
Nebraska Child Death Review Report For 2004

The fifth report of the
Nebraska Child Death Review Team
October, 2007

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The Honorable Dave Heineman
Governor, State of Nebraska

Honorable Members of the Nebraska State Legislature

I am pleased to submit this fifth report on deaths to Nebraska resident infants and children, in accordance with Nebraska Revised Statute §71-3404. The report presents the Child Death Review Team's findings on the 302 deaths that occurred during 2004, spotlights trends and includes recommendations on reducing future deaths.

Our ongoing reviews have found many ways that we can save lives and help children grow up in safer and healthier environments. Yet, the data reveal a lack of significant improvement in recent years in several cause of death categories, and a few where deaths have actually increased, including from birth defects and injuries. Although there is no one single cause of these trends, it is clear that too many children continue to die from preventable causes - from automobile crashes, from violence, abuse and neglect, and from taking their own lives. The disproportionate number of deaths among the state's racial and ethnic groups also tells us that neither the problems nor the solutions are single-faceted. The report thus includes broad-reaching recommendations from the state and the nation's leading prevention and safety advocates.

While a state review process can identify systemic problems and policy issues, it cannot substitute for local action in individual communities. We thus hope that the information in this report is used by families and local communities as well as state level policy makers to strengthen their prevention and intervention efforts on behalf of children and families.

Please note that the views and recommendations of this report are those of the Child Death Review Team, and are not necessarily those of the Department of Health and Human Services.

If I can be of any further assistance, please do not hesitate to contact me. We thank you for your help in protecting the welfare of the children and families of Nebraska.

Sincerely,



Joann Schaefer, M.D., Chief Medical Officer
Director, Division of Public Health
Department of Health and Human Services

The Child Death Review Team would like to thank the County Attorneys and their staff, hospital Medical Records Departments, Tribal Authorities, State agencies, HHSS staff, family members and other individuals who graciously provided the information that made this report possible.

This report was designed to provide useful information for evaluation, planning and prevention purposes. Any questions or comments regarding the report or the Nebraska Child Death Review Team should be directed to:

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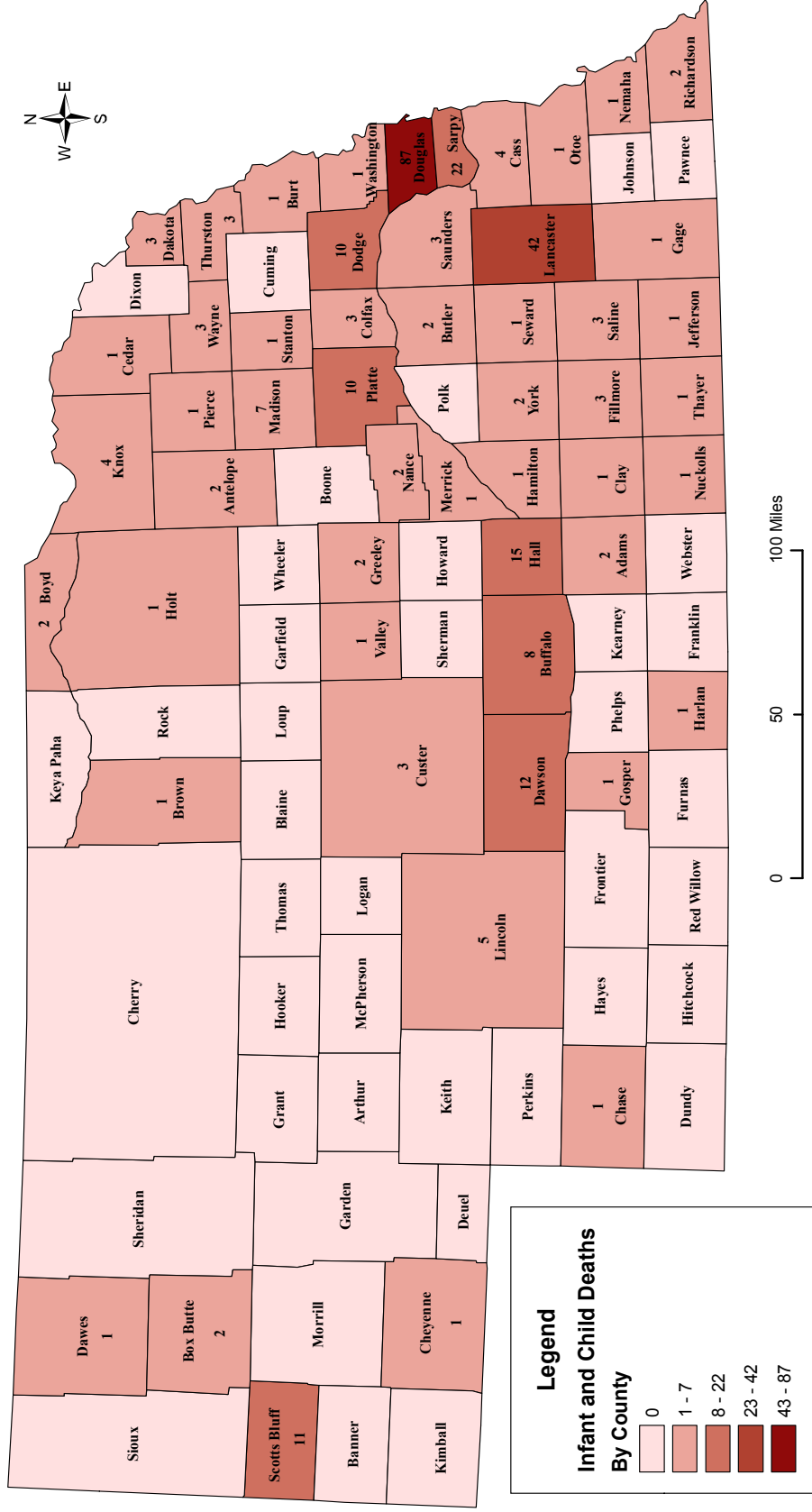
This report is also available at www.hhss.ne.gov/srd/srdindex.htm and
<http://www.dhhs.ne.gov/hew/fah/CDRteam/reports.htm>.

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Infant and Child Deaths (0-17) By County of Residence (N=302) Nebraska 2004



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Executive Summary

The Nebraska Child Death Review Team (CDRT) was established by the Nebraska Legislature in 1993 and charged with undertaking an ongoing, comprehensive review of existing information regarding child deaths in Nebraska. This report presents the CDRT's findings and recommendations based on review and analysis of deaths of the 302 Nebraska resident children (newborns through 17 years of age) who died during 2004.

The overall death rate of children in Nebraska was 16% lower in 2004 than in 1993 when child death reviews began, declining from 361 deaths (82.6 /100,000 children 0-17) to 302 deaths (69.5/100,000). Overall death rates for African-American, Native American and Hispanic children were higher than for White and Asian children, a pattern observed during previous review periods. The specific causes of death that lead to these overall mortality disparities are under investigation.

Top Five Causes of Death for Children in Nebraska, 2004, and Key Recommendations for Future Prevention

1. Pregnancy-Related – 87 deaths

Pregnancy-related factors such as prematurity, maternal complications, and events of labor and delivery were the underlying cause of 29% of all infant and child deaths during 2004. Of these, prematurity accounted for 51% and maternal complications for 42%. Among infant deaths attributed to prematurity, 55% were to multiple gestation infants who are known to have both higher prematurity and mortality rates. One infant died from a perinatally-transmitted HIV infection. Preconception care - interventions begun before the start of pregnancy, may represent the best opportunity to reduce perinatal risk factors and improve pregnancy outcomes.

Preconception care should be considered a vital and routine aspect of care for all reproductive age women.

All personnel who are involved in the care of pregnant women, fetuses and newborns should use the current AAP Guidelines for Perinatal Care.

The Centers for Disease Control and Prevention recommends that all pregnant women have access to HIV counseling and testing and, when indicated, antiretroviral (ARV) medications during labor to prevent HIV transmission to their babies.

2. Birth Defects – 74 deaths

Heart defects (19.2%) and chromosomal anomalies (17.8%) were the largest categories of lethal birth defects. Six infants and two older children died from neural tube defects. The causes of most birth defects, including chromosomal anomalies, are unknown. However, women who do not take multi-vitamins, who use alcohol, tobacco or other drugs, who are overweight or who have diabetes are at higher risk of having a child with birth defects.

Women of childbearing age, whether or not they plan on becoming pregnant, should consume a daily multi-vitamin containing 400 micrograms of folic acid, the best way to prevent neural tube defects.

3. Motor Vehicle-Related Incidents – 40 deaths

Most (80.0%) of motor vehicle-related deaths occurred to children killed while driving or riding in a motor vehicle; an additional five children (12.8%) were killed in all terrain-type vehicles (ATV) and motorcycle crashes. While the total number of children killed in motor vehicle-related incidents has declined over time, under-use of age-appropriate restraints (safety belt or child safety seat) continues to be a leading factor. Statewide, alcohol was involved in one out of four crashes where a child died.

Parents should limit the number of teenage passengers a teen driver may carry.

Children under 16 should not ride or drive adult size all terrain-type vehicles (ATV) under any circumstances.

4. Unintentional Injuries – 22 deaths

The majority of unintentional injury deaths were from drowning (27.3%), residential fire (18.2%), and accidental suffocation or hanging (13.6%). One teen was killed while playing with a firearm.

Young children should never be unsupervised in or near water, even shallow wading pools.

Parents who keep firearms in the home must understand the importance of storing unloaded firearms and ammunition in separate, locked and inaccessible locations.

5. Cancer / Malignant Neoplasms - 19 deaths

After years of slight declines, the overall childhood cancer mortality rate in Nebraska rose significantly in 2004, largely due to an increase in brain tumor-related deaths. Although a relatively small number, these 13 brain cancer cases represented a rate of 2.99 deaths per 100,000 children, a significant increase from the 1994-2003 average rate of 0.96 deaths per 100,000 children. There were no significant differences in mortality rates by child's race, ethnicity or sex. It is difficult to predict whether the

increases seen in 2004, which are spread out around the state, represent the beginning of a sustained increase or a one-time phenomenon. The Nebraska Cancer Registry, the Comprehensive Cancer Control Program and the CDRT will continue to monitor childhood cancer occurrence and risk factors.

Providers should stay up to date on findings regarding risk factors for, causes of and treatments for childhood cancers. Children diagnosed with cancer should be enrolled in clinical trials in order to receive access to the newest experimental treatments.

B Background

Review of 2004 Nebraska Child Deaths

The Legislature finds and declares that it is in the best interests of the state, its citizens and especially the children of this state that the number and causes of death of children in this state be examined. There is a need for a comprehensive integrated review of all child deaths in Nebraska and a system for statewide retrospective review of existing records relating to each child death.
Neb. Rev. Stat. §71-3404

This report presents the findings and recommendations of the Nebraska Child Death Review Team, based on the review and tabulation of the 302 deaths of Nebraska resident children (newborns through age 17) known to have occurred during 2004. The traditional belief that “things will happen” ignores the reality that many of these deaths could have been prevented.

BACKGROUND

The Nebraska Child Death Review Team (CDRT) was established by the Nebraska Legislature in 1993 and charged with undertaking a comprehensive, integrated review of existing records and other information regarding each child death. At that time, the Nebraska Commission for the Protection of Children had found that about 300 children died each year in the state, but that there was no systematic process in place for consistent review of those deaths to determine contributing circumstances.

The purpose of the CDRT includes developing an understanding of the number and causes of child deaths, and advising the Governor, Legislature, other policy makers and the public on changes that might prevent them in the future. All child deaths are reviewed, not just “suspicious” or violent ones. The Team uses information in written records and the expertise of its members to identify situations where, in retrospect, reasonable intervention might have prevented a death. Members of the original Team determined that the specific goals of these reviews would be to:

- Identify patterns of preventable child deaths;
- Recommend changes in system responses to child deaths;
- Refer to law enforcement newly-suspected cases of abuse, malpractice, or homicide; and,
- Compile findings into reports designed to educate the public and state policy makers about child deaths.

Four previous reports have been issued, covering child deaths in 1993, 1994-1995, 1996-2001 and 2002-2003.

M ethodology

In making its assessments, the Team obtains information from multiple sources, including:

- The Vital Records section of the Nebraska Health and Human Services System (HHSS), which provides death certificates for all Nebraska resident children under the age of 18, and matched birth certificates for those under the age of one year;
- County Attorneys, who are contacted annually for information on all deaths to children who resided in their respective counties;
- Hospitals, which are contacted annually for information on all deaths to children that occurred in those facilities;
- The HHSS Office of Protection and Safety and the Child Care Licensing section;
- Additional sources as needed, e.g., private providers, public officials in counties or states where a death occurred but where the child was not a resident.

The annual State of Nebraska Vital Statistics Reports provide categorized cause of death information for infants and older children. However, the CDRT review determines underlying causes that do not always correspond to those assigned by Vital Statistics, as the Team tends to reach further back in the chain of events that led to the death to assign an underlying cause. As the goal of the CDRT is prevention of future deaths, this process was felt to better distinguish between preventable and non-preventable deaths.

The Team also uses HHSS electronic databases, including children's birth and death certificates. Numbers and names of Sudden Infant Death Syndrome (SIDS), suicide, homicide and criminal child abuse cases were compared to ensure that all children known to the state were listed appropriately in the CDRT files. Similarly, the state's Cancer Registry is used to cross-check cancer deaths. The Nebraska Crash Outcome Data Evaluation System (CODES) database provides aggregate data on passenger restraint (e.g., seatbelt) use and the involvement of alcohol in automobile crashes. CODES data were not individually matched to CDRT cases but do provide an aggregate assessment of the same children and incidents. Finally, in a small number of cases, the only information available was obtained from archived newspaper reports.

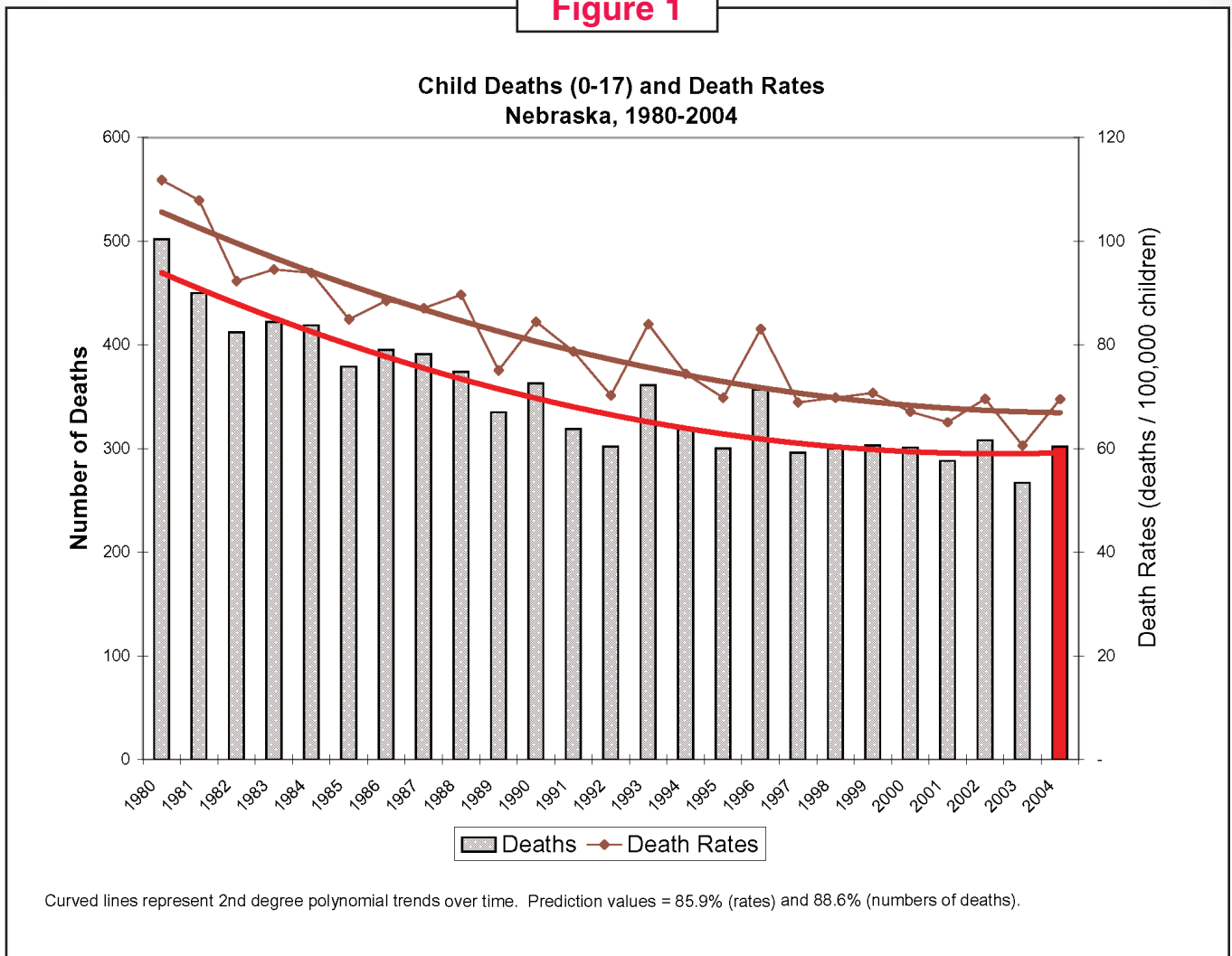
Using this information, the CDRT Coordinator reviewed all cases and classified them into one of 16 categories based on the "underlying" cause and circumstances of death.¹ Because information was incomplete for some children, some misclassification may have occurred. Team members discussed cases where the classification was not immediately obvious or was controversial. Most cases were not individually assessed for preventability; however, all unintentional injuries ("accidents") to young children, child abuse cases and suicides were reviewed by at least two Team members to determine whether caretaker neglect may have been involved.

¹ The underlying cause of death is the disease or condition that initiated the chain of morbid events leading directly to death, and may be many years removed from the actual occurrence of death. See Glossary for further discussion.

Findings

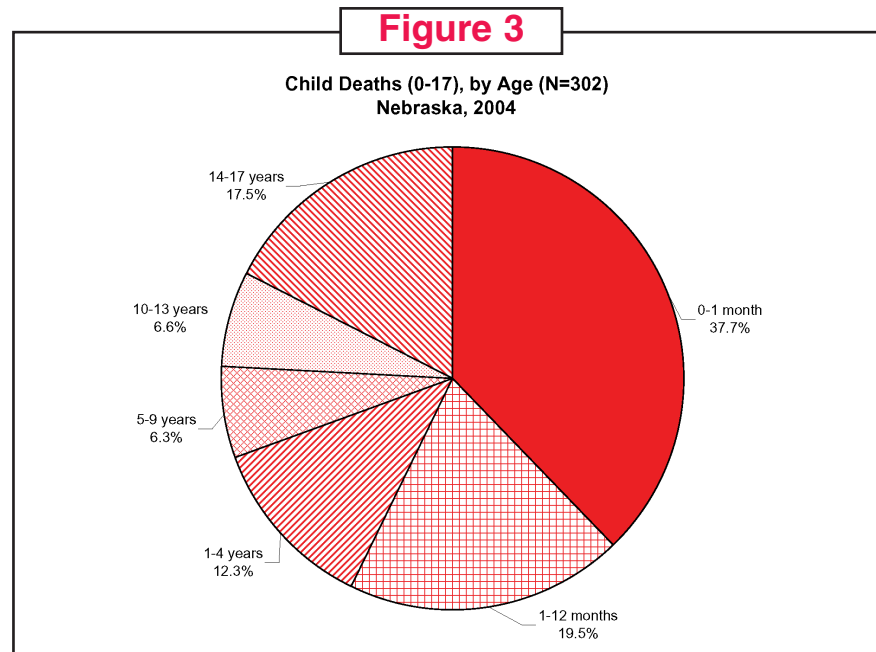
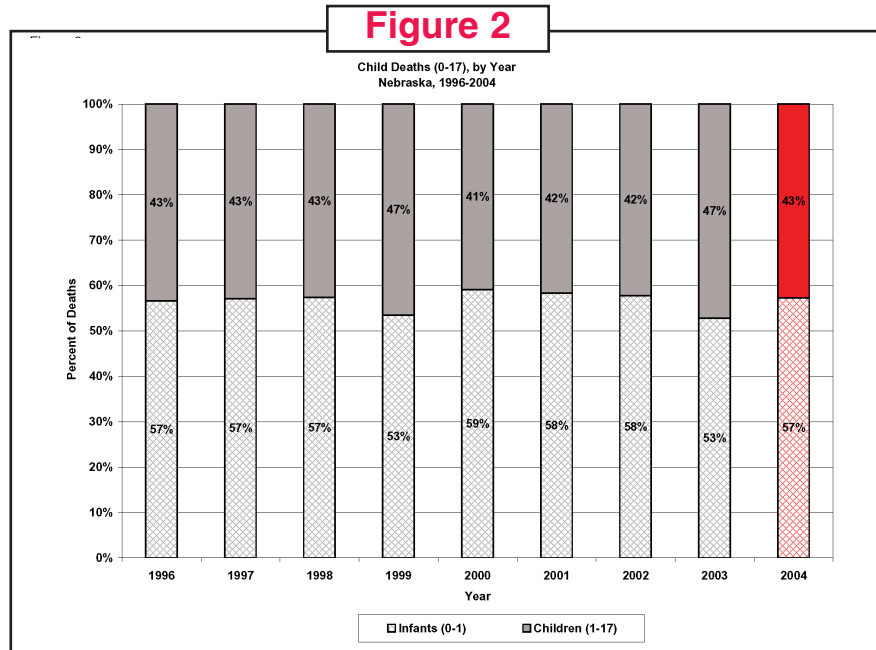
A total of 302 Nebraska children ages 0 to 17 died during 2004 (Table 1). This represents a 16% decrease in the number of deaths (from 361 deaths) and in the death rate (from 82.6 deaths per 100,000 children 0-17 to 69.5 deaths per 100,000) since child death reviews began in 1993. However, the year-to-year change has been inconsistent (Figure 1).

Figure 1



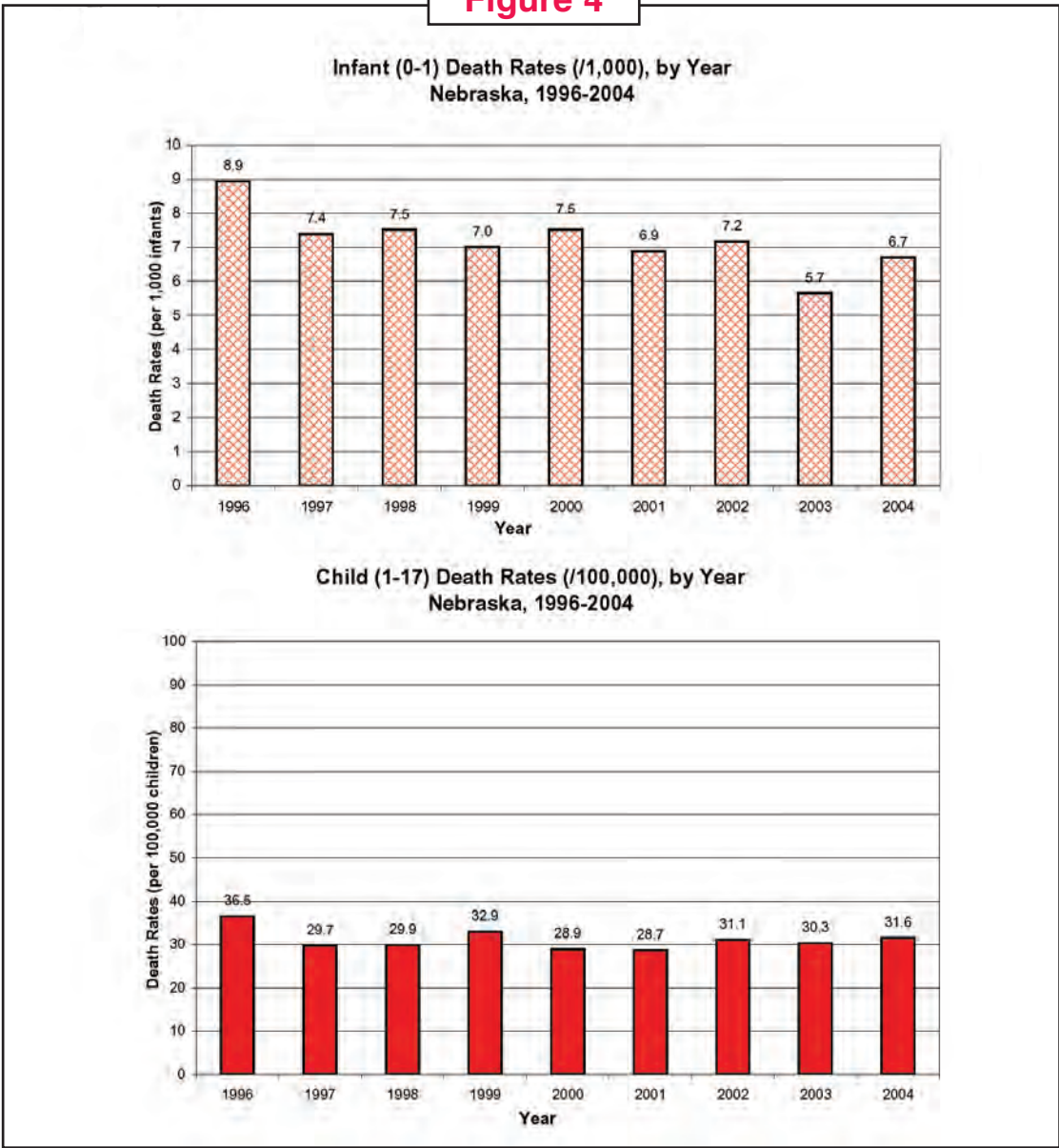
Demographics

Infants less than 12 months old accounted for approximately 57% of all deaths, consistent with previous years (Figure 2). Of these, about two-thirds died in their first month (Figure 3). Overall, the infant death rate increased 17.5% from the low value observed in 2003, while the child death rate remained steady (Figure 4).



The children were predominantly male (54.3%) and White (81.8%) (Figure 5). African-American children made up 13.6% of deaths, Native American 2.0%, Asian 2.0% and Hispanic² children 14.6%. When calculated as rates of death per 100,000 children, African-American and to a lesser extent Hispanic children had significantly higher death rates than did White children (Figure 6). Native American and Asian death rates were also higher than those of White children. However, these rates are based on very small numbers of deaths and the differences are not statistically significant. All groups showed evidence of declining mortality over time except for Asians, where an increase from one to six deaths between 2003 and 2004 affected what had been a generally declining trend (Figure 7). There was no single cause of death category that accounted for this increase.

Figure 4



² Persons of Hispanic origin may be of any race, thus race and ethnicity percentages sum to greater than 100 percent.

Figure 5

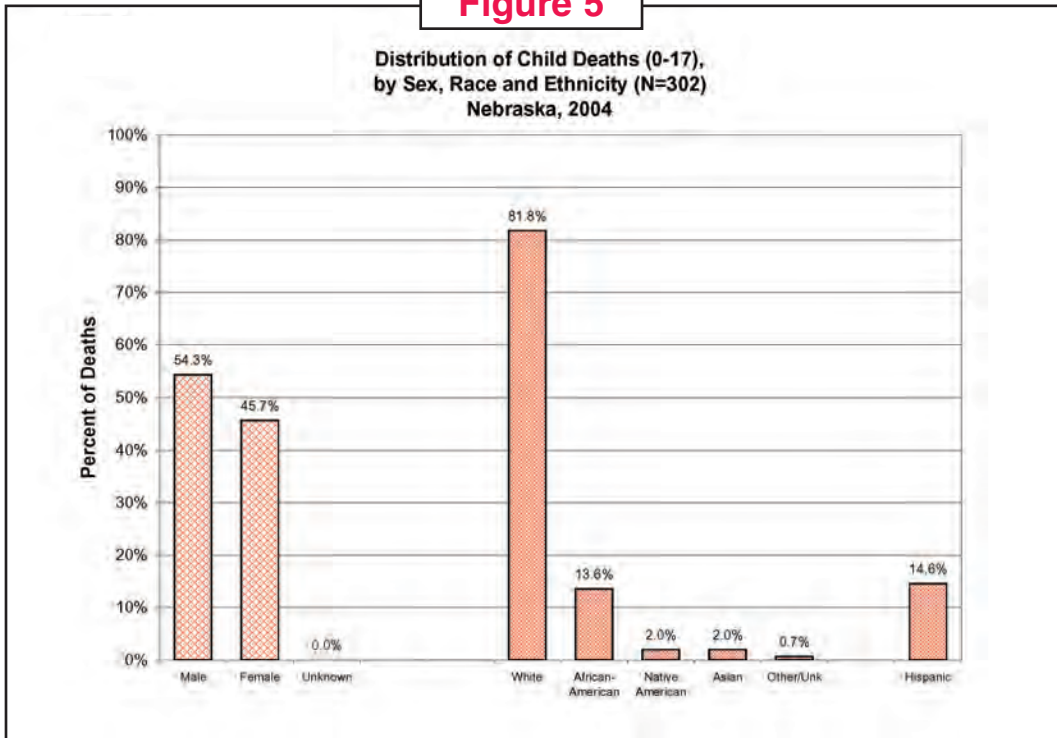


Figure 6

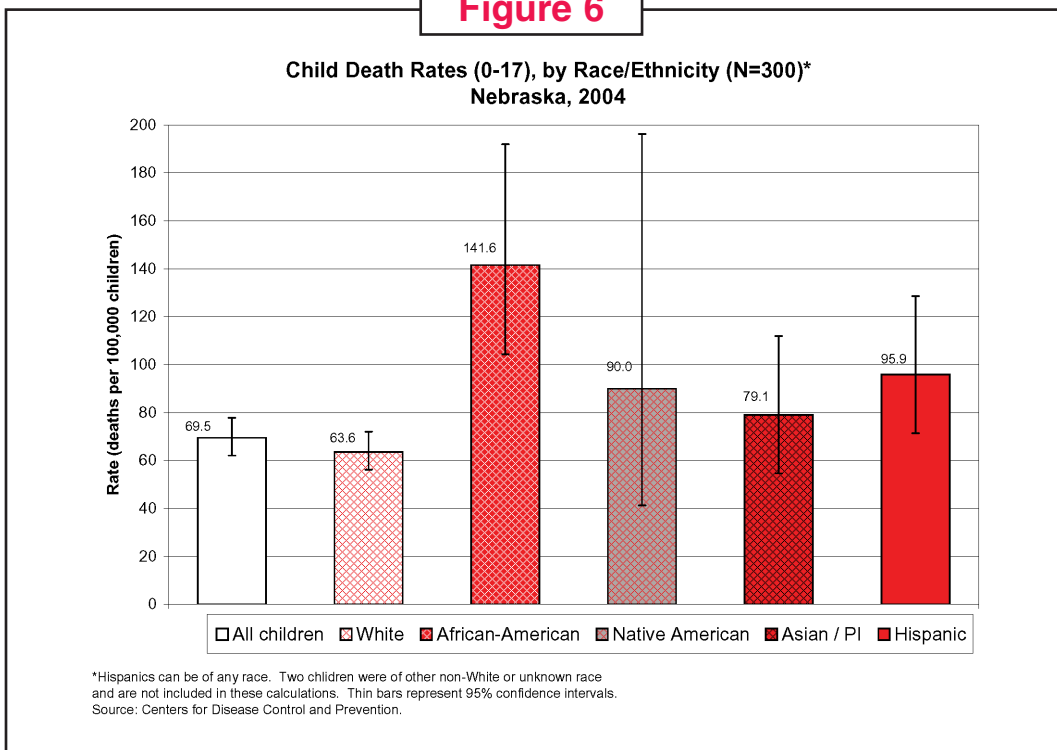
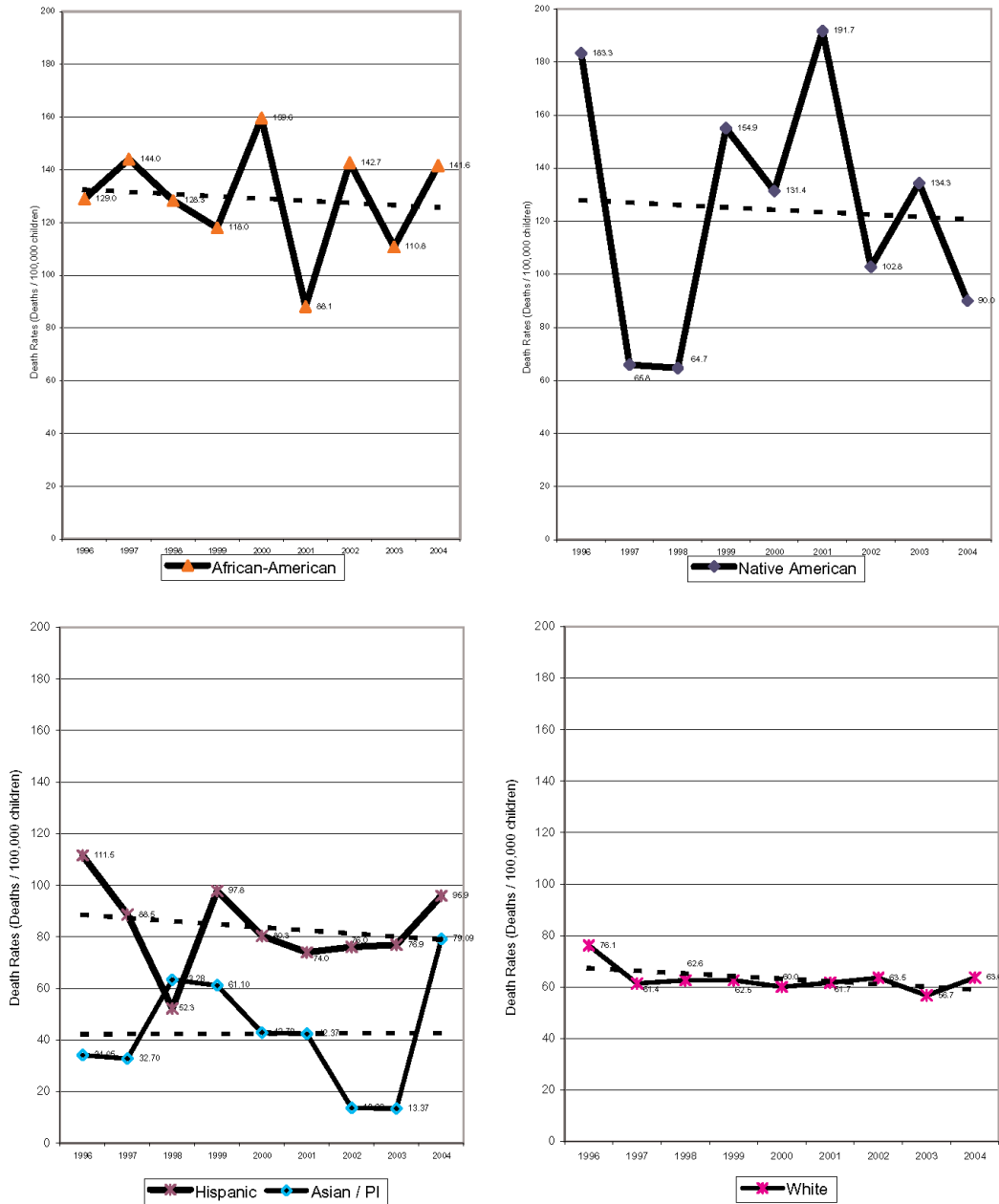


Figure 7

**Child Mortality Rates (0-17), by Race / Ethnicity
Nebraska, 1996-2004**

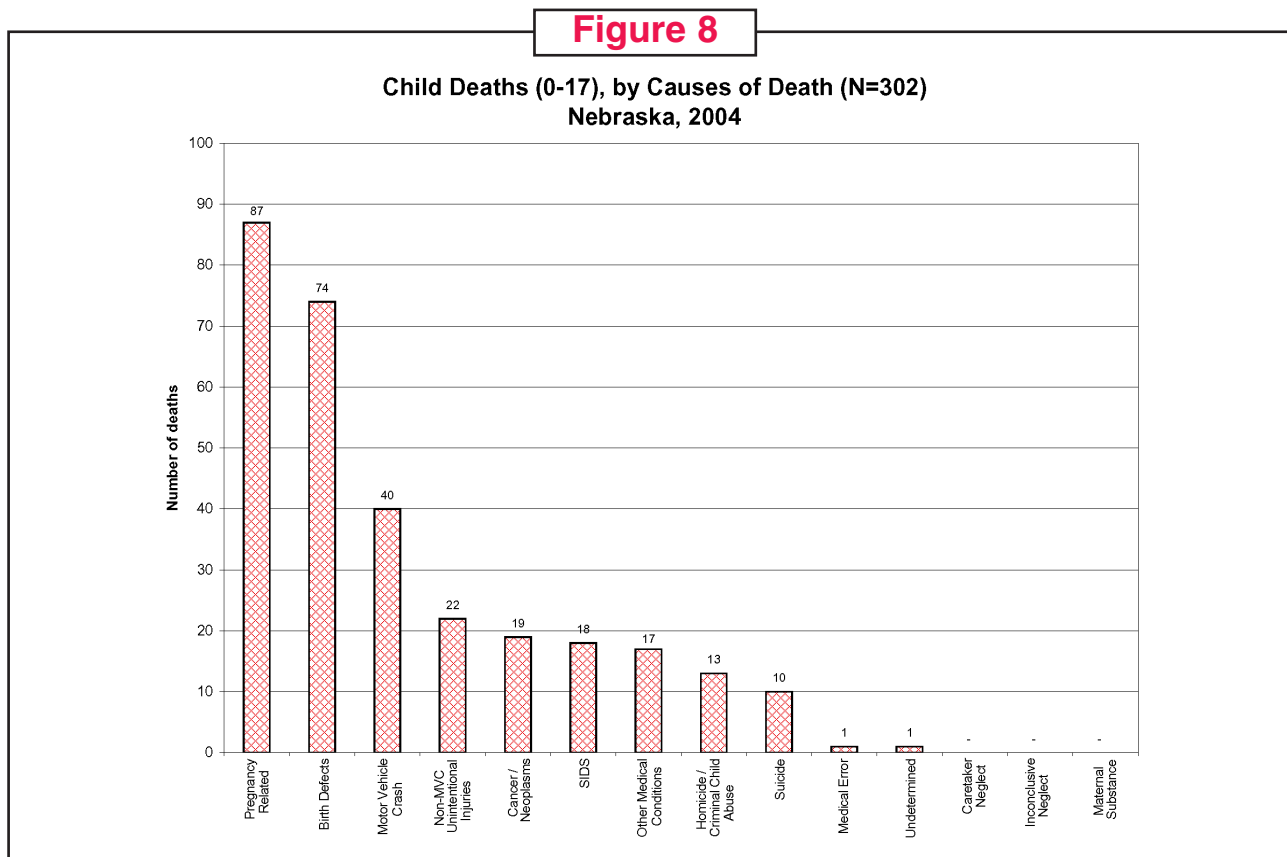


Dotted lines represent the linear trends in mortality over time.
 Figures do not include two children of other non-White or unknown race.
 The rise in Asian mortality from 2003 to 2004 represents an increase from one to six deaths.
 Source: Centers for Disease Control and Prevention.

Causes of death

Overview

Based on the Team’s reviews, over one-quarter of all child deaths (28.8%) during 2004 were attributable to “Pregnancy-Related” causes, a combined category of maternal complications during pregnancy, labor and delivery problems, and prematurity (Table 1; Figure 8). Birth defects were the second most common underlying cause with 23.8% of all deaths; motor vehicle crash-related deaths continued to be the third largest cause (12.6%). One-fourth (26.5%) of all deaths were attributed to non-medical conditions of which the majority was preventable.

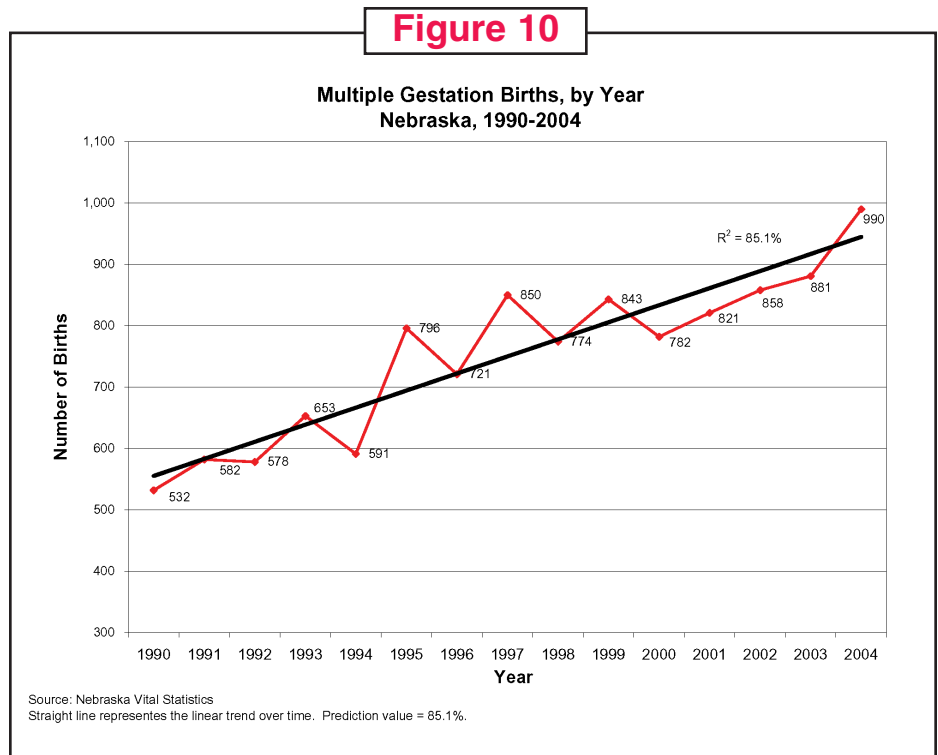
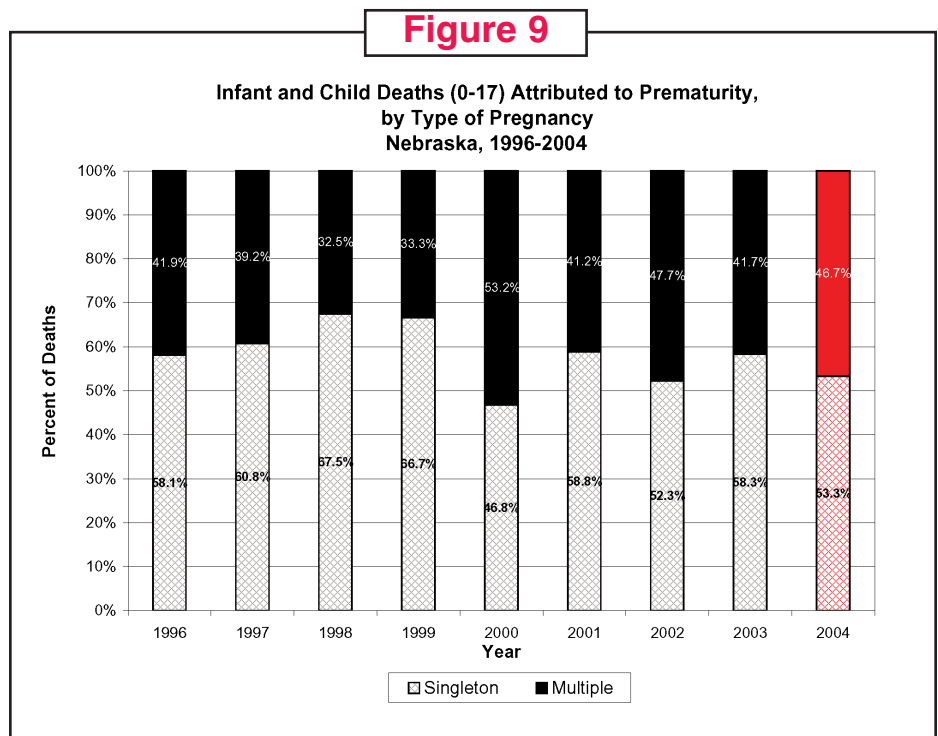


Pregnancy-Related Deaths - Key Findings

Factors related to pregnancy accounted for 28.8% of all deaths during 2004 (Table 1); all but two of these were of infants (less than 12 months old). Prematurity, being born at a gestational age of 37 weeks or less, is a leading cause of infant death and accounted for half of the pregnancy-related deaths (Table 1). However, preventing premature birth has proven to be a difficult task. It is thus useful to look further for specific conditions that may have caused the prematurity or that were directly implicated in the death, particularly since babies of at least 28 weeks gestational age will often survive if specialized neonatal care is available.

Of the 173 Nebraska infants who died during 2004, 115 (66.5%) were documented as having been born early. However, prematurity alone was felt to be the underlying cause of death for only 45 of these (26.0% of all infant deaths; 39.1% of deaths to premature infants). The other 70 premature infants who died (40.4% of all infant deaths; 60.9% of deaths to premature infants) had either a known reason for their prematurity or a distinct cause of death other than their immature development. For example, maternal complications rather than prematurity would be considered the underlying cause of death for an infant delivered at 23 weeks gestation from a pre-eclamptic pregnancy.

The 45 infant deaths that were attributed directly to premature birth were split fairly evenly between multiple³ (46.7%) and single gestation infants (53.3%) (Table 2; Figure 9). Both prematurity and mortality rates for multiple gestation infants are considerably higher than for singletons, resulting in a significant impact of multiple births on Nebraska's prematurity-related death rates. The annual number of multiple births in Nebraska continues to increase (Figure 10).



³ Twins, triplets and quadruplets. All multiple gestation infants who died were premature.

Remaining pregnancy-related deaths were largely attributed to maternal complications (37 deaths), the most frequent of which were incompetent cervix, placental infections and placental abruption (Table 3). Notable is one infant who died from perinatally acquired human immunodeficiency virus (HIV). Two infants died from oxygen deprivation during the birth process (Table 4), and three from conditions not elsewhere classified, including perinatal sepsis and maternal-fetal hemorrhage (Table 1).

Discussion. The prevention of premature birth is the focus of many national and local efforts. Considerable attention is being paid to “pre-conception care,” biomedical and behavioral interventions designed to reduce perinatal risk factors, improve pregnancy outcomes and reduce societal costs. These interventions must be implemented before the start of pregnancy to maximize their influence on its outcome, as a woman’s health status before she becomes pregnant may have as much influence on the probability that a pregnancy is carried to term as do events during the actual pregnancy.

For these reasons it is valuable to look beyond the mere fact of a premature delivery to the actual underlying causes. Nearly two-thirds of the premature infants discussed here had a known reason for their prematurity, among which maternal complications were the largest contributors. There are few known risk factors for most of these complications, and infant survival becomes dependent on the quality of medical management. However, there is emerging evidence of a role for some preventive behaviors, for example, multivitamin supplements may help prevent pre-eclampsia, particularly among lean women.

Between 1996 and 2004, seven Nebraska newborns were born HIV positive; two are known to have died. While transmission of the human immunodeficiency virus (HIV) from mother to child can occur during pregnancy, labor and delivery, or from breastfeeding, the majority of infants are infected during delivery. With early diagnosis and comprehensive prenatal treatment with antiretroviral medications, the rate of mother-to-child transmission can be reduced to less than 2%. Additional studies have suggested that treatment begun during labor and the immediate newborn period can also significantly reduce the risk of perinatal transmission. Perhaps most importantly, routinely offering rapid HIV testing to women whose HIV status is unknown during labor and delivery provides the opportunity to reduce transmission even among women who do not seek care until labor begins. In 2004, the federal Centers for Disease Control and Prevention (CDC) recommended that all hospitals adopt a policy of routine rapid HIV testing with an “opt-out” approach for women whose HIV status is unknown when presenting to labor and delivery. With the opt-out approach, pregnant women are notified about perinatal HIV and its prevention and are advised that an HIV test will be included in the standard battery of prenatal tests unless she refuses. Treatment of an HIV-infected newborn has been estimated at over \$160,000.

➤ **Recommendations**

State Policy Makers: *All pregnant women should have access, including financial access, to high quality prenatal care.* Women who do not receive prenatal care are more likely to have pregnancies and/or newborns that incur larger publicly-paid expenses.

State legislation is needed requiring all providers who attend pregnant women to notify them that an HIV test will be performed unless the patient objects (“opt-out” approach). At least seven states, including Oregon, New York and Tennessee have opt-out legislation. The American College of Obstetricians and Gynecologists (ACOG) has developed an information packet for state legislators and advocates on the issues surrounding prenatal/perinatal HIV testing, current national testing guidance and suggested legislative language.

Physicians and Other Health Care Providers: Preconception care should be considered a vital and routine aspect of care for all reproductive age women.

All pregnant women should have access to HIV counseling and testing and, when indicated, antiretroviral (ARV) medications for their own health and to prevent HIV transmission to their babies. In 2003, the CDC reiterated its goal of universal HIV testing of all pregnant women and recommended the "opt-out approach" to prenatal HIV screening. The CDC also recommends routine rapid testing at labor for those women whose HIV status is still unknown. Hospitals play a critical and unique role in eliminating perinatal HIV transmission in the US.

All personnel who are involved in the care of pregnant women, their fetuses, and their neonates should be aware of the current Guidelines for Perinatal Care of the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists. These Guidelines are a comprehensive resource on the organization and content of perinatal health services.

Providers who care for pregnant women should be aware of new treatments available for the prevention of preterm labor, and the situations for which they are appropriate. Providers who care for pregnant women should understand the extent to which maternal complications of pregnancy such as placental abruption contribute to prematurity, infant mortality and maternal morbidity, and be aware of current prevention and/or medical management recommendations.

Health Care Advocates and Families: Preconception care should be considered a vital and routine aspect of care for all reproductive age women. Preconception care aims to promote women’s health before conception and thereby improve pregnancy-related outcomes for women and for babies.

Once conception occurs, early and regular prenatal care is one of the best ways to promote a healthy pregnancy. During prenatal care visits, women can discuss with their health care provider warning signs of preterm labor, and receive individualized assessments of other potential complications.

Birth Defects / Congenital Anomalies - Key Findings

Birth defects accounted for one in four of the infant and child deaths (24.5%, or 74 deaths), comprising the second largest cause of death category. Approximately one-third of these deaths occurred within the first day of life (Figure 11), where the single most common problem was anencephaly, a neural tube defect (6 cases; Table 5). Among all children as well as those who survived more than one day, heart defects were the single largest category of lethal defects (11 cases; Table 5; Figures 12-13). These observations are consistent with national trends.

Figure 11

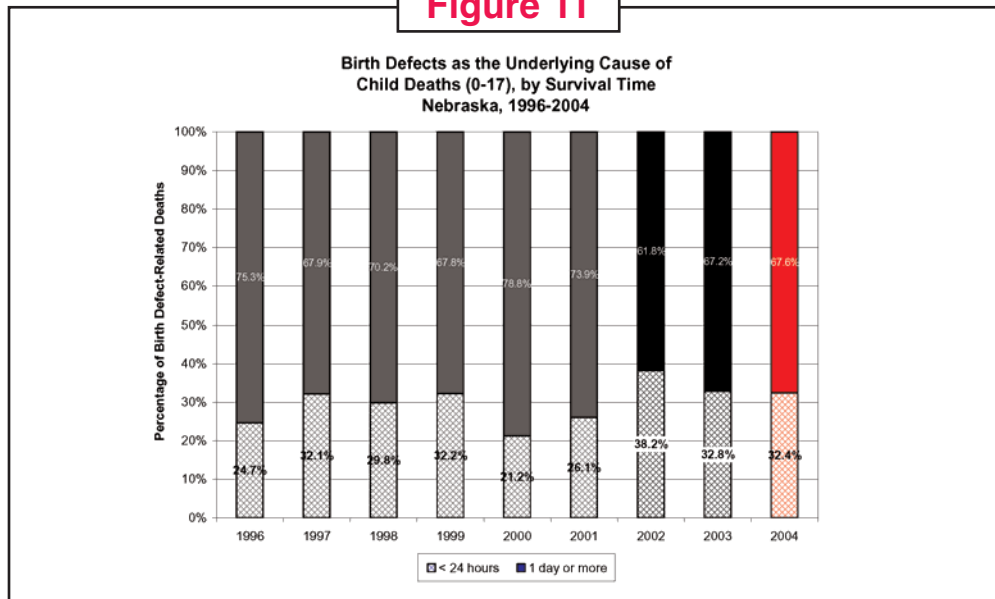


Figure 12

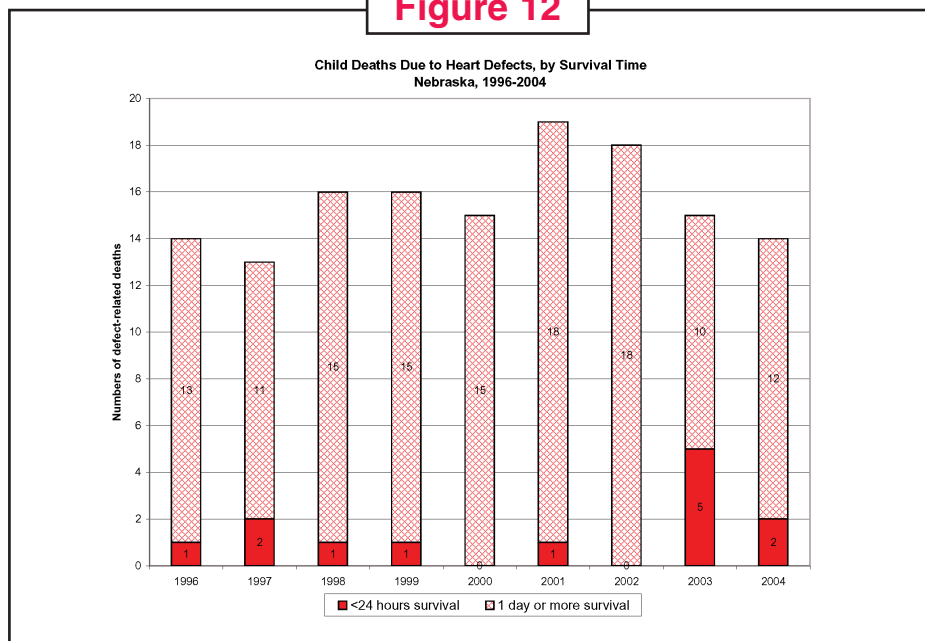
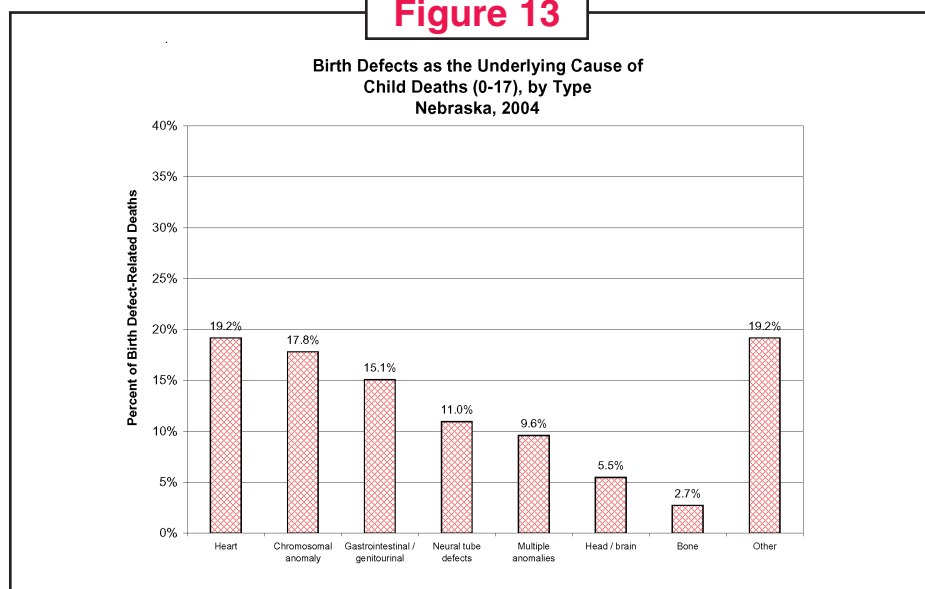


Figure 13



All infants born in the state of Nebraska must have a blood test that screens for eight specific metabolic and genetic diseases. Although cases are rare, early detection allows early treatment of these potentially debilitating or lethal diseases. During 2004, 32 Nebraska newborns were diagnosed with a screened disorder; there were no deaths attributed to metabolic or genetic diseases.

Discussion. Nationally, about 1 in 30 babies is born with a birth defect. In Nebraska, the rate during 2004 was approximately 1 in 35. Since 1998, folic acid enrichment of cereal grains sold in the U.S. is thought to have decreased neural tube defect rates by approximately 50%. Nevertheless, individual protection is still best achieved with pre-pregnancy multi-vitamin use. There is also emerging evidence that maternal folic acid intake early in pregnancy protects against the development of cleft lip (with or without accompanying cleft palate) in the baby. The causes of most other birth defects, including chromosomal anomalies, are unknown. However, women who do not take multi-vitamins, who use alcohol, tobacco or other drugs, who are overweight or who have diabetes are at higher risk of having a child with birth defects.

Nationally, Down syndrome (Trisomy 21), Edwards' syndrome (Trisomy 18) and Patau syndrome (Trisomy 13) are the most commonly occurring chromosomal anomalies. However, the survival rate for Down syndrome is considerably higher than that of the others and thus the actual number of deaths is quite low. In contrast, infants born with extra copies of chromosomes 13 or 18 have a much less favorable outlook and most die during their first year. Nationally, about 2 in 5,000 babies are born with either Trisomy 13 or Trisomy 18, similar to the Nebraska incidence rate of approximately 2.7 per 5,000 births (2004)⁴. Increasing maternal age is the only commonly accepted risk factor for most trisomies, although the majority of these births actually occur to younger women.

⁴ Because there are only a small number of cases annually (e.g., 14 total for Trisomy 13 and 18 combined in 2004), the 2004 rate is not significantly different from either the national rate or the Nebraska 2002-2003 rate of 1.4.

➤ **Recommendations**

State Policy Makers: *Additional resources for the Nebraska Birth Defects Registry would allow it to more effectively and accurately meet the state's needs.* A well-functioning registry monitors birth defect occurrence, causation, illness and mortality and related costs, provides data-based decision making for prevention activities, and monitors the provision of services to children living with congenital anomalies.

Providers: *Every effort should be made to accurately identify and report congenital anomalies at birth, whether or not they are lethal.* Accurate and early detection of defects and anomalies will help ensure that the child receives appropriate medical care. It also allows better forecasting of future needs by schools and other systems that serve children with disabilities.

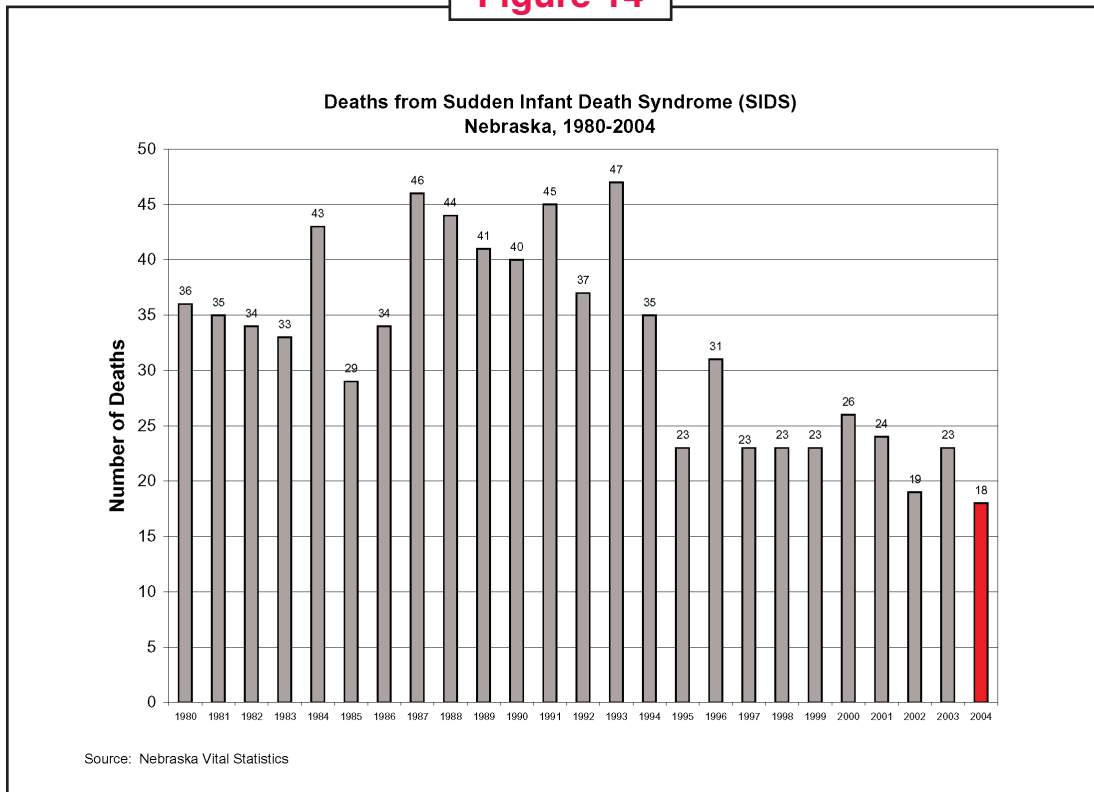
Communities and Families: *Women of child-bearing age, whether or not they plan on becoming pregnant, should consume a daily multi-vitamin containing 400 micrograms of folic acid.* For folic acid supplementation to be effective, women should be taking it before they become pregnant, as neural tubes close within the first four weeks of gestation. Folic acid may also prevent other birth defects, such as cleft lip/cleft palate and some heart defects.

Early and regular prenatal care is one of the best ways to promote a healthy pregnancy. During prenatal care visits, women can discuss with their health care provider the risks to the fetus from certain foods, lifestyle and environmental exposures, as well as any immunization needs.

Sudden Infant Death Syndrome (SIDS) / Sudden Unexpected Infant Death (SUID) – Key Findings

Diagnosed deaths from Sudden Infant Death Syndrome (SIDS) have declined considerably in Nebraska over the past decade (Figure 14). SIDS is officially defined as the sudden death of an infant less than one year of age which remains unexplained after a thorough medical and legal investigation. It is commonly perceived as a death for which “nothing could have been done to prevent it.” In contrast, Sudden Unexpected Infant Death (SUID) is an unofficial diagnosis that refers merely to the unexpectedness of the death and leaves open the issue of a distinct cause. In both cases most, although not all, infants die in their sleep.

Figure 14



During 2004, 18 infant deaths were officially reported as SIDS. Six additional infants who died in their sleep were not diagnosed as SIDS, but had medical or other records similar to infants who in the past *had* been diagnosed as SIDS (Table 6).⁵ They are thus considered together in a broader “sleep-associated death” category. These 24 total deaths had similar characteristics regardless of actual diagnosis. Deaths occurred in 10 different cities; the infants were disproportionately African-American (16.7%) and were more likely to be male (75.0% male versus 25.0% female) (Tables 7-8). Similar to previous years, approximately 17% of the sleep-associated deaths were known to have occurred while

⁵ Their causes of death were reported as “accidental suffocation or strangulation in bed” and one case each of pneumonia, rheumatoid arthritis, “unspecified fall” and “undetermined”. The pneumonia and rheumatoid arthritis cases are also reported in the “Other Medical Conditions” section of this report; the Undetermined cases is included in the “Undetermined” section, and the three suffocation and fall deaths are also included in the “Unintentional Injuries” section.

the child was in a child care setting (licensed or unlicensed; Table 9). Figure 15 and Table 10 show the age distribution of the SUID; sudden deaths occurring at later ages were much more likely to have causes identified.

Figure 15

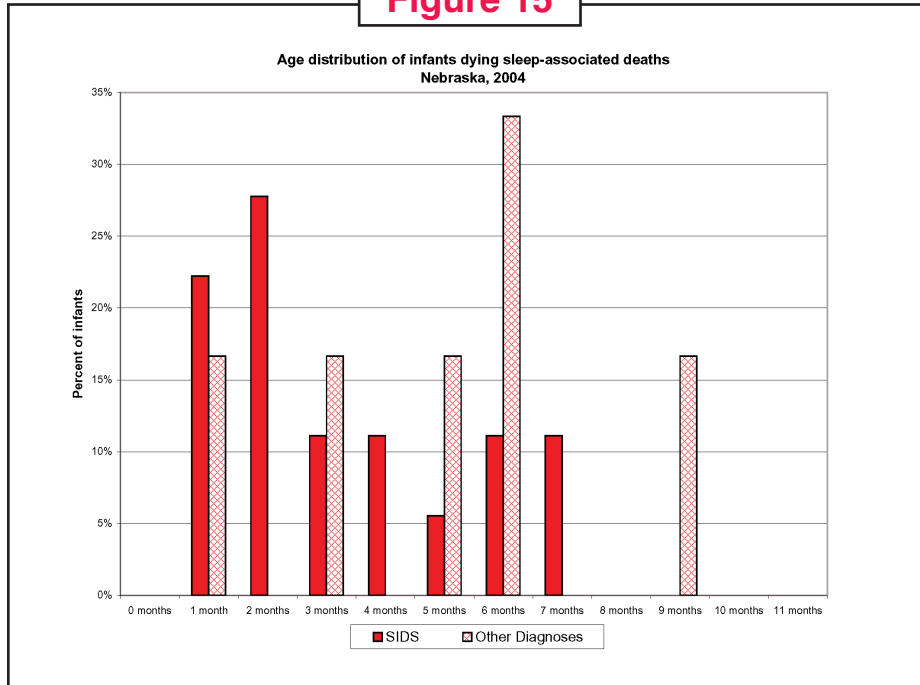
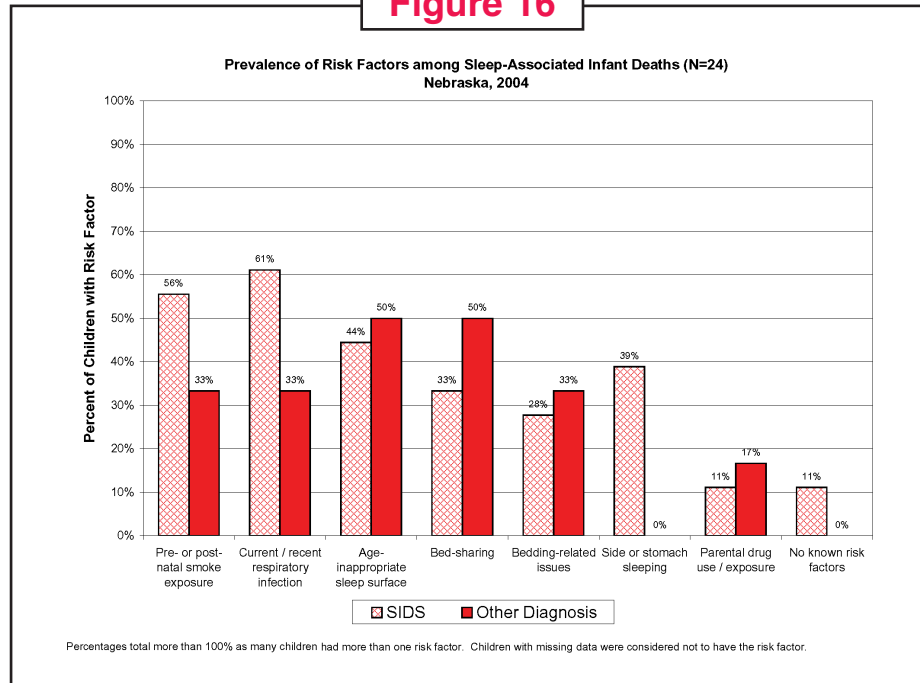


Figure 16



Of the 24 total cases, all but two (91.7%) had at least one of eight major risk factors for a sleep-associated death (Table 11; Figure 16).

- Half of the official SIDS (55.6%) and one-third (33.3%) of the SUID infants had documented exposure to tobacco smoke, considerably higher than the most recent estimated statewide smoking prevalences of 26.1% before pregnancy, 16.0% during the last trimester of pregnancy and 20.8% after the birth (PRAMS, 2004).
- Over half (61.1%) of the SIDS infants and 45.8% of all SIDS/SUID infants were reported to have current or recent respiratory infections, a likely contributor to impaired breathing.
- Close to half of the SIDS infants (44.4%) and of all SIDS/SUID infants (45.8%) were sleeping in or on something other than a safety-approved crib, playpen or baby bed.
- At the time of death, one-third of the infants (33.3% of SIDS infants; 37.5% of all SIDS/SUID infants) were sleeping with or on an adult or other child. Published estimates of “usual” bed sharing range from 13% to 51%.
- Approximately one-third of the SIDS infants (38.9%) and of all SIDS/SUID infants (29.2%) had not been put to sleep on their backs, compared to a recent statewide estimate of 29.5% (PRAMS, 2004).
- Around one-quarter (29.2%) of all SIDS/SUID infants were reported to have been sleeping with large pillows or loose bedding including extra quilts or blankets. One baby was put to bed with a blanket wrapped around his head to hold in a pacifier.
- One infant apparently overheated / suffocated while being carried in a soft, front-pack type baby carrier. Although infants slipping through leg openings of these carriers are more common occurrences, seven probable suffocation deaths have been reported to the national Consumer Product Safety Commission since 1998.

Discussion. Sudden deaths in infancy have dropped considerably over the past decade as many parents have recognized the dangers associated with infants sleeping on their stomachs, and adopted the recommendations of the “Back to Sleep” campaign. However, there are still children who are not placed to sleep on their backs. It is also becoming clear that many deaths that are called “SIDS” are actually unintentional suffocations. Excess blankets and pillows, sleep surfaces not designed for an infant, second-hand tobacco smoke and other impediments to infant breathing (Table 11) have emerged as major risk factors for the sudden death of infants, particularly but not uniquely when they are sleeping on their stomachs. These small infants may not be physiologically mature enough to overcome otherwise minor challenges to their breathing, particularly during sleep.

The similarities between the official Sudden Infant Death Syndrome (SIDS) cases and the six additional sleep-associated deaths underscore both the importance of autopsies and inconsistencies in the use of the SIDS diagnosis. The previous CDRT report for 2002-2003 began categorizing sudden infant deaths by the presence of known risk factors for suffocation or death. These categories allow for examination of major risk factors associated with all sleep-associated sudden infant deaths, bypassing inconsistencies in assigning an official cause of death. Understanding exactly what happened in each case is impeded by

inconsistencies of death scene investigations around the state. Nonetheless, sufficient information was received to reveal that only two of 24 sudden infant deaths in 2004 had no known risk factors. Promoting "Safe Sleep" rather than the more narrow "SIDS prevention" increases the number as well as types of deaths that may be averted.

Although the scientific understanding of sudden infant death continues to evolve, in 2005, the American Academy of Pediatrics (AAP) issued a revised SIDS risk reduction policy statement based on the best available evidence.⁶ Key points are:

- **Infants should be placed wholly on their back for every sleep.**
- **The best sleeping surface** is a firm crib mattress, covered by a sheet.
- **Keep soft objects and loose bedding out of the crib.** Pillows, quilts, comforters, sheepskins, stuffed toys and other soft objects should not be around a sleeping infant.
- **Do not smoke during pregnancy.** Avoid infant's exposure to second-hand smoke.
- **Bed sharing during sleep is not recommended.** A separate but close sleeping environment is recommended, such as a separate crib in the parent's bedroom.
- **Consider offering a pacifier at nap and bedtime.** Breastfed infants should be at least one month old before a pacifier is used, once breastfeeding is firmly established.
- **Avoid overheating.** Infants should be lightly clothed for sleep, regardless of where they are. The room temperature should be comfortable for a lightly clothed adult.
- **Avoid commercial devices** claiming to reduce the risk of SIDS. None have shown efficacy or safety.
- **There is no evidence that use of home monitors decreases the risk of SIDS.**
- **Encourage "tummy time"** to avoid development of head flattening ("positional plagiocephaly"). Avoid having the infant spend excessive time in car-seat carriers and bouncers.
- **Ensure that others caring for the infant are aware of these recommendations.**

➤ Recommendations

State Policy Makers: *Regulations for infants in licensed child care facilities should be revised to mandate back sleeping, recognizing the need for a waiver in some situations, and to repeal requirements for "bumper pad" and stuffed toys in cribs.* Nationally, 20% of SIDS deaths occur in child care facilities, emphasizing the importance of prevention practices in these settings. This recommendation is in line with positions of national and state advocates, who note that any items in infants' cribs increase the chances of sudden death.

Programs are needed that specifically target smoking among pregnant and postpartum women. Smoking during and/or after pregnancy is a risk factor for multiple infant and childhood illnesses, as

⁶ www.aap.org/ncepr/sids.htm.

well as for sudden infant death. Previous funding for such programs that resulted from a recommendation made by the Governor's Blue Ribbon Panel on Infant Mortality (2000) needs to be restored and expanded.

A standardized death scene investigation should be conducted for all unexpected child deaths. Doll reenactments should be part of the investigative protocol for sleep-related infant deaths. A thorough investigation improves understanding of the events surrounding the death, and can help dispel suspicions of possible caretaker malfeasance. Doll reenactments are valuable tools to help witnesses describe the body and face position of the infant when found.

Community Organizations and Child Advocates: Existing SIDS prevention regulations, messages and initiatives should be expanded to include other "Safe Sleep" issues and options. These messages should include the AAP recommendations (above), and be tailored to racially, ethnically, culturally and financially diverse audiences. Additional emphasis is needed on including grandparents and other extended family members as targets of safe sleep messages. The US Department of Health and Human Services has produced risk reduction and bereavement support services materials which can be used with both providers and community members (see References and Further Resources section).

"Safe Crib" programs have been successfully implemented in communities around the country to provide low-income families with cribs that meet current safety standards.

Parents: Infants should be placed wholly on their back for every sleep.

Breastfed infants appear to have lower risks of sudden death.

The American Academy of Pediatrics (AAP) does not recommend bed-sharing during sleep. The recent AAP policy statement asserts that, "Infants may be brought into bed for nursing or comforting, but should be returned to their own crib or bassinet when the parent is ready to return to sleep. However, there is growing evidence that room sharing (infant sleeping in a crib in parent's bedroom) is associated with a reduced risk of SIDS. The AAP recommends a separate but close sleeping environment."

Cancer / Malignant Neoplasms - Key Findings

Childhood cancer is not one disease, but rather a variety of different malignancies with different causes. After years of slight declines, the overall childhood cancer mortality rate in Nebraska rose significantly in 2004, largely due to an increase in brain tumor-related deaths (Table 12). Although a relatively small number, the 13 brain cancer cases seen in 2004 represented a rate of 2.99 deaths per 100,000 children, a significant increase from the 1994-2003 average rate of 0.96 deaths per 100,000 children (Figure 17). There were no significant differences in mortality rates by child's race, ethnicity or sex (Figure 18). Rates varied by age group, but were not significantly different from national age-specific rates (Figure 19). The seven cases seen among 10-14 year olds had different ages of onset.

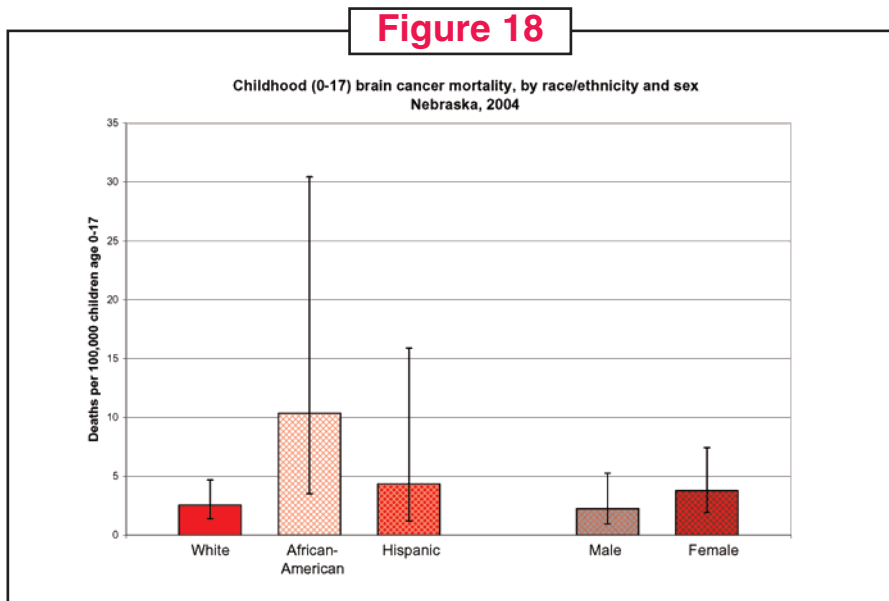
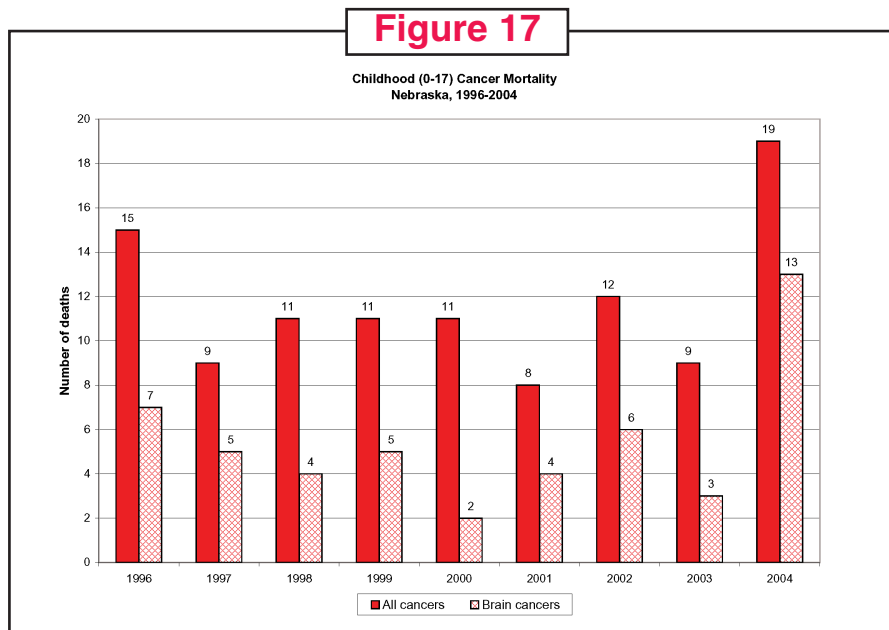
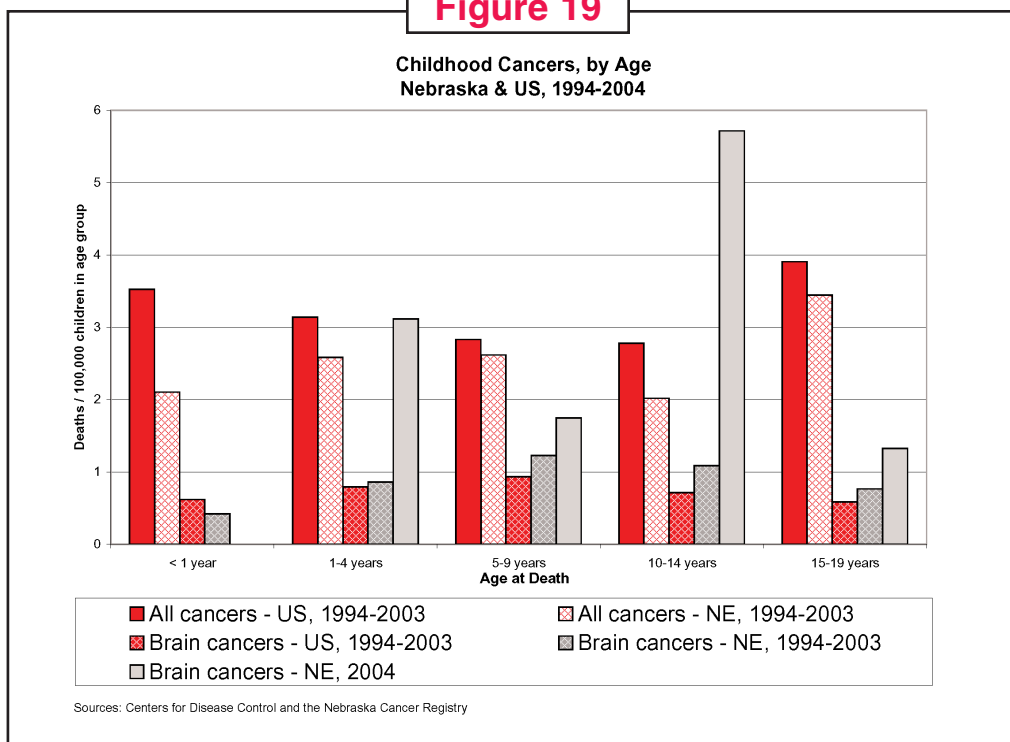


Figure 19



Discussion. National statistics show that childhood cancer kills more children each year than asthma, diabetes, cystic fibrosis and AIDS combined. The small numbers of cancers that occur in any given geographic area make it difficult to find clear risk factors. A few conditions, such as Down syndrome, other specific chromosomal and genetic abnormalities, and ionizing radiation exposures explain a small percentage of cases. There are, however, growing findings of increased risk for childhood brain tumors associated with life on a farm and farm animal exposures, and a lower risk associated with maternal prenatal vitamin intake. However, environmental and non-medical causes of childhood cancer have been difficult to demonstrate conclusively. It is difficult to predict whether the increases seen in 2004, which are spread out around the state, represent the beginning of a sustained increase or a one-time phenomenon. The Nebraska Cancer Registry, the Comprehensive Cancer Control Program (“Nebraska C.A.R.E.S.”)⁷ and the CDRT will continue to monitor childhood cancer occurrence and risk factors.

➤ **Recommendations**

Families, Health Care Providers and Health Educators: *Providers should stay up to date on findings regarding risk factors for, causes of and treatments for childhood cancers. Children diagnosed with cancer should be enrolled in clinical trials in order to receive access to the newest experimental treatments.*

⁷ The State Cancer Control Plan is available at <http://www.hhss.ne.gov/hew/hpe/NebraskaCARES/about.htm>.

Infectious, Chronic and Other Medical Conditions

The 17 “other” medical cases (Table 13) cover a wide range of causes. Infectious disease-related deaths in infants at least one week old and who were not preterm are included here, recognizing that there is some overlap with pregnancy-related conditions. However, children who died from complications of maternal infections, e.g., herpes virus, are considered in the Pregnancy-Related section, again acknowledging the overlap between categories.

Influenza is typically the leading cause of vaccine-preventable death in children. However, of seven respiratory illness-related deaths in 2004, only one was clearly attributed to post-influenza complications (one other child’s medical record listed the cause of death as “pneumonia” without specifying a specific causal agent). Four children ranging from one month to six years old died from illnesses caused by Respiratory Syncytial Virus (RSV).

Two asthma-related deaths were reported during 2004, both under fairly unique circumstances involving physical trauma. In the first case, medical personnel kept searching for a causal link between a recent accident and the child’s symptoms and did not suspect asthma. A second case involved an asthma attack that occurred following a physical assault. This latter case is not counted in this section but rather under “Homicide / Criminal Child Abuse.” Nonetheless, the Team felt strongly that the role of the child’s asthma in causing the death should not be ignored.

Discussion. The largest common cause of death in this category was from Respiratory Syncytial Virus (RSV)-related illness (4 deaths); RSV is the most common cause nationally of bronchiolitis and pneumonia among infants. Three of the four children were infants and had other conditions that would make them appropriate candidates for the RSV vaccine, which is recommended for premature and other medically high-risk infants. Information was not available on whether they had actually been vaccinated.

Death can occur from mild, moderate or severe persistent asthma; there is no relationship between severity and the risk of death. Frequent use of albuterol inhalers and emergency injectors is a warning that a child’s asthma is not being properly controlled. Although recent studies have shown that proper use of inhaled corticosteroids decreases asthma deaths, since 1996 70% of Nebraska children dying from asthma were being treated for their conditions (Table 13). This observation implies that families may have been relying on less effective treatments to control their children’s asthma. The unusual circumstances of the two 2004 asthma-related deaths are also a warning that asthma should not be overlooked as a potential cause of a wide variety of symptoms, including recurrent headaches and chronic allergies.

There have not been any reported childhood deaths since 1997 from the once common, vaccine-preventable infectious diseases - polio, chickenpox (varicella), measles, mumps, rubella, diphtheria, tetanus, pertussis, or hepatitis B. The organisms that cause these diseases have not disappeared, however, particularly for chickenpox, and both the diseases and related deaths will reemerge if vaccination coverage drops. In 2004, 83.0% of Nebraska two-year olds had received the chickenpox

vaccine, a significant improvement over the 2003 value of 75.3%. Children who are not vaccinated risk getting the disease as adults when complications are more severe. Complications from chickenpox can include bacterial infections, pneumonia, dehydration, central nervous system problems and death.

➤ Recommendations

State Policy Makers: *A statewide registry to track immunizations would allow for better development of prevention strategies against existing and emerging disease.* Existing registries only cover select parts of the state's population and are not coordinated with each other. A comprehensive registry would include public and private providers, improve access to records for families who move or change providers, and enhance the ability to examine trends and gaps in immunization coverage.

Communities: *There are many resources available to help improve community health and prevent infectious disease.* For example, the Guide to Community Preventive Services addresses the effectiveness of three population-based strategies to increase vaccination coverage: 1) Increasing community demand, 2) Enhancing access to vaccination services, and 3) Provider-based interventions.

Providers, Communities and Parents: *Adolescents who seem to have grown out of asthma should continue to be monitored even if symptoms have disappeared.* One-third or more of adolescents without symptoms may relapse.

Children with persistent asthma should be taking a daily prevention medicine, the most effective being inhaled corticosteroids. Reliance on albuterol-based inhalers in an emergency should not be considered effective control of asthma. Frequent use of albuterol inhalers or an emergency injector, disturbed sleep or a decrease in activity levels are warnings that a child's asthma is not being properly controlled. A customized, written asthma action plan developed in conjunction with the child's medical provider should be on file at the child's school and/or child care facility.

The Centers for Disease Control and Prevention (CDC) recommend influenza vaccine for healthy children ages 6 to 59 months. The American Academy of Pediatrics recommends RSV vaccination for children under 2 years with chronic lung disease and for premature infants with other risk factors. Recent reports have demonstrated that otherwise healthy young children aged 6 to 24 months are hospitalized for influenza and its complications at rates comparable to pregnant women and the elderly. Epidemiologic data suggest that RSV infection is more likely to lead to hospitalization for premature infants with two or more of the following risk factors: child care attendance, school-aged siblings, exposure to environmental air pollutants, congenital abnormalities of the airways, or severe neuromuscular disease. The risk increases as the number of risk factors for an individual infant increases.

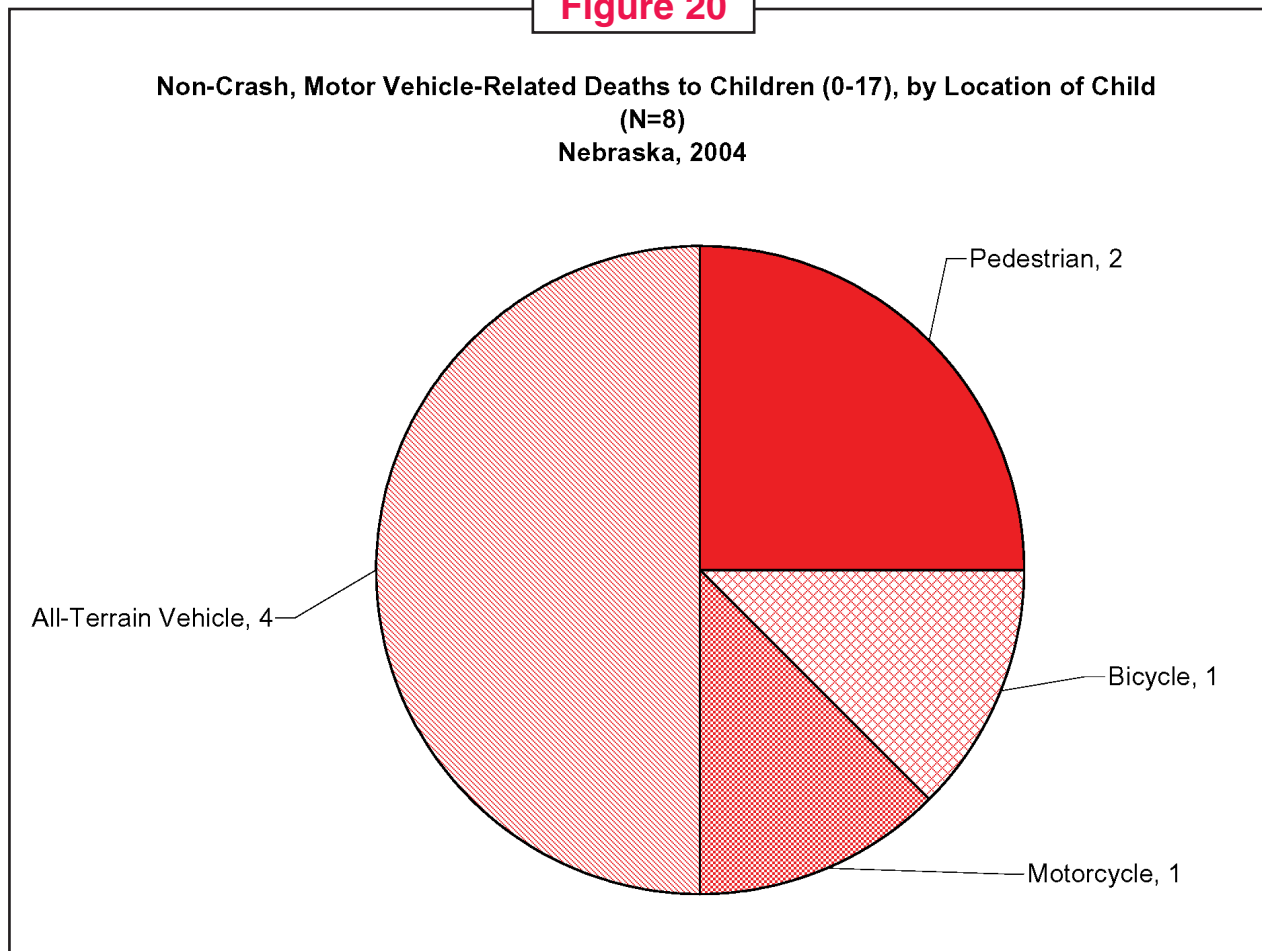
High-risk infants never should be exposed to tobacco smoke. Exposure to tobacco smoke is a risk factor that can be controlled by the family of an infant at increased risk of RSV disease, and tobacco smoke control measures are far less costly than vaccines and medical treatment.

Parents should consult their providers about which vaccines their children should have and when, and keep track of their children's immunization status. The Centers for Disease Control and Prevention (CDC) consider vaccinations some of the most important tools available for preventing disease. Vaccinations not only protect children from developing a potentially serious disease but also protect the community by reducing the spread of infectious disease.

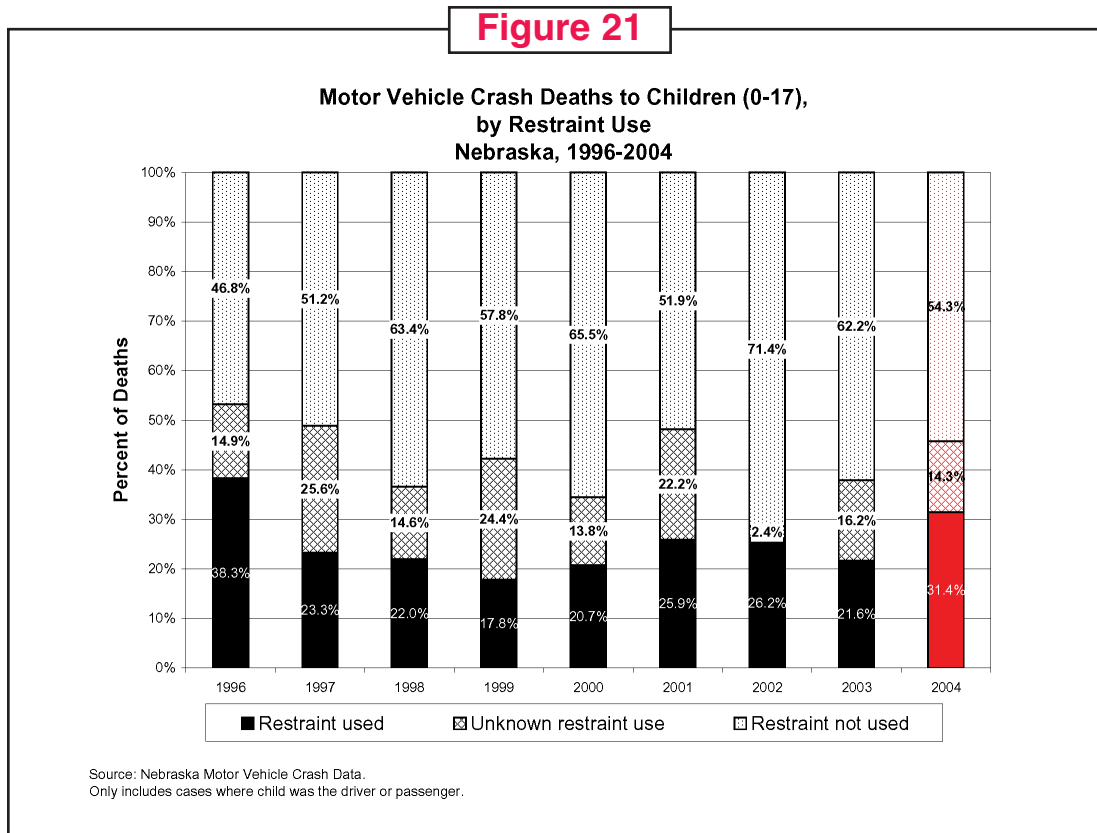
Motor Vehicle-Related Incidents - Key Findings

The third most frequent cause of death to Nebraska's children continues to involve motor vehicles in traffic situations. At least 32 children were killed while in a motor vehicle either as a driver or passenger, representing 80.0% of all motor vehicle-related deaths to children (Table 14). An additional three children (7.5%) were struck and killed by motor vehicles while they were walking or riding a bicycle (Figure 20). Four children (10.0%) were killed in all terrain vehicle (ATV) incidents; in all four incidents the children were driving the vehicle. In two of these cases the vehicle flipped during off-road driving, while two incidents involved the ATV being driven on or crossing a public road and colliding with another vehicle.

Figure 20



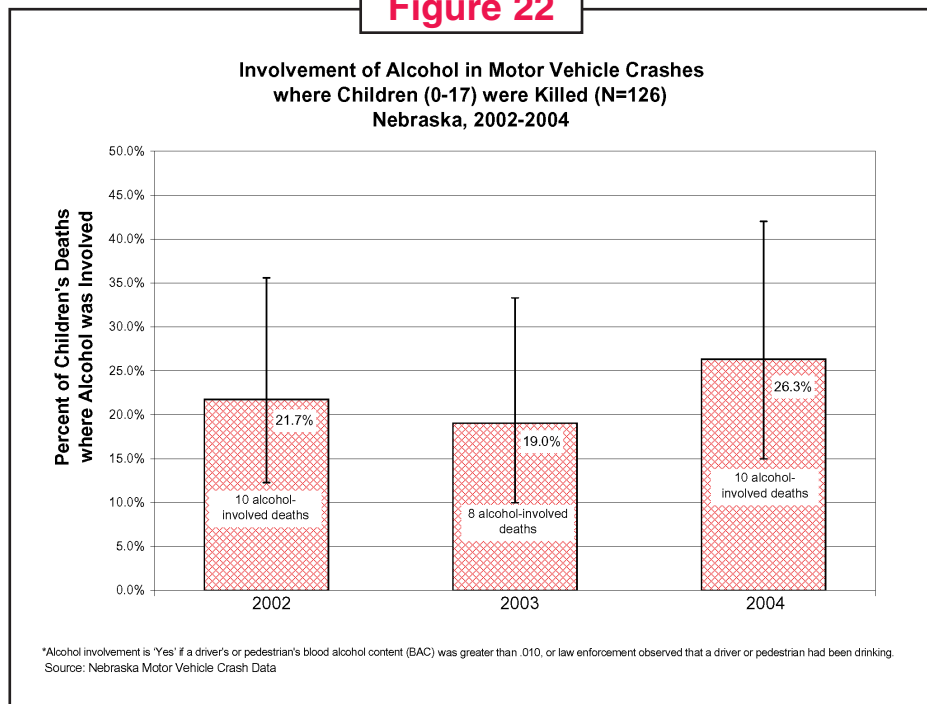
Nearly 60% of the children killed in car crashes were documented as either having been unrestrained or ejected from the vehicle (Table 14). Information on the use of restraints (safety belt or child safety seat) was not available for five (15.6%) of the incidents. Statewide motor vehicle crash data show an increase in restraint use among child fatalities in 2004 compared to the 2002-2003 period; however, the direction of the long term trend is not clear (Figure 21)⁸.



The method used to determine the involvement of alcohol in crashes where children were killed was changed in 2001; as a result figures are not directly comparable for periods before then. Alcohol was determined to be involved in more crashes in 2004 (26.3%) as compared to 2002 (21.7%) and 2003 (19.1%) (Figure 22). Data were not available to consistently determine whether the alcohol use was by the child, someone else in the child’s vehicle, or a person in a different vehicle involved in the crash. However, nationally, nearly two-thirds of children age 15 and younger who died in alcohol-related motor vehicle crashes were riding with the drinking driver.

⁸ CDRT data include out-of-state deaths, so restraint use percentages are not directly comparable with the state Motor Vehicle Crash Death data.

Figure 22



Discussion. The vast majority of motor vehicle incidents were preventable - attributed to driver error or poor judgment. A recent Child Trends report⁹ discusses several risk factors for fatal crashes among adolescents, including a lack of experience, a propensity for risk taking, and even incomplete brain development; the report goes on to propose new programs and legislation. However, many deaths could be prevented through better application of safety measures and improved enforcement of existing laws. There is strong evidence that appropriate use of safety restraints decreases fatal injuries. The Nebraska Injury Prevention State Plan provides a comprehensive assessment of motor vehicle injuries and recommendations to prevent future injuries. For more information contact the Injury Prevention Program, Nebraska Health and Human Services System.¹⁰

➤ Recommendations

State Policy Makers: *Nebraska's safety belt law should be upgraded to primary (standard) enforcement. Seat belt use should be a primary offense for teen drivers.* The importance of shoulder belts, in addition to lap belts, should be included in educational messages. States with primary enforcement laws have a safety belt usage that is estimated at 15% higher than those without. Safety belts cut the risk of death or serious injury in a crash by 45 to 50%. Children riding with unrestrained drivers are much more likely to be completely unrestrained compared to children riding with belted drivers.

⁹ <http://www.childtrendsdatabank.org/pdf/teen%20driving.pdf>.

¹⁰ 402/471-2101; <http://www.hhss.ne.gov/hpe/injury.htm>.

Child endangerment laws should be considered that provide special sanctions for drivers convicted of DUI with a child in the vehicle. Currently, 33 states have such laws. Mothers Against Drunk Driving (MADD) cites research showing that, “A child in a vehicle with a drinking driver is not only at risk from the impaired driver, but also from the lack of safety restraint use..., as drinking drivers are much less likely to make sure a child is properly restrained.”

The American Academy of Pediatrics recommends passage of legislation in all states prohibiting the use of 3- and 4-wheeled off-road vehicles (ATV) by children younger than 16 years. Safe Kids Worldwide and the national Consumer Product Safety Commission recommend that no children under age 16 be allowed to ride an ATV under any circumstances. An ATV can weigh in excess of 500 pounds and travel at speeds of over 60 miles per hour. Children do not possess the physical strength, coordination, or judgment necessary to pilot these vehicles safely.

Helmet use should be required for all ATV drivers and passengers. Educational campaigns should include the risks/dangers associated with even the proper use of ATVs.

Parents: Children should always use age-appropriate restraints when in a motor vehicle. Parents should model for teens the importance of wearing safety belts every time they drive or ride in a vehicle.

- ***Child safety seats.*** When used correctly, child safety seats reduce the risk of death by 71% for infants and by 54% for children ages 1 to 4.
- ***Child booster seats.*** A child who has outgrown a child safety seat (generally at 40 pounds) should use a booster seat until approximately age 8 or 80 pounds and/or 4’9” tall. Children ages 4 – 8 years old are four times more likely to suffer a serious head injury when restrained only by a safety belt as compared to children who used child safety seats or booster seats.
- ***Safety belts.*** For children who are large enough to fit in them properly, safety belts reduce the risk of death or serious injury in a crash by 45 to 50%. The 2003 Nebraska Youth Risk Behavior Survey (YRBS) indicated that only 66.6% of teens surveyed usually wore a safety belt when riding in a car driven by someone else.

Children age 12 years and younger should not ride in the front seat. Children are at risk of injury from front passenger-side airbags; rear seats are the safest part of a vehicle in the event of a crash. Riding in the back seat is associated with a 46% reduction in the risk of fatal injury in cars with a front passenger-side airbag and at least a 30% reduction in the risk of fatal injury in cars without one.

Bicycle helmets should be worn by all persons (i.e., bicycle operators and passengers) of any age whenever and wherever they ride a bicycle. Bicycle helmets reduce the risk of serious head injury by as much as 85% and the risk of brain injury by as much as 88%.

Teach children motor-vehicle safety. Children shouldn’t be allowed to play in/around cars; keys should never be left in the ignition. Parents need to understand how vehicles can be inadvertently knocked into gear.

Teach children pedestrian safety. The most important thing parents can do to teach their children safe pedestrian behavior is to practice it themselves: crossing streets at corners, using traffic signals and crosswalks whenever possible, and making eye contact with drivers prior to crossing in front of them.

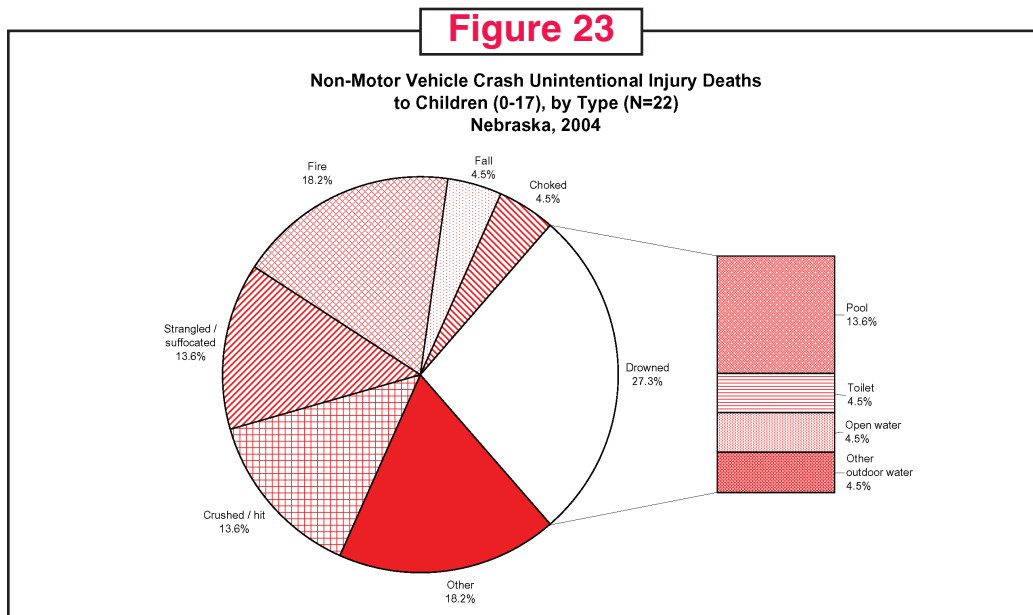
Children under 16 should not drive or ride full-size all terrain-type vehicles (ATV) under any circumstances. Off-road vehicles are particularly dangerous for children younger than 16 years who may have immature judgment and motor skills. Children should operate junior-size ATVs and only on designated trails, not on public roads, paved surfaces or fields. Personal protective equipment for ATV operators should include a U.S. Department of Transportation-approved helmet with face protection, goggles (if the helmet does not have face protection), a long-sleeved shirt or long pants, non-skid boots and gloves. However, the national Safe Kids organization concludes "...there is simply no way to make ATV riding a safe activity for children."

Unintentional Injuries - Key Findings

A lack of parental supervision contributed to several of these incidents, but those included in this section did not rise to the level of clear "Neglect."

Drowning

The most common cause of non-motor vehicle-related, unintentional injury death was drowning, accounting for 27.3% of the 22 total unintentional injury deaths (Table 15; Figure 23). None occurred to children and youth swimming in lakes and rivers. Rather, three involved young children who eluded supervision and drowned in either indoor (toilet) or outdoor (home pool, landscape pond) bodies of water. Two children drowned at public pools despite the presence of family and attendants, and one teen fell through the ice while walking on a frozen creek.



Discussion. Safe Kids USA states that:

“While water recreation provides hours of enjoyment and exercise for children, water and children can be a deadly mix when an unsafe environment, inadequate supervision or improperly used safety gear is also present. Nationally, drowning remains the second leading cause of injury-related death among children ages 1 to 14.

Drowning can occur in a variety of circumstances – during water recreational activities (such as swimming and boating) or when a young child is left unsupervised for a short time in the bathtub or around the home with access to nearby pools and spas. Drowning, which can happen in as little as one inch of water, is usually quick and silent. A child will lose consciousness two minutes after submersion, with irreversible brain damage occurring within four to six minutes. The majority of children who survive without neurological consequences are discovered within two minutes of submersion, and most children who die are found after 10 minutes.

Research shows there is no one device or solution that can prevent all childhood drownings. Instead, a multifaceted strategy, including active supervision by a designated adult, safe water environments, proper gear and education, is required to ensure children’s safety in and around water.”¹¹

Fire

Four children were killed in two separate home fires. Both incidents were thought to have been caused by unattended candles; in one case candles were being used because the family’s electricity had been shut off (Table 15).

Discussion. Even though home fires are rare, it is crucial to be prepared. Escape routes need to be practiced with both adults and children; younger children are more likely to try and hide from a fire than to try and escape. Adults send the wrong message to children when they disable or do not maintain smoke alarms. The National Fire Protection Association reports that in 2004, an estimated 17,200 home structure fires started by candles were reported to local fire departments.

Other

The remaining unintentional injury deaths were largely preventable using basic and appropriate safety precautions. Three children were killed in 2004 from being hit or crushed by an object, including one child run over in a driveway by a vehicle inadvertently knocked into gear, and a teenager who was improperly operating construction machinery (Table 15). The third child was crushed by the collapse of a public restroom wall in a municipal building that had not been safety inspected for many years. Two children died from effects of taking parents’ medications. One teen was unintentionally shot during unsupervised play with firearms, one child strangled while playing with a dog leash and one child

¹¹ <http://www.usa.safekids.org/NSKW.cfm>.

choked on a kernel of popcorn. Finally, one child was killed in a home propane explosion following repairs to the gas line by a person not certified for that type of work.

Discussion. The Kids and Cars program¹² estimates that nearly half (46%) of non-traffic, non-crash vehicle fatalities involving children under 15 were caused by motor vehicle backovers. Children are very quick, small and easily out of sight when in front of or behind a motor vehicle, particularly as personal vehicles get larger and longer and their "blind spots" correspondingly larger. Adults operating motor vehicles or farm machinery can not adequately monitor the whereabouts and movements of young children.

In contrast to the one reported unintentional firearm death during this period, the Nebraska Hospital Association reports 102 firearm-related hospitalizations of children during 2003, the most recent data available. Home firearms should always be stored safely. A recent study from Alabama determined that parents were more likely to store firearms locked if they knew that their child had handled the firearm, but, were not very accurate in their perceptions of whether such handling had occurred. Lists are available of firearm safety devices that have been tested and approved by the state of California.¹³ Local law enforcement agencies also have access to trigger locks for community giveaway programs.

The death resulting from the collapse of a restroom wall occurred in a city park. Municipal buildings such as these are not required by state law to be inspected, although they may be covered by local ordinances. LB264 (2007) now holds park owners accountable for keeping their facilities up to date, in conjunction with the "Alexa Check" which asks people to notice damaged and worn out facilities and report them to local authorities¹⁴.

➤ Recommendations

Communities: *Communities are encouraged to implement smoke alarm distribution, firesetter prevention and fire intervention programs.* Homes with working smoke alarms typically have a death rate that is 40% to 50% less than for homes without them. The State Fire Marshall's Office has family-oriented safety tips available on its website¹⁵.

Official inspection of municipal buildings is a cost-effective method of preventing needless tragedies.

Parents: *When near a pool or body of water, parents and other caretakers should always designate one adult to keep sight of all children, at all times. A child should never be unsupervised in or near water, even shallow wading pools.* Devices such as "water wings" can not be relied upon to keep children afloat and alive. Young children can drown in as little as one inch of water, very quickly.

¹² <http://www.kidsandcars.org/>

¹³ <http://caag.state.ca.us/firearms/devices.htm> or <http://justice.hcdcojnet.state.ca.us/safetydevice/allmakes.pdf>.

¹⁴ <http://www.ea.state.ne.us/content/pdf/alexa2.pdf>

¹⁵ <http://www.sfm.ne.gov/publications/safetyalerts.html>.

Smoke alarms should be installed and maintained on every floor of a home. Smoke alarms are recommended in each sleeping room. Alarms need to be tested frequently and the batteries replaced at least once a year. The entire alarm should be replaced every 10 years as the sensors wear out even though the alarm will still sound when tested. Devices are currently available to assist individuals with sight and/or hearing impairment to recognize warnings provided by smoke alarms.

Extinguish all candles when leaving the room or going to sleep.

Family discussions on fire safety will help familiarize young children with what to do during a fire, including practicing an escape plan. These discussions can also help adults recognize and correct any hazards that would delay or block escape.

Medicines should be kept in a locked cabinet, out of the reach of children. Medicines should not be “shared” among family members. Nearly 40% of accidental poisonings of children involve medications. The poison control hotline number is 800-222-1222.

Parents and caregivers should be aware of the types of foods and objects that pose a choking risk for children, become familiar with methods to reduce this risk, and be able to treat choking in children.¹⁶

¹⁶ <http://www.heimlichinstitute.org/howtodo.html#infantAnchor>.

Suicide - Key Findings

Suicide rates for Nebraska children ages 10 to 17 increased slightly between 2001 and 2004 (Figure 24). While the actual number of deaths is relatively small, Nebraska's rates have been statistically significantly higher than national rates during that period. During 2004, at least 10 children ranging in age from 13 to 17 and resident in seven Nebraska counties took their own lives (Table 16; Figure 25). The suicide rate for three urban/metropolitan counties (Douglas, Lancaster and Sarpy Counties) (3.16 deaths /100,000 population) was non-significantly higher than the remainder of the state (2.95 deaths / 100,000 population)¹⁷. Nearly three-quarters of the suicides were boys (70.0%) ranging in age from 13 to 17; only three (30.0%) of the suicide victims were girls (Table 16; Figure 25). Thirty percent of the children used a firearm to commit suicide (Table 16). Cases reviewed by the Team have consistently tended to fall into three groups:

- Youth with identified mental health issues where suicide had previously been identified as at risk;
- Youth with no identified mental health issues but who tended to have trouble in school, lacked a peer group and/or manifested feelings of hopelessness; and,
- Purely situational cases.

Figure 24

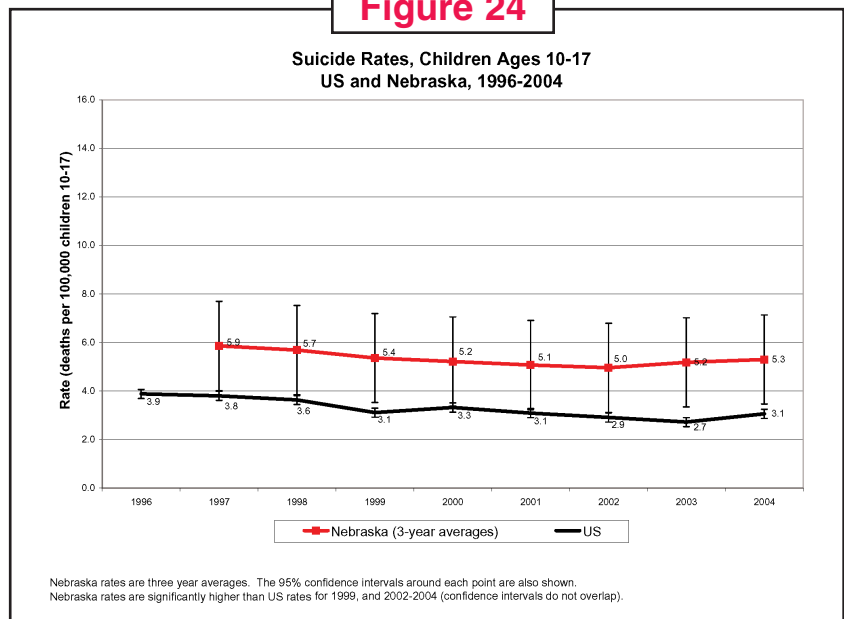
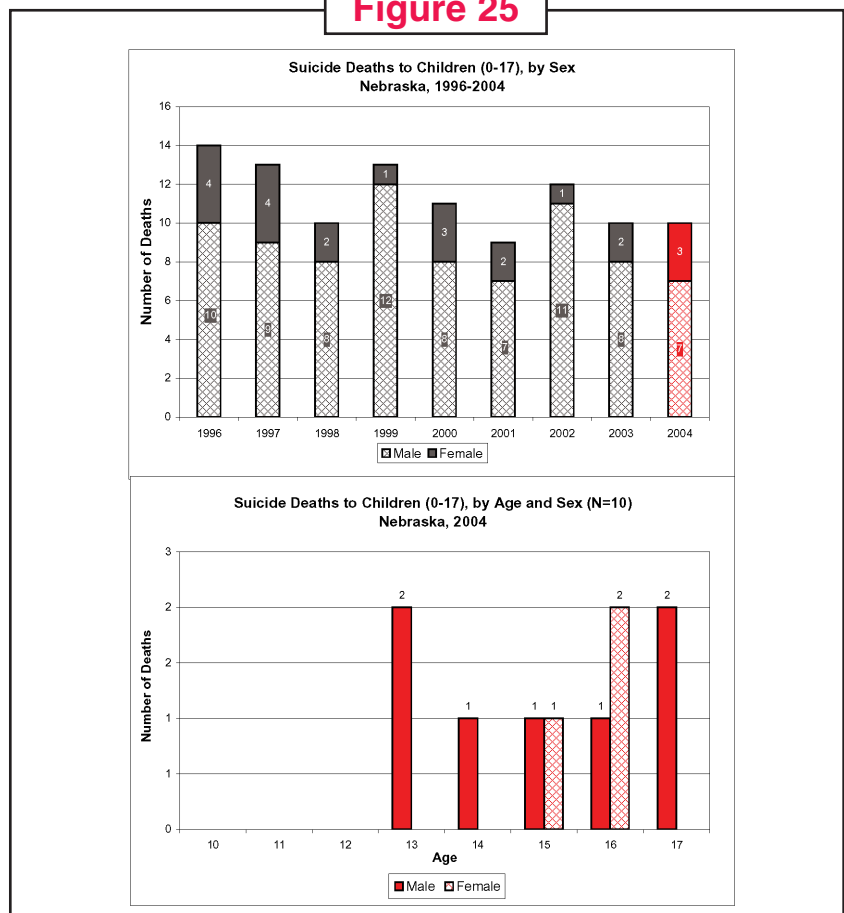


Figure 25



¹⁷ Based on 2000 Census data for county populations 10-17.

Discussion. In 2004, suicide was the second leading cause of death for children ages 10 to 17 nationwide. The 1999 Surgeon General’s Report on Mental Health noted that “Pre-existing mental health problems, availability of firearms, substance abuse, youth-specific stressful life situations, and a focus on the drama of suicide by the news and entertainment industries are all considered factors contributing to the incidence of youth suicide.” The Team felt there were several deaths that probably could have been prevented if the youth had not had access to a firearm during a critical period.

Youth who are lacking a strong support system at home are also particularly vulnerable to experiencing feelings of hopelessness and isolation. Programs that match youth with caring adults who spend time with them and take an interest in them may reduce their feelings of hopelessness and isolation. A growing body of literature points to effective mental health interventions that reduce risk for suicide when youth considering suicide are identified and treated with therapy and medication.

Effective prevention of youth suicide requires collaboration between prevention, early intervention and treatment programs. All communities and school systems need the ability to screen for and identify youth at risk for suicide and to implement individualized intervention plans when needed. Schools should be considered an important part of this system, as they “cannot achieve their mission of educating the young when students’ problems are major barriers to learning and development.”¹⁸ The state’s Injury Prevention Program and the Suicide Prevention Committee have recommended integrating suicide assessment and prevention into school curricula.

➤ **Recommendations**

State Policy Makers and Communities: *All teenagers need access, including financial access, to confidential, professional mental health services.* Co-locating mental health professionals with health care providers or within other non-traditional settings may make youth more comfortable accessing these services.

Funding is needed for community-based adolescent suicide prevention programs. A pilot Gatekeeper Training project was begun in southeast Nebraska in 2003 that targeted educators, primary care providers, law enforcement officers, and clergy for training on the warning signs, risk factors, and interventions to prevent suicide. This project should be evaluated and potentially replicated in other areas of the state.

Communities, Schools and Parents: *Broad-based public education efforts are needed to draw attention to suicide as a significant and preventable cause of death for youth, create awareness of signs that indicate risk for individual youth, and encourage help-seeking actions when at-risk youth are identified.* The Nebraska Suicide Prevention Committee recommends implementation of Columbia University’s TeenScreen[®] Program in schools¹⁹.

¹⁸ Excerpted from Youth Suicide Prevention: Mental Health and Public Health Perspectives. UCLA.

¹⁹ <http://www.teenscreen.org/>.

Among the many other available resources are the National Center for Suicide Prevention Training's on-line workshops on "Planning and Evaluation for Youth Suicide Prevention," and "Youth Suicide Prevention: An Introduction to Gatekeeping".²⁰ The "Youth Suicide Prevention School-Based Guide" provides user-oriented materials for schools to address this difficult topic, evaluate their prevention efforts, and assist in developing partnerships with communities and families.²¹

Parents: *Any suicidal gesture, no matter how "harmless" it seems, demands immediate professional attention.* Parents need to be aware of signs and symptoms of depression and/or suicidal ideation in teenagers and not be afraid to talk to their children about them. No talk of suicide should be taken lightly and parents should not be reluctant to seek help if their child seems depressed, highly anxious or has made suicide threats.

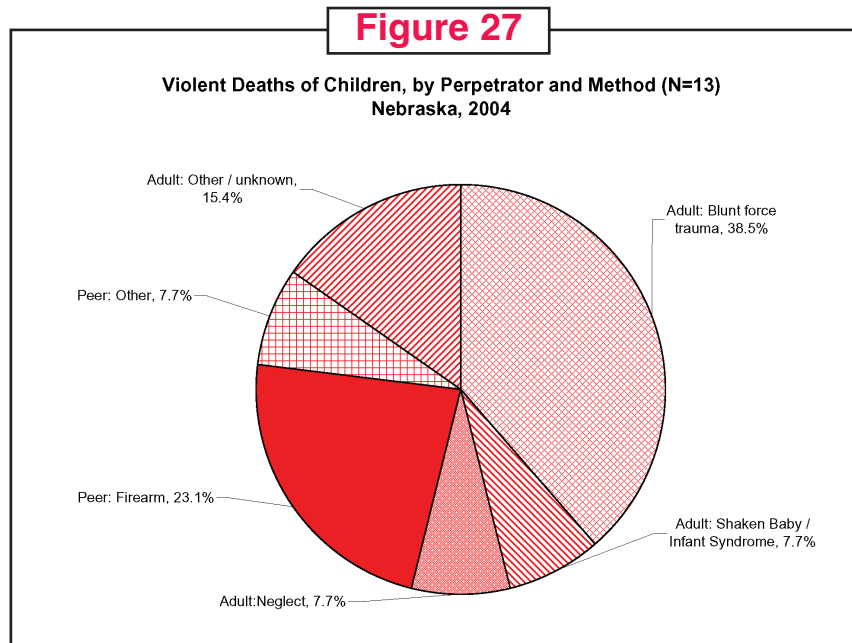
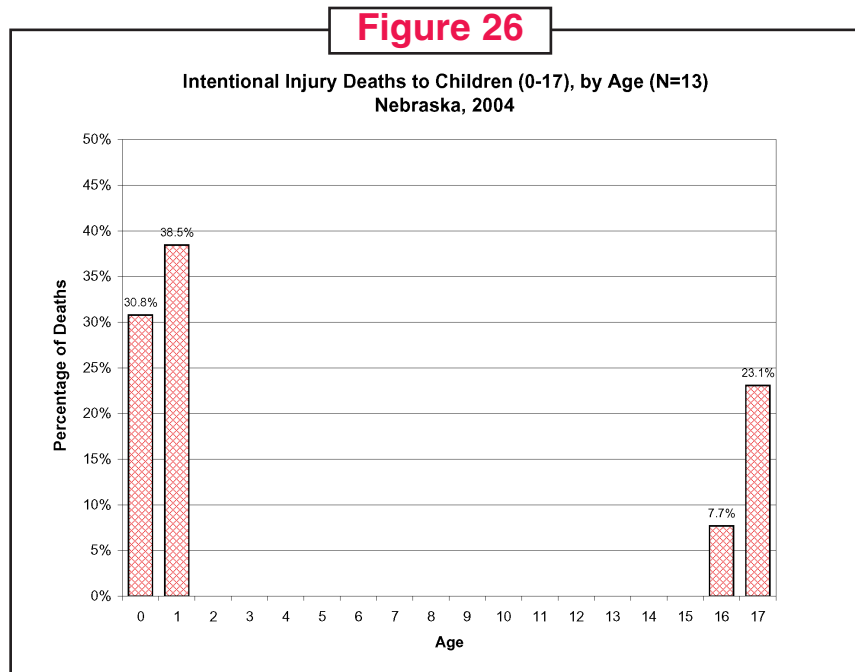
Parents who keep firearms in the home must understand the importance of storing unloaded firearms and ammunition in separate, locked and inaccessible locations.

²⁰ <http://www.ncspt.org/about.asp>.

²¹ <http://theguide.fmhi.usf.edu/>.

Homicide – Youth Violence / Criminal Child Abuse & Neglect - Key Findings

Thirteen children suffered violent, abusive or neglectful deaths during 2004; all deaths were either to children under two or ages 16-17 (Table 17; Figure 26). Three male teenagers were shot in disputes with friends or peers and one female teen suffered a fatal asthma attack following a peer assault (Table 17, Figure 27). These four deaths occurred in Douglas County, which has borne most of the burden of teen-on-teen violence in the state.



Of the nine children not killed by peers, five (38.5%) died from blunt force trauma, e.g., having their head hit against a hard surface, and one each (7.7%) from Shaken Baby / Shaken Infant Syndrome and from being smothered (Table 17, Figure 27).

The remaining two deaths were of a one-year old child who was unintentionally electrocuted after being locked in a room for up to two days (criminal child neglect) and an newborn whose badly decomposed body was found in a spillway (no perpetrator or parent identified). These nine deaths occurred in six different counties; about half (55.5%) of the victims were female.

Discussion – Youth Violence. Nationally, homicide is the third leading cause of death for children ages 10 to 17. For older teens (15-17), it is second only to motor vehicle accidents as a cause of death. Research increasingly shows that family structure and stability, particularly for boys, is an important determinant of adolescents’ involvement in violent behavior. Additionally, the availability of guns turns “normal” adolescent conflicts into violent confrontations resulting in serious injury or death. Common risk factors for adolescent gun violence include:

- Exposure to violence, including domestic violence and violent media (e.g., movies, song lyrics, video games);
- Being victimized, including bullying;
- Lack of self-control;
- Low self-efficacy;
- Aggression;
- Gang involvement;
- Substance use; and,
- The availability of guns.

There are multiple resources available to communities wishing to reduce youth violence. At the national level, the Surgeon General’s Report on Youth Violence (2001) examines youth violence from a public health perspective, with an important focus on protective factors and effective, research-based prevention strategies that can be implemented by parents, schools, and communities. The Guide to Community Preventive Services reviews the effectiveness of community interventions that work to prevent violence through four main approaches: (1) behavioral change interventions, (2) health and education system level interventions, (3) legislation and public policy interventions, and (4) environmental interventions. Effective community-based programs to prevent youth violence typically include:

- Clear goals and objectives;
- A broad base of community professionals, organizations and parents;
- An understanding of the source of firearms used in crimes; and,
- An understanding of the extent of violence-related injuries as well as deaths.

The US Office of Juvenile Justice has also assessed “best practice” programs that work to strengthen families and parental relationships as a way of preventing juvenile delinquency and substance abuse.

➤ **Recommendations**

Communities: *Schools, communities and others concerned about youth violence should be aware of and take advantage of the substantial resources available to help develop effective, community-based prevention programs.*

Support the development of healthy families. To provide for healthy child development, the community must support parents and other adult caretakers of children. Basic support for families includes healthy relationship education, affordable housing, access to health care, employment, quality day care, quality education, and safe neighborhoods. Specific focus should be directed to teenage parents who are at very high risk of limited parenting skills.

Parents:²²

- Monitor/supervise children’s use of the Internet, television, reading material, movies, music, and video games;
- Establish and enforce household rules and reward positive behavior;
- Supervise the activities of children; know their schedule and their friends;
- Practice zero-tolerance for bullying in the family and take proactive steps to eliminate bullying in schools; and,
- Encourage community service.

Discussion – Criminal Child Abuse & Neglect. The nine adult-caused child deaths in 2004 represented a decrease from the 28 observed during 2002-2003, although it is higher than the average 5.2 per year observed from 1996-2001. Previous CDRT reviews found that alcohol and drugs play large parts in child neglect, inappropriate child care, and fatal child abuse. Actions taken to prevent child deaths resulting from abuse by a caretaker must include strategies to address the problems of substance abuse and domestic violence. Young children should never be left in the care of persons who are not suited to handle the particular pressures posed by infants.

LB157, currently under consideration by the Nebraska Unicameral, would allow a parent to voluntarily relinquish custody of a newborn child within 72 hours of birth to a firefighter or hospital. Nebraska is currently one of only two states without such a “safe haven” law.

²² Excerpted from Youth and Violence, Commission for the Prevention of Youth Violence, 2000. Available at <http://www.ama-assn.org/ama/upload/mm/386/fullreport.pdf>.

➤ **Selected Recommendations from the 2003 Governor’s Children’s Task Force**

Prevention:

- *Statewide, voluntary home visiting programs are needed that provide support and assistance to expecting and new mothers in their homes.*
- *There is a need for parent education programs located, for example, in high schools that focus on teen parents, or within substance abuse treatment programs for mothers and families with young children.*

➤ **Recommendations from the Child Death Review Team**

Communities and Parents: *Expanded availability of safe and affordable child care will reduce the number of children left in inappropriate and/or unsafe situations.*

“Never, never, never shake a child[®].”²³ Shaking is ineffective in stopping crying and causes tearing and bleeding of veins inside the brain. Severe damage from shaking can occur in children through age five. There are many resources available to help communities understand and publicize the dangers of shaking babies.²⁴

Caretaker Neglect and Inconclusive Neglect - Key Findings

Deaths are attributed to caretaker neglect when a child’s caretaker(s) knowingly does something that places the child’s life in danger or does not remove the child from a dangerous situation. The National Center for Child Death Review recognizes five types of supervisory neglect:

- Failure to protect from hazard
- Failure to provide necessities (food, shelter, other)
- Failure to seek medical care / follow treatment
- Emotional neglect
- Abandonment

Deaths where a caretaker was convicted of child abuse or neglect, or likely would have been if identified, are reported in the category of Criminal Child Abuse / Neglect. Child protection specialists from the Team individually reviewed all remaining injury deaths to young children for a possible fit with the categories of neglect listed above. No cases in 2004 were considered to fit the criteria for neglect.

²³ “Never, never, never shake a child” is the copyrighted slogan of SBS Prevention Plus.

²⁴ <http://www.hhss.ne.gov/protectachild/shakenbaby.htm>.

Discussion. Determining when a lack of supervision of small children crosses the line between understandable and negligence is complicated; parental responsibility for supervision is constantly challenged by competing demands. However, the younger the child the less time he/she should be left unwatched and/or unaccounted for.

➤ **Recommendations**

Parents: *Young children should never be left unsupervised.*

Substance Use During Pregnancy

Nationally, between 5.5% and 18% of all births are thought to be affected by illegal drug use during pregnancy. Established delivery and neonatal complications from illegal drugs such as cocaine and methamphetamine include premature rupture of membranes (PROM), placental abruption, preterm delivery, and pre-eclampsia-like symptoms. However, because these problems also occur in non-drug using women, it is difficult to state with certainty when an infant's or child's death was directly related to the mother's drug use.

As a result, although several child deaths had indications that they were related to gestational exposure to cocaine, other illicit drugs and/or alcohol use, none of the 2004 deaths were able to be directly attributed to maternal substance use.

➤ **Recommendations**

Health Care Providers: *Delivery personnel should be able to recognize and report Fetal Alcohol Syndrome and other disorders related to prenatal alcohol consumption.* The number of maternal alcohol-affected newborns is much likely higher than the zero to five cases reported annually in Nebraska. Accurate knowledge of the prevalence of FAS will aid in its treatment and prevention.

Communities: *Specialized resources should be available for substance-addicted pregnant women who are trying to quit.* Providers need to be aware of available referral options.

Parents and Communities: *Women should abstain from drinking alcohol at any time during pregnancy.* Women are more likely to abstain from drinking during pregnancy when their partner also accepts the need to do so. There is no known safe amount of alcohol to drink while pregnant, nor does there appear to be a safe time to do so.

Medical Error

Although several deaths in 2004 occurred under circumstances where the available information indicated less-than-optimal medical care was delivered, only one clearly rose to the level of medical error. This involved the hospital-based care of a newborn infant. Litigation in the case was dismissed by the District Court.

Undetermined

The cause of death of one child remained officially undetermined, even after extensive law enforcement and medical investigations (Table 1). Circumstances in this case were such that neither medical causes nor inflicted injuries could be ruled out. This case is cross-listed in the SIDS/SUID section.

No information available

There were no child deaths from 2004 where the Team was unable to obtain at least minimal cause of death information (Table 1).

ACTIONS TAKEN ON RECOMMENDATIONS FROM PREVIOUS ANNUAL REPORTS

Regarding Pregnancy-Related Deaths

1. (Providers) Continuing education on cause of death determination should be provided to all persons who fill out death certificates. (1996-2001, 2002-2003)

Update: The CDRT will again sponsor workshops during 2007 on accurate determination of cause of death, and how to fill out death certificates. The workshops are oriented towards physicians, county attorneys, and coroners.

Regarding Birth Defects / Congenital Anomalies

2. (Providers) Every effort should be made to accurately identify and report congenital anomalies at birth, whether or not they are lethal. (1996-2001, 2002-2003)
3. (Providers) Delivery personnel should be able to recognize and report Fetal Alcohol Syndrome and other disorders related to prenatal alcohol consumption. (1996-2001)

Update: LB 56, currently under consideration by the Nebraska Unicameral, provides for public and provider education around Fetal Alcohol Syndrome and prevention.

Regarding SIDS and Infant Suffocation

4. (State Policy Makers) Infants in child care facilities should be put to sleep on their back unless there is a documented medical reason why the child should sleep in a different position. Regulations for child care facilities that require crib “bumper pads” and that allow stuffed toys in cribs should be repealed. (1996-2001, 2002-2003)

Update: The Child Care Licensing Program (HHSS) has submitted a proposal for statewide regulations for licensed child care requiring that infants be put to sleep on their backs in the absence of a specific waiver, specifying appropriate sleep surfaces for infants and children, and prohibiting toys and blankets in cribs.

5. (State Policy Makers) State-level funding should support work to reduce the prevalence of smoking among pregnant and postpartum women. (1996-2001, 2002-2003)

Update: While there are currently no on-going, state-funded tobacco cessation programs specifically for pregnant and postpartum women, the Tobacco Free Nebraska (TFN) program does provide the Nebraska Tobacco Quitline which offers free, telephone-based cessation counseling services for up to five counseling sessions. The Quitline has tailored protocols for pregnant women.

Other TFN projects include:

- Funding pilot projects at area hospitals to offer individual and group cessation counseling services to women who are pregnant, contemplating pregnancy, or up to 12 months postpartum and their spouses.

-
- Providing educational resources to the Geneva Youth Rehabilitation and Treatment Center's Mothers and Babies Program.
 - Placing an ad in the Omaha World-Herald on or near Mothers Day
 - Providing funding for resource materials for school nurses in the state including on prevention, cessation, spit tobacco, and second-hand smoke topics.
6. (State Policy Makers) A standardized death scene investigation should be conducted for all unexpected child deaths. (1996-2001, 2002-2003)

Update:

- Two CDRT members sit on the Child Death Scene Investigation Protocol Committee, a subcommittee of the Governor's Commission for the Protection of Children, convened in 2005 to improve the amount and quality of information obtained after an infant death.
 - Nebraska Revised Statute §23-1824 (2006), now requires death scene investigations for unexpected infant and child deaths, and provides partial funding for autopsies of children under five.
 - Douglas County law enforcement is using doll re-enactments in child death scene investigations.
7. (Community Organizations and Child Advocates) Existing SIDS prevention regulations, messages and initiatives should be expanded to include other "Safe Sleeping" issues and options. (1996-2001, 2002-2003)

Update:

- Nebraska Revised Statutes §71-2101-2104 (2006) require hospitals to provide written material and a video to new parents on safety measures which can be taken to prevent sudden infant death, and the dangers associated with infants sleeping in the same bed with other children or adults. The Nebraska Department of Health and Human Services is currently preparing a video for hospital use.
Other provisions of these statutes include training requirements for child care providers and public awareness activities. Activities are being developed in accordance with the broader safe sleeping guidelines as included in the American Academy of Pediatrics revised SIDS risk reduction policy statement of 2005.
- The Baby Blossoms Initiative is continuing its work to promote safe sleep messages to child care providers, health care facilities and parents in Douglas County.

Regarding Infectious, Chronic and Other Medical Conditions

8. (State Policy Makers) A statewide registry to track immunizations would allow for better development of prevention strategies against existing and emerging diseases. (2002-2003)

Update: The 2006 Nebraska Unicameral authorized an interim study on the status of implementing an immunization registry. The state's Immunization Program has chosen available public access software and is in the process of adapting it for Nebraska's use as quickly as resources allow.

Regarding Motor Vehicle Crash Deaths

9. (State Policy Makers and Communities) Upgrade Nebraska's Graduated Licensing Provisions. (1996-2001, 2002-2003)

Update: LB415, passed by the Nebraska Unicameral in 2007, strengthens the requirements for provisional licenses, including increasing the number of practice driving hours, limiting the number of non-family member passengers, restricting driving after 12 midnight, and prohibiting the use of a cell phone while driving.

10. (Parents) A child who has outgrown a child safety seat (generally at 40 pounds) should use a booster seat until approximately age 8 or 80 pounds and/or 4'9" tall. (1996-2001, 2002-2003)

Update: LB 254, currently under consideration by the Nebraska Unicameral, increases the requirement of use of a passenger restraint system to age eight.

11. (Parents) Parents should be aware of the high potential for serious injury and even death when ATVs are ridden or operated by children under 16. ATVs should be operated only on designated trails, not on public roads, paved surfaces or fields. (1996-2001, 2002-2003)

Update: LB 288, currently under consideration by the Nebraska Unicameral, permits ATV use on all roads but highways and permits the crossing of non-controlled access highways by persons with a Class O operator permit.

Regarding Child Abuse and Neglect Deaths

12. (State Policy Makers and Communities) Statewide, voluntary home visiting programs are needed that provide support and assistance to expecting and new mothers in their homes. (1996-2001, 2002-2003)

Update:

- The 2005 state budget (LB 425) authorized pilot home visitation programs. From December 1, 2005 through November 30, 2006, services were provided at two pilot sites (one urban and one rural) to 68 families with 83 children that are at high risk of child abuse and neglect, including nearly 1,500 hours of in-home services. As of March 2007, 55 children (66.3%) continue to receive services with their families working their way towards successful completion of the programs. The programs will be evaluated after two years of operation.
- LB 55, currently under consideration by the Nebraska Unicameral, would increase this funding level to create statewide home visitation, child screening and early intervention, and parenting education programs.

13. (Communities and Parents) “Never, never, never shake a child©.”²⁵ (1996-2001, 2002-2003)

Update:

- The "You Have the Power to Protect a Child" campaign²⁶ was developed by HHSS in response to recommendations made by the Children’s Task Force. The campaign is focusing on raising public awareness on four topics: child abuse prevention, shaken baby syndrome, domestic violence, and substance abuse (specifically methamphetamine); and includes television and radio spots, newspaper ads, and posters and brochures.
- The Nebraska Child Abuse Prevention Fund Board (NCAPFB) provides grants to local communities and agencies for child abuse prevention activities. During 2006, NCAPFB awarded over \$200,000 to 11 programs for these activities.
- In 2006, Nebraska Health and Human Services, Nebraska Children and Families Foundation and the Nebraska Child Abuse Prevention Fund Board formed the Nebraska Statewide Prevention Partnership. This Partnership is committed to increasing public awareness of child abuse, delivering child abuse prevention “best practice” models to local communities, building community capacity to increase protective factors, strengthening families by support, and encouraging community-based partnerships. The Partnership’s goal is to reduce child abuse in Nebraska by 20 percent by the year 2020. The Partnership's 2007 “Winds of Change” campaign is highlighting how parenting has changed as a result of changes in social, cultural and demographic trends in families; working to educate parents and caregivers on positive child guidance techniques and developmentally appropriate expectations; demonstrating how to prevent child abuse rather than how to stop child abuse from occurring; and advocating for a community – wide commitment to support all children from birth.

14. (State Policy Makers and Communities) Broad-based public education efforts are needed to draw attention to suicide as a significant and preventable cause of death for youth, create awareness of signs that indicate risk for individual youth, and encourage help-seeking actions when at-risk youth are identified. (1996-2001, 2002-2003)

Update:

- The Nebraska Health and Human Services System Injury Prevention Program, the Injury Community Planning Group (ICPG), and the Nebraska State Suicide Prevention Committee sponsored a Suicide Prevention Symposium in June, 2006. Recommendations from the symposium included working with schools around youth suicide awareness and prevention.
- The Nebraska Commission on Indian Affairs has made youth suicide prevention a priority for 2007.

²⁵ “Never, never, never shake a child” is the copyrighted slogan of SBS Prevention Plus.

²⁶ <http://www.hhss.ne.gov/ProtectAChild/index.htm>

Glossary

Births

Apgar Score

Newborn viability is most often assessed by the Apgar score. The Apgar score is a widely used assessment of the physical condition of a newborn infant based on heart rate, muscle tone, breathing effort, color and reflex responsiveness. Scores are assessed at 1, 5 and 10 minutes after birth. A score of 10 suggests the healthiest infant, and scores below 5 indicate that the infant needs immediate assistance in adjusting to his or her new environment. The Apgar test is non-invasive and does not involve risk to the newborn.

Birth Defect / Congenital Anomaly

A birth defect is an abnormality of structure, function or metabolism (body chemistry) that is present at birth. Birth defects may be caused by chromosomal or “hereditary” errors or by other influences on the fetus during gestation. They are the leading cause of death for infants. The March of Dimes groups birth defects in three main categories:

- Structural/metabolic (e.g., neural tube defects, missing organs),
- Congenital infections (e.g., Rubella (German measles), syphilis), and
- Other (e.g., Fetal Alcohol Syndrome (FAS)).

For this report, birth defects are only categorized as such if there was no known cause for their occurrence. For example, defects resulting from congenital infections are considered under Maternal Complications; defects resulting from FAS are under Maternal Substance Use.

Gestation

The gestational age of the newborn is the interval between the first day of the mother’s last normal menstrual period (LMP) and the date of birth. It is typically determined by maternal recall, but can also be determined by clinical examination if the mother’s information is not available or is inconsistent with the fetus’ or newborn’s size.

Live Birth

The state of Nebraska defines a live birth as “The complete expulsion or extraction of a product of conception from its mother, irrespective of the period of gestation, which, after such separation, breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached, and is reportable.”

Premature birth

Premature birth is a leading cause of infant mortality, yet little is known on how to prevent it. A normal gestation is defined as 37 to 41 weeks; an infant born at 37 or fewer weeks of gestation is considered premature. Through 37 weeks, major systems and organs are still developing.

However, babies with at least 28 weeks of gestation are considerably more likely to survive; each additional week of gestation improves the likelihood of survival and decreases the probability of lifelong disabilities. Multiple gestation pregnancies (twins, triplets, etc.) are more likely to deliver prematurely. The prematurity rate is the number of live births of 37 weeks or less gestation divided by the total number of live births.

Viable

Capable of living; born alive and with such form and development of organs as to be capable of living.

Death / Mortality

Cause of Death

The *immediate* cause of death is the disease (condition) or complication occurring closest to the time of death that leads to or contributes to death, and is classifiable according to the International Classification of Diseases (ICD) system. The State of Nebraska used the Ninth Revision for deaths up until 1998, and the Tenth Revision since 1999. However, the immediate cause of death does not necessarily reflect the complete set of reasons for the death. The *underlying* cause of death is the disease or condition that initiated the train of morbid events leading directly to death, and may be many years removed from the actual occurrence of death.

Although immediate causes of death are often preventable, underlying causes are more informative for primary prevention purposes as defined by the Team. For example, pneumonia deaths are largely preventable. However, when pneumonia is the immediate cause of death in a child who is ventilator dependent due to cerebral palsy, prevention of infantile or childhood cerebral palsy becomes the larger, long-term focus. Similarly, while massive head trauma may be an immediate cause of death, prevention of the motor vehicle crash that caused the trauma is as important as improved emergency medical care.

Manner of Death

The manner of death is important and distinct from the cause of death. Manner of death is typically classified as:

- Natural
- Accidental
- Homicide
- Suicide
- Undetermined
- Unknown / No Answer

Fetal Death

The state of Nebraska follows the National Center for Health Statistics' definition of a fetal death as "... death prior to²⁷ the complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy and which is not an induced termination of pregnancy. The death is indicated by the fact that after such expulsion or extraction, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles."

Neonatal Death

Death of a live born infant under 28 days of age.

Perinatal Death

Death of a fetus after 28 weeks or more of gestation or of a live born infant within seven days of life.

Medical Conditions

Cancer / Malignant Neoplasms

Cancer begins in cells, the building blocks that make up tissues. Normally, cells grow and divide to form new cells as the body needs them. When cells grow old, they die and new cells take their place. When new cells form that the body does not need and old cells do not die when they should, these extra cells can form a mass of tissue called a growth or tumor. Not all tumors are cancer. Tumors can be benign or malignant:

- Benign tumors are not cancer
 - Benign tumors are rarely life-threatening.
 - Usually, benign tumors can be removed, and they seldom grow back.
 - Cells from benign tumors do not spread to tissues around them or to other parts of the body.
- Malignant tumors are cancer
 - Malignant tumors generally are more serious than benign tumors. They may be life-threatening.
 - Malignant tumors often can be removed, but they can grow back.

Hypoxia / Asphyxia

Hypoxia is an insufficient supply of oxygen to the brain. The American Academy of Pediatrics states that an infant who has had "asphyxia" or hypoxia immediately prior to or during delivery that is severe

²⁷ Emphasis added.

enough to result in acute neurologic injury should demonstrate all of the following: (a) profound metabolic or mixed acidemia (ph <7.00) on an umbilical arterial blood sample, if obtained, (b) an Apgar score of 0 to 3 for longer than 5 minutes, (c) neurologic manifestation, e.g., Seizure, coma, or hypotonia, and (d) evidence of multiorgan dysfunction. Because this level of detail was rarely available for this report, the physician's or pathologist's assessment was accepted.

Neural tube defect(s)

The neural tube is the part of the developing fetus that becomes the spinal cord and brain. Neural tubes close within the first four weeks of gestation, often before a woman knows she is pregnant; neural tube defects (NTD) occur when the tube only closes partially or not at all. NTDs are among the most common of all serious birth defects.

The two major types of NTDs are anencephaly and spina bifida. Anencephaly is the partial or complete absence of the baby's brain. This defect causes extensive damage, and most of these babies are stillborn or die soon after birth. Spina bifida occurs when an opening remains in the spine. These babies need surgery soon after birth to close the spine and prevent further damage. They also may need a shunt or a drain to prevent a build-up of spinal fluid in the brain called hydrocephalus. Babies with spina bifida may lack feeling in their legs and later develop problems with walking. In addition, these children may develop problems with their bowel and bladder control. They may also have learning problems, and some have mental retardation.

Sudden Infant Death Syndrome (SIDS)

SIDS is officially defined in Nebraska as the sudden death of an infant less than 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.²⁸ Major risk factors for SIDS are pre- or post-natal exposure to tobacco smoke, low birth weight, not breast-feeding, and the baby not sleeping on his/her back. SIDS is officially a diagnosis of exclusion, when no legitimate cause of death can be determined by autopsy or other means.

Trisomy

Trisomies are genetic conditions present at birth where cells contain three copies of specific chromosomes instead of the normal two copies. For example, the presence of three copies of chromosome 21 is called Trisomy 21. A partial trisomy occurs when part of an extra chromosome is attached to one of the other chromosomes. A mosaic trisomy occurs when not all cells contain the extra chromosomal material. Trisomies can result in birth defects, miscarriage or early infant death.

Other Terms

Preventability

²⁸ Nebr. Rev. Stat. §71-605.

The Team focuses on identifying deaths that could have been prevented under Nebraska's definition:

“Preventable child death shall mean the death of any child which reasonable medical, social, legal, psychological, or educational intervention may have prevented. Preventable child death shall include, but not be limited to, the death of a child from (a) intentional and unintentional injuries, (b) medical misadventures, including untoward results, malpractice, and foreseeable complications, (c) lack of access to medical care, (d) neglect and reckless conduct, including failure to supervise and failure to seek medical care for various reasons, and (e) preventable premature birth; Reasonable shall mean taking into consideration the condition, circumstances, and resources available.” §71-3405 Neb. Rev. Stat.

While preventability is often a straightforward assessment, it can also be quite challenging. For example, if a seizure disorder has been controlled with medications yet causes a 17-year old driver to have a fatal motor vehicle crash, preventability becomes problematic. Because of the large number of cases reviewed for this report, individual assessments of preventability were made only for potential “Caretaker Neglect.” Team members did feel that it is reasonable to assume that most motor vehicle-related deaths are preventable, particularly given the large numbers of deaths that occurred when an unrestrained child was ejected from the vehicle. Likewise, the unintentional and intentional injuries were largely preventable. On the other hand, most of the medical conditions appeared to have received appropriate medical care and thus the resulting deaths were perhaps not preventable.

Although the Team is comfortable with the generalized assessments of preventability made for this report, it is clear that determinations made on a case by case basis are preferable. This is the process that is being developed for future reports.

Race and Ethnicity

Nebraska assigns infant race and ethnicity at birth as that of the mother as reported on the birth certificate. Ethnicity and race are overlapping categories and are thus reported separately. For the time period of these data (2004), Nebraska recognized four racial categories: White, African-American, Native American and Asian / Pacific Islander.

Risk Factor

There is a distinct difference between a “risk factor” for a disease and a “cause” of that disease. A “cause” refers to something that leads to something else with some degree of certainty through a recognized series of normal or abnormal events. For some diseases or conditions, however, such causes remain unknown and possible chains of events are only hypotheses or theories. Therefore public health workers talk about “risk factors,” factors that are found more frequently in a group of people with a certain problem than in a group of people without that particular problem. The connection between the risk factor and the problem is not always obvious. Some risk factors are not at all modifiable, such as sex and birth year. Others are categorized as such because, for instance, once an infant is born its birth

weight and gestational age can not be changed even though they may place the infant at risk for other diseases. However, some risk factors can be modified, for example, sleeping position, use of car restraints, vaccination status.

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Appendix – Detailed Data Tables

Table 1.

Underlying Cause of Death	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)
Preterm Birth	43	51	40	39	47	34	44	24	45	367
Maternal Complications	41	24	34	29	38	46	35	34	37	318
Complications of Labor & Delivery	13	9	5	9	4	5	7	1	2	55
Other Pregnancy & Neonatal-Related Conditions	5	9	6	4	1	5	0	0	3	33
Total, Pregnancy-Related	102	93	85	81	90	90	86	59	87	773
Pregnancy Related	102	93	85	81	90	90	86	59	87	773
Birth Defects / Inherited & Chromosomal Disorders	73	56	57	59	66	69	68	61	74	583
SIDS	35	23	25	24	27	26	19	23	18	220
Cancer / Neoplasms	14	9	11	11	11	8	12	9	19	104
Infectious, Chronic & Other Medical Conditions	24	17	26	29	20	22	27	17	17	199
Motor Vehicle Crash	52	43	43	47	36	38	44	48	40	391
Non-MVC Unintentional Injuries	15	17	17	19	19	11	17	15	22	152
Suicide	14	13	10	13	11	9	12	10	10	102
Homicide / Criminal Child Abuse & Neglect	11	14	9	8	14	7	13	15	13	104
Caretaker Neglect	4	3	5	8	6	3	4	3	0	36
Inconclusive Neglect	0	5	2	0	0	1	0	2	0	10
Maternal Substance Use	0	0	0	2	0	2	1	0	0	5
Medical Error	0	0	0	1	0	0	0	0	1	2
Undetermined	1	1	0	1	1	2	5	5	1	17
No Information Available	12	2	10	0	0	0	0	0	0	24
Total (N)	357	296	300	303	301	288	308	267	302	2,722
Percent (%)	13.1%	10.9%	11.0%	11.1%	11.1%	10.6%	11.3%	9.8%	11.1%	

Underlying Cause of Death	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Preterm Birth	42.2%	54.8%	47.1%	48.1%	52.2%	37.8%	51.2%	40.7%	51.7%	47.5%
Maternal Complications	40.2%	25.8%	40.0%	35.8%	42.2%	51.1%	40.7%	57.6%	42.5%	41.1%
Complications of Labor & Delivery	12.7%	9.7%	5.9%	11.1%	4.4%	5.6%	8.1%	1.7%	2.3%	7.1%
Other Pregnancy & Neonatal-Related Conditions	4.9%	9.7%	7.1%	4.9%	1.1%	5.6%	0.0%	0.0%	3.4%	4.3%
Total, Pregnancy-Related	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	95.7%
Pregnancy Related	28.6%	31.4%	28.3%	26.7%	29.9%	31.3%	27.9%	22.1%	28.8%	28.4%
Birth Defects / Inherited & Chromosomal Disorders	20.4%	18.9%	19.0%	19.5%	21.9%	24.0%	22.1%	22.8%	24.5%	21.4%
SIDS	9.8%	7.8%	8.3%	7.9%	9.0%	9.0%	6.2%	8.6%	6.0%	8.1%
Cancer / Neoplasms	3.9%	3.0%	3.7%	3.6%	3.7%	2.8%	3.9%	3.4%	6.3%	3.8%
Infectious, Chronic & Other Medical Conditions	6.7%	5.7%	8.7%	9.6%	6.6%	7.6%	8.8%	6.4%	5.6%	7.3%
Motor Vehicle Crash	14.6%	14.5%	14.3%	15.5%	12.0%	13.2%	14.3%	18.0%	13.2%	14.4%
Non-MVC Unintentional Injuries	4.2%	5.7%	5.7%	6.3%	6.3%	3.8%	5.5%	5.6%	7.3%	5.6%
Suicide	3.9%	4.4%	3.3%	4.3%	3.7%	3.1%	3.9%	3.7%	3.3%	3.7%
Homicide / Criminal Child Abuse & Neglect	3.1%	4.7%	3.0%	2.6%	4.7%	2.4%	4.2%	5.6%	4.3%	3.8%
Caretaker Neglect	1.1%	1.0%	1.7%	2.6%	2.0%	1.0%	1.3%	1.1%	0.0%	1.3%
Inconclusive Neglect	0.0%	1.7%	0.7%	0.0%	0.0%	0.3%	0.0%	0.7%	0.0%	0.4%
Maternal Substance Use	0.0%	0.0%	0.0%	0.7%	0.0%	0.7%	0.3%	0.0%	0.0%	0.2%
Medical Error	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%
Unable to Determine	0.3%	0.3%	0.0%	0.3%	0.3%	0.7%	1.6%	1.9%	0.3%	0.6%
No Information Available	3.4%	0.7%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%
Total (N)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2.

Preterm Births	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total	
	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	%
Singleton gestation	25	31	27	26	22	20	23	14	24	212	57.8%
Multiple gestation	18	20	13	13	25	14	21	10	21	155	42.2%
Total (N)	43	51	40	39	47	34	44	24	45	367	100.0%

Table 3.

Maternal Complications	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total	
	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	%
Diabetes, gestational	1	0	0	0	1	2	0	1	0	5	1.6%
HELLP syndrome*	0	0	5	0	0	1	0	1	4	11	3.5%
Hypertension, pregnancy-induced or chronic	0	2	4	1	0	1	0	2	4	14	4.4%
Incompetent cervix	7	6	14	6	12	10	7	9	11	82	25.8%
Infection / chorioamnionitis	3	1	2	2	5	6	4	6	7	36	11.3%
Infection, cytomegalovirus	1	1	0	0	2	2	1	0	0	7	2.2%
Infection, Group B streptococcus	0	0	0	0	0	0	1	0	0	1	0.3%
Infection, herpes	1	0	1	1	0	0	0	0	1	4	1.3%
Infection, HIV	1	0	0	0	0	0	0	0	1	2	0.6%
Infection, multiple / other	2	1	0	0	0	1	1	1	0	6	1.9%
Placenta previa	0	1	0	1	1	4	3	1	1	12	3.8%
Placental abruption / separation	10	3	4	13	11	9	9	5	5	69	21.7%
Pre-eclampsia / eclampsia	4	2	0	2	2	3	4	2	1	20	6.3%
Vaginal bleeding / uterine rupture	9	3	1	2	1	4	1	3	1	25	7.9%
Other / unknown	2	4	3	1	3	3	4	3	1	24	7.5%
Total (N)	41	24	34	29	38	46	35	34	37	318	100.0%

Table 4.

Complications of Labor & Delivery	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total	
	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	%
Perinatal hypoxia / asphyxia	11	8	5	5	2	3	4	0	2	40	72.7%
Meconium aspiration	2	1	0	3	0	1	1	1	0	9	16.4%
Aspiration pneumonia	0	0	0	0	0	0	1	0	0	1	1.8%
Delivery trauma	0	0	0	1	2	1	1	0	0	5	9.1%
Total (N)	13	9	5	9	4	5	7	1	2	55	100.0%

Table 5.

Birth Defects / Inherited & Chromosomal Disorders	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total	
	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	%
Neonatal (< 1 day)											
Bone disorder	0	2	1	1	1	1	1	1	2	10	5.7%
Chromosomal anomaly, Trisomy 13 (Patau syndrome)	2	1	0	0	0	1	1	2	2	9	5.2%
Chromosomal anomaly, Trisomy 18 (Edwards syndrome)	0	0	3	1	1	0	1	0	4	10	5.7%
Chromosomal anomaly, Trisomy 21 (Down syndrome)	0	0	0	0	1	0	1	0	0	2	1.1%
Chromosomal anomaly, other	1	0	1	3	1	1	2	0	0	9	5.2%
Conjoined twins	0	0	0	0	0	0	0	2	0	2	1.1%
DiGeorge syndrome	0	0	0	0	0	0	1	0	0	1	0.6%
Gastrointestinal / genitourinary anomaly	2	1	1	0	1	4	2	1	1	13	7.5%
Head / brain anomaly	0	1	0	0	2	1	1	1	1	6	3.4%
Heart defect / anomaly	1	2	1	1	0	1	0	5	2	13	7.5%
Hydrops fetalis, non-immune	0	0	0	1	0	0	1	2	0	4	2.3%
Kidney defect / anomaly	4	7	3	4	1	2	7	2	4	34	19.5%
Lung defect / anomaly	0	0	0	1	0	2	0	0	0	3	1.7%
Multiple congenital anomalies	1	2	3	3	5	5	2	1	2	24	13.8%
Neural tube defect - anencephaly	5	2	3	3	0	0	6	3	6	28	16.1%
Neural tube defect - encephalocele	1	0	1	0	0	0	0	0	0	2	1.1%
Neural tube defect - myelomeningocele / spina bifida	1	0	0	0	1	0	1	0	0	3	1.7%
Turner Syndrome	0	0	0	1	0	0	0	0	0	1	0.6%
Subtotal (N)	18	18	17	19	14	18	26	20	24	174	100.0%
	10.3%	10.3%	9.8%	10.9%	8.0%	26.1%	38.2%	32.8%	32.4%	29.8%	

Table 5 cont...

Post-neonatal (1+ days)	Age	Age	Age	Age	Age	Age	Age	Age	Age	(N)	%
Alstrom's Disease								13y		1	0.2%
Anemia, Fanconi's						5y				1	0.2%
Anemia, sickle cell					13y			1y		2	0.5%
Apert's Syndrome									9y	1	0.2%
Batten's disease				7y, 8y*						2	0.5%
Bone disorders	4d	8d	2m, 10m	1d				2d, 1y		7	1.7%
Bowen Conradi syndrome	10y									1	0.2%
Central Nervous System disorders	6wks, 9y					7y				3	0.7%
Cerebral palsy, infantile									10y	1	0.2%
Cerebro-costo-mandibular Syndrome	4y									1	0.2%
Chromosomal anomaly, Trisomy 13 (Patau syndrome)	1d, 3d			2d	2d, 3d, 4d, 5d,			2d	4d, 4d, 6d	13	3.2%
Chromosomal anomaly, Trisomy 18 (Edwards syndrome)	1d, 3d, 4d, 1m, 2m	1d, 1m, 2m	2d, 7d	2d, 4d, 4d	1d, 5d, 2m, 4m, 8m, 1y	1d, 5d, 22d, 1m, 7m	3d, 5d, 11d, 15d	1d, 5d	5d, 7d	32	7.8%
Chromosomal anomaly, Trisomy 21 (Down syndrome)	3m, 6m	3y	3m, 2y	15y	8m	6y		11y	1y	10	2.5%
Chromosomal anomaly, other	6d	1m		16d, 14y		2y, 3y		1y, 11y	2y	13	3.2%
Cockayne syndrome								5y		1	0.2%
Coffin-Siris Syndrome						11y				1	0.2%
Costello's Syndrome			6m							1	0.2%
Cystic fibrosis				17y						1	0.2%
Dandy Walker Syndrome			2y		9m					2	0.5%
DiGeorge Syndrome			26d	4y	11m	1y		2m	25d	6	1.5%
Gastrointestinal / genitourinary malformations	1d, 18d, 1y, 2y	17d	2d, 15d, 2m, 5m	1d, 3y	1d, 1m, 7y	4y, 14y	15d	12d, 1m	1d, 23d, 1y, 1y, 1y, 2y, 4y	26	6.4%
Head / brain anomalies, early myoclonic							1m			1	0.2%
Head / brain anomalies, holoprocencephaly	6y			14y	9y				2y	4	1.0%
Head / brain anomalies, hydrocephaly	3m, 12y, 16y	10y, 14y						14y		6	1.5%
Head / brain anomalies, other		2y			2d, 7m, 2y, 7y	11m, 1y, 2y	1m	8d, 10d	1y, 6y	13	3.2%
Heart disease, hypoplastic left	1d, 7d, 8d, 14d, 1m	2d, 8d, 11d, 1wk, 1y, 2y	2d, 6d, 5m	10d, 2m, 4m, 7m,	1d, 9d, 10d, 1m, 2m	3d, 2m, 3m	2d, 20d, 3m	3d, 23d, 6m, 1y	4m	34	8.3%
Heart disease, other	2d, 25d, 3m, 5m, 11m, 1y, 2y, 16y	2d, 5d, 6m, 12y, 16y	5d, 7d, 10d, 15d, 21d, 1m, 1m, 3m, 4m, 5m, 5m, 2y	1d, 2d, 2d, 3d, 1m, 2m, 5m, 8m, 2y, 9y, 9y	5d, 5d, 6d, 15d, 1m, 2m, 5m, 9m, 1y, 6y	1d, 7d, 8d, 8d, 13d, 16d, 16d, 1m, 1m, 1m, 1m, 4m, 8m, 9y, 12y	3d, 3d, 8d, 8d, 15d, 19d, 24d, 30d, 1m, 1m, 2m, 5m, 9m, 2y, 8y	17d, 2w, 2m, 6m, 1y, 1y	14d, 21d, 27d, 1m, 2m, 3m, 8m, 1y, 10y, 13y, 16y,	93	22.8%
Hemachromatosis					14y					1	0.2%
Hurler's Syndrome	1y				5y					2	0.5%
Hydromyelia			4m							1	0.2%
Hydrops, non-immune			2d		5d	1m	2d		24d	5	1.2%
Histiocytosis X		1y					4y			2	0.5%
Hypothalamic dysfunction									2y	1	0.2%
Kidney defect / anomaly		1d, 3d		1d		15y	2m	1m		6	1.5%
Klippel-Trenaunay-Weber syndrome								14y		1	0.2%
Krabbe's disease / sphingomyelinidosis)									1y, 11y	2	0.5%
Lactic acidemia, congenital			3m							1	0.2%
Leigh's encephalopathy		6m								1	0.2%
Leukemia, congenital								11d		1	0.2%
Leukodystrophy, metachromatic								16y		1	0.2%
Liver defect / anomaly	2y					2y, 3y, 11y	10y	2y		6	1.5%
Lung defect / anomaly	2m			11d	2y					3	0.7%
Menke's Disease		2y						9m		2	0.5%
Metabolic disorder	7d	6m	10m			2d, 3m				5	1.2%
Microvillus inclusion disease								2y		1	0.2%
Multiple congenital anomalies	5d, 12d, 1m, 2y, 3y, 5y	1d, 6d, 9d, 28d, 3m, 5m, 7m, 7m	12d, 25d, 10y	17d, 2m, 4m, 8m, 9m	3m, 2y	3d, 5y, 5y, 17y	1y	2d, 3d, 5y	2m, 9m, 1y, 11y	36	8.8%
Muscular dystrophy	15y			17y		17y			13y, 13y	5	1.2%
Myotonia, congenital	1m									1	0.2%
Myotonic dystrophy						16y				1	0.2%
Neural tube defect, anencephaly			1d		1d,1d,2d, 3d,5d			1m	2m	8	2.0%
Neural tube defect, encephalocele				4m		3d				2	0.5%
Neural tube defect, myelomeningocele / spina bifida	9d, 21d	7y	13y		14y		5y	12y, 13y	14y	9	2.2%
Neurodegenerative disease						1y				1	0.2%
Neuromuscular disorder	28d, 5m, 6y				2m, 4m	19d, 6m				7	1.7%
Otahara Syndrome			9m					6y		2	0.5%
Pena Shokeir Syndrome	16d									1	0.2%
Peripheral arterio-venous malformation									12y	1	0.2%
Persistent pulmonary hypertension	5m									1	0.2%
Rett syndrome								1y		1	0.2%
Sandhoff Disease								3y		1	0.2%
Seizure disorders				9y					17y	2	0.5%
Smith-Lemli-Opitz syndrome (defective cholesterol synthesis)								11d		1	0.2%
Spinal muscle atrophy								2m	2m, 4m, 5m	4	1.0%
Tay-Sach's Disease		3y								1	0.2%
Tracheal stenosis			1y							1	0.2%
Tumor, neuroectodermal								6m		1	0.2%
Zellweger's Syndrome		2m	3d							2	0.5%
Subtotal (N)	55	38	40	40	52	51	42	41	50	408	100.0%
	13.5%	9.3%	9.8%	9.8%	12.7%	73.9%	61.8%	67.2%	67.6%	70.0%	
Total (N)	73	56	57	59	66	69	68	61	74	583	
	12.5%	9.6%	9.8%	10.1%	11.3%	11.8%	11.7%	10.5%	12.7%	100.0%	
*Siblings.											

Table 6.						
Sleep-Associated Death – Official Diagnosis						
	Total	(%)				
SIDS	18	75.0%				
Medical Condition	2	8.3%				
Suffocation	2	8.3%				
Fall	1	4.2%				
Undetermined	1	4.2%				
Total (N)	24	100.0%				
Table 7.						
Sleep-Associated Death – Race / Ethnicity						
	SIDS		Other Diagnoses		Total	(%)
White	14	77.8%	5	83.3%	19	79.2%
African-American	3	16.7%	1	16.7%	4	16.7%
Native American	0	0.0%	0	0.0%	0	0.0%
Asian	1	5.6%	0	0.0%	1	4.2%
Total (N)	18		6		24	100.0%
	75.0%		25.0%			
Hispanic Ethnicity	2		1		3	12.5%
	66.7%		33.3%		12.5%	
Table 8.						
Sleep-Associated Death – Sex						
	SIDS		Other Diagnoses		Total	(%)
Male	12	66.7%	6	100.0%	18	75.0%
Female	6	33.3%	0	0.0%	6	25.0%
Unknown	0	0.0%	0	0.0%	0	0.0%
Total (N)	18		6		24	100.0%
	75.0%		25.0%			
Table 9.						
Sleep-Associated Death – Caretaker						
	SIDS		Other Diagnoses		Total	(%)
Babysitter / Child Care	3	16.7%	1	16.7%	4	16.7%
Parents / Family member	14	77.8%	5	83.3%	19	79.2%
Unknown	1	5.6%	0	0.0%	1	4.2%
Total (N)	18	100.0%	6	100.0%	24	100.0%
	75.0%		25.0%			
Table 10.						
Sleep-Associated Death – Age						
	SIDS		Other Diagnoses		Total	(%)
0 months	0	0.0%	0	0.0%	0	0.0%
1 month	4	22.2%	1	16.7%	5	20.8%
2 months	5	27.8%	0	0.0%	5	20.8%
3 months	2	11.1%	1	16.7%	3	12.5%
4 months	2	11.1%	0	0.0%	2	8.3%
5 months	1	5.6%	1	16.7%	2	8.3%
6 months	2	11.1%	2	33.3%	4	16.7%
7 months	2	11.1%	0	0.0%	2	8.3%
9 months	0	0.0%	1	16.7%	1	4.2%
10 months	0	0.0%	0	0.0%	0	0.0%
11 months	0	0.0%	0	0.0%	0	0.0%
Total (N)	18	100.0%	6	100.0%	24	100.0%
Table 11.						
Sleep-Associated Death – Risk Factors						
	SIDS		Other Diagnosis			
Pre- or post-natal smoke exposure	10	55.6%	2	33.3%		
Current / recent respiratory infection	11	61.1%	2	33.3%		
Age-inappropriate sleep surface	8	44.4%	3	50.0%		
Bed-sharing	6	33.3%	3	50.0%		
Bedding-related issues	5	27.8%	2	33.3%		
Side or stomach sleeping	7	38.9%	0	0.0%		
Parental drug use / exposure	2	11.1%	1	16.7%		
No known risk factors	2	11.1%	0	0.0%		

Table 12.											
Cancer / Neoplasms	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total	
	Age (yrs)	Age (yrs)	Age (yrs)	Age (yrs)	Age (yrs)	Age (yrs)	Age (yrs)	Age (yrs)	Age (yrs)	(N)	%
Adrenal gland							9y	5y		2	1.9%
Blastoma, unspecified			2							1	1.0%
Bone, all sites					10					2	1.9%
Brain tumor (total)	7	5	4	5	2	4	6	3	13	49	46.7%
Astrocytoma / glioma	3, 7		5, 8, 11, 13	8, 17		15	3, 5, 16	7	10, 13, 13	16	32.7%
Brain stem, unspecified									3, 6	2	4.1%
Ependymoma	11, 11			13					6	4	8.2%
Medulloblastoma		15		5				8	13	4	8.2%
Rhabdoid									1	1	2.0%
Unspecified	6, 12, 15	1, 4, 11, 12		11	10, 11	4, 6, 11	4, 9, 10	2	2, 10, 12, 14, 16	22	44.9%
Ewing's sarcoma			13		9					2	1.9%
Hepatic carcinoma / hepatoblastoma								5		1	1.0%
Leukemia, acute or chronic	8	1, 6	6m	1, 2, 15, 17	3, 12, 12	13, 16				16	15.2%
Lymphoma, Hodgkin's						17		17		2	1.9%
Lymphoma, non-Hodgkin's ("lymphobl)	16		12				11			3	2.9%
Mesothelioma, peritoneal						17				1	1.0%
Neuroblastoma		5	3, 9	10	3, 4, 4		5			8	7.6%
Neuroendocrine tumor	11									1	1.0%
Osteosarcoma								4	17	2	1.9%
Palate tumor								16		1	1.0%
Pelvic sarcoma							14			1	1.0%
Pineal gland dysgerminoma	9									1	1.0%
Renal medullary carcinoma	11									1	1.0%
Rhabdoid tumor of the kidney		1		11m						2	1.9%
Rhabdomyosarcoma	17, 17		6		7					4	3.8%
Wilms' tumor							3, 6	16	4	4	3.8%
Unspecified type	17									1	1.0%
Total (N)	15	9	11	11	11	8	12	9	19	105	100.0%

Table 13.

Infectious, Chronic and Other Disease Conditions	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total	
	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	%
"Cold injury syndrome of the newborn"	1d									1	0.5%
"Collapsed during physical activity"					12y	17y				2	1.0%
"Idiopathic vomiting and diarrhea"			3m							1	0.5%
"Organic brain disease"			11y							1	0.5%
"Probable viral respiratory disorder"				5y						1	0.5%
Anemia, aplastic					11y					1	0.5%
Appendix, perforated/ruptured			13y		12y				13y	1	0.5%
Asthma, treated**	9y, 13y, 17y	11y, 14y		13y, 14y, 17y	16y, 15y	14y	17y			14	7.3%
Asthma, untreated								9y	14y	2	1.0%
Asthma, treatment unknown	10y, 14y	15y						9y		4	2.1%
Bronchitis / bronchiolitis/ bronchopneumonia*	4m		1y	7m, 7m, 3y		1m, 5y, 14y,	28d, 2m, 4m, 8m, 1y, 2y, 8y	2m		16	8.4%
Cerebral palsy (complications)		5y, 8y, 10y, 10y	1y, 3y, 5y, 8y, 15y, 16y	3y, 5y, 11y	15y, 16y	4y, 5y, 17y	8y, 15y, 15y, 15y	9y, 17y	2y	25	13.1%
Cerebral aneurysm								4m		1	0.5%
Chickenpox		9y								1	0.5%
Complications of surgery	17y							2y, 12y		3	1.6%
Cystic fibrosis			16y		13y					2	1.0%
Dermatomyositis				13y						1	0.5%
Diabetes mellitus					1y	2y				2	1.0%
Drug abuse (crank), chronic	17y									1	0.5%
Encephalitis / encephalopathy		15y		15y		1y				3	1.6%
Epilepsy					1y, 7y					2	1.0%
Evans Syndrome / moyamoya disease							9y			1	0.5%
Gastroenteritis							1y			1	0.5%
Gastroesophageal reflux disease		3m	3m					15y		3	1.6%
Glomerulonephritis						11y				1	0.5%
Heart disease, cardiomegaly							14y	13y		2	1.0%
Heart disease, myocarditis		3m	18m	11m	5y	2y		13y	1y, 16y	8	4.2%
Heart disease, other	13y, 17y	2y, 13y, 15y, 17y	16y	2y, 15y		2y, 12y				11	5.8%
Hemolytic uremic syndrome					2y			1y	2y	3	1.6%
Hemorrhage, subarachnoid				17y						1	0.5%
Hepatitis C				17y						1	0.5%
Hypothyroidism / seizure disorder							11y			1	0.5%
Idiopathic inclusion body myopathy	3m									1	0.5%
Infantile spasm/seizure disorder							6m, 3y			2	1.0%
Intestinal disorders, vascular							1m			1	0.5%
Laryngeal tracheitis				2y		3y				2	1.0%
Leukodystrophy, adrenal			12y							1	0.5%
Liver failure / probable fatal infectious mononucleosis	14y									1	0.5%
Liver failure, unknown cause	16y		3m				2y			3	1.6%
Lung disease, idiopathic pulmonary fibrosis							13y			1	0.5%
Lung disease, primary pulmonary hypertension								16y		1	0.5%
Lung disease, unspecified			2y							1	0.5%
Meckel's diverticulum, perforation of				3y						1	0.5%
Meningitis	1y	13d	12w, 1y		20d	6y	1m	8m	11d	9	4.7%
Mononucleosis	14y									1	0.5%
Motor neuron disease						15y				1	0.5%
Pneumonia / pneumonitis	7m, 14y		2m, 12y		1m, 2m, 3m	12y				8	4.2%
Pneumonia, aspiration	3y, 11y					3y				3	1.6%
Pneumonia (MRSA)								6m	2m	2	1.0%
Pneumonia (not MRSA)									2m	1	0.5%
Pneumonia, H. influenza + S. pneumonia							1m			1	0.5%
Post-influenza encephalitis									1y	1	0.5%
Probable metabolic disorder							5m			1	0.5%
Respiratory Syncytial Virus (RSV) bronchiolitis/pneumonia			7y	6m, 6m, 4y			2m, 3m		24d, 1m, 6m, 6y	10	5.2%
Reye's Syndrome			10y							1	0.5%
Rheumatoid arthritis*									5m	1	0.5%
Seizure disorder, unknown origin	8m, 12y	11y		7y					1m	5	2.6%
Sepsis, bacterial / viral								6d, 1m, 5y		3	1.6%
Stevens-Johnson Disease				2y						1	0.5%
Streptococcal arthritis, complications from						12y				1	0.5%
Waterhouse-Friderichsen syndrome					1y					1	0.5%
Undetermined medical cause			14d, 5y,		1y, 15y		13y		4m	7	3.7%
TOTAL	22	17	25	26	19	20	27	18	17	191	100.0%
*Considered by the CDRT to be a sleep-related rather than caused by the medical condition.											
Quality of care may have contributed to death.											

Table 14.

Table 14.											
Motor Vehicle-Related Incidents ¹	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total	
	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(N)	(%)
Motor Vehicle Crash - Restraint status^{2,3}											
Restrained	8	3	3	3	4	3	9	6	8	47	14.7%
Not restrained	14	5	9	6	5	2	14	9	13	77	24.1%
Ejected	4	10	8	12	9	7	15	14	6	85	26.6%
Unknown	14	19	12	20	15	15	3	7	5	110	34.5%
MVC Subtotal	40	37	32	41	33	27	41	36	32	319	81.6%
Pedestrian	7	2	3	2	2	3	1	3	2	25	6.4%
Bicycle	2	1	4	1		3	2	1	1	15	3.8%
Motorcycle	-	1		1				0	1	3	0.8%
All-Terrain Vehicle	1		1	1	1	1		2	4	11	2.8%
School bus						3		0		3	0.8%
Train-car	1	2	2	1		1		1		8	2.0%
Train-pedestrian	1		1					0		2	0.5%
Vehicle fire								5 ⁴		5	1.3%
Total (N)	52	43	43	47	36	38	44	48	40	391	100.0%
	13.3%	11.0%	11.0%	12.0%	9.2%	9.7%	11.3%	12.3%	10.2%	100.0%	
Numbers of cases.									59.4%		

¹Only includes motor vehicles engaged in traffic. Categories refer to the location of the child.

²Age-appropriate restraints: car seat or booster seat for children through age eight; seatbelt and/or shoulder harness for older ages.

³Includes babies delivered prematurely after crashes involving their mothers, by mothers' restraint status: 1 unknown status in 1996, 1 unrestrained in 1999, 1 unrestrained in 2004.

⁴Two separate incidents.

Table 15.

Unintentional Injury	1996 (Age)	1997 (Age)	1998 (Age)	1999 (Age)	2000 (Age)	2001 (Age)	2002 (Age)	2003 (Age)	2004 (Age)	Total (N)
Animal-drawn vehicle						9y				1
Athletic injury								12y		1
Bitten by dogs								3y		1
Carbon monoxide poisoning			17y							1
Choked on food		2y	1y	3y	11y	4y	1y		5y	7
Drowned, bath tub [*]	2y									1
Drowned, toilet							1y		9m	2
Drowned, attended pool									5y, 9y	2
Drowned, unattended pool/unknown location		13y	1y		17y	13y	3y		2y	6
Drowned, landscape pond/farm tank/trough							1y, 1y		11m	3
Drowned, broke through ice on creek									14y	1
Drowned, open water (swimming / canoeing / body surfing / wading / rescue attempt)	11y, 17y, 17y	17y, 17y	14y	11y, 16y	12y, 16y, 17y, 17y		14y	7y, 13y		15
Electrocution, playing around power lines	7y		11y	14y						3
Explosion, building pipe bombs					17y					1
Explosion, home propane tanks									15y	1
Fall from and stepped on by horse	2y	12y	10y				5y			4
Fall in grain elevator								13y		1
Fall, other		8y	14y				6y		6m**	4
Fight				15y						1
Fire, house/trailer/apartment***	14y	2y & 3y	6y			4m & 2y, 3y, 6y & 7y	10y	10y & 13y, 5y	1y & 3y & 6y, 3y	17
Hit by jet ski							17y			1
Hit / crushed by moving vehicle in driveway, not in traffic		2y	5y, 16y		5y, 16y		1y, 2y, 3y	1y, 2y	1y	11
Hit / crushed by farm or construction vehicle, not in traffic		3y, 3y		13y	5y, 16y	5y, 16y			17y	8
Hit / crushed by falling object				3y, 17y				13y	8y	4
Hit / crushed by object, other	13y	10y		5y, 15y	16y					5
Hypothermia (cold) / outdoor exposure		17y								1
Knife wound (unintentional)	12y			12y						2
Methamphetamine intoxication							15y			1
Poisoning, unintentional, over-the-counter or prescription medication		17y			16y	17y		15y	7y, 7y	6
Playing with firearm	13y, 14y	15y	16y					9y	17y	6
Suffocation / strangulation, sleep-related****	1m, 1m, 1y	3wks	1y, 1y, 9y	4m, 5m	1m, 1m, 3m, 7m				1m, 6m	15
Suffocation / strangulation, unintentional				6y, 15y, 17y			13y, 13y	5m, 1y	9y	8
Wasp sting (allergic reaction)							1y			1
Total (N)	14	16	14	16	17	11	17	15	22	142

*After 2001, additional tub drownings are classified in the Neglect section.

**Considered by the CDRT to be a sleep-associated suffocation, and discussed in the SIDS/SUID section.

***Deaths connected with "&" are from the same incident.

****After 2001, sleep-related deaths of infants are also considered in the SIDS section.

Table 16.

Suicide		Firearms (Age)	Hanging (Age)	Overdose (Age)	Other (Age)	Subtotal (N, %)	Total (N)
1996	Male	15, 16, 16, 16	11, 11, 13, 13, 17	-	16	10 71.4%	14
	Female	13, 15, 17	15	-	-	4 28.6%	
1997	Male	12, 14, 15, 16, 16, 17, 17	13	-	17	9 69.2%	13
	Female	17	-	14, 16, 16	-	4 30.8%	
1998	Male	14, 15, 15, 16, 16	14, 17	-	16	8 80.0%	10
	Female	16, 16	-	-	-	2 20.0%	
1999	Male	15, 15, 16	15, 15, 15, 15, 16, 17, 17	-	14, 17	12 92.3%	13
	Female	-	15	-	-	1 7.7%	
2000	Male	13, 17, 17, 17, 16	14, 16	16	-	8 72.7%	11
	Female	14, 16	17	-	-	3 27.3%	
2001	Male	14, 15, 15, 15, 16, 16, 17	-	-	-	7 77.8%	9
	Female	15	14	-	-	2 22.2%	
2002	Male	16, 16, 17	11, 12, 15, 17, 17, 17	16	13	11 91.7%	12
	Female	16	-	-	-	1 8.3%	
2003	Male	12, 13, 13, 16, 17	15	-	17, 17	8 80.0%	10
	Female	-	-	-	14, 16	2 20.0%	
2004	Male	13, 17	13, 14, 16, 17	-	15	7 70.0%	10
	Female	16	15	-	16	3 30.0%	
Subtotal (N)	Male	41 79%	28 85%	2 40%	9 75%	80 78.4%	102
	Female	11 21%	5 15%	3 60%	3 25%	22 21.6%	
Total (N)		52 51.0%	33 32.4%	5 4.9%	12 11.8%	102	

Table 17.

Intentional injury	1996 (Age)	1997 (Age)	1998 (Age)	1999 (Age)	2000 (Age)	2001 (Age)	2002 (Age)	2003 (Age)	2004 (Age)	Total (N)	(%)
Criminal child abuse or neglect (alleged or convicted)											
Blunt force trauma	1y, 2y	7 wks, 1y, 18m, 7y	4y			3y	8m	2m, 2y, 2y	2m, 2m, 1y, 1y, 1y	17	16.3%
Chronic physical abuse		9m	1y			2m		3y		4	3.8%
Dehydration / malnutrition	1y, 3y									2	
Drowning (tub)		8m								1	
Drowning (pool)							7y			1	1.0%
Hypothermia								4y		1	1.0%
Illicit drug overdose (provided by parent)		17y								1	
Neglect									Newborn, 1y	2	1.9%
Scalding water (bath tub)	2m			2y			3y	2y		4	3.8%
Shaken Baby / Shaken Infant Syndrome		2m	9m	3y	2m, 3y	4m			11m	7	6.7%
Smothering						2y	2m, 3m, 1y	2m, 10m, 1y	1y	8	7.7%
Other							10y			1	1.0%
Subtotal (N)	5	8	3	2	2	4	7	9	9	49	47.1%
Homicide / manslaughter (alleged or convicted)											
Firearm	13y, 14y, 15y, 17y, 17y, 17y	12y, 15y, 15y, 16y, 16y, 17y	15y, 15y, 15y, 17y, 17y, 17y	17y, 17y, 17y	2y, 3y, 12y, 14y, 15y, 16y, 17y, 17y, 17y	17y, 17y, 17y	2y, 13y, 17y, 17y	4m, 15y, 16y, 17y	17y, 17y, 17y	44	42.3%
Fight				5y & 8y			16y		16y	1	1.0%
Stabbing							17y			3	2.9%
Strangulation					7y & 13y, 17y					4	3.8%
Unknown				3y				4y, 13y		3	2.9%
Subtotal (N)	6	6	6	6	12	3	6	6	4	55	52.9%
Total (N)	11	14	9	8	14	7	13	15	13	104	100.0%
Ages are given in years (y), months (m) and weeks (wks).											
Cases separated by "&" refer to siblings.											

ADA/AA/EOE

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