

# SUDDEN UNEXPECTED INFANT DEATH REPORT

*Wisconsin data from 2015-2017*

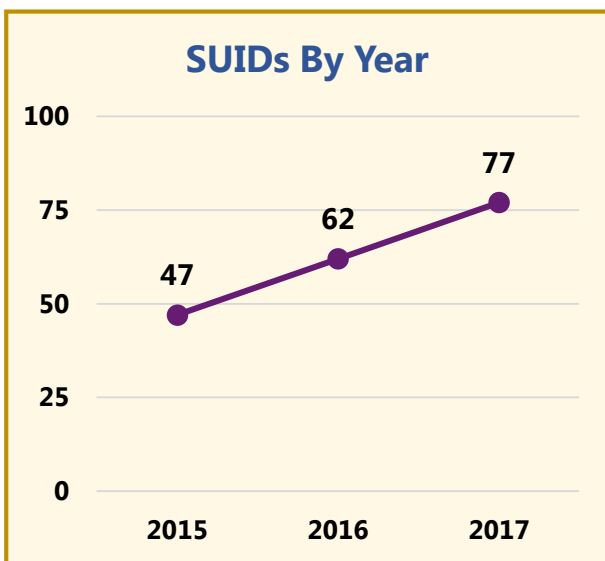
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WISCONSIN DEPARTMENT  
*of* HEALTH SERVICES

## SUDDEN UNEXPECTED INFANT DEATH IN WISCONSIN

A sudden unexpected infant death (SUID) is defined as the death of an infant suddenly and unexpectedly, the cause of which is not immediately clear prior to investigation (CDC, 2018). In Wisconsin from 2015 to 2017, the number of SUIDs increased despite a decline in the number of live births. This necessitates action to prevent future infant deaths.



The most common causes of infant death in Wisconsin are low birth weight and birth defects (WDHS, 2019). SUIDs comprised 15% of infant deaths from 2015 to 2017.

Between 2015 and 2017, nearly all SUIDs occurred in the sleep environment. After investigation, SUIDs fell into three categories in Wisconsin:

- **Undetermined (72%)** These deaths were certified as Sudden Infant Death Syndrome (SIDS), SUID or Undetermined, and the autopsy did not reveal a specific cause of death. However, the majority of these deaths occurred in an unsafe sleep environment.

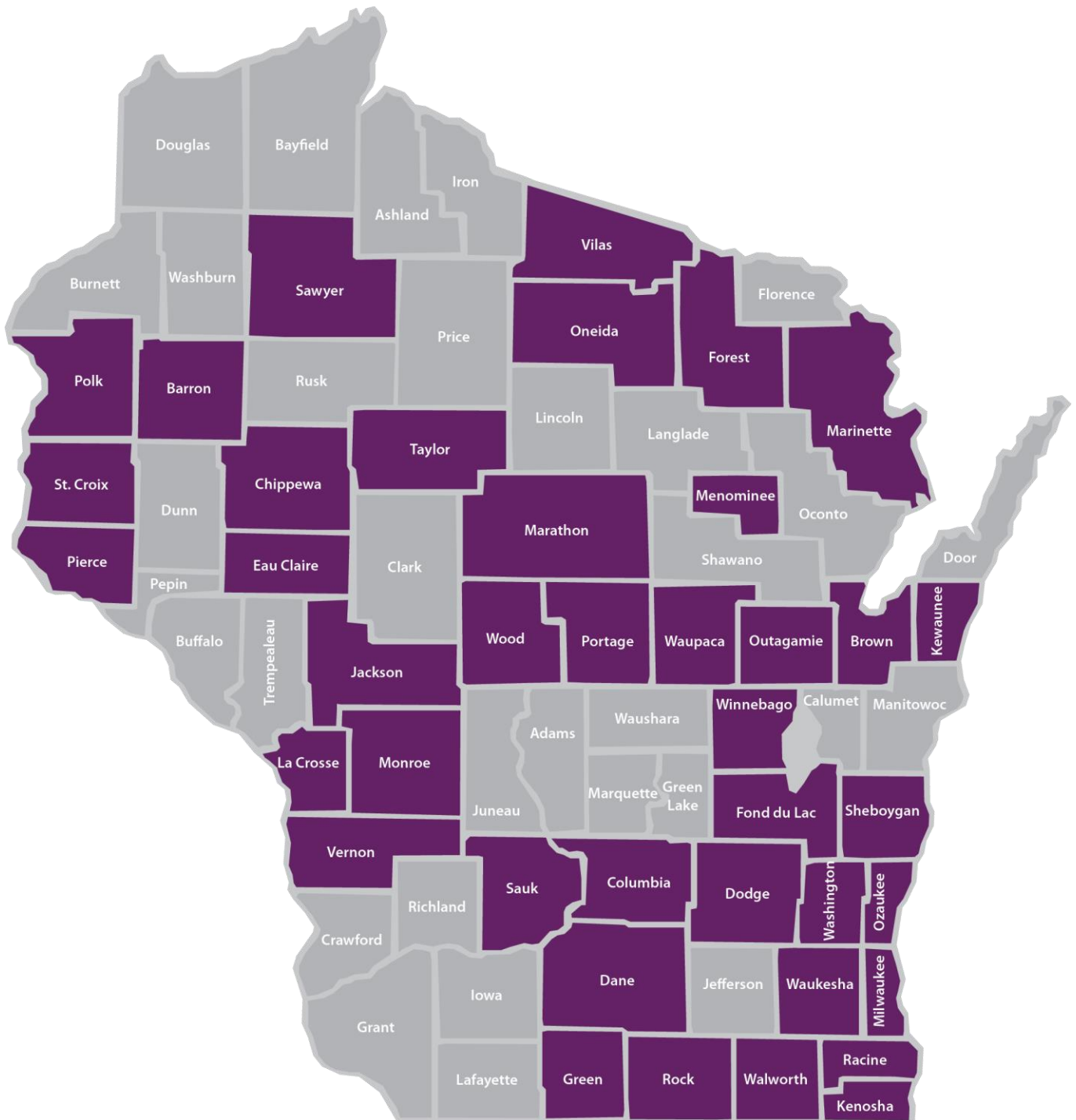
- **Asphyxia (27%)** Deaths in this category were the result of one or more factors, including soft bedding, overlay or wedging.
- **Medical cause with unsafe sleep factors indicated on death certificate (2%)** The coroner or medical examiner indicated unsafe sleep factors as a condition contributing to these deaths.

This report will first inform the reader of the demographics and the social and economic inequities among SUIDs. Secondly, the sleep environment circumstances are compared to the American Academy of Pediatrics recommendations for a safe infant sleep environment. Additionally, information from a population-based sample of new mothers across the state, the Pregnancy Risk Assessment Monitoring System (PRAMS), is offered as a perspective on sleep habits among Wisconsin infants born in 2017. Lastly, the report outlines Wisconsin’s participation in the Centers for Disease Control and Prevention’s SUID Case Registry.

Wisconsin conducts statewide surveillance on SUIDs through the work of local child death review (CDR) teams and the Wisconsin Child Death Review Advisory Council. The Alliance thanks the local teams and Council members for their dedication to reviewing SUIDs and striving to gather high quality, timely data to assist their communities and Wisconsin stakeholders in understanding the risk factors and circumstances leading to SUIDs and to inform efforts to prevent future deaths.

This report offers information on SUIDs occurring in 2017, as well as information on SUIDs across the last three years, 2015-2017.

## WISCONSIN COUNTIES WITH A SUID, 2015-2017



### PURPOSE

This report provides information on the circumstances and risk factors leading to SUIDs in order to inform prevention work among partners statewide.

**TABLE 1**

| <b>Infant and Maternal Demographics in Wisconsin (WI)</b> |                                       |                                 |                                              |                                         |
|-----------------------------------------------------------|---------------------------------------|---------------------------------|----------------------------------------------|-----------------------------------------|
| <b>Characteristic</b>                                     | <b>SUIDs in WI, 2015-2017 (N=186)</b> | <b>SUIDs in WI, 2017 (N=77)</b> | <b>All infant deaths in WI, 2017 (N=422)</b> | <b>All births in WI, 2017 (N=64994)</b> |
| <b>Sex, %</b>                                             |                                       |                                 |                                              |                                         |
| Female                                                    | 44%                                   | 39%                             | 44%                                          | 49%                                     |
| Male                                                      | 56%                                   | 61%                             | 54%                                          | 51%                                     |
| Missing                                                   | 0%                                    | 0%                              | 2%                                           | <1%                                     |
| <b>Gestational age, %</b>                                 |                                       |                                 |                                              |                                         |
| Pre-term (less than 37 weeks)                             | 25%                                   | 19%                             | 67%                                          | 10%                                     |
| Term (37 weeks or greater)                                | 74%                                   | 79%                             | 32%                                          | 90%                                     |
| Missing                                                   | 2%                                    | 1%                              | <1%                                          | <1%                                     |
| <b>Birth weight (BW), %</b>                               |                                       |                                 |                                              |                                         |
| Very low BW (less than 1500 grams)                        | 3%                                    | 1%                              | 50%                                          | 1%                                      |
| Low BW (1500 to 2499 grams)                               | 17%                                   | 19%                             | 17%                                          | 6%                                      |
| Normal BW (2500 grams or greater)                         | 79%                                   | 79%                             | 32%                                          | 92%                                     |
| Missing                                                   | 1%                                    | 0%                              | 1%                                           | <1%                                     |
| <b>Infant age in months at death, %</b>                   |                                       |                                 |                                              |                                         |
| Younger than 1 month                                      | 7%                                    | 6%                              | 64%                                          | ---                                     |
| 1 to 2 months                                             | 41%                                   | 49%                             | 17%                                          | ---                                     |
| 3 to 4 months                                             | 35%                                   | 30%                             | 9%                                           | ---                                     |
| 5 to 6 months                                             | 11%                                   | 9%                              | 4%                                           | ---                                     |
| 7 to 12 months                                            | 6%                                    | 5%                              | 4%                                           | ---                                     |
| <b>Maternal age, %</b>                                    |                                       |                                 |                                              |                                         |
| Younger than 20                                           | 8%                                    | 9%                              | 8%                                           | 4%                                      |
| 20-24 years of age                                        | 31%                                   | 35%                             | 24%                                          | 18%                                     |
| 25-29 years of age                                        | 30%                                   | 25%                             | 29%                                          | 31%                                     |
| 30-34 years of age                                        | 20%                                   | 23%                             | 24%                                          | 31%                                     |
| 35-39 years of age                                        | 9%                                    | 6%                              | 13%                                          | 13%                                     |
| Age 40 or older                                           | 2%                                    | 1%                              | 3%                                           | 2%                                      |
| Missing                                                   | 1%                                    | 0%                              | 0%                                           | 0%                                      |

## SUID DEMOGRAPHICS

Table 1 describes the characteristics of SUIDs in 2017 compared to all 2017 infant deaths and all 2017 infant births in Wisconsin. A comparison of characteristics among all SUIDs occurring between 2015 and 2017 is provided as well.

**Sex:** Among SUIDs in 2017, 61% were male while males comprised 51% of infants born in 2017. In comparison, among *all* infant deaths in 2017, 54% were male.

**Gestational age and birth weight:** Preterm birth and low birth weight are leading causes of infant mortality (CDC, 2019). Table 1 demonstrates that the majority, 67%, of *all* infants that died in 2017 were born prematurely and 67% were very low or low birth weight.

**In 2017, nearly 9 in 10 SUIDs occurred to infants less than 5 months of age.**

The majority of SUIDs did not occur to infants born prematurely or with low birth weight. However, prematurity and low birth weight were more common among SUIDs than among all infants born in 2017.

In 2017, infants with low birth weight represented 19% of the SUIDs but only 6% of the birth cohort. Among 2017 SUIDs, 19% of the infants were born before 37 weeks gestation while only 10% of all infants born in Wisconsin in 2017 were premature.

Rates of SUID can be calculated and compared when the number of infants born in each gestational weight and birth weight category is known. The rate of SUID was more than two times greater among preterm infants compared to term infants and nearly four times greater among low birth weight infants compared to normal birth weight infants in 2017.

**Infant age at death:** In 2017, the greatest percentage of SUIDs was among infants 1-2 months of age and 86% of all SUIDs occurred in the first 4 months of life. Among SUIDs, 5% occurred among infants less than 1 month of age. By contrast, among *all* infant deaths in 2017, 64% were among infants less than 1 month of age.

**Maternal age:** The most common maternal age category among SUIDs in 2017 was 20-24 years. While women ages 20-24 years birthed 18% of the birth cohort, they comprised 35% of the women experiencing a SUID. Among *all* infant deaths, by comparison, 24% were experienced by women ages 20-24 years.

When considering the number of infants born to women in each age category, the rate of SUID was more than two times greater among women ages 20-24 years compared to women ages 25-59 years.

**TABLE 2**

| <b>Social and Economic Factors Influencing Maternal and Child Health</b>   |                                     |                               |                                           |                               |
|----------------------------------------------------------------------------|-------------------------------------|-------------------------------|-------------------------------------------|-------------------------------|
| <b>Characteristic</b>                                                      | <b>SUIDs in WI, 2017<br/>(N=77)</b> |                               | <b>SUIDs in WI, 2015-2017<br/>(N=186)</b> |                               |
|                                                                            | Percentage                          | Rate per 1,000<br>live births | Percentage                                | Rate per 1,000<br>live births |
| <b>Highest level of education completed among mothers age 20 and older</b> |                                     |                               |                                           |                               |
| Less than high school                                                      | 20%                                 | 3.1                           | 19%                                       | 1.9                           |
| High school or GED                                                         | 66%                                 | 1.5                           | 62%                                       | 1.0                           |
| College degree                                                             | 7%                                  | 0.3                           | 8%                                        | 0.3                           |
| Post graduate degree                                                       | 3%                                  | 0.3                           | 2%                                        | 0.2                           |
| Missing                                                                    | 4%                                  | ---                           | 8%                                        | ---                           |
| <b>Highest level of education completed among mothers age 25 and older</b> |                                     |                               |                                           |                               |
| Less than high school                                                      | 16%                                 | 1.9                           | 18%                                       | 1.7                           |
| High school or GED                                                         | 67%                                 | 1.2                           | 59%                                       | 0.9                           |
| College degree                                                             | 9%                                  | 0.3                           | 12%                                       | 0.3                           |
| Post graduate degree                                                       | 5%                                  | 0.3                           | 4%                                        | 0.2                           |
| Missing                                                                    | 2%                                  | ---                           | 8%                                        | ---                           |
| <b>Maternal race and ethnicity combined</b>                                |                                     |                               |                                           |                               |
| Hispanic                                                                   | 13%                                 | 1.6                           | 8%                                        | 0.7                           |
| Multi-racial, non-Hispanic                                                 | 4%                                  | 2.1                           | 3%                                        | 1.2                           |
| Non-Hispanic black                                                         | 48%                                 | 5.4                           | 34%                                       | 3.2                           |
| Non-Hispanic white                                                         | 31%                                 | 0.5                           | 46%                                       | 0.6                           |
| Other categories combined                                                  | 3%                                  | 0.5                           | 1%                                        | 0.2                           |
| Missing                                                                    | 2%                                  | --                            | 9%                                        | ---                           |
| <b>Insurance (infant)</b>                                                  |                                     |                               |                                           |                               |
| Private                                                                    | 13%                                 | 0.3                           | 16%                                       | 0.3                           |
| Public                                                                     | 78%                                 | 2.6                           | 74%                                       | 1.9                           |
| Other                                                                      | 4%                                  | ---                           | 2%                                        | ---                           |
| None                                                                       | 3%                                  | ---                           | 2%                                        | ---                           |
| Missing                                                                    | 3%                                  | ---                           | 6%                                        | ---                           |

## SOCIAL AND ECONOMIC FACTORS

Social and economic factors influence the health of infants and their families, both directly and indirectly. Often described as the social determinants of health, these factors are outside of an individual's control but affect the environment in which the individual lives (CDC, 2011).

Examples of these factors include employment, housing instability and quality, poverty, education, discrimination and access to health care (Office of Disease Prevention and Health Promotion, 2019). Social determinants influence health inequities which can be defined as differences in health outcomes that are unfair and avoidable (CSDH, 2010).

**Among 2015-2017 SUIDs, 7 in 10 infants were publicly insured, compared with 4 in 10 of all infants born in 2015-2017.**

Understanding SUID inequities helps determine where monetary resources and time need to be directed in order to eliminate the unjust differences in SUID rates.

SUID data collected by child death review teams includes birth certificate information on maternal education, maternal race and Hispanic ethnicity and the infant's insurance.

In Table 2, social and economic factors among SUIDs occurring in 2017 are compared to SUIDs occurring between 2015 and 2017. For each factor, the percentage of SUIDs in each category is given. In addition, a rate, which

takes into account the number of Wisconsin infants in each category for the given year(s), is provided.

**Educational attainment:** The rate of SUID differs by maternal educational attainment. Between 2015 and 2017 among mothers age 25 and older, mothers with less than a high school education experienced the loss of an infant to SUID at a nearly six times greater rate than mothers with a college degree. In the same time period, mothers age 25 and older with a high school degree experienced the loss of an infant to SUID at a rate three times greater than mothers with a college degree.

**Maternal race and Hispanic ethnicity:** An inequity in SUID by maternal race and ethnicity also exists. Racial categories are understood to reflect social definitions in the United States (United States Census Bureau, 2018). Race affects the social determinants of health through differences in how resources, such as housing, transportation and income are distributed as well as through experiences of racism (Robert Wood Johnson Foundation, 2018). Chronic stress from repeated negative experiences such as discrimination is associated with health inequities (APA, 2019). From 2015 to 2017, Black mothers experienced the loss of an infant to SUID at a rate five times greater than white mothers.

**Insurance:** An infant's insurance is used as an approximation of socioeconomic position. SUID data reveal an inequity in SUID rate by insurance status as well. Between 2015 and 2017, infants with public insurance experienced SUID at a more than six times greater rate than infants with private insurance.

**TABLE 3**

| <b>Sleep Environment Factors among SUIDs in Wisconsin</b>                                                                                               |                                                   |                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------|
| <b>Recommendation</b>                                                                                                                                   | <b>2017 SUIDs (N=76*) with recommendation met</b> | <b>2015-2017 SUIDs with recommendation met</b> |
| Back to sleep for every sleep                                                                                                                           | 57%                                               | 61%                                            |
| Use a firm sleep surface                                                                                                                                | 21%                                               | 25%                                            |
| Breastfeeding is recommended (measured as ever breastfed)                                                                                               | 50%                                               | 54%                                            |
| Sleep infant in parents' room but on a separate surface designed for infants, ideally for the first year of life, but at least for the first six months | 16%                                               | 15%                                            |
| Keep soft objects and loose bedding away from infant's sleep area to reduce the risk of SIDS, suffocation, entrapment and strangulation                 | 13%                                               | 15%                                            |
| Consider offering a pacifier at naptime and bedtime (excluding infants less than 28 days of age)                                                        | 11%                                               | 17%                                            |
| Avoid smoke exposure during pregnancy and after birth                                                                                                   | 30%                                               | 39%                                            |
| Avoid alcohol and illicit drug use during pregnancy and after birth                                                                                     | 70%                                               | 73%                                            |
| Avoid overheating and head covering in infants                                                                                                          | 100%                                              | 98%                                            |
| Pregnant women should obtain regular prenatal care                                                                                                      | 67%                                               | 71%                                            |

\*Note: N=76 SUIDs confirmed to have occurred in the sleep environment.



## SUIDS AND THE SLEEP ENVIRONMENT

Nearly all 2017 SUIDs occurred while the infant was confirmed to be in the sleep environment. The American Academy of Pediatrics (AAP) provides a policy statement on recommendations for a safe infant sleeping environment (AAP, 2016). Information gathered by CDR teams allows a comparison of the sleep environment factors among SUIDs to ten of the AAP safe sleep recommendations (Table 3).

These comparisons are provided to illuminate which recommendations need the greatest improvement in order to progress in the prevention of SUIDs. In Table 3, each recommendation is listed along with the percentage of SUIDs from 2017 in which the recommendation was being followed. Information on the sleep environment among 2015-2017 SUIDs combined is provided as well.

The percentage of SUIDs with missing data is reported below when 10% or more cases are missing the data point.

**From 2015-2017, 5 in 10 infants were sleeping on an adult bed when the SUID occurred.**

**Sleep position and surface:** Infants should be placed on their backs on a firm, flat surface such as a crib, bassinet, portable crib or play yard without soft objects or loose bedding. Among 2017 SUIDs, 25% of infants were placed on their stomachs. An additional 14% were placed on their sides. In regards to surface, 54% of infants were placed on an adult bed and 9% of infants were on a couch.

The majority (77%) of SUID sleep environments contained soft bedding. The most common bedding items were blankets (49%), pillows (46%) and comforters (42%). There were two or more bedding items present in half the cases.

**Availability of safe sleep surface:** A safe sleep surface should be available at each location an infant will sleep and utilized by each individual that cares for an infant. The majority (80%) of the incidents leading to a SUID occurred at the infant's home. Among these cases, 87% of infants had a safe sleep surface available. The second most common incident location was a relative's home (13%). Importantly, among these cases, only 40% of infants had a safe sleep surface available.

Eight infants were under the supervision of someone other than the biological mother or father at the time of the incident. In each of these cases, a safe sleep surface was present.

**Breastfeeding:** Infants should be breastfed or fed expressed breast milk exclusively for the first six months and continue breastfeeding as complementary foods are introduced for one year or more (Eidelman & Schanler, 2012).

Breastfeeding provides a protective effect against sudden death in infants. While any breastfeeding is more protective than no breastfeeding, the degree of protection for the infant increases when breastfeeding is done exclusively, without supplementation from non-human milk (Hauck et al, 2011).

Among 2017 SUIDs, 51% of infants were breastfed at some point since delivery. However, among these infants, 50% received formula at their last meals prior to being placed to sleep, indicating breastfeeding was not exclusive.

**Bed sharing:** Infants should sleep on a separate surface designed for infants. Among 2017 SUIDs, 63% of infants were sharing a surface with one or more adults or children. In 9% of cases, the infant was on a surface with an adult who fell asleep while feeding the infant, 5% while breastfeeding and 4% while bottle feeding.

**Smoke exposure, alcohol use and illicit drug use:** Infants should not be exposed to smoking during pregnancy or following birth. Among 2017 SUIDs, prenatal and postnatal smoke exposure was confirmed in 37% of the infants. Exposure to smoke after birth was not known in 13% of cases.

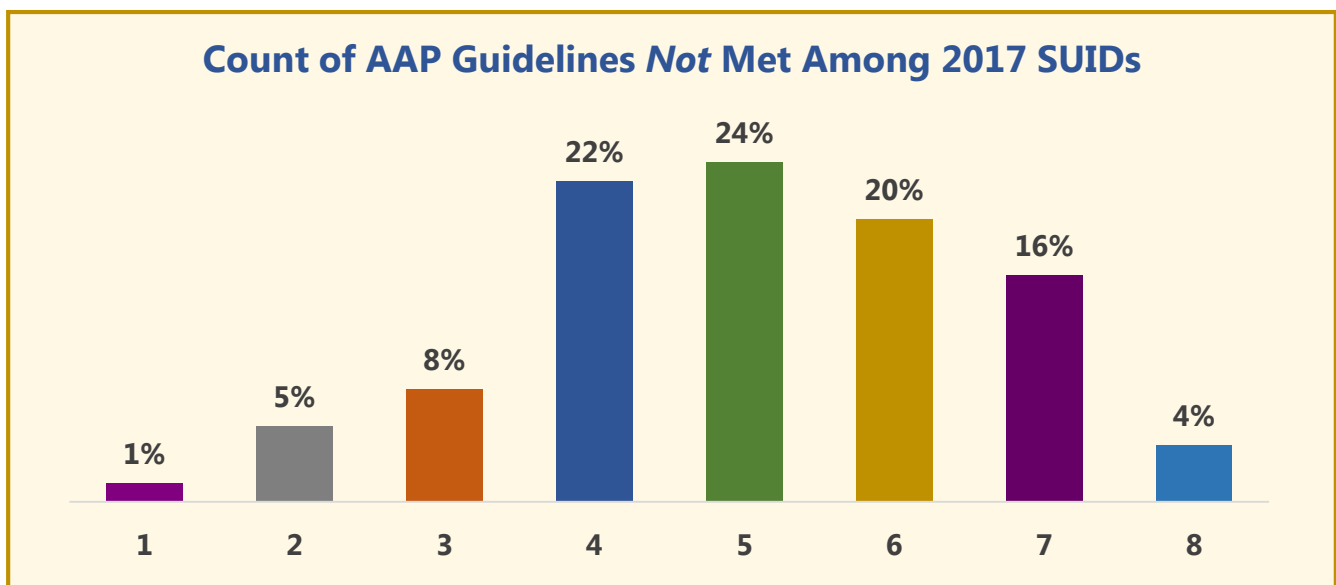
Additionally, maternal alcohol and illicit drug use during pregnancy and caregiver substance use after birth, particularly combined with bed sharing, should be avoided. Caregiver substance use while sharing a sleep surface with the infant was confirmed in 18% of cases.

**Prenatal care:** Pregnant women should obtain regular prenatal care. Although the frequency of visits is determined by the needs of the

individual and her prenatal risk factors, prenatal care is generally initiated in the first trimester (AAP & ACOG, 2012). Among 2017 SUIDs, 67% of infants received prenatal care beginning in the first trimester. Both the mean and median number of visits was 11, with the visit number missing for 12% of cases.

**Pacifier use:** Pacifiers have been demonstrated to have a protective effect against sudden death in infants. Introduction of a pacifier is recommended once breastfeeding is established, which typically occurs after the first four weeks following birth. Among 2017 SUIDs older than 28 days, pacifier use was confirmed in 11% of cases. Pacifier use did not differ by breastfeeding status. Pacifier use was unknown in 15% of cases.

**Overall adherence:** As demonstrated in the graph below, the majority of SUIDs occurred in an environment in which more than one AAP recommendation for a safe infant sleep environment was not in place. Among 2017 SUIDs, an average of five AAP recommendations were *not* met in the sleep environment in which the death occurred.



## SLEEP BABY SAFE TRAININGS AND PROFESSIONAL RESOURCES



Children's Health Alliance of Wisconsin has partnered with the Wisconsin Department of Health Services Maternal and Child Health Title V program

to support tribal and local health departments in addressing infant safe sleep.

Sleep Baby Safe is a suite of trainings and resources designed for professionals working with families to take safe sleep messaging from a campaign to a conversation. These resources are available to enhance local efforts to promote a consistent, clear and concise message on infant safe sleep.

Using a train-the-trainer format, Alliance staff can help local health departments and tribal agencies to plan safe sleep trainings for professionals, such as home visitors, medical professionals and child care providers.

The Sleep Baby Safe trainings provide research-based information about the importance of safe sleep messaging, share the American Academy of Pediatrics (AAP) recommendations and provide a framework for having conversations

on the topic. In addition to in-person trainings, the Alliance provides online modules which can be used for refresher training.

New in 2019, the Alliance has developed a toolkit to support hospitals, clinics and health professionals in implementing safe sleep policies, training and resources for staff and the families they serve.

The Alliance also manages Newborn Nest, a baby box program developed from Sleep Baby Safe and funded through Children's Hospital of Wisconsin Foundation.

Baby boxes can be used as a temporary resource for families who need an additional safe sleep environment for their newborn. The program emphasizes the importance of securing a long-term safe sleep area such as a crib or Pack 'n Play. The Newborn Nest program includes comprehensive training, follow-up and evaluation for agencies that choose to participate.

Find these and other resources on the Sleep Baby Safe page of the Alliance website [www.chawisconsin.org/sbs](http://www.chawisconsin.org/sbs):

- Safe sleep video for families
- Sleep Baby Safe table talk handouts
- Sleep Baby Safe notebook for professionals
- Sleep Baby Safe conversation guide

**TABLE 4**

| <b>Pregnancy Risk Assessment Monitoring System – Wisconsin 2017</b>        |                            |                                    |
|----------------------------------------------------------------------------|----------------------------|------------------------------------|
| <b>Survey Question</b>                                                     | <b>Weighted Percentage</b> | <b>95% Confidence Interval (%)</b> |
| <b>Maternal protective factors against SUID</b>                            |                            |                                    |
| Initiated prenatal care in the first trimester                             | 88%                        | 85.2, 90.1                         |
| Breastfed at some time since birth                                         | 89%                        | 86.8, 91.7                         |
| No exposure to maternal smoking in third trimester                         | 88%                        | 85.2, 90.9                         |
| Mother does not currently smoke                                            | 85%                        | 82.0, 88.1                         |
| No illicit drug use during pregnancy                                       | 94%                        | 92.0, 96.0                         |
| <b>Sleep practices in the past two weeks</b>                               |                            |                                    |
| Infant positioned on back most often when laid to sleep                    | 86%                        | 83.5, 89.0                         |
| Infant always sleeps alone in his or her own bed                           | 64%                        | 60.6, 68.4                         |
| Crib in the same room as mother when infant sleeps alone                   | 76%                        | 72.7, 80.1                         |
| Infant usually sleeps in a crib, bassinet or pack and play                 | 91%                        | 88.5, 93.2                         |
| Infant usually does not have any additional items in the sleep environment | 47%                        | 43.3, 51.6                         |
| <b>Safe sleep education from doctor, nurse or other health care worker</b> |                            |                                    |
| Place the infant on his or her back to sleep                               | 95%                        | 94.2, 97.6                         |
| Place the infant to sleep in a crib, bassinet, or pack and play            | 92%                        | 89.7, 94.4                         |
| Place the infant’s crib or bed in mother’s room                            | 50%                        | 46.2, 54.4                         |
| What things should and should not go in bed with the infant                | 86%                        | 83.2, 89.3                         |

## PRAMS DATA

Each year, a sample of new mothers in Wisconsin are surveyed using the Pregnancy Risk Assessment Monitoring System (PRAMS), coordinated by the Wisconsin Department of Health Services and the Centers for Disease Control and Prevention. Survey questions are related to safe pregnancy and healthy infancy. The survey responses are weighted so mothers sampled are representative of all new Wisconsin mothers in a given year.

Table 4 offers 2017 PRAMS data related to the AAP recommendations for a safe infant sleep environment. In addition to the weighted percentage, a 95% confidence interval is offered.

Direct comparisons to SUID data are difficult because the PRAMS and SUID case report questions are not identical. For example, new mothers are surveyed about the position they *most often* lay the baby down to sleep. By contrast, among SUIDs, information is gathered on the infant's position at the time of the incident rather than position most often placed to sleep.

### **Maternal protective factors against SUID:**

The majority of new mothers reported they initiated prenatal care in the first trimester (88%), did not use illicit substances during pregnancy (94%), and breastfed their infants at some point since delivery (89%). In regards to smoke exposure, 88% of new mothers did not smoke in the third trimester of their pregnancies and 85% were not smoking at the time of the survey.

### **Sleep practices and provider guidance on**

**safe sleep:** New mothers are asked a series of questions about current sleep habits with their infants. Additionally, new mothers are asked about components of safe sleep education received from their health care providers.

The majority of new mothers position the infant on his or her back most often when laid to sleep (86%) and nearly all (95%) of new mothers were told by a health care provider to place the infant on his or her back to sleep.

Fewer new mothers (64%) reported the infant *always* sleeps alone in his or her own crib or bed. By contrast, 91% of new mothers reported the infant *usually* sleeps in a crib, bassinet or pack and play, indicating that infants were often sleeping on a recommended surface but not for every sleep. The majority (92%) of new mothers reported they were advised to place their infants to sleep in a crib, bassinet or pack and play by a health care provider.

New mothers were asked whether the infant's crib or bed was placed in the mother's room when the infant sleeps alone. Among new mothers, 76% place the infant's crib or bed in the mother's bedroom when the infant sleeps alone. Half of new mothers (50%) reported a health care provider guided them to place the infant's crib or bed in the mother's room.

Lastly, among new mothers, 47% reported the infant does not usually have any additional items such as blankets, pillows, toys, cushions and bumper pads in the sleep area. By contrast, 86% of new mothers indicated receiving health care provider guidance on what things should and should not go in the bed with the infant.

## SUID CATEGORIZATION

Wisconsin has participated in the Sudden Unexpected Infant Death Case Registry (the Registry) through the Centers for Disease Control and Prevention since 2013. Along with teams in 21 other states and jurisdictions, Wisconsin collects information on the circumstances and risk factors of SUIDs through local CDR teams.

The Registry aims to determine SUID rates and monitor trends across the United States, improve the quality and consistency of SUID investigations and utilize the data to inform SUID prevention efforts at both the program and policy levels (CDC, 2019).

**Less than 5 in 10 infants born in 2017 were slept without any blankets or other items in their sleep area.**

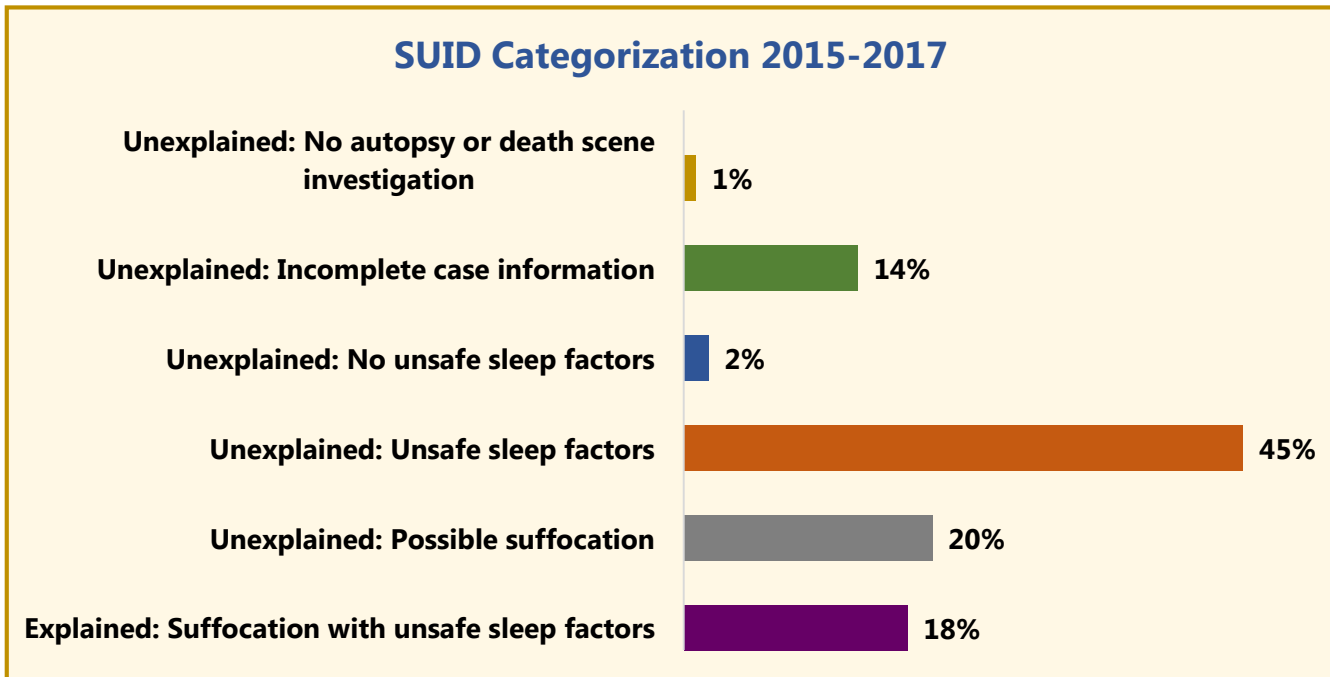
In the case of a SUID, the death certificate may be completed by a coroner, medical examiner or forensic pathologist. The Registry includes an infant death as a SUID when the death certificate indicates the cause as unknown, undetermined, SIDS, SUID, unintentional sleep-related asphyxia / suffocation / strangulation, cardiac or respiratory arrest without other well-defined causes, or unspecified causes with potentially unsafe sleep factors.

Regional differences in how SUIDs are certified lead to challenges in monitoring trends among SUIDs in the United States (Shapiro-Mendoza et al., 2018). To standardize how SUIDs are classified, the Registry utilizes an algorithm to categorize the SUIDs. The algorithm is based upon components of the investigation and the conditions in the infant's sleep environment.

Possible SUID categories include:

- **No autopsy or death scene investigation:** Cases in which an autopsy or a death investigation was not completed
- **Incomplete case information:** Cases in which the autopsy did not include toxicology, any imaging and pathology or the location and position in which the infant was found was not known
- **No unsafe sleep factors:** Cases in which the infant was placed alone on his or her back on a sleep surface recommended for an infant without any soft or loose objects in the sleep area
- **Unsafe sleep factors:** Cases in which the infant's sleep environment had one or more unsafe sleep factors (e.g. placed on stomach to sleep) but evidence of airway obstruction was not present OR evidence of what object obstructed the airway was not known
- **Possible suffocation with unsafe sleep factors:** Cases in which unsafe sleep factors were present and evidence of what caused at least partial obstruction of the airway is known but does not meet the criteria of the next category, explained suffocation
- **Explained suffocation with unsafe sleep factors:** Cases with a non-conflicting account of placed and found position, no other potentially fatal findings or conditions from autopsy, age and developmental stage that made a suffocation event possible, evidence to visualize how the airway obstruction occurred and strong evidence of a full external obstruction of the airway

**FIGURE C**



The percentage of 2015-2017 SUID cases in each category is indicated in Figure C. The majority of SUIDs were confirmed to occur in an unsafe sleep environment. SUIDs categorized as unsafe sleep factors, possible suffocation, and explained suffocation comprised 83% of the SUIDs. By contrast, 2% of cases were confirmed to not have any unsafe sleep factors, meaning the infant was alone on his or her back on a sleep surface intended for an infant without soft bedding or loose objects.

Importantly, the remaining 15% categorized as incomplete case information or no autopsy or death scene investigation may have involved unsafe sleep factors but were lacking the investigation components required to categorize them further. For example, among 2015-2017 SUIDs categorized as incomplete case information, 46% of autopsies did not include imaging and the position in which the infant was found was unknown in 35% of cases.

### CONCLUSION: PREVENTING SUIDS

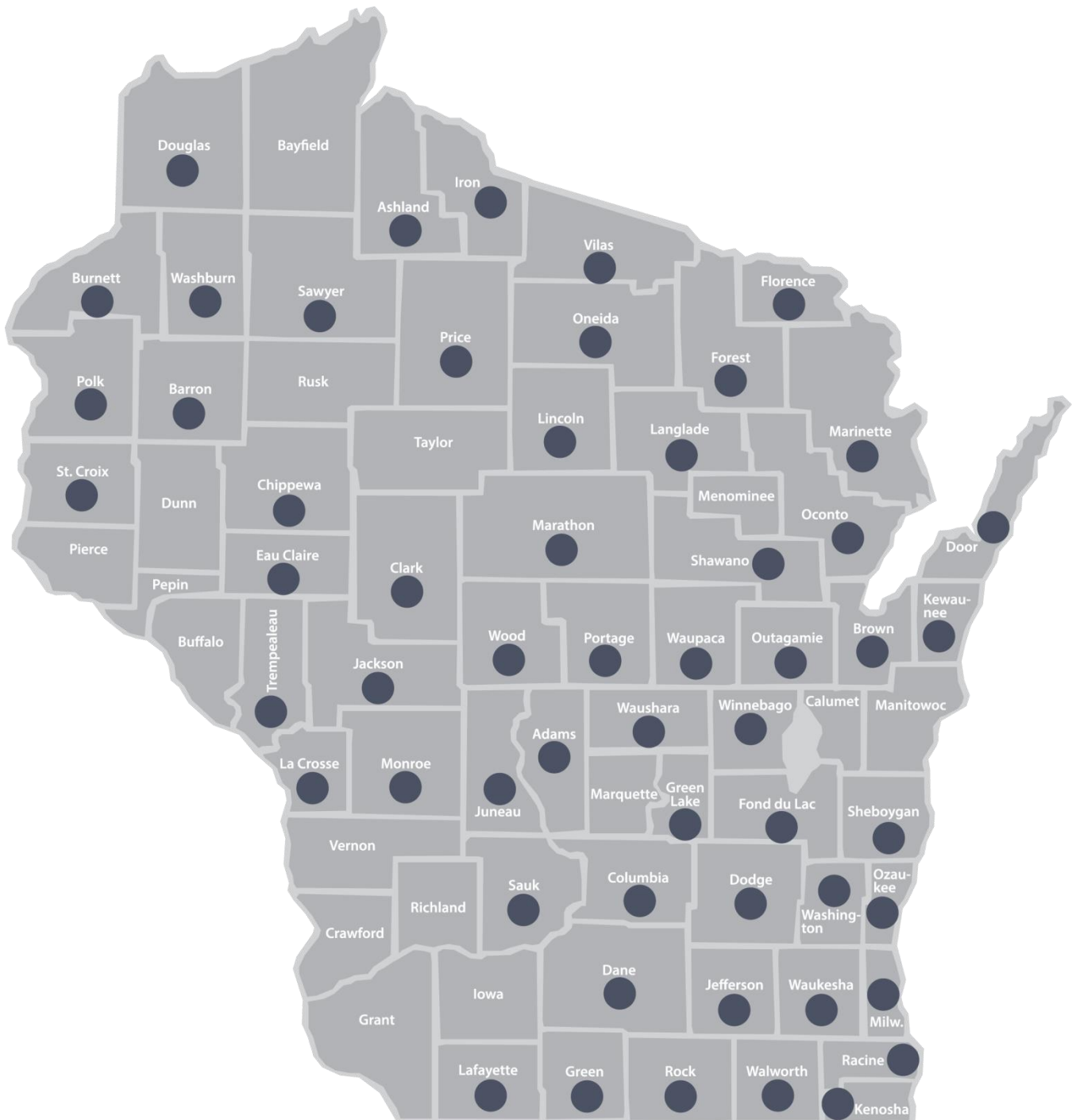
The prevention of SUIDs requires a multi-pronged approach.

1. The social and economic conditions in which families and infants live matter. These conditions lead to inequities in the rate of SUIDs and should be considered in prevention recommendations.
2. The adoption of safe sleep practices requires a conversation, not simply education, to understand beliefs and barriers related to safe sleep conditions for infants.
3. SUID investigations should be standardized to ensure circumstances and risk factors are understood, regardless of where the SUID occurs. The Wisconsin Child Death Review Advisory Council adopted autopsy guidelines in 2018 to improve child death investigations. These guidelines are published by the Wisconsin Department of Health Services at [dhs.wisconsin.gov/publication/p02155.pdf](https://dhs.wisconsin.gov/publication/p02155.pdf).



## KEEPING KIDS ALIVE IN WISCONSIN

Keeping Kids Alive in Wisconsin is a program comprised of local child death review and fetal infant mortality review teams. Wisconsin has local review teams in more than 50 counties as indicated on the map below. These teams are multidisciplinary and prevention focused, working to improve the health and safety of children in their communities. Our understanding of the risk factors and circumstances surrounding SUIDs comes from the death reviews conducted by local teams. For more information on starting a team in your county, please contact Karen Nash at [knash@chw.org](mailto:knash@chw.org).





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## TECHNICAL NOTES

Maternal age: Included SUID cases where the biological mother was one of the primary caregivers of the infant. N=77 for SUIDs in 2017; N=182 for SUIDs 2015-2017.

Insurance at birth: None indicated as self-pay for full birth cohort. Rate not calculated as principal source of payment at delivery may not represent infant's insurance at time of death.

Regular prenatal care: Extensive prenatal care history is not collected for SUID cases. For this report, "regular prenatal care" is defined as initiating prenatal care in the first trimester.

Wisconsin PRAMS data are weighted by the CDC to approximate representation of the entire state population of women who recently gave birth. All percentages are based on weighted survey responses. The confidence intervals given reflect the probable range of the true population percentages.

## TECHNICAL ASSISTANCE

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