

# TFIMR

Tulsa  
Fetal & Infant  
Mortality Review  
Project

## Sleep Related Infant Deaths

Tulsa County 2004 – 2009



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# INTRODUCTION

The idea that not all babies leave the hospital to live happy and healthy lives is difficult to hear; however, many families in our community have suffered the loss of an infant. The nature of a preventable infant death makes this an even more difficult discussion.

Over the last decade, there have been periods of time when Tulsa County mothers have experienced infant mortality rates higher than other mothers in the state. Over that same decade, Oklahoma as a whole has consistently exceeded national infant mortality rates. The purpose of this report is to bring attention to the role sleep related deaths play in infant mortality. Sleep related deaths account for 19% of all Tulsa County infant deaths and are typically identified in one of three categories: Sudden Infant Death Syndrome (SIDS), Asphyxia, or Unknown Cause. Nationally, SIDS is the leading cause of death among infants aged 1 month to 12 months and is the third leading cause overall of infant mortality in the United States (Sudden Unexpected Infant Death and Sudden Infant Death Syndrome). On average, every year in Tulsa County there are 14 sleep related infant deaths. The five year rate, from 2005 – 2009, illustrates a 13.2% increase from the previous 5 year rate.

**Table 1: Sleep Related Deaths:  
Tulsa County and Oklahoma State**

| Year  | Tulsa County     |                           | Oklahoma State   |                           |
|-------|------------------|---------------------------|------------------|---------------------------|
|       | Number of Deaths | Rate per 1000 live births | Number of Deaths | Rate per 1000 live births |
| 2000  | 15               | 1.61                      | 81               | 1.63                      |
| 2001  | 11               | 1.18                      | 62               | 1.24                      |
| 2002  | 16               | 1.72                      | 77               | 1.53                      |
| 2003  | 13               | 1.39                      | 90               | 1.77                      |
| 2004  | 11               | 1.20                      | 68               | 1.33                      |
| 2005  | 10               | 1.08                      | 71               | 1.37                      |
| 2006  | 20               | 2.05                      | 89               | 1.65                      |
| 2007  | 17               | 1.74                      | 89               | 1.62                      |
| 2008* | 13               | 1.39                      | 93               | 1.70                      |
| 2009* | 19               | 1.95                      | 95               | 1.79                      |
| Total | 145              | 1.54                      | 815              | 1.57                      |

\*Preliminary Data (6/22/11)

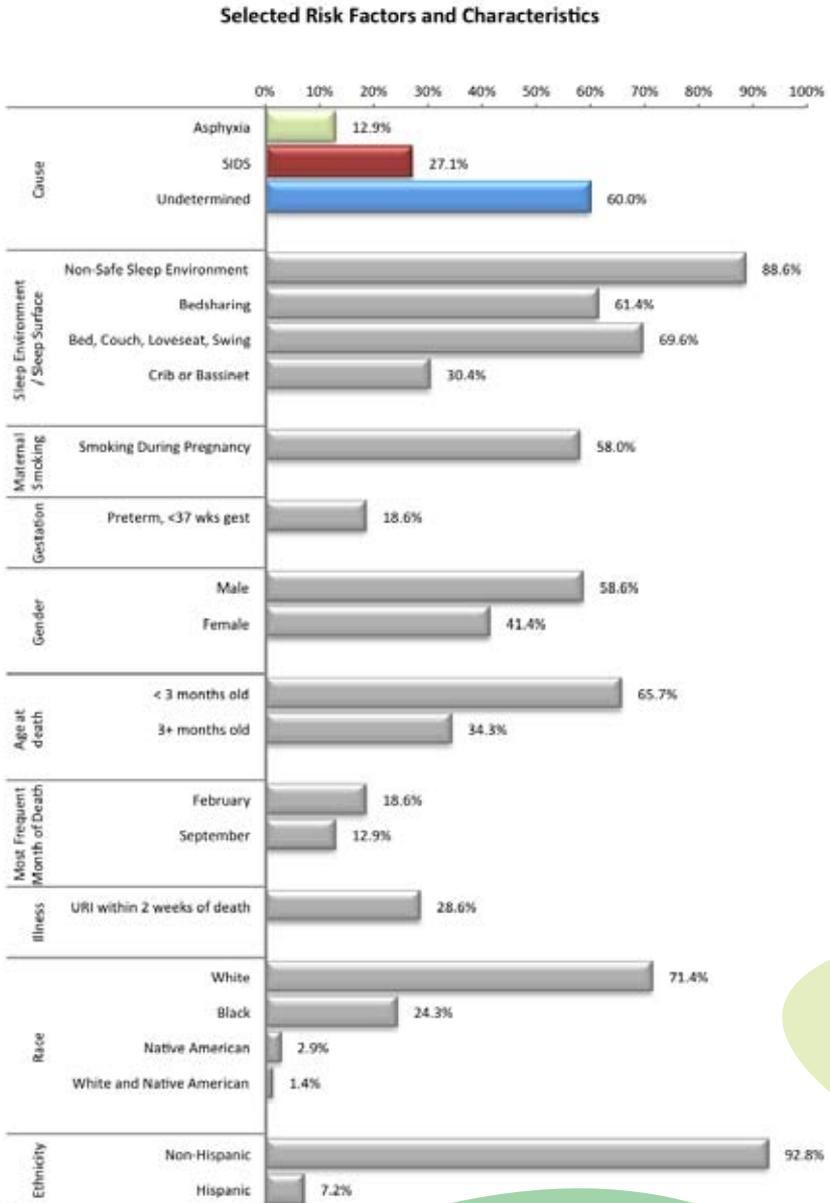
Source OK2Share, Oklahoma State Department of Health

There are a variety of modifiable and non-modifiable risk factors that influence an infant's sleep environment and impact mortality. Non-modifiable risk factors such as gender, time of year, race/ethnicity, premature birth, mother's age, and family history are beyond our scope of influence. Modifiable risk factors such as bedsharing\*, sleep surface, sleep position, loose bedding or other objects in the sleep area, exposure to environmental tobacco smoke, overheating, and maternal alcohol and illegal drug use can and should be addressed. Figure 1 summarizes these risk factors.

The goal of the Tulsa Fetal and Infant Mortality Review Project (TFIMR) is to work with the community to reduce infant mortality rates through targeted systems changes and improvements. Working with others in the community, specifically those who play a part in the delivery of maternal and child health services, is a requirement if we expect to meaningfully address this important issue.

\* Bedsharing also known as co-sleeping, is defined as sharing a sleep surface with one or more individuals

Figure 1: Summary of Selected Risk Factors



# SUMMARY RECOMMENDATIONS AND FINDINGS

- 88.6% (62) of the sleep related deaths were considered to be in a non-safe sleep environment.
- 70% (42) of sleep related infant deaths were categorized as unknown or undetermined.
- 61.4% (43) of the infants were sharing a sleep surface with at least one other individual.
- When sleep position was known, 56.3% (18) of infants were placed in the prone or face down position.
- 63% of sleep related infant deaths occurred to mother reporting tobacco use.

## Targeted Education Regarding Protective Measures

Certain factors are considered protective against SIDS. A significant reduction in the risk for SIDS has been demonstrated with pacifier use, particularly during sleep (Hauck, 2011). Breastfeeding has also been found to be protective against SIDS and the recommendation is to include breastfeeding with other SIDS risk reduction messages, such as “Back to Sleep” campaigns and encouraging roomsharing (Hauck Fern R., 2005). Education should be provided by practitioners throughout pregnancy and at birth and well child visits on a consistent basis.



## Promote accurate and consistent death scene investigation

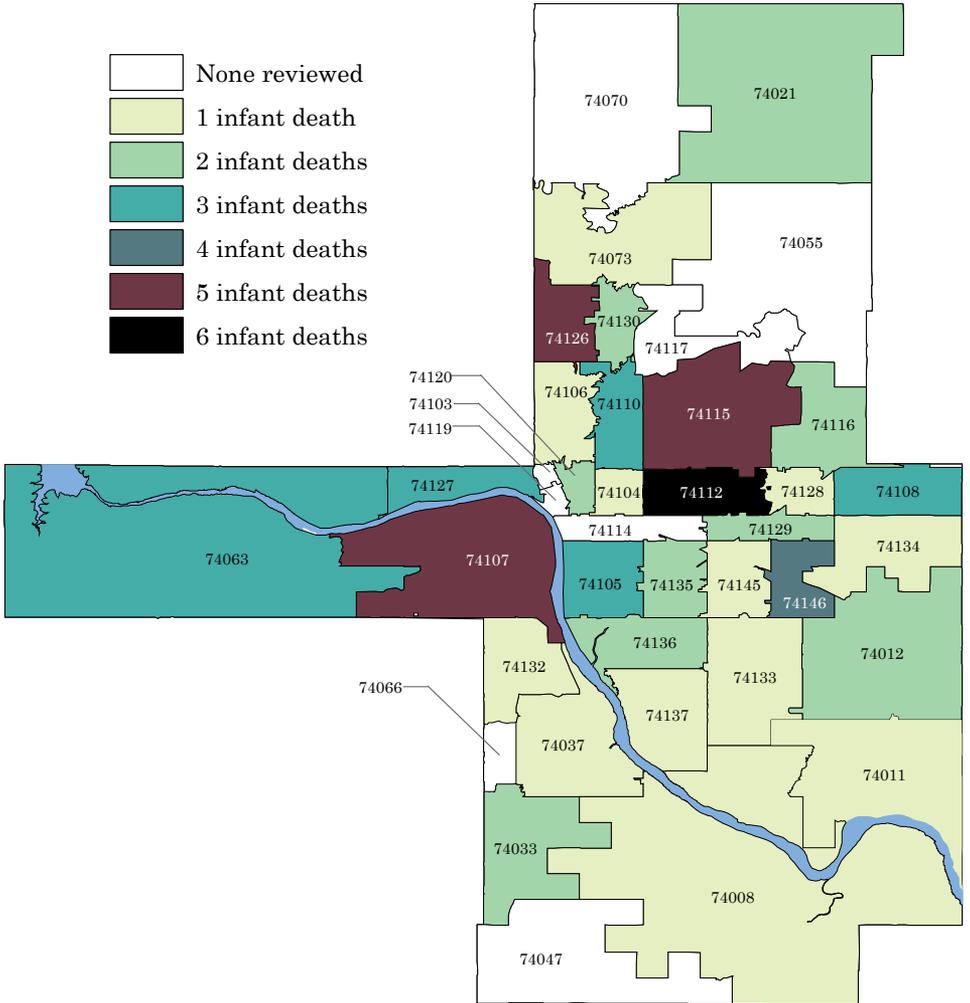
Using the Sudden Unexplained Infant Death Investigation reporting forms developed by the Centers for Disease Control (CDC) would ensure consistent death scene investigations and provide the medical examiner additional information for assigning a cause of death. Forms and information can be accessed at the following website: [www.cdc.gov/sids/SUIDRE.htm](http://www.cdc.gov/sids/SUIDRE.htm)

## Intensify public awareness campaigns on all aspects of safe sleep

This includes providing information on all Safe Sleep Top 10 recommendations and modifiable risk factors. Focus should include reduction in modifiable risk factors surrounding sleep related infant deaths and communication between mothers and their providers. Practitioners have the most consistent contact through prenatal appointments and should be provided tools and technical assistance to convey the importance of safe sleep practices and risk exposure for both mother and baby.

# DATA AND STATISTICS

Sleep Related Deaths 2004 – 2009 | Tulsa County



## Case Selection Criteria and Case Definition

Sleep related infant deaths occurring from 2004 – 2009 that meet TFIMR's case selection criteria and case definition were included in this report. In order to qualify as a sleep related death, available documentation (hospital records, autopsy reports, death certificates and/or police reports) must have indicated an unsafe sleep environment.

## Death Certificates

Death certificate data include the manner and cause of death. Several individuals are responsible for completing the relevant information. Primarily, the medical examiner or pathologist is responsible for completing the death certificate. Occasionally, the funeral director will also provide information. The death certificate also contains data revealing additional significant medical conditions when applicable.

## Infant Deaths 2004 – 2009

From 2004 – 2009, there were a total of 457 Tulsa County resident infant deaths. Of these, TFIMR has abstracted data for 411 infant deaths, representing 404 pregnancies.



Table 2: TFIMR Infant Deaths by Year of Death and Cause of Death

| Year of Death | N Infant Deaths (Data Abstracted) | Sleep Related Deaths Reviewed by TFIMR | Asphyxia | SIDS | Undetermined |
|---------------|-----------------------------------|--|----------|------|--------------|
| 2004          | 46                                | 6                                      | 1        | 3    | 2            |
| 2005          | 68                                | 7                                      | 1        | 2    | 4            |
| 2006          | 79                                | 19                                     | 3        | 8    | 8            |
| 2007          | 86                                | 16                                     | 2        | 3    | 11           |
| 2008          | 66                                | 10                                     | 1        | 0    | 9            |
| 2009          | 66                                | 12                                     | 1        | 3    | 8            |
|               | 411                               | 70                                     | 9        | 19   | 42           |

Summary of all Infant Deaths, Tulsa County, 2004 – 2009

Of the total infant deaths from 2004 – 2009, 70 were considered sleep related. For those cases reviewed by TFIMR, the causes of death were listed as:

- 27.1% Sudden Infant Death Syndrome (SIDS)
- 60.0% Undetermined/Unknown
- 12.9% Asphyxia

Table 3 illustrates actual numbers and underlying or additional causes of death.

Table 3: Summary of Sleep Related Deaths by Manner of Death (2004 – 2009)

| Manner of death  | Cause of death      | Due to                                      | Other significant medical conditions           | Total     |
|--|---------------------|---|--|-----------|
| <b>Natural: Total = 19</b>   |                     |   |  |           |
|  | SIDS                |   |  | 19        |
| <b>Unknown: Total = 42</b>   |                     |   |  |           |
|  | Undetermined        |   |  | 36        |
|  | Undetermined        |   | Prone sleeping position and adult type bedding | 1         |
|  | Undetermined        |   | Co-sleeping*; resolving right lung pneumonia   | 1         |
|  | Undetermined        |   | Co-sleeping*                                   | 1         |
|  | Unknown             |   |  | 3         |
| <b>Accident: Total = 9</b>   |                     |   |  |           |
|  | Asphyxia            | Overlay                                     |  | 4         |
|  | Asphyxia            | Probable overlaying                         |  | 1         |
|  | Probable asphyxia   | Overlaying                                  |  | 1         |
|  | Asphyxia            | Airway Obstruction                          |  | 1         |
|  | Positional asphyxia |   |  | 1         |
|  | Probable asphyxia   | Airway obstruction and/or chest compression |  | 1         |
| <b>Total Sleep Related Deaths</b>  |                     |   |  | <b>70</b> |
| <i>Other significant medical conditions are conditions contributing to death but not resulting in the underlying cause of death.</i> |                     |   |  |           |
| <i>*Co-sleeping means bedsharing.</i>  |                     |   |  |           |

# MODIFIABLE RISK FACTORS FOR SLEEP RELATED INFANT DEATHS

## Sleep Surface and Environment

For the 70 sleep related deaths, the most common sleep surface identified was an adult size bed (55.1%). The chart to the right identifies by percent the surface associated with sleep related infant deaths.

### Sleep Surface

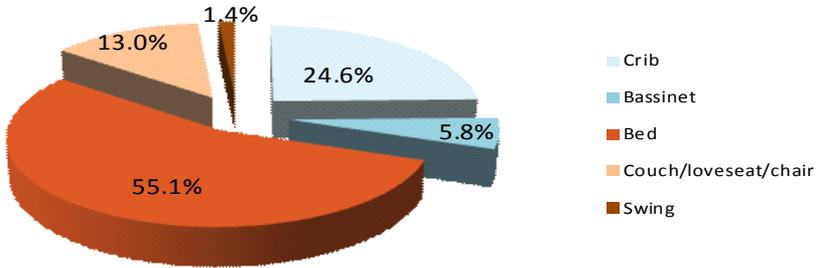


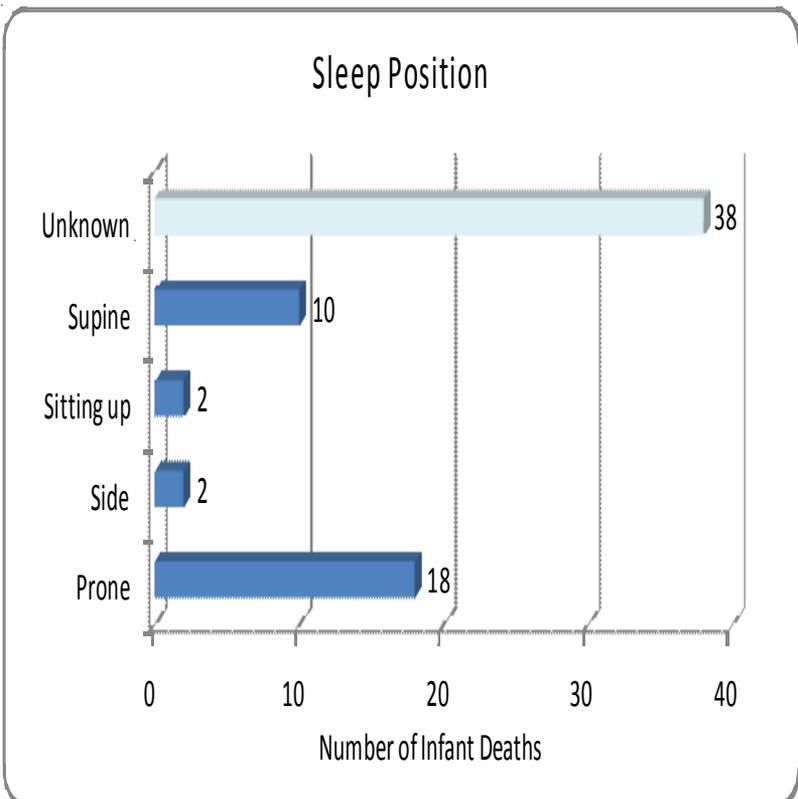
Table 4: Sleep Surface & Bed Sharing Status by Cause of Death (2004 – 2009)

| Sharing Sleep Surface     | Asphyxia | SIDS      | Undetermined | Total     |
|---------------------------|----------|-----------|--------------|-----------|
| Bassinet                  | 0        | 0         | 0            | 0         |
| Crib                      | 0        | 2         | 0            | 2         |
| Couch                     | 4        | 1         | 3            | 8         |
| Adult bed                 | 3        | 0         | 29           | 32        |
| Swing                     | 0        | 0         | 0            | 0         |
| Unknown                   | 0        | 0         | 1            | 1         |
| <b>Total</b>              | <b>7</b> | <b>3</b>  | <b>33</b>    | <b>43</b> |
| Not Sharing Sleep Surface |          |           |              |           |
| Bassinet                  | 0        | 2         | 2            | 4         |
| Crib                      | 0        | 12        | 3            | 15        |
| Couch                     | 0        | 1         | 0            | 1         |
| Adult bed                 | 2        | 1         | 3            | 6         |
| Swing                     | 0        | 0         | 1            | 1         |
| Unknown                   | 0        | 0         | 0            | 0         |
| <b>Total</b>              | <b>2</b> | <b>16</b> | <b>9</b>     | <b>27</b> |

Table 4 illustrates cause of death by type of sleep surface and presence of bedsharing. For sleep related SIDS deaths, 73.7% (14) occurred in a crib or bassinet and non-bedsharing environments. Asphyxia and Undetermined causes of death combined for 97.5% (38) of sleep related deaths when a shared surface includes a couch or adult bed, with adult beds accounting for 84.2% (32) of those deaths.

## Sleep Position

The American Academy of Pediatrics recommends infants be placed on their backs to sleep to reduce the risk of SIDS and infants are provided with “Tummy Time” during the day for exercise. The risk of SIDS is lowest for infants placed on their back (supine) to sleep and increases when placed on their stomach (prone) to sleep. Infants who are unaccustomed to sleeping on their stomach and are placed on their stomach to sleep are at much higher risk for SIDS (Centers for Disease Control). Out of 70 infant deaths that were reviewed, sleep position was unknown for 38 infants. Of the 32 infant deaths where sleep position was known, 18 (56.3%) were placed or found prone or face down



## Access to Prenatal Care

Recommendations from this report identified prenatal care appointments as a feasible option to provide targeted safe sleep messages to mothers and other caregivers. Table 3 illustrates that of known access to prenatal care, only 10.1% of mothers delayed prenatal care until the 3<sup>rd</sup> trimester and only 4.3% received no prenatal care. The majority of mothers accessed prenatal care prior to the end of the first trimester and a combined 85.5% accessed prenatal care prior to the end of the second trimester.

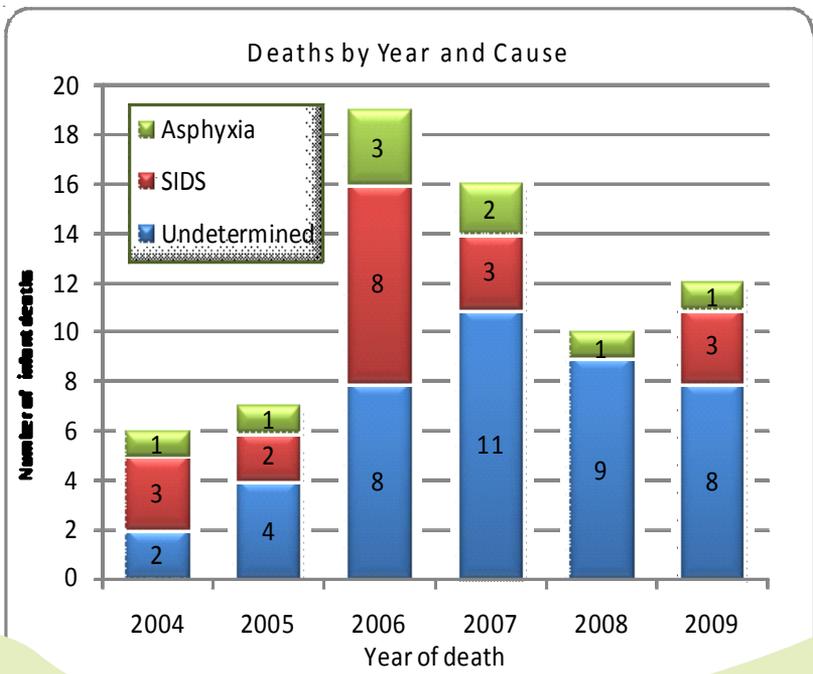
Table 5: PNC by Infant Cause of Death

| PNC During Pregnancy<br>Week PNC Started | Asphyxia | SIDS | Undetermined | Total |
|--|----------|------|--------------|-------|
| <14                                      | 2        | 14   | 20           | 36    |
| 14 – 24                                  | 5        | 4    | 14           | 23    |
| 25+                                      | 2        | 0    | 5            | 7     |
| None                                     | 0        | 1    | 2            | 3     |
| Unknown                                  | 0        | 0    | 1            | 1     |
| Total                                    | 9        | 19   | 42           | 70    |



## Triple Risk Model for SIDS

The Triple Risk Model (Administration, Sudden Unexpected Infant Death and Sudden Infant Death Syndrome) includes three factors: a vulnerable infant, a critical developmental time period in an infant's life, and an external stressor. When these three elements come together SIDS can occur. In order to reduce the number of sleep related infant deaths, we must be able to identify and educate the public about the risk factors associated with these types of infant deaths.



## TFIMR HOME INTERVIEWS

Home or phone interviews were conducted on 36 (51.4%) of the 70 sleep related infant deaths. Some of the general observations made during home interviews have been:

Most of the families appreciate the opportunity to discuss the life of their baby. It is always difficult to hear about a child death but there seems to be a sense of relief when someone wants to hear the details, see the pictures, and watch the videos. Whether the baby lived for a minute, a year, or even died in utero, all of our parents recognize this as a life and want those around them to recognize it as such and give it the same value that is given to any life.

Most families do not understand why their baby died, but they want to understand. There is a frustration that arises when a baby's death is listed as "undetermined." Families believe all sorts of things contributed to the death of their baby, but very few understand exactly what happened. Overall when we ask "What do you think happened to your baby?" the answer is "I don't know."



Families do not have a sleep plan. Although all of our families, in one way or another, describe preparations they made for their baby, no family we have spoken with considered how they were going to put their baby to sleep before the baby was born. Many mothers have expressed being overwhelmingly tired and having little support to help them care for the baby.

Resources are available in Tulsa County. Almost all of our families had a crib or bassinette when the baby came home from the hospital. Because of our area social service agencies and their generosity, safe sleep resources are available in our county.

The Safe Sleep message is incomplete and misunderstood. Although most of our families say they have heard a safe sleep message at one time or another, the message is incomplete or misunderstood. Families are familiar with “Back to Sleep” but still fear their baby may choke in this position. Families generally have not heard of the dangers of suffocation that accompany co-sleeping or securing the baby with pillows.

Finally, most of our families are doing okay. Almost all of our families are emotional during the interview; they tear up or express some anger at a situation that cannot be changed. However, with just a handful of exceptions, they are experiencing appropriate grief and have had normal reactions to an incredibly difficult situation. They are able to get up in the morning and take care of their family, go to work, have contact with friends and family, and are able to smile and laugh. The pain is still evident, but they are moving forward.

# CASE REVIEW TEAM (CRT) REVIEW

The case review team reviews the de-identified information collected in interviews and medical data abstractions. The CRT then summarizes findings and creates recommendations to improve the community's service delivery systems and resources. The CRT reviewed 87.1% of the sleep related infant deaths.

## Recommendations made by the CRT:

A strong Safe Sleep “information card” should be developed and given to women residing in TFIMR Counties, at delivery and preferably during early prenatal care. It should include TFIMR sleep related statistics.

- Prepare an opinion column for local media with the sleep environment statistics
- Have sleep environment topic presented at local hospital grand rounds.
- Social Service agencies require Safe Sleep video viewing before receiving a crib.
- Promote looping Safe Sleep video in waiting rooms (“I Sleep Alone”)
- Promote morning TV time slots with 1<sup>st</sup> responder and/or physician discussing safe sleep issue
- Have a safe sleep presence at State Fair and Just Between Friends
- Partner with Emergency Infant Services and Women, Infant and Children to promote safe sleep
- Prepare statistics and a statement on sleep related deaths
- Have someone available to interpret autopsy reports to families, particularly sleep environment deaths.



## APPENDIX I: SAFE SLEEP TOP 10

1. Always place your baby on his or her back to sleep, for naps and at night. The back sleep position is the safest, and every sleep time counts.
2. Place your baby on a firm sleep surface, such as on a safety-approved crib mattress, covered by a fitted sheet. Never place your baby to sleep on pillows, quilts, sheepskins, and other soft surfaces.
3. Keep soft objects, toys, and loose bedding out of your baby's sleep area. Don't use pillows, blankets, quilts, sheepskins, and pillow-like crib bumpers in your baby's sleep area, and keep any other items away from your baby's face.
4. Do not allow smoking around your baby. Don't smoke before or after the birth of your baby, and don't let others smoke around your baby.
5. Keep your baby's sleep area close to, but separate from, where you and others sleep. Your baby should not sleep in a bed or on a couch or armchair with adults or other children, but he or she can sleep in the same room as you. If you bring your baby in bed with you to breastfeed, put him or her back in a separate sleep area, such as a bassinet, crib, cradle, or a bedside cosleeper (infant bed that attaches to an adult bed) when finished.



6. Think about using a clean, dry pacifier when placing the infant down to sleep, but don't force the baby to take it. (If you are breastfeeding your baby, wait until your child is 1 month old or is used to breastfeeding before using a pacifier.)
7. Do not let your baby overheat during sleep. Dress your baby in light sleep clothing and keep the room at a temperature that is comfortable for an adult.
8. Avoid products that claim to reduce the risk of SIDS because most have not been tested for effectiveness or safety.
9. Do not use home monitors to reduce the risk of SIDS. If you have questions about using monitors for other conditions talk to your health care provider
10. Reduce the chance that flat spots will develop on your baby's head: provide "Tummy Time" when your baby is awake and someone is watching; change the direction that your baby lies in the crib from one week to the next; and avoid too much time in car seats, carriers, and bouncers.

*Source: Eunice Kennedy Shriver, National Institute of Child Health and Human Development. Safe Sleep Top 10.*

*Retrieved from [http://www.nichd.nih.gov/publications/pubs/safe\\_sleep\\_gen.cfm#risk](http://www.nichd.nih.gov/publications/pubs/safe_sleep_gen.cfm#risk)*

## APPENDIX II: HEALTHY PEOPLE 2020 GOALS

Healthy People 2020 goals are the nation's 10-year goals and objectives for health promotion and disease prevention. For 30 years, Healthy People has established benchmarks and monitored progress over time to encourage collaborations across sectors, guide individuals toward making informed health decisions and measure the impact of prevention activities. Healthy People 2020 goals for reducing infant deaths from SIDS, SUID, and increasing Back to Sleep are:

- Reduce the number of infant deaths from SIDS from 0.55 per 1,000 live births to 0.50 deaths per 1,000 live births.
- Reduce the number of infant deaths from sudden unexpected infant deaths (includes SIDS, Unknown Cause, Accidental Suffocation and Strangulation in Bed) from 0.93 infant deaths per 1,000 live births to 0.84 infant deaths per 1,000 live births.
- Increase the percentage of infants who are put to sleep on their backs from 69% to 75.9%.

*Source: Healthy People 2020.*

*Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=26>*

## APPENDIX III: AVAILABLE RESOURCES AND TRAINING

<http://www.211tulsa.org/>

Free, confidential call for health and social services information. Dial 211 from any phone.

<http://www.thegriefcenter.org>

Comprehensive, long-term counseling to assist the bereaved in the wake of their loss, located at 3930 E. 31st Street, Tulsa, OK 74135  
918.587.1200

<http://www.fcsok.org/> | Family and Children's Services

Provides an array of family services and comprehensive mental health services for adults and children.

### COPEs

Free 24/7 telephone and mobile psychiatric crisis intervention for children, adolescents, and adults in Tulsa County.

650 South Peoria Avenue, Tulsa, OK 74120-4429

918.744.4800

<http://www.goodsamaritanhealth.org/>

utilizes mobile medical units to offer free, quality medical care directly to the poor and under-served in the greater Tulsa area.

<http://www.ppaeo.org> | Planned Parenthood

Sexual and reproductive health care provider offering services such as birth control, std testing & treatment, emergency contraception, abortion referrals and women's health services.

[http://www.cdc.gov/ncbddd/pregnancy\\_gateway/index.html](http://www.cdc.gov/ncbddd/pregnancy_gateway/index.html)

CDC website on pregnancy. If you are pregnant or planning to get pregnant there are steps you can take for a healthy pregnancy and a healthy baby. Visit this website for more information.

[http://www.ok.gov/health/Child\\_and\\_Family\\_Health/Improving\\_Infant\\_Outcomes/index.html](http://www.ok.gov/health/Child_and_Family_Health/Improving_Infant_Outcomes/index.html)

Oklahoma State Department of Health website. We all want Oklahoma's babies to be safe and healthy. Many things can help and everyone can play a role. View this website for information on keeping babies safe and healthy.

<http://www.rwjf.org/>

The mission of the Robert Wood Johnson Foundation is to improve the health and health care of all Americans. Their goal is to help our society transform itself for the better.

<http://www.aecf.org/MajorInitiatives/KIDSCOUNT.aspx>

Annie E Casey Foundation. Helping vulnerable kids and families succeed. Explore hundreds of measures of well-being for kids across the nation, or in your state, city, or community.

<http://www.cdc.gov/sids/>

The Center for Disease Control and Prevention's website for information on Sudden Unexpected Infant Death (SUID) and Sudden Infant Death Syndrome (SIDS). The site offers information about their SUID Initiative as well as materials for training.

<http://www.firstcandle.org/>

First Candle is one of the nation's leading nonprofit organizations dedicated to safe pregnancies and the survival of babies through the first years of life. Our current priority is to eliminate Stillbirth, Sudden Infant Death Syndrome (SIDS) and other Sudden Unexpected Infant Deaths (SUID) with programs of research, education and advocacy.

<http://www.marchofdimes.com/>

A non-profit organization whose mission is to improve the health of babies by preventing birth defects, prematurity and infant mortality. The site provides information for women planning a pregnancy or who are pregnant as well as research information and educational materials for professionals.

## APPENDIX IV: REFERENCES

Health Resources and Services Administration (n.d.). SIDS/ID Program Manual. Centers for Disease Control.

Centers for Disease Control. (n.d.). Sudden Unexplained Infant Death Investigation. A Systematic Training Program for the Professional Infant Death Investigation Specialist.

Hauck Fern R., O. O. (2005). Do Pacifiers Reduce the Risk of Sudden Infant Death Syndrome: A meta-analysis. *Pediatrics*. Vol. 116, No. 5, pp. e716 – e723.

Hauck, F. R. (2011). Breastfeeding and Reduction Risk of Sudden Infant Death Syndrome: A Meta-analysis. *Pediatrics*. Originally published online at: <http://pediatrics.aappublications.org/content/early/2011/06/08/peds.2010-3000>

Sudden Unexpected Infant Death and Sudden Infant Death Sundrome. (n.d.). Retrieved June 15, 2011, from Centers for Disease Control: <http://www.cdc.gov/SIDS/>





This report was produced with data from 2004 – 2009 and distributed in 2011 by the Tulsa Fetal and Infant Mortality Review Project (TFIMR) as a collaborative effort including data and information collected through the data abstraction process, home interviews, and the CRT and CAT processes. Members of CRT and CAT represent practitioners and community members dedicated to reducing infant mortality for Tulsa County through systems changes. To learn more about TFIMR or to request additional copies of this report, please send an e-mail to [aplatti@tulsa-health.org](mailto:aplatti@tulsa-health.org), call 918.595.4441, or visit our website at [www.tulsa-health.org](http://www.tulsa-health.org).

The Fetal and Infant Mortality Review process model was developed in collaboration between the American College of Obstetrics and Gynecology (ACOG) and the Maternal and Child Health Bureau. For over 25 years, FIMR projects across the United States have been working to understand infant mortality and develop local, systems-oriented solutions.

The Tulsa Fetal and Infant Mortality Review Project is supported by the Maternal and Child Health Services Title V Block Grant, Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, administered by the Oklahoma State Department of Health, Maternal and Child Health.











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