Child Deaths in Michigan

Michigan Child Death State Advisory Team
First Annual Report
June, 1999

A report on the causes and trends of child deaths in Michigan based on findings from community-based Child Death Review Teams.

With recommendations for policy and practice to prevent child deaths.

June, 1999

The Honorable John Engler, Governor
Honorable Members of the Michigan Legislature

I am submitting this first annual report of child deaths in Michigan, in accordance with Public Act 167 of 1997, which requires the Michigan Child Death State Advisory Team to:

> *Identify and make recommendations on policy and statutory changes pertaining to child fatalities and to guide statewide prevention, education and training efforts…and publish an annual report on child fatalities.*

This report highlights the magnitude of and trends in deaths to Michigan children over a ten-year period. It presents findings from the reviews of 827 deaths, conducted by thirty-eight community-based child death review teams.

The report presents recommendations that we believe can improve policy and practice in order to prevent other children from dying. It represents our first effort to understand and identify what our state can and should do to prevent child deaths. There is still much that we do not know. As we continue our work, we hope to use this report as a first step in informing state and local officials and the citizens of Michigan on how we can save children's lives.

Thank you for the opportunity to continue our efforts toward making our communities safer and healthier for Michigan's children.

Respectfully Submitted,

Douglas E. Howard

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Michigan Child Death State Advisory Team
First Annual Report
June, 1999

MISSION

To understand how and why children die in Michigan,
and to take action to prevent other child deaths.

Submitted to
The Honorable John Engler, Governor, State of Michigan
The Honorable Dan L. DeGrow, Majority Leader, Michigan State Senate
The Honorable Charles R. Perricone, Speaker of the House, Michigan House of Representatives

ACKNOWLEDGEMENTS

We wish to acknowledge the dedication and unwavering support of the more than 800 volunteers throughout Michigan who serve our state and the children of Michigan by serving on Child Death Review Teams. It is an act of courage to acknowledge that the death of a child is a community problem. Their willingness to step outside of their traditional professional roles to examine all of the circumstances that led to child deaths, and to seriously consider ways to prevent other deaths, has made this report possible. Most especially, we want to thank the County Child Death Review Team Coordinators, for volunteering their time to organize, facilitate and report on the findings of their reviews.

The Michigan Department of Community Health, Division for Vital Records and Health Statistics has been especially helpful in providing the child mortality data and in helping us to better understand and interpret the statistics on child deaths.

In 1995, The Governor's Task Force on Children's Justice, under the leadership of Chief Justice Elizabeth A. Weaver took the first steps necessary to make Child Death Review a reality in Michigan. This support was critical in encouraging the first 17 counties to participate in the program.

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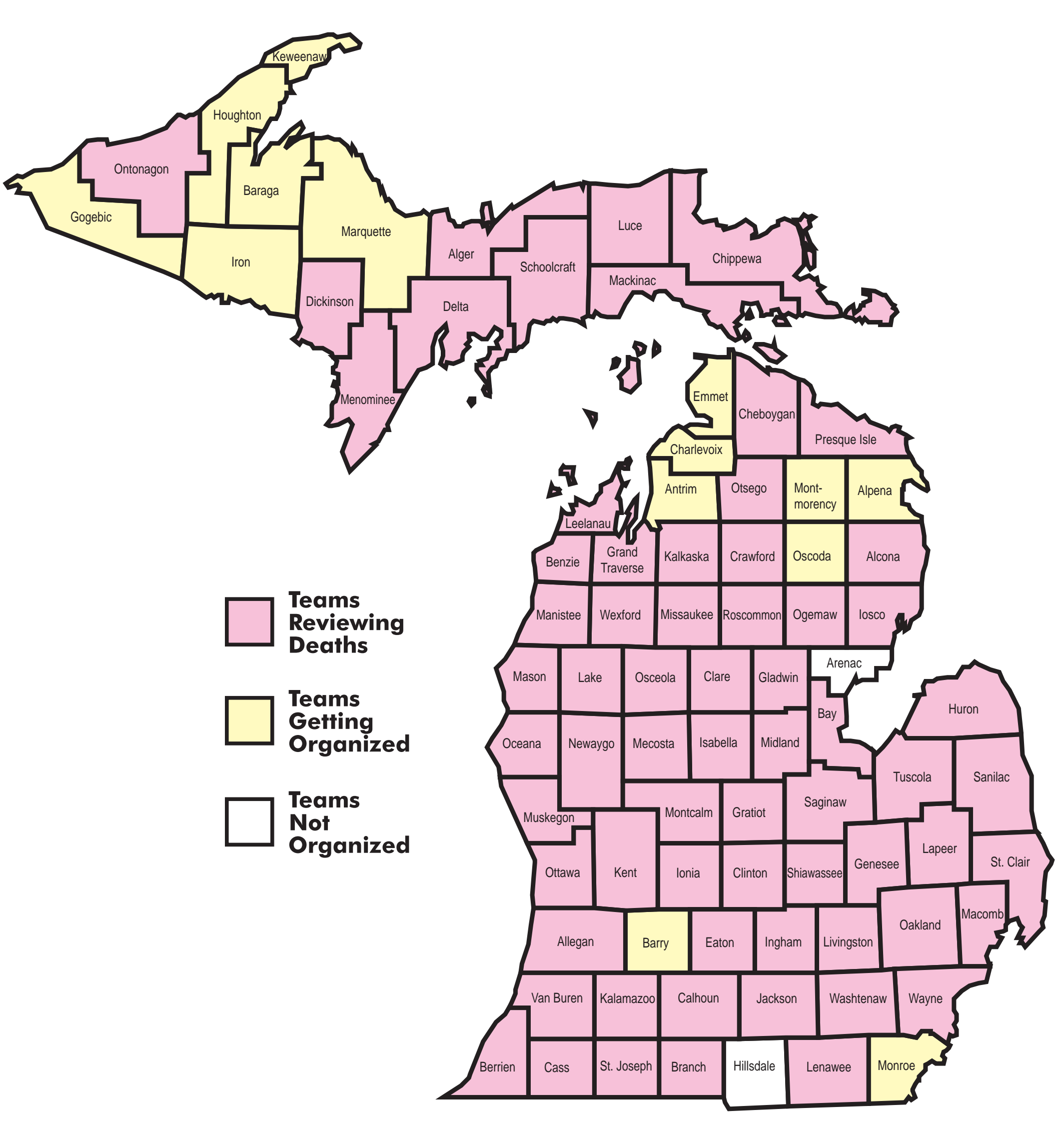
Status of Child Death Review Teams in Michigan — June, 1999



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INTRODUCTION

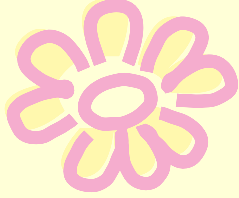
In I995, Michigan embarked on a program to better understand why almost 2,000 of its children die each year. As of December 31, 1998, members of county-based Child Death Review Teams had reviewed 827 child deaths. These reviews have increased our knowledge of how and why our children are dying and have led to local and state prevention efforts to help *keep kids alive*. Over the past year, the Michigan Child Death State Advisory Team has studied the findings of these reviews. This report represents the team's first effort to understand the magnitude of the child mortality problem in Michigan. It includes our first set of recommendations on what our state can and should do to prevent child deaths. There is still much to be learned, and the State Child Death Advisory Team will continue to meet and deliberate on how to make Michigan a safer and healthier state for children.

This report:

- Identifies the causes of childhood deaths, risk factors associated with these deaths and trends that can be addressed with prevention strategies in order to reduce the number of preventable deaths to children in Michigan.
- Makes recommendations to the Governor, the legislature, state agencies and the public for changes in law, policy and practice to prevent child deaths.
- Makes recommendations for system improvements in policy and practice for state and local agencies to improve their effectiveness in identifying, investigating and responding to child fatalities.
- Makes recommendations to strengthen and improve the Michigan Child Death Review Program.

Michigan's Support for Child Death Review

In January 1998, Governor John Engler, in supporting expansion of the Child Death Review (CDR) Program from 17 to all 83 counties, stated that "No child should die unnecessarily in our state. We must learn from the results of these reviews and take the steps necessary to make the changes needed to avoid senseless tragedies in the future." Following the Governor's and former Lt. Governor Connie Binsfield's direction, and with broad bipartisan support, PA 167 of 1997 amended the Michigan Child Protection Act, effective March 31, 1998, to support the CDR program.



The program was piloted in 1995 with funding from the Governor's Task Force on Children's Justice and with support from the Michigan Family Independence Agency (FIA), Michigan Department of Community Health (MDCH), and Michigan State Police. It is currently funded by FIA and managed by the Michigan Public Health Institute (MPHI).

The Review Process

Child Death Review is a community-based process. Local teams are organized within their own community context, but with support and technical assistance from the state. Eighty-one counties have now established or are organizing multi-disciplinary teams with broad representation from the health, child welfare, law enforcement, education and emergency medical services communities as well as the legal system. Over 800 community professionals participate on review teams in Michigan. Team members receive training and technical support. Each team also completes a case report for every death reviewed.

Local review teams attempt to conduct a comprehensive, retrospective analysis of all deaths of children living in their counties. When available and in accordance with confidentiality provisions, each team member shares his or her agency's knowledge of the circumstances surrounding the death and the agency's response to the death. The team discusses the who, where, when and why of every death. Team meetings are not subject to Michigan's Open Meetings Act. In many cases, these discussions have led to improvements in death investigations, services to families and others and agency practices. They have improved coordination and cooperation among agencies involved in child health, safety and protection.

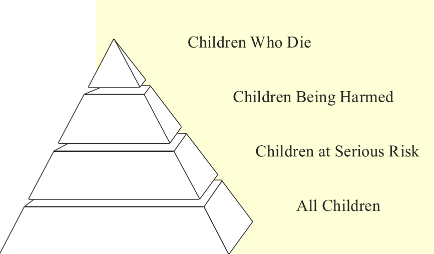
Most importantly, the reviews focus on the prevention of other child deaths. At each review, the team tries to answer the following: what risk factors contributed to this death? To what degree do we believe this death was preventable, and what reasonable action could have been taken to prevent this death? Knowing this, what will we do to prevent similar deaths to children in the future?

The State Advisory Team

A State Child Death Advisory Team was also established by PA 167 of 1997. The team is responsible for reviewing case reports submitted by county teams, state child mortality data and child death data from the Family Independence Agency in order to make recommendations on improving state policy and practice. The state team is required to issue an annual report to the Governor and Michigan Legislature. This is the first report of the team, which has met six times since its inception in January 1998.

Deaths Reviewed

This first annual report provides information on the 827 child deaths reviewed since 1995 and child mortality data provided by the Division for Vital Records & Health Statistics, MDCH.* Selected data on child abuse deaths from FIA child protection reports for fiscal year 1997 (October 1, 1997-September 30, 1998) are included in Part Two, Section Three. The 17 pilot counties from 1995-1997 reviewed 346 of the 827 deaths. The remaining 481 deaths were reviewed by 38 counties in 1998. The 1998 reviews represent approximately one quarter of all children who died in Michigan and one third of all children who died outside Wayne County in 1998.



For every child who dies, many more children are at risk.

* The review team findings in this report should not be directly correlated by calendar year with the child mortality data.

While statistics can provide an overall picture of fatalities, it is from each child's death from which we can learn the most. It is through the review of each individual child death that the teams are best able to understand and take action to prevent other deaths. Therefore individual cases are described throughout this report. These cases are representative of other children who also died in much the same manner or circumstances.

Although the reviews focus on the deaths to children, these deaths are often the sentinel events that warn us that other children are at risk and in harm's way. Often the only difference between a death and a non-fatal event is a few feet, a few inches or a few seconds. For each child who dies from a preventable cause, there are more children at serious risk of death, and still more at potential risk of being harmed.

This report honors the memory of children who have died in Michigan. It is hoped that as we learn lessons from the circumstances surrounding the deaths to our children, we can more effectively prevent the future deaths of Michigan's most innocent citizens, so that our children will be healthy, safe and protected.

PART ONE

The Review Process and Child Mortality Data

CONDUCTING A LOCAL REVIEW

Although supported through legislation, CDR teams are organized on a voluntary basis.[1] There are seventy-six single county teams, and two multi-county teams (which are comprised of five counties). The teams conduct their reviews in accordance with the *Michigan Child Death Review Team Protocols*.[2]

Purpose

The operating principle of the reviews is that the death of a child is a community problem and that the responsibilities to respond to and address the circumstances involved in most child deaths are too multidimensional to rest with one person or agency.

The goal of CDR is to improve our understanding of how and why children die, to demonstrate the need for and to influence policies and programs to improve child health, safety and protection and to prevent other child deaths.

The objectives of the review are the:

- Accurate identification and uniform reporting of the cause and manner of every child death.
- Improved communication and linkages among agencies and enhanced coordination of efforts.
- Improved agency responses to child deaths in the investigation and delivery of services.
- Design and implementation of cooperative, standardized protocols for the investigation of certain categories of child death.
- Identification of needed changes in legislation, policy and practices, and expanded efforts in child health and safety to prevent child deaths.

Membership

Statute requires that where teams are established, they must include at least the county medical examiner, the prosecuting attorney, a chief law enforcement officer and designees from the local public health department and Family Independence

Agency. All of the teams meet this requirement, and most teams have much broader representation, including designees from community mental health, education, emergency medical services, pediatricians and hospitals.

Team Coordination

Each team determines the agency or individual that will coordinate its team activities. The role of the coordinator includes identifying cases for review, communicating with team members, coordinating and hosting meetings, in most cases facilitating the meetings and completing the case reports. There are no program funds supporting the local coordinator activities.

Cases Selected for Review

The teams attempt to review all deaths of children under the age of 19, with the exception of the largest counties in Michigan (Wayne, Oakland, Macomb and Genesee). Because of their high numbers of child deaths, these counties review a selected sample of deaths. Some teams may select cases that fall under the jurisdiction of the medical examiner (sudden and unexpected deaths) for more intensive review and only do a cursory review of other natural deaths. All counties review child abuse deaths.

Frequency of Meetings

How often teams meet varies, dependent on the number of deaths they review. Rural counties with few deaths may meet only when a death occurs, yet some rural teams meet quarterly. Most mid-sized counties meet bimonthly or monthly. In rare cases, a team may choose to do a review within 48 hours of the death. In this case, the review serves to aid in the early investigation of the death.

At the Review

An effective review begins with all participants sharing the relevant information that their agency has regarding the history on the child, the family and the circumstances surrounding the child's death. Team members ask for clarification as needed. The team then attempts to answer the following:

- Is our investigation complete?
- Are there services we should be providing?
- Are there other children at imminent risk of harm?
- What were the risk factors involved in this death?
- Are there agency policies and practices that should be changed?
- What are we going to do to prevent another similar death?

Reports of the Review

The team completes a confidential case report form on each death reviewed and submits this report to the CDR Program Office. The report is then entered into a database and the aggregate findings are presented in the annual report. When appropriate, and in accordance with state statute, general findings of the local teams can also be shared with the public in order to encourage community involvement in prevention initiatives.

State Program Support

The Michigan Family Independence Agency provides funding to the Michigan Public Health Institute to manage the program. MPHI program staff provide:

- Technical assistance and consultation to local teams.
- Review team training for new team members and other trainings related to specific causes of deaths and death investigation.
- Assistance in death investigation, services and prevention and in procuring information on specific deaths.
- Coordination among the local programs, and state, federal and other resources.
- Management of the reporting system and CDR database.
- Staff support to the State Advisory Team.

MICHIGAN CHILD MORTALITY DATA

Child Death Review is a process that carefully studies and responds to individual deaths, but with attention to how common or frequent the cause of death may be. Child mortality data provides us with an overall picture of the child deaths in the state and tells us what deaths occur most frequently. The official count of the number of children who die each year in Michigan is provided by the Division for Vital Records & Health Statistics at the Michigan Department of Community Health. This count is tabulated based on information from the death certificates that each county clerk files to the State Registrar. Death certificates help to enumerate the causes and manners of death by age, race, sex and other factors. While death certificates do not tell the whole story, they do serve to provide an official count of all deaths for a given year.

The following figures are the mortality data based on the count of the number of children who died in Michigan. Unless noted, the source of all mortality data is the 1988-1997 Michigan Resident Death File, Division for Vital Records and Health Statistics, Michigan Department of Community Health. Death rates are calculated as the number of resident deaths in a specific age group and from a specific cause by the total number of residents in a specific age group times 100,000. The resident populations are based on population estimates for a specific year, provided by the Office of the State Demographer, Michigan Department of Management and Budget. Death rates are not provided if the number of cases is less than six. Appendix A lists total child deaths by county over ten years. Appendix B lists total deaths reviewed by county.

The total population of children in Michigan in 1997 was 2,644,953. By age, the population was:

Under one year	129,533
Ages 0-4	523,213
Ages 5-9	711,781
Ages 10-14	703,924
Ages 15-18	576,502

Figure 1. Michigan Child Deaths, 1988 - 1997
Ages 0-18

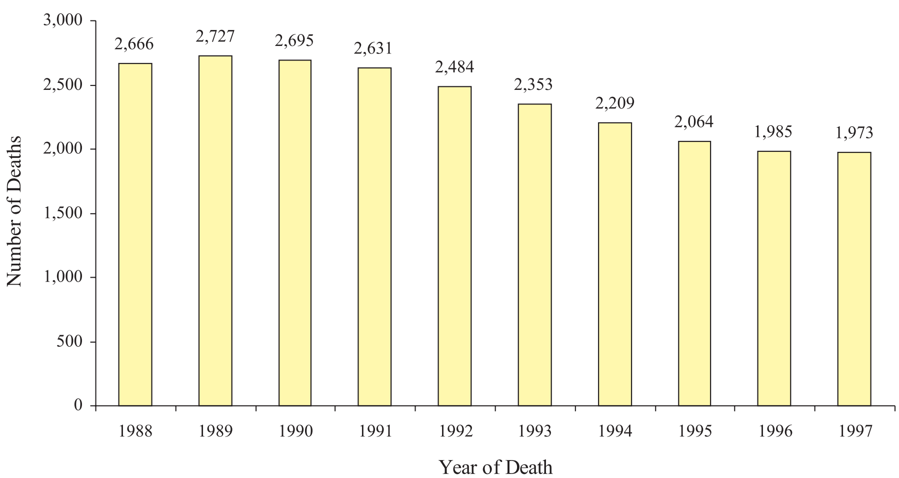


Figure 2. Michigan Child Death Rates, 1988 - 1997
Ages 0-18

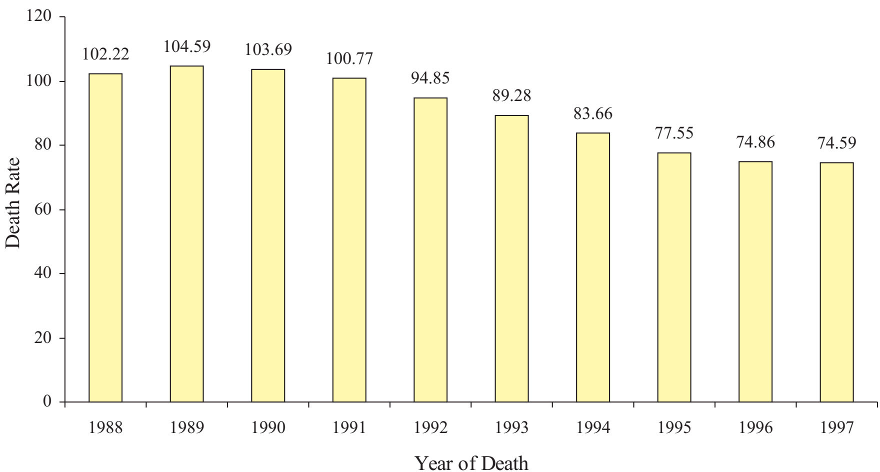


Figure 3. Michigan Child Deaths by Manner, 1988 - 1997
Ages 0-18

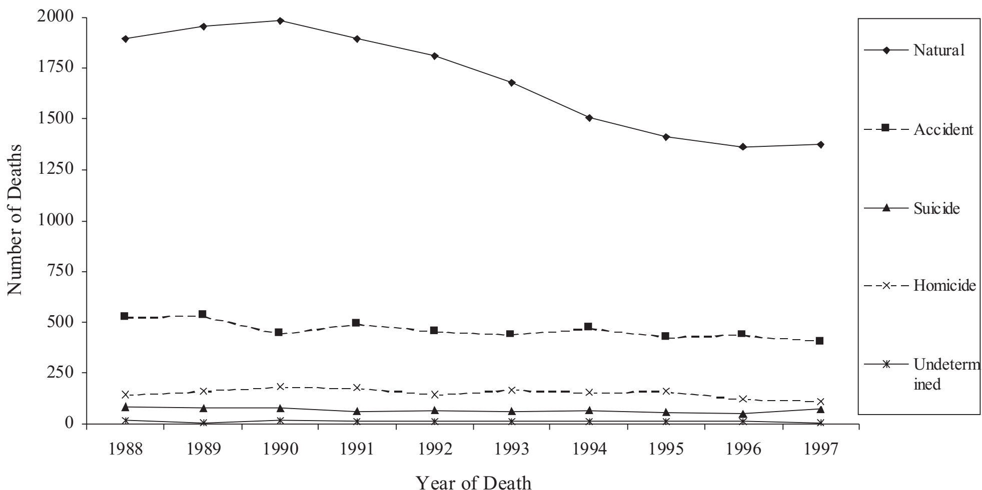
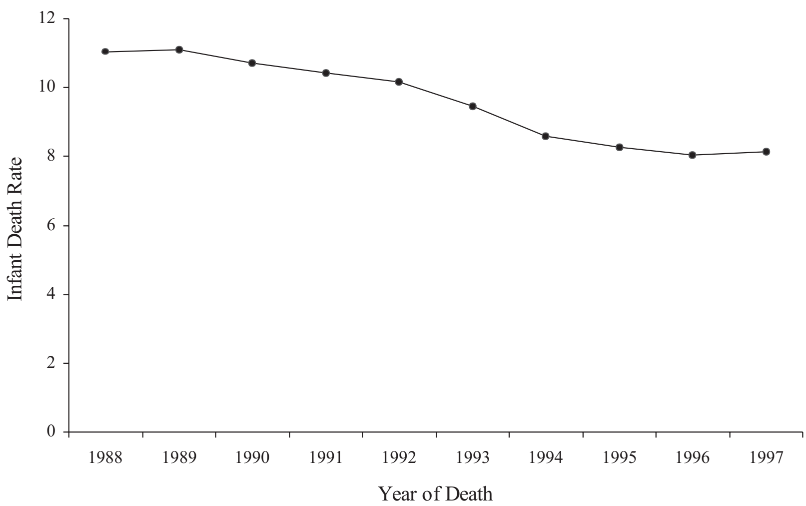


Figure 4. Michigan Infant Death Rates*, 1988 - 1997
Age Less than One



* Infant Death Rates are per 1,000 live births.

Figure 5. Michigan Child Death Rates, 1988 - 1997
Ages 1-18

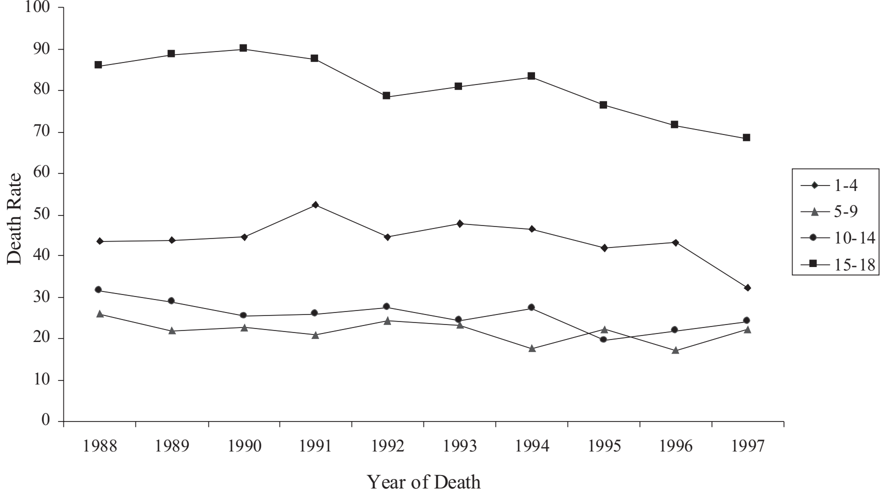


Figure 6. Michigan Child Deaths by Age, 1997
N=1,973

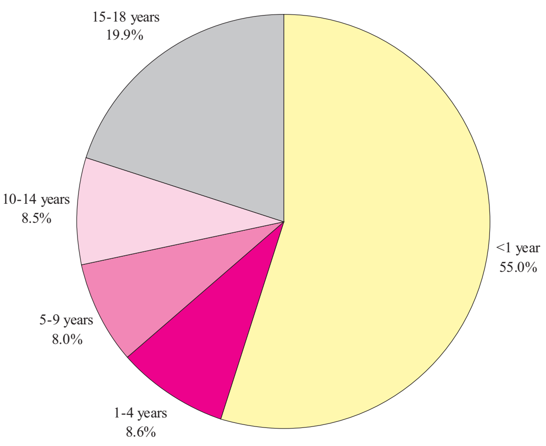


Figure 7. Michigan Child Deaths by Manner, 1997
Less than 1 Year of Age, N=1,085

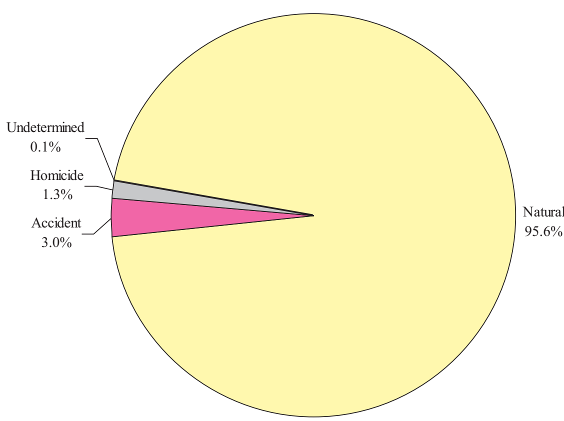
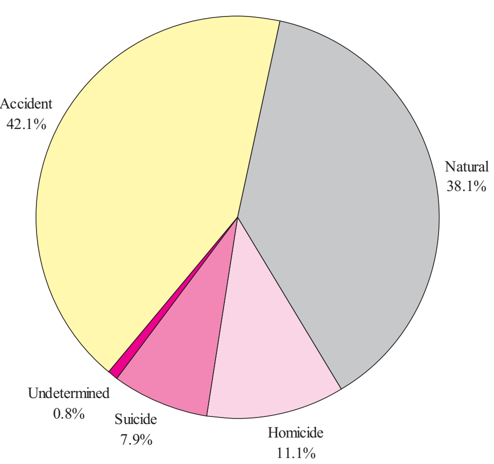


Figure 8. Michigan Child Deaths by Manner, 1997
Ages 1-18, N=888



REVIEW TEAM FINDINGS: A SUMMARY

Manner and Age of Deaths Reviewed

Teams submitted reports on 827 deaths, which included 346 reviews conducted from 1995-1997 and 481 conducted in 1998. The death of the child may have occurred in a year different than the year the death was reviewed. In a number of cases, teams did not complete all of the information on a review, so that the totals may not add up due to missing data.

Teams believe that 44% of the deaths they reviewed could have been prevented.

Manner of Death is listed on the death certificate as being one of five categories: natural, accident, homicide, suicide or undetermined. For the purposes of this report, Sudden Infant Death Syndrome (SIDS) has been separated out from other natural deaths.

Table 1: Deaths Reviewed and Total Number of Michigan Deaths by Manner

Manner of Death	Number of Cases 1995-1998	Number of Michigan Deaths Ages 0-18 1995-1997
Natural Deaths	378	4189
(SIDS)	(104)	(435)
Accidents	277	1286
Homicides	94	395
Suicides	46	175
Undetermined	32	31

Table 2: Deaths Reviewed by Age

Age at Death	Number of Cases
0-27 days	136
28 days-1 year	209
1-4 years	140
5-9 years	81
10-14 years	91
15-18 years	161

Preventability

A child's death is considered preventable if an individual or the community could reasonably have done something that would have changed the circumstances, thus keeping the child alive. At each review, the team makes a determination of preventability. Teams determine this within the context of their own communities. Of the 827 deaths reviewed, team members believed that 365, or 44%, were probably or definitely preventable.

Prevention enlists many strategies and approaches to deal with complex issues, in an effort to minimize or eliminate risk factors. Risk factors are elements in a community that can influence or contribute to a death, but not necessarily cause a death. For example, a behavioral risk factor of a motor vehicle crash may be driver inexperience; a social risk factor for a teen homicide may be gang activity; an economic risk factor in a fire death may be old, substandard housing; and an environmental risk factor in an accidental carbon monoxide suffocation death may be faulty heating. There can be multiple risk factors involved in a death. Team members identified the following risk factors as primarily contributing to the preventable deaths they reviewed:

Behavior is the number one risk factor identified by teams in their reviews.

Table 3: Risk Factors Involved in Deaths Reviewed

Risk Factor	Number of Cases	% of Cases
Behavioral	301	36.4%
Medical	270	32.6%
Social	151	18.3%
Environmental	130	15.7%
Economic	69	8.3%
Drugs or Alcohol	64	7.7%
Other	60	7.3%
Product Safety	36	4.4%

The teams reported that in 30% of the 365 preventable deaths, the risk factors had not been identified in their community prior to the death. In 40% of the 365 preventable deaths, they reported that no action had been taken to address known risk factors prior to the child's death. In 14 deaths, the teams believed that there had been mismanagement in addressing the known risks in the community.

The review teams noted that in 94 cases, agency policy or practices had been changed as a direct result of a review, 36 of these as prevention initiatives. They made recommendations for 419 different prevention strategies and activities as a result of their reviews. Most importantly, 204 prevention activities have occurred since the reviews. Many of these are described in the following sections of this report. The types of initiatives include:

Table 4: Prevention Initiatives Recommended and Resulting from Reviews

Type of Initiative	Recommended	Initiated
Legislation, Law or Ordinance	25	6
Community Safety Project	70	24
Product Safety Action	14	7
Education in Schools	80	41
Education in the Media	91	56
Public Forums	22	13
New Services	14	2
Changes in Agency Practice	36	15
Other Programs	67	40

Table 5: Target Populations for Prevention Activities

Target Population	Prevention Activities
The General Public	242
Parents and Caregivers	184
Children	115
Professionals	62
Others	24

Table 6: Lead Organizations for Local Prevention Initiatives Resulting from Reviews

Lead Organization	Initiatives
The Local Health Department	149
A Law Enforcement Agency	81
Schools	47
A Local Community Group	29
Family Independence Agency	28
Community Mental Health	21
Others	73

The teams have demonstrated that responsibility for prevention is a community concern and is not the sole responsibility of one single agency or community group.

PART TWO

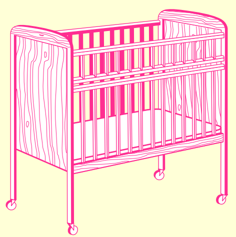
Review Team Findings by Cause of Death

Note on Data Presented

Part Two includes child mortality data on the various causes of death as well as the team findings for each cause of death reviewed.

The reader is cautioned not to make a direct comparison between the child mortality data from the Office of the State Registrar, Family Independence Agency child death data from fiscal year 1998 and the review team findings. It is important to keep in mind the following:

- Child mortality data becomes available to the public approximately ten months after the end of the calendar year. This report contains mortality data only through 1997. Therefore, the mortality data lags one year behind review team findings. While review team information from 1998 is included in this report, the mortality data for 1998 is not.m
- The FIA death data is from reports submitted by county FIA staff when they become aware that a child in the child welfare system has died, when they investigate a death potentially due to abuse or neglect or when they believe that filing a report may benefit subsequent children in a family. These reports represent deaths only from October 1, 1997 to September 30, 1998. This is the first year that FIA has issued data from this system.
- Between 1995 and 1997, only 17 counties in Michigan were conducting reviews. However, the child mortality data for 1995-1997 represents child deaths from **all** Michigan counties.
- Finally, because not all child deaths are reviewed, one should not assume that the CDR team findings reported here represent a complete picture of child deaths in Michigan.



Teams reviewed 104 SIDS deaths. 138 babies died of SIDS in Michigan in 1997.

SIDS is the diagnosis given for the sudden death of an infant under one year of age that remains unexplained after a complete investigation, which includes an autopsy, examination of the death scene, and review of the symptoms of illnesses the infant had prior to dying and any other pertinent medical history.

SUDDEN INFANT DEATH SYNDROME

Overview

Sudden Infant Death Syndrome (SIDS) is the most common cause of death for children between the ages of one month to one year. It is listed as the cause of death when no other possible reason can be identified for the death. For that reason, SIDS is often called a diagnosis of exclusion. While we still do not know what causes SIDS, we are becoming more aware that there are environmental, physiological and social risk factors that may play a part in SIDS. Face down or stomach sleep position is a major risk factor for SIDS. Putting babies to sleep on their backs has been shown to be very effective in reducing the numbers of SIDS deaths. Since the Back to Sleep Campaign was begun in the U.S. in 1992, the SIDS rate has dropped by 42.3%, as more parents put their babies to sleep on their backs.[3] The American Academy of Pediatrics and the National Institutes of Health with the support of national and state SIDS organizations initiated this public education campaign. In addition to sleep position, other major risk factors include cigarette smoke exposure, overheating, late entry to prenatal care, low birth weight and young mothers with limited education.[4]

Of major concern is the fact that the SIDS rate has not dropped as rapidly in major urban areas, especially in the City of Detroit. It is thought that many urban families are not practicing Back to Sleep. A major campaign to more effectively encourage Back to Sleep, especially among urban African American families, is underway in Wayne County through a partnership with MDCH and the Michigan SIDS Alliance.

Figure 9. Michigan Sudden Infant Death Syndrome Deaths 1988-1997

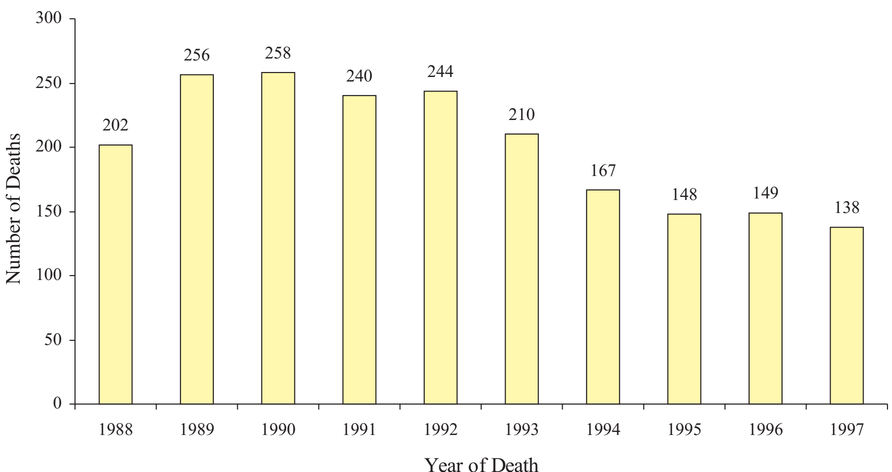
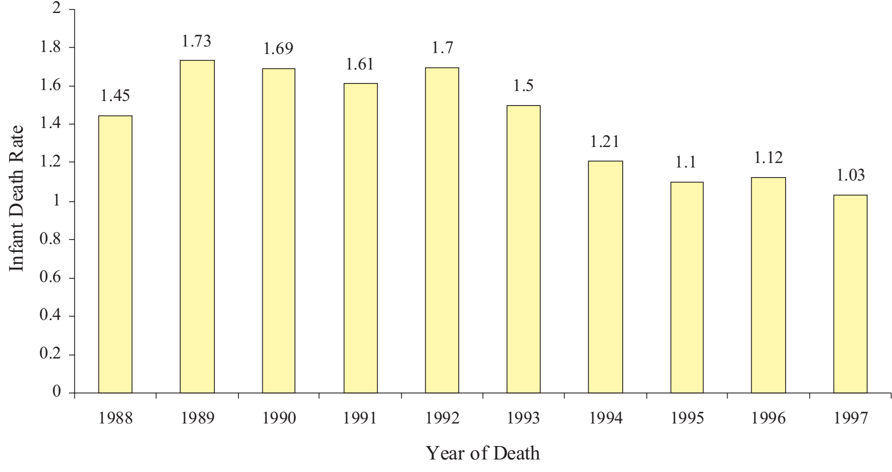


Figure 10. Michigan Sudden Infant Death Syndrome Death Rates* 1988-1997



* Infant Death Rates are per 1,000 live births.

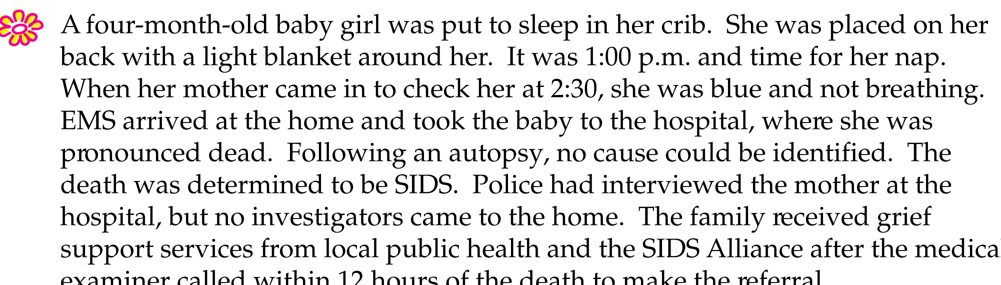
Figure 11. Michigan SIDS Death Rates* by Race and Sex, 1997
N=138

Race	Male	Female
White	0.91	0.39
Black	3.12	2.50
Other Races	0.52	0.00

Infant Death Rate; Race

* Infant Death Rates are per 1,000 live births.

Representative Cases Reviewed



- A four-month-old baby girl was put to sleep in her crib. She was placed on her back with a light blanket around her. It was 1:00 p.m. and time for her nap. When her mother came in to check her at 2:30, she was blue and not breathing. EMS arrived at the home and took the baby to the hospital, where she was pronounced dead. Following an autopsy, no cause could be identified. The death was determined to be SIDS. Police had interviewed the mother at the hospital, but no investigators came to the home. The family received grief support services from local public health and the SIDS Alliance after the medical examiner called within 12 hours of the death to make the referral.

- A two-month-old baby boy was sleeping next to his teenage babysitter on the living room couch at midnight. The parents were having a party at their home. When the sitter awoke at 1:00 a.m., she noticed the baby not breathing. EMS could not revive the baby boy. An autopsy was performed, but no cause of death could be determined. A scene investigation and interviews with the baby sitter and parents were not conducted. The investigators felt confident with the autopsy reports and did not want to further upset the family or have the young teen believe the death to be her fault. The families did not receive grief support services until a review team member made a referral three months later.

- A three-month-old baby girl went to sleep with her parents, in their bed, at midnight. In the morning they discovered the baby lifeless, snuggled down near their legs. An autopsy could find no cause of death. A scene investigation was not conducted but the parents were interviewed at the hospital. Their baby girl was their first child, following many years of fertility treatments. The death was ruled a SIDS. The parents were given phone numbers for SIDS grief support but had not called three months later.

- A four-month-old baby died suddenly and unexpectedly. An autopsy was conducted, but no scene investigation or review of the medical history took place. The medical examiner signed it out as a SIDS case. Upon review, the team was made aware that two previous children in the family had also died of SIDS. All three children were reported to have had seizures right before their deaths.

Team Findings

Teams reviewed 104 SIDS deaths. Many of the babies whose deaths were reviewed had one or more SIDS risk factors, especially as they relate to sleep position. Although in a crib, alone, on the back, is the safest sleeping position for babies, only 40 of the 104 babies were sleeping in cribs. Only 21 were sleeping on their backs when found and 59 were sleeping alone. Only 5 of the 104 babies were sleeping in cribs, alone, and on their backs.

Table 7: SIDS Deaths Reviewed by Infant Sleeping Location

Sleeping Location	Number of Cases
In Crib	40
In Other Bed	17
On Couch	16
In Playpen	3
On Floor	3
Other	9
Missing	16

International studies report very high correlations between smoke exposure and SIDS. They demonstrate that pregnant women who smoke 10 or more cigarettes a day have 3 times the SIDS rate of non-smokers.[5] Of the cases reviewed, 29% of the babies were living in smoky environments. In one case, a baby was born at 31 weeks, weighed under 4 pounds, and was born opiate addicted. The mother was on methadone and was a heavy smoker. The death certificate ruled this death a SIDS.

SIDS should be determined as the cause of death only after an autopsy, review of the medical history and thorough scene investigation have been completed. A new initiative of the Michigan Department of Community Health now allows reimbursement to county medical examiner offices of up to $800 for completing an autopsy and death scene investigation in accordance with established protocols.

In 1994, MDCH and the Michigan SIDS Alliance convened a State SIDS Task Force. One of this group's recommendations was the development of standardized investigation protocols for sudden and unexplained infant deaths. The CDR Program organized an effort to develop these protocols. These *State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths* have since been endorsed by all major state investigative agencies and coalitions, distributed across the state to all investigative agencies and are now required standards of practice in a number of counties.[6] They have also been adapted for use by a number of other states.

Still, the reviews found that complete investigations were lacking in many cases. Of the 104 cases reviewed, six babies did not have an autopsy and 39 did not have their medical histories reviewed. Scene investigations were conducted either by medical examiners (40 cases) or by law enforcement (61 cases). However, most counties found that scene investigations are conducted only by interviewing family members at the hospital. In many of the cases where the babies were not sleeping in safe environments, other causes of death (especially unintentional or intentional suffocation) cannot be ruled out due to the lack of a complete scene investigation where the incident actually occurred. SIDS families often report that they want a complete investigation in order to confirm for themselves and others that SIDS was in fact the cause of their baby's death.

One medical examiner stated at a review, "I don't want to do a scene investigation, because in asking questions, I make the parents think that they may have killed their

baby." Following team discussion, he agreed that a quality investigation could in fact help the family obtain answers to their own questions. He has accepted help from local law enforcement and is now conducting scene investigations prior to making SIDS determinations.

Early access to bereavement support services is also known to help families who suffer the devastating loss of their infants to SIDS. The Michigan SIDS Alliance and MDCH offer family based support services. The teams have been very effective in encouraging early referrals to support services for families and in training local staff in SIDS bereavement support. A number of counties provided their own local training for sudden infant loss following SIDS reviews.

Reviews found that in 28 of 104 SIDS cases, someone in the family had had prior involvement with Child Protective Services (CPS). As a result of the reviews, CPS subsequently investigated three families, substantiating neglect in all three cases.

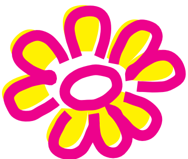
Local Initiatives that Resulted from the Reviews

Based on review findings, several communities are more actively addressing the issue of SIDS risk reduction and are implementing the following:

- Many counties now require use of the standardized protocols. Two counties have provided specialized training on child death investigation to law enforcement and medical examiner investigators.
- Several hospitals that teach stomach sleep position to new mothers have been contacted and encouraged to change their practices.
- A loan-a-crib program was started in one county and over 250 new cribs have been distributed. A number of other counties are planning this type of program.
- Thousands of Back to Sleep brochures have been more widely distributed.
- Counties have increased their use of the *State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths.*

State Advisory Team Recommendations for Michigan Policy Makers

1. Require the use of standardized protocols (including autopsy, scene investigation and review of medical history) for the investigation of all sudden and unexplained child deaths.
2. Ensure that adequate training is available for medical examiners, medical examiner investigators and law enforcement personnel in the thorough investigation of child deaths.
3. Enhance support for public education campaigns on SIDS risk reduction, especially those focused on urban and African American families and professionals who work with families. Emphasize the importance of Back to Sleep, safe sleeping and smoke-free environments.
4. Continue to fund SIDS professional bereavement counseling through MDCH beyond the 1998 supplemental funding, in order to better help families.



NATURAL DEATHS OTHER THAN SIDS

Teams reviewed 256 natural deaths other than SIDS. 1,237 children died of natural deaths (other than SIDS) in 1997.

Overview

Natural deaths are the leading cause of death to children, most occurring during the first month of life. Infants up to one month of age comprise the largest group of child deaths in the state. The Michigan Infant Death Statistics Report for 1997 finds that for every 1,000 live births in Michigan, approximately eight infants will die before their first birthday and most infants that die within the first year of life die within the first 48 hours of life.[7] Most infants die from congenital anomalies or conditions originating in the perinatal period (the time period surrounding the child's birth) that result in low birth weight and/or prematurity. Some infants are at higher risk of dying, including very low birth weight infants and multiple birth infants. In 1997, Michigan infants born with a very low birth weight (less than 1,500 grams) experienced a death rate of 274.0 per 1,000 live births compared to a rate of 2.7 per 1,000 for those infants weighing 2,500 grams or more.

There are great disparities in death rates between black and white infants. Black infants die at much higher rates than white and other race infants do. The risk factors related to socioeconomic status have a great effect on these rates. Although these deaths are natural, many are considered preventable and are often related to poverty. Several of the specific risk factors that have been identified in the Michigan Infant Death Report include:

- Age of mother: mother's age as less than 20 or greater than 40.
- Marital status: unmarried mothers have twice the infant mortality rate as married women.
- Inadequate prenatal care: women who obtained inadequate prenatal care have infant mortality rates as high as three times those women who received adequate care.
- Prenatal smoking: women who smoked during pregnancy had an infant death rate of 11.8 compared to 6.9 for non-smokers.
- A current Michigan study is examining a suspected link between domestic violence and infant mortality, with preliminary findings suggesting that domestic violence by a mother's partner was a factor in almost half of the infant deaths.

Other natural deaths to Michigan children are from medical conditions, including cancer, heart disease and infections. Twenty-seven percent of natural deaths were to children less than the age of one, with the rest of the deaths spread rather evenly across age groups. Although many of these natural deaths are not considered preventable, there are issues related to adequate health care, support to families and caregivers' abilities to care for their sick children, especially for chronically ill children.

Figure 12. Michigan Natural Child Deaths Other Than SIDS 1988 - 1997, Ages 0-18

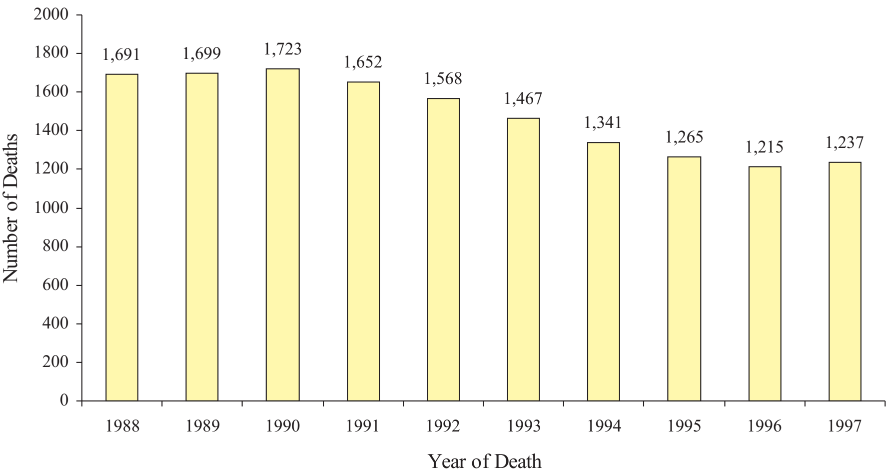


Figure 13. Michigan Natural Child Death Rates, Other Than SIDS 1988 - 1997, Ages 0-18

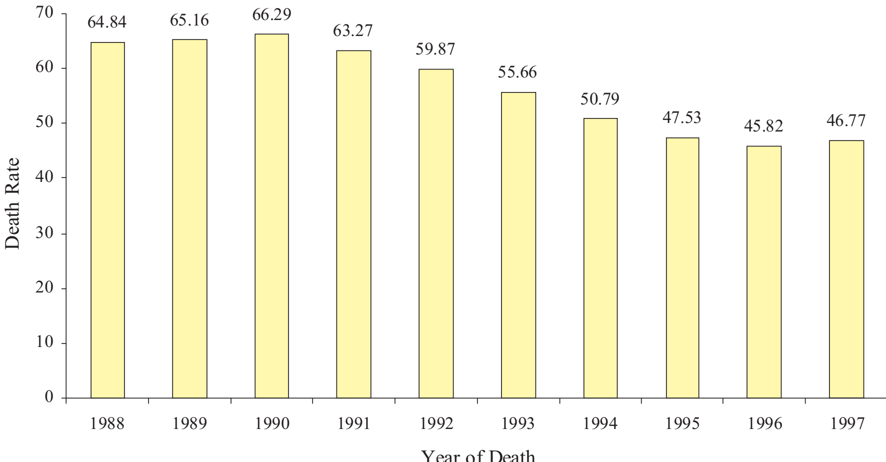


Figure 14. Michigan Natural Child Deaths, Other Than SIDS by Cause, 1997, Ages 0-18, N=1,237

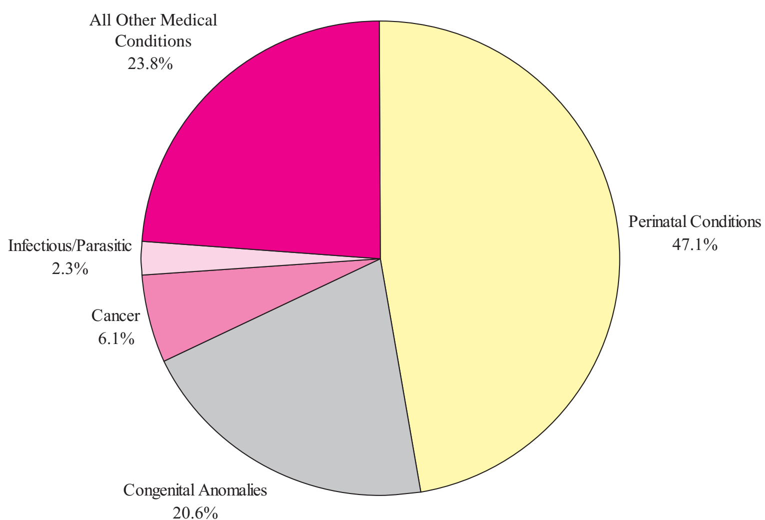


Figure 15. Michigan Natural Child Deaths Other Than SIDS by Age, 1997, N=1,237

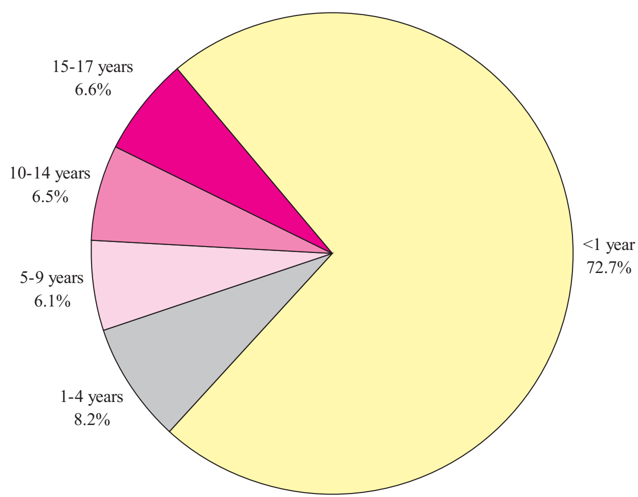
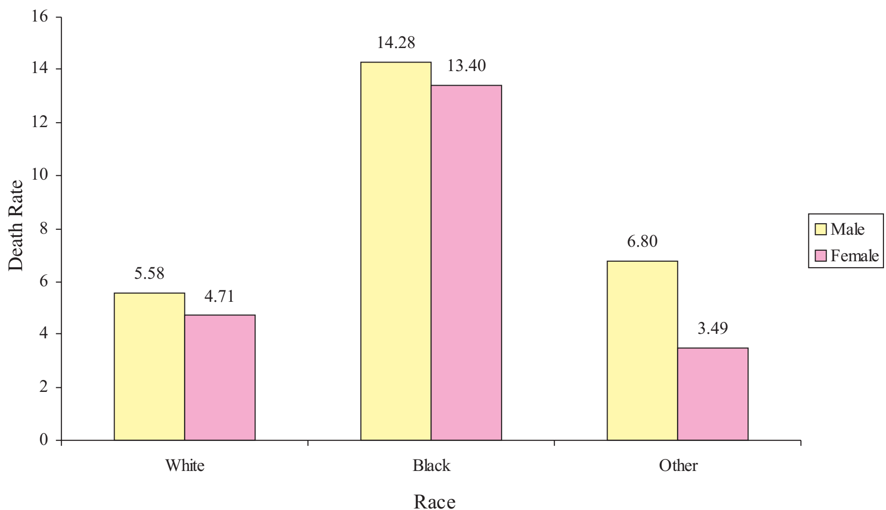


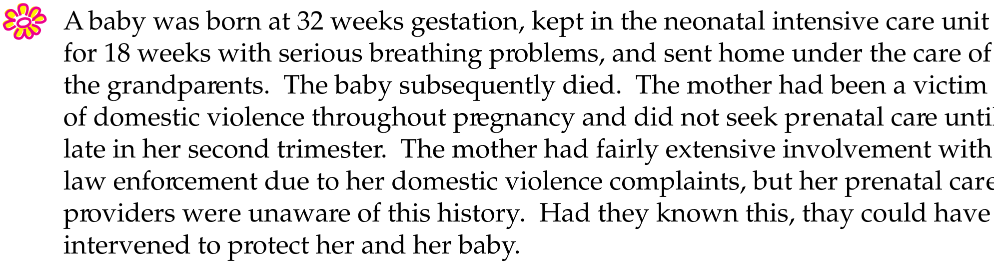
Figure 16. Michigan Natural Child Death Rates* By Race and Sex, 1997, Age Less than One Year, N=899**



* Infant Death Rates are per 1,000 live births.

** 4 cases with unknown gender are not included in this figure.

Representative Cases Reviewed



- A baby was born at 32 weeks gestation, kept in the neonatal intensive care unit for 18 weeks with serious breathing problems, and sent home under the care of the grandparents. The baby subsequently died. The mother had been a victim of domestic violence throughout pregnancy and did not seek prenatal care until late in her second trimester. The mother had fairly extensive involvement with law enforcement due to her domestic violence complaints, but her prenatal care providers were unaware of this history. Had they known this, thay could have intervened to protect her and her baby.

- A baby girl was born HIV positive, but the mother was not aware of her or the baby's HIV status until the baby became sick. The baby died of AIDS at five months. The mother was not offered HIV testing during her pregnancy. She began prenatal care in the first trimester, had no medical complications during pregnancy and delivered a normal birth weight baby. Knowledge of her HIV status could have begun intensive drug treatments during pregnancy to prevent HIV transmission to the baby.

- A baby boy died within 12 hours of birth, at 31 weeks gestation and weighing 3 pounds, 3 ounces. His mother is 17 years old. She delayed seeking prenatal care because of her fear of being "found out."

- A baby was born attended by a lay midwife. She did not seek medical attention attention when the baby's condition became serious. The infant died of asphyxiation.

- A three-year-old male toddler died of cancer while residing in a foster home in a county different than the county that had his case. There was a poor exchange of information about his medical records across county lines, and it does not appear that he had obtained regular well-child visits prior to his cancer being identified.

- A medically fragile child died at age 12. He lived in a foster care home. He had a medical emergency that was not identified by his foster parents and he died before receiving medical attention. An investigation revealed that the foster home was not monitoring his medical condition.

Local Team Findings

The teams reviewed 256 natural deaths (in addition to the 104 SIDS deaths reviewed). Of the 256, 148 were natural deaths of infants under one year of age. There was often difficulty in conducting these reviews because of the complexity of the medical issues surrounding the deaths. Also, for the infant deaths, teams were often limited in the information that they were able to obtain from the mothers' medical records. Thus, many teams were only able to conduct a cursory review of the deaths.

One county review team formed a sub-committee to review their natural infant deaths. Neonatologists, pediatricians, nurses, social workers and others attended these specialized reviews. Case record abstractions were completed prior to the meeting. The team closely examined the prenatal and birth history of the mothers and infants. In their review of over 125 neonatal infant deaths, this group found that at least half were preventable. The most common risk factors they identified included lack of access to or poor utilization of prenatal care, substance use during pregnancy, teen pregnancies, other poverty related factors and lay midwife deliveries without adequate medical backup.

A number of Michigan counties are conducting more specialized infant death reviews through a formal process known as FIMR: Fetal Infant Mortality Review. These reviews include extensive medical record abstraction on mother and infant, home interviews and active participation in the review by a wide spectrum of the medical community. MDCH is in the second year of a three-year federal grant to expand FIMRs in Michigan. Saginaw and Kalamazoo counties are currently conducting these more focused and specialized reviews. Seven counties have received support grants to assist them in establishing these teams. The state FIMR coordinator works closely with Child Death Review to ensure program coordination and collaboration. In addition, the CDR program coordinator participated on a federal panel that made national recommendations for states to coordinate FIMR and Child Death Review.

In an effort to help local CDR teams who do not conduct FIMRs or other specialized infant death reviews, the case report form includes several queries on specific risk factors related to maternal and birth histories. Although the information reported by teams in the case reports is limited, the following was reported for natural infant deaths other than SIDS:

Table 8:
Natural Infant Deaths Reviewed by Age at Death

Age at Death	Number of Cases
Fetal	7
0-24 hours	55
24-48 hours	3
48 hours-6 weeks	29
6 weeks-6 months	34
6 months-1 year	12
Missing	8

Table 9:
Natural Infant Deaths Reviewed by Gestational Age

Gestational Age	Number of Cases
< 22 weeks	14
22-35 weeks	23
36-37 weeks	7
> 37 weeks	15
Missing	89

Table 10:
Natural Infant Deaths Reviewed by Birth Weight in Grams

Birth Weight in Grams	Number of Cases
< 750	14
750-1,499	6
1,500-2,499	5
> 2,500	11
Missing	112

Table 11:
Natural Infant Deaths Reviewed by Number of Prenatal Visits

Total Number of Prenatal Visits	Number of Cases
None	2
1-3	1
4-6	7
7-10	23
Missing	115

Seventeen of 148 (11%) mothers received Maternal Support Services (an intensive home visit support program) during pregnancy. Some other risk factors identified by the teams included:

- 22 of 148 (15%) mothers had medical complications in pregnancy.
- 16 of 148 (10%) mothers reported that they smoked during pregnancy.
- 3 of 148 (2%) mothers reported that they used drugs during pregnancy.
- 1 of 148 (1%) mothers reported that they used alcohol during pregnancy.
- 21 of 148 babies' families had had prior CPS involvement: 18 had a family member with a CPS substantiation and 3 of the children who died had prior substantiated abuse.
- The deaths of three newborns were reviewed in which it was determined that a lay midwife did not seek additional medical assistance as necessary.

State Advisory Team Recommendations for Michigan Policy Makers

5. Expand the Fetal Infant Mortality Review (FIMR) program to communities in Michigan with higher infant mortality rates than the state average.

6. Encourage the state organizations of lay midwives to develop standards for practice and explore the need for public education and state regulation of lay midwifery.

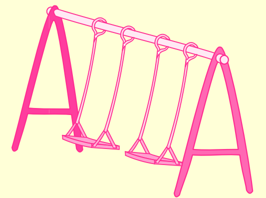
7. Encourage medical care organizations and insurance companies to work with their provider groups and private health care providers to:

    a. Ensure early access to and continuity of care for all pregnant women.

    b. Comply with state laws that require physicians to offer pregnant women client-centered counseling and voluntary HIV testing.

    c. Improve screening of pregnant women and new parent patients for domestic violence and substance abuse and assure appropriate referral and service capacity (in all areas of client contact. For example, physicians' offices, social and human service organizations).

    d. Increase referrals to risk reduction programs such as Maternal Support Services (MSS) and Infant Support Services (ISS).



Teams reviewed 277 unintentional injury deaths. 407 children died from unintentional injuries in Michigan in 1997.

UNINTENTIONAL INJURY DEATHS

Unintentional injury deaths to children are deaths that result when a person, object or event causes an injury, but in which no harm was intended. Unintentional injuries are still commonly known as accidents, and are recorded on death certificates as such. However, child injury professionals, following the guidance of the National Center for Injury Prevention at the Centers for Disease Control, are now using the term "unintentional injuries" to replace the term "accidents". The term accident implies that nothing could have been done to avoid the event. But contrary to popular belief, except for natural disasters, accidents are not random events. Almost all accidents are in fact predictable and understandable, and therefore preventable.[8]

Unintentional injuries were the number one cause of deaths among children aged 1-18, representing 42% of all deaths in 1997 in Michigan.

Motor vehicle crashes are far and away the primary cause of unintentional injury deaths, in all age groups. Drownings and fires are the second and third most frequent causes, depending on the year. Unintentional suffocations, especially among infants and toddlers, are the fourth most common cause of unintentional injury deaths.

The teams reviewed 277 unintentional deaths to children.

Table 12:
Unintentional Child Deaths Reviewed by Cause

Causes	Number of Cases
Motor Vehicle	151
Fires	38
Drownings	39
Suffocations	21
Firearms	7
Poisonings	5
Falls	1
Electrocutions	1

Figure 17. Michigan Child Deaths Due to Unintentional Injuries 1988 - 1997, Ages 0-18

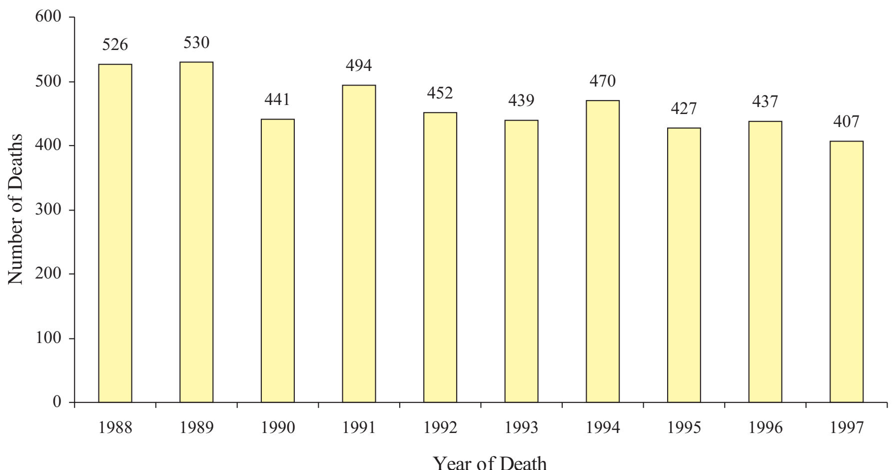


Figure 18. Michigan Child Death Rates Due to Unintentional Injuries 1988 - 1997, Ages 0-18

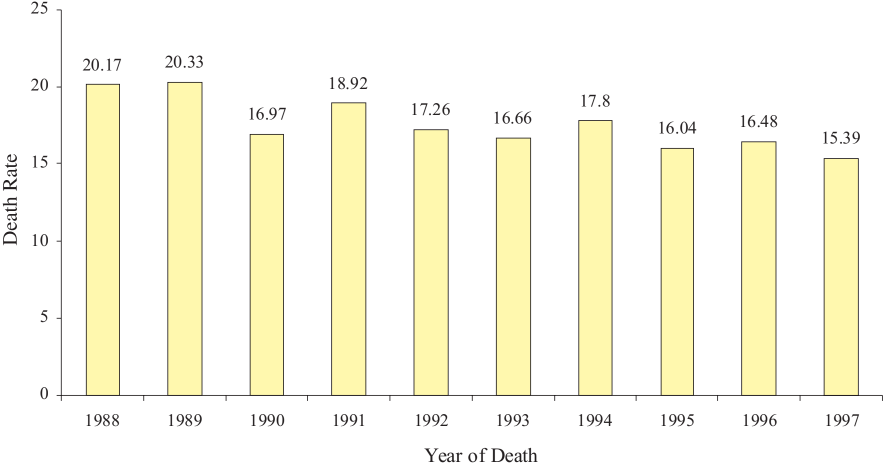
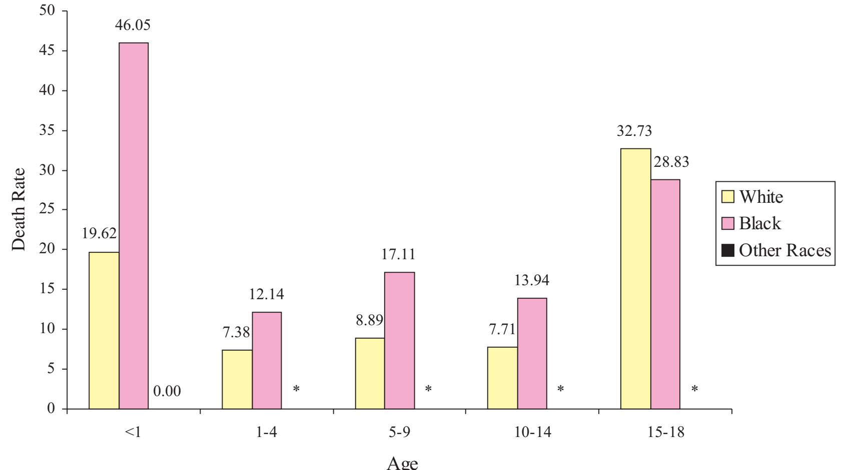


Figure 19. Michigan Child Death Rates Due to All Unintentional Injuries by Age and Race, 1997, N=407



* Other Race Numbers are too small (<6) to calculate rate.

Figure 20. Michigan Child Deaths Due to All Unintentional Injuries by Cause, 1997, Ages 0-18, N=407

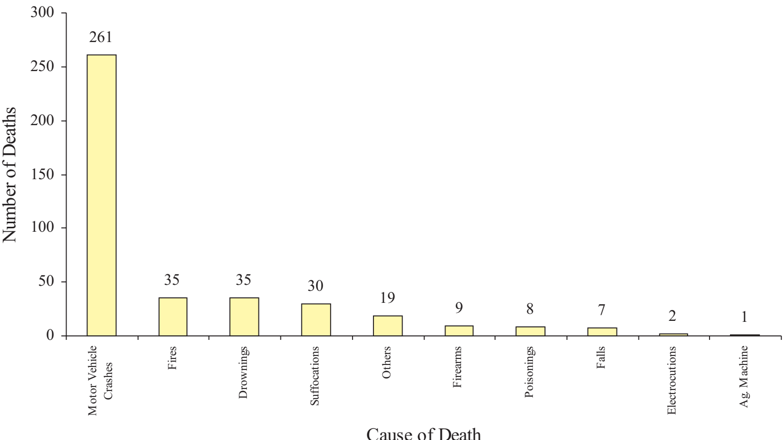
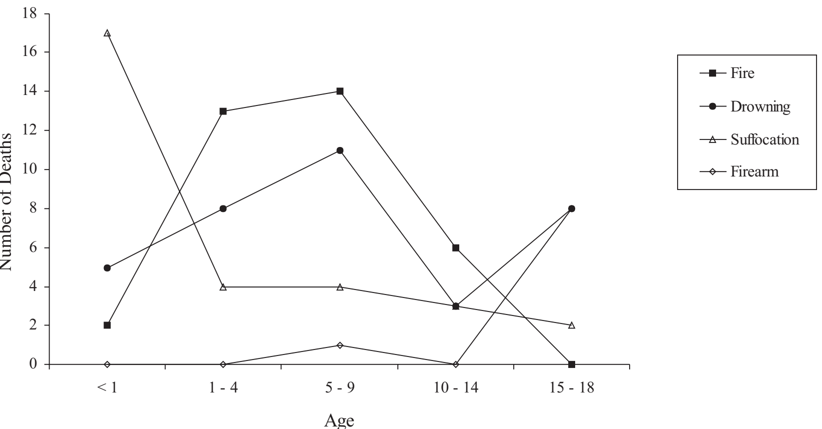
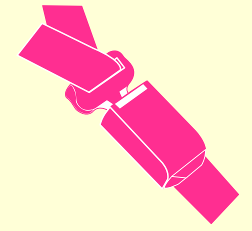


Figure 21. Michigan Child Deaths Due to Unintentional Injuries by Selected Causes and Age, 1997





MOTOR VEHICLE CRASHES

Teams reviewed 160 motor vehicle deaths. 261 Michigan children died from motor vehicle crashes in 1997.

Overview

Motor vehicle deaths include all deaths occurring to children who are drivers, passengers, pedestrians or other types of occupants in a form of transport. This includes cars, trucks, bicycles, trains, snowmobiles and all-terrain vehicles. The majority of children who died in crashes were passengers.

The National Center for Injury Prevention and Control lists unrestrained children, drunk drivers and teen inexperience as the major risk factors in motor vehicle deaths of children. In the United States in 1996, 62% of children 0-14 years of age who were killed in fatal crashes were unrestrained[9] and between 1985-1996, nearly 24% of children ages 0-14 who died were in alcohol related crashes (60% were riding in the impaired driver's car).[10] Teen drivers with blood alcohol levels of 0.05-0.10 are more likely to be killed in single vehicle crashes (18 times more for males and 54 times more for females).[11]

Driver inexperience is closely related to teen fatalities. Teens lack maturity and driving experience, yet as a group are more likely to take risks and not use seat belts. Also, nationally, about half of all teen crash deaths occur between 9:00 p.m. and 6:00 a.m.[11]

Michigan teens are most often killed as passengers or while driving with other teens in the car. A Michigan State Police Prevention Officer stated that "if we could convince teens not to drive home from social gatherings in cars with their friends, we could prevent a great number of deaths."

Michigan has recently taken steps to improve the driving skills and experience of teen drivers and curb alcohol-related teen deaths. The Michigan Graduated Licensing Program is one of the strictest in the nation. Also Michigan enforces zero tolerance in alcohol use by teen drivers.

The use of infant and child restraints has received a great deal of attention in the past several years. Consumer education efforts have been especially focused on the proper positioning (rear seat) for young children, hazards of air bag deployment for young front seat passengers and the need for proper installation and use of infant seats.

It is estimated that 75% of bicycle related deaths to children could be prevented if all children on bicycles wore helmets. Bicycle helmets reduce the risk of head injury by 85% and brain injury by 88%.[12]

Off-road vehicle deaths to children include snowmobile and all-terrain vehicle deaths. High speeds and driver inexperience are the most common factors contributing to these deaths.

Figure 22. Michigan Child Deaths Due to Motor Vehicle Crashes, 1988 - 1997, Ages 0-18

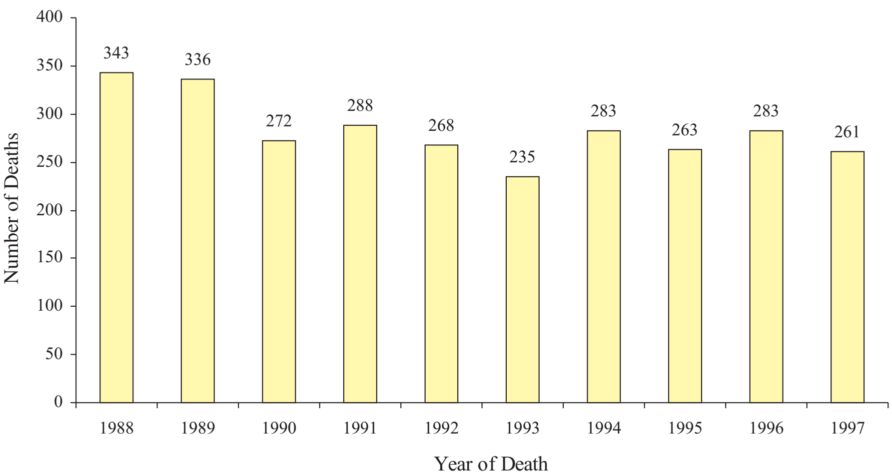


Figure 23. Michigan Child Death Rates Due to Motor Vehicle Crashes, 1988 - 1997, Ages 0-18

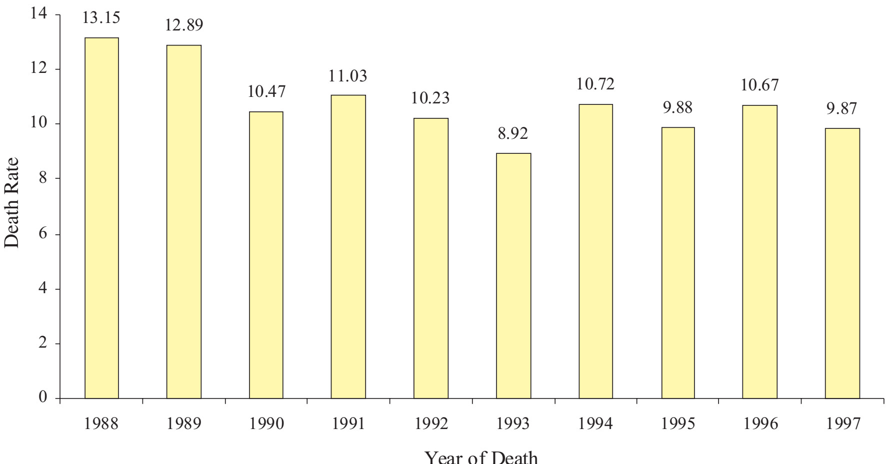


Figure 24. Michigan Child Deaths Due to Motor Vehicle Crashes by Role in Crash, 1997, Ages 0-18

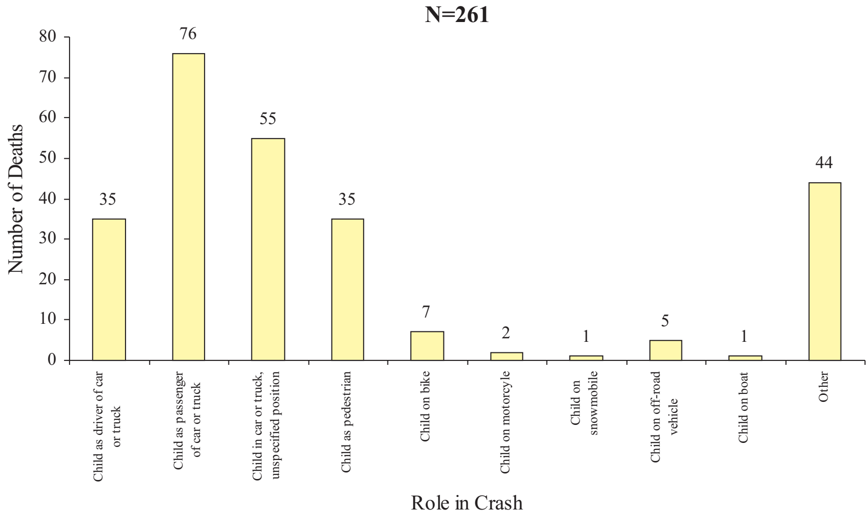
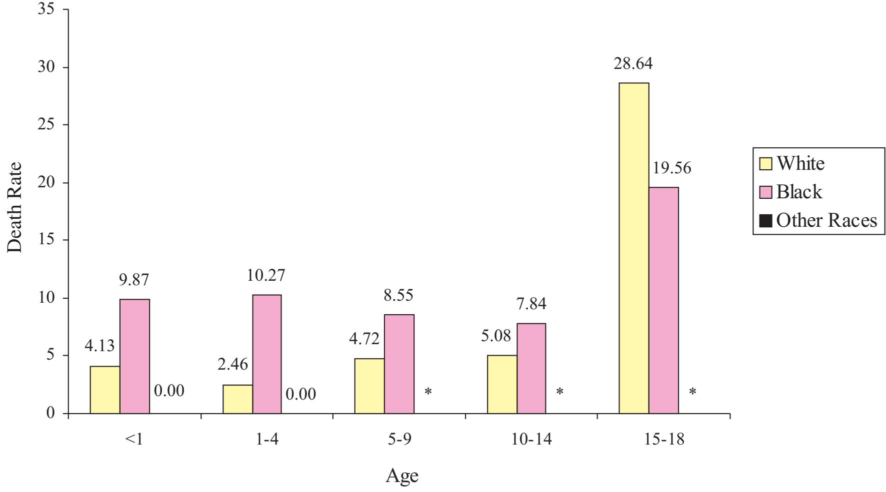


Figure 25. Michigan Child Death Rates Due to Motor Vehicle Crashes by Age and Race, 1997, N=261



* Other Race Numbers are too small (<6) to calculate rate.

Representative Cases Reviewed

- A 16-year-old girl was driving on an icy rural road and lost control of her car. She was wearing her seat belt, but her injuries were so great that she died at the scene. The team believes she had very little experience with hazardous road conditions.
- A 14-year-old boy was the passenger in a car driven by a 16-year-old friend. The friend was driving recklessly and flipped the car off the road. The younger teen died instantly. He was not wearing his seat belt and probably would have survived the crash with minor injuries if he had been buckled in. There was no alcohol involved.
- A 14-year-old girl's teenage brother was driving her to the doctor. He lost control of the car on a notoriously bad curve. She was thrown from the car and killed. Had she been wearing her seat belt, she probably would have suffered only minor injuries.
- A one-year-old baby girl was standing up in the back seat of her grandparents' car. Grandpa stopped suddenly at a stop sign. The baby was thrown against the window and died of head injuries.
- Three teens (all aged 16) were driving home from a kegger at a friend's house. The driver lost control and the two passengers were killed. None of the teens were wearing seat belts and they all had blood alcohol levels over 0.2. The driver is awaiting trial.
- A three-month-old baby boy was seated on his mother's lap while dad was driving at the posted speed limit. The parents got into an argument and dad lost control of the car, hitting a building. The baby was ejected from the car and died from multiple injuries. Both parents were uninjured.
- A 17-year-old girl was riding her Jet Ski on a lake. The sun was bright and low in the sky. She collided with a dock at full speed, and died from internal injuries.
- A 12-year-old boy was riding his bike along a rural road and was hit from behind by a car. He suffered massive head injuries and died. He was not wearing a helmet.

Team Findings

The teams reviewed 160 motor vehicle crash deaths. Most occured to children driving or riding in cars.

Table 13: Deaths Reviewed by Vehicle Causing Death

Vehicle Causing Death	Number of Cases
Car	101
Truck	26
Motorcycle	2
Bicycle	4
Farm Vehicle	4
All-Terrain	3
Other	8
Missing	12

Most of the car crashes occurred due to reckless driving, speeding or other driver error. In 31 cases, the teen who died was the driver, but in only four of these cases was the teen driver alcohol impaired. There were 27 other crashes in which the teen driver did not die, but a child or teen passenger died. Six of these teen drivers were alcohol impaired. One teen driver killed a child pedestrian.

Table 14:
Motor Vehicle Related Child Deaths Reviewed by Age of Driver

Age of Driver in Crash that Killed a Child	Number of Cases
16-18	60
19-24	21
25-35	13
36-59	16
> 60	3
Does not apply	14
Missing	33

Other findings included:

- Alcohol or other drugs were involved in 15% of deaths reviewed, with 14 of the crashes involving a drunk driver.
- Seat restraints could have been a factor in 30% of the deaths. Seat belts or child seats should have been used in 102 of the crashes. Of these cases, restraints were present but not used in 50 deaths. Four car seats should have been used, but were not even present in the vehicle; and three were present, but used incorrectly.
- Two crashes were reviewed involving teen passengers thrown from the beds of pickup trucks.
- Of the four crashes in which a car struck a child bicyclist, two of the children were not wearing helmets. The team did not have information on helmet use for the other two deaths.
- Two teens were killed on the same day at two different railroad crossings in one county.

Local Initiatives that Resulted from the Reviews

The teams proposed 100 prevention initiatives as a result of their reviews, and have begun to implement 42 of these. Some of their initiatives include:

- A countywide campaign to encourage seat belt use and proper use of child seats.
- A new initiative, in which law enforcement officers responding to crashes place a sticker on all child safety seats, advising that the seats were damaged in a crash and should be replaced.
- Review team advocacy with legislators on primary seat belt enforcement and legislation prohibiting truck bed passengers under age 14.
- Review team support of Students Against Driving Drunk activities.
- Scrutiny of and improvements to drivers' education curricula, to ensure that local traffic safety issues are included.

- Advocacy with road commissions to re-engineer dangerous road conditions.
- Two county campaigns to develop new signage for dangerous intersections related to stop signs and railroad crossings.

State Advisory Team Recommendations for Michigan Policy Makers

8. Consider the merits of legislation and provide public education on:
   a. Primary seat belt enforcement.
   b. Prohibition on children riding in the back seat of pickup trucks.
   c. Bicycle helmet use.
9. Encourage partnerships among state level highway and traffic safety agencies and local communities to improve dangerous roads, traffic and pedestrian areas.
10. Encourage communities to support and fund local Students Against Driving Drunk (SADD) chapters and other similar interventions to encourage responsible teen driving.
11. Support expanded education on child automobile restraint use.
12. Improve and increase enforcement and public education of watercraft and snowmobile regulations with an emphasis on prevention of alcohol use.

FIRES

Teams reviewed
38 fire deaths.
35 Michigan children
died in fires in 1997.

Overview

House fires are the leading cause of fire related deaths to children.[13] Children who are poor, African American and living in older, substandard housing are significantly more at risk of dying in a house fire than other children. Older homes occupied by poor families are more likely to be wood frame, use alternative heating sources and lack smoke detectors.[14] The U.S. Fire Administration reports that 90% of the fire-related deaths to children under the age of five occur in homes without a functioning smoke alarm.[15] Young children are especially vulnerable in residential fires. Children between the ages of 0-4 have the highest rates of fire deaths (in the U.S., 60% of children who die are 0-4 years of age). These children do not know how to escape and/or are unable to escape from a burning house.[14] Nationally, African American children are three times more likely to die in a house fire than white children are.[13]

Children playing with ignition sources cause about 10% of all fatal fires in the United States.[16] Data is not currently available on the number of fires set by children who are known fire-starters, a recognized mental health disorder. But these children present a greater risk, especially when other risk factors are also present.

Other contributing risk factors include fires that occur when young children are left alone in homes or when caregivers are intoxicated. One study found that alcohol intoxication was a contributing factor, once a fire was started, in 40% of the fatalities.[17]

Figure 26. Michigan Unintentional Child Deaths Due to Fire, 1988 - 1997, Ages 0-18

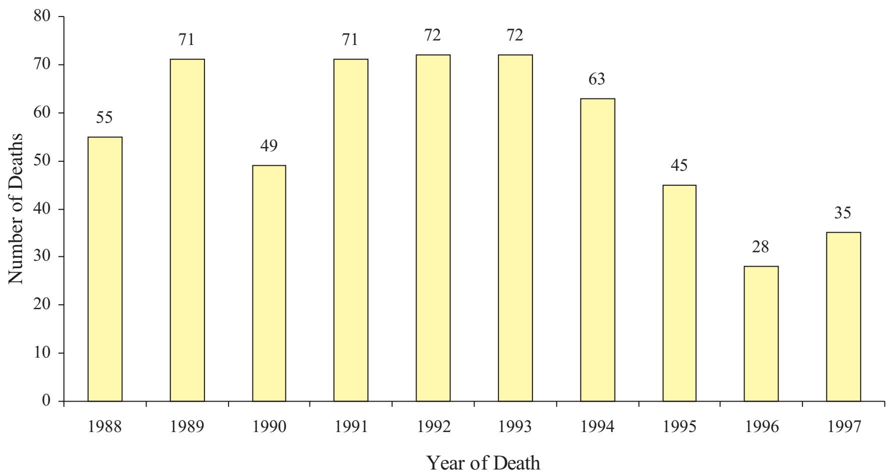


Figure 27. Michigan Unintentional Child Death Rates Due to Fire, 1988 - 1997, Ages 0-18

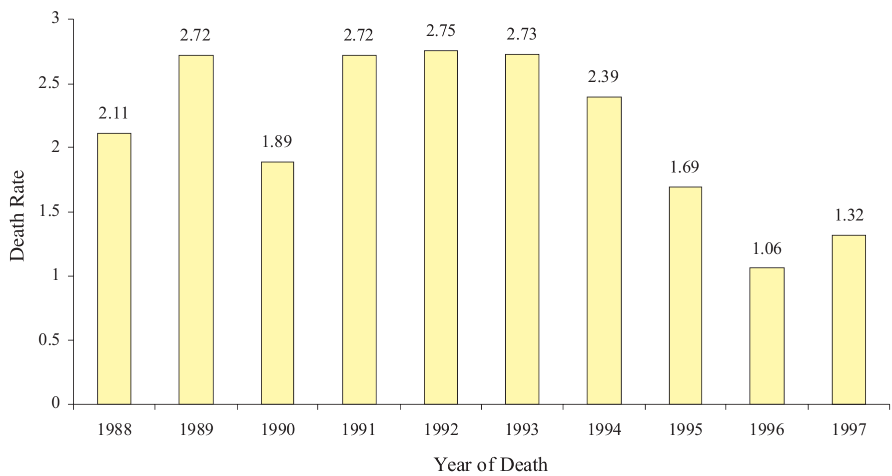


Figure 28. Michigan Unintentional Child Deaths Due to Fire, by Age, Race, and Sex, 1997, N=35

Age	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
<1	1	-	-	1	-	-	2
1-4	4	2	5	2	-	-	13
5-9	4	4	2	2	1	1	14
10-14	2	1	-	3	-	-	6
15-18	-	-	-	-	-	-	-
Total	11	7	7	8	1	1	35

Representative Cases Reviewed

- A 12-year-old girl was sleeping when the space heater in the family room caught the curtains on fire. She and her father died in the fire. There were no smoke detectors in the rental home. She died of smoke inhalation.
- A one-year-old baby boy was sleeping in the basement apartment of his grandparents' home when fire broke out upstairs. The heat of the fire prevented anyone from entering through the upstairs, and the windows to the basement were too small to enter to rescue the baby. He died of smoke inhalation and burns. There were no smoke detectors in the home.
- A father was smoking on the couch and fell asleep. His cigarette started a fire. His four children were asleep upstairs. When the father awoke, he couldn't get upstairs because of the heat. In trying to break open a window, he fueled the fire further and all of his children died of smoke inhalation. There were no smoke detectors in the house.
- Three children, ages 1-6, were left alone for several hours while their mother went out one evening. A fire started in the house and all three children died of smoke inhalation.

Team Findings

The teams reviewed 38 unintentional fire deaths to children and 8 homicide (arson) fire deaths. Thirty-three of the fires occurred in older wood frame homes (five of these as arsons). These homes burned rapidly and the fires caused more than one injury or death in 25 of the cases.

Twenty-three (or 61%) of the unintentional fire deaths were to children under five years of age. Four children were found in their beds and two were hiding. The teams reported that 36 of the children did not know of an escape plan.

Matches (n=5), cigarettes (n=5) and lighters (n=8) caused 18 of the fires. Ten occurred while children were playing with matches (n=4) or lighters (n=6).

Faulty heating or wiring caused six of the fires.

The teams reported that 25 of the fatal fires occured in homes without smoke detectors. Of the others, 13 homes had detectors, but in five cases they were without batteries at the time of the fire.

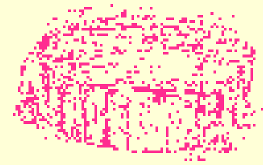
Local Initiatives that Resulted from the Reviews

Based on the reviews, the teams recommended 38 initiatives, including 10 changes to agency policy and practices and 28 prevention initiatives. These include:

- Better in-home assessment by human service agencies (e.g. MSS and CPS) of smoke detectors, fire hazards and fire escape plans.
- A number of counties are working for better enforcement and prosecutions when rental units fail to have adequate smoke detection systems in place.
- Smoke detector awareness days.
- Parent education through the schools.
- Increased fire department involvement in the schools.
- Fire safety programs targeted toward preschoolers.

State Advisory Team Recommendations for Michigan Policy Makers

13. Examine ways to fund and support public education campaigns on proper storage and use of space heaters.
14. Expand current fire safety education to include all Head Start and publicly funded preschool programs.
15. Study options to improve the technology and utilization of reliable smoke detectors and carbon monoxide detectors in new public and rental housing, including trailers.



DROWNINGS

Teams reviewed 39 drowning deaths. 35 Michigan children died from drowning in 1997.

Overview

Drowning occurs most frequently in swimming pools, followed by lakes and rivers, bathtubs and in other areas such as gravel pits. Drownings and fires are interchanged as the second and third leading causes of unintentional injuries to children in Michigan in any given year. Most drownings occur when supervision is inadequate. While all ages are at risk of drowning, children between the ages of 1-4 and teens are most vulnerable.[18] National studies show that the risk factors most related to drowning include: children's inability to swim, alcohol use (especially by male adolescents and by the supervising caregivers),[19] inadequate pool fencing and easy access to hazardous water areas (such as gravel pits).

Nationally, 60% to 90% of drownings to children aged 0-4 happen in pools, usually in their own homes. According to the Consumer Product Safety Commission, residential swimming pools without complete fencing are 60% more likely to be involved in drownings as pools with adequate fencing.[20]

Bathtub drownings almost always involve a lack of supervision (from a few minutes to longer periods of time). Infants who drown are unable to regain posture after slipping into the water. Even a few inches of water can be fatal to an infant. The review teams analyzed a number of bathtub drownings, some of which were listed as unintentional injuries and others as homicides due to negligence.

Figure 29. Michigan Unintentional Child Deaths Due to Drowning, 1988 - 1997, Ages 0-18

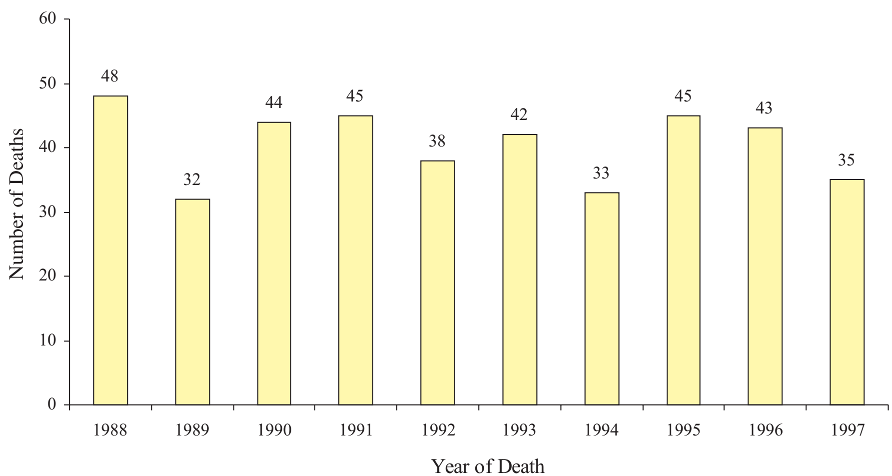


Figure 30. Michigan Unintentional Child Death Rates Due to Drowning, 1988 - 1997, Ages 0-18

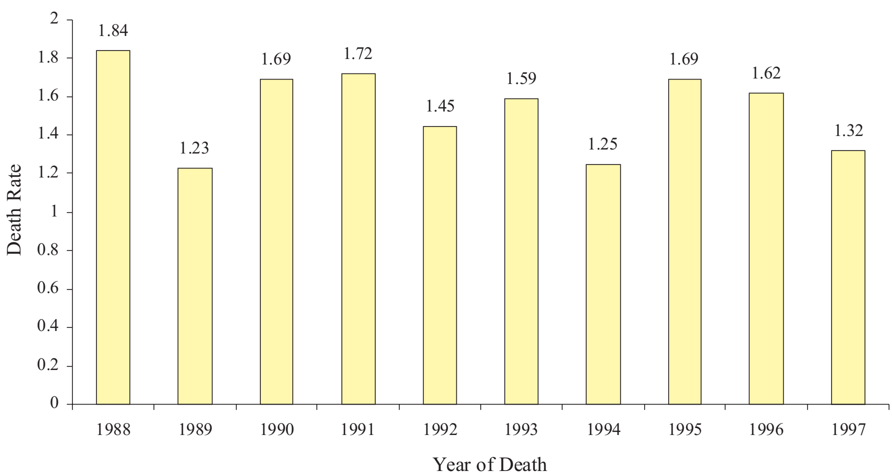


Figure 31. Michigan Child Deaths Due to Unintentional Drowning, by Age, Race and Sex 1997, N=35

Age	White		Black		Total
	Male	Female	Male	Female	
<1	1	1	2	1	5
1-4	6	1	-	1	8
5-9	4	3	2	2	11
10-14	1	-	2	-	3
15-18	5	-	3	-	8
Total	17	5	9	4	35

Representative Cases Reviewed

- A three-year-old toddler hopped on his tricycle and rode over to the next door neighbor's house. He went into the back yard and climbed up the ladder of an above-ground pool, falling in. His father had looked out the window and noticed the tricycle in the neighbor's driveway and assumed he was visiting the neighbors. The little boy was not discovered for two hours.

- A two-year-old girl was playing with her siblings. Both parents were home but each assumed the other was monitoring the children. The little girl opened the back door and went out to the family pool and fell in. The pool had fencing but no locked barrier between the back of the home and the pool.

- A nine-month-old baby girl was playing in the bathtub when her mother went to answer a phone call. When the mother returned 15 minutes later, the baby had drowned in 9 inches of water.

- A two-and-a-half year old toddler was playing at his licensed day care home. He climbed up onto the hot tub, located in the back yard. The tub did not have a hard locked cover, and the boy fell through the soft cover and drowned.

Local Team Findings

The teams reviewed 41 drowning deaths. Thirty-nine were determined to be unintentional injuries, one was a suicide and one was a homicide (described in the following section). As with fires, young children are at greatest risk. Eighteen of the 39 deaths were to children ages 1-4, four deaths were to children under a year, 10 children ages 5-9 drowned and seven deaths were to children ages 10-18.

Table 15:
Child Drowning Deaths Reviewed by Location

Location of Drowning	Number of Cases
Lake, River, Pond, Gravel Pit	19
Swimming Pool	12
Bathtub	5
Other	2
Wading Pool	1

The children were all playing or bathing at the time of the drownings. Eight of the children were swimming, but the team determined that only four of those children were able to swim well. Nineteen children were playing near water, and none of those children were able to swim well. Alcohol use by caretakers was a factor in one death.

Two categories of drowning received special attention by the teams: bathtub drownings and children who fell into pools or ponds in which the fencing was inadequate.

The five children who were in bathtubs at the time of drowning were all left unattended for a period of time long enough for the child to drown. In one of these cases, the mother has been charged. Three other cases have action pending by the prosecutor. CPS conducted an investigation of four cases and substantiated neglect in three cases, but no other children have been removed from the homes.

Six deaths occured after the children entered a swimming pool unattended, in which the pool had no fencing or the gate was unlocked. In two drownings there were locked gates, but the child still managed to enter the pool (one by squeezing through the opening). In one case, action is pending by the prosecutor. CPS conducted investigations in five of these deaths but did not substantiate charges of neglect.

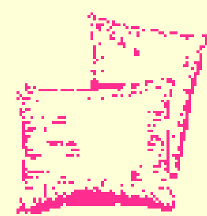
Local Initiatives that Resulted from the Reviews

The reviews led to 26 local recommendations for community action and nine of them were initiated. These include:

- A study of local ordinances related to pool fencing, finding that contrary to popular belief, many communities had no swimming pool fencing requirements.
- A letter addressed to the state's Child Day Care Licensing Agency to request a requirement that day care homes with hot tubs have hard cover, locked hot tub covers and self locking doors for hot tub and pool areas.
- Swimming safety classes made more available to grade school children in a community with many rivers and irrigation canals.
- Improved gates and safety bars near where driveways cross irrigation canals in a farming community.
- A SAFE KIDS campaign to distribute free pool alarms to swimming pool owners.

State Advisory Team Recommendations for Michigan Policy Makers

16. Encourage local governmental units to develop safety regulations related to swimming pools, hot tubs, gravel pit and bathtubs.
17. Publicize that swimming pool and hot tub enclosures as standard features will prevent deaths.
18. Publicize the need to reduce children's access to gravel pits, uncapped wells and other water hazards.



SUFFOCATIONS

Teams reviewed 21 unintentional suffocation deaths. 30 Michigan children died from suffocations in 1997.

Overview

Unintentional suffocations include smothering and choking deaths. They include deaths caused by objects that cover a child's face, such as plastic bags; deaths caused by a child choking on an object, such as a balloon; deaths caused when a child is confined in an airtight place, such as a refrigerator; deaths caused when a child becomes wedged into a space, such as between a mattress and a wall (positional asphyxia); and deaths caused by persons that accidentally lay over and smother a child (overlays).

Suffocations happen most frequently to infants and toddlers. Infants are at greatest risk for overlay and positional asphyxia, because they are not strong enough to move their heads or bodies. Most infants who suffocate by overlay or positional asphyxia do not have clinical findings at autopsy. It is only through a thorough scene investigation (including reconstruction of the event) that these deaths can be distinguished from SIDS.

Positional asphyxia deaths occur when infants sleep on soft mattresses, waterbeds, in older cribs with loose fitting mattresses and wide slats, on couches or regular mattresses, or when covered in heavy blankets. Infants are at risk of overlay death when they sleep with adults, especially when the adults are obese and/or are alcohol or drug impaired. Currently there is a national debate about the benefits and risks of co-sleeping with infants. The American Academy of Pediatrics issued guidance on co-sleeping in 1997. While it clarified the risk factors, it did not make a definitive recommendation.[21]

Intentional smotherings of infants, e.g. homicides, are often clinically indistinguishable at autopsy from SIDS and unintentional suffocations and can also only be identified through a thorough scene investigation and review of medical histories. Several scientific papers and the 1997 book *The Death of Innocents* brought to public attention a number of smothering homicides that were masqueraded as accidents or natural deaths.[22] Many of these deaths occur after the infant has already experienced apparent life threatening events (ALTEs) such as breathing difficulties and apnea episodes. A number of these deaths can be attributed to Munchausen's Syndrome by Proxy (in which the parent is seeking attention by creating a fictitious illness in the child).

Figure 32. Michigan Unintentional Child Deaths Due to Suffocation, 1988 - 1997, Ages 0-18

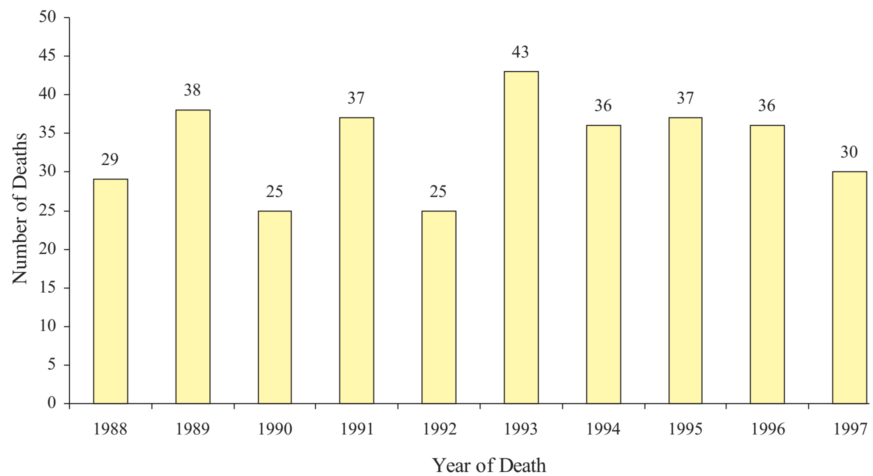


Figure 33. Michigan Unintentional Child Death Rates Due to Suffocation, 1988 - 1997, Ages 0-18

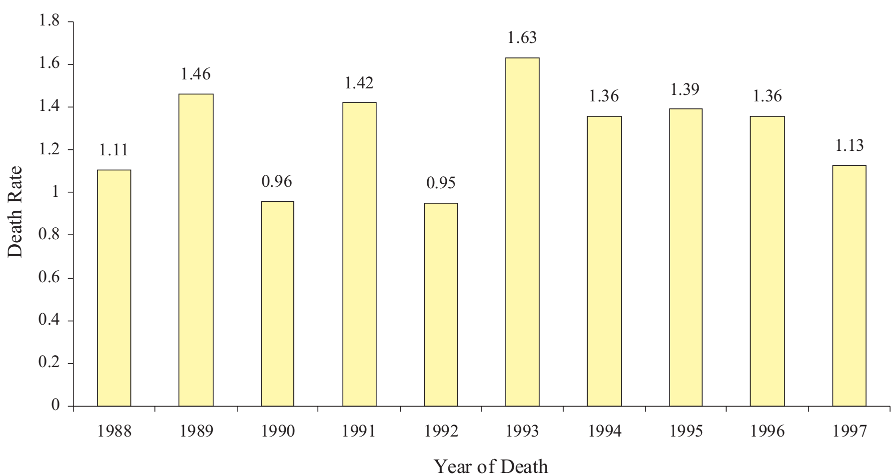


Figure 34. Michigan Unintentional Child Deaths Due to Suffocations, by Age, Race and Sex, 1997, N=30

Age	White		Black		Other		
	Male	Female	Male	Female	Male	Female	Total
<1	2	9	3	3	-	-	17
1-4	1	-	1	1	1	-	4
5-9	3	-	1	-	-	-	4
10-14	2	1	-	-	-	-	3
15-18	1	1	-	-	-	-	2
Total	9	11	5	4	1	-	30

Representative Cases Reviewed

- A one-month-old baby girl was asleep in her own bed. The parents returned home at 2:30 a.m. from a party, and the mother went to bed. The baby awoke at 3:30 a.m., the father brought her to the mother, who nursed her and kept her in bed with her. When the mother awoke late the next morning, the baby was suffocated under her body.

- A four-month-old baby girl was asleep on the couch. The baby rolled over and her face fell against a plastic bag that was wedged into the corner of the couch. Her mother found her not breathing in the morning.

- A five-month-old baby was placed to sleep on the floor and covered with a heavy quilt. Her parents discovered her not breathing early the next morning. The quilt was twisted up around her face.

- A father came home from a party, at which he had been drinking heavily, and lay on the couch with his sleeping baby. He rolled over onto the baby and did not wake up until late the next morning. The baby was not breathing and is believed to have died several hours earlier.

Local Team Findings

The teams reviewed 21 unintentional suffocations, 16 of which were infants.

CPS substantiated charges on the parents in three cases of unintentional suffocation due to the fact that the person overlying on the child was drug or alcohol impaired at the time.

Of the 21 cases, five children died when another person rolled onto them while sleeping. Five children suffocated in bedding, including four on soft beds. Two children died when their faces came into contact with plastic bags while sleeping (the bags were left near the babies' faces).

Eleven of the children died while they were in bed, four of these children were sleeping with others. Seven children died when ropes or cords strangled them and one child choked on a toy.

Local Initiatives that Resulted from the Reviews

The teams proposed 22 recommendations for changes in agency practices or community prevention based on these reviews, and seven of these have been initiated. They include:

- Education for new families about unsafe sleep environments.

- Correspondence with hospitals encouraging that they model safe sleeping at their maternity units and encourage safe sleep environments.

- Improved investigations and training of death investigators to better recognize suffocations versus SIDS.

- Newspaper articles written by team members addressing the dangers of unsafe sleep environments and the hazards of co-sleeping with infants.

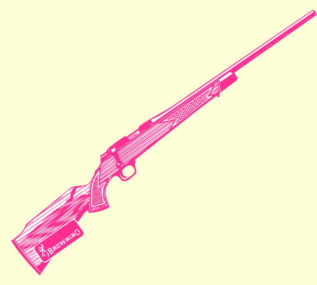
- As with SIDS, efforts to ensure safe sleeping environments for high-risk babies, through loan-a-crib programs and parenting education.

State Advisory Team Recommendations for Michigan Policy Makers

19. Require the use of standardized protocols (including autopsy, scene investigation and review of medical history) for the investigation of all sudden and unexplained child deaths.

20. Ensure that adequate training is available for medical examiners, medical examiner investigators and law enforcement personnel in the thorough investigation of child deaths.

21. Enhance support for public education campaigns on safe sleep environments for infants.



FIREARM DEATHS

Overview

Although approximately 95% of firearm deaths are homicides, many children are killed each year while playing with firearms or in hunting accidents. Nationally, children and adolescents commit 55% of all unintentional firearm deaths.[23] The majority of these deaths occur in the childrens' homes and involve handguns. Most deaths to children occur when they are playing with or showing a gun to friends or siblings and the gun accidentally discharges. The easy availability of a gun is the number one risk factor in most cases, nationally and in Michigan. A Gallup study found that 46% of all U.S. households with children have guns and 25% have handguns.[24] It is estimated that 25% of gun owners keep their guns loaded and unlocked. Researchers have found that in 48% of shootings in the U.S., children gained access to guns that were loaded and not locked away.[25] A 1992 Michigan Behavioral Risk Factor Survey of Michigan families found that 46.2% of the respondents reported that there was at least one gun in their home; 23.3% of whom reported that at least some of their guns were unlocked and unloaded with ammunition also unlocked, and 6.6% report that they kept their guns unlocked and loaded.[26]

Teams reviewed 7 unintentional firearm deaths. 8 Michigan children died from intentional firearm injuries in 1997.

Figure 35. Michigan Unintentional Child Deaths Due to Firearms, 1988 - 1997, Ages 0-18

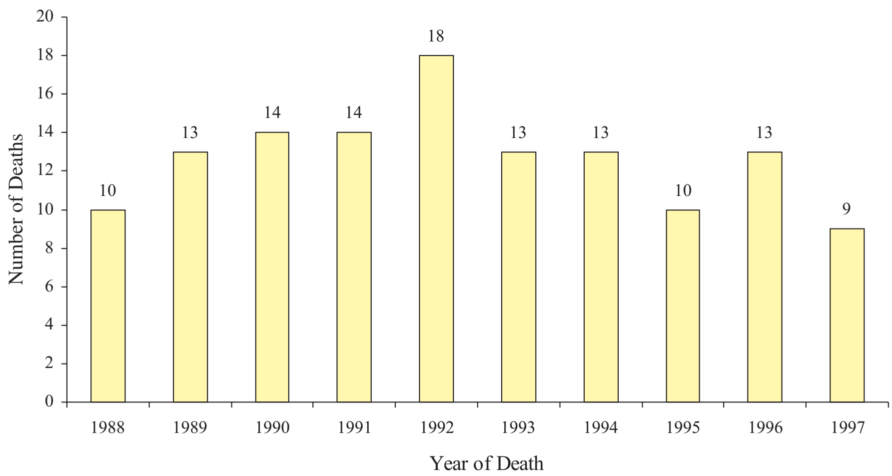


Figure 36. Michigan Unintentional Child Death Rates Due to Firearms, 1988 - 1997, Ages 0-18

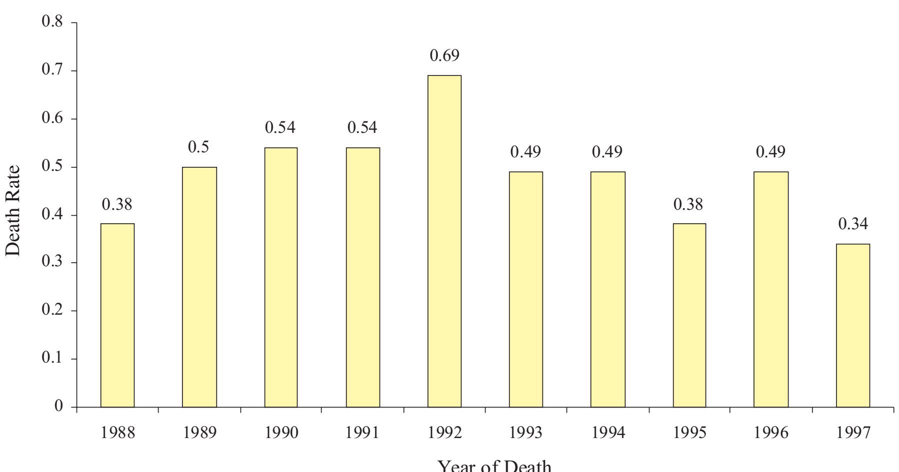


Figure 37. Michigan Unintentional Child Deaths Due to Firearms by Age, Race and Sex, 1997, N=9

Age	White		Black		Other Races		
	Male	Female	Male	Female	Male	Female	Total
<1	-	-	-	-	-	-	-
1-4	-	-	-	-	-	-	-
5-9	-	-	1	-	-	-	1
10-14	-	-	-	-	-	-	-
15-18	4	-	4	-	-	-	8
Total	4	-	5	-	-	-	9

Representative Cases Reviewed

- A 12-year-old boy was showing his eight-year-old brother their father's gun. The gun was unintentionally discharged, killing the younger brother. The older brother got the gun from under his father's pillow. It was loaded and unlocked.

- A ten-year-old boy was playing with his father's hunting rifle, when it was unintentionally discharged, killing him. The gun was stored unlocked and loaded, in the boy's bedroom.

- Two 11-year-old boys stayed home from school and were playing with a handgun that belonged to an older brother. The weapon misfired, killing one of the boys. The handgun wasn't registered.

Local Team Findings

The teams reviewed seven unintentional firearm deaths. All of the children were playing with the guns when they discharged. Four of the guns were handguns, two were rifles and one was a shotgun. Two of the handguns were not registered. Four of the children were 12 years old, one was 13 and two were 17. Five of the children had never attended a gun safety class. The reviews found that in only one case was the gun that killed a child locked in a gun cabinet. All of the other children had fairly easy access to the guns.

The teams made 10 recommendations for community action, implementing five of these, including:

- Exploring options for prosecution of caregivers when a child is killed with their gun.
- Promoting gun safety classes in rural areas among young hunters.
- Advocacy for legislation on trigger locks.

State Advisory Team Recommendations for Michigan Policy Makers

22. Consider ways to provide trigger locks with all firearms sold in Michigan.

23. Expand support for youth and parent gun safety education.

24. Explore ways to require gun dealers to provide material at the point of sale or resale, on gun safety and the proper storage and usage of guns, especially as they relate to children.

OTHER UNINTENTIONAL INJURIES

Teams reviewed 7 other unintentional injury deaths. 33 Michigan children died from other unintentional injuries in 1997.

Overview

Other unintentional injury deaths to children are grouped together here because of their relatively small numbers. These deaths were the result of poisonings, falls, agricultural machine injuries, cutting instruments, electrocutions and others.

Nationally, many of these deaths result from unsafe practices within homes and poor parental supervision.[8] Children's access to household chemicals and over-the-counter medications is the number one cause of poisonings. Agricutural injuries most often occur to children playing or working with farm equipment. Tractor injuries are the most common, and happen most frequently to school age children. Electrocutions are most often due to lightning strikes and downed power lines. Fatal falls to children are rare. They happen most frequently to children who fall from heights of several stories or who fall down stairs while restrained (such as in a baby walker). Our increased knowledge of the force required to cause a fatal fall death (usually from at least several stories, down steps onto a hard surface or from a moving vehicle); and improved death investigations have increased our ability to distinguish accidental falls from homicides due to beatings or violent shaking by caregivers.

Figure 38. Michigan Child Deaths Due to Other Unintentional Injuries, 1988 - 1997, Ages 0-18

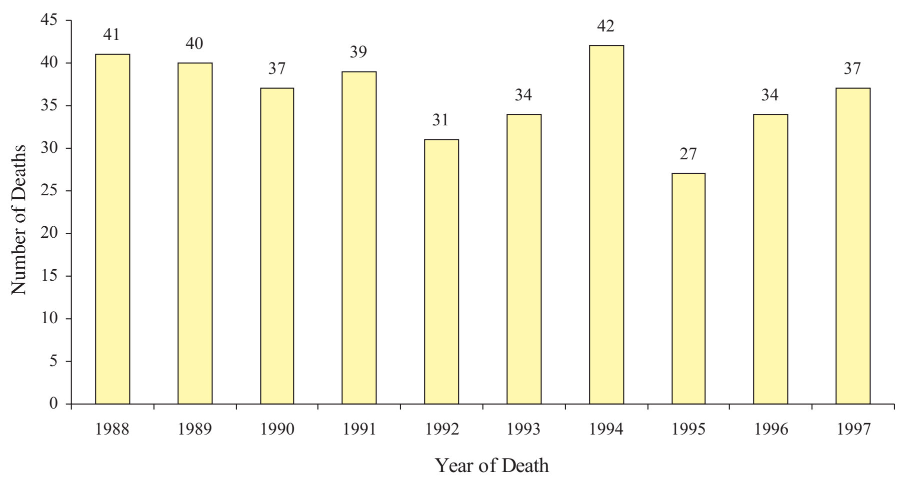


Figure 39. Michigan Child Death Rates Due to Other Unintentional Injuries, 1988 - 1997, Ages 0-18

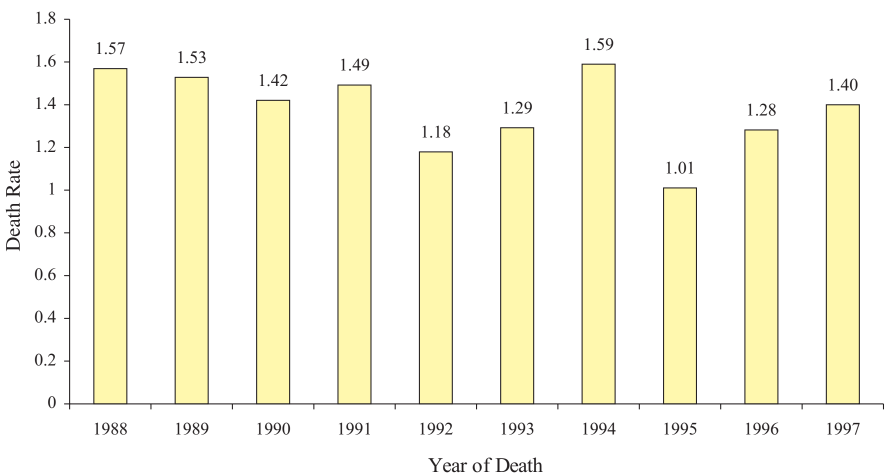


Figure 40. Michigan Child Deaths Due to Other Unintentional Injuries by Age, Race and Sex, 1997, N=37

Age	White		Black		Other Races		
	Male	Female	Male	Female	Male	Female	Total
<1	-	1	-	1	-	-	2
1-4	3	3	1	1	-	-	8
5-9	2	3	1	1	-	-	7
10-14	6	2	1	1	-	-	10
15-18	8	-	2	-	-	-	10
Total	19	9	5	4	-	-	37

Representative Cases Reviewed

A child was electrocuted when she came into contact with a downed power line following a storm.

A child died after ingesting some of her mother's methadone on a Sunday. The methadone clinics are not open on Sundays and clients bring home their Sunday dose.

Local Review Team Findings

The teams reviewed seven other unintentional child deaths; five to poisoning, one to a fall and one to an electrocution. The fall occurred when a child fell out of a moving vehicle. Two of the poisonings were methadone poisonings. Upon further review, the medical examiner identified three other methadone poisonings to young children over a three-year period. It was found that all five of the poisonings occurred over the weekend, when the mother had to bring her weekend dose home, because the clinics were not open on Sundays. In all cases, the drug had been left in a bottle within reach of the toddlers. The drug is a pink liquid with a sweet taste.

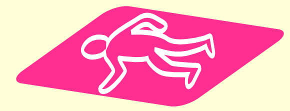
Local Initiatives Resulting from the Reviews

The team made several recommendations for community action based on these reviews. They included:

- Requesting that the state study clinic policies for methadone distribution on weekends, and discussions with state officials on these policies.

State Advisory Team Recommendations for Michigan Policy Makers

25. Study state policies and strategies to improve the safe and responsible distribution of methadone to reduce accidental poisoning to children.



HOMICIDES

A homicide is the taking of a life at the hands of another. Reviews of homicides against children can be grouped into three major areas: homicides of teenagers (usually teens using firearms against one another), abuse and neglect homicides (committed by caregivers) and other homicides in which the child may not be the intended victim (such as arsons or drunk driving crashes). The teams reviewed 94 homicides.

Teams reviewed 94 homicides. 113 Michigan children died from homicides in 1997.

Table 16:
Child Homicides Reviewed by Cause of Death

Cause of Death	Number of Cases
Shootings	35
Child Beatings/Shaken Baby	29
Inadequate Care and Neglect	8
Arsons	8
Motor Vehicle	4
Suffocations	4
Poisonings	1
Drownings	1

Figure 41. Michigan Child Homicides, 1988 - 1997, Ages 0-18

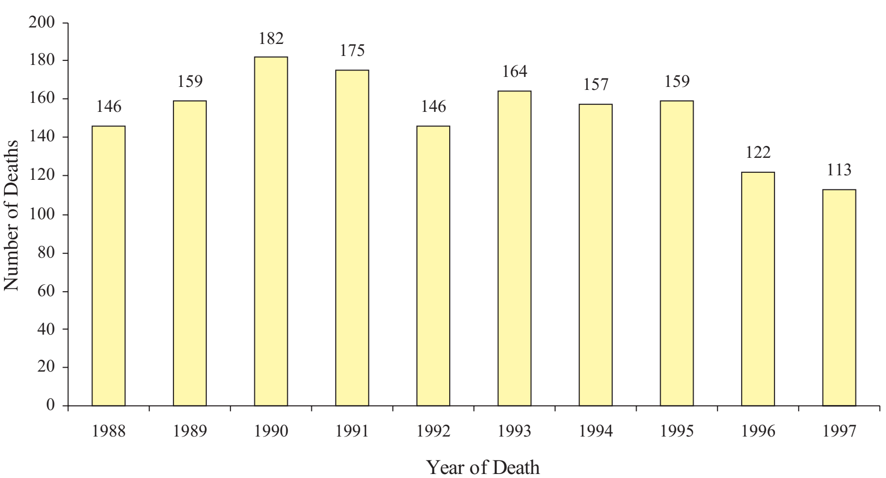


Figure 42. Michigan Child Homicide Rates, 1988 - 1997, Ages 0-18

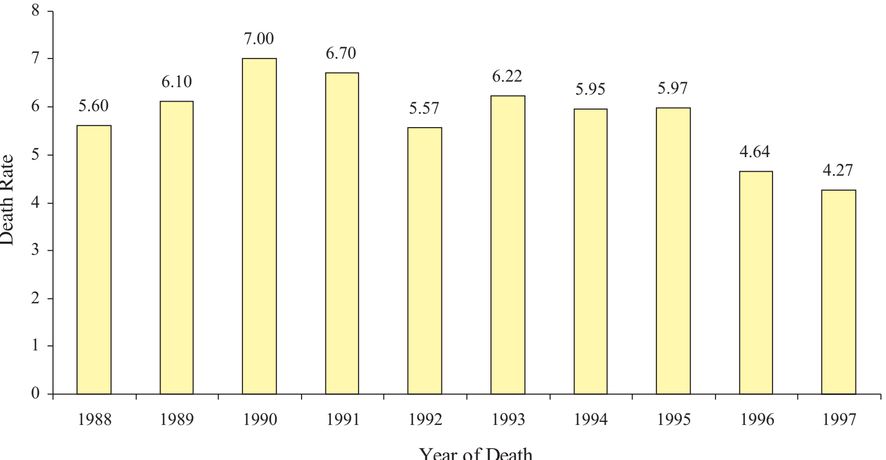


Figure 43. Michigan Child Homicides by Cause, 1997
Ages 0-18, N=113

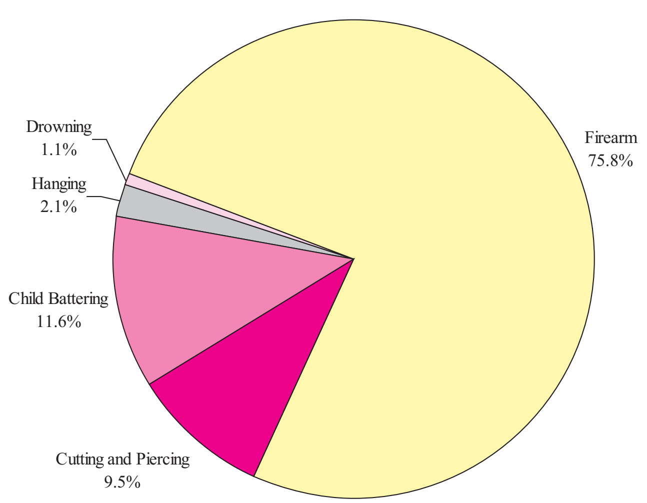
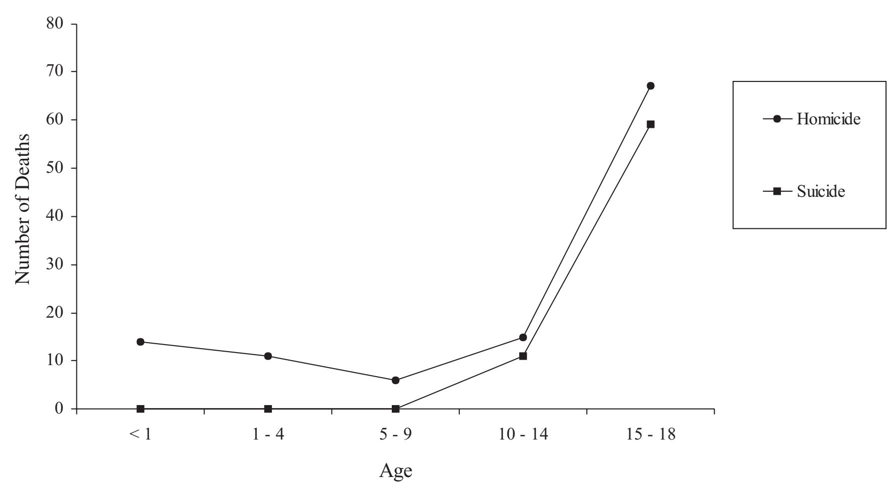


Figure 44. Michigan Child Homicide Rates
by Age, Race and Sex, 1997, N=30

Age at Death	White		Black		Total
	Male	Female	Male	Female	
<1	12.1	*	*	*	10.8
1-4	*	*	*	-	2.1
5-9	*	-	*	*	0.8
10-14	*	*	12.1	*	2.1
15-18	3.4	3.5	84.5	16.9	11.6
Total	2.1	1.3	24.2	6.6	4.3

*Rates were censored due to less than six cases.

Figure 45. Michigan Child Deaths by Homicide and Suicide,
and by Age, 1997



HOMICIDES BY FIREARMS

Teams reviewed 35 homicides by firearms. 72 children died from firearm homicides in 1997.

Overview

Teen homicide rates involving firearms reached such high levels in the late 1980s that the United States Surgeon General declared teen gun violence to be an epidemic. The risk of dying from a firearm more than doubled for teens between 1985 and 1994 in the United States. Homicides of adolescents almost always are committed by casual acquaintances of the same gender, race and age, using handguns. Nationally, homicides are the number one cause of death for African American and Hispanic teens.[23] Most teen homicide victims are poor, African American urban males. African American teen males have a homicide rate approximately seven times higher than white teen males.[27] Yet when socioeconomic status is held constant, differences in homicide rates by race are insignificant.[23] These homicides usually occur in connection with an argument or dispute. Major contributing factors in addition to poverty include easy access to handguns, involvement in drug and gang activity, family disruption and school failure. In the Youth Risk Behavior Surveillance Survey in 1997 for the United States, almost one-fifth of the students reported that they had carried a firearm within the previous 30 days for self-defense or to settle disputes.[28]

Figure 46. Michigan Child Homicides Due to Firearms 1988 - 1997, Ages 0-18

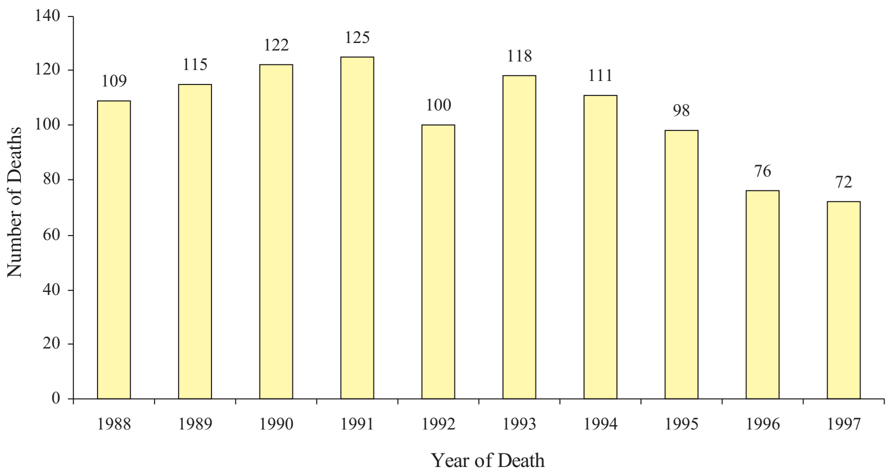


Figure 47. Michigan Child Homicides Rates Due to Firearms 1988 - 1997, Ages 0-18

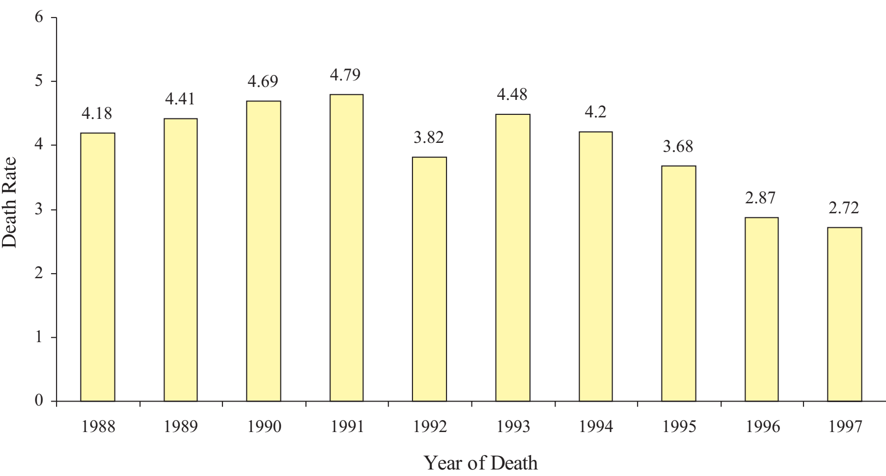
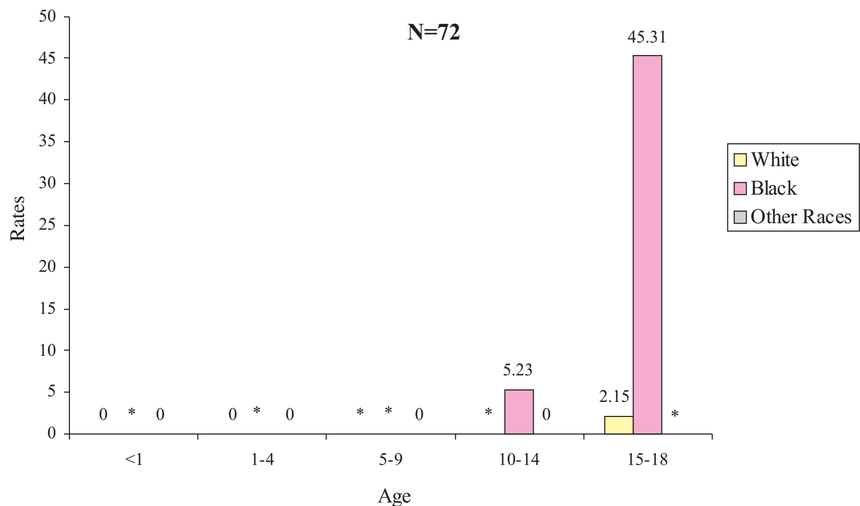


Figure 48. Michigan Child Homicide Rates Due to Firearms by Age and Race, 1997, N=72



* Numbers are too small (<6) to calculate rate.

Representative Cases Reviewed

A 14-year-old boy had a long history with the courts and police. He was born into violence and in his short life was both a victim and an aggressor. He was known since early childhood to multiple human service providers. His record began at age two, with reports of family violence, which continued throughout his childhood. When he reached middle school he became an aggressor, often in fights and committing petty crimes. He was sent to a residential treatment facility but was released because of his truancy. He had been involved in drug dealing, and was eventually shot in the back on the street. His killer was never identified.

A 17-year-old had had many contacts with his alleged killer, involving threats and beatings. They were both part of an active street network of friends and foes, but were not considered to be members of an organized gang. He was shot in the back while returning home one night. The motives were considered to be revenge, honor and retribution.

Local Team Findings

The teams reviewed 35 homicide deaths involving guns. Thirty were intentional shootings. The child was not the intended victim in five cases. Two were neglect homicides, in that the children had easy access to guns and were killed while playing with them. In two cases the child was a random victim. In half of the cases, the team did not know the age of the person doing the shooting. In eight of the known cases, the shooter was less than 19 years old. Thirteen of the deaths involved handguns, ten involved rifles or shotguns. Only five of the known guns were registered. Seven of the deaths involved drugs or alcohol. Not surprisingly, only two of the guns were stored in a locked place.

Eight of the shootings were drug related, and four of them were gang related. In 15 cases, a person was arrested, and 13 have been charged. One person had a record of a prior homicide. Fifteen of the shooters were friends or acquaintances, and only one was a stranger to the victim.

Local Initiatives Resulting from the Reviews

Teams found gun violence among teenagers to be a difficult area in which to develop recommendations. Their reason for this was the fact that they found youth violence to be a multi-dimensional, complex and deeply entrenched community problem that defies simple solutions. However, six prevention strategies were implemented, including:

- Improved coordination among law enforcement, the schools and mental health in identifying and providing services to high-risk teens.
- Gang violence training for health professionals.
- Advocacy against passage of the concealed weapon legislation.
- Crisis team support in grief and trauma to students and friends who witness shootings.

State Advisory Team Recommendations for Michigan Policy Makers

26. Enhance support for after-school and evening supervised youth programs.
27. Support victim advocacy and crisis team support to children who witness violence.
28. Encourage Human Service Collaborative Bodies (HSCBs) to implement or strengthen innovative community based violence prevention initiatives and programs to promote youth successes.
29. Encourage the provision of alternative educational and social support for students expelled from schools for carrying weapons.

CHILD ABUSE AND NEGLECT

Overview

The teams reviewed 35 child abuse and neglect homicides. 11 Michigan children died from battered child syndrome in 1997. The actual number of abuse deaths is probably higher.

Conservative estimates indicate that almost 2,000 infants and young children are killed each year by their parents and caretakers. U.S. homicide rates to young children under the age of four have reached a 30-year high. Children less than four years old are more likely to be victims of child abuse than older children, and national studies report that 40% of the victims are less than one year of age.[29] In fact, abuse homicides are the leading category of injury deaths to infants in the United States.[30] Younger children are more vulnerable to physical attacks, to the dangers created by lack of supervision and neglect and are more isolated than school-aged children.

Child abuse homicides are grouped into two major categories: physical abuse and abuse by neglect. Physical abuse deaths happen most frequently by violent shaking (Shaken Baby Syndrome) or from severe beatings. Physical abuse deaths are most often committed by male caregivers, especially fathers and mothers' boyfriends. These deaths often happen in a moment of rage or frustration. These men primarily assault the children by beating them, shaking them violently, intentionally suffocating them or immersing them in hot water. Triggering events include inconsolable crying, disobedience, feeding and toilet training difficulties. Most events occur when the caregiver is left alone with the child for extended periods of time. Researchers are suggesting that infant homicides will continue to increase as more mothers enter the workforce without having quality childcare. The child can also be a secondary victim, as some assaults begin with spouses/mates. In fact, evidence is suggesting that domestic violence is strongly correlated with fatal child abuse. Abuse deaths happen more frequently to girls. Infants born to teenage mothers who already have one or more children are at the highest risk of becoming victims.

Another type of physical abuse death is intentional suffocation. These are difficult to distinguish from SIDS or unintentional suffocations. But research suggests that looking for prior incidents of apnea and/or other feigned illnesses can better identify homicides. Many of these deaths can be attributed to mental disorders of the mother and are considered to be Munchausen's Syndrome by Proxy deaths.

Neglect deaths occur from chronic neglect (failure to thrive, for example) or lack of supervision at critical moments when the child is in harm's way. Unlike physical abuse deaths, boys are more at risk for neglect deaths. Mothers are much more likely to fatally

neglect their children than are other male or female caregivers. Postpartum depression, substance abuse, domestic violence and mental illness are major risk factors for mothers who neglect their children. Chronic neglect can be difficult to identify, and improved screening and reporting is suggested as a factor in preventing these deaths.

It is widely believed that fatal abuse deaths are underreported.[31] Research at the Centers for Disease Control and Prevention suggests a conservative child abuse homicide rate of 5.4 deaths per 100,000; but with better classification, suggests that this rate should be closer to 11.6 per 100,000. Child mortality data from Michigan as presented in the following pages suggest that our state's abuse deaths are also underreported. FIA death reports include 22 homicides by beating or shaking for fiscal year 1997, yet mortality statistics for calendar year 1997 report only 11 child beating deaths.[32] The U.S. Advisory Committee on Child Abuse and Neglect suggests that under-reporting is caused by inadequate investigations, lack of in-formation at the time of death, poor interagency coordination and an outdated injury coding system. For example, Shaken Baby Syndrome is not yet an available external cause of injury (e-code) in the international death classification system. Neglect deaths are often listed as natural deaths, resulting from the medical conditions of the neglect, rather than being listed as homicides due to the caregivers' inability to adequately provide care.

Figure 49. Michigan Child Homicides Due to Abuse and Neglect, 1988 -1997, Ages 0-18

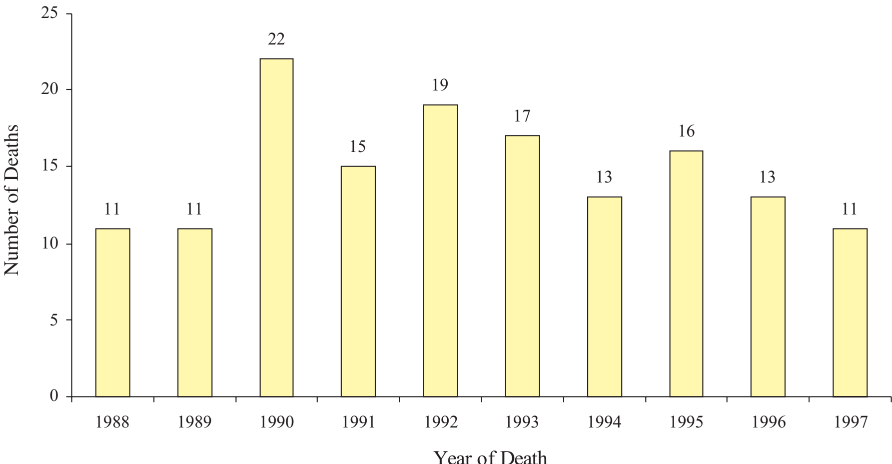


Figure 50. Michigan Child Homicide Rates Due to Abuse and Neglect, 1988 - 1997, Ages 0-18

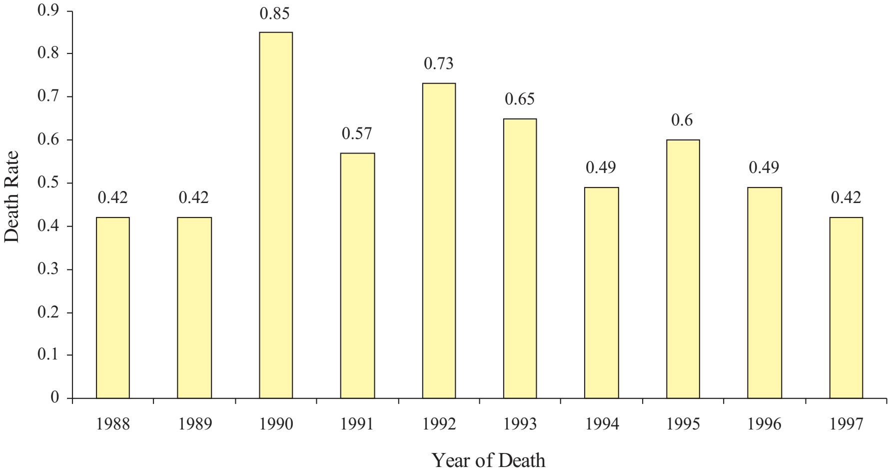


Figure 51. Michigan Child Homicides Due to Child Abuse and Neglect, by Age, Race and Sex, 1997, N=11

Age at Death	White		Black		Total
	Male	Female	Male	Female	Total
<1	2	1	1	2	6
1-4	1	-	-	2	3
5-9	-	-	1	-	1
10-14	-	1	-	-	1
15-18	-	-	-	-	-
Total	3	2	4	2	11

FIA Child Death Data

In 1997, the Michigan Family Independence Agency established a reporting system and database to identify all deaths to children involved with the state's child welfare system. This includes foster care, child protection and delinquency. FIA field staff are required to file a report within 24 hours of a child's death. For fiscal year 1998 (October 1, 1997-September 30, 1998), 29 child abuse homicides and 11 neglect deaths were reported to FIA.[32]

The 29 child abuse homicides reported to FIA were caused by: Shaken Baby Syndrome (n=18), shootings (n=3), multiple head and internal injuries (n=4), drowning (n=1), asphyxia (n=2) and seizures (n=1). (Two of the shootings involved the murder of 2 children and subsequent suicide of the mother.)

Of these 40 deaths, 24 (62%) had no prior involvement with the state's child welfare system, nine (23%) had prior unsubstantiated complaints of abuse or neglect reported to FIA and seven (15%) of the children who died of abuse or neglect had prior substantiated reports of abuse or neglect. One of the 40 children who died was living in a foster care home at the time of death. This death was the result of a beating caused by the live-in partner of a relative foster mother. None of the 40 children who died had reports of prior participation in family preservation services.

In addition to the 40 reports submitted, three cases were reported in which the manner of death was undetermined, but the descriptions of the circumstances surrounding the deaths are very suggestive of child abuse or neglect.

Representative Cases Reviewed

- An eight-month-old baby would not stop crying. The babysitter, the mother's 19-year-old boyfriend, became frustrated with the baby and slammed her head against the bed while trying to get her to be quiet. The baby died of massive head injuries.
- The mother's boyfriend was taking care of a 15-month-old baby boy. He became frustrated with the baby's crying and punched him in the stomach. The baby died due to lacerations of the liver. The boyfriend had served prior time for shaking to death his own 22-day-old son and had also previously broken the arm of a four-year-old.
- A two-year-old toddler was locked up in her room one summer evening, because she kept coming downstairs instead of staying in bed. Her bedroom did not have an air conditioner and the temperature within the room rose to over 100 degrees. When her parents checked on her the next day at noon, they discovered her dead.
- A mother with a history of mental illness was living with her six children in an abandoned house. When she was discovered, most of her children were severely malnourished, and one of them subsequently died.

Local Review Team Findings

The teams reviewed 35 cases of abuse and neglect. Of these, 29 were due to severe beatings or shakings. Six were due to neglect, including medical neglect (failure to seek adequate care) or failure to thrive. The teams also determined that in four other cases (one natural, two accidents and one undetermined), failure to seek adequate medical care or failure to adequately supervise the children was a major factor in their deaths.

Child Beating Deaths

The teams reviewed 29 child beating deaths.

Table 17:
Child Beating Deaths Reviewed by Age at Death

Age at Death	Number of Cases
0-27 days	2
28 days-1 year	12
1-4 years	14

Sixty-five percent of these children were white (n=19), 35% were black (n=10); 57% were girls (n=17) and 43% were boys (n=12).

Twenty-three of the 40 perpetrators were male, 10 were fathers and 10 were the mothers' boyfriends. Only two perpetrators had prior criminal records for similar offenses. Sixteen of the perpetrators were arrested.

Table 18:
Child Beating Deaths Reviewed by Perpetrator

Perpetrator of Child Beating	Number of Cases
Father	10
Mother's Boyfriend	10
Mother	5
Other Relative	1
Sibling	1
Child Care Worker	1
Acquaintance	1
Friend of Family	1
Other Child	1
Unknown	1

Crying was the most common trigger, leading to the abuse or shaking of 15 children. Other triggers included disobedience (n=2), feeding difficulty (n=3), toilet training (n=1) and others (n=6).

Almost half of the children (n=14) came from families that had prior CPS involvement, including four cases in which CPS had previously been involved with the child who died. At the time of the beatings, no perpetrator was receiving parent education training or other prevention services.

Child Neglect Deaths

The teams reviewed six child homicides due to neglect. In three cases, failure to seek medical care for the child caused their deaths and three children were not given adequate food and starved to death. The teams also reviewed two natural deaths that they believed were caused by failure to seek medical care, and 11 unintentional injury deaths that the team believed resulted from negligent supervision on the part of the caretakers.

Table 19:
Child Neglect Deaths Reviewed by Age at Death

Age of Child	Number of Cases
28 days-1 year	2
1-4 years	4

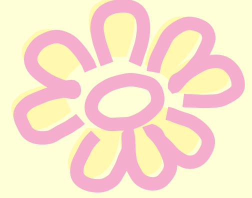
Four of the six children were boys. Three were white and three were black.

Two of the children came from families that had prior CPS involvement, but not with the child who died. Two mothers were arrested and charged with failure to seek adequate care. One was involved in chronic drug use, had a previous history of neglecting her child and was receiving preventive services at the time of the child's death. One father, acting as the sole caregiver, had an untreated but severe mental illness. In two cases, the team determined that there had been mismanagement by a health care provider in not recognizing signs of neglect.

Local Initiatives Resulting from the Reviews

For all types of abuse and neglect deaths, the teams proposed 13 changes to agency policies and 42 different prevention initiatives. County teams have begun action on 13 of these. They include:

- Training on Shaken Baby Syndrome.
- Interagency discussions on improving the child welfare and justice system within a county.
- Public education campaigns directed at male caregivers.
- Closer collaboration with wraparound services and high-risk families.
- Feedback to community groups on mandatory reporting of child abuse.
- In-services to hospital emergency room staff on better identification of child abuse injuries and medical neglect.



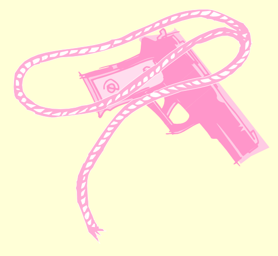
State Advisory Team Recommendations for Michigan Policy Makers

30. Enhance training on mandatory child abuse reporting for health, education and human service providers, including administrators, with an expanded emphasis on neglect.

31. Support efforts to strengthen enforcement of the current mandatory child abuse and neglect reporting laws.

32. Encourage Human Service Coordinating Bodies (HSCBs) to develop common community understanding and application of standards for the reporting of child abuse and neglect.

33. Enhance training opportunities on the *Child Maltreatment Investigation Coordinated Protocol* and *Forensic Interviewing Protocol.*



SUICIDES

Teams reviewed 46 suicides. 70 Michigan children commited suicide in 1997.

Overview

In the national Youth Risk Behavior Surveillance Survey of 1997, 20.5% of high school students reported that they have seriously considered suicide in the past year.[27] Suicide rates among adolescents has increased sharply in the past three decades, more than tripling since the 1950s. Suicide rates have been declining among young adults aged 20-24 and middle-aged adults. The rate in the U.S. rose most sharply among black males aged 15-19 (165%) and among young teens, aged 10-14 of all racial and sex groups (120%).[33, 34, 35] Michigan had a steady decline in the teen suicide rate, down 40% from 1988 (3.22) to 1996 (1.89). However, the rate rose 30% from 1996 to 1997, up to 2.65.

It is believed that in the U.S., easier access to firearms, especially handguns, has been the major factor in the increase of suicides to teens. Firearm related suicides accounted for 81% of the increase in the overall rate among young persons from 1980 to 1992.[23] While suicides by poisoning, cutting and other methods have declined, deaths by the more lethal methods of firearms and hangings have increased.

The causes of suicide are multiple and complex. It is believed that, in comparison to older persons, teens who commit suicide are less likely to be clinically depressed or have mental health disorders closely linked to suicides. Some have suggested that the increase in suicides among teens is due to an increasing interaction of risk factors, including substance abuse; impulsive, aggressive and antisocial behavior; family influences, including a history of violence, family disruption or prior suicides; severe stress in school or social life; rapid socio-cultural change and access to firearms.

One specific risk factor that has emerged is suicide "contagion," a process whereby teens are influenced to commit suicide when they are exposed to suicide via peers or the media.[36] Michigan has had a number of these cluster suicides. Rapid and appropriate response to teen suicides is essential to prevent clusters from occurring.

The Centers for Disease Control and Prevention have identified a continuum of interventions that can help prevent suicides.[37, 38] These include: education to teens and helping professionals (especially teachers) on understanding and identifying suicidal behaviors, appropriate screenings for suicides, timely and effective mental health services and a rapid response to other teens when a suicide occurs.

Figure 52. Michigan Child Deaths Due to Suicide, 1988 - 1997, Ages 0-18

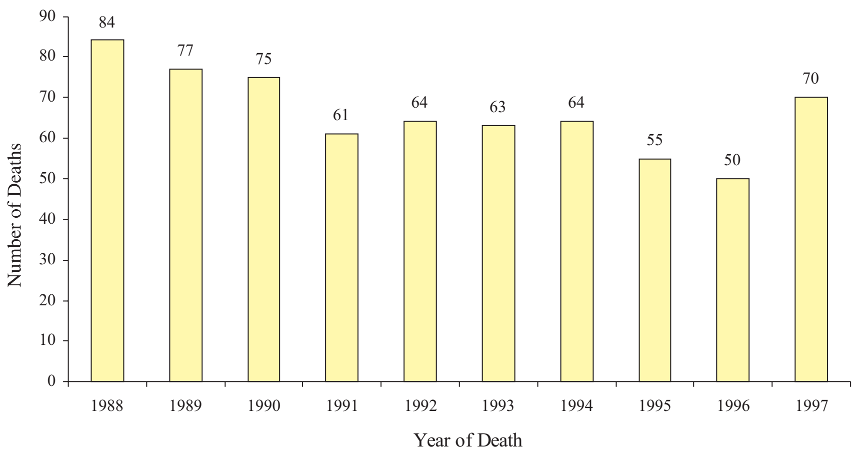


Figure 53. Michigan Child Suicide Rates, 1988 - 1997, Ages 0-18

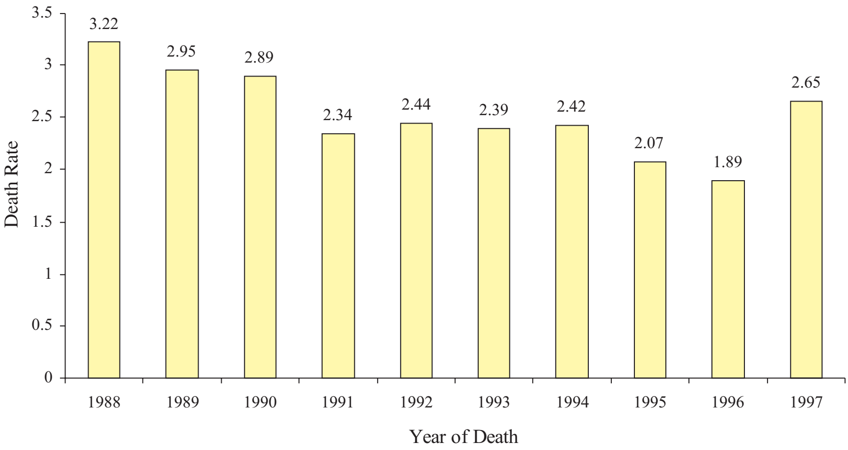
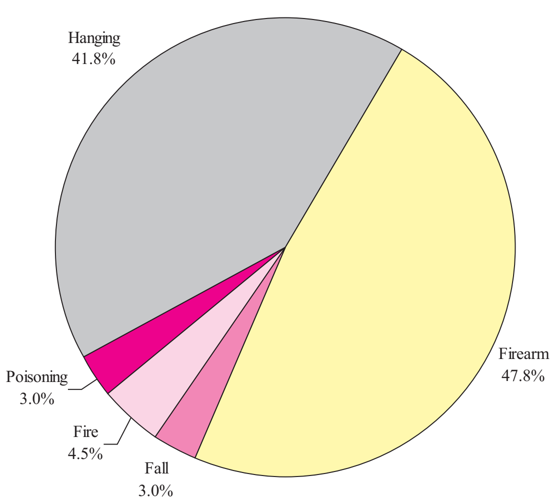


Figure 54. Michigan Child Suicides by Cause, 1997

N=70



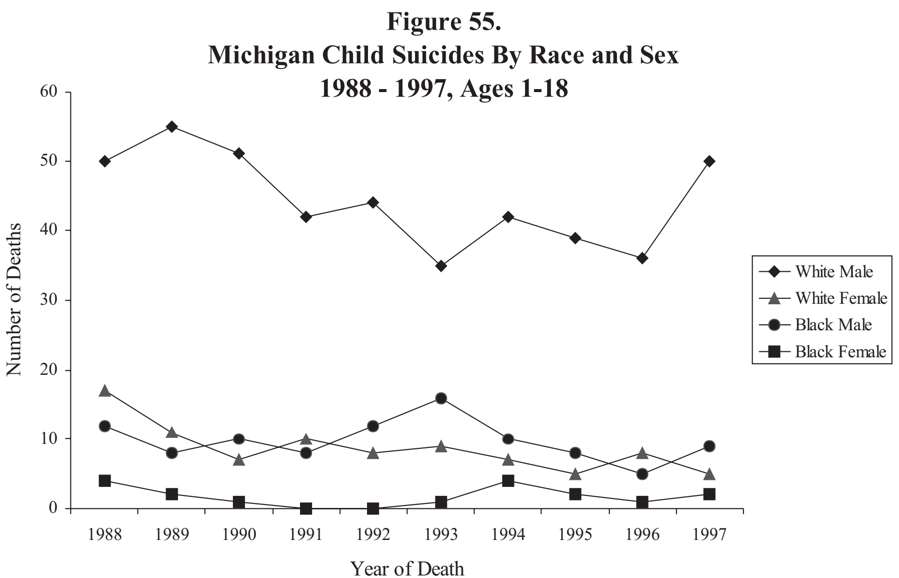


Figure 55.
Michigan Child Suicides By Race and Sex
1988 - 1997, Ages 1-18

Figure 56. Michigan Child Suicide Rates by Age, Race and Sex, 1997, N=70

Age	White		Black		Total
	Male	Female	Male	Female	
<1	-	-	-	-	-
1-4-	-	-	-	-	-
5-9-	-	-	-	-	-
10-14	3.4	-	-	-	1.6
15-18	16.8	*	18.1	*	10.2
Total	9.4	*	8.4	*	11.2

Total death rates only include residents 10 to 18 years of age and, therefore, may be different than suicide rates reported earlier in this report.

*Rates were censored due to less than six cases.

Representative Cases Reviewed

- A mother found her 15-year-old son hanging in his bedroom closet. No note was left. He had been troubled for four years, after witnessing the shooting death of his younger brother when the two of them were playing with a gun. He had been required to testify in court about this shooting and had not received any counseling following that death.

- A 16-year-old was despondent over the suicide of his girlfriend two weeks earlier. He had been talking about taking his life and was seeing a counselor as an outpatient. He shot himself in his garage.

- A 17-year-old was scheduled to graduate, but hadn't passed all of his classes. He hid his report card from his parents, and shot himself on the morning of the graduation party his parents were throwing for him.

- A teenage boy died of asphyxia by hanging two weeks after his second car accident. Damages were minimal in these accidents and the parents did not overreact to them. On the day he died, the boy called his father at work and spoke of killing himself. The father, knowing his son had made prior suicide threats, tried to calm him and stated that he was on his way home. By the time he arrived home, his son was dead.

- A 10-year-old boy had a history of ADHD, depression and obsessive/compulsive disorder. He had written his own suicide note in the past. His life was marked by abuse, domestic violence, a parent moving to another state, isolation and loneliness. He hung himself with a belt in his bedroom. He had been receiving mental health and prevention services.

Local Team Findings

The teams reviewed 46 deaths to children by suicide.

**Table 20:
Suicides Reviewed by Method**

Method of Suicide	Number of Cases
Self-Inflicted Gunshot	18
Asphyxia by Hanging	17
Car Crash	2
Carbon Monoxide Poisoning	1
Missing	8

Thirty-five of the teens were aged 15-18 and 10 were aged 10-14. Thirty-seven of the teens were white, six were black and three were Native Americans. Thirty-six (or 79%) of the teens were boys.

In nine of the cases, one or more other teens witnessed the suicide. In one case, the teen shot himself in front of the school.

Fourteen of the teens had prior mental health problems, but only 10 had received any mental health services. Three of the teens had made prior attempts. In 18 of the cases the suicide was completely unexpected by family and friends. Three of the suicides were possible cluster suicides.

In many of the cases, the teen was about to experience a major disappointment or frightening life event. Teens killed themselves just prior to incarceration, while in jail, at the anniversary of traumatic events or when they failed in school or relationships.

In seven of the cases, CPS had been involved, three with the child who died.

The teams felt that 29 of the suicides were preventable. Access to guns was a key factor in a number of deaths. One report stated that "depression and the ability to get a weapon caused this death." Only one of the 18 guns used was stored in a locked cabinet. In two cases the teams felt that there was mismanagement in preventing the risk factors causing the suicides. Teams also became more aware of the difficulty of identifying suicidal teens from the general teenage population.

Local Initiatives Resulting from the Reviews

Thirty-six community prevention activities were proposed and 26 of these have been implemented as a result of these deaths. They include:

- Establishment of several community suicide task forces that attempt to wrap preventive and intervention services around youths that threaten or attempt suicide; and/or which provide suicide education in the schools.
- Submission of a grant proposal and subsequent funding, coupled with an intermediate school district requirement that all teachers receive suicide prevention education.
- Establishment of crisis response teams to better assist students who witness or know of a suicide.
- Cross discipline training on traumatic stress syndrome and young victims.

State Advisory Team Recommendations for Michigan Policy Makers

34. Support widespread teacher, health and human service training on suicide prevention.
35. Develop protocols to help families, case workers and law enforcement officers identify and respond to suicide risks for teens awaiting sentencing or detention as juvenile offenders.
36. Conduct a statewide epidemiological study of adolescent suicide and assessment of available preventive resources.

PART THREE

The Review Team Program: A Progress Report

PROGRESS IN MEETING 1999 PROGRAM OBJECTIVES:

Objective: Expand Local Teams Throughout the State

The number of local teams conducting reviews has increased from 17 to 67. At the time this report was prepared, review data was available from 38 counties. Twenty-nine additional counties have begun reviews and fourteen are in the process of becoming organized.

Objective: Ensure Adequate Training for All Team Members

The state appropriations for CDR made it possible to continue to offer review team trainings for new team members. These trainings have been very highly rated and account in large part for the program's success in rapidly implementing teams. Most of the trainers are Michigan experts in child fatalities. Three seperate 2 1/2 day trainings for new team members have been held, attended by over 400 persons. Over 300 persons attended a one-day training on Shaken Baby Syndrome and 180 persons attended a two-day child death investigation training.

The program has participated in a number of regional, state and national conferences designed to increase interest and participation in the review process. Program staff presented at the National Center on Child Abuse and Neglect Conference, the International SIDS Conference, the International Society for the Prevention of Child Abuse and Neglect Conference and authored curricula for the American Bar Association's (ABA) National Training on CDR. Staff also participated in a U.S. Health and Human Services panel to develop national child fatality review recommendations.

Objective: Establish a State Advisory Team

This report is the product of the first year's work of the Child Death State Advisory Team. The team met five times during their inaugural year. The first half of the year was spent orienting the members to the review process, including their attendance at the new team training. During the second half of the year, the team began to identify and study the major causes of death and contributing risk factors. Through the process of preparing this report, the team identified many issues that will be

studied in greater depth in the coming year. The State Advisory Team has also agreed to serve as one of three federally required Citizen Review Panels for the Michigan Family Independence Agency. In this capacity, the team will issue recommendations to FIA for improvements in agency policy and practice related to child abuse and neglect deaths.

Objective: Implement Statewide Standards for Child Death Investigations

The state child death investigative protocols were completed and endorsed by all major state investigative bodies, including the Michigan Association of Medical Examiners, the Michigan State Police, the Michigan Chiefs of Police, The Michigan Sheriffs' Association, the Prosecuting Attorneys Association of Michigan, the Michigan Family Independence Agency and Michigan Department of Community Health. The protocol was distributed to all medical examiners and chief law enforcement officers in the state. A number of county medical examiners and prosecutors are now requiring that this tool be used in all child death investigations. A two-day training in the use of the protocols was held last summer. Additional funds have been procured through the Governor's Task Force on Children's Justice to develop death investigation modules to be used at the county level for medical examiner investigators.

Objective: Link Child Death Review to Other Statewide Initiatives

The CDR program works closely with a number of state agencies and organizations. A partnership with the Michigan Association of Medical Examiners (MAME) led to the development of a six-hour training curriculum module on child death investigation. This module can now be used at the county or regional level to train investigators. MAME has worked closely with the program to obtain widespread endorsements and encourage utilization of the investigative protocols throughout the state.

The CDR program has worked closely with MDCH and the Michigan SIDS Alliance on SIDS risk reduction and bereavement support. This partnership is developing an improved SIDS bereavement and support program and an expanded Back to Sleep Campaign that can reach high-risk families, especially those in Wayne County.

The program has worked closely with the MDCH Fetal Infant Mortality Review Program, ensuring that all communities with both Child Death and Infant Mortality reviews work closely together to enhance efforts. A program staff person was part of a U.S. Health and Human Services work group to develop national guidelines on CDR and FIMR.

The program staff have worked with FIA so that the State Advisory Team will become one of the federally mandated Citizen Review Panels focusing on child abuse, foster care, adoption and child fatalities.

The program has worked closely with a number of other state initiatives, including the SAFE KIDS Campaign, the 0-3 Prevention Conference and the Children's Trust Fund's Shaken Baby Prevention Initiative.

Objective: Support Local Prevention Efforts

Program staff have worked closely with a number of communities in identifying prevention strategies and locating resources for these programs. A staff prevention coordinator works directly with communities who need assistance in designing programs and obtaining resources.

Objective: Establish a Child Mortality Surveillance System

This report is the first effort at issuing findings based on the review team process. The ability to issue these findings is based on the willingness of each review team to complete a comprehensive case report. This year, the CDR case reporting system will become available to local review team coordinators via the Internet and linked to the State Medical Examiner's Database. In subsequent years, as the number of reviews increase, it will be possible to link the reviews by case with death certificate information, vital statistics and the FIA child fatality database. This will provide us with an even more complete understanding of how and why children die.

OBSTACLES TO EFFECTIVE REVIEWS

Timely and Complete Access to Information

Many counties report frustration in accessing death certificate information, especially for children who die outside of the resident county. The state program office has attempted to facilitate this with the help of the Division for Vital Records & Health Statistics at MDCH, but this involves a 3-8 month wait for the death transcript. It is particularly difficult for counties that border on other states and Canada to obtain information on children who die out of state.

Access to information on the child or family history has been inadequate in many counties. The legislation passed last year provides teams the authority to meet, and requires that the meetings are confidential, but does not address access to records. Many teams express frustration with their inability to obtain complete information for the meetings. A number of key team players, e.g. a neonatologist, have been told they cannot share information at the team meetings. Much of the information missing from this state report is due to team members' inability to share information. Many team members express the desire for further legislation to allow the sharing of medical, health and other information at reviews with appropriate legal protections.

Death Scene Investigations

The death scene investigations of many child deaths continue to be minimal and sometimes non-existent. Many investigations do not uncover information that could be helpful in identifying the cause and manner of death, or in identifying risk factors and effective interventions. For example, a fire investigation may not identify if smoke detectors were working; a SIDS investigation may not identify where the baby was sleeping or the baby's past medical history.

The program must continue, with interagency support, to increase the quality of investigations statewide.

Team Membership

It has been the experience of most teams that the longer they meet, the greater the interest becomes in participating on a team. There are a number of counties, however, where one of the mandated agency representatives either chooses not to participate or is unable to attend team meetings. Team membership often reflects the power and influence profile in a community, but does not represent the children most at risk.

The program must identify a means to ensure mandatory participation in accordance with the law of the five core member agencies, so that the review process is not jeopardized. The state program must also encourage and support teams in recruiting a diverse membership, representative of the children at risk in the communities.

Support for Prevention Initiatives

Most teams report that they desire the time and resources to develop high quality prevention initiatives, or the expertise in learning how to connect to other community resources. Lack of seed monies to "jump start" prevention initiatives seems to be a major impediment. Community programs need to explore the array of options for communities to access local, state and national grants and other sources of revenue to advance their prevention initiatives. The CDR program can assist communities in identifying resources.

Appendix A

Total Number of Deaths Among Michigan Residents 0 to 18 Years of Age
By County of Residence and Year of Death
1988-1997

County of Residence	Year of Death 1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1986-1997
Alcona	2	4	1	1	-	2	2	1	-	2	15
Alger	7	-	1	-	3	1	1	1	2	2	18
Allegan	21	25	20	13	17	20	21	19	23	16	195
Alpena	8	6	4	9	2	12	2	3	7	4	57
Antrim	4	4	2	3	5	3	5	4	6	7	43
Arenac	4	4	3	4	4	4	3	2	2	1	31
Baraga	2	1	2	1	1	-	2	2	1	3	15
Barry	11	10	18	12	8	13	10	9	6	15	112
Bay	27	21	25	30	37	28	15	23	21	14	241
Benzie	1	1	6	2	3	1	3	5	2	3	27
Berrien	52	50	62	50	43	41	43	48	40	46	475
Branch	2	11	17	10	12	13	9	6	9	6	95
Calhoun	38	44	32	36	36	43	26	25	25	47	352
Cass	5	11	9	9	19	16	15	11	9	11	115
Charlevoix	11	5	3	5	3	3	4	7	8	6	55
Cheboygan	6	6	11	7	6	9	5	6	3	6	65
Chippewa	8	4	4	6	6	5	7	9	5	6	60
Clare	4	6	5	4	4	6	8	5	7	6	55
Clinton	5	10	13	11	10	8	7	11	4	11	90
Crawford	8	6	6	4	4	6	3	4	4	1	46
Delta	11	4	6	10	5	7	12	6	3	7	71
Dickinson	6	2	1	9	6	1	4	3	3	3	38
Eaton	18	14	29	16	11	18	17	14	21	5	163
Emmet	8	6	6	6	9	7	2	4	2	6	56
Genesee	142	149	156	144	130	130	148	122	139	138	1,398
Gladwin	5	8	10	4	4	-	4	10	6	4	55
Gogebic	5	2	-	5	1	3	2	3	1	8	30
Grand Traverse	10	14	8	21	17	14	8	8	13	11	124
Gratiot	13	10	4	10	9	11	10	11	9	7	94
Hillsdale	5	13	12	11	11	13	19	9	7	14	114
Houghton	6	5	6	4	6	4	4	6	3	7	51
Huron	11	5	5	12	14	4	7	6	7	4	75
Ingham	72	64	81	63	61	63	63	50	50	42	609
Ionia	15	17	19	29	15	14	11	9	12	13	154
Iosco	8	3	3	5	1	5	8	5	2	1	41
Iron	5	3	3	3	2	1	-	3	-	-	20
Isabella	5	10	12	11	14	9	13	11	8	7	100
Jackson	45	43	44	38	33	32	36	25	30	32	358
Kalamazoo	46	54	47	61	56	50	32	41	40	44	471
Kalkaska	2	6	4	3	5	7	4	2	5	4	42
Kent	143	155	136	143	114	140	136	120	129	98	1,314

Appendix A (Continued)

County of Residence	Year of Death										
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1986-1997
Keweenaw	-	-	-	-	-	3	-	-	1	-	4
Lake	2	2	6	3	4	3	5	3	3	4	35
Lapeer	18	20	15	22	16	18	8	9	13	24	163
Leelanau	-	3	2	6	3	6	3	1	3	1	28
Lenawee	16	25	21	15	23	29	17	18	12	18	194
Livingston	19	14	34	22	15	27	13	13	25	15	197
Luce	3	2	3	-	3	-	-	-	2	3	16
Mackinac	7	3	-	-	-	1	1	1	5	3	21
Macomb	152	135	118	120	107	116	102	113	109	103	1,175
Manistee	3	4	2	4	6	3	1	5	5	2	35
Marquette	11	13	8	11	15	13	14	12	10	12	119
Mason	11	4	5	2	4	15	3	4	6	8	62
Mecosta	11	6	15	18	10	9	12	4	5	6	96
Menominee	8	5	3	6	7	7	6	5	4	2	53
Midland	21	18	13	17	16	13	22	10	15	15	160
Missaukee	5	5	3	6	6	4	1	2	3	3	38
Monroe	31	21	29	27	24	18	26	22	29	25	252
Montcalm	19	15	13	15	12	11	10	13	11	12	131
Montmorency	-	3	-	-	-	-	-	1	1	1	6
Muskegon	40	53	42	60	41	32	43	37	37	39	424
Newaygo	9	16	8	5	9	12	12	9	9	12	101
Oakland	250	223	202	210	217	185	177	180	148	175	1,967
Oceana	7	4	5	9	6	9	4	5	5	4	58
Ogemaw	4	2	7	6	6	4	4	6	7	3	49
Ontonagon	4	1	-	1	4	3	-	1	1	-	15
Osceola	9	8	6	5	7	2	2	2	4	5	50
Oscoda	1	3	4	4	-	2	3	4	1	1	23
Otsego	2	7	4	4	2	2	3	2	6	5	37
Ottawa	42	43	36	38	34	38	38	40	39	31	379
Presque Isle	4	1	4	1	3	2	-	7	-	-	22
Roscommon	3	4	3	5	2	7	2	4	4	4	38
Saginaw	80	75	80	71	74	59	51	48	49	51	638
St. Clair	33	40	40	34	28	34	39	20	32	32	332
St. Joseph	11	19	24	13	17	12	12	18	11	10	147
Sanilac	11	14	9	12	16	5	16	13	7	3	106
Schoolcraft	1	4	1	2	1	1	1	2	3	-	16
Shiawassee	20	21	15	19	10	15	11	11	10	14	146
Tuscola	20	23	11	16	6	21	21	18	17	17	170
Van Buren	27	24	25	28	17	20	15	19	15	17	207
Washtenaw	55	63	53	53	56	43	43	50	34	39	489
Wayne	879	955	982	907	905	775	726	655	603	581	7,968
Wexford	9	8	4	7	4	5	7	8	5	4	61
Unknown	1	2	4	2	1	2	4	-	2	1	19
Total	2,666	2,727	2,695	2,631	2,484	2,353	2,209	2,064	1,985	1,973	23,787

Source: Division for Vital Records and Health Statistics, MDCH.

Appendix B

Total Number of Cases Reviewed by County

1995-1998

County Name	Number of Cases Reviewed 1995-1997	Number of Cases Reviewed 1998	Total Number of Cases Reviewed 1995-1998
Alcona	0	0	0
Alger	0	0	0
Allegan	0	7	7
Alpena	0	0	0
Antrim	0	0	0
Arenac	0	0	0
Baraga	0	0	0
Barry	0	0	0
Bay	0	7	7
Benzie	0	0	0
Berrien	63	25	88
Branch	0	4	4
Calhoun	0	84	84
Cass	0	10	10
Charlevoix	0	0	0
Cheboygan	0	4	4
Chippewa	9	11	20
Clare	0	0	0
Clinton	0	5	5
Crawford	0	7	7
Delta	0	0	0
Dickinson	0	0	0
Eaton	12	13	25
Emmet	0	0	0
Genesee	33	18	51
Gladwin	0	2	2
Gogebic	0	0	0
Grand Traverse	0	0	0
Gratiot	0	4	4
Hillsdale	0	0	0
Houghton	0	0	0
Huron	0	4	4
Ingham	0	0	0
Ionia	0	2	2
Iosco	0	0	0
Iron	0	0	0
Isabella	0	0	0
Jackson	0	1	1
Kalamazoo	11	20	31
Kalkaska	0	0	0
Kent	80	30	110

Appendix B (Continued)

County Name	Number of Cases Reviewed 1995-1997	Number of Cases Reviewed 1998	Total Number of Cases Reviewed 1995-1998
Keweenaw	0	0	0
Lake	0	0	0
Lapeer	0	7	7
Leelanau	0	2	2
Lenawee	0	0	0
Livingston	0	11	11
Luce	3	0	3
Mackinac	7	0	7
Macomb	0	12	12
Manistee	0	2	2
Marquette	0	0	0
Mason	3	0	3
Mecosta	0	18	18
Menominee	0	0	0
Midland	0	0	0
Missaukee	0	1	1
Monroe	0	0	0
Montcalm	0	13	13
Montmorency	0	0	0
Muskegon	0	25	25
Newaygo	0	6	6
Oakland	14	0	14
Oceana	0	0	0
Ogemaw	0	0	0
Ontonagon	0	0	0
Osceola	0	0	0
Oscoda	0	0	0
Otsego	0	2	2
Ottawa	0	19	19
Presque Isle	0	0	0
Roscommon	0	0	0
Saginaw	0	3	3
St. Clair	57	23	80
St. Joseph	0	8	8
Sanilac	1	0	1
Schoolcraft	0	0	0
Shiawassee	0	13	13
Tuscola	10	0	10
Van Buren	0	12	12
Washtenaw	1	20	21
Wayne	42	25	67
Wexford	0	1	1
Total	346	481	827

Appendix C

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Appendix D

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