Bedsharing and Sudden Infant Death Syndrome

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No Conflicts of Interest to Disclose
“And this woman's son died in the night ...”

1 Kings 3: 19
(950 B.C.)

LAPSE OF TIME FROM MOMENT WHEN LAST SEEN ALIVE TO THE DISCOVERY OF DEATH (96 Cases)

Figure Courtesy of Doctor Maria Valdes-Dapena
Sudden Infant Death Syndrome

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.

Infant Deaths by Age of Death

Infant Deaths by Month of Death

- SIDS
- Undetermined
- All Other

California Department of Health Services, MCAH/OFP, September 2005.
Infant Deaths by Race/Ethnicity

SIDS Autopsy Findings

- No identifiable cause of death.
- No signs of severe illness.
- No signs of significant stress.
With the perseverance of Trojans ...  

- Faithful.  
- Scholarly.  
- Skillful.  
- Courageous.  
- Ambitious.  

“Here are provided seats of meditative joy,  
Where shall arise again the destined reign of Troy.”  
Virgil, Aeneid
Imagine a car driving up a steep mountain road. The car has stopped. Why can’t the car continue up the hill?

Modified after Professor Jacopo P. Mortola. McGill University.
How Are We to Understand SIDS?

Imagine a car driving up a steep mountain road. The car has stopped. Why can’t the car continue up the hill?

• Medical Model.
  • All four tires are flat.
  • Identify the problem.
  • Find a solution to the problem.
  • Fix the problem.

Modified after Professor Jacopo P. Mortola. McGill University.
Medical Model of SIDS

- Cardiac causes.
- Respiratory causes.
- Arousal disorders.
- Metabolic disorders.
- Infections.
- Vitamin deficiency.
- Environmental toxins.
How Are We to Understand SIDS?

Imagine a car driving up a steep mountain road. The car has stopped. Why can’t the car continue up the hill?

- **A New Way of Thinking.**
  - There are too many passengers.
  - The engine is not powerful enough.
  - The road is too rocky.
  - The road is too steep.

Modified after Professor Jacopo P. Mortola. McGill University.
Infant Vulnerability

Development

Environment

SIDS

Brainstem Neurotransmitters in SIDS

• Brainstem is the *life support* portion of the brain.

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

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

Brainstem Serotonin Concentration (pmol/mg)

- SIDS (n=35)
- Controls (n=5)
- Hospitalized (n=5)

**Raphe Obscurus**
- SIDS: 60
- Controls: 80
- Hospitalized: 40

**PGCL**
- SIDS: 40
- Controls: 60
- Hospitalized: 80

P <0.05

P <0.04

Sudden death without Asphyxia
Sudden death with Asphyxia
Known Cause of Death

*P < 0.001
Brainstem Neurotransmitters in SIDS

- SIDS victims may have abnormal neurologic control of cardiac, respiratory, and/or arousal function.
- Infants thought to have died from asphyxiation show similar brainstem neurotransmitter findings, suggesting some vulnerability.
- Supports risk reduction strategies.

Accidental Asphyxia or Suffocation

Sudden Death with Asphyxia

Sudden Death without Asphyxia

Brainstem Abnormality

Small
Intermediate
Severe

Asphyxial Insult

Severe
Intermediate
None

**SIDS**

**Known Cause of Death**

**Biology Interacts with Environment**

**“True” SIDS**

Clear evidence of suffocation, entrapment, etc. 

Dx: Accidental

Some Risk Factors, but would not cause death in all infants.

Dx: Variable

No Risk Factors.

Dx: SIDS
Known Cause of Death

Biology Interacts with Environment

“True” SIDS

Dx: Accidental

Dx: Variable

Dx: SIDS
Infant Vulnerability

Development

Environment

SIDS

Infant Vulnerability

Development

Environment

SIDS

The majority of SIDS victims have ≥1 Risk Factor

244 SIDS victims from New Jersey, 1996-2000.

How can we, as a population, reduce the risks of SIDS?
Most infants with risk factors will not die from SIDS.

Some infants without risk factors will die from SIDS.

However, infants with risk factors are at increased risk of dying from SIDS.
POLICY STATEMENT

SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment

abstract

Despite a major decrease in the incidence of sudden infant death syndrome (SIDS) since the American Academy of Pediatrics (AAP) released its recommendation in 1992 that infants be placed for sleep in a non-prone position, this decline has plateaued in recent years. Concurrently, other causes of sudden unexpected infant death that occur during sleep (sleep-related deaths), including suffocation, asphyxia, and ill-defined or unspecified causes of death have increased, particularly since the AAP published its last set of recommendations in 2005. It has become increasingly important to understand the causes of sleep-related infant death. Many of the modifiable risk factors for SIDS and suffocation are also found in sleep-related deaths, so the AAP is expanding its recommendations beyond just SIDS to focusing on a safe sleep environment for all infants.
AAP Recommendation #1

Back to Sleep for every sleep—To reduce the risk of SIDS, infants should be placed for sleep in a supine position (wholly on the back) for every sleep by every caregiver until 1 year of life.

Side sleeping is not safe and is not advised.

Prone Sleeping and SIDS
(Odds Ratios vs Non-Prone Sleeping)

National Infant Sleep Position Study (U.S.A.)


SIDS Risk Odds Ratio vs Supine Sleep Position

Unaccustomed Prone Sleeping ↑ SIDS Risk

- 1987-1990, case control study in New Zealand.
- 20% of SIDS deaths involved lack of experience with prone position.

Safe Infant Sleep Recommendations

• Use a firm mattress without blankets or pillows.
• Keep soft items out of the crib.
• Roomshare, but not bedshare.
• Avoid cigarette smoke, alcohol, and drug exposure.
• Breastfeed.

Safe Infant Sleep Recommendations

• Offer a pacifier during sleep.
• Avoid overheating.
• Infants should be fully immunized.
• Avoid commercial devices claiming to prevent SIDS.
• Supervised *Tummy Time* while awake.

AAP Recommendation #3

Room-sharing without bedsharing is recommended---There is evidence that this arrangement decreases the risk of SIDS by as much as 50%. In addition, this arrangement is most likely to prevent suffocation, strangulation, and entrapment that might occur when the infant is sleeping in an adult bed.

Early Study of Maternal Overlaying

- In 1892, a Scottish police surgeon, Templeman, was the first to draw attention to the potential role of excessive alcohol consumption and overlaying.
- 258 cases of suffocation in infants.
- More than half of deaths occurred Saturday night.
- Postulated that intoxication impaired arousal responses of parents sleeping with infants, thus increasing the risk of accidental suffocation.

Infant Bedsharing in Los Angeles County

- **All**: 79.1%
- **White**: 67.1%
- **Latina**: 80.3%
- **Afr-Am**: 87.6%
- **API**: 85.3%

*n = 6,246*

Los Angeles Mommy and Baby (LAMB) Project, 2007
National Child and Adolescent Health Research, Evaluation, and Planning Unit
Los Angeles County Department of Public Health
Health Resources and Services Administration (HRSA) R40MC06635
James J. McKenna, Ph.D.
Professor and Chair.
Department of Anthropology.
University of Notre Dame.
South Bend, Indiana.
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<th>USC</th>
<th>10</th>
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<tbody>
<tr>
<td>Notre Dame</td>
<td>14</td>
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October 19, 2013
Notre Dame Stadium
The University of Notre Dame
South Bend, Indiana.
Mother-Infant Bedsharing Increases Breastfeeding vs Sleeping in a Different Room

James J. McKenna, Ph.D.
Professor and Chair
Department of Anthropology
University of Notre Dame

Mother-Infant Bedsharing

Mother-Infant Bedsharing

Arousals which Overlap (%)

Solitary Solitary Bedshare

Infant Mother

0 25 50 75

Bedsharing, Breathing, and Infant Sleep

- Increased breastfeeding, but not when compared to room-sharing.
- No decrease in apnea.
- No stimulation of breathing.
- Increased arousals (baby wakes mother).
- Decrease in deep sleep.
- No apparent physiological protection.

Bedsharing and SIDS in Ireland, 1994-1998


123 SIDS. 263 controls.

Odds Ratio SIDS vs Controls

- All: 2.89
- Couch: 66.90
- <11 weeks old: 10.20
- >11 weeks old: 1.07
- Separate Room: 3.26


SIDS = 127
Controls = 922

Odds Ratio
Bedsharing and SIDS Risk: CESDI Study (Odds Ratios vs did not sleep with an adult)


- **Separate Room**
- **Bedshare on Sofa**
- **Bedshare, but return to cot**
- **Whole Night Bedshare**

SIDS = 325
Controls = 1300
Infant Deaths by “Sleeping Alone or With Others” California 2003 SUID Data

Two Distinct Bedsharing Subgroups

Elective:
- Breast feeders
- Non-smokers
- Firm mattress

Less Risk?

Non-Elective:
- Bottle fed
- Smokers
- Risk factors

High Risk

Roomsharing

• Place infant’s crib or bassinet in the parents’ room close to parents’ bed.

• Removes the possibility of suffocation, strangulation, or entrapment which may occur with the infant in an adult bed.

• Allows close parent proximity to facilitate feeding, comforting, and monitoring the infant.

• Infant can be brought to bed for breastfeeding, but then returned to the crib.

• Devices promoted to make bedsharing “safe” are not recommended.

• Because of the extremely high risk of bedsharing on a sofa or armchair, infants should not be fed on a sofa or armchair when the parent may fall asleep.

*Pediatrics, 128: 1030-1039, 2011.*
Roomsharing

• No studies have shown bedsharing to be safe or protective against SIDS.

• All risks associated with bedsharing, can not be controlled.

• AAP does not recommend any bedsharing situations as safe.

• Provide separate sleep areas for twins, triplets,
Bedsharing is Especially Unsafe with:

- Infant <3-months of age.
- Parent cigarette smoking.
- Parent is excessively tired; such as sleep deprivation (<4-hours sleep the previous night).
- Parent depressant medication or alcohol use.
- With non-parent or multiple persons.
- Soft or unsafe bed.
- Duvets, pillows, or soft covers.
- Sleeping on a sofa, armchair, or couch.

McKenna’s Bedsharing Recommendations

- All other risk factors should be eliminated.
- Bed in the middle of the floor away from walls or furniture.
- Mattress out of its frame covered with simple, lightweight blankets, tight fitting sheets, and firm pillows.
- Do not bedshare with other children.
- Do not bedshare if parents ever smoked cigarettes.

McKenna, J.J.  
Sleeping with Your Baby. 2007.
AAP Recommendations

• Room-sharing, with the infant in a crib in the parents’ room next to the adult bed, is safest, and is safer than bedsharing.

• Infants brought to bed for breastfeeding should return to a separate crib.

• Do not bedshare if parents smoke cigarettes.

• Do not bedshare if the parents’ arousal is depressed (alcohol, drugs, sleep deprived <4-hours sleep the night before).

• Do not sleep with an infant on a sofa or chair.

Parents Ignore Safe Infant Sleep Recommendations

http://www.parents.com/baby/safety/nursery/how-safe-is-your-babys-sleep/?page=3
Supine
Alone
Firm mattress
Empty crib
Known Cause of Death

Biology Interacts with Environment

“True” SIDS

Clear evidence of suffocation, entrapment, etc.

Some Risk Factors, but would not cause death in all infants.

No Risk Factors.

Dx: Accidental

Dx: Variable

Dx: SIDS
Coroners’ Curriculum Development Committee
California State Coroners Association
• 32 Coroners and Pathologists from around California attended.

• Working conference to explore whether or not it is possible to achieve better consistency between counties on diagnosing the cause and manner of death in babies dying suddenly and unexpectedly.

• Attendees voted on cause of death and manner of death on a number of cases, to bring out areas of common ground and of difference.
Some pathologists were persuaded to use “SUID” because it is recommended by the Center for Disease Control and Prevention.

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>%</th>
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<tbody>
<tr>
<td>SIDS</td>
<td>56</td>
</tr>
<tr>
<td>Undetermined</td>
<td>22</td>
</tr>
<tr>
<td>SUID</td>
<td>16</td>
</tr>
<tr>
<td>Asphyxia</td>
<td>6</td>
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<table>
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<tr>
<th>Manner of Death</th>
<th>%</th>
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<tbody>
<tr>
<td>Accidental</td>
<td>0</td>
</tr>
<tr>
<td>Homicide</td>
<td>0</td>
</tr>
<tr>
<td>Natural</td>
<td>63</td>
</tr>
<tr>
<td>Undetermined</td>
<td>38</td>
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Other cases were reviewed which had a variety of findings.

Complete consensus was not achieved on any case, but those with a positive finding had better agreement.

The conference illustrated the complexity of cases Coroners currently see.

Increased observations revealed more questions.

Difficult to come to a definitive diagnosis.

Achieve “probable cause” or “certainty”
**Known Cause of Death**

- **Clear evidence of suffocation, entrapment, etc.**
  - **Dx:** Accidental

- **Some Risk Factors, but would not cause death in all infants.**
  - **Dx:** Variable

- **No Risk Factors.**
  - **Dx:** SIDS

**Biology Interacts with Environment**

**“True” SIDS**
Diagnosis of SUDI in California

- Coroners and Medical Examiners in different counties use different diagnoses (names) for unexplained infant deaths which are sudden and unexpected.
- SIDS, Undetermined, SUID, SUDI, etc.
- These all mean the same thing.
- Public health services should be provided to all.
- Parents should be counseled that these diagnoses all mean the same thing.

Studio City, California. October 19, 2011.
SUDI: Challenge to the California SIDS Community

- As authorities in health care, we need to convey the message that these differing diagnoses are equivalent!
- Support should be provided to all families.
- Coroners and Medical Examiners should voluntarily refer all families to MCAH/Public Health Nurses.
- MCAH should provide grief and education services to families of all SIDS, SUID, undetermined, etc.
- Support services help families work through the death of their infant and are critical and beneficial.

California Department of Public Health, December 17, 2012.
The cause of SIDS is not yet known.

This information has not been proved to be the cause of SIDS.

However, I have attempted to give you some idea about some current directions of SIDS research.
SIDS

Infant Vulnerability

Development

Environment

Sudden Infant Death Syndrome

• Most common cause of sudden infant death between the ages of 1-month and 1-year.

• Cause remains unknown.

• Can not be predicted in infants prior to death.

• Reduction in SIDS in populations through public health intervention.
• Bedsharing is associated with an increased risk of infant death.

• Bedsharing is increasingly common, despite known risks.

• No study shows that bedsharing is protective.

• Roomsharing, but not bedsharing, is the safest infant sleep environment.