



Child Emergencies with Fatal Outcomes in North Carolina: The Response and Role of Emergency Medical Services

A Three-Year Review of EMS Response to Child Emergencies with Fatal Outcomes Due to Homicide by Parent or Caregiver, Sudden Infant Death Syndrome and Toxins

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Acknowledgements

The North Carolina Child Fatality Prevention Team (NC CFPT) is charged with the difficult yet important task of making recommendations that will not only keep children alive, but will also improve the well-being of children throughout the state. To accomplish this duty, the NC CFPT studies child fatalities in order to understand the causes of child deaths, identify fatality trends and to recognize needs or gaps in services in order to determine how similar deaths may be prevented. While these data are extremely important in forming our prevention strategies, we should never fail to acknowledge that every life lost is a horrible tragedy and that while we may make progress, as long as children die from preventable means, we can claim little victory. We do, however, wish to recognize those that assist us in our efforts to make every generation safer than the one that came before it. The Child Fatality Prevention Team would especially like to thank: Jennie Olympio for her hard work and dedication to completing this project; Gloria Hale, EMSC Program Manager, for her support and assistance; Dr. Greg Mears and the staff of the Emergency Medical Services Performance Improvement Center; and, the many local personnel who assisted with gathering this information. We would also like to thank the EMS providers who, every day, provide care to hundreds of children that will not become part of these sad statistics.

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Summary

Emergency Medical Services provide vital assistance to those who suffer an acute medical crisis requiring immediate medical attention. In 2010, over 500 EMS agencies across North Carolina responded to over a million calls with approximately 6 percent of those calls involving pediatric patients. Despite the best efforts of EMS and other providers, some of these calls result in death. Of the 1,600 children who die in North Carolina each year, the majority of children die from known, natural causes. However, just over one-third of all child deaths are non-natural or sudden and unexpected in nature and fall under the jurisdiction of the N.C. Medical Examiner System. The North Carolina Child Fatality Prevention Team (NC CFPT) reviews these deaths in order to identify gaps in services or to identify other relevant factors. This information is then used to assist the team in developing recommendations to various agencies and organizations to effect system change in order to prevent future deaths.

Through funding made available from the N.C. Office of Emergency Medical Services for Children program, the NC CFPT undertook a study to examine EMS providers' role in responding to child deaths that fell into three categories: Homicide by Parent or Caregiver (HPC), Sudden Infant Death Syndrome (SIDS) and deaths from toxins. These deaths were specifically examined to determine: 1) reporting patterns of EMS when, and if, they had suspicions of child abuse and neglect; 2) the treatment of infants who were obviously deceased upon arrival of EMS to the scene; and, 3) whether law enforcement was present at the scenes of child emergency calls that were ultimately fatalities.

Studying the period between 2007 and 2009, all fatality cases of children with ages birth through 17 years that lived and died in North Carolina and that were identified by the Child Fatality Prevention Team as fitting the chosen categories were selected. There were 466 cases identified. EMS data were matched and collected, when available, through the Prehospital Medical Information System (PreMIS) or from individual EMS agencies across North Carolina. Three cases were eliminated as EMS response was not from an EMS agency licensed in the state. Of the 463 cases, EMS was notified in 94 percent of the deaths and records were available in 95 percent of the cases in which EMS responded to the scene. Ultimately, 71 Homicide by Parent Caregiver (HPC) cases, 332 Sudden Infant Death Syndrome (SIDS) cases were identified and 232 were reviewed and 60 toxin cases were examined.

This study found that despite documenting suspicions of abuse or neglect in almost half of the HPC deaths, no documentation was found that local departments of social services were notified by EMS professionals in any of the HPC cases. EMS did not notify the local department of social services to report suspicions of child abuse in any of the HPC cases. An examination of the SIDS deaths revealed that EMS attempted resuscitation efforts on children that were noted in the prehospital care reports to be obviously deceased in approximately one-third of the cases. Interestingly, EMS has in place policies that specifically address how to properly handle both circumstances. In toxin cases, law enforcement was present at the scene in 95 percent of the deaths and naloxone was administered in approximately half of the cases that were suspected to be a result of drug overdose.

The EMS records are a valuable resource for child fatality review. The findings indicate the need for further investigation into why some EMS providers and agencies appear to not be adhering to state law and EMS policy regarding the reporting of suspicions of child abuse and neglect, as well as EMS policy regarding withholding resuscitation from the obviously deceased and how compliance can be instituted. Law Enforcement presence at the scene was not 100 percent, possibly affecting the ability of officers to conduct an investigation in a timely manner. Ultimately, the responsibility falls to the Office of EMS and the N.C. College of Emergency Physicians, possibly through communication with the EMS providers in the field, to improve compliance and collaboration with all of those responding to pediatric emergency calls.

Significant Findings

- ◆ Abuse or neglect was suspected in approximately half of the Homicide by Parent or Caregiver deaths; however, there was no documentation that EMS providers ever reported these suspicions to local DSS and little documentation of reports to the receiving Emergency Department staff. These findings suggest that EMS providers did not adhere to state child maltreatment reporting statutes or additional EMS policy standards regarding reporting child abuse and neglect.
- ◆ In approximately one-third of the SIDS deaths where children were obviously deceased upon EMS arrival, resuscitation efforts were performed despite state EMS policy regarding withholding resuscitation when there are obvious signs of death.
- ◆ 911 was not called by caregivers in all child deaths that fell under Medical Examiner jurisdiction. Homicide by Parent or Caregiver fatalities had more cases where EMS was not involved than toxin deaths.
- ◆ Patient care reports were not created in all calls in which EMS responded to a scene and the child was obviously deceased.

Recommendations

The State Child Fatality Prevention Team recommends that the N.C. College of Emergency Physicians, which developed the state's Standards for EMS Medical Oversight and Data Collection, and the N.C. Office of EMS clarify the procedures regarding an EMS professional's duty to report suspicions of child abuse and neglect to DSS, require documentation that a report was made to DSS, and if transported for further treatment, to report suspicions to Emergency Department staff as well.

Additional Considerations

- ◆ EMS records are a valuable resource for child fatality review.
- ◆ Law Enforcement notification, at the time of a life-threatening pediatric emergency call and at the time death is declared, is important in ensuring that an investigation is conducted in a timely manner.
- ◆ Determining why some EMS providers or agencies did not adhere to policies regarding the reporting of suspicions of child abuse and neglect as well as not withholding resuscitation to the obviously deceased was beyond the scope of this project. Further study may be beneficial to ascertain what, if any, issues are affecting adherence and how those issues can be addressed in order to ensure compliance with EMS policies and state law.

Introduction

In 2010, the over 740 Emergency Medical Services (EMS) agencies that make up the 100 EMS systems in North Carolina¹ responded to 1,068,686 emergency calls, 68,715 (6.4%) of which were for pediatric patients less than 16 years of age². When EMS personnel are dispatched to the scene for a reported illness or injury, they are responsible for assessing the patient and providing emergency medical care using advanced skills, medications and procedures. The N.C. Office of EMS (OEMS) has a mission to ensure that optimum emergency medical care is provided to the state's citizens and works with the N.C. Medical Board and the N.C. College of Emergency Physicians (NCCEP)³ to meet this goal. Specifically, the OEMS works with the NCCEP to develop EMS standards to ensure that quality care is delivered⁴. As part of its mission, the OEMS strives to ensure that the unique emergency medical care needs of children are recognized and addressed through its Emergency Medical Services for Children (EMSC) program. The program is charged with ensuring that optimum standards are met throughout the continuum of emergency medical care when a child enters the emergency medical care system².

Unfortunately, despite aggressive life saving efforts by EMS and other emergency professionals, not all children respond to acute care. EMS responds to a number of the approximately 1,600 children who die in North Carolina each year before their 18th birthday⁵. These deaths are a result of many different causes, from natural disease processes to motor vehicle crashes to firearm injuries. Deaths from injury and violence, those that are suspicious in nature or are sudden and unexpected must be reported to the North Carolina Medical Examiner System, overseen by the North Carolina Office of the Chief Medical Examiner (OCME). In 2009, the Medical Examiner System certified the deaths of approximately 12,000 people, approximately 600 of those children under the age of 18 years⁶.

In order to prevent child deaths, the NC Child Fatality Prevention Team (NC CFPT) has been reviewing these cases since 1991. The purpose of the review is not to lay blame on any individual or agency, but to understand the causes of child deaths, identify trends and to look for any gaps in systems, policies and laws to determine how to prevent deaths of a similar nature from occurring in the future. As EMS providers play a critical role in responding to children who are at risk or who have died, the CFPT has long recognized the role of EMS in pediatric cases and how EMS provider actions and policies may contribute to our understanding of the causes and prevention of child deaths.

Working with the EMSC program, the N.C. CFPT chose to study child deaths with EMS involvement regarding 3 specific areas that had been identified as areas of interest, either by EMSC or through CFPT case review. The areas of interest were: 1) EMS provider reporting of suspicions of child abuse and neglect; 2) the treatment of patients who were obviously deceased upon arrival of EMS to the scene; and, 3) the presence of law enforcement at the scenes of child emergency calls that were ultimately fatalities.

1) Recognizing the importance of providing safety and security for children and their right to be free from harm, North Carolina requires that anyone who suspects that a child is being abused or neglected report these suspicions to the local department of social services (DSS)⁷. EMS providers are in a unique position as they enter homes and physically examine children and may have first hand knowledge or suspicions. The NCCEP developed a Standards Policy for "Child Abuse Recognition and Reporting"⁸ for EMS that goes beyond the statutory reporting requirement. In addition to making a statutorily mandated report to DSS, EMS providers are also instructed to notify the receiving hospital of their suspicions; to assess and document signs of physical abuse or neglect or any psychological characteristics of abuse; and to notify law enforcement in the event of a child fatality.

2) There are calls in which an EMS provider will arrive to find that the patient is obviously deceased. In these instances, attempted resuscitation would be futile. Despite this, some providers attempt resuscitation. There may be several reasons for this extraneous effort. The provider may want the family present to feel that he or she did everything to "save" their child. He or she may not want to tell the family that there is nothing more that can be done. The provider may want to feel that he or she did everything possible to save a child as well. However, there is no evidence to suggest that excessive resuscitative efforts, beyond those that serve no life saving purpose, benefits the family

and may, in fact, disturb evidence or leave additional artifacts that must be sorted out at autopsy. In order to “honor those who have obviously expired prior to EMS arrival”, the NCCEP developed a Standards Policy for “Criteria for Death/Withholding Resuscitation”⁸ to instruct EMS providers that CPR and ALS treatment are to be withheld if the patient is “obviously dead”. The policy goes on to note complete cardiopulmonary arrest and one or more criteria including body decomposition, rigor mortis, dependent lividity, blunt force trauma, injury not compatible with life, and extended downtime with asystole on the ECG are all signs of obvious death.

3) Deaths from toxic agents, such as drugs, chemicals or gasses, account for an average of 15 child deaths in North Carolina each year. While toxicological testing can indicate the presence of a drug or chemical or even provide a cause of death, information related to how the child obtained or was exposed to the toxin is often lacking. Law enforcement investigation in these cases is very important not only to identify if a crime occurred, but also to determine how a child obtained access to a drug or chemical. To understand how to prevent these deaths, it is critically important to know how children are accessing the toxins. This information needs to be gathered, and determining whether or not law enforcement is notified is the first step in identifying how more information can be obtained in these cases.

In addition to the above, records from all three categories were examined for basic demographic information as well as general information such as law enforcement presence at the scene, if there was some level of scene description and what actions were taken by EMS at the scene for both the HPC and toxin cases, and if EMS had previous encounters with the child.

Case Selection & Criteria

The three-year period of 2007 – 2009 was chosen for study. Child fatality cases, with child being defined by the N.C. CFPT as a person aged from birth through 17 years were identified through the N.C. CFPT review of child medical examiner cases for that time period. Case selection was limited to those deaths in which the child was a resident of North Carolina and died in North Carolina. Cases were further narrowed into the N.C. CFPT categories that best fit the study areas. These categories included: 1) Homicide by Parent or Caregiver; 2) Sudden Infant Death Syndrome (SIDS); and, 3) deaths from toxins, where a toxin is considered to be any drug, chemical, or gas.

Homicide by Parent or Caregiver: EMS Reporting of Child Abuse or Neglect

Homicide by Parent or Caregiver (HPC) is a classification assigned by the N.C. CFPT staff to the child deaths that occur from an intentional act of injury or a severe fatal act of omission on the part of a parent or caregiver responsible for the child at the time of the injury. On average, over 20 child deaths fall into this classification each year. These deaths may include blunt trauma, suffocation, firearm injuries or other means of death. While some children may not show signs of external trauma or injury until undergoing hospital testing or autopsy, the majority of the children who are classified as HPC had visible acute injury and many had healing or healed injury. As HPC deaths often have physical injuries that would cause an EMS provider to have suspicions of abuse or neglect, this category was chosen to examine EMS reporting of child abuse and neglect. There were 74 HPC cases identified and 71 met the parameters of this study.

Sudden Infant Death Syndrome

A death is classified as SIDS when: the child is under the age of 1 year; the death is sudden and unexpected during sleep, and; the cause of death remains unexplained after autopsy, scene investigation and review of the infant’s history. These deaths are ruled natural in manner; as investigation should rule out means that were external therefore eliminate other manners of death. In North Carolina, approximately 100 deaths are certified as SIDS each year. Formerly known as “crib death” because infants were often found deceased after they had been put down to sleep, infants who die from SIDS may be found minutes to hours after death as the caregiver believes the child to be sleeping and does not wish to disturb the infant. While infant deaths during sleep may later be determined to be the result of pneumonia, accidental asphyxiation or other causes, cases of Sudden

Infant Death Syndrome (SIDS) were chosen to assess EMS response to these cases. Because these infants are not expected to die, there are usually no signs of external trauma or known disease, and the child is more likely to have been deceased for some time prior to arrival of EMS, it was determined that SIDS cases were the best sample for examining EMS treatment of obviously deceased infants. There were 332 SIDS cases identified for this study.

Notification of Law Enforcement in Suspected Toxin Deaths

Toxin cases of all applicable manners of death (accident, homicide, suicide and undetermined) were examined as toxin involvement may or may not have been suspected at the time of EMS involvement. Toxin suspicions can be evidenced by EMS documentation or the administration of naloxone, an opioid antagonist utilized in emergency treatment of suspected or known acute opioid overdose. There were 60 toxin cases identified for this study.

Case Review

There were 466 cases identified for this review through N.C. CFPT classification. Once these cases were identified, the cases were matched by name to the EMS care reports in the Prehospital Medical Information System (PreMIS), a confidential, Internet-based, electronic EMS health care record system which is maintained and supported by the EMS Performance Improvement Center (EMSPIC). When EMS patient care reports were not found in PreMIS, or when additional information was needed, the reports were requested from the individual EMS agency that responded to the call.

All of the Toxin cases identified were eligible for review. There were 74 HPC cases identified; however, three of the onset of injury locations were federal military installations and were excluded from this review of state EMS systems, leaving 71 cases for review. There were 332 SIDS cases identified, but availability and time constraints resulted in only 232 cases being examined. Therefore, a total of 363 cases were included in the data in this report.

<i>Year</i>	<i>Homicide by Parent or Caregiver (HPC)</i>	<i>SIDS</i>	<i>Toxin</i>	<i>Total</i>
2007	24	32	23	79
2008	31	114	18	163
2009	16	86	19	121
Total	71	232	60	363

Table 1. Select North Carolina Child Fatalities Cases Reviewed with Possible EMS Involvement by Manner/Means Category by Year, 2007-2009.

After collecting or requesting records on all of the cases, it was found that not all deaths involved EMS and not all deaths in which EMS responded included documentation. Three categories of EMS notification were identified. The first category of “Notified, Documented Response” includes those deaths with EMS response and treatment/transport of the child. The second category, “Notified, No Documentation”, includes children who were identified as having EMS involvement but no EMS

documentation was available for review. The last category “No EMS Involvement” includes those cases in which no 911/emergency call was made and the child was either transported to the hospital via private vehicle or EMS services were not needed based on the circumstances of the death.

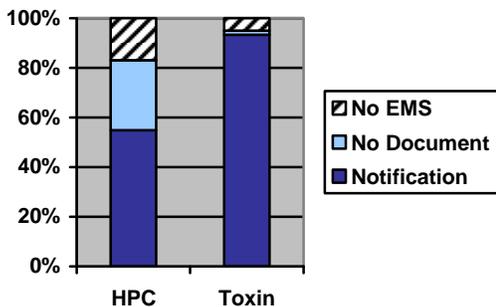


Chart 1. EMS Notification in North Carolina Child Deaths Classified as Homicide by Parent or Caregiver or from Toxins, 2007 – 2009.

EMS was notified and responded in 94 percent of the cases and their response was documented in 95 percent of those cases. It was learned that cases in which EMS is notified and responds to a call and the child is deceased

(i.e. a decomposing body) may not have a patient care report. County-level notification tables can be found in the Appendices.

Homicides by Parent or Caregiver had fewer EMS notifications than toxins (83% vs 95%), more notification without documentation (51% vs 2%) and more cases in which EMS was not involved (17% vs 5%). SIDS information was not included here as not all EMS reports for the SIDS cases were collected.

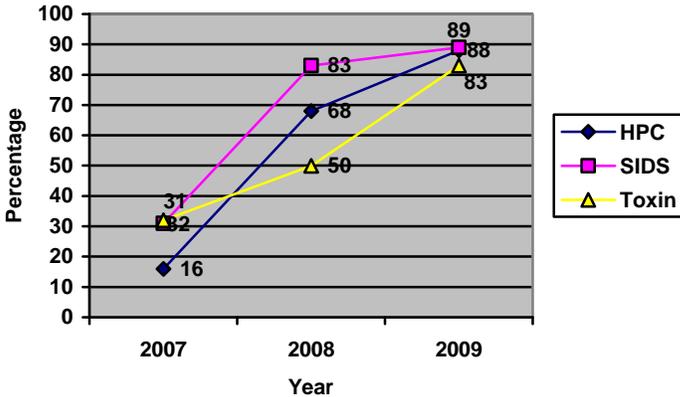


Chart 2. PreMIS Availability of Records in Select North Carolina Child Deaths, 2007 – 2009.

Availability of patient care reports differed by year. Availability through PreMIS increased for all of the death categories each year. In total, 56 percent of the HPC cases, 69 percent of the SIDS cases and 55 percent of the Toxin cases were obtained through PreMIS. The remaining cases were requested through individual agencies or did not exist due to no EMS involvement.

The rest of this report will be divided into the areas of interest.

EMS Reporting of Child Abuse or Neglect in Fatality Cases: Homicide by Parent or Caregiver

As noted previously, 74 cases were identified as HPC deaths but 71 HPC cases met the case selection criteria. These deaths included children who died as a result of action or egregious inaction of a parent or caregiver.

Demographics

The majority of the victims were male 37 (52%). White children accounted for 35 (49%) of the deaths, followed by black children with 26 (37%) deaths and Native Americans with two (3%) deaths. There were eight (11%) children who did not have a race identified. For these cases, the ethnicity was recorded, but the race was either not documented or ethnicity was improperly recorded as the race. There were seven (10%) children identified as Hispanic in ethnicity.

The 1 to 4 years age group accounted for the largest number, with 30 (42%) deaths, followed by infants with 29 (41%) deaths. Older children accounted for 10 percent or less of the deaths per age group.

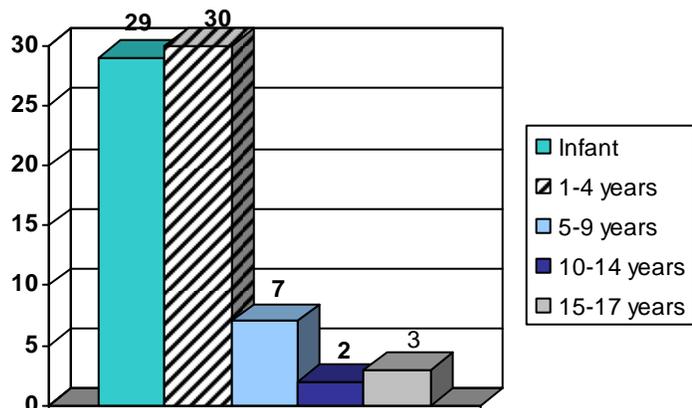


Chart 3. Homicide by Parent or Caregiver Demographics, 2007 – 2009.

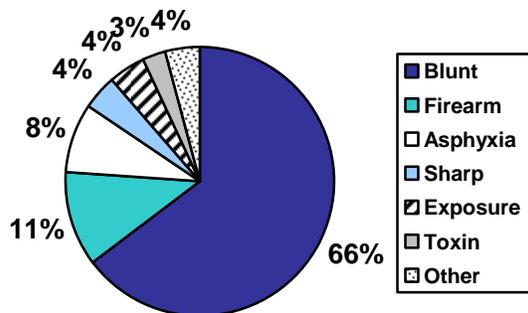


Chart 4. HPC by Means of Death in EMS Review, 2007 – 2009.

four (6%) deaths each.

EMS was called to the scene in 59 (83%) deaths whereas 12 (17%) victims were transported to the emergency department by a personal vehicle. All of the children transported by private vehicle were 1 year of age or younger. When EMS was notified, 39 of the 59 cases, or 66 percent, involved treatment/transport of the child as evidenced by prehospital care report data. However, no prehospital care reports could be found for the remainder of the cases, 20 (34%).

Procedure & Documentation

As noted above, only 39 HPC cases had prehospital care report documentation. The majority of HPC victims (36) were treated and transported to an Emergency Department and three (8%) were pronounced at the scene after resuscitative measures were determined to be futile.

In 37 (95%) cases, EMS described some level of the scene/environment and statements from the caregiver(s)/ 911 callers were documented in 30 (77%) cases.

Law Enforcement was noted to be present at the scene in 30 (77%) cases.

	Yes	No
Documented Signs/Symptoms	18	19
Reported to ED	6	N/A
Reported to DSS	0	N/A

Table 3. HPC Cases with EMS Documentation of Suspicious and Reporting of Abuse and Neglect by Year, 2007 - 2009.

As noted previously, EMS policy dictates that EMS providers assess and document signs, symptoms or injury suspicious for abuse and neglect. EMS providers did so in 18 (46%) of the 39 cases later determined to be HPC deaths. State law requires and EMS standards instruct providers to notify local DSS agencies of suspicions of abuse or neglect. Despite documenting signs or symptoms in almost half of the cases, **no reports** indicated that EMS notified local DSS of their suspicions. EMS policy further instructs EMS providers to report suspicions to ED staff, which they did in six cases.

To determine if a child had previous EMS involvement, PreMIS was examined for other calls made previous to the death. There were five (7%) cases that had previous EMS involvement. In cases in which there was previous EMS contact with the child, all were less than 2 months prior to the death.

Treatment of Patients Deceased Upon EMS Arrival: Sudden Infant Death Syndrome

A death is classified as SIDS when: the child is under the age of 1 year; the death is sudden and unexpected during sleep, and; the cause of death remains unexplained after autopsy, scene

The majority of children died from blunt force trauma (66%). Additional causes of death included firearm injuries, asphyxiation (suffocation), sharp force injuries (i.e. stab wounds), exposure (i.e. hyperthermia or hypothermia), toxins and other causes.

EMS Involvement

The 71 HPC deaths had onset of injury in 37 counties. Wake County had the highest number of deaths, with six (8%), Mecklenburg had the second highest number, with five (7%) fatalities, followed by Union and Cumberland counties with

Year	Total
2007	12
2008	19
2009	8
Total	39

Table 2. HPC Cases with EMS Documentation by Year, 2007 - 2009.

investigation and review of the child's history. These deaths are ruled natural in manner, as investigation should rule out means that were external therefore eliminating other manners of death. There were 332 SIDS deaths identified and in 12 of those cases, the patient was transported by private vehicle and EMS was not notified. Prehospital care reports could not be obtained on all of the remaining 320 cases due to the large number of the remaining cases, time constraints and lack of electronic records. Therefore, only 220 cases were examined, 30 from 2007, 112 from 2008, and 78 from 2009. The majority of cases in which prehospital care reports could not be obtained were from 2007, with only 31 percent of EMS prehospital care reports obtained. Numbers were better in 2008 (83%) and 2009 (89%) records. Unless otherwise specified, the information below will address only the 220 cases examined.

Demographics

Almost all of the SIDS deaths were of infants 6 months of age or younger (216, 97%). The majority of deaths were of male children, accounting for 122 (55%) deaths, while females accounted for 98 (45%) deaths. The majority of children were white, accounting for 116 (53%) deaths. Black children accounted for the second largest group with 87 (40%) deaths, followed by Native American with three (<2%) deaths and one death of an Asian child. There were 13 (6%) children who did not have a race identified. For these cases, the ethnicity was recorded, but the race was either not documented or was incorrectly documented as the ethnicity. There were 14 (6%) children identified as Hispanic in ethnicity.

EMS Involvement

The 332 deaths occurred in 80 counties, while the 220 SIDS deaths examined occurred in 72 of those counties. There were nine counties that accounted for the 12 cases in which EMS was not involved or notified. Full county level breakdown, including level of EMS involvement, can be found in the Appendices.

Procedure & Documentation

EMS had some level of scene information related to the infant/death circumstances (i.e. infant position upon arrival, infant location, etc.) in 175 (80%) cases and no scene/event information in 21 (10%) cases. There were 24 (11%) cases in which no narrative summary had been completed or no scene/event information was included. Law Enforcement was noted to be present at the scene in 111 (50%) cases.

In 78 (36%) cases children were noted to have one or more of the obvious signs of death as outlined in the NCCEP EMS Standards policy regarding withholding resuscitative measures. Of those, EMS personnel attempted resuscitation in 27 (35%) deaths, with resuscitation efforts for 12 (44%) of those cases being terminated at the scene and the remaining cases had resuscitation efforts continued through to the Emergency Department.

Notification of Law Enforcement in Suspected Toxin Deaths

There were 60 cases identified as deaths from toxins (drugs, chemicals or gasses) that were either classified by the Office of the Chief Medical Examiner as accident, homicide, suicide or undetermined in manner.

Demographics

The majority of deaths were of male children, accounting for 43 (72%) deaths. Female children accounted for 17 (28%) deaths. White children accounted for the majority of deaths, with 53 (88%) cases, black children accounted for six (10%) deaths, and there was one death of an Asian child. None of the children was noted to be Hispanic.

Teenagers between the ages of 15 and 17 years accounted for the majority of the deaths, with 38 (63%) deaths. The 10 to 14 years of age group had the second highest number, with nine (15%) deaths, followed by the 1 to 4 years of age group, accounting for six (10%) deaths. The 5 to 9 years of age group had five (8%) deaths, and then the infants followed with two deaths, accounting for 3 percent of the total toxin deaths.

Of the two infant deaths, one was a homicide and the other had a manner of undetermined, indicating that while the cause of death was known, the intent of the death was not determined. Of the six deaths in the 1 to 4 years of age group, there were four accidental toxins and two undetermined. There were five deaths in the 5 to 9 years of age group, including two accidents, one homicide, one suicide, and one undetermined. Of the nine deaths in the 10 to 14 years of age group, there were five accidents, one suicide and three undetermined. Lastly, of the 38 deaths in the 15 to 19 years of age group, there were 30 accidents, six suicides and two undetermined.

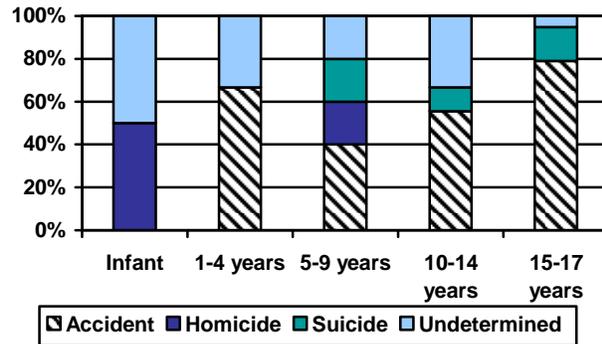


Chart 5. Toxin deaths by Age Group by Manner, 2007 – 2009.

EMS Involvement

The 60 toxin deaths occurred in a total of 35 counties. The counties with the highest number of toxin deaths were Davidson, Forsyth, New Hanover, Rowan and Wilkes, each with three (5%) deaths. County-level breakdown of EMS involvement can be found in the appendices.

There were 56 (93%) cases with EMS response and treatment/transport of the child, one (2%) case with EMS response but the child was dead at the scene with no further documentation available for review, and three (5%) cases in which there was no EMS involvement and the child was transported to the emergency department by a personal vehicle. Thus, there were 56 toxin cases with EMS documentation. Of the 56 toxin cases with EMS documentation, 31 (55%) cases were found in PreMIS. Of the 25 (45%) cases not found in PreMIS, only one prehospital care report could not be collected.

Procedure & Documentation

Law Enforcement was noted to be present at the scene in 53 (95%) cases. Law Enforcement was notified in the remaining three cases but not until the child had been transported or until after the child had died in three (5%) cases.

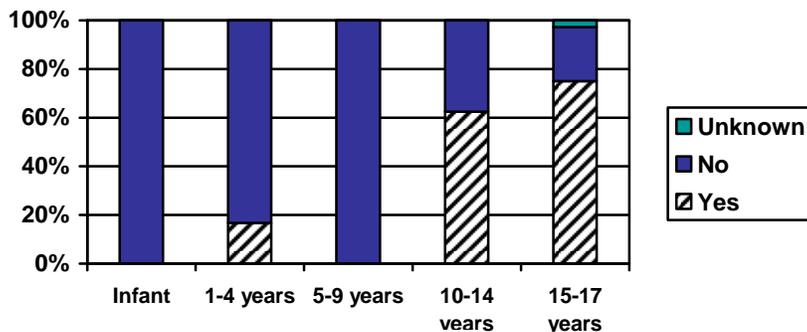


Chart 6. EMS Suspicions of a Toxin by Age Group, 2007 – 2009.

EMS documented scene information or statements of persons present regarding possible toxin use in 31 (55%) cases. EMS suspected a toxin in the child's acute illness/injury in 33 (59%) of the cases. The previous chart demonstrates that the majority of accidental toxin deaths occurred

among the older age groups. According to documented scene information or statements, it is evident that EMS was more suspicious of toxin involvement in older children than in younger children.

The types of toxins suspected in the 33 cases are listed in the table to the right. The majority were prescription drugs. Of the 33 cases in which a toxin was suspected in the child's condition/death, naloxone was administered in 16 (48%) cases. Naloxone hydrochloride is an opioid antagonist that prevents or reverses respiratory depression and other effects of opioid overdose. In 10 of these cases, the suspected toxin was an opioid, in five cases the suspected toxin was unknown, and in the remaining case the drug was an illicit non-opioid drug.

Type of Suspected Toxin	Cases
Prescription Drugs	18
Illicit drugs	2
Carbon monoxide	2
Chemicals	2
Ethanol	1
Not Specified	8
Total	33

Table 4. EMS Suspicions of a Toxin by Type, 2007 - 2009.

In toxin deaths, 23 (41%) deaths occurred on the same day as the EMS response. Death occurred the next day in 25 (45%) of the cases and in six deaths the time frame was less than a week. In one case death was over a week later and in one other case, the time between onset and death was not available.

In 9 percent of the 60 toxin cases there were previous toxin-related EMS calls for the decedent.

Discussion

EMS providers have an important duty to respond to those in acute crisis and serve an important role in preventing tragic outcomes. Thousands of children survive each year because of dedicated EMS professionals. The State Child Fatality Prevention Team had a unique opportunity to undertake an in-depth study of one often overlooked system of care, prehospital emergency care, in its ongoing charge to review the circumstances of child deaths to help determine where improvements could be made to prevent future child deaths. There were several significant findings.

State law and EMS policy dictate that suspicions of abuse and neglect be reported to local DSS. EMS policy directs providers to also document signs or symptoms of injury, and to report suspicions to the hospital and to local DSS. In 46 percent of the cases of Homicide by Parent or Caregiver, EMS documented suspicions of abuse and neglect. In one-third of these cases suspicions were reported to ED staff. However, there is no indication that EMS reported any of the children they suspected of being victims of abuse or neglect to the local department of social services. It should be noted that five HPC victims had a previous history of an EMS call with all five of these calls occurring less than two months before the deaths. This study only examined if EMS providers were reporting suspicions and following state law and state EMS policy. It is not known why reporting was not taking place since there are clear directives in place. Failure to report may be from inadequate training, the belief that someone else will do it or not wanting to get involved in a child protective services case. This is unknown, and while policies and procedures may be examined to determine if they are adequately written, disseminated and enforced, the researchers feel that it may be helpful to survey EMS professionals to determine what the possible barriers are to reporting in order to determine the best way to assist them in becoming compliant with law and policy.

In infant deaths later determined to be SIDS, there were 78 cases where children were noted to have obvious signs of death, and in 32 percent of these cases, resuscitation efforts were made by EMS. Again, EMS has a policy regarding withholding care of obviously deceased patients. This policy does not make a distinction between adults or pediatric patients. It is not known whether excessive resuscitation efforts are performed in order to make family members present feel that the provider did everything they could to assist the child or whether it may create additional trauma for the family. It is not known if excessive resuscitation efforts are a result of a provider needing to feel that he or she did everything they could to "prevent" the death of an infant. It can, however, create artifacts that have to be discriminated at autopsy. A better understanding may be gained through survey of EMS providers.

In cases of child deaths by toxins, EMS providers suspected a toxin in the child's condition/death in 59 percent of the cases, and were less likely to suspect toxins in younger children. This may be because there was an obvious sign of toxin use at the scene or people made statements regarding

the drug use, as the majority of the older children who died from toxins were accidental in nature. Younger children had fewer toxin deaths and were more likely to be homicides or undetermined in nature and less likely to have information about exposure to toxins. An interesting finding was that 9 percent of the toxin cases had a previous EMS call to the scene where toxins were involved.

Examining all of the groups together, law enforcement was documented as present at the scene in most toxin cases (95%), followed by HPC (77%) deaths and SIDS (50%) deaths. It is possible that law enforcement was notified and it was not documented, but a sudden and unexpected injury or death or injuries from violence or possible criminal acts would benefit from early notification of law enforcement to ensure that an investigation is started as soon as possible.

EMS documented scene information and/or statements in 77 percent to 95 percent of the cases, differing by manner and means of death. Statements are very important for EMS and other emergency care providers to learn how the child came to be in the state they were in order to properly treat the patient and to forensic pathologists to help guide the investigation to determine cause and manner of death.

Limitations

There were a number of limitations and barriers encountered when completing this project. One limitation was the time to obtain and review the records. Records that had to be requested from individual agencies could take an hour or a month to receive. It was also noted, when both electronic and agency records were available on the same case, there seemed to be more information within the agency record than in the electronic record. Electronic records were easier and faster to obtain as long as the parameters were searchable.

Obtaining “prior” EMS history before 2005 was daunting, as there was not really a systematic way to do this with so many EMS agencies and no real centralized data system. The PreMIS system should make it easier to identify prior EMS responses as use of the system has expanded over recent years.

More information may have been gained through examination of all child deaths for these three years but this was restricted by time/staffing. This could be remedied through use of EMS records in all fatality reviews.

The scope of this study did not include assessing why EMS providers appear to be failing to report suspicions of child abuse and neglect. While it is expected that all EMS providers within the state system are trained about their duty to report their suspicions, we cannot know if training is consistent, if the agencies are interpreting the policy in the same way or if the policies are enforced. Additionally, there may be the thought that someone else will make a report if other professionals are involved. Unfortunately, this way of thinking can lead to a child death, and all who have suspicions should report them as multiple reports are better than no report. Further study or survey of providers may be necessary to determine exactly why providers are failing to adhere to state law and EMS policy.

APPENDICES

Appendix A. Homicide by Parent or Caregiver Deaths by County and EMS Involvement, 2007 – 2009.

County	Notified, Documented Response	Notified, No Documentation	No EMS Involvement	Total
Alexander		1	1	2
Cabarrus	1			1
Catawba			1	1
Cleveland	2			2
Craven			2	2
Cumberland	1	3		4
Davidson			1	1
Duplin	1	1		2
Durham	1	1	1	3
Edgecombe	2			2
Forsyth	1			1
Gaston		1		1
Greene	1			1
Guilford	1		1	2
Harnett	1			1
Johnston		3		3
Lee	1			1
Lenoir	1			1
McDowell		1		1
Mecklenburg	4	1		5
Moore	1			1
Nash	1	1		2
New Hanover			1	1
Onslow	3			3
Pitt	3			3
Randolph	1			1
Robeson	1		1	2
Rockingham	1		1	2
Rutherford	1			1
Sampson		1		1
Scotland	1			1
Stanly	1			1
Stokes	1		1	2
Transylvania	2			2
Union		4		4
Wake	4	2		6
Wayne			1	1
Total	39	20	12	71

Appendix B. SIDS deaths by County and Level of EMS Involvement, 2007 - 2009.

County	Cases Examined	Notified, No Documentation	Total SIDS Deaths
Alamance	3		5
Alexander	2		3
Alleghany	1		1
Anson	1		1
Avery	1		1
Bertie	1		1
Brunswick	1		1
Buncombe	5		5
Burke	4		5
Cabarrus	0	1	1
Caldwell	2		2
Camden	1		1
Carteret	1		1
Catawba	5		5
Chatham	1	1	2
Cherokee	1		1
Cleveland	2		2
Columbus	2		2
Craven	0		5
Cumberland	15		24
Currituck	1		2
Davidson	7		11
Davie	1		1
Duplin	3		3
Durham	3	1	6
Edgecombe	1		1
Forsyth	11		19
Franklin	3		4
Gaston	2		6
Graham	1		1
Greene	1		2
Guilford	8		9
Halifax	0		1
Harnett	1		2
Haywood	1		2
Henderson	2		3
Hertford	1	1	4
Hoke	3		3
Iredell	2		2
Jackson	2		2
Johnston	4		7

Lee	4	1	6
Lenoir	4		4
Lincoln	2		2
Macon	1		2
Madison	2		2
Martin	1		1
Mecklenburg	4		9
Mitchell	0		1
Montgomery	1		1
Moore	1		1
Nash	1		1
New Hanover	5		8
Northampton	2		2
Onslow	12		17
Orange	2		2
Pasquotank	1	3	4
Pender	4		4
Pitt	5		10
Randolph	5		6
Richmond	2		2
Robeson	6		12
Rockingham	2		2
Rowan	4		5
Rutherford	1		1
Sampson	1		1
Scotland	2		2
Stanly	1		1
Stokes	1		1
Surry	1		2
Transylvania	0		2
Union	6		6
Unknown	1		2
Vance	1	2	3
Wake	18		27
Washington	1		1
Wayne	8	1	10
Wilkes	1		1
Wilson	1		3
Yadkin	0	1	4
Yancey	1		1
Total	220	12	332

Appendix C. Toxin deaths by County and Level of EMS Involvement, 2007 – 2009.

County	Notified, Documented Response	Notified, No Documentation	No EMS Involvement	Total
Beaufort	1			1
Brunswick	2			2
Buncombe	1			1
Burke	2			2
Cabarrus	2			2
Cumberland	2			2
Davidson	3			3
Durham	2			2
Edgecombe	1			1
Forsyth	3			3
Gaston	2			2
Granville	2			2
Guilford			1	1
Harnett	1			1
Henderson	2			2
Hertford	1			1
Iredell	2			2
Jackson	1		1	2
McDowell	1			1
Mecklenburg	1	1		2
Mitchell	1			1
New Hanover	3			3
Person	1			1
Pitt	1		1	2
Polk	1			1
Randolph	2			2
Richmond	1			1
Robeson	1			1
Rowan	3			3
Sampson	1			1
Stokes	1			1
Surry	1			1
Transylvania	1			1
Wake	2			2
Watauga	1			1
Wilkes	3			3
Total	56	1	3	60

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- ¹ G. Hale, personal communication, October 2011.
 - ² G. Hale, personal communication, May 2011.
 - ³ NC Division of Health Service Regulation, Office of Emergency Medical Services. Confirmed September 1, 2011, from <http://www.ncdhhs.gov/dhsr/EMS/ems.htm>
 - ⁴ North Carolina College of Emergency Physicians, Committees. Confirmed September 1, 2011, from <http://www.acepchapters.org/nc/AboutUs/Committees.aspx>
 - ⁵ K. Ragan, personal communication, May 2011.
 - ⁶ P. Barnes, personal communication, May 2011.
 - ⁷ NCGS § 7B-301. Duty to report abuse, neglect, dependency, or death due to maltreatment.
 - ⁸ Child Abuse Recognition and Reporting. In *EMS Patient Care Related Operational Policies for NC EMS Systems*. Confirmed September 1, 2011, from <http://www.ncems.org/pdf/Pol2-ChildAbuseRecognitionandReporting.pdf>