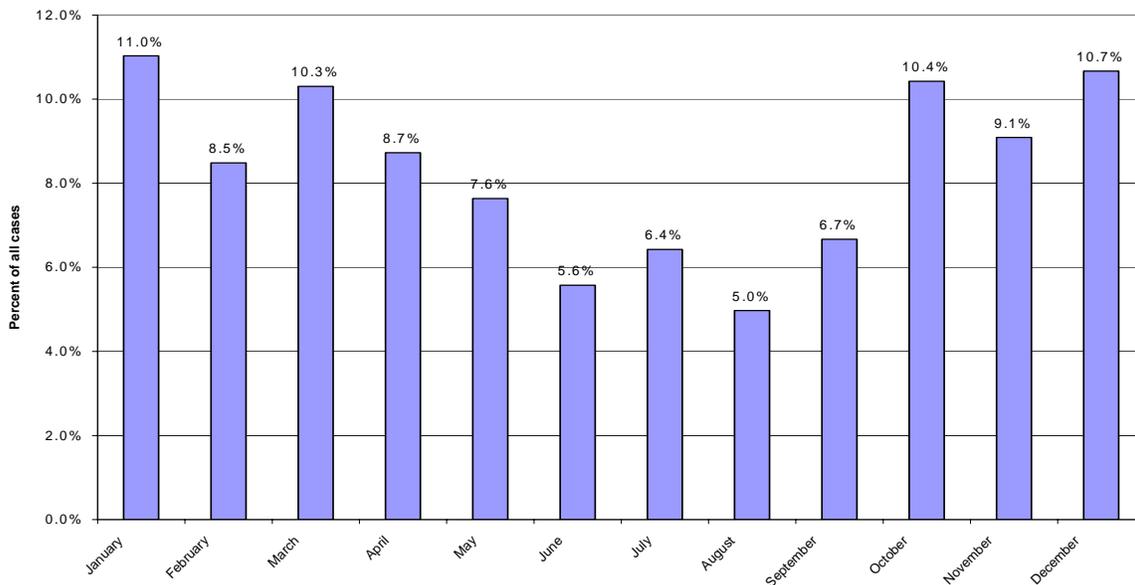
- Mother climbed into the playpen with baby to sleep after self-reported use of meth.
- Investigator found it plausible that baby, who was propped against pillows on his side, rolled onto his stomach against the pillows.
- Baby slid down between mother and side of couch while sleeping.
- Baby was strapped on her back to a cradle board which was placed on a bed, however, signs of lividity (bruising) were on forehead and side of face.
- A law enforcement investigation was held, but minimal details reported.

The three “Unclassified” cases included one case without autopsy, and one case with autopsy results showing bronchopneumonia that could have been sufficient as a cause of death. A third case was noted to have dried vomit around his face and blanket as well as considerable sweating; these are not commonly accepted symptoms of SIDS.

TEMPORAL PATTERNS OF SIDS IN NEBRASKA

When examined over time, infant deaths attributed to SIDS display a clear temporal pattern, with deaths in the winter months (October-April) significantly higher than those from May through September ($p < .0001$). Approximately 30 percent of all SIDS deaths occurred between January and March. Possible explanatory factors have included cold weather respiratory infections that compromise infants' breathing abilities, and young infants who are overbundled and/or overheated, becoming too lethargic to move their heads to clear airway obstructions. Researchers have also suggested that winter viruses play a triggering role in SIDS, although this has not been proven (Spitzer, 2005).

Figure 1. SIDS Cases by Month
Nebraska, 1979-2003



SIDS RISK IN WINTER 2004-2005

There is a popular perception that the rate of respiratory disease seen in winter 2004-2005 was higher than that for recent winter periods. Whether that winter will indeed be shown to be associated with a higher rate of respiratory infections and/or a higher SIDS death rate nationwide remains to be determined.

However, there are ways by which the number of SIDS-associated deaths in early 2005 can be compared to previous Nebraska experience to assess whether they are in excess of what would be expected (see Attachment for detailed calculations). Looking at the cohorts of

infants born between September-March each year⁶, over the period 2000-2004 their SIDS rate is estimated at about 5.16 per 10,000 births. For September 2004-March 2005, the observed rate was 7.98 per 10,000, about 50% higher than the previous four year period but *not* statistically significantly different ($p=0.18$, Fisher's exact test). Nevertheless, based on the observed number of deaths and the distribution shown in Figure 1, the projected total number of deaths for 2005 is 40, which would be the highest number seen in the state since the early 1990s (Figure 2).

Figure 2. Mortality from Sudden Infant Death Syndrome
 Nebraska, 1979-2004



DISCUSSION

PREVENTIVE ASPECTS OF DEATHS

Tobacco smoke The Nebraska PRAMS program reports that 19.4% of postpartum women in the state smoke, although only 12% reported that their infants were exposed to environmental smoke in the home (NHHSS, 2004). A full 50% of cases in the current study did not have any data on smoke exposure and it is thus not possible to say that smoking exposure of SIDS infants was significantly higher than expected. However, 5 of the 6 infants (83.3%) for whom smoke exposure status was known *did* have documented smoke exposure, which is widely thought to predispose them to respiratory difficulties and sudden death.

Maternal methamphetamine use The documented use of methamphetamine by three mothers is a troubling observation, although the relationship of their meth use to the infant's death is not certain. Annual prevalence of meth use in the US female population aged 19-30 is estimated to be about 1.8% (Johnston et al., 2004). That 25% (3/12) of the SIDS deaths were

⁶ All but one infant in the current study were born between September 2004 and March 2005. Two additional infants with birthdates after September 1, 2004 are known to have died in December 2004, and are included for this calculation only.

associated with prior meth use in the mother is consistent with data reporting an association between meth use in the mother and a higher SIDS risk. For instance, a report from Washington State (Schrager et al., 1995) suggests SIDS is 2.5 times higher in infants of women reporting drug abuse.

The association of methamphetamine and sudden infant death could be through either mechanical or physiologic mechanisms. Bed sharing is strongly discouraged for parents who are under the influence of drugs or alcohol or are otherwise impaired, because of possible overlay onto the baby or other accidental suffocation. Questions of physiologic toxicity to infants are harder to answer. The infant who was found with vomit and sweat had been recently breastfed by his mother who did test positive for meth. Meth is known to be transmitted through breastmilk with fairly high efficiency. However, a toxicology screen was not performed on the baby which would have informed an assessment of meth toxicity as cause of death.

Sleep position

In this small sample, only three of the eight infants (37.5%) whose sleep position was reported (33.3% had unknown sleep position) appear to have been put to sleep on their backs (Table 4). This is lower than the 62.5% reported by PRAMS respondents. Furthermore, only one of these three infants, and none of the others, were on their backs when found (data not shown). The value of back sleeping is generally felt to be its effect in maintaining an unobstructed airway and avoiding rebreathing (Paluszynska et al., 2004 ; Tonkin et al., 2002). Infants with a respiratory infection, who are overheated and lethargic, or who are under the influence of a cold medication, have challenges to their breathing that are further compounded by prone sleeping and will be at a higher risk of asphyxia. Infants may also learn to change their position at an earlier age than parents expect, placing them at risk from other objects in their sleep environment (blankets, toys, etc.).

Bed sharing

The proportion of infants who were put to sleep in an infant-appropriate environment (crib, playpen, etc.; 40.0% with known sleep location) was lower than that reported by the National Infant Sleep Position Study (NISPS; 87.4%) although similar to the study of low income women in Washington, D.C. (43.4%). Bed sharing (50.0%) was also similar to the Washington results (51%). The NISPS found that infants who bed shared were 2.9 times more likely to usually sleep beneath more than two bed covers and 1.75 times more likely to be covered with a quilt. As with sleep position, infants with compromised breathing for some other reason will also be at increased risk of asphyxia from coverings or from the presence of soft objects (including adults and siblings) in their bed.

Study Question 1. WHAT WERE THE ASSOCIATED CAUSES OF DEATH BY AUTOPSY?

Of the 22 infant deaths initially reported to be from SIDS, seven (31.8%) were ruled out by autopsy and/or Emergency Department reports, reinforcing the importance of requiring an

autopsy before identifying a SIDS death. Of the 12 deaths studied here⁷, there was no single common factor. However, many had strong risk factors for a suffocation death, the most common being bed sharing with one or more parents and siblings (53.3%).

Given that, by definition, SIDS is reserved for deaths with no other explanation, it is the opinion of the CDRT that medical examiners were not consistently taking into account death scene investigation findings when determining cause of death. Certainly, in several instances their assessments were hampered by cursory scene investigations. However,

- Four cases (33.3%) had fairly clear evidence of accidental suffocation;
 - One case (8.3%) had bronchopneumonia
 - One case (8.3%) had symptoms (vomit, sweat) not consistent with classical SIDS.
- Further, of the 11 cases (8.3%) for which full information was received, *none* had both an autopsy and documentation to have been sleeping alone, on their back, and in an infant-appropriate setting. It is entirely possible that *all* of the 12 studied cases were explainable had complete documentation been available.

It is the consensus of the Team that while “sleep associated” deaths among infants are a real concern, over-use of the term “SIDS” hampers prevention efforts. Because recent years’ data have not yet been examined in such detail, it is impossible to know whether the same percentage of previous SIDS deaths was likely misclassified. However, previous CDRT analyses reported that accidental suffocation and SIDS deaths were not well delineated.

Study Question 2. DO THE CASES POINT TO A TREND?

Comparison with data from recent years indicate that the number of SIDS cases seen in the first three months of 2005 in Nebraska is higher than expected, although the difference is not statistically significant. The relatively small number of cases, short time frame involved, and the fact that the current cases appear to reflect a mix of very different circumstances, make the assessment of significance and trend analysis problematic.

Study Question 3. ARE CURRENT POLICIES BEING FOLLOWED IN THE RULING OF CAUSE OF DEATH?

In all but one case, state law requiring an autopsy for use of the SIDS diagnosis was followed. The national recommendations of thorough scene investigation and review of clinical history were followed less often. Investigative reports ranged from thorough to minimal.

Study Question 4. ARE THERE NEW RECOMMENDATIONS BASED ON THESE REVIEWS FOR PUBLIC HEALTH INTERVENTION STRATEGIES?

Despite the relatively small number of cases reviewed, it quickly became apparent that

⁷ Three additional deaths occurred after April 1, 2005 and are not included in this report.

comprehensive, thorough information was a limiting factor to accurately determining probable causes of death. In addition to ongoing activities, we strongly recommend that the following be consistently and routinely implemented:

- ***A comprehensive, investigative review of the circumstances of all unexpected infant deaths,⁸ specifically including a doll reenactment with a trained investigator.*** Doll reenactments are critical to understanding what otherwise may be conflicting testimony even from well-meaning reporters. For example, the patterns of lividity (bruising) on the baby sleeping on a cradleboard did not point to a baby lying on her back. The investigator noted the conflict but did not apparently have a method of resolving it with the mother. The purpose of these investigations is not solely to determine whether physical abuse was involved, but rather to clarify what *did* happen.
- ***Full analyses - toxicologic, microbiologic, radiologic and vitreous chemistry, in addition to a complete autopsy, performed on all cases of unexpected infant death.*** Unintentional medication overdoses, infant consumption (passive or active) of illegal drugs, and past trauma are factors that are not necessarily apparent at an Emergency Department examination. ***Toxicologic analyses should also be performed on their caretakers.*** While we cannot be certain that maternal methamphetamine use was involved in any of these deaths, we can unequivocally state that there is a strong possibility of harm to infants and children from caretakers' use of meth, and assessing that harm requires data.

Further, our review points to the following needs:

- ***Infants in licensed child care facilities should be put to sleep on their back unless there is a documented medical reason why the child should sleep in a different position. Regulations for licensed child care facilities that require crib "bumper pads" and that allow stuffed toys in cribs should be repealed.*** The federal Maternal and Child Health Bureau, the American SIDS Institute and other SIDS prevention organizations have taken the position that any items in infants' cribs increase the chances of a SIDS or suffocation death.
- ***Comprehensive dialogue needs to be generated among health professionals, consumer groups, cultural organizations and others on the importance of back sleeping and the risks of bed sharing.*** Back sleeping is the position of choice for only 62.5% of Nebraska mothers, with even lower rates in certain racial and ethnic groups (NHHSS, 2004). Bed sharing occurs for many reasons -including cultural, financial and logistical, and is thus a complicated issue. However, infants with pre- or post-natal exposure to tobacco smoke should be understood to be at special risk from stomach sleeping and bed sharing. More work is needed to adapt and promote comprehensive "Safe Sleep" messages to different cultural,

⁸ This phrasing avoids "death scene investigations" that never occur because the actual death occurs at the hospital. "Review of the circumstances of death includes not only examination of the death scene but also assessment of all of the environments an infant might have been in before or after death" (Krous et al, 2004).

economic and age groups (c.f. Unger et al., 2003). The observation that many families in the current study received economic assistance (66.7%) and/or WIC (58.3%) benefits suggests that these programs may be valuable pathways for public health education.

- ***The Child Death Review Team and others should continue to use and promote the latest research on classification of sleep-associated deaths, to improve public understanding of the related public health and prevention needs.***

FINAL COMMENTS

This report provides the Child Death Review Team an important opportunity to re-emphasize well known risk factors and recommendations associated with SIDS and other sudden infant death (US DHHS, 2003).

- ***Always place your baby on his or her Back to Sleep, even for naps.*** This is the safest sleep position for a healthy baby to reduce the risk of suffocation or SIDS.
- ***Babies should sleep on a firm mattress, such as in a safety approved crib.*** Babies who sleep on soft mattresses, sofas, sofa cushions, waterbeds, or other soft surfaces are at increased risk of suffocation or SIDS.
- ***Make sure everyone who cares for your baby knows to place your baby on his or her back to sleep, and about the dangers of soft bedding.***
- ***Parents who choose to bed share with their infants need to be aware of the risks involved.*** Adult beds have soft mattresses and bedding that can cause baby to suffocate. Bed sharing also increases the risk of babies being rolled over on, or having their nose blocked by someone lying against them.
- ***Remove soft, fluffy and loose bedding and stuffed toys from baby's sleep area.***
- ***Baby's face and head should stay uncovered during sleep.*** Dress baby in sleep clothing so that no other covering over the baby is needed.
- ***Do not allow smoking around babies.*** Avoid exposure of the baby to tobacco smoke, including on clothing.
- ***Do not let baby get too warm during sleep. Baby's room should be at a temperature that is comfortable for an adult. Too many layers of clothing or blankets can overheat your baby.***

REFERENCES

- Brenner R, BG Simons-Morton, B Bhaskar, et al. 2003. Infant-Parent Bed Sharing in an Inner-City Population. *Archives Pediatric and Adolescent Medicine* 157:33-39.
- Filiano JJ, HC Kinney. 1994. A perspective on neuropathologic findings in victims of the sudden infant death syndrome: the triple-risk model. *Biology of the Neonate* 65:194-197.
- Guntheroth WG, PS Spiers. 2002. The Triple Risk Hypotheses in Sudden Infant Death Syndrome. *Pediatrics* 110:e64-e69.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2004). *Monitoring the Future - National Survey Results on Drug Use, 1975-2003. Volume II: College students and adults ages 19-45* (NIH Publication No. 04-5508). Bethesda, MD: National Institute on Drug Abuse. Available at <http://www.monitoringthefuture.org/pubs.html>.
- Krous HF, JB Beckwith, RW Byard, et al. 2004. Sudden Infant Death Syndrome and Unclassified Sudden Infant Deaths: A Definitional and Diagnostic Approach. *Pediatrics* 114(1):234-238.
- Mage DT. 2004. Seasonal variation of sudden infant death syndrome in Hawaii. *Journal of Epidemiology and Community Health* 58:912-916.
- Nebraska Health and Human Services System. 2004. Nebraska Pregnancy Risk Assessment Monitoring System – 2000 Surveillance Report. Lincoln, NE. Available at http://www.hhs.state.ne.us/srd/PRAMS_report2000.pdf.
- Paluszynska DA, KA Harris, BT Thach. 2004. Influence of sleep position experience on ability of prone-sleeping infants to escape from asphyxiating microenvironments by changing head position. *Pediatrics* 114(6) :1634-1639.
- Schrager L, J. Joyce and L. Cawthon. 1995. Substance Abuse, Treatment, and Birth Outcomes for Pregnant and Postpartum Women in Washington State. Olympia, Wash.: Washington State Department of Social and Health Services.
- Spitzer AR. 2005. Current controversies in the pathophysiology and prevention of sudden infant death syndrome. *Current Opinions in Pediatrics* 17(2):181-185.
- Tonkin SL, TR Gunn, L Bennet, et al. 2002. A review of the anatomy of the upper airway in early infancy and its possible relevance to SIDS. *Early Human Development* 66(2):107-121.
- Unger B, JS Kemp, D Wilkins, et al. 2003. Racial Disparity and Modifiable Risk Factors Among Infants Dying Suddenly and Unexpectedly. *Pediatrics* 111(2):e127-e131.
- US Department of Health and Human Services. 2003. Safe Sleep for Your Baby. Available at <http://www.nichd.nih.gov/publications/pubs/babiessafesleep-AA.pdf> or http://www.nichd.nih.gov/sids/reduce_infant_risk.pdf.
- Willinger M, C-W Ko, HJ Hoffman, et al. 2003. Trends in Infant Bed Sharing in the United States, 1993-2000. *Archives of Pediatric and Adolescent Medicine* 157:43-49.

**MEMBERS OF THE NEBRASKA CHILD DEATH REVIEW TEAM – 2005 SIDS
REVIEW WORKGROUP**

- Chair: Joann Schaefer, MD
Deputy Chief Medical Officer, Nebraska Health and Human Services System
Associate Professor, Department of Family Medicine,
Creighton University Medical Center, Omaha
- Jim Anderson, Ph.D.
Chair, Section of Preventive and Societal Medicine
University of Nebraska Medical Center, Omaha
- Karen Authier, M.S.W.
Lutheran Family Services, Omaha
- Stuart Dornan
Douglas County Attorney, Omaha
- Howard Needelman, M.D.
Section of Neonatology, Children's Hospital, Omaha
- Mary Jo Pankoke
Executive Director, Nebraska Children and Families Foundation, Lincoln
- Shirley Pickens-White
Office of Protection and Safety
Nebraska Health and Human Services System, Lincoln

Debora Barnes-Josiah, Ph.D.
CDRT Coordinator

ATTACHMENT

Comparing the rate of SIDS death in January-March, 2005 to recent previous experience

Dr. James Anderson
Chair, Section of Preventive and Societal Medicine
University of Nebraska Medical Center, Omaha
May 17, 2005

To compare the rate of SIDS death in January-March, 2005 to recent previous experience, we focused on births occurring between September and March during the years 2001 to 2005. We focused on these infants because SIDS death rates are higher in winter than in summer and SIDS most often occurs in the 6 month period after birth. The table below provides the number of births during the September-March period for recent years, and the number of SIDS deaths among these infants reported through March 31 of each year. March 31 was chosen because this was the end of the follow-up period for the infants born between 9/04 and 3/05.

Period	Number of Births	Known SIDS deaths among births
9/00-3/01	14182	9
9/01-3/02	14370	7
9/02-3/03	14466	10
9/03-3/04	15168	4
9/04-3/05	15029	12

For the September-March periods in 2000 through 2004, the observed SIDS death rate was 5.16 per 10,000. For September 2004 - March 2005, the observed SIDS death rate was 7.98 per 10,000, about 50% higher than the previous 4-year period. Nevertheless, the observed rate for 2004-05 is not statistically significantly different from that seen in the previous period ($p=0.18$, Fisher's exact test).