

## **Appendix B**

**Sleep-Related Infant Mortality Profile  
2004-2011  
Iowa Child Death Review Team  
Prepared by the Iowa Department of Public Health**



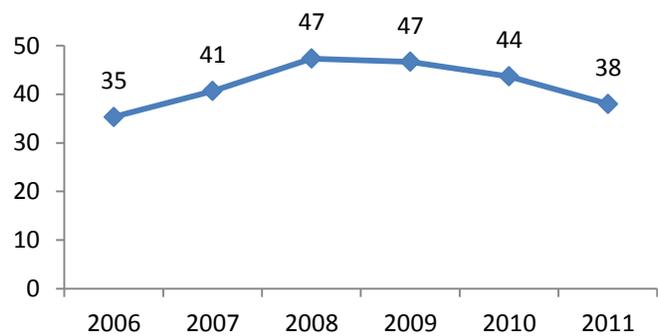
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### Summary

Over the past five years, sleep-related infant deaths have averaged 43 per year, with a range of 36 (2009) to 55 (2008). The average number of deaths per month is three. The five year moving average slows little fluctuation from year to year with the exception of 2008, where a spike in winter deaths resulted in a high count for that year (Figure 1). The spike was attributed in part to respiratory infections, some undetected, including RSV, influenza, and bacterial infections of the upper and lower respiratory tracts.

The average age at death for seven years was 2.8 months, with a range of 1 to 4.5 months.

**5-Year Moving Average of Sleep-Related Deaths by Year, 2006-2011**

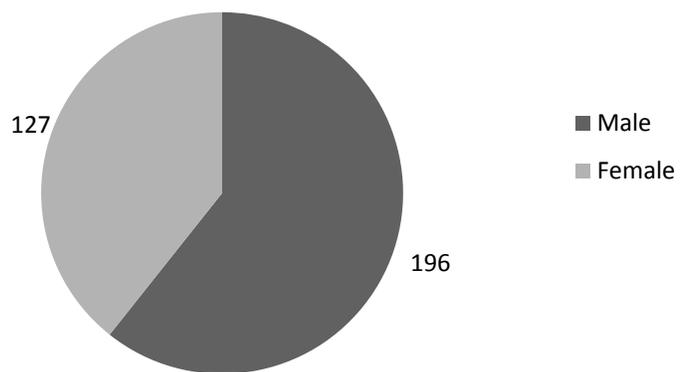


**Figure 1. The five year average of sleep-related deaths from 2006-2011.**

Month	5-Yr mean	SD	Mean+2SD
Jan	4	3.1	10
Feb	3	2.0	7
March	2	1.2	5
April	4	1.8	7.5
May	4	1.4	6.5
June	4	1.9	7.3
July	4	1.8	7
Aug	3	2.0	7.2
Sept	4	2.5	9
Oct	4	1.3	6.3
Nov	2	0.8	3.8
Dec	3	1.8	7

**Table 1. Mean monthly mortality and threshold data for 2007-2011.**

**Number of male to female infant sleep-related deaths**



**Figure 3. Number of infant sleep-related deaths from 2004-2011 by sex.**

It is important to examine gender and racial breakdowns to determine which groups might be disproportionately impacted by sleep-related deaths. There is nearly a 1.5:1 ratio of male to female deaths (Figure 3). This is consistent with findings in scientific literature, though is not fully understood. Consistent with research studies on Sudden Infant Death (SID), male infants are at higher risk for experiencing sleep-related death than females. The percent distribution of deaths by race group changes only slightly over time (Table 2). The percent of deaths occurring among Blacks is higher than the percent that race group comprises for the population of Iowa.

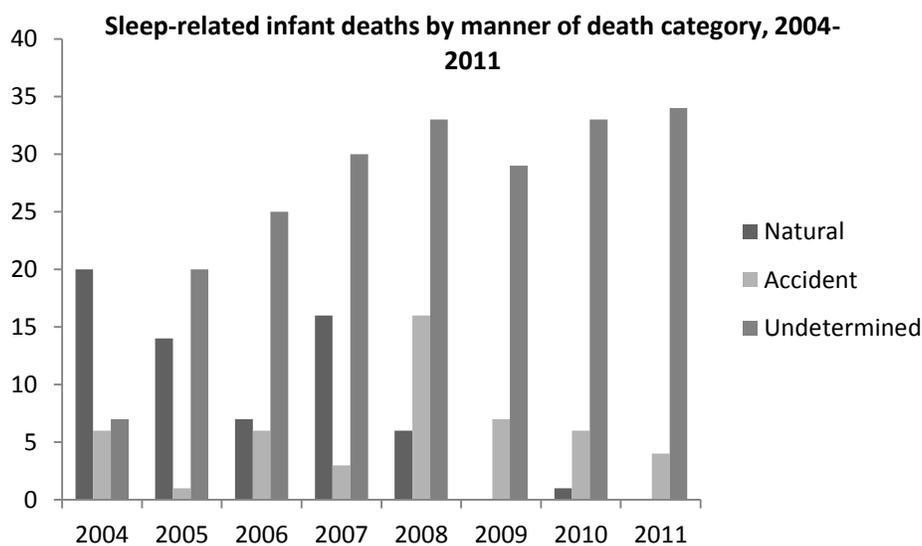
## Iowa Sleep-Related Infant Mortality Profile, 2004-2011

	2004	%	2005	%	2006	%	2007	%	2008	%	2009	%	2010	%	2011	%
<b>White</b>	25	76	32	94	32	86	41	84	42	76	34	94	31	78	31	82
<b>Black</b>	4	12	2	6	4	11	8	16	11	20	2	6	6	15	2	5
<b>Asian</b>	1	3	0	0	0	0	0	0	0	0	0	0	1	3	0	0
<b>American Indian</b>	3	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Multi-Racial</b>	0	0	0	0	1	3	0	0	2	4	0	0	2	5	5	13

**Table 2.** The number of infant sleep-related deaths by race group from 2004-2011.

### Classification of Deaths

Sleep-related deaths are classified for manner of death as “natural”, “accident”, or “undetermined”. Deaths that are undetermined are typically SIDS cases. From 2004 to 2011, there is a change in the use of manner of death classification “natural” (Figure 4). In 2009, it appears the use of “natural” became less frequently used as there was not a significant change in the average number of deaths per year.



**Figure 4.** The number of sleep-related deaths by manner of death from 2004-2011.

Sleep related deaths are categorized for cause of death as “external injury”, “medical condition”, “undetermined”, and “unknown”. The category “medical condition” has the highest number of sleep related deaths by year (Figure 5). Further investigation into the medical conditions compromising the category for cause of death is needed.

**Risk Factors**

Risk factors that may contribute to infant death were evaluated. The most common item found in the sleeping space with an infant was a blanket. However, 29 percent of the deaths occurred when the infant was co-sleeping with an adult (Figure 6). There is a significant racial disparity among Blacks in that nearly 40 percent of infants are regularly placed to sleep in an adult bed and in nearly all instances an adult or child was co-sleeping in the adult bed (Figure 7 and Figure 8).

Other risk factors identified were the presence of a pillow or comforter. Non-significant risk factors included the presence of bumper pads. Protective factors of pacifier or fan use were not reported frequently enough to be included in this analysis.

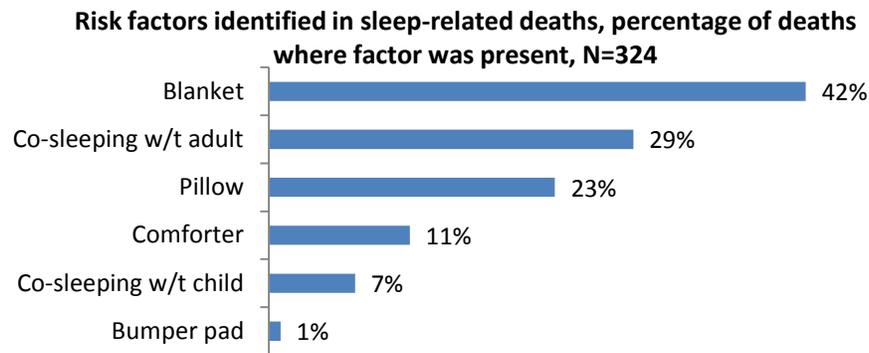


Figure 6. The percent of sleep-related deaths where identified risk factors were present.

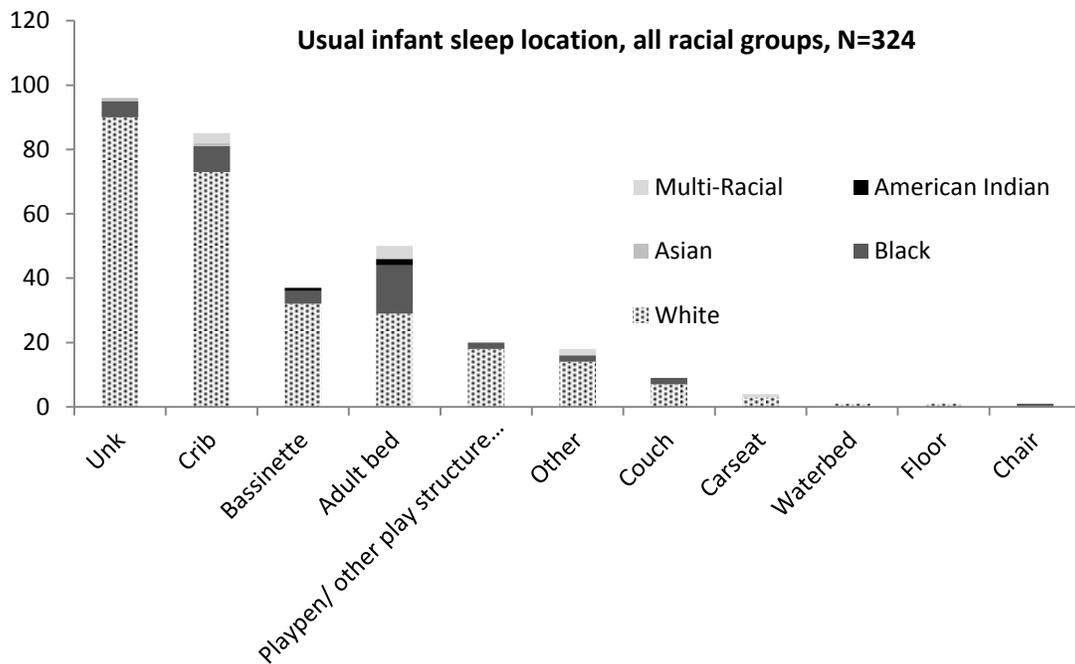
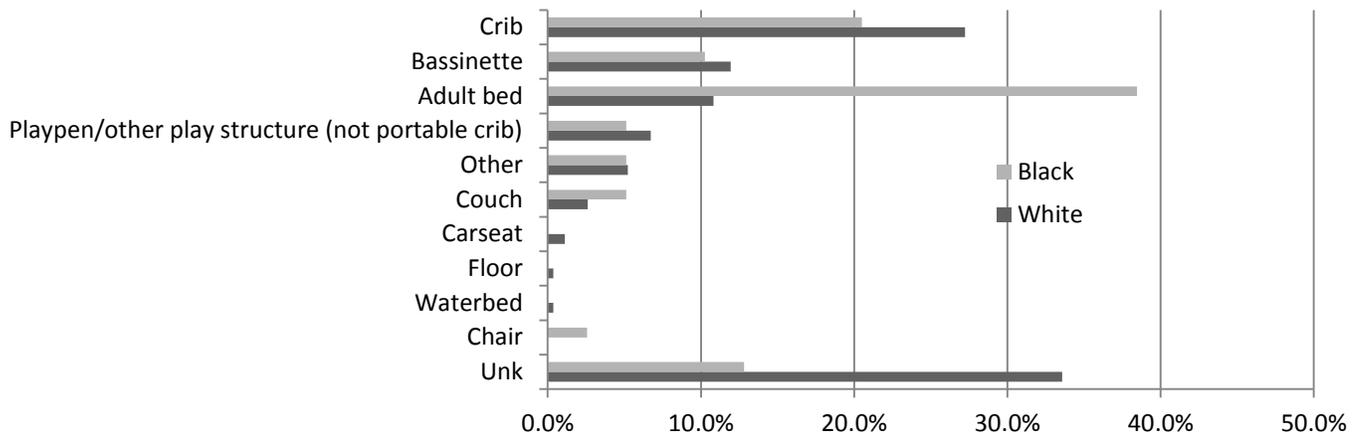


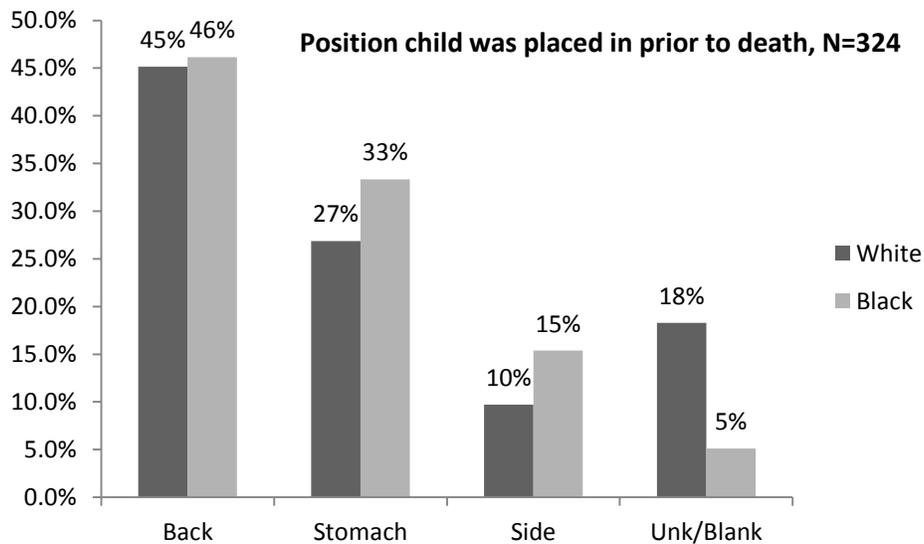
Figure 7. The case count of usual infant sleep locations for all race groups from 2004-2011.

**Usual infant sleep location, White and Black race groups, N=307**



**Figure 8. The percent distribution of usual infant sleep positions for White and Black race groups.**

Sleep positioning is a critically important aspect of preventing sleep-related infant deaths. In this evaluation, infants were reportedly placed on their backs, the recommended position, nearly half of the time. Infants were placed on their stomachs about one-third of the time and Black infants were placed in this position more often than Whites (Figure 9). However, the statistics reversed for the position that infants were found in when unresponsive or deceased (Figure 10). Infant development research demonstrates that ages 4-6 months is the most common age for infants to acquire the ability to roll-over<sup>1</sup>.



**Figure 9. The percent distribution of sleep positions infants were placed in prior to death for White and Black race groups.**

<sup>1</sup> <http://www.mayoclinic.com/health/infant-development/FL00099>

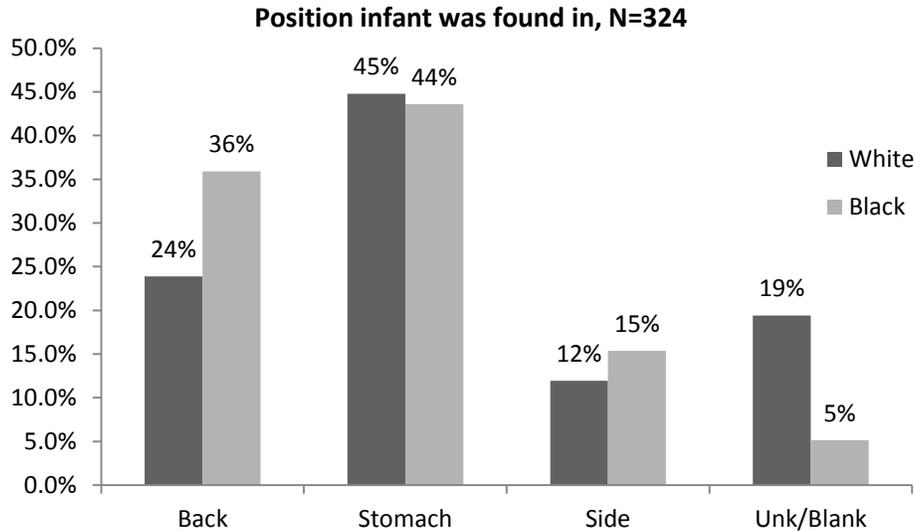


Figure 10. The percent distribution of sleep positions infants were found in after death for White and Black race groups.

Infants were most often found on top of the sleep surface they were placed on. However, other locations relative to the sleep surface varied and were not significant by position or race group (Figure 11). More than half of Black infants were reportedly sleeping on the same surface as another person or an animal and this statistic was quite close to others assessing co-sleeping with an adult or infant (Figure 12).

A crib (non-portable) was the most common location infants were placed in before death and portable cribs were the location of sleep in only 4 percent of cases.

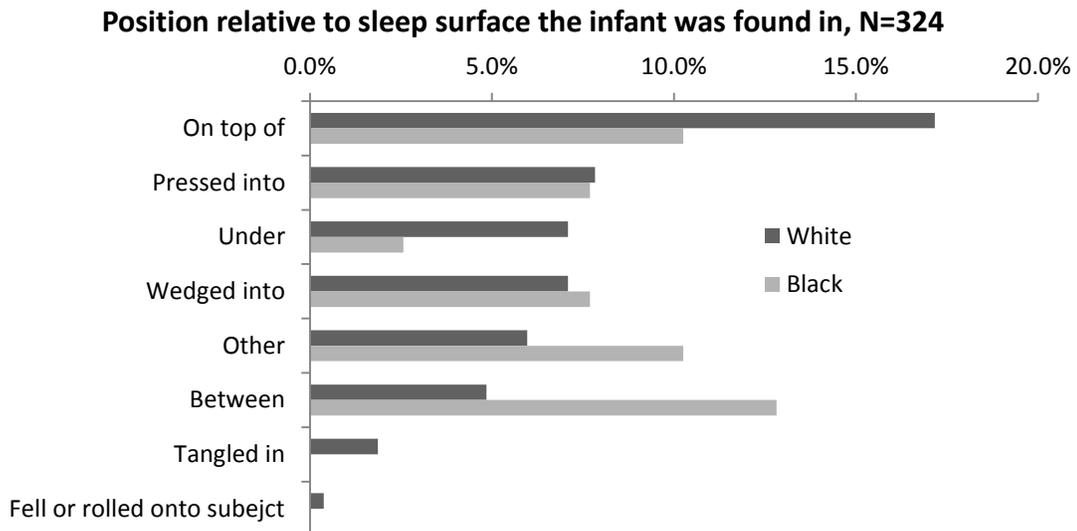
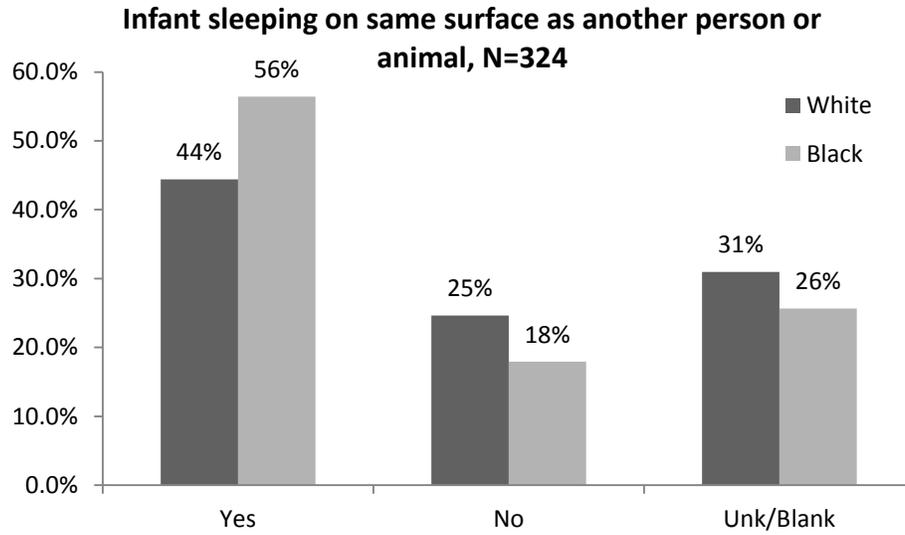


Figure 11. The percent distribution of position relative to sleep surface the infants were found in for White and Black race groups.



**Figure 12. The percent distribution of infants sleeping on the same surface as another person or animal for White and Black race groups.**

### Caregiver Profile

A profile of the primary and secondary caregivers for the 324 cases of sleep-related infant death was developed and includes frequency and percentage of significant factors. *Compared to the general population*, caregivers of infants who died from sleep-related causes were twice as likely to be unemployed, of low-income status and having completed only high school. At the time of infant death, one-third of caregivers were receiving social services, including 31 percent on Medicaid. Other negative factors include 24 percent of caregivers with a history of drug abuse, 12 percent were known perpetrators of child maltreatment and two percent had experienced a prior infant death (Table 3).

\*National average the last 10 years is 6.7%; Iowa rate in 2013 was 4.9%

\*\*Compared to 11.9% of Iowans living at or below the poverty level

†Percent of Iowans that have completed HS as of 2011 is 90.3%; Percent of Iowans that have completed college is 24.9%

‡Five year average of Iowa mothers receiving WIC is 37.49%

‡ In 2008-2010, 5.33% of Iowans reported illicit drug use (NSDUH).

	N=648	Frequency	Percent
<b>Employment status</b>			
Employed	167	26	
Unemployed*	62	10	
Stay at home	18	3	
Unknown	401	62	
<b>Income status</b>			
Low**	148	23	
High	2	0	
Medium	8	1	
Unknown	490	76	
<b>Educational attainment level</b>			
HS†	268	41	
College†	103	16	
Less than HS	99	15	
Post graduate	4	1	
Unknown	174	27	
<b>Receiving any social services</b>			
Yes‡	220	34	
No	109	17	
Unknown	319	49	
<b>Medicaid</b>			
Unknown	449	69	
Yes	199	31	
<b>History of drug abuse</b>			
Yes‡	158	24	
No	216	33	
Unknown	274		
<b>Perpetrator of maltreatment of a child</b>			
Yes	78	12	
No	388	60	
Unknown	182	28	
<b>Received mental health services</b>			
Yes	21	3	
No	220	34	
Unknown	407	63	
<b>Experienced prior death</b>			
Yes	11	2	
No	448	69	
Unknown	189	29	

**Table 3. Demographics of primary and secondary caregivers for sleep-related infant death cases from 2004-2011.**

**Pregnancy and access to prenatal care**

Pregnancy data were available on a subset of the 324 cases examined. Overall, 94 percent of mothers reported accessing prenatal care on a regular basis\*. However, 25 percent reported medical complications with pregnancy, nearly 44 percent reported smoking\*\* and 8 percent reported drug use during pregnancy. There were no cases of fetal alcohol syndrome reported and less than two percent of mothers reported drinking during pregnancy (Table 4).

*\*From 2004-2011, 96.29% of Iowan mothers received prenatal care (IA Birth Certificate Data)*

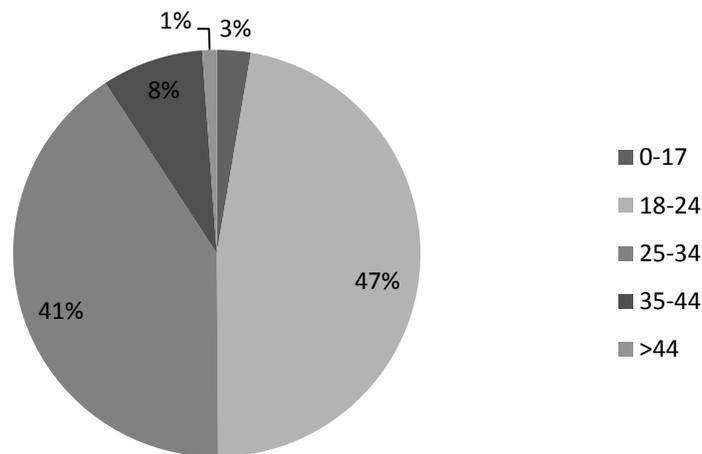
*\*\*Compared to 13.7% of Iowan mothers reported smoking during pregnancy from 2004-2011(IA Birth Certificate Data) and 16.1% of all Iowans reported smoking in 2011(BRFSS).*

	N=324	Frequency	Percent
<b>Medical complications</b>			
Unknown		244	75.3
Yes		80	24.7
<b>Smoked during pregnancy</b>			
Unknown		183	56.5
Yes		141	43.5
<b>Drug use during pregnancy</b>			
Unknown		297	91.7
Yes		27	8.3
<b>Baby drug test positive after birth</b>			
Unknown		312	96.3
Yes		12	3.7
<b>Used alcohol</b>			
Unknown		318	98.1
Yes		6	1.9
<b>Issues accessing prenatal care</b>			
Unknown		133	.9
Yes		20	6.2
No		171	52.8

**Table 4. Pregnancy data for mothers of infants in sleep-related deaths from 2004-2011.**

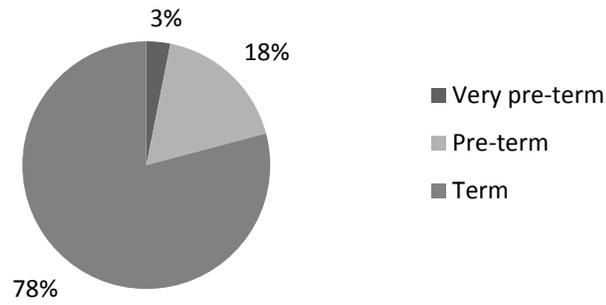
Female caregivers were most often aged 18-24 years followed by those aged 25 to 34 years (Figure 13). Cases were typically infants born full term, though risk for sleep-related death increased after 35 weeks gestation (Figure 14 and Figure 15). The frequency of low birth weight (<2500 grams) infants was at 19 percent.

**Age group category of female caregivers, N=521**

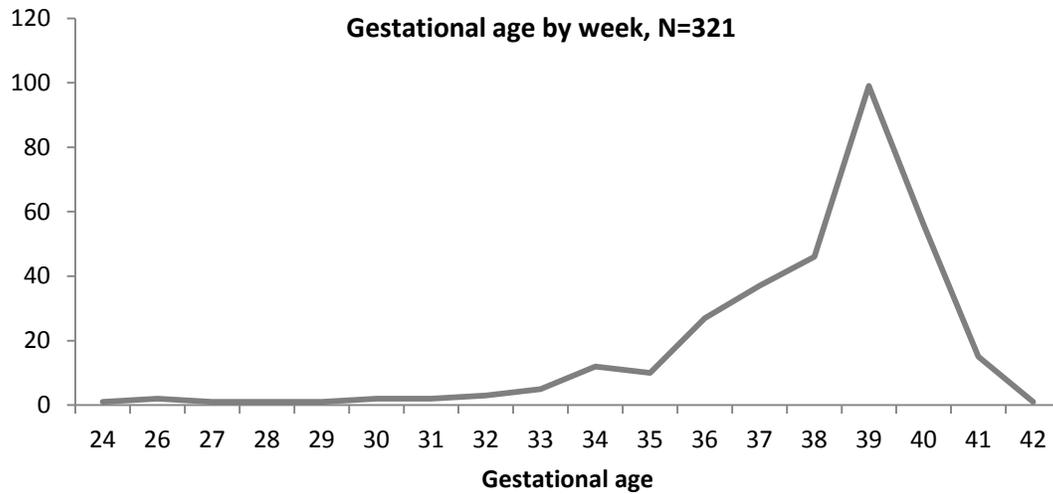


**Figure 13. The percent distribution of female caregivers by age group.**

**Percent category of term at delivery, N=321**



**Figure 14. The percent distribution of sleep-related death events by category of term at delivery from 2004-2011.**



**Figure 15. The case count of sleep related death events by gestational age by week from 2004-2011.**  
 \*From 2004-2011, 3.39% of infants were born at or before 33 weeks, 8.1% of infants were born between 34-36 weeks and 88.5% of infants were born at or after 37 weeks (IA Birth Certificate Data).