

## Infant Sleep-Surface Sharing and Other Safe Sleep Practices among Oklahoma American Indian Mothers

### Introduction:

Oklahoma has one of the highest rates of infant mortality in the nation. Infant mortality is often used as a measure of the overall health of a population. According to 2013-2015 vital statistics data, the infant mortality rate (IMR) in Oklahoma was 7.4 per 1,000 live births; the United States for the same period was 5.9 per 1,000 births.<sup>1,2</sup> Although there is a difference between Oklahoma and the US when it comes to the overall IMR, one similarity when looking at which babies live to their first birthday is the inequity that exists between racial and ethnic groups.

In Oklahoma, Non-Hispanic (NH) American Indians had the second highest IMR at 10.1 per 1,000 live births from 2013-2015.<sup>1</sup> The rate among this population has been increasing since 2011, while the rate among other groups has been declining.<sup>3</sup> Additionally, NH American Indians had higher infant mortality due to sleep-related conditions such as Sudden Infant Death Syndrome (SIDS) and Sudden Unexpected Infant Death (SUID) than did all other racial and ethnic groups<sup>4</sup> (25.1%; data not shown).

In response to continued cases of Sudden Infant Death Syndrome (SIDS) and other sleep-related infant deaths, in 2016 the American Academy of Pediatrics (AAP) released updated environment recommendations for infant safe sleep. The newest recommendations address room-sharing, the use of bedside and in-bed sleepers, and expand on how to create a safe sleep environment.<sup>5</sup> Evidence shows that safe sleep environments and avoiding

bed-sharing (a type of sleep-surface sharing) can reduce the risk of sleep-related infant deaths.<sup>5,6,7</sup>

Sudden unexpected infant death (SUID) includes deaths related to accidental suffocation and strangulation in bed, unknown causes, and SIDS. A SIDS death is only declared after all other causes and risk factors have been eliminated through a scene investigation, complete autopsy and review of the infant medical history.<sup>8</sup> Nearly 21% of all infant deaths in Oklahoma for 2013-2015 were attributed to SIDS and other sleep-related conditions.<sup>1</sup>

Yet, the reasons these inequities exist are not completely clear, indicating that factors not typically captured in population-based data collection, such as the influence of culture, tradition, or social context, may play a role. This report used 2012-2014 data from the Oklahoma Pregnancy Risk Assessment Monitoring System (PRAMS) to examine sleep-surface sharing and other safe sleep-related practices among American Indian mothers in Oklahoma.

### Methods:

PRAMS is a population-based surveillance system about maternal behaviors and experiences before, during, and after pregnancy. This report used PRAMS aggregated data from 2012-2014 with a total sample size of 8800 and average weighted response rate of 63.1%.

### OKLAHOMA FACTS:

The infant mortality rate in Oklahoma (7.4) was higher than the US rate (5.9) from 2013-2015.

Differences in infant mortality persisted across racial and ethnic groups.

Non-Hispanic (NH) American Indian mothers had the highest rate of sleep-related infant mortality than other racial and ethnic groups.

NH American Indian mothers reported the highest rate of putting their infants to sleep with a blanket among all racial and ethnic groups.

Sleep-surface sharing with infants among NH American Indian mothers was greater among those:

- ◆ less than 25 years old
- ◆ unmarried
- ◆ with a household income less than or equal to \$26,000 annually
- ◆ with a high school degree or less

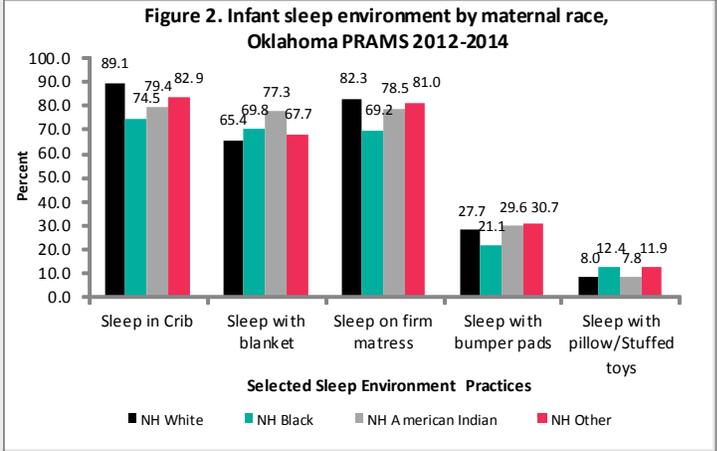
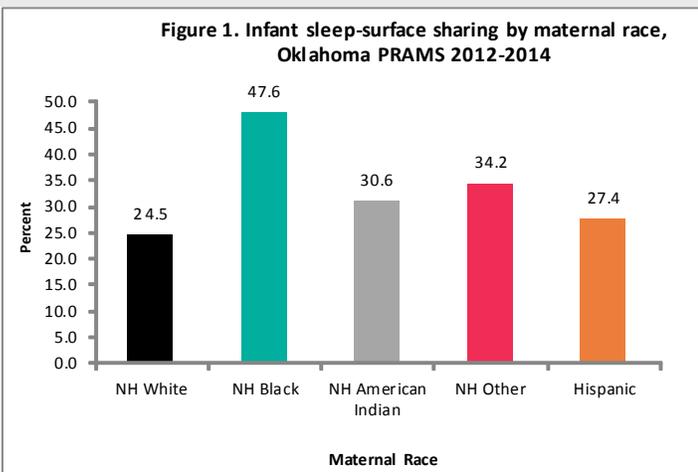
Detailed PRAMS methodology is described elsewhere.<sup>9</sup> To estimate the prevalence of sleep-surface sharing and other sleep related practices, several questions were used including the position the infant was often put to sleep. Prevalence and 95% confidence intervals were estimated. All analyses were done using SAS-callable SUDAAN.

Differences in maternal demographic characteristics by safe sleep practices were examined using chi-square tests at  $P \leq 0.05$ . Race and Hispanic origin are categorized as NH White, NH Black, NH American Indian, NH other, and Hispanic.

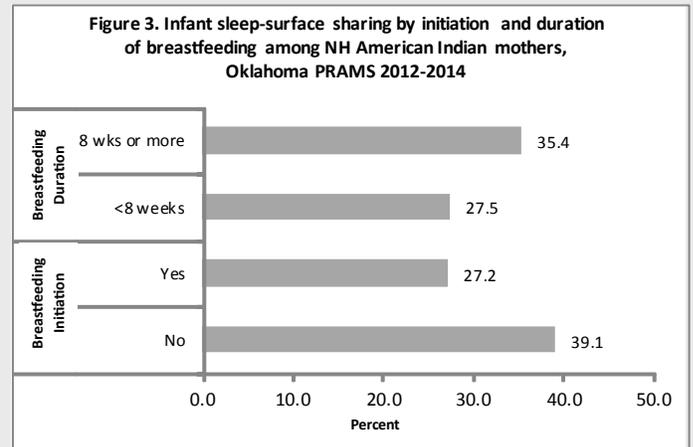
PRAMS asked mothers to select no or yes to statements that described how their new baby usually slept. Response options available were if the new baby slept: (1) in a crib or portable crib, (2) on a firm or hard mattress, (3) with a pillow and/or stuffed toys, (4) with bumper pads, (5) with a blanket, or (6) with me (mother) or another person. The options were not restricted to just bed-sharing. PRAMS also asked mothers about the one sleep position they most often lay their baby to sleep. Response options were: (1) on his or her side, (2) on his or her back, or (3) on his or her stomach.

## Results

Over 28% of all Oklahoma mothers indicated that someone shared a sleep surface with their infants. Figure 1 shows sleep-surface sharing by maternal race. As compared to NH White mothers at 24.5%, other racial and ethnic groups have higher percentages of sleep-surface sharing. NH Black mothers reported the highest percentage of sleep-surface sharing (47.6%), followed by NH other (34.2%), NH American Indian mothers (30.6%), and Hispanic (27.4%).



and Hispanic mothers (27.4%). Figure 2 shows infant sleep environments by maternal race. Slightly more than 79% of NH American Indian mothers reported that their infant usually slept in a crib while 78.5% reported that their infant usually slept on a firm or hard mattress. NH American Indian mothers reported the lowest rate of their infants sleeping with pillows or stuffed toys (7.8%). When looking at infants sleeping with bumper pads, NH American Indian mothers reported the second highest rate at 29.6%. These mothers also reported the highest rates of their infants usually sleeping with blankets at 77.3%.



Several studies have shown that breastfeeding is related to sharing sleep surfaces with infants.<sup>10, 11</sup> In Oklahoma, NH American Indian mothers who did not initiate breastfeeding tended to share a sleep surface at a higher rate than those who initiated breastfeeding (39.1% vs. 27.2%). However, NH American Indian mothers who breastfed for a longer duration (8 weeks or more) tended to share sleep surface more (35.4% vs. 27.5%; figure 3). Among NH American Indian mothers, those who were

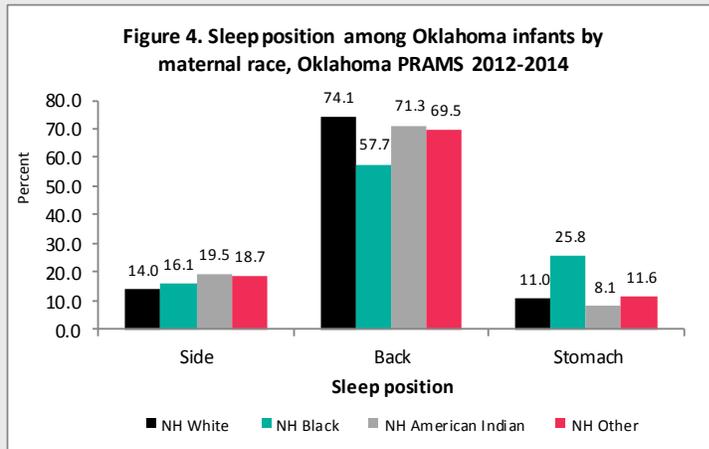
less than 25 years old, those who were unmarried, and those with an income equal to or less than \$26,000 all had higher rates of sharing a sleep surface with infants. Moreover, over half (56%) of NH American Indian mothers who had a high school education or less shared a sleep surface with their infants (Table 1).

**Table 1. Infant sleep-surface sharing among NH American Indian mothers by selected demographics, Oklahoma PRAMS 2012-2014**

Maternal Characteristics	Infant Sleep With a Person (%)	95% C.I
<b>Age</b>		
< 25 yrs	34.4	23.6 - 47.2
>=25 yrs	27.0	18.8 - 37.2
<b>Education</b>		
< = High School	56.0	41.4 - 69.7
>High School	42.5	31.4 - 54.4
<b>Marital Status</b>		
Married	26.3	18.3 - 36.2
Other	34.3	23.8 - 46.7
<b>Annual Household Income</b>		
< = \$26,000	34.4	24.5 - 45.9
>26,000	26.4	17.2 - 38.3
<b>Pre-Pregnancy BMI</b>		
Underweight and Normal	30.8	18.8 - 46.0
Overweight & Obese	30.3	22.2 - 40.0
<b>Medicaid (During Pregnancy)</b>		
No	32.9	21.8 - 46.4
Yes	29.4	21.0 - 39.5
<b>Overall</b>	<b>30.6</b>	<b>23.6 - 38.6</b>

NH American Indian mothers who used alcohol or smoked cigarettes three months before pregnancy tended to share a sleep surface at a lower rate than mothers who did not engage in these behaviors (data not shown).

Over 71% of NH American Indian mothers lay their infants on their backs to sleep, 19.5% lay them on their sides, and 8.1% lay them on their stomach (Figure 4).



### Limitations

The current analysis did not identify a statistically significant association between sharing a sleep surface, sleep environment, and maternal characteristics or behaviors. This may largely be due to the small sample size available for the NH American Indian population in the PRAMS 2012-2014 data. Additionally, PRAMS does not account for cultural differences relating to sleep-surface sharing and sleep environment in the American Indian population, as well the cultural differences between the tribes represented by the mothers.

### Discussion

In the US and in Oklahoma, the mortality rate for Black infants has consistently been the highest among all racial and ethnic groups (more than twice as high as the rate of white infants for decades), but the increase in deaths among American Indian infants over the last few years is noteworthy. There appear to be factors that continue to influence mothers’ decisions to have their infants share a sleep space and utilize a safe sleep environment.

It is unknown what conditions within the home lead to sleep-surface sharing; this information is not captured in PRAMS. However, there are numerous reasons people share sleep surfaces with infants, intentionally or unintentionally. Limited space, economics, belief systems, and exhaustion are just a few of the reasons.<sup>5</sup> This is applicable to American Indians as well as other populations.

Although American Indian parents in the United States routinely position their infants to sleep on their back, bed sharing with infants is still common.<sup>12,13</sup> The higher percentages of sleep-surface sharing among American

Indian mothers less than 25 years of age, those unmarried, those with an income equal to or less than \$26,000 annual household income, and those with less education suggest an interrelationship between access to resources and the propensity to share a sleep surface. Further research would be needed to assess this relationship more in depth.

Oklahoma's American Indian Data Community of Practice group noted that cultural factors might also play a part in creating safe sleep environments. Blankets and other textiles have a long history of use within many American Indian tribes, often given as a sign of honor or respect. This contextual point may partially explain the higher percentage of blanket use for American Indian infants. Other cultural factors such as traditional belief systems, the influence of community, and respect and listening to the wisdom and advice of elders may also influence sleep environment and sleep-surface sharing in a way not easily captured by modern population-based data collection systems. Moreover, other environmental factors (such as limited space or the unavailability of safe sleep spaces) may play a role in why American Indian parents bed-share with infants or may have spaces that are not safe sleep environments. (Workgroup meeting, July 17, 2017)

The results of this study support the need for more tailored messages surrounding safe sleep and the risks associated with sleep-surface sharing. It also supports the need to increase access to safe sleep resources, including those that are culturally relevant.

## Recommendations

The AAP Task Force on SIDS recommended a series of safe sleep practices to address SUID. These included placing infants on their back for sleep, sharing a room without bed-sharing (ideally for the first year of life, but at least for the first six months), using a firm sleep surface, avoiding soft bedding such as crib bumpers, blankets, pillows and soft toys and preventing exposure to commercial tobacco smoke, alcohol and illicit drugs.<sup>6</sup>

However, reducing the risk for SIDS requires action from the entire community, not just the individual family unit, in order to understand and practice risk reduction.<sup>14</sup> Therefore, education and outreach efforts must go beyond just the mother and father and reach out to the larger, extended network. Within the American Indian community, the influence and value of trusted sources of information cannot be overlooked. Providers need to work with tribal elders, grandparents, tribal leadership, community members, home visitors, and others within the community in order to raise awareness, tailor messages, and carry out interventions that fit appropriately within the local social context and culture. Recommendations include:<sup>14</sup>

1. Implement listening circles (focus groups) to determine best approaches for safe sleep messaging;
2. Tailor safe sleep messages to include cultural values and beliefs;
3. Incorporate models that look traditional and non-traditional when designing safe sleep materials;

## TERMS

Infant mortality – the death of a child less than one year of age.

Social context – the environment that shapes people's daily experiences that directly and indirectly affect health and behavior.<sup>15</sup>

Sleep-surface sharing – a sleep arrangement in which an infant sleeps on the same surface with another person (can include sharing a bed).<sup>16</sup>

Sudden Infant Death Syndrome (SIDS) – the sudden death of an infant younger than one year that cannot be explained even after a full investigation.<sup>16</sup>

Sudden Unexpected Infant Death (SUID) – the death of an infant younger than one year that occurs suddenly and unexpected. After an investigation, the deaths may be classified into several types such as SIDS, entrapment, suffocation, or undetermined.<sup>16</sup>

Culture – the customary beliefs, social forms, and material traits of a racial, religious, or social group; the characteristic features of everyday existence shared by people in a place or time.<sup>17</sup>

4. Incorporate pictures of the cradleboard in messages and tailor messages that highlight American Indian specific safe sleep practices;
5. Reflect cultural heritage by hanging blankets on the wall in the child’s room and not in the crib;
6. Incorporate traditional messages – such as the 7th Generation Principle (the concept that current generations should consider how decisions today will benefit seven generations into the future) into safe sleep messages and materials;
7. Develop a public service message with tribal leaders to promote safe sleep;
8. Provide culturally specific materials on the danger of co-sleeping and develop cultural specific messaging around the value of room-sharing.

Education is necessary but not always sufficient to invoke change on its own. While it is important to be consistent about the basic overall safe sleep messages, they must be tailored to the needs and issues specific within that American Indian community, nation, or tribe.<sup>14</sup> Cultural norms may particularly influence behaviors, responses, and understanding when looking within the context of infant mortality. Therefore, when considering interventions to reduce the infant mortality rate, particularly related to safe sleep among the American Indian population, it is important to consider multiple factors that may be involved, including cultural and behavioral aspects.

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The Pregnancy Risk Assessment Monitoring System (PRAMS) is an ongoing, population-based study designed to collect information about maternal behaviors and experiences before, during, and after pregnancy.

Monthly, PRAMS sampled between 200 to 250 recent mothers taken from the Oklahoma live birth registry. Mothers were mailed up to three questionnaires in either English or Spanish seeking their participation. Follow-up phone interviews for non-respondents were conducted.

A systematic stratified sampling design was used to yield sample sizes sufficient to generate population estimates for groups considered at risk for adverse pregnancy outcomes. Information included in the birth registry is used to develop analysis weights that adjust for probability of selection and non-response.

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