Reducing the Risk of Sudden Infant Death Syndrome (SIDS) and Other Sleep-Related Infant Deaths

Implementing the American Academy of Pediatrics (AAP) SIDS Prevention Guidelines
Objectives

1. Define SIDS
2. Learn about SIDS legislation
3. Learn the steps involved when a SIDS death is suspected
4. Describe SIDS risk factors
5. Review SIDS research
6. List the critical SIDS risk reduction messages for parents and caregivers
7. Identify why modeling safe sleep positioning is important
Sudden Infant Death Syndrome (SIDS)

The sudden unexpected death of an infant, under one-year of age, with onset of the fatal episode apparently occurring during sleep, that remains unexplained after a thorough investigation, including performance of a complete autopsy, and review of the circumstances of death and the clinical history.

California SIDS Legislation

- Boatwright Bills
  - SB 1067 – Training for First Responders
  - SB 1068 – Education and Monitoring
  - SB 1069 – Procedures and Protocols
  - SB 1070 – State Council and Conference
- Statute of 1991
  - SB 362 – Local Health Department Services and Support
California SIDS Legislation - AB 757

An act to add Sections 1254.6 and 1596.847 to the Health and Safety Code, relating to infant safety.

- Requires information and instructional materials relating to SIDS be provided to parents or guardians of newborns by hospitals or midwives.

- Requires education about infant safe sleep and SIDS risk reduction.
  - Optimal education involves modeling and recommending safe infant sleep.

- Requires information to be provided at the newborn infant’s hospital discharge or to the parents or guardian by a licensed midwife in the event of a home birth.
SIDS is...

- A major cause of death in infants
- Most common between 2 and 4 months of age
- Sudden & Silent
- No signs of suffering
- Associated with sleep
SIDS is **not**... 

- Entirely preventable but risks can be reduced
- The same as suffocation
- Caused by vomiting or choking
- Caused by immunizations
- Contagious
- A result of child neglect/abuse
- Hereditary
- The cause of every unexpected infant death
Facts About SIDS

- Can happen to any family
- Affects all social, economic and ethnic groups
- Is not a new reason infants die
- 91% of SIDS deaths occur before 6 months of age
- Is nearly 2 ½ times more likely to occur in African American infants than in white infants
Epidemiology of SIDS in San Diego

SIDIS DEATHS BY YEAR, 2000 - 2010

N=244
Source: County of San Diego Medical Examiner's Database
The Sudden Death of an Infant
When an Infant Dies Suddenly & Unexpectedly

- Baby found not breathing
- Call is made to 911
- Emergency Medical Services (EMS), fire and/or police respond
- Decision made about CPR/transport
- Baby is pronounced dead
- Medical Examiner arrives at death scene or hospital
- Law enforcement officers investigate scene
Determination of Cause of Death

A diagnosis of SIDS is made by collecting information and conducting forensic tests, and by talking with parents, other caregivers, and health care providers. In the absence of an identifiable cause of death after this process, infant fatalities may be diagnosed as SIDS.
Local Health Department Responsibilities

In San Diego County there is a SIDS Coordinator and specially trained Public Health Nurses (PHNs) in each of the 6 regions.
Public Health Nurse (PHN)

- Contact family, childcare provider and/or foster parent within three working days
- Provide counseling, support and bereavement
- Submit documentation of services to the California SIDS program through the SIDS Coordinator
- Notify primary physician of infant’s death
- HIPPPA does not require parental consent

SD 362, statute of 1991
CA Health and Safety Code 123725-123745
SIDS RESEARCH
Current Research Findings and Theories About SIDS

• Cardiac causes

• Brain Abnormalities

• The Triple Risk Model
Brain Abnormalities Theory

Brainstem Neurotransmitters in SIDS Study
Brainstem

Cortical Influences

Behavioral Control of Ventilation

Reticular Formation
Sleep/Wakefulness

Central Chemoreceptor
Sensitive to Small Changes in CO₂

Upper Airway Skeletal Muscles

Automatic Control of Ventilation

Peripheral Chemoreceptor
Sensitive to Large Drops in Oxygen & pH & Large Increases in CO₂

Diaphragm

Chest Wall Muscles

Pulmonary, Chest Wall, & Airway Receptors
Brainstem is the *life support* portion of the brain.

Autopsy study found decreased serotonin (5-HT) and serotonergic neurotransmitter receptor binding activity in SIDS brainstems vs controls.

Basic elements of serotonin synthesis, neurotransmission, and neuronal firing, of 5-HT are abnormal.

5-HT$_{1A}$ Receptor Binding Density in the Mid-Medulla from SIDS vs Control

A perspective on neuropathology findings in victims of the sudden infant death syndrome: The triple-risk model.
Triple Risk Model

Extrinsic Risk Factors
- Prone or side sleep position
- Bed sharing
- Over-bundling
- Soft bedding
- Face covered

Intrinsic Risk Factors
- Male Gender
- Genetic polymorphisms
- Prenatal exposures to cigarettes and/or alcohol

Environmental Factors
- Development

SIDS

A San Diego Study

San Diego SIDS/Sudden Unexplained Death in Childhood Research Project (SUDCRP)

The SUDC webpage is: www.sudc.org
The Problem

- Diagnosing the cause and manner of death for infants who die suddenly and unexpectedly has become challenging.
- There is a lack of consistency in the way these diagnoses are made between counties in California.
- Infants with similar death scene and autopsy findings may be “SIDS” in one county, “Undetermined” in another, and “Positional asphyxia” in still another.
Risk Factor Changes for Sudden Infant Death Syndrome After Initiation of Back-to-Sleep Campaign Study

- **Objective:**
  - Test the hypothesis that there has been a change in the profile of sudden infant death syndrome (SIDS) after the initiation of the Back-to-Sleep (BTS) campaign in 1994.

- **Methods:**
  - Risk factors were recorded for 568 SIDS deaths from 1991 to 2008 based on standardized death scene investigations and autopsies.
    - The population was 100% of infant deaths from the San Diego Medical Examiner’s Office during the period of interest.
  - Risks were divided into intrinsic (e.g., male gender) and extrinsic (e.g., prone sleep).
TABLE 1  SIDS and Other Sudden Unexpected Infant Deaths in San Diego County, California from 1991 to 2008

<table>
<thead>
<tr>
<th></th>
<th>SIDS, n (%)</th>
<th>Other Natural Causes, n (%)</th>
<th>Accident, n (%)</th>
<th>Homicide, n (%)</th>
<th>Unclassified, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991–1993</td>
<td>169 (65)</td>
<td>38 (15)</td>
<td>27 (10)</td>
<td>9 (3)</td>
<td>17 (7)</td>
</tr>
<tr>
<td>1994–1995</td>
<td>92 (65)</td>
<td>20 (14)</td>
<td>11 (8)</td>
<td>11 (8)</td>
<td>8 (6)</td>
</tr>
<tr>
<td>1996–2008</td>
<td>307 (56)</td>
<td>73 (13)</td>
<td>75 (14)</td>
<td>35 (6)</td>
<td>62 (11)</td>
</tr>
<tr>
<td>Total</td>
<td>568 (60)</td>
<td>131 (14)</td>
<td>113 (12)</td>
<td>55 (6)</td>
<td>87 (9)</td>
</tr>
</tbody>
</table>
Findings:

- There was a consistently high prevalence of both intrinsic and especially extrinsic risks both before and during the Back-to-Sleep era.

- Risk reduction campaigns emphasizing the importance of avoiding multiple and simultaneous SIDS risks are essential to reduce the risk of SIDS, including among infants who may already be vulnerable.
SIDS Risk Reduction
Which Infants Are at Greatest Risk?

- Infants Born:
  - To mothers with late/no prenatal care
  - To young mothers (under 20 years of age)
  - Male
  - In multiples (e.g., twins, triplets, etc.)
  - African Americans and Native Americans
  - Premature and/or low birth weight infants (under 1000 grams)
Which Infants Are at Greatest Risk?

- Infants Exposed to:
  - Nicotine/tobacco
  - Prenatal illicit drug and alcohol use
  - Sleeping on their stomach
  - Soft bedding
  - Overheating (e.g., blankets, hats, etc.)
Factors Thought to be Protective Against SIDS

Breastfeeding  Immunizations  Pacifiers
Back To Sleep Campaign

Figure 2. U.S. SIDS Rate and Sleep Position, 1988–2003 (Deaths per 1,000 Live Births)

Sources: SIDS rate source: National Center for Health Statistics, Centers for Disease Control and Prevention, Department of Health and Human Services. Sleep position data: Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Infant Sleep Position Study.
Which One is the Safe Sleep Area?
Tummy Time Is Important

- Avoid development of positional plagiocephaly.
- Encourage “tummy time” when the infant is awake and observed. This will enhance motor development.
- Alter the supine head position during sleep.

Babies need tummy time! Place babies on their stomachs when they are awake and someone is watching. Tummy time helps babies head and neck muscles get stronger and helps to prevent flat spots on their head.
Addressing Common Arguments Against Back Sleeping

- Fear of Aspiration
  - Response:
    - No evidence that aspiration is more common among healthy babies sleeping on their backs
    - Cases of fatal aspiration very rare
    - Back position has been studied since BTS, no evidence of increase in aspirations
    - In fact babies may clear secretions better when placed on their backs (see figure)
In the U.S. from 1991 to 1996:

- Overall infant mortality rate fell 21.9%.
- SIDS rate fell 38.9%.
- There were no increased infant deaths due to: Aspiration, Asphyxia, or Respiratory failure.
**Figure 1** Upper Respiratory Anatomy: Baby in the Back Sleeping Position

**Figure 2** Upper Respiratory Anatomy: Baby in the Stomach Sleeping Position
Importance of Modeling Supine Sleeping Position
Infant Sleep Position Recommended by Nursery Staff in Hospital Normal Newborn Nurseries study

<table>
<thead>
<tr>
<th>Position</th>
<th>Percentage</th>
<th>N = 96 Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prone</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Side</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>Supine</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Side or Supine</td>
<td>42%</td>
<td></td>
</tr>
</tbody>
</table>

Safest Sleeping Position to Reduce the Risk for SIDS Cited by Nurses

N = 96 nurses

Motivations for *Side* Infant Placement Choice Among Nursery Staff

- **Fear of Aspiration**: 91%
- **Personal Knowledge**: 41%
- **Written Policy**: 5%
- **Verbal Policy**: 6%
- **Physician Instruction**: 3%
- **Head Nurse Instruction**: 3%

*N= 96 nurses*  
Infant Sleep Position Modeled by Nursery Staff in Hospital Normal Newborn Nurseries

N = 579 Mothers

SIDS Risk-Reduction Messages for Parents and Caregivers

- Always place baby on their backs to sleep for every sleep (including naps)
- Use a firm sleep surface for infants. A firm crib mattress covered by a fitted sheet is the recommended sleeping surface
- Soft objects and loose bedding should not be in baby’s crib
• Baby’s sleep area should be separate but in the same room where parents are sleeping.

• Infants may be brought into bed for breastfeeding, but then should be returned to their own crib.
SIDS Risk-Reduction Messages for Parents and Caregivers cont.

- Do not let baby get too hot or cover the infant’s head when sleeping (no hats)
- Do not allow smoking around a baby
- Pregnant women should receive early and regular prenatal care
- Avoid alcohol and the use of illicit drugs during pregnancy and after birth
- Discourage the use of home monitors and devices that claim to reduce the risk of SIDS
Unaccustomed Tummy Sleeping Increases the Risk of SIDS

Babies who normally sleep on their backs at home are then placed on their tummies to sleep at child care or other settings are 18 times more likely to die from SIDS.
How to Help Your Families

• Ask about how and where the baby will be sleeping when he or she sees the parents during prenatal care visits;

• Provide education during pregnancy about SIDS risk reduction;

• Model behavior by placing the infant on his or her back to sleep in the nursery or at home visit;

• Reinforce the SIDS risk reduction messages following the infant’s birth;
How to Help Your Families cont.

• Monitor the infant’s sleep position by asking the parents about it during every office visit, through periodic phone calls, or home visits; and

• Help parents modify the crib and home environment according to SIDS risk reduction recommendations, if needed.

• Implement safe sleep policy in your hospital.
Encouraging Parents to Take Action

**Attention.** Finding an optimal time for education when the parents are alert will increase attention to the message.

**Retention.** For SIDS risk reduction recommendations to be retained, it is vital that you consistently model the behavior of placing infants on their backs to sleep.

**Reproduction.** Provide opportunities for parents to practice placing their baby in the back sleep position and then provide feedback and encouragement.

**Motivation.** Convincing parents of the benefits of the practice is critical to their motivation to implement the recommendations.

*Base on Social Cognitive Theory or Social Learning Theory*
ABCs of Safe Sleep for Infants

ALONE to SLEEP: Babies sleep safest ALONE in a separate sleep space.

BACK to SLEEP: is the only acceptable position for babies to sleep.

CRIB to SLEEP: an uncluttered, safety approved crib or bassinet with a firm mattress
Resources

For additional SIDS Information:

www.californiasids.com
www.cdc.gov/sids
www.nichd.nih.gov/sids
www.healthychildcare.org/sids.html
www.sidscenter.org

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Questions and Answers