

Trends in Sudden Unexpected Infant Deaths

In Indiana, 1990-2006

Evidence of Recent Change in Classification or Reporting

(Published April 2008)

Indiana State Department of Health
Maternal and Children's Special Health Care Services
2 North Meridian Street
Indianapolis, Indiana 46204

For questions about this report, please
Call 317.233.1344 or e-mail bmjohnso@isdh.in.gov

Indiana State Department of Health
Judith Monroe, MD, State Health Commissioner
Mary L. Hill, RN, Esq., Deputy State Health Commissioner

Maternal and Children's Special Health Care Services
Judith Ganser, MD, Medical Director

Author
Atossa Rahmanifar, PhD, RD

Table of Contents

Executive Summary

Introduction

Methods

Results and Discussion

References

List of Tables

List of Figures

Appendix

Executive Summary

Background

Indiana's high infant mortality rate due to accidental suffocation deaths during 1999 to 2004 made Indiana second in the nation for highest rate, created much concern in Indiana's public health community, and lead to further investigation of the trends in accidental suffocation deaths in Indiana which is reflected in this report.

Purpose of study

The purpose of this report is to assess trends in various causes of [sudden unexpected infant deaths \(SUIDs\)](#) including sudden infant death syndrome (SIDS), other SUIDs (accidental suffocation and strangulation, intent unknown suffocation, neglect, abandonment, and maltreatment syndromes), and unknown cause. This report also examines the variations in distribution of SUIDs among five major Indiana counties.

Method

Yearly infant mortality rates are presented for SIDS, other SUIDs, and unknown cause using the Indiana mortality data for all infant deaths between 1990 and 2006. Years were combined into 1990-1994, 1995-1998, 1999-2002, and 2003-2006 to yield more stable rates. Moreover, the two periods of 1990-1994 and 1995-1998 represent the years prior to and immediately after launching "Back to Sleep" campaign, the 1999-2002 period represents the years after changing to ICD-10 coding system, and the 2003-2006 period represents the most recent data available. Distribution of SUIDs deaths in five Indiana counties are reported for the combined years of 1999-2006.

Results and Discussion

Between 1990 and 1998, as SIDS rates declined in Indiana, so did rates due to combined SIDS, other SUIDs, and unknown cause; thereafter, SIDS rates continued to decline whereas the combined rates of SIDS, other SUIDs, and unknown cause did not, a pattern also reported at the national level.

Between 1995-1998 and 1999-2002, SIDS rate in Indiana declined by 39 percent whereas rates for unknown cause and accidental suffocation increased by 67 and 106 percents, respectively. Recent studies on national data produced similar results and provided evidence that most of the decline in SIDS and increase in accidental suffocation rates after 1998 is due to shifts in reporting or classification of deaths from SIDS to accidental suffocation and to unknown cause rather than a true change.

The recent shift observed in Indiana and nationwide may partly be explained by change to ICD-10 coding system, by improved death scene investigations, and/or by higher awareness of investigators in regards to unsafe sleep environment. Finding an infant

lying on soft bedding face down may be reported as accidental suffocation and strangulation instead of what could have been reported as SIDS in earlier years.

Enormous variation in percent distribution of infant deaths due to SIDS, other SUIDs, and unknown cause among Indiana's five major counties reveals lack of consistency in reporting SUIDs within our state.

Indiana's national rankings in SUIDs rates

According to CDC Wonder On-Line Database, between 1990-1994 and 1999-2004:

- SIDS rate declined by 62 percent in Indiana (from 142.2 to 54.3 deaths per 100,000 live births) and by 51 percent nationwide (from 120.3 to 59.4 deaths per 100,000 live births) resulting in Indiana's national ranking of SIDS improving from 20th to 35th.
- Accidental suffocation rate tripled in Indiana (from 11.5 to 34.6 deaths per 100,000 live births) and doubled in US (from 6.6 to 13.5 deaths per 100,000 live births), making Indiana rank number two for highest rate (among the states with stable rates).
- Indiana's rate of combined deaths due to SIDS, other SUIDs, and unknown cause was above the national average by 14 percent in 1990-1994 and by only 11 percent in 1999-2004 with a relatively stable national ranking of 22nd and 20th, respectively.

Recommendation

It is recommended that until an agreement on a more standardized approach to certifying SIDS and other SUIDs can be attained, monitoring progress on reducing sudden infant deaths should include observing trends in the broad categories that encompasses SIDS as well as other SUIDs and unknown cause.

Sudden Unexpected Infant Deaths (SUIDs)

Sudden Unexpected Infant Deaths (SUIDs) consists of:

1. Sudden Infant Death Syndrome (SIDS)
SIDS is the sudden death of an infant under one year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history. (*Willinger et al, 1991*).
2. Other SUIDs
 - a. Accidental Suffocation and Strangulation in Bed (ASSB)
 - b. Other Accidental Suffocation and Strangulations (OAS)
 - c. Intent Unknown Suffocation (IUS)
 - d. Neglect, Abandonment, and other maltreatment syndromes (NAM)

Introduction

Sudden unexpected infant death (SUID) is any infant death that is unexpected and initially unexplained. Under such circumstances, a cause of death is to be determined after subsequent investigations. Frequently, the majority of SUIDs are later diagnosed as **sudden infant death syndrome (SIDS)**. SIDS is a term that has been used to describe unexpected deaths of an infant when subsequent investigation fail to demonstrate a definite cause of death. Other diagnosis that could fall under the SUIDs category are accidental suffocation and strangulation in bed (ASSB), other accidental suffocation (OAS), intent unknown suffocation (IUS), and neglect, abandonment, and other maltreatment syndromes (NAM).

The concept of SIDS was first proposed in 1969 and defined as “the sudden death of any infant or young child which is unexpected by history, and in which a thorough postmortem examination fails to demonstrate an adequate cause of death.” (1, p. 18). Over the following years, the initial concept and definition of SIDS faced controversies and criticism for lack of consistency in requirements of standard definition (2, 3). In 1989, the National Institute of Child Health and Human Development convened an expert panel to revisit the issue of SIDS and its definition. The panel proposed that SIDS be defined as “the sudden death of an infant under one year of age, which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history” (4). The new definition restricted the age to under one and made the requirement of a death scene investigation explicit.

In 1996, to improve the scope of the procedures and standardize the quality of information collected and used for diagnosing SUIDs, Center for Disease Control and Prevention (CDC) published “Guidelines for Death Scene Investigation of Sudden, Unexplained Infant Deaths” (5) and introduced the Sudden Unexplained Infant Deaths Investigation Report Form (SUIDIRF). A 2001 national survey indicated that SUIDIRF was not widely used because it was poorly organized, lengthy, and cumbersome (6). Moreover, use of the 1996 guidelines and SUIDIRF was not mandated. CDC in partnership with other federal agencies and organization launched an initiative in 2004 to further improve the investigation and reporting of SUIDs. As a result of this initiative, in 2006, CDC released the new Sudden Unexplained Infant Deaths Investigation (SUIDI) Report Form for use by state and local agencies in infant death scene investigations (<http://www.cdc.gov/sids/SUID.htm>).

Changes in definition of SIDS and in certifiers’ interpretation of and adherence to SIDS definitions are believed to have influenced the SIDS rate over the past two decades (1, 4, 7). Moreover, changes between ICD revisions can also have an effect on how deaths are classified and reported (8). Substantial nationwide decline in SIDS rate during the 1990’s has mainly been attributed to the marked reduction in prone-sleep prevalence as a result of American Academy of Pediatrics recommendation in 1992 for placing infant supine during sleep and the “Back to Sleep” campaign (9-11).

The apparent decline in SIDS rate since 1999, however, has been suggested to be due to shifts in reporting or classification of death from SIDS to other causes of SUIDs (12-14). Even with a thorough death scene investigation, autopsy, and review of the clinical history and findings, it

can be difficult to distinguish SIDS from other causes of SUIDs such as accidental suffocation and asphyxia (15). A recent study assessing US mortality rates provided more compelling evidence that most of the decline in SIDS rates since 1999 is likely due to increased reporting of cause unknown/unspecified and accidental suffocation and strangulation in bed (ASSB) (16).

According to CDC Wonder On-Line Database (17, 18), between the two periods of 1990-1994 and 1995-1998, SIDS rates declined considerably and accidental suffocation rates increased modestly in Indiana and in the U.S., with higher rates in Indiana compared to the national average (Figures A and B). Between 1995-1998 and 1999-2004, however, accidental suffocation rates increased sharply and to a greater extent in Indiana compared to the national average, making Indiana the second state for highest rate of accidental suffocation deaths in 1999-2004 among 34 states with stable rates.

Indiana's high ranking in infant deaths due to accidental suffocation created much concern in Indiana's public health community and led to further investigation of the trends in accidental suffocation and SUIDs in Indiana which is reflected in this report. The purpose of this report is to assess trends in sudden unexpected infant deaths (SUIDs) including SIDS, other SUIDs (ASSB, OAS, IUS, and NAM), and unknown or unspecified cause in Indiana using the vital statistics data for all infant deaths between 1990 and 2006, and to compare rates and trends in Indiana with national statistics using the CDC Wonder On-Line Database (17, 18).

Methods

Indiana data presented in this report were obtained from the death certificates of all infants (under 1 year of age) who were Indiana residents and died between 1990 and 2006. The information obtained was used to analyze trends in cause specific infant mortality rates (number of infant deaths for a specific cause-of-death category per 100,000 live births) attributable to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause (other ill-defined and unspecified cause). Other SUIDs includes accidental suffocation and strangulation in bed (ASSB), other accidental suffocation and strangulation, intent unknown suffocation, and neglect, abandonment, and other maltreatment syndromes.

Cause of death data were derived from the underlying cause of death reported on the death certificate. Codes for cause of death were defined according to *the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9) (19)* for the 1990 to 1998 period, and the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) (20)* for the 1999 to 2006 period. Cause-specific infant mortality rates in Indiana are compared to the national rates obtained from CDC Wonder On-line Database from 1990 to 2004, the latest year for which data is available (17-18).

Yearly infant mortality rates are presented for SIDS and the combined deaths due to other SUIDs and unknown cause. Separate yearly rates for other SUIDs (and its sub-categories) and unknown cause were unstable during the 1990's due to the small number of infant deaths (less than 20) reported for each cause during those individual years. Years were combined into 1990-1994, 1995-1998, 1999-2002, and 2003-2006 periods to yield more stable rates. Moreover, the selected combination of years represents the unique historical significance of each time period. The two periods of 1990-1994 and 1995-1998 represent the years prior to and immediately after launching "Back to Sleep" campaign in October of 1994, respectively. The years 1999-2002 represent the years after changing to ICD-10 coding system and 2003-2006 represent the most recent data available.

Infant mortality rates due to SIDS, other SUIDs and unknown cause and percent distribution of infant deaths among these causes are presented for five major counties (Allen, Elkhart, Lake, Marion, and St. Joseph) for the combined years of 1999-2006 to examine variations among the major Indiana counties.

Results and Discussion

Trend in yearly infant mortality rates due to SIDS in Indiana between 1990 and 2006 reveals a consistent decline between 1993 and 2002 whereas mortality rates due to combined SIDS, other SUIDs, and unknown cause ceased to decline past 1998 (Table 1, Figure 1). Between 1998 and 2002, SIDS rate decreased by 36 percent (from 74.1 to 47.1 deaths per 100,000 live births) while combined rates due to other SUIDs and unknown cause increased by 82 percent (from 38.8 to 70.7 deaths per 100,000 live births); thereafter, SIDS rate had an upward trend (between 2004 and 2006) whereas rates due to other SUIDs and unknown cause declined. This pattern indicates that after 1998, as SIDS rate changed, the combined rates of other SUIDs and unknown cause changed in an opposite and reciprocal manner resulting in a relatively stable mortality rates due to the combined rates of SIDS, other SUIDs and unknown cause (Table 1, Figures 1-2).

Between the two periods of 1990-1994 and 1995-1998 in Indiana, SIDS rate declined by 34 percent, rates for other SUIDs and unknown cause increased by 20 and 13 percent, respectively, and rate for all of the above causes combined declined by 26 percent (Table 2, Figure 3). Between 1995-1998 and 1999-2002, SIDS rate continued to decline by another 39 percent whereas rates for other SUIDs and unknown cause increased by 86 and 67 percent, respectively, resulting in a negligible decline (8 percent) in rate for all causes combined (SIDS, other SUIDs, and unknown cause). The sharp increase in SUIDs rate in Indiana between 1995-1998 and 1999-2002 (from 21.5 to 40.1 deaths per 100,000 live births) is mainly due to the increases in accidental suffocation and strangulation in bed (ASSB) (by 111 percent, from 7.2 to 15.1 deaths per 100,000 live births) and other accidental suffocation and strangulation (by 101 percent, from 8.4 to 16.9 deaths per 100,000 live births) (Table 2, Figure 4). The declining trends in the combined rates of SIDS, other SUIDs, and unknown cause closely resembled that of the SIDS rate until 1998 but not thereafter; SIDS rate continued to decline noticeably after 1998 while the combined rate did not.

A similar pattern of decline in SIDS rate, increase in other SUIDs (especially in accidental suffocation and strangulation) and unknown cause, and unnoticeable change in the combined rate of all these causes observed in Indiana has also been reported at the national level between 1995-1998 and 1999-2001 (16). It was concluded that the more recent decline in SIDS rate and increase in ASSB rates (after 1998) were likely not a true decline in SIDS or increase in ASSB but due to changes in the ways these infant deaths were being reported and classified. Increasing asphyxia deaths rates and falling SIDS rates has raised questions on the reliability of SIDS certification (7). SIDS is defined as "the sudden death of an infant under one year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history" (4, p. 681). According to Beckwith (21), "SIDS remains a diagnosis of exclusion," subject "to the whims of the diagnosing pathologist".

The concomitant increase in accidental suffocation and strangulation and decrease in SIDS rates in recent years in Indiana and nationwide may be explained by improved death scene investigations and more awareness of the investigators as to what constitutes an unsafe sleep environment, including the risk associated with soft sleep surfaces and loose bedding (22-24).

Therefore, finding an infant lying on soft bedding face down may be reported by investigators as accidental suffocation and strangulation instead of what could be reported as SIDS in earlier years.

Compared to national averages (according to CDC Wonder, 17-18), SIDS rates in Indiana were higher in both 1990-1994 (by 18 percent) and 1995-1998 (by 20 percent) but lower in 1999-2004 (by 9 percent), whereas other SUIDs rates were consistently and considerably higher (by 84, 89, and 147 percents, respectively), and rates due to unknown cause were consistently lower (by 52, 39 and 33 percents, respectively) in Indiana throughout these periods. However, when infant mortality rates due to combined SIDS, other SUIDs, and unknown cause were examined and compared to US averages during the above three time periods, rates in Indiana were only 14, 16, and 11 percents higher than the national averages, respectively (Table 4, Figures 6-7). Moreover, Indiana's national ranking for accidental suffocation deaths remained in the top two or three states (for high rates) during 1990-1994, 1995-1998, and 1999-2004 whereas its ranking for SIDS dropped from 20th to 35th and its ranking based on the combined rates of SIDS, other SUIDs, and unknown cause put Indiana at 22nd, 18th, and 20th state, respectively.

This study indicates that the recent reports of a shift in classification of sudden and unexpected infant death at the national level (classifying less SIDS and more SUIDs and cause unknown rather than a true change) may have happened to an even greater extent in Indiana as shown by the steeper decline in the reported SIDS rates in Indiana along with the widening gap in the reported accidental suffocation deaths compared to US (Table 3). This shift may be due to changes in the way those investigating infant deaths and certifying the cause-of-death assess, diagnose, and report these deaths.

Even with a thorough death scene investigation, review of the clinical history, and autopsy, SIDS can be difficult to distinguish from other SUIDs, such as accidental suffocation and strangulation (15). The fact that throughout the 1990 to 2004 period Indiana had consistently higher SUIDs rates (as reflected in high national ranking for accidental suffocation deaths), lower unknown cause rates, and similar rates of combined SIDS, SUIDs, and unknown cause compared to the national average points to the possibility that Indiana has been more stringent in reporting unknown cause and recently even more lenient in classifying SUIDs as accidental suffocation rather than SIDS. Greater rate of decline in SIDS rate and increase in accidental suffocation deaths in Indiana compared to US in recent years may have been due to more reluctance of Indiana death certifiers to assign SIDS as the cause of death unless a thorough investigation had been conducted.

It is important to note that there was enormous variations in infant mortality rates and percent distribution of deaths due to SIDS, other SUIDs, and unknown cause among five major Indiana counties (Allen, Elkhart, Lake, Marion, and St. Joseph) (Tables 5 and 6). In the 1999-2006 period, among all infant deaths due to combined causes of SIDS, other SUIDs, and unknown cause, Lake County had the lowest proportion of SIDS deaths (8 percent) followed by Marion County (31 percent), compared to Elkhart (59 percent), St. Joseph (62 percent), and Allen counties (81 percent); in contrast, Lake County had a considerably higher proportion of ASSB deaths (62 percent) compared to other four counties (8-13 percents) (Table 6, Figure 8).

The Center for Disease Control and Prevention initiated the Sudden, Unexplained Infant Death Initiative in 2004 to standardize data collection at infant death scenes and to improve the reporting of cause of death on death certificates. It is recommended that until agreement on a more standardized approach to certifying sudden infant death can be attained, monitoring progress on reducing sudden infant death should include observing trends in the broad categories that encompasses SIDS as well as SUIDs and unknown cause.

References:

1. Beckwith JB. Discussion of terminology and definition of sudden infant death syndrome. In: Bergman AB, Beckwith JB, Ray CG, eds. *Sudden Infant Death Syndrome: Proceedings of the Second International Conference on Causes of Sudden Death in Infants*. Seattle, WA: University of Washington Press; 1970:14-22.
2. Emery JL. Is sudden infant death syndrome a diagnosis? *BMJ*. 1989;299 :1240
3. Gilbert-Barness E. Is sudden infant death syndrome a cause of death? *Am J Dis Child*. 1993;147 :25 –26
4. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol* 1991;11:677-84.
5. Centers for Disease Control and Prevention. Guidelines for death scene investigation of sudden, unexplained infant deaths: recommendations of the Interagency Panel on Sudden Infant Death Syndrome. *MMWR Morb Mortal Wkly Rep*. 1996;45(RR-10) :1 –22. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00042657.htm>
6. Hauck F. *Final Report: National Survey to Evaluate Use of the Sudden Unexplained Infant Death Investigation Report Form (SUIDIRF)*. Charlottesville, VA: University of Virginia Health System; 2001
7. Mitchell E, Krous HF, Donald T, Byard RW. Changing trends in the diagnosis of sudden infant death. *Am J Forensic Med Pathol*. 2000;21 :311 –314
8. National Center for Health Statistics. *US Public Use ICD-9/ICD-10 Comparability File* [on CD-ROM]. Hyattsville, MD: National Center for Health Statistics; 2003
9. Kattwinkel J, Brooks J, Myerberg D. American Academy of Pediatrics AAP Task Force on Infant Positioning and SIDS: Positioning and SIDS [published correction appears in *Pediatrics*. 1992;90:264]. *Pediatrics*. 1992;89 :1120 –1126
10. Malloy MH, Freeman DH. Age at death, season, and day of death as indicators of the effect of the back to sleep program on sudden infant death syndrome in the United States, 1992–1999. *Arch Pediatr Adolesc Med*. 2004;158 :359 –365
11. Willinger M, Ko CW, Hoffman HJ, Kessler RC, Corwin MJ. Factors associated with caregivers' choice of infant sleep position, 1994–1998: the National Infant Sleep Position Study. *JAMA*. 2000;283 :2135 –2142
12. Malloy MH. Trends in postneonatal aspiration deaths and reclassification of sudden infant death syndrome: impact of the “Back to Sleep” program. *Pediatrics* 2002;109:661-5.

13. Overpeck MD, Brenner RA, Cosgrove C, et al. National underascertainment of sudden unexpected infant deaths associated deaths of unknown cause. *Pediatrics* 2002;109:274-83.
14. Malloy MH, MacDorman M. Changes in the classification of sudden unexpected infant deaths: United States, 1992-2001. *Pediatrics* 2005;115:1247-53.
15. Hanzlick R. Death scene investigation. In: Byard RW, Krous HF, eds. *Sudden infant death syndrome: problems, progress and possibilities*. London, United Kingdom: Arnold, 2001:58-65.
16. Shapiro-Mendoza CK, Tomashek KM, Anderson RN, Wingo J. Recent national trends in sudden, unexpected infant deaths: more evidence supporting a change in classification or reporting. *Am J Epidemiol* 2006;163:762-9.
17. Centers for Disease Control and Prevention, National Center for Health Statistics. *Compressed Mortality File 1979-1998*. CDC WONDER On-line Database, compiled from Compressed Mortality File CMF 1968-1998, Series 20, No. 2A, 200 and CMF 1889-1998, Series 20, No. 2E, 2003. Accessed at: <http://wonder.cdc.gov/cmfi-icd9.html>
18. Centers for Disease Control and Prevention, National Center for Health Statistics. *Compressed Mortality File 1999-2004*. CDC WONDER On-line Database, compiled from Compressed Mortality File 1999-2004, Series 20, No. 2J, 2007. Accessed at: <http://wonder.cdc.gov/cmfi-icd10.html>
19. World Health Organization. *International Classification of Diseases. Ninth Revision*. Geneva, Switzerland: World Health Organization, 1979.
20. World Health Organization. *International Statistical Classification of Diseases and Related Health Problems. Tenth Revision*. Geneva, Switzerland: World Health Organization, 1992.
21. Beckwith JB. Defining the sudden infant death syndrome. *Arch Pediatr Adolesc Med*. 2003;157:286-290.
22. Kemp JS, Unger B, Wilkins D, et al. Unsafe sleep practices and an analysis of bedsharing among infants dying suddenly and unexpectedly: results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. (Electronic article). *Pediatrics* 2000;106:e41.
23. Carroll-Pankhurst C, Mortimer EA Jr. Sudden infant death syndrome, bedsharing, parental weight, and age at death. *Pediatrics* 2001;107:530-6.
24. Hauck FR, Herman SM, Donovan M, et al. Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago Infant Mortality Study. *Pediatrics* 2003;111:1207-14.

List of Tables

- Table 1:** Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana, 1990-2006
- Table 2:** Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause and percent change in rates: Indiana, 1990-1994, 1995-1998, 1999-2002, and 2003-2006
- Table 3:** Percent distribution of infant deaths due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana, 1990-1994, 1995-1998, 1999-2002, and 2003-2006
- Table 4:** Infant mortality rates in Indiana and US due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause, rate ratios in Indiana relative to US, and national rankings of Indiana: 1990-1994, 1995-1998, and 1999-2004
- Table 5:** Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause in selected counties: Indiana, 1999-2006
- Table 6:** Percent distribution of infant deaths due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause in selected counties: Indiana, 1999-2006

Appendix

- Table A-1:** Number of infant deaths for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana, 1990-2006
- Table A-2:** Number of infant deaths for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause in selected counties: Indiana, 1999-2006

Table 1. Infant mortality rates for sudden infant death syndrom (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana, 1990-2006

Cause of death (ICD-9 / ICD-10 code)	Infant mortality rate (per 100,000 live births)																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SIDS (798.0 / R95)	139.5	143.5	143.9	151.6	132.1	100.1	104.6	97.1	74.1	62.0	62.7	58.1	47.1	47.5	48.2	56.3	62.0
Other SUIDs*	--	--	--	26.3	--	--	--	26.4	27.0	42.1	39.9	33.7	44.8	52.1	44.8	41.3	32.7
Unknown cause (799.9 / R99)	--	--	--	--	--	--	--	--	--	--	--	32.5	25.9	--	--	--	--
Other SUIDs* and unknown cause combined	29.1	24.5	30.9	35.8	26.7	27.7	27.7	38.4	38.8	49.1	52.5	66.2	70.7	63.7	60.8	49.4	42.8
SIDS, other SUIDs*, and unknown cause combined	168.6	168.0	174.9	187.5	158.7	127.8	132.3	135.5	112.9	111.1	115.2	124.2	117.9	111.1	109.0	105.6	104.8

Note: ICD-9= International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death

*Other SUIDs (Sudden Unexpected Infant Deaths) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

-- Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator

Table 1. Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause by cause of death and year: Indiana, 1990-2006

Cause of death (ICD-9 / ICD-10 code)	Infant mortality rate (per 100,000 live births)																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SIDS (798.0 / R95)	139.5	143.5	143.9	151.6	132.1	100.1	104.6	97.1	74.1	62.0	62.7	58.1	47.1	47.5	48.2	56.3	62.0
Other SUIDs*																	
Accidental suffocation and strangulation (E913 / W75-W77, W81-W84)	--	--	--	--	--	--	--	--	--	38.6	33.1	24.4	31.8	41.7	37.9	36.7	31.5
Accidental suffocation and strangulation in bed (E913.0 / W75)	--	--	--	--	--	--	--	--	--	23.4	--	--	--	24.3	--	--	23.7
Other accidental suffocation and strangulation (E913.1-E913.9 / W76-W77, W81-W84)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intent unknown suffocation (E983 / Y20)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Neglect, abandonment, and other maltreatment syndromes (E967, E968.4 / Y06-Y07)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unknown cause (799.9 / R99)	--	--	--	--	--	--	--	--	--	--	--	32.5	25.9	--	--	--	--
Other SUIDs* and unknown cause combined	29.1	24.5	30.9	35.8	26.7	27.7	27.7	38.4	38.8	49.1	52.5	66.2	70.7	63.7	60.8	49.4	42.8
SIDS, other SUIDs*, and unknown cause combined	168.6	168.0	174.9	187.5	158.7	127.8	132.3	135.5	112.9	111.1	115.2	124.2	117.9	111.1	109.0	105.6	104.8

Note: ICD-9= International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death

*Other SUIDs (Sudden Unexpected Infant Deaths) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

-- Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator

Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services
Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006

Table 2. Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause, and percent change in rates: Indiana, 1990-1994, 1995-1998, 1999-2002, and 2003-2006

Cause of death (ICD-9 / ICD-10 code)	Infant mortality rates (per 100,000 live births)				% Change in rate		
	1990-1994	1995-1998	1999-2002	2003-2006	From 1990-1994 to 1995-1998	From 1995-1998 to 1999-2002	From 1999-2002 to 2003-2006
SIDS (798.0 / R95)	142.2	93.9	57.5	53.5	-34	-39	-7
Other SUIDs*	19.7	21.5	40.1	42.7	9	86	6
Accidental suffocation and strangulation (E913 / W75-W77, W81-W84)	11.6	15.5	32.0	36.9	34	106	16
Accidental suffocation and strangulation in bed (E913.0 / W75)	6.4	7.2	15.1	22.3	12	111	48
strangulation (E913.1-E913.9 / W76-W77, W81- W84)	5.2	8.4	16.9	14.6	61	101	-13
Intent unknown suffocations (E983 / Y20)	--	--	7.3	--
Neglect, abandonment, and other maltreatment syndromes (E967, E968.4 / Y06-Y07)	7.1	--	--	--
Unknown cause (799.9 / R99)	9.7	11.7	19.5	11.4	20	67	-41
Other SUIDs* and unknown cause combined	29.4	33.2	59.6	54.1	13	80	-9
SIDS, other SUIDs*, and unknown cause combined	171.5	127.0	117.1	107.6	-26	-8	-8

Note: ICD-9= International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death

*Other SUIDs (Sudden Unexpected Infant Deaths) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

-- Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator

... Not applicable

Table 3. Percent distribution of infant deaths due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana, 1990-1994, 1995-1998, 1999-2002, 2003-2006

Cause of death (ICD-9 / ICD-10 code)	Percent			
	1990-1994	1995-1998	1999-2002	2003-2006
SIDS, other SUIDs*, and unknown cause combined	100	100	100	100
SIDS (798.0 / R95)	83	74	49	50
Other SUIDs*	11	17	34	40
Accidental suffocation and strangulation (E913 / W75-W77, W81-W84)	7	12	27	34
Accidental suffocation and strangulation in bed (E913.0 / W75)	4	6	13	21
Other accidental suffocation and strangulation (E913.1-E913.9 / W76-W77, W81-W84)	3	7	14	14
Intent unknown suffocations (E983 / Y20)	1	1	6	3
Neglect, abandonment, and other maltreatment syndromes (E967, E968.4 / Y06-Y07)	4	4	1	2
Unknown cause (799.9 / R99)	6	9	17	11

Note: ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death

*Other SUIDs (Sudden Unexpected Infant Deaths) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

Table 4. Infant mortality rates in Indiana and US due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause, rate ratios in Indiana relative to US, and national rankings of Indiana: 1990-1994, 1995-1998, and 1999-2004

Cause of death (ICD-9 / ICD-10 code)	1990-1994	1995-1998	1999-2004
	Infant mortality rate (per 100,000 live births) Indiana ¹		
SIDS (798.0 / R95)	142.2	93.9	54.3
Other SUIDs*	19.7	21.5	42.9
Accidental suffocation and strangulation (E913 / W75-W77, W81-W84))	11.6	15.5	34.6
Unknown cause (799.9 / R99)	9.7	11.7	17.6
SIDS, other SUIDs*, and unknown cause combined	171.5	127.0	114.7
	Infant mortality rate (per 100,000 live births) US ²		
SIDS (798.0 / R95)	120.3	78.5	59.4
Other SUIDs*	10.7	11.4	17.4
Accidental suffocation and strangulation (E913 / W75-W77, W81-W84))	6.6	7.7	13.5
Unknown cause (799.9 / R99)	20.1	19.2	26.3
SIDS, other SUIDs*, and unknown cause combined	151.1	109.2	103.2
	Rate ratio of Indiana ¹ /US ²		
SIDS (798.0 / R95)	1.18	1.20	0.91
Other SUIDs*	1.84	1.89	2.47
Accidental suffocation and strangulation (E913 / W75-W77, W81-W84))	1.76	2.01	2.56
Unknown cause (799.9 / R99)	0.48	0.61	0.67
SIDS, other SUIDs*, and unknown cause combined	1.14	1.16	1.11
	National ranking of Indiana ^{2,3}		
SIDS (798.0 / R95)	20	22	35
Other SUIDs*	2	2	2
Accidental suffocation and strangulation (E913 / W75-W77, W81-W84))	2	3	2
Unknown cause (799.9 / R99)	28	25	26
SIDS, other SUIDs*, and unknown cause combined	22	18	20

Note: ICD-9= International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death

*Other SUIDs (Sudden Unexpected Infant Deaths) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

¹According to Indiana vital statistics; ²According to CDC WONDER (1-2); ³Among states with stable rates, 1 indicates highest rate.

Table 5. Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause in selected counties: Indiana, 1999-2006

Cause of death (ICD-10 code)	Infant mortality rates (per 100,000 live births)					
	Allen	Elkhart	Lake	Marion	St. Joseph	All counties
SIDS (R95)	104.4	88.2	--	38.3	90.8	55.5
Other SUIDs*	--	--	75.6	77.5	--	41.4
Accidental suffocation and strangulation (W75-W77, W81-W84)	--	--	73.8	56.2	--	34.5
Accidental suffocation and strangulation in bed (W75)	--	--	55.8	--	--	18.7
Other accidental suffocation and strangulation (W76-W77, W81-W84)	--	--	--	46.8	--	15.7
Intent unknown suffocations (Y20)	--	--	--	19.6	--	5.2
Neglect, abandonment, and other maltreatment syndromes (Y06-Y07)	--	--	--	--	--	--
Unknown cause (R99)	--	--	--	--	--	15.4
Other SUIDs* and unknown cause combined	--	--	82.8	85.1	--	56.8
SIDS, other SUIDs*, and unknown cause combined	128.2	149.6	90.0	123.4	146.0	112.3

Note: ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death

*Other SUID (Sudden Unexpected Infant Death) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

-- Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator

Table 6. Percent distribution of infant deaths due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause in selected counties: Indiana, 1999-2006

Cause of death (ICD-10 code)	Percent					
	Allen	Elkhart	Lake	Marion	St. Joseph	All counties
SIDS, other SUIDs*, and unknown cause combined	100	100	100	100	100	100
SIDS (R95)	81	59	8	31	62	49
Other SUIDs* and unknown cause combined	19	41	92	69	38	51
Other SUIDs*	15	13	84	63	24	37
Accidental suffocation and strangulation (W75-W77, W81-W84)	13	13	82	46	22	31
Accidental suffocation and strangulation in bed (W75)	11	13	62	8	13	17
Other accidental suffocation and strangulation (W76-W77, W81-W84)	2	0	20	38	9	14
Intent unknown suffocations (Y20)	0	0	0	16	0	5
Neglect, abandonment, and other maltreatment syndromes (Y06-Y07)	2	0	2	1	2	2
Unknown cause (R99)	4	28	8	6	13	14

Note: ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death

*Other SUID (Sudden Unexpected Infant Death) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

-- Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator

Table A-1. Number of infant deaths for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana, 1990-2006

Cause of death (ICD-9 / ICD-10 code)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Live births	85,991	85,708	84,058	83,755	82,530	82,918	83,157	83,385	85,055	85,489	87,700	86,122	84,839	86,382	87,125	87,088	88,753
SIDS (798.0 / R95)	120	123	121	127	109	83	87	81	63	53	55	50	40	41	42	49	55
Other SUIDs*	14	16	15	22	16	15	12	22	23	36	35	29	38	45	39	36	29
Accidental suffocation and strangulation (E913/W75-W77, W81-W84)	7	10	9	11	12	12	9	14	17	33	29	21	27	36	33	32	28
Accidental suffocation and strangulation in bed (E913.0 / W75)	5	6	3	4	9	6	5	8	5	20	15	7	10	21	18	18	21
Other accidental suffocation and strangulation (E913.1-E913.9 / W76- W77, W81-W84)	2	4	6	7	3	6	4	6	12	13	14	14	17	15	15	14	7
Intent unknown suffocation (E983 / Y20)	2	1	0	1	0	1	0	3	1	1	6	8	10	7	4	0	0
Neglect, abandonment, and other maltreatment syndromes (E967, E968.4 / Y06-Y07)	5	5	6	10	4	2	3	5	5	2	0	0	1	2	2	4	1
Unknown cause (799.9 / R99)	11	5	11	8	6	8	11	10	10	6	11	28	22	10	14	7	9
Other SUIDs* and unknown cause combined	25	21	26	30	22	23	23	32	33	42	46	57	60	55	53	43	38
SIDS, other SUIDs*, and unknown cause combined	145	144	147	157	131	106	110	113	96	95	101	107	100	96	95	92	93

Note: ICD-9= International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Death.

*SUID (Sudden Unexpected Infant Death) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

Table A-2. Number of infant deaths for sudden infant death syndroms, other sudden unexpected infant deaths (SUIDs), and unknown cause in selected counties: Indiana, 1999-2006

Cause of death (ICD-10 code)	Allen	Elkhart	Lake	Marion	St. Joseph	All counties
Live births	42,136	26,063	55,580	117,464	30,830	693,498
SIDS (R95)	44	23	4	45	28	385
Other SUIDs*	8	5	42	91	11	287
Accidental suffocation and strangulation (W75-W77, W81-W84)	7	5	41	66	10	239
Accidental suffocation and strangulation in bed (W75)	6	5	31	11	6	130
Other accidental suffocation and strangulation (W76-W77, W81-W84)	1	0	10	55	4	109
Intent unknown suffocations (Y20)	0	0	0	23	0	36
Neglect, abandonment, and other maltreatment syndromes (Y06-Y07)	1	0	1	2	1	12
Unknown cause (R99)	2	11	4	9	6	107
Other SUIDs* and unknown cause combined	10	16	46	100	17	394
SIDS, other SUIDs*, and unknown cause combined	54	39	50	145	45	779

Note:ICD-10= International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; SIDS= Sudden Infant Death Syndrome; SUID= Sudden Unexpected Infant Deaths

*Other SUID (Sudden Unexpected Infant Death) includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

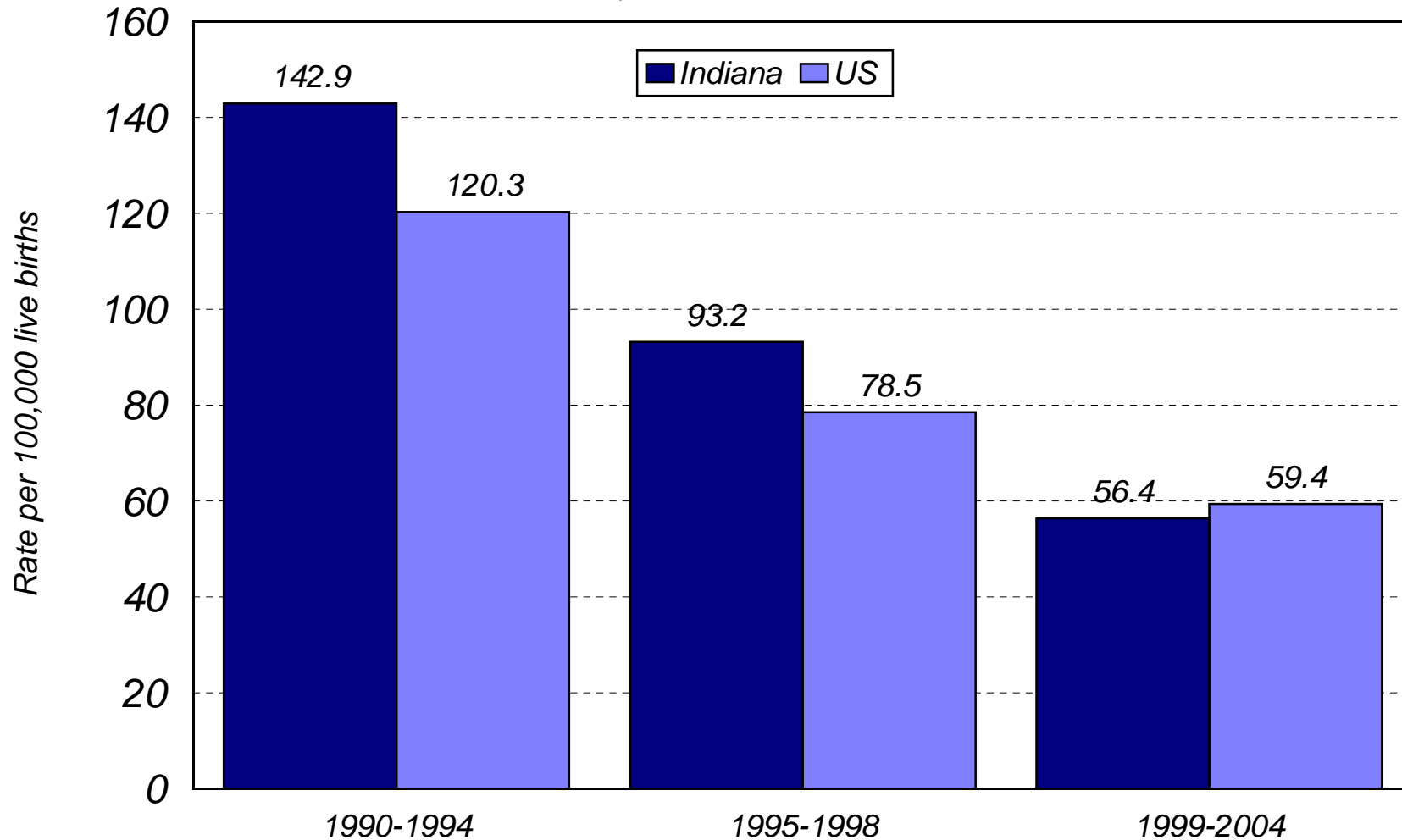
List of Figures

- Figure A:** Infant mortality rates for Sudden Infant Death Syndrome (SIDS) in Indiana compared to US: 1990-1994, 1995-1998, and 1999-2004
- Figure B:** Infant mortality rates for accidental suffocation in Indiana compared to US: 1990-1994, 1995-1998, and 1999-2004
- Figure 1:** Trends in overall infant mortality rates for sudden infant death syndrome (SIDS) and other sudden unexpected infant deaths (SUIDs) and unknown cause combined: Indiana 1990-2006
- Figure 2:** Infant mortality rates for sudden infant death syndrome (SIDS) and for other sudden unexpected infant deaths (SUIDs) and unknown cause combined: Indiana 1990-2006
- Figure 3:** Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana 1990-1994, 1995-1998, 1999-2002, 2003-2006
- Figure 4:** Infant mortality rates for SUIDs: Indiana, 1990-1994, 1995-1998, 1999-2002, 2003-2006
- Figure 5:** Percent distribution of infant deaths due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause: Indiana 1990-1994, 1995-1998, 1999-2002, 2003-2006
- Figure 6:** Infant mortality rates for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause, Indiana compared to US: 1990-1994, 1995-1998, and 1999-2004
- Figure 7:** Rate ratios of infant mortality in Indiana relative to US for sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), unknown cause, and all combined: 1990-1994, 1995-1998, and 1999-2004
- Figure 8:** Percent distribution of infant deaths due to sudden infant death syndrome (SIDS), other sudden unexpected infant deaths (SUIDs), and unknown cause, selected counties: Indiana 1999-2006

Figure A

Infant Mortality Rates for Sudden Infant Death Syndrome (SIDS) In Indiana Compared to U.S.

1990-1994, 1995-1998 and 1999-2004

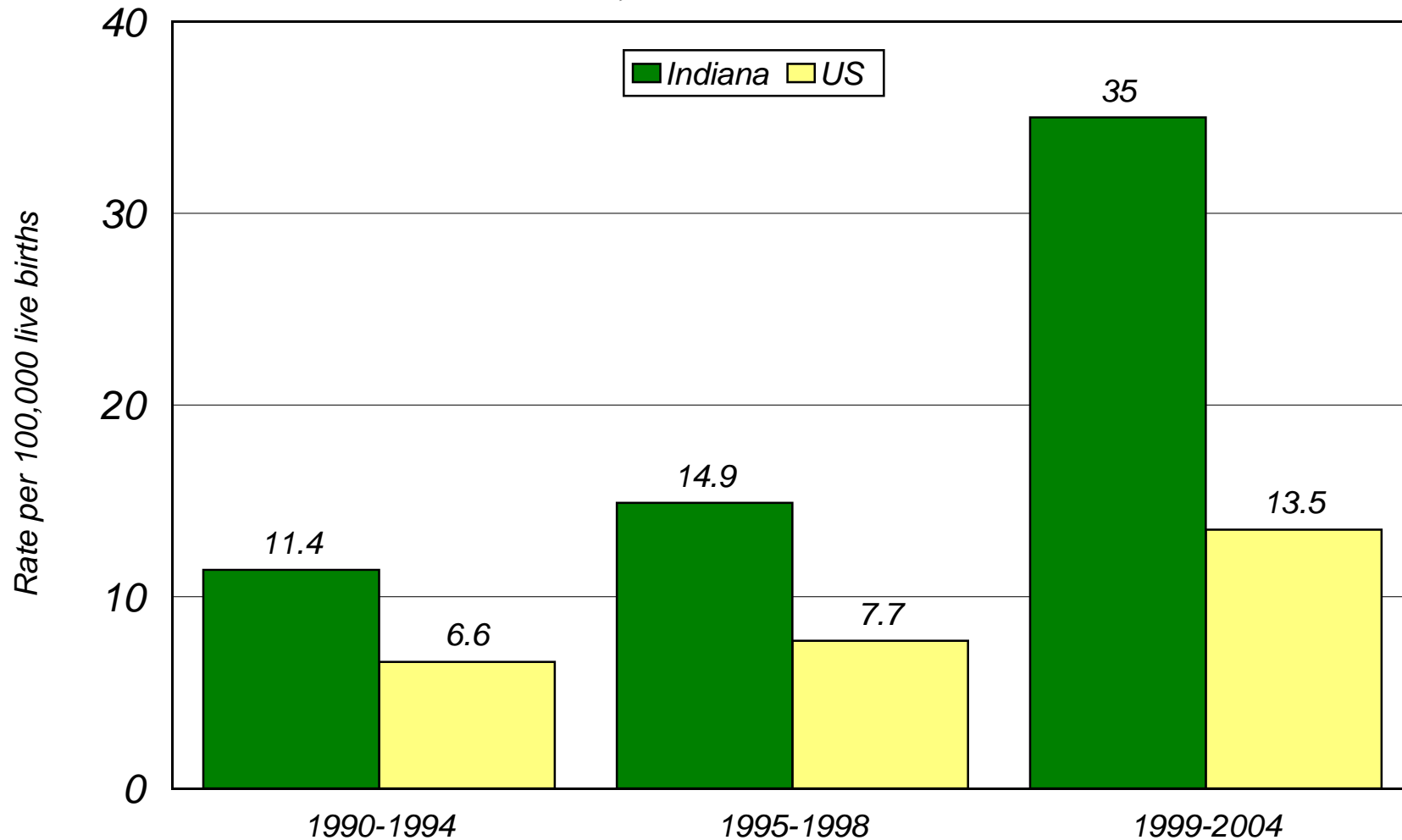


Note: Infant mortality rates due to SIDS according to CDC Wonder On-line Database (ICD-9 code 798.0 for 1990-1998, <http://wonder.cdc.gov/cmfi-cd9.html>; ICD-10 code R95 for 1999-2004, <http://wonder.cdc.gov/cmfi-cd10.html>)
Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services
Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006

Figure B

Infant Mortality Rates for Accidental Suffocation In Indiana Compared to U.S.

1990-1994, 1995-1998 and 1999-2004



Note: Infant mortality rates due to accidental suffocation according to CDC Wonder On-line Database.

(ICD-9 code E913 for 1990-1998, <http://wonder.cdc.gov/cmfi-cd9.html>; ICD-10 code W75-W77, W81-W84 for 1999-2004, <http://wonder.cdc.gov/cmfi-cd10.html>)

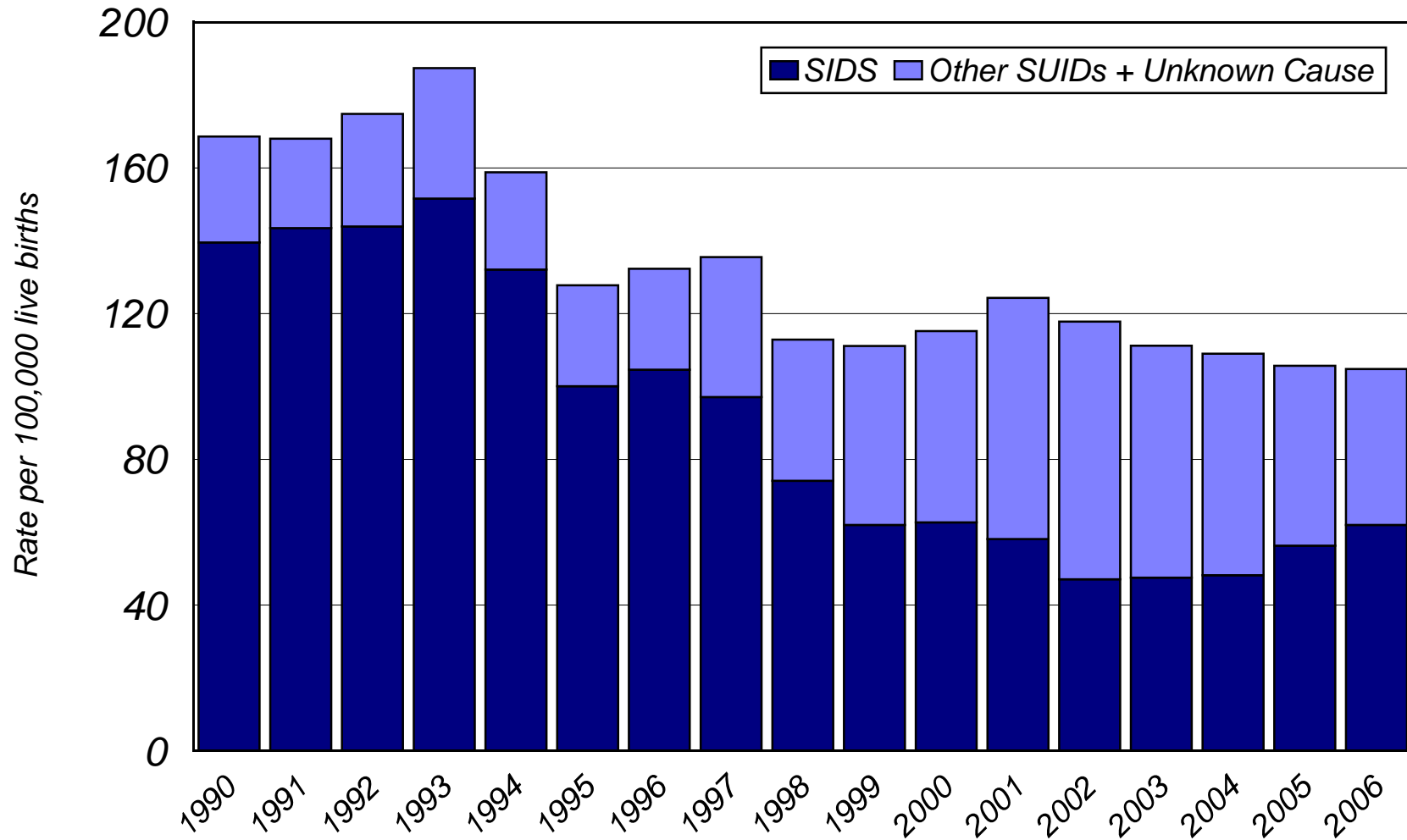
Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006

Figure 1

Trends in Infant Mortality Rates for Sudden Infant Death Syndrome (SIDS) and Combined Other Sudden Unexpected Infant Deaths (SUIDs) and Unknown Cause

Indiana: 1990-2006



Note: Other SUIDs includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

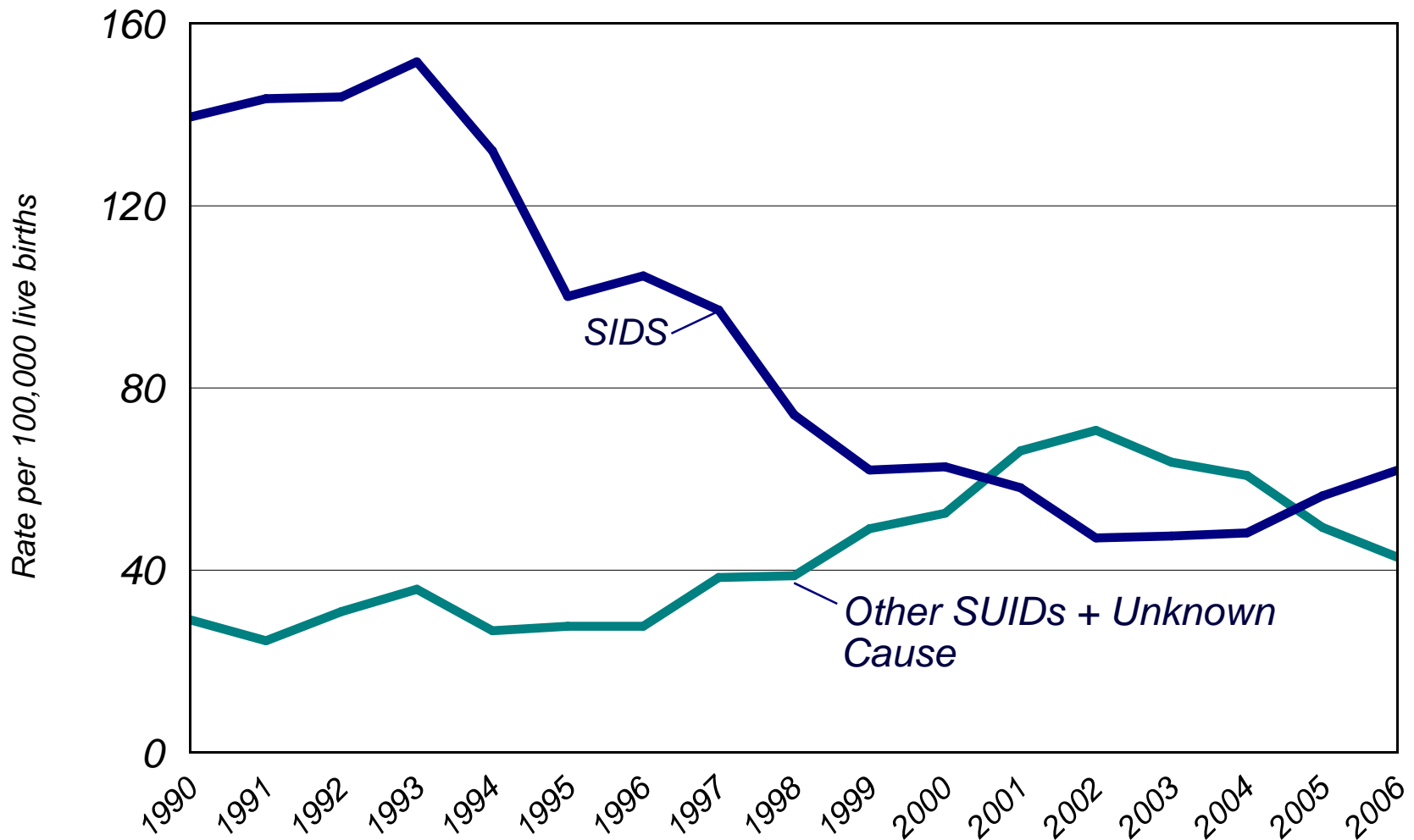
Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, [Table 1](#)

Figure 2

Infant Mortality Rates for Sudden Infant Death Syndrome (SIDS) and Combined Other Sudden Unexpected Infant Deaths (SUIDs) and Unknown Cause

Indiana: 1990-2006



Note: Other SUIDs includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

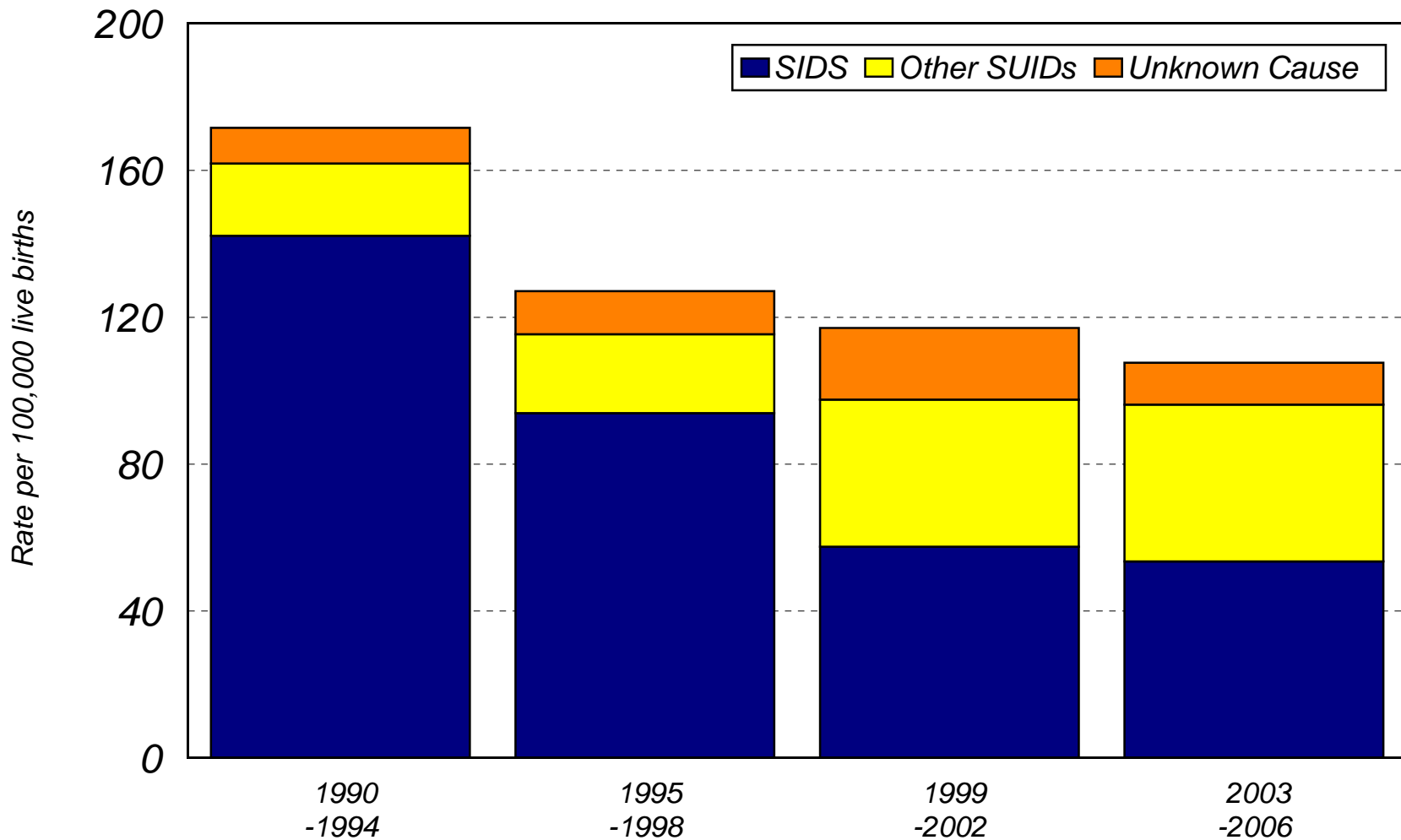
Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, [Table 1](#)

Figure 3

Infant Mortality Rates for Sudden Infant Death Syndrome (SIDS), Other Sudden Unexpected Infant Deaths (SUIDs), and Unknown Cause

Combined-year Averages, Indiana: 1990-1994, 1995-1998, 1999-2002, 2003-2006



Note: Other SUIDs includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

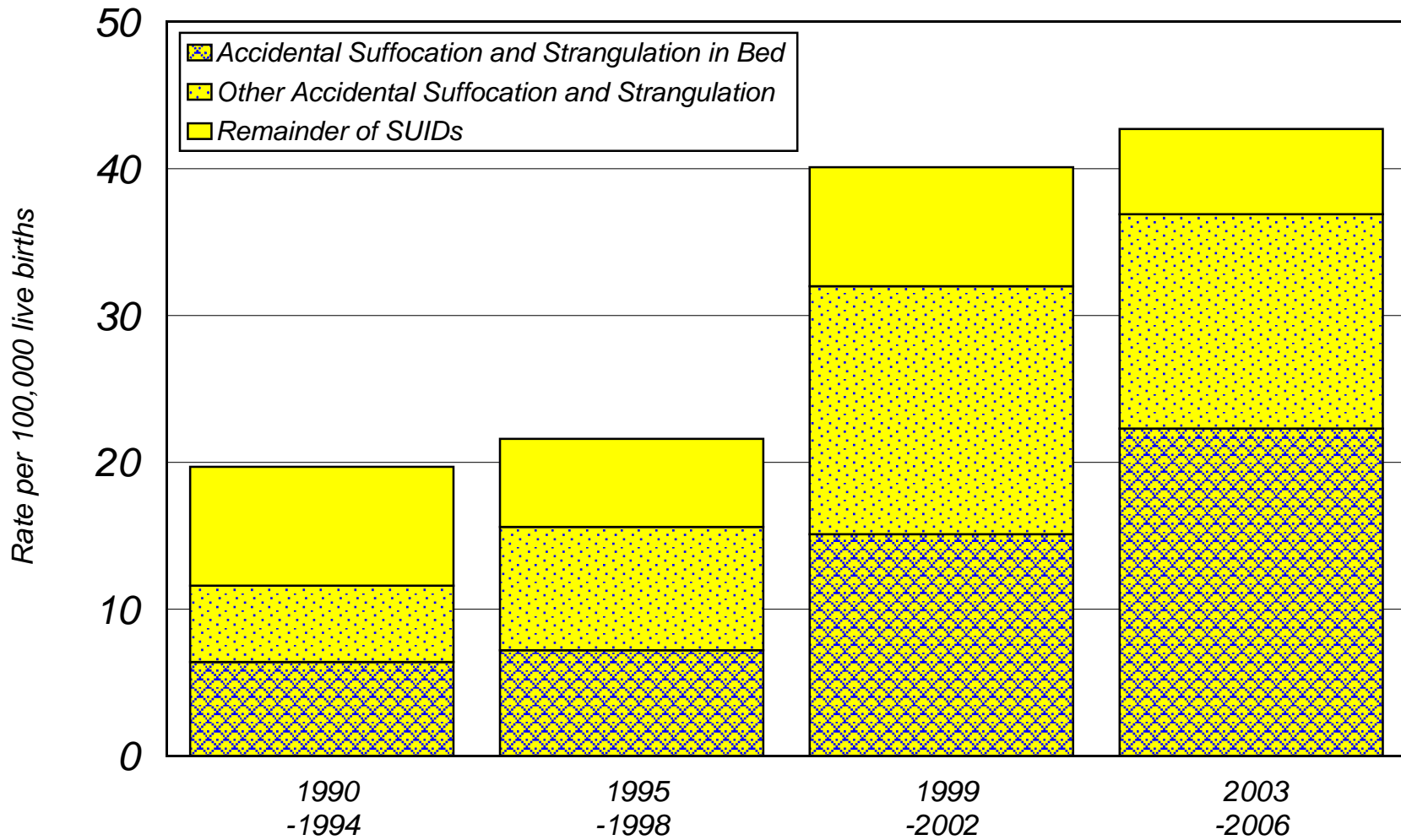
Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, [Table 2](#)

Figure 4

Infant Mortality Rates for Other SUIDs

Combined-year Averages, Indiana: 1990-2006



Note: Other SUIDs includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

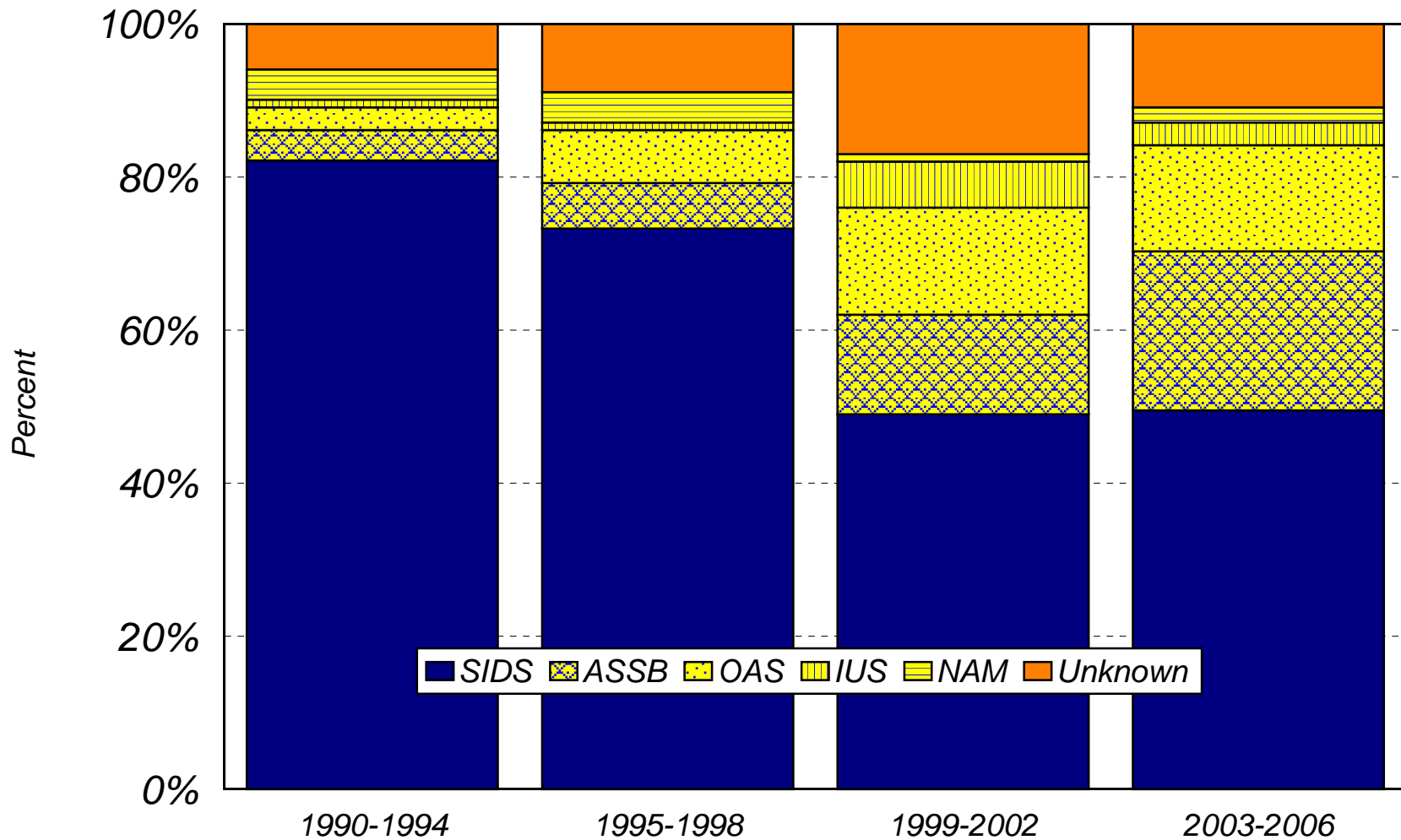
Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, [Table 2](#)

Figure 5

Percent Distribution of Infant Deaths Due to Sudden Infant Death Syndrome (SIDS), Other Sudden Unexpected Infant Deaths (SUIDs), and Unknown Cause

Indiana: 1990-1994, 1995-1998, 1999-2002, 2003-2006



Note: Other SUIDs includes accidental suffocation and strangulation in bed (ASSB); other accidental suffocation and strangulation (OAS); intent unknown suffocation (IUS); and neglect, abandonment, and other maltreatment syndromes (NAM).

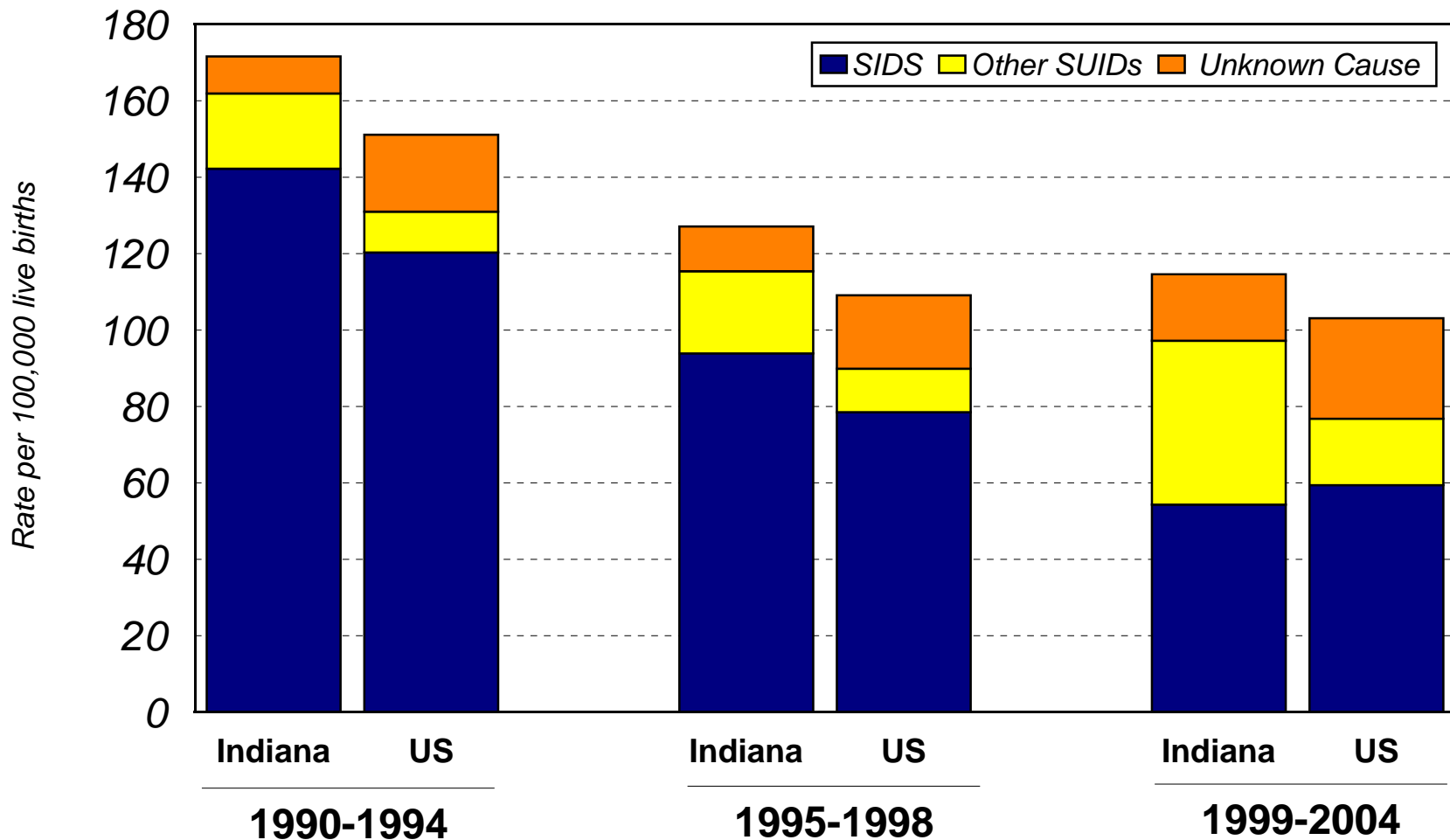
Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, [Table 3](#)

Figure 6

Infant Mortality Rates for Sudden Infant Death Syndrome (SIDS), Other Sudden Unexpected Infant Deaths (SUIDs), and Unknown Cause

Indiana Compared to US: 1990-1994, 1995-1998 and 1999-2004



Note: Other SUIDs includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

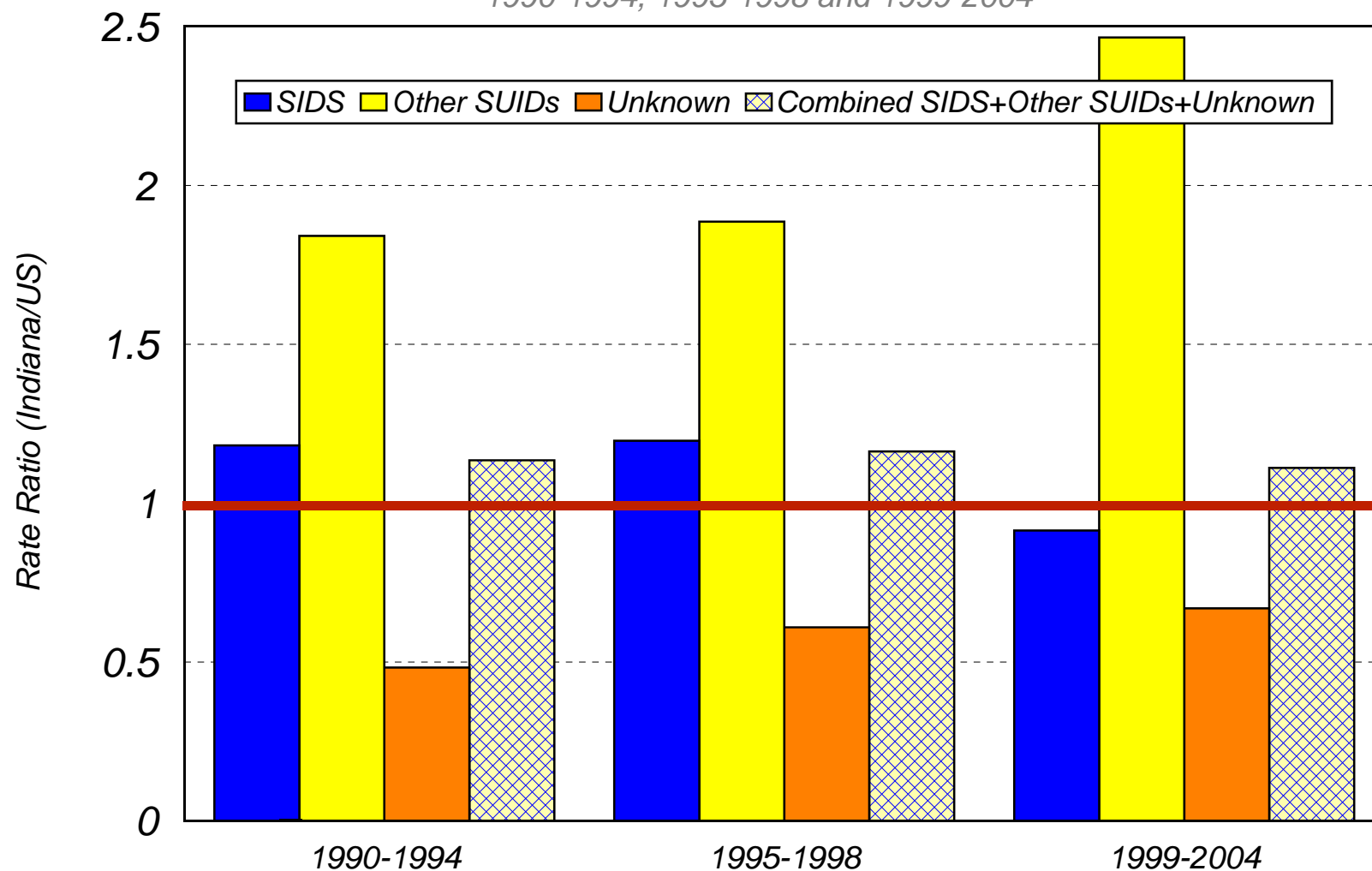
Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, Table 4

US data derived from CDC WONDER On-line data base, accessed at <http://wonder.cdc.gov/cmfi-icd-9.html> and <http://wonder.cdc.gov/cmfi-icd-10.html>

Figure 7

Rate Ratios of Infant Mortality in Indiana Relative to US for Sudden Infant Death Syndrome (SIDS), Other Sudden Unexpected Infant Deaths (SUIDs), Unknown Cause, and All Combined

1990-1994, 1995-1998 and 1999-2004



Note: Other SUIDs includes accidental suffocation and strangulation in bed; other accidental suffocation and strangulation; intent unknown suffocation; and neglect, abandonment, and other maltreatment syndromes.

Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

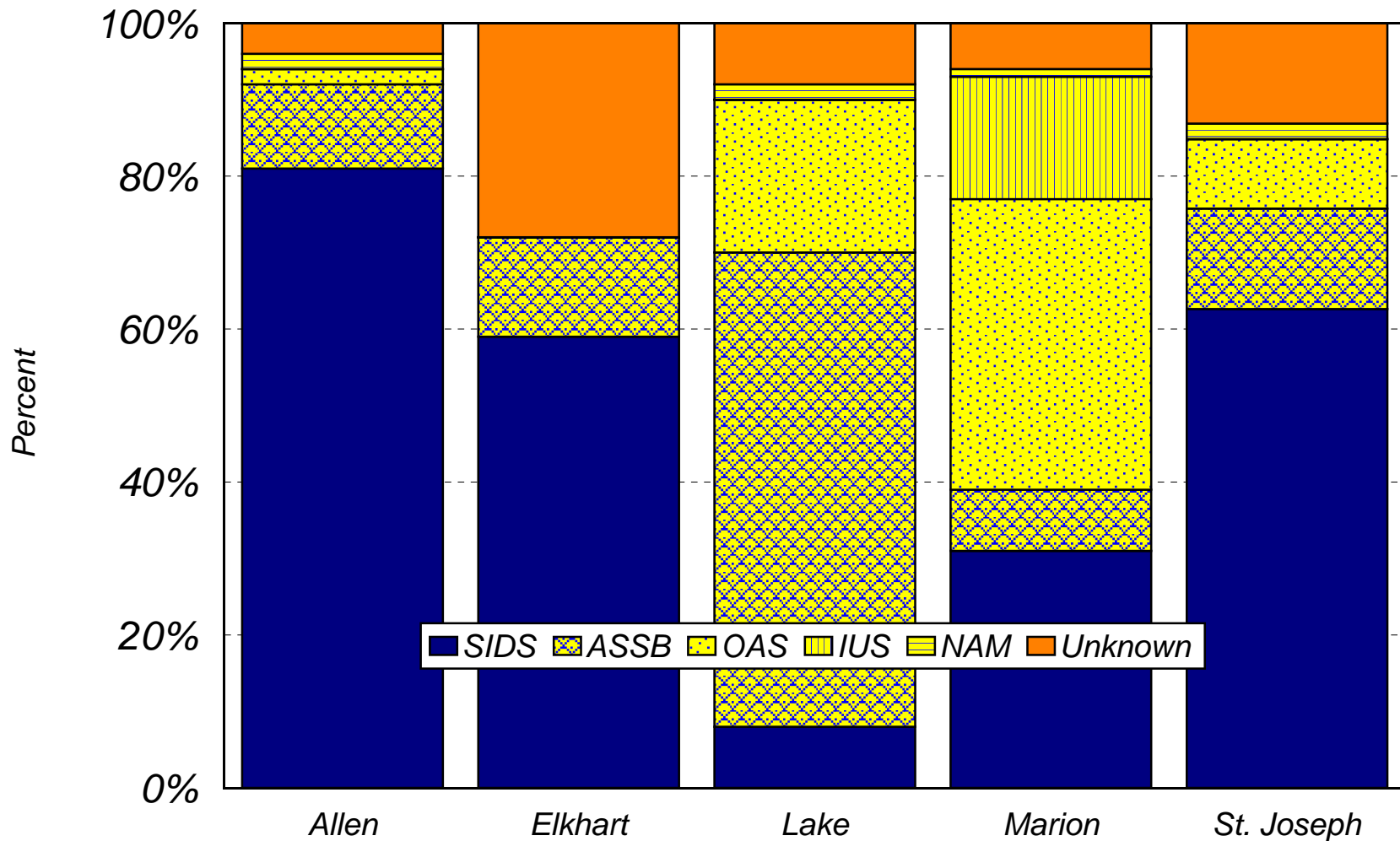
Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, Table 4

US data derived from CDC WONDER On-line data base, accessed at <http://wonder.cdc.gov/cmfi-icd-9.html> and <http://wonder.cdc.gov/cmfi-icd-10.html>

Figure 8

Percent Distribution of Infant Deaths Due to Sudden Infant Death Syndrome (SIDS), Other Sudden Unexpected Infant Deaths (SUIDs), and Unknown Cause

Selected Counties, Indiana: 1999-2006



Note: Other SUIDs includes accidental suffocation and strangulation in bed (ASSB); other accidental suffocation and strangulation (OAS); intent unknown suffocation (IUS); and neglect, abandonment, and other maltreatment syndromes (NAM).

Source: Indiana State Department of Health, Maternal and Children's Special Health Care Services

Report: Trends in Sudden Unexpected Infant Deaths in Indiana: 1990-2006, [Table 6](#)