# CAN WE PREVENT INFANT SLEEP-RELATED DEATHS?

#### What You Need to Know Now

A Nursing Competency





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#### Objectives

# Upon completion Health Care Providers & Clinical Staff (HCP/CS) will be able to:

- Define SIDS and SUID (Sudden Unexpected Infant Death.
- List the critical infant sleep safety messages for parents and caregivers.
- Describe their key role as educators to parents and caregivers about infant sleep safety.
- Describe ways that nurses can effectively communicate infant sleep safety messages to parents and caregivers.

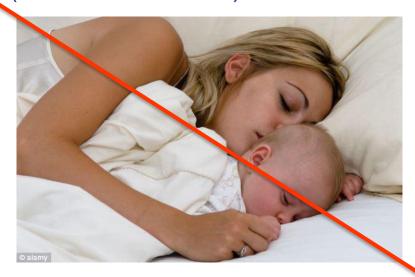
## Infant Sleep Safety

 Requires a consistent and repetitive message in the community to prevent accidental deaths



#### **Definitions**

- <u>Co-sleeping:</u> a vague and confusing term to describe shared sleeping arrangements between infant and parents
- <u>Bed-sharing:</u> any individual sharing a sleeping surface with an infant (NOT RECOMMENDED)
- Room-sharing: parent and infant sleep proximate in the same room, on separate sleep surfaces for the first 6 months. (RECOMMENDED)

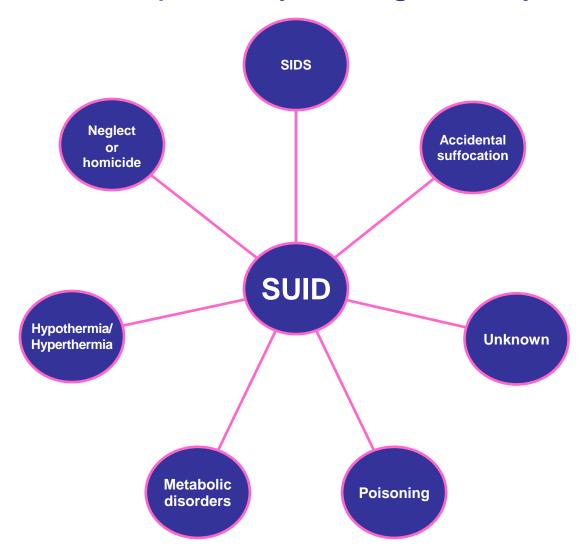




#### What is SUID or SUDI?

- Sudden Unexpected Infant Death
  - Occurs in a previously healthy infant
  - No obvious cause of death prior to investigation
  - Excludes deaths with obvious cause
- The big "umbrella" of all unexplained infant deaths
- SIDS represents a <u>subcategory</u> of SUID

# Some causes of deaths that occur suddenly and unexpectedly during infancy



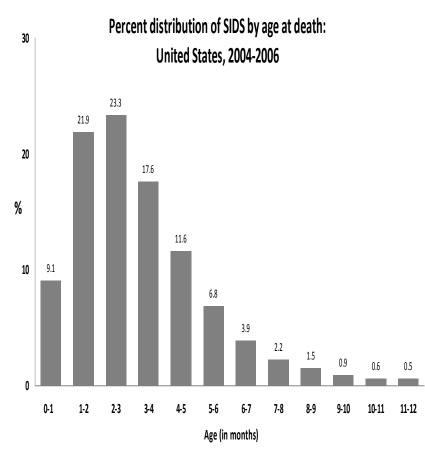
#### What is SIDS?

ICD-10 Definition: The sudden death of an infant under one year of age which remains unexplained after the performance of a complete post-mortem investigation including:

- Performance of a complete autopsy
- Examination of the death scene
- Review of the case history

#### SIDS Facts

- The leading cause of death in infants from one month to one year of age (post-neonatal infant mortality)
- A diagnosis of exclusion. The cause of death is assigned only after ruling out other causes
- Peak time of occurrence: 1-4 months
- Higher incidence in males
- No longer see a higher frequency in colder months



AAP Task Force on SIDS Policy Statement: Nov. 2011

#### SIDS Facts

- Higher incidence in preterm and low birth weight infants
- Associated with:
  - Young maternal age
  - Maternal smoking with pregnancy
  - Late or no prenatal care
- 2-3 times more common in African-American, American Indian, Alaska Native children
- Hispanic and Asian/Pacific Islanders infants have among the lowest SIDS rates.

# Did you know?

- About 1 in 5 infant sleep-related deaths occur while an infant is in non parental care.
- Many times this occurs because the caregiver places babies to sleep on their tummies.
- This is called "unaccustomed tummy sleeping". These babies are 18 times more likely to die.



## Understanding Cultural Issues

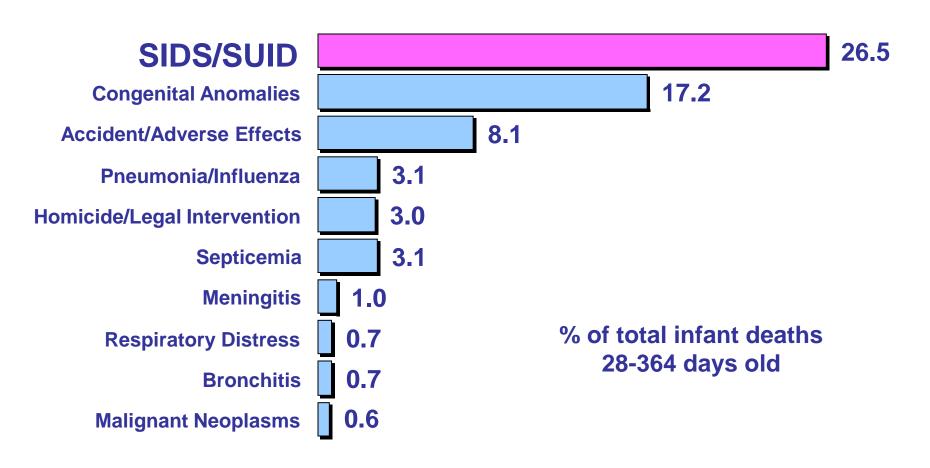
- Sleeping on soft bedding and bed sharing, two practices that increase the risk of sleep-related death are more common among minority populations.
- Infants born to African American families and to families living in some urban areas are more likely to be placed on their stomach, the position that poses the highest risk.
- Dressing an infant in multiple layers can lead to overheating, which is a leading risk factor in American Indian communities.

#### SIDS is NOT...

- Preventable...but the risk can be reduced!
- Caused by vomiting and/or choking
- Caused by immunizations
- Contagious
- The result of child abuse or neglect
- The cause of every unexpected infant death

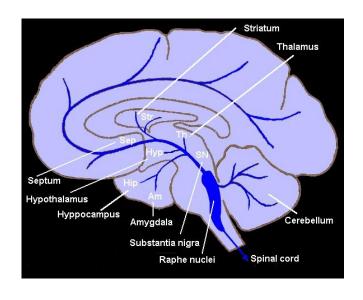
## Infant Mortality Statistics

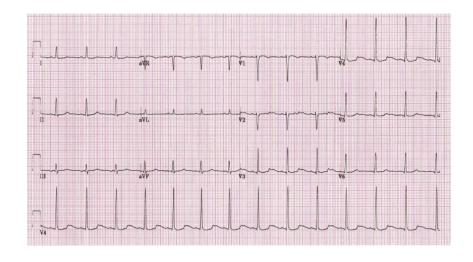
SIDS/SUID – United States 1999
The major cause of infant death after the first month



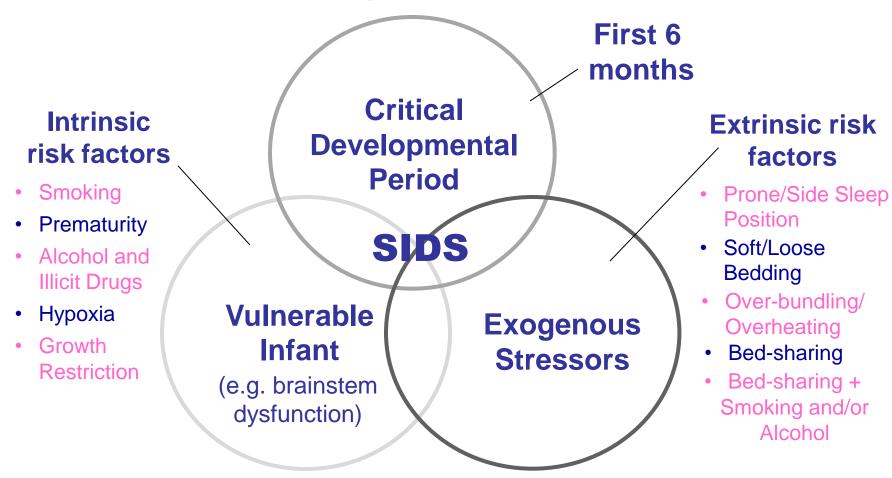
#### Underlying Vulnerabilities

- Anatomic or genetic abnormalities:
  - Brainstem abnormalities
  - Cardiac arrhythmia





# Triple Risk Model to Explain SIDS



# According to the triple-risk model, all three elements must be present for a sudden infant death to occur

- 1. The baby's vulnerability is undetected;
- 2. The infant is in a critical developmental period that can temporarily destabilize his or her systems; and
- 3. The infant is exposed to one or more outside stressors that he or she cannot overcome because of the first two factors.

## A Brainstem Abnormality?

- Serotonergic neurons in the medulla project to nuclei in the brainstem and spinal cord which help regulate vital autonomic functions:
  - Blood pressure
  - Temperature control
  - Respiratory control
  - Upper Airway Reflexes
  - Arousal

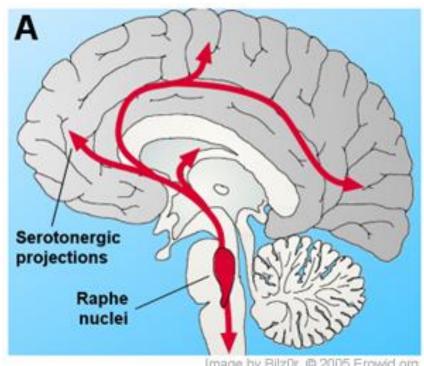


Image by Bilz0r, @ 2005 Erowid.org

# Evidence for a Brainstem Abnormality in SIDS

- Kinney et al. identified altered serotonin receptor binding density in medullas in brains of infants dying of SIDS (J. Neuropathology & Exp Neurology (2003)
- Hypothesis:
  - Medullary serotonin dysfunction results in a failure of autonomic and respiratory responses to hypoxia or hypercapnia
  - Results in sudden death in a subset of SIDS cases
- Serotonin receptor binding density lower in SIDS cases compared to controls. (JAMA 2006)
- Serotonin levels 26% lower in SIDS cases compared to controls! (JAMA 2010)

## Critical Period of Development

- 90% of sleep-related death cases prior to 6 mos.
- Rapid brain growth
- Developmental changes in sleep state organization, arousal, cardiorespiratory control, and metabolism
- Individual differences in the normal physiologic maturation of the brain and brainstem
- Individual variations in development of muscle tone and head control

## Modifiable Environmental Stressors

- Prone/Side Sleep Position
- Nicotine Exposure
- Soft/Loose Bedding

- Overheating
- Bed Sharing







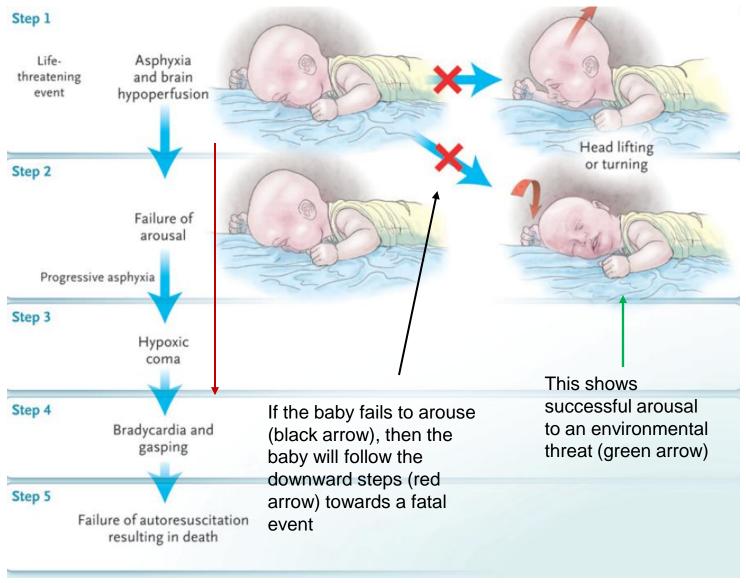
#### Risk Factors

#### Babies who sleep on their stomachs are:

- have longer periods of deep sleep
- are less reactive to noise
- experience less movement
- have higher arousal threshold
- experience sudden decreases in blood pressure and heart rate control

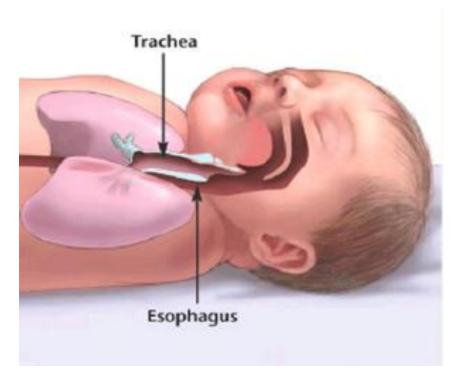


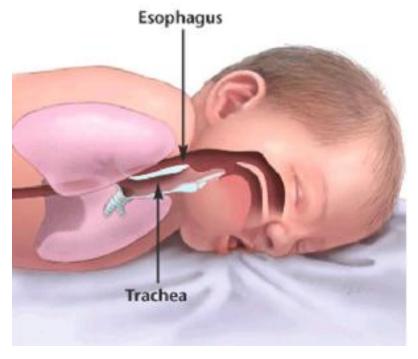
#### An example of SIDS pathogenesis



# The Truth About Supine Sleep and Aspiration: Ending the Fallacy

Orientation of the Trachea to the Esophagus





# The Truth About Supine Sleep and Aspiration

- When the baby is placed on the back, the esophagus is below the trachea. If the baby spits up, the content will come out of the baby's mouth. The remaining content will go back down the esophagus by the force of gravity. The content is swallowed and will not get into the lungs.
- On the other hand, when the baby is placed on the stomach, the trachea is below the esophagus. If the baby spits up, the content can go into the trachea resulting in aspiration.
- Remember: Coughing does not indicate choking. People cough to clear and protect their airway. It is a reflex, and healthy babies use it just like adults do!

#### Risk Reduction Outreach

- 1992-the AAP recommends that all healthy infants younger than 1 year age be placed to sleep on their backs or sides to reduce SIDS.
- 1994-"Back to Sleep" campaign launched.
- 1996-AAP recommends that infants be placed "wholly" on their backs, the position associated with the lowest SIDS risk.



## Why Back to Sleep?

- Stomach sleeping carries between 1.7 and 12.9 times the risk of SIDS as back sleeping.
- Stomach sleeping may increase the risk of SIDS through a variety of mechanisms including: having the baby rebreathe his/her own expired breath leading to CO<sub>2</sub> build up and low O<sub>2</sub> levels, causing upper airway obstruction and interfering with heat dissipation, leading to overheating.

## Benefits of Back Sleeping

- Less likely to develop ear infections, stuffy noses and fevers.
- There is no increase in aspiration or vomiting when babies are placed on their back to sleep.
- Back sleepers may be somewhat slower to learn to roll over, sit up, creep, crawl and pull to standing position than stomach sleepers but, there is no significant difference in the age when infants learn to walk.



## Where Should Infants Sleep?

Sheers, Rutherford, and Kemp Pediatrics, Oct. 2003

- Infants < 8 months, incidence of death in cribs:</li>
   .63 deaths/100,000 infants.
- Infants < 8 months, incidence of death in co-sleeping:</li>
   25.5 deaths per 100,000 infants.

#### **Risk for SIDS:**

- Greatest if sharing a sleep surface.
- Intermediate if sleeping in another room.
- <u>Least</u> if infant sleeps in same room without bed-sharing

# Bed Sharing with Siblings, Soft Bedding Increase the Risk

Chicago Infant Mortality Study, Pediatrics, May, 2003

- Sleeping on soft bedding: increased SIDS risk 5 X
- Sleeping on the stomach: increased SIDS risk 2.4 X
- SIDS victims were 5.4 times more likely to have shared a bed with other children.
- Sleeping on the stomach on soft bedding: increased risk of SIDS
   21 times

# Unsafe Sleep Environment



## **Bed-Sharing**



There is enough weight in a human arm to suffocate an infant!

## Bed-Sharing with Overlay



The nose or mouth can become obstructed or the weight of the adult can constrict the infant's chest!

# Couch-Sleeping



From this position, babies can slip down between the cushion and the adult.

## Couch-Sleeping



Just like on the bed, the airway can be blocked or the chest crushed!

### 2011 SIDS Task Force Policy Statement: **Key Points**

- Expansion from SIDS to include other sleep related deaths (asphyxia, suffocation)
  - Increasing incidence
  - Similar environmental conditions
- Consistent with, reinforce, and expand on the 2005 recommendations
- Easier to understand, with specific answers to common questions
- Attempt to overcome barriers to implementation with evidencebased answers

# Environmental Similarities in SIDS and Suffocation

RISK FACTOR	SIDS	SUFFOCATION
Stomach Sleeping	yes	unknown
Soft Bedding	yes	yes
Adult or Other Bed, Couch	yes	yes
Over-bundling	yes	yes
Loose Bedding, Head Cover	yes	yes
Bed-sharing	yes	yes
Cigarette Smoke	yes	unknown

# Soft Sleeping Surfaces and Loose Bedding

- Soft bedding vs. firm bedding poses five times the risk.
- Infants who sleep on their stomachs on soft bedding are at 21 times greater risk than those infants that slept on their back on firm bedding.
- The AAP recommends that babies sleep flat on their backs on a safety approved mattress, free of loose materials, including pillow like stuffed toys, fluffy blankets and bumper pads.

 ALWAYS place the baby on his/her back to sleep for naps and at night.



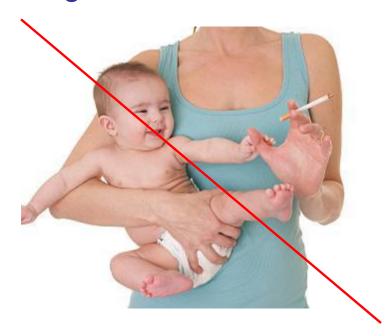
 Place the baby on a firm sleep surface, such as a safety approved crib mattress covered by a fitted sheet.



 Keep soft objects, pillows, toys, loose bedding, wedges, positioners, and bumpers out of the baby's sleep area.



 Do not allow smoking around the baby. Heavy smokers should consider changing their clothing before handling the infant.



 Keep the baby's sleep area close to but separate from where you and others sleep (room-sharing).



 Think about using a clean dry pacifier when placing the baby down to sleep.



 Do not let the baby overheat during sleep. Try a onesie with wearable blanket instead of loose blankets. Keep room temperature comfortable for an adult.



Avoid products that claim to reduce the risk.



- Get regular prenatal care.
- Breastfeed your baby as much as possible.
- Get your baby immunized.



- Do not use home cardiorespiratory monitors as a strategy for reducing the risk.
- Supervised, awake tummy time is recommended to facilitate development and to minimize the development of positional plagiocephaly.



### Unsafe Sleeping Environment

- Soft bedding, pillows, quilts, comforters, sheepskins, stuffed animals and toys
- Bumpers are considered unsafe!
- Any place other then the baby's crib including: sofa, recliner, rocking chair, or an adult bed. Infants may becoming trapped, wedged, injured, rolled on and suffocated!



### Controversy: Should Bumper Pads Be Used in Cribs?

#### Council bans sale of crib bumper pads in Chicago

- Original intent of bumper pads: Prevent injury/death due to head entrapment
- Newer crib standards (slat spacing less than 2-3/8 inches) obviate the need for bumper pads!





#### **Bumper Pad Fatalities**

- Thach study using CPSC data found 3 mechanisms for deaths related to Bumper Pads:
  - Suffocation against soft "pillow-like" bumpers
  - Entrapment between mattress or crib and firm bumper pads
  - Strangulation from bumper pad ties



### No Bumpers in the Crib!

- No evidence that bumper pads or similar products that attach to crib slats or sides prevent injury in young infants
- Potential for suffocation, entrapment, and strangulation
- Bumper pads and similar products are not recommended.



### Smoking and Smoke in the Infant's Environment



- Infants born to mothers who smoked during pregnancy are three times more likely to die of SIDS.
- Exposure to passive smoke in the household doubles a baby's risk.
- Exactly how smoking affects the infant is not clear, but smoking may negatively affect development of the nervous system.

# Is There a Relationship Between Vaccines and SIDS?

- Peak incidence of SIDS = time when infants are receiving numerous immunizations
- 1970's case reports of a cluster of deaths shortly after DPT immunization.
- In 2003, based on analysis of case-control studies, the IOM concluded: "The evidence favors rejection of a causal relationship between exposure to multiple vaccinations and SIDS."

#### Immunization Recommendation

Infants should be immunized in accordance with AAP and CDC recommendations.

- No evidence of causal relationship between immunizations and SIDS
- The recent evidence suggests that immunization may have a protective effect against SIDS.



### **Avoid Overheating**

- Increased risk of SIDS
  - Studies show that an overheated baby is more likely to go into a deep sleep from which it is difficult to arouse.
  - Excessive clothing, head coverings, blankets and an increased room temperature can increase the SIDS risk.
  - The risk increases if the infant has an infection or cold.



SAFE



**NOT SAFE** 

### **Avoid Overheating**

- Definition of overheating varies.
- Cannot provide specific room temperature guidelines.
- Dress infants appropriately for the environment, with no greater than 1 layer more than an adult would wear to be comfortable.
- There is currently insufficient evidence to recommend use of a fan as a SIDS risk-reduction strategy.
- Try a wearable blanket instead of a loose blanket if extra warmth is necessary.



#### To Swaddle or Not to Swaddle?

#### Pros:

- Calms the infant; promotes sleep; decreases number of awakenings
- Encourages use of the supine position



#### Cons:

- Increased respiratory rate and reduced functional residual lung capacity
- Exacerbates hip dysplasia if the hips are kept in extension and adduction
- "Loose" swaddling becomes loose bedding
- Overheating, especially if the head is covered or the infant has infection
- Effects on arousal to an external stimulus remain unclear (conflicting data). There may be minimal effects of routine swaddling on arousal.

### Swaddling

- There is insufficient evidence to recommend routine swaddling as a strategy to reduce the incidence of SIDS.
- Swaddling must be correctly applied to avoid the possible hazards
- Swaddling does not reduce the necessity to follow recommended safe sleep practices.

Swaddling should be discontinued when a baby starts to try to roll

over.



#### **Pacifiers**

- AAP recommendation: Consider offering a pacifier at nap time and bedtime.
- Studies consistently demonstrate a protective effect of pacifiers on SIDS
- Mechanism unknown:
  - Dislodge within 15 to60 minutes
  - Decreased arousal threshold



#### Pacifier Risks

- Dental malocclusion:
  - Non-nutritive sucking is normal in infants
  - AAPD and AAP conclude that it is unlikely to cause long-term problems if stopped by age 3
- Otitis media:
  - Risk 1.2 to 2 times increased....But incidence is low in first 6 months, when SIDS risk is highest
- Gastrointestinal infections more common?
- Increased oral colonization with Candida

### Pacifiers and Breastfeeding

- Observational studies (weakest data): consistent relationship between pacifier use and decreased breastfeeding duration
- Well-designed trials:
  - 2 found no association among term infants
  - 1 found no association among preterm infants
  - 1 found slightly decreased breastfeeding duration at one month if pacifier introduced in first week of life, but NO difference if pacifier introduced after one month!



#### Recommendations:

#### Pacifier Use

- Consider using a pacifier at bedtime and nap time during the first year of life
  - If breastfeeding, delay pacifier introduction until 3 to 4 weeks of age to assure firm establishment of breastfeeding
  - Use when baby is falling asleep
  - Do NOT reinsert after baby is asleep
  - Do NOT coat in any sweet solution
  - Clean pacifiers often and replace regularly



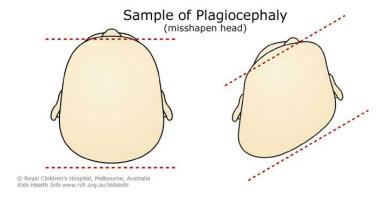


= HEALTHY & SAFE

#### What Happened to Your Head?

### Plagiocephaly

- Plagiocephaly = Oblique Head
  - Increased in frequency since "Back to Sleep" from 1 in 300 to 1 in 60
  - Often associated with torticollis, a tilt or rotation of the head



### Preventing Plagiocephaly

- Changing head position at sleep time
  - Change position from one side to the other each week
  - Periodically change orientation of the infant to outside activity (door of the room)
- Avoid excessive time in car seats and bouncers where pressure is applied to the occiput
- Encourage "tummy time" when awake and observed



### **Tummy Time**

- Ample tummy time is a necessary part of infant development
- Parents should place babies on their stomachs for a certain amount of time each day when they are supervised, to promote motor development.
- Tummy time strengthens shoulder and neck muscles that are used to acquire many infant motor milestones. Tummy time also helps prevent the development of flat spots.



# Breastfeeding: Protective Mechanisms Against SIDS

- Studies show a 50% risk reduction in SIDS when babies are breastfed.
- The benefit is increased as the baby receives more breast milk.
- Breastfed babies more easily aroused from sleep vs. formula fed babies.
- Breastfeeding decreases incidence of multiple infectious illnesses, esp. respiratory and Gl...associated with increased vulnerability to SIDS.
- Breast milk contains maternal antibodies, micronutrients, cytokines which promote immune system benefits.



#### Bed-sharing and Infant Death

- **FACT**: Half of the infants in the U.S. who die from Sudden Unexpected Death do so while sleeping with their parents
  - U.S. experience with bed-sharing and infant death is very different from other cultures
  - Cultures where babies routinely sleep with their parents:
    - Use firm mats on the floor
    - Have separate mats for the infant
    - Do not use soft bedding

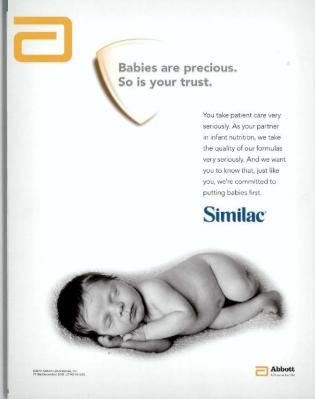
#### Media and Manufacturers

- Media messages affect consumer behavior
- Moon study: more than one-third of the pictures had infants in an inappropriate sleep position and twothirds demonstrated an unsafe sleep environment
- Messages contrary to sleep recommendations creates misinformation and implication that messages are not important
- Media and manufacturers should follow safe sleep recommendations in their messaging and advertising



### Unsafe Sleep in Advertising







### "It Will Never Happen to Me..."

There are scores of bereaved parents who saw themselves as low risk; who didn't smoke, received early prenatal care, were middle class, Caucasian, and breastfed their infant and although they knew the recommendations for "Back to Sleep", they ignored them....WHY????

"Because it will never happen to me!"

## Hospital Based Infant Safe Sleep Program

- Goal: Reduce the risk of injury or death to infants while sleeping
  - Provide accurate and consistent infant safe sleep information to hospital personnel
    - Medical, nursing, breastfeeding, child birth education, and nutritional staff
  - Enable hospitals to implement and model infant safe sleep practices throughout the facility
  - Provide direction to health care professionals so parents receive consistent, repetitive safe sleep education

## Voluntary Acknowledgement Statement

### By signing this statement I agree that I have received this information and understand that:

- my baby should sleep on the back; sleeping on the side or tummy is dangerous.
- sleeping with my baby increases the risk of my baby dying from suffocation or SIDS.
- An acknowledgement form <u>only</u>
- Focuses family on the importance of the information
- Not for legal purposes
- Protects the hospital from potential legal action in event of a later SUID event at home

## Safe Sleep: Nurse Modeling

- The most effective way to communicate risk reduction messages is to PRACTICE them so that parents and families can see the message in action!!
- People trust nurses
- Whatever the nurse does must be correct and it will be imitated in the home
- Fact: supine positioning in the nursery can almost **DOUBLE** its use in the home!



# Spreading the Safe Sleep Message

- The vast majority of nurses know the importance of back-only sleeping and many do embrace it as positive advice for parents, however not all nurses practice it.
- Nurses have the power to influence parents' behavior by modeling safe sleep practices in a consistent manner.
- YOU can help protect infants from sleeprelated deaths!

# Sleep Position in Newborn Nursery

- Infants in the newborn nursery and infants who are rooming in with their parents should be placed in the supine position as soon as they are ready to be placed in the bassinet.
  - No evidence that placing infants on the side during the first few hours of life promotes clearance of amniotic fluid and decreases the risk of aspiration.



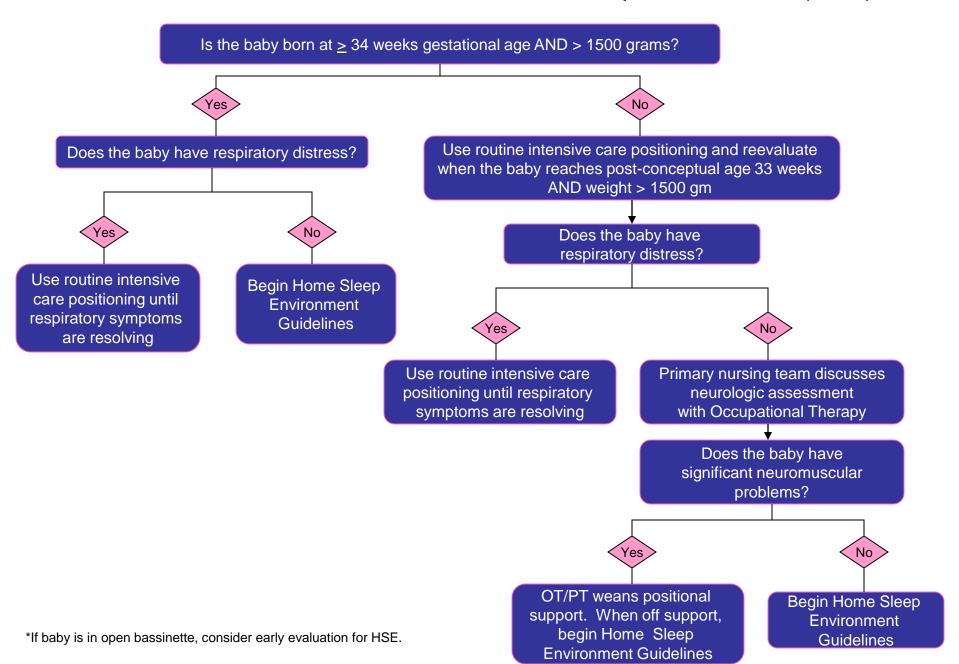
### Safe Sleep in the NICU

- Recommend safe sleep modeling by 32 weeks PMA.
- Kangaroo Care
- Problem: What parents see in the hospital, they will DO AT HOME!
- Educate, Educate, Educate!!!





### Assessment of NICU Patients for Home Sleep Environment (HSE)



# Challenges to Infant Sleep Safety

- Cultural.
- The possibility of aspiration or choking.
- The infant's comfort.
- Concern about a flattened skull.
- Advice from others.

## Aspiration and Choking

A major reason that parents avoid the back sleep position is that they fear their infant will regurgitate and aspirate if the infant sleeps on his/her back.

### **FACT**

Babies may actually clear secretions better when placed on their backs. This is because of the relation of the trachea to the esophagus in the back sleep position.

### Comfort

Infant's seem to sleep more deeply and appear more comfortable while sleeping on their stomachs.

#### **FACT**

- The very absence of deep sleep is believed to help protect infant's against SIDS.
- While comfort is important, the infant's safety is more important!

## Encouraging parents to take action!

According to the *Social Learning Theory* parents are more likely to recall and comply with instructions when the health care provider:

- Uses a positive tone.
- Provides adequate information.
- Allows the parent to ask most of the questions.

## Explain Medical Exceptions in the Hospital

- Certain medical conditions may necessitate putting a baby prone or side lying to sleep.
- Thermoregulation needs may also warrant extra bundling and/or hats when sleeping.
- Any deviation from the AAP recommendations needs to be accompanied by an explanation to the parents!
- Once a baby can roll over you do not need to awaken him/her to reposition but, always start sleep in the back position.

## Things You Can Do in Your Practice...

- Give parents tools to cope with fussy babies
- Sleep-deprived parents may make poor judgments
- Make use of tools such as swaddling, side carrying, shushing, swinging, and sucking





# Changes you may wish to make in your practice

- Discuss sleep safety instead of just SIDS
- Discuss concerns about aspiration and choking with parents of young infants
- Discourage use of bumper pads and other soft bedding
- Encourage room-sharing without bed-sharing



### Parent Education

- Prior to discharge, all parents should be informed!
- Review the safe sleep pamphlet. Parents should also be taught what safe sleep is, risk factors, and how to prevent these deaths at home.
- Ask parents if they have a safe place for their baby to sleep. If not, help them get one! Contact social work to be referred for a Pack 'n Play<sub>®</sub>.
- Parents should view the DVD and sign the Educational Voluntary Commitment Contract (like Shaken Baby). This will become a part of the patient's permanent medical record.



### Safe Sleep Infant Positioning NICU

#### Instructions

Click the Next button (lower right corner) to begin the quiz.

The question numbers appear in the upper left corner of each screen. When you reach the last question you will be prompted to submit your answers or return to the quiz (if you want to review and/or change your answers).

At the CONGRATULATIONS screen, click the Finish button to confirm your test results. Once you are returned to the LMS, remember to press F5 to refresh that screen and view your current status.

NOTE: If you begin the quiz and close the course before finishing the quiz, it will NOT remember your answers and you will have to begin the quiz again.

#### **PROPERTIES**

On passing, 'Finish' button:
On failing, 'Finish' button:
Allow user to leave quiz:
User may view slides after quiz:
User may attempt quiz:

Goes to Next Slide Goes to Next Slide After user has completed quiz At any time

**Unlimited times** 



