Child Fatality Review

An Interdisciplinary Guide and Photographic Reference

G.W. Medical Publishing, Inc.
St. Louis

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Foreword

The health and well-being of children is a primary responsibility of society. Although child death is less common than the morbidity of disease, famine, violence, accidents, and other social concerns, both worldwide and in the United States, the death of children is often a marker of the larger underlying issues. By understanding how and why children die and what contributes to these deaths, it should be possible to apply public health and other approaches to reduce childhood morbidity and mortality.

The problem of child fatalities is enormous, despite the striking gains of the last century. In developing countries, diseases such as diarrhea, malaria, and HIV contribute to epidemics of child deaths. In more industrialized countries, fatal diseases may be seen less often, but underlying social problems emerge more prominently.

For example, youth violence is a serious problem in the United States, both in the form of children being killed by their caregivers (child abuse) and from youths killing youths (homicide). In 2001, a report issued at my direction as the US Surgeon General highlighted youth violence as a major public health problem. This report brought together the Centers for Disease Control and Prevention, the National Institute of Mental Health, the Substance Abuse and Mental Health Services Administration, and a panel of experts to detail the magnitude of the problem, describe its characteristics, and suggest a number of prevention and intervention strategies. Prevention of youth violence would substantially reduce child deaths and morbidity, and a public health approach would add immeasurably to existing social services and legal services.

Within the last several decades, public health approaches to the prevention of unintentional injury (eg, from seat belts, car seats, swimming pools), disease reduction (eg, Hib, polio, and other immunizations), and, most recently, violence have made substantial inroads in preserving the health and well-being of children. By applying scientific processes to such problems, professionals and communities may no longer perceive them as inevitable or impossible to address. Increased investments in the protection and health of children will have a tremendous impact on reducing the social and health costs of both child and adult fatalities.

This is the first major book to address issues of child fatality. An international list of authors puts these problems in perspective in the Unites States and worldwide. By considering causes of child death and utilizing the multidisciplinary process to address them, specific prevention efforts may be tailored to fit a community's particular needs. These efforts are necessary if we are to preserve our future: our children.

David Satcher, MD, PhD
Former President
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Foreword

The impact of a child's death should be immeasurable, whether it occurs because of an extremely premature birth, ravaging cancer, or a terrible accident. Regardless of the circumstances, a child's demise is catastrophic. However, when a child dies from abuse and/or neglect, a brief surge of public outrage may be the extent of the reaction. Many times, the fact that this type of death tends to be more preventable then any of the previously mentioned is not acknowledged. This text brings the reality of preventable child abuse deaths to the forefront of social consideration and challenges professionals to unify their thought and documentation processes.

The emergence of child fatality review teams throughout the United States compels us to develop protocols and best practices standards, as well as to carefully reflect upon and learn from past lessons. This compendium provides an extremely thought-provoking discussion of the complexity of child fatality and its relevance to many professional disciplines. With an original focus in the criminal justice and child protective services arena, the incorporation of public health and prevention efforts into the tasks of child fatality review teams advances prevention not only at the local and community levels, but also within society as a whole.

Child Fatality Review brings together many great minds that articulate the numerous challenges in the child death review process. We have come to recognize the lack of uniformity from state to state in the documentation of the cause and manner of a child's death. Additionally, not only are deaths misclassified in nearly 1 out of 3 cases, but also these tragic deaths are woefully absent from child abuse tracking systems.

Just as criminal justice research has opened society's eyes to the immediate threat to a child's survival when he or she is abducted by a stranger, so too does this work possess the potential to open eyes as we struggle to decrease childhood fatalities. Community response to the threat of danger and the need for timely action in cases of child abduction has effected state and national legislation such as the American Missing Broadcasting Emergency Response (AMBER) Alert and models how, through increased public awareness and education, child death review team research can move society forward in preventing subsequent mortality in siblings of deceased children, recurrent accidental deaths in communities, and even fatal trauma due to a parent's loss of control when frustrated by a crying baby. These teams can also establish partnerships between state agencies and the private sector to enhance child health and safety.

This excellent text will advance the field of child fatality review by providing a guide for an encompassing network for a multitude of professionals, all of whom must work together and share knowledge, experience, and respect for each other's divergent perspectives in order to ultimately protect our most important and irreplaceable resource, our children.

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Introduction

Rituals surrounding child death are ancient. Centuries ago, a mother held a still body and screamed. An older woman more experienced with death held the mother, and the chief and the shaman joined them. A small group gathered to chant and appease the gods, support one another, and protect themselves from events they could not understand, like a child's death.

This ancient process continues today, aided by experts from different agencies, modern forensics, data analysis, and computer communications. The behavior appears modern and potentially impersonal, but at the core the ancient purpose remains. The tribal response to the loss of a child has been reborn in the modern process of child death review, in which professionals support one another and work together to understand how these tragedies occur.

The Beginnings of Child Death Review Teams

The concept of multiple agencies reviewing child death as a team came to me from an experience I had in medical school with internal and pediatric medicine. Each week, internal medicine faculty, residents, interns, students, nursing staff, social workers, and others gathered to review patient deaths. In my first review session, the patient died of an abdominal tumor that was missed on physical examination. The staff wanted to learn from what went wrong. Death review, it seemed to me, was part of pursuing excellence. The doctors could evaluate their work, successes as well as failures, as they pursued excellence. However, many people found the process out of place in a system that celebrated life.

Pediatric services did not address death so directly, perhaps because of the special status we give to the life of a child. When a child died, staff seemed to behave almost as if it had not happened. Another child arrived to fill the bed in the hospital. Nothing was said. I made note cards on children who might die with the intent of pulling their charts in 6 months to see what happened, but I lost the cards. The task of analyzing child death would eventually require not one doctor, but rather considerable group effort and multiple professions. The work causes pain that, like the ancient tribe, requires a system of peer support.

My work with the precursors of child death review began in Los Angeles County in 1975, where reviews of coroner records created a basis for the first team. The LA County Inter-Agency Council on Child Abuse and Neglect (ICAN) formed in 1977 as one of the first multiagency child abuse forums. This organization provided the agencies for my model in 1978, and we began the first child death review. We shared with other counties and states and the second team formed in San Diego in 1982. I personally contacted all states and met face-to-face with about half of them. We were the center of a rapidly growing peer support network. In 1996, the US Department of Justice was joined by the US Department of Health and Human Services at a press conference to declare ICAN the National Center on Child Fatality Review.

Deaths of children provided the motivation and material for review, one case at a time. Other California counties soon formed review teams, and other states followed suit in the mid 1980s. By 2001, all states had implemented the child death review process with state and/or local teams. The United States had nearly 1000 state and local teams by 2006. International teams began in Sydney, Australia, and British Columbia, Canada, and filed their first team reports in 1994. New Zealand and the Philippines followed. Teams are underway in England and beginning in Scotland and Japan, and professional-assistance requests are arriving from India, Pakistan, Portugal, Estonia, and others. Most of the resources and direction for teams has come from local resources and local child deaths. Some teams begin with a notorious fatal child abuse case and later expand to include all injury deaths. The growing network continues to depend on peer support.

Many agencies are now involved in child death review. The Centers for Disease Control and Prevention sponsors state grants to connect and reconcile data from vital statistics, criminal justice, and social services. The National Association of Medical Examiners has issued death scene protocols. The American Academy of Pediatrics added suspicious child death to growing systems addressing child abuse. The US Department of Defense is beginning review teams for fatalities in military families. The Internet has added resources with Web pages for multiple teams and programs, and international systems exist for medical experts to share cases and Internet training.

Why Teams Are Forming and Expanding

Child death review teams form to investigate and prevent child deaths. However, certain factors influence the action of the teams. Child deaths, particularly preventable abusive deaths, create great pain for frontline professionals who have known the children. This pain motivates individuals who, in turn, motivate others. The team provides a forum in which to share that pain. Team intervention is more effective and tempers the sense of helplessness that accompanies the death of a child.

A second factor that affects review teams' effectiveness is technology, including the expansion of the Internet communication and information systems. Computer technology makes the multiagency team process more available to professionals and advocates at all levels. The team review functions as a tool for individuals and agencies trying to work together to be more effective and efficient with multiagency team management of child death. These skills and experiences are passed on to those involved in cases of live children, particularly the very young, and team members learn to work together.

Child death review has grown substantially from its roots in the work of frontline staff serving and suffering with children who die. This is a cultural movement similar to our recognition and fight against child sexual abuse, when we learned to face the obvious facts with technical superstructures and resources that helped us see more clearly. Knowledge of risk factors and possible action for intervention and prevention are important tools, but they are only tools. New interventions, including outcome-oriented data systems, parenting classes, scientific studies, and new criminal sanctions and therapies, may be useful, but the work is not so simple. It is impressive how much effort we make to study children, families, and risk factors and how little we study ourselves. The exception is the multiagency team peer group that makes this work more vigorous and keeps us a bit more accountable and focused on each case.

Bureaucratic, political, legal, and personal barriers to review will persist as this process crosses professional and political lines. Agencies and individuals will build unnecessary walls to protect personal territory. However, the desire to prevent children's deaths will generally overcome the walls. We will learn and relearn to work together and support the review process that existed centuries ago, has been recreated, and thrives because of and despite us. We are learning.

Conclusion

Since the first team formed almost 30 years ago, there has been an explosion of child death review teams. The next 30 years will see the formation of even more teams, increased integration between teams, more competent technology, and more appreciation of the need to work with others. Eventually, the spectrum of reviews will include nonfatal and/or severe abuse with reviews of cases of live children with injuries that require hospitalization. Grief support for survivors will improve, and data systems will expand to provide information for prevention programs. The process of an ancient tribe is joining with technology to teach us all.

Michael Durfee, MD
Founder
Inter-Agency Council on Child Abuse and Neglect
National Center on Child Fatality Review

PREFACE

While people have always wondered how children die, it is only in the last 30 years that interdisciplinary teams have been created formally to understand deaths and to consider methods of prevention. Previous efforts to address individual causes of child death now are being supplemented by a more systematic approach.

In 1994, I was the guest editor of a special issue of the American Professional Society on the Abuse of Children's newsletter, the *Advisor*. It was titled "Special Issues on Child Fatalities" and had contributions from multiple authors, some of whom are included in this book. In 1995, the US Advisory Board on Child Abuse and Neglect issued an important work titled *A Nation's Shame: Fatal Child Abuse and Neglect in the United States*. Although focusing only on child abuse deaths, its incisive findings and recommendations for child death review are (sadly) just as relevant years later.

In the years that followed, Michael Durfee and I (and others) would periodically meet at conferences and bemoan that no one had ever picked up on these earlier efforts and put together a comprehensive book covering the entire spectrum of child death review. *Child Fatality Review: An Interdisciplinary Guide and Photographic Reference* is the result of this discontent and need from the field, and it is the very first book to systematically include common causes and manners of death, discuss how a child fatality review team functions in response to deaths, and address how deaths might be prevented. This is truly an interdisciplinary text reflecting the work of the numerous professionals needed to gain a more complete understanding of how children die.

In creating this book, certain goals were paramount: determine a comprehensive outline of the fields and issues involved in child deaths and death review, consider more strongly all causes of death beyond what some teams have as their focus, assemble top authors in their respective fields, and include an international perspective.

Any beginning to the problem of child deaths must include some description of how children die. As noted in the chapter titled "Epidemiology of Child Death," the statistics of this topic are not completely certain for a variety of reasons. However, efforts to prevent child deaths eventually need these numbers to assess the efficacy of prevention programs.

The next section of the book includes information about a variety of ways in which children die. The approach is to model child fatality review as looking at all causes of death, not just a narrow subset. There is a strong emphasis on perinatal deaths, sudden infant death syndrome, and child abuse not only because they are among the leading causes of child fatalities, but also because they are among the major topics of discussion for child death review teams. Other chapters address leading causes of death for older children, while still others address less common causes. Lightening is an uncommon cause of child death, but a chapter is included to illustrate what might be done to comprehensively identify a problem and how its understanding may aid in diagnosis and prevention. The photographic chapters depict many of the possible manners of death and allow team members who may have limited experience with actual deaths and autopsies to better understand the findings in such cases.

The third section was designed to look at the process of child death review, spanning how it is approached in multiple ways and using the experience of the world's leading experts in the child death field. International comparisons are important in not only confirming best practices, but also in suggesting new ways in which the problem of children dying may be considered. Native American child fatality review reveals that additional or different steps must be taken compared to the larger population, in which indigenous or culturally distinct groups may exist. The US military has a large number of children as dependents and has distinctly different issues and approaches to investigating child deaths and determining interventions.

The next section looks further into the details of child death review—health, investigation, treatment, education, and prevention. These chapters provide an overview of the many facets of child death review befitting the challenging and sometimes daunting task that teams face when considering how all children die. As the different team members come together—many of whom otherwise might never have contact with each other in their daily jobs—the creative energy of different perspectives and skills allows the interdisciplinary team to transcend the expertise of any one of its members. This can only work to the benefit of children. Most importantly, prevention is the ultimate goal of all child death review teams and needs an increased emphasis during and after the process.

The final section includes a summary of existing recommendations for child death review teams. Despite the large number of different recommendations by teams around the world, they tend to fall within a limited number of categories. A key observation is that perhaps rather than inventing an increasing number of new recommendations, teams might concentrate on refinement and implementation of recommendations for major categories of child deaths. The final chapter is a look at how teams could review all child deaths, prospectively consider risks to children beyond what occurred in the previous year or two, and frame recommendations for child death prevention with some statement of expected efficacy and fiscal impact statements.

With a wide range of detail about child fatalities, this reference will help professionals working with children, and those involved in child death review in particular, to better understand and prevent the deaths of children.

Randell Alexander, MD, PhD, FAAP

Reviews

The multidisciplinary team approach to investigating the issues surrounding the protection of children should be a UN resolution. Irrespective of economic status, all nations should be encouraged to develop this approach. Having highly trained teams will better serve the community. Dr. Randell Alexander's vision for the future and his continual contribution to the world medical and legal communities will always serve the protectors of this borderless crime. To my friend, keep up this vital work.

DS 282 Mark Clarke
Juvenile & Domestic Crime Unit
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Child Fatality Review: An Interdisciplinary Guide and Photographic Reference *is a must-have for all members of child fatality review teams, legislators, government, administrators of child-focused programs, as well as child advocates. This reference manual takes a broad look at the concept of fatality review, its history, current direction, and recommendations for future direction. Most importantly, the manual outlines the need for consistency, nationally and internationally, in programmatic aspects of child fatality review and in prevention activities.*

Eva Pattillo
Executive Director
Georgia Child Fatality Review Panel
Marietta, Georgia

To create a comprehensive and interdisciplinary guide to child death review is a testimony to the degree to which this endeavor has advanced in the 30 or so years since its inception. The guide is insightful and forward-looking and deals with the complexities of discussions surrounding cases of child death. The inclusion of specific cases makes the guide both readable and practical, and many of us who have served on fatality review boards will nod in agreement as we read cases that sound all too familiar. The guide is a valuable resource to seasoned as well as novice team members.

Carol Berkowitz, MD, FAAP
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The cumulative body of work in this book is represented in the form of detailed documentation of all forms of child fatality, real case illustrations, and practical solutions to all forms of child deaths including child abuse. This book is an exceptional reference for anyone who cares about the health of children, in every society and at all levels, especially pediatricians in the international settings. It is a milestone in prevention of injury and child abuse in the west that should be transported to the international society. All health care workers around the world need access to this reference for teaching new professionals globally on how to manage cases of child fatalities.

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Executive Director
National Family Safety Program
Consultant Pediatric Infectious Diseases
Riyadh, Saudi Arabia

This comprehensive guide to child fatality review successfully renders a complex topic easily accessible to the myriad of professionals responsible for the review process. Bringing their collective experience to bear, leaders in the field provide case examples and photographs to illustrate basic concepts as well as difficult issues central to effective death review. A thoughtful discussion of the challenges inherent in launching effective prevention efforts reminds us of the ultimate goal of the process.

Jordan Greenbaum, MD
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Cases of child fatality are tragic both for society and for the family of the child. They need to be dealt with and investigated carefully and sympathetically by professionals. Child death review teams help to set the highest standards for this. This book goes a long way toward helping to promote and improve that standard in other countries with less experience. The most common injury patterns and mechanisms are thoroughly discussed with many illustrative cases, important because in order to find something, we need to know what to look for.

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INTRODUCTION

CASE EXAMPLE

A 20-month-old girl was brought to the ER by her parents. The girl was pale, limp, and breathing only occasionally. Her pupils were dilated and poorly reactive, and she gazed to the left. Neurological examination yielded a Glascow coma score of 5. Emergency medical staff intubated the child, established an intravenous line, and gave her pressor medications. Her blood glucose was 300 mg/dL, electrolyte levels were normal, her hemoglobin level was 8.8 g/dL, and the white blood count was 20 000 mm^3. Blood cultures were drawn and antibiotic treatment initiated. The girl was taken for a computed tomography scan, which revealed a left subdural hemorrhage and cerebral edema.

In the pediatric intensive care unit, the girl's condition deteriorated. An ophthalmology examination showed numerous bilateral multilayer retinal hemorrhages. The treating physician ordered a skeletal survey, but the order was deferred when it became apparent that the child would die. Brain death criteria were met and life support was withdrawn 40 hours after her admission.

The autopsy revealed extensive cerebral edema with herniation, bilateral retinal hemorrhages, a moderately sized left subdural hemorrhage, and scattered microscopic subarachnoid hemorrhages. No signs of impact to the head were observed, and the skeletal survey did not show any abnormalities. The cause of death was listed as shaken baby syndrome (SBS) and the manner as homicide.

Both parents were available to provide a history of the girl's condition. The mother stated that she left home at about 8:15 AM to go to work. She fed her daughter and left her in the care of the father. The father reported that during the morning, the child seemed fine; she played and ate lunch. After lunch, she took a nap, from which she awoke at 2:30 PM, and then played some more. At about 4:00 PM, when the father was watching television, the child suddenly arched back from a sitting position. She was limp but may have made several jerking motions with her arms. The father called the mother at work, and she came home. Once the mother saw the child, the parents took their daughter to the ER.

The hospital child protection team reviewed the case. Based on this review, the father was arrested for felony murder and, at the time of the child death team review, was awaiting trial.

The parents had no prior police or child protective services reports, and this girl was their only child.

CHILD DEATH REVIEW TEAM ANALYSIS

- The team concurred with the diagnosis of SBS, the hospital child protection team's analysis of the timing, and hence also the identification of the likely perpetrator.
- The professionals involved appeared to perform appropriately.
- The public health member of the team presented data revealing:
  - The statewide hospital coding database recorded about 30 cases of SBS per year. About half were coded as 995.55 (International Classification of Diseases,

9th revision); the others were some combination of intracranial hemorrhage and retinal hemorrhage. Additional cases in which a child died before a diagnosis could be made in the hospital would have been missed with this analysis.

- — The hospital costs for these cases averaged slightly over $32 000 per patient per year.
- — This cost did not include physician fees, which would perhaps double the figure, nor clinic visits and tests for the survivors.
- — Less than 10% of the lifetime costs of a brain-damaged individual are medical. Education, police, legal, and other factors are responsible for the other costs.
- — A crude estimate is that the average SBS case costs more than $1 million over a lifetime.

— The team noted that funding for child abuse prevention programs related to physical abuse in some way totaled to approximately $1.2 million in the state.

— The conclusion was that this death was preventable.

Subsequent Recommendations for Prevention

— Support prevention programs on coping with crying. If even 1 of the 30 estimated annual cases of SBS in the state were prevented, the expenditure of $1 million on prevention efforts would equal the cost that the victim would have incurred to the state over his or her lifetime.

— Refer the mother to a parent support group for SBS.

Overview

Randell Alexander, MD, PhD, FAAP

Death is a universal experience of all living creatures. At one time, many children died from diseases and conditions that are now treatable. The expectation for most 21st-century parents is that their children will outlive them. Unfortunately, this is not always true.

The creation of child death review teams (CDRTs) is foremost a formal attempt to answer the question, "Why?" The question comes from the perceived unnaturalness of a child dying, intellectual curiosity about how this could be so, and grief-inspired anguish. Additional questions include "What could have prevented this?" and "What could we have done better?" It is in the structure of CDRTs, the issues they face, and their commitment to children that prevention recommendations are made.

Rationale for Child Death Review

The inspiration for child death review arose primarily from the concern about child abuse. While questions periodically arise about possible clusters of birth defects and deaths, environmental toxicology has not been the stimulus for the formation of child fatality review (and may indeed be underappreciated if or when it does exist). Motor vehicle–related fatalities are major causes of childhood death, yet this did not serve as the inspiration for the spread of CDRTs. Therefore, it was not the fact of child fatalities alone that caused such teams to arise, but rather concerns about the occurrence of undetected homicide caused by child abuse.

Child abuse first received attention in 1962 with the publication of "The Battered Child Syndrome" in the *Journal of the American Medical Association*.[1] This article described physical abuse, particularly cases with multiple and recurrent injuries. As a result of this publication, within the next 5 years all 50 states enacted child abuse reporting laws. Indeed, the *Journal of the American Medical Association* has cited this article as one of its "landmark" articles, acknowledging its pioneering importance in shaping the field of child abuse.[2]

These early descriptions of child abuse focused on physical abuse; sexual abuse and neglect were better appreciated later. Although much physical abuse is overt (eg, skin injuries) and potentially easily recognizable, there are some forms of physical abuse that may be very difficult to detect. For example, the findings of shaken baby syndrome were first linked with shaking as a mechanism of action in the early 1970s.[3-5] In these early descriptions, cases were identified as shaken baby syndrome only if there were no signs of impact to the head. A child would be seen who had no apparent external signs of trauma but considerable brain injury. Shaken baby syndrome injuries (brain injury and swelling, intracranial bleeding, and retinal hemorrhages, in most cases) are internal and, thus, they can be missed in cases of sudden death without an autopsy. Later, coexisting impact trauma to the head[6,7] and elsewhere on the body[8] was better characterized. Nevertheless, many cases of shaken baby syndrome have no external signs of physical abuse.

Likewise, abusive abdominal trauma often leaves no external signs. When hit, the skin of the abdomen is not trapped against adjacent underlying bone, as is the case

with skin over the tibia, forehead, cheekbones, or other sites commonly seen with accidental bruising. Punching, stomping, or impacts with blunt objects (eg, knee, baseball bat) are not high velocity mechanisms like slaps, which can leave bruising on areas of skin without underlying bone. Unless these mechanisms of injury drive with such force and depth that they trap the skin against the spine and cause bruising, the skin of the abdomen is usually clear, even with considerable internal injury.

Mandatory autopsy laws and much of the motivation of CDRTs have stemmed from the fact that a child with no signs of external trauma (eg, shaken baby syndrome, abdominal trauma) might not be correctly diagnosed as being a victim of child abuse. The victim might then be buried with an incorrect diagnosis such as sudden infant death syndrome (SIDS). The consequences of this mistake could be considerable by allowing a perpetrator of fatal child abuse to remain in a position to hurt or kill other children. Underascertainment of specific causes of child fatality cases results in incorrect death certificates and a distorted picture of how children die.[9,10]

Although fear of missing a child abuse death may have been the initial rationale for the establishment of most CDRTs, the key charge to all such teams is prevention. For each death that is reviewed, many teams explicitly consider the degree to which the child's death was preventable. Consider **Case Study 1-1**.

Case Study 1-1

A 3-year-old child was unrestrained in a car when a railroad crossing gate began to lower. Late for an appointment, the mother attempted to go around the gate but was hit by a train traveling at 48 km per hour. The car was dragged for approximately ½ km before the train was able to stop. The mother and the 3-year-old child were both killed at the scene. Upon review of the case, information was provided by the police that the car was severely crushed. Child protective services (CPS) did not get involved because there were no other children. The CDRT noted that the child was unrestrained in violation of state law and medical standards for proper restraint systems. Although proper child restraint often saves a child's life, in this instance the crash was so severe that even if restrained, the child would have died. Thus this case was classified as unpreventable with regard to the seat restraint issue but preventable with regard to the mother's actions.

Definitions of preventability vary, but many are similar to this: "A preventable death is one in which an individual or a community could reasonably have done something that would have changed the circumstances that led to the death."[11]

Three options of relative preventability are preventable, possibly preventable, or unpreventable. Teams may use other terminology but commonly face the issue that preventability is not "all or none." The compilation of recommendations across cases comprises the reports made by state and local teams in an effort to reduce child deaths, and the degree of preventability helps with the prioritization of such recommendations. In **Case Study 1-1**, preventability is high with regard to the mother's attempt to go around a railroad gate. This does not obviate the need for proper child restraint in other cases in which such restraint might make a difference in survival.

Child Death Review Teams

Over time, the mission of CDRTs has expanded in many jurisdictions to include non–abuse-related deaths and older children rather than simply looking at child abuse–related deaths in young children. Yet a wide range still exists between teams that look only at deaths determined by CPS to be due to child abuse (eg, Florida) and those that look at deaths of all children (eg, Oklahoma). Some teams have begun to look at serious child abuse that is not fatal. Multidisciplinary fatality review teams for intimate partner violence (less precisely known as "domestic violence") have arisen in some states and have been modeled after CDRTs.

There is also a spectrum of what child death review means. At a state level, the review process often includes cases that are 6 to 12 months old. Any decisions about whether a crime was committed are almost always made by local authorities before

Chapter 2

Epidemiology of Child Death

Randell Alexander, MD, PhD, FAAP
Megan Meisner

Key functions of child death review teams are the collection, characterization, and public documentation of data about deaths. Thus, most child death review teams spend considerable time reviewing cases, determining how a child died and assigning the death to a category, assembling case demographics, examining patterns, and preparing reports that summarize these data. The result is a snapshot of how children have died for the period in question (usually over the course of a calendar year). If done well, this then serves as a powerful aid in developing prevention recommendations and prioritizing prevention efforts.

A basic operating assumption underlying this process is that how children died in one year is a good predictor of how they will die in the next unless some type of effective prevention or intervention is implemented (eg, a vaccine or superior medication). Although episodic disasters may be missed with this short-term focus of looking only at the last several years, most teams have found that one year's "performance" is usually a good predictor of the next year's.

The epidemiology of child fatality is, therefore, an important part of the child death review process and enables the monitoring of trends over time, which is essential when tracking the possible effectiveness of prevention programs.

Problems With Counting Child Fatalities

No one knows how many children die each year or of what causes. Official databases (eg, vital statistics) are subject to numerous limitations, basically consisting of poor data leading to poor summary statistics. It is the job of the child death review team to attempt to come close to the ideal of describing who dies and why, something no person or organization has been able to accomplish to date.

Capturing all child deaths is not as simple as may be imagined. Some reasons this may be difficult are listed in **Table 2-1**. In remote areas of the world, formal record keeping may be spotty, especially for indigenous peoples. In some parts of the world there is not an obvious central repository of child deaths. Local records (eg, church records, family plots) may be the only way to find information on the deaths of children. In addition, for a number of reasons, children may become separated from their families and have no one to confirm their identity. These reasons include natural causes (eg, parents dying of HIV, disasters) as well as human causes (eg, wars).

Table 2-2 illustrates some of the ways in which the cause of death can be difficult to ascertain or to compare across jurisdictions. Even if there were an accurate tally of all child deaths, their causes of death are not always recorded in the same way by different authorities. Superficially, this could be as simple as sudden infant death syndrome (SIDS) being labeled as "cot death" in England. These types of synonyms pose no problem for a human coder but cause problems with electronic databases. More of an obstacle is seen when such a death is coded by a medical examiner as

Table 2-1. Problems in Accounting for Child Deaths

Record Keeping in Remote Areas of the World

— Accurately recording newborns as born alive or dead

— Central record keeping of child deaths

Finding and Identifying Dead Children

— Homicide deaths that are not detected

  — Children buried without notification of authorities (eg, some religious cults)

  — Disasters

  — Uncertain outcome of abducted children

— Mobility of children and teenagers (lost to families and potentially unidentifiable)

  — Child soldiers

  — Natural disasters separating families

  — Wars separating families

  — Famine separating families

  — HIV separating families

Table 2-2. Problems in Identifying the Cause of Death

Medical

— Different medical customs in labeling causes

— Assigning direct and indirect causes

— Failure to obtain autopsies

— Unknown medical conditions

Systemic Issues

— Lack of multidisciplinary review

— Poor training of the certifier of death

— Insufficient scene investigation or history

"sudden unexpected infant death while cosleeping." Is this the equivalent of SIDS, or is cosleeping (without obvious overlaying) another category or a subcategory? Shaken baby syndrome is coded as 995.55 in the *International Classification of Diseases*, listed as "shaken infant syndrome."[1] If the hospital or the medical examiner refers to the death as "craniocerebral trauma," "inflicted neurotrauma," or "blunt force head trauma," it would take a sophisticated system to infer that these are probably the same, since the coding may be different. Teams routinely wrestle with trying to impose order on the efforts of many different certifiers of death.

Another problem with assigning manner to a child's death is deciding what factors were responsible, filtered through the cultural lens of the certifier. For example, if a child dies in a motor vehicle crash, is it strictly an accident? Might poor highway maintenance be listed as a factor if it applies? Do automobile manufacturers bear some responsibility for failure to build safer cars? Are politicians responsible for failing to enforce safety issues and simply allowing predictable and high rates of motor vehicle deaths? A given culture might have different views of these priorities and a different sense of preventability.

In many instances, autopsies of children are not obtained. With a sophisticated medical system, many causes of death can be determined without an autopsy, but not all. Obvious accidents, chronic diseases, and thorough medical workups can yield a high degree of accuracy in diagnosis. Yet the level of certainty of all cases may be lacking. With less sophisticated medical systems, the accuracy of diagnosis may be considerably less and the data about how children die may be compromised to a small extent (with the most sophisticated medical systems including strong autopsy laws and practices) or to a large extent (systems with rare autopsies and less sophisticated medical practices).

Life Expectancy

Life expectancies have improved dramatically around the world within the last several hundred years. More reliable food sources, sanitation, and, more recently, the advent of antibiotics and effective medical care have increased the probability of a child surviving to adulthood. Survival to adulthood improves the overall average life expectancy of any given cohort followed from birth until death.

Child Fatality Causes

Case Example

Emergency medical services (EMS) responded to a call about an 8-month-old boy who was not breathing. Initial information was that the boy had drowned in the bathtub. When EMS arrived, the infant was not breathing but had a pulse of 8 beats per minute. EMS personnel intubated the child, established an interosseous line, and gave him epinephrine. In the ER, he was given multiple medications, and a pulse rate of 110 beats per minute and a blood pressure of 90 over 50 mmHg were established. His initial pH was 6.8 (normal is 7.35-7.45), and a physical examination revealed no injuries. The boy was admitted to the pediatric intensive care unit. He required 100% oxygen and still had problems fully oxygenating his lungs. A chest radiograph showed complete opacification of the lung fields. Two days later, the infant's pulmonary insufficiency caused him to go into cardiac arrest, from which he did not recover.

The history obtained from the mother was that she was home alone with her son and had just placed him in the bathtub in an infant bathtub seat (a bath ring marketed as a device for securing a child during bathing) when the telephone rang. She left the infant in order to answer the phone and put away some clothes, estimating that she was away from him for "just a minute." When she returned, she found her son face down in the bathtub.

The mother was 2 months pregnant at the time, and there were no other children in the family. Police and child protective services records revealed no previous entries for the mother.

The autopsy report stated that the boy died of drowning and that the manner of his death was accidental.

Child Death Review Team Analysis

— The team agreed that the child died of drowning.

— According to the boy's medical records, his motor skills were developing normally.

— At the time of his death, this child had been sitting independently for about 2 months. However, a child of 8 months of age is too young to be alone in a bathtub.

— Although the bathtub seat had warnings about leaving a child unsupervised when bathing, the team felt that the device inherently conveyed a sense of stability and safety to parents. In this case, the mother may have erroneously concluded that her son would be relatively safe while she was gone.

— The mother's act of leaving the infant alone for a period that was at least several minutes, despite the fact that she perceived it to be shorter, constituted neglect regardless of the use of the bathtub seat.

— Because of the complicating factor of the bathtub seat, no prosecution was contemplated. Child protective services confirmed the case as neglect and planned to offer services to the mother when her next child was born.

— The team concluded that this boy's death was preventable.

SUBSEQUENT RECOMMENDATIONS FOR PREVENTION

— Educate the public about the dangers of leaving young children alone in a bathtub under any circumstances.

— A report of this case was to be written and submitted for publication in the statewide pediatric and family practice medical journals in an effort to warn physicians about the need for strong anticipatory guidance on this subject.

— A report was submitted to the US Consumer Product Safety Commission (CPSC) about the use of the bathtub seat in conjunction with this drowning. Because other similar death reports had been published, the team urged the CPSC to ban the manufacture and sale of such devices.

Chapter 3

The Homicides of Children and Youth*

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Murders of children and youth are the ultimate form of juvenile victimization and have received a great deal of deserved public notoriety in recent years. (Strictly speaking, murder and homicide are not identical; however, in this chapter the terms are sometimes used interchangeably to improve readability.) Even though the images of Amber Hagerman or the students at Columbine High School are vivid in the public's mind, the statistics on child murder victims are not. Substantial misunderstandings exist about magnitudes, trends, and which children are at risk

This chapter is intended to give a brief statistical portrait of the various facets of child and youth homicides in the United States. It draws heavily on homicide data from the Federal Bureau of Investigation's (FBI) *Supplementary Homicide Reports* (SHR).[1] Among the highlights of the findings are the following:

— In 1997, there were slightly more than 2000 juvenile homicide victims or a rate of 3 per 100 000, a rate substantially larger than any other developed country.

— Juvenile homicide is unevenly distributed geographically and demographically. Rates are substantially higher for black and Hispanic juveniles, for certain jurisdictions (eg, District of Columbia, Nevada), and for certain counties; at the same time, 85% of all US counties had no juvenile homicide at all in 1997.

— The homicides of teenagers, young children, and children in middle childhood appear to be different on a number of dimensions, suggesting they need to be analyzed separately.

— The homicides of teenagers rose dramatically in the late 1980s and early 1990s but have declined sharply since 1993. These homicides mostly involve male victims and offenders and firearms.

— The homicides of young children are committed largely by family members using beatings and suffocation. Boys and girls are victimized about equally. A disproportionate number of offenders are women. These homicides may be seriously undercounted.

— Middle childhood is a time of life when homicide risk is low. The homicides in this age group show a mixed pattern, including cases involving child maltreatment, firearms, sexual motivation, and multiple family homicides.

— Types of juvenile homicide victimization that deserve special attention include child maltreatment homicides, multiple victim family homicides, female offender

** Adapted from Finkelhor D, Ormrod R. Homicides of children and youth.* OJJDP Juvenile Justice Bulletin. *Washington, DC: US Dept of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention; October 2001. NCJ 187239. Work on this bulletin was supported by grant 1999-JP-FX-1101 from the Office of Juvenile Justice and Delinquency Prevention, US Department of Justice. John Humphrey, PhD, provided background research and editorial review in the preparation of this document.*

homicides, abduction homicides, juvenile-on-juvenile homicides, and school homicides.

Overall Pattern of Juvenile Homicide Victimization

According to FBI data, 2087 persons younger than 18 years were victims of homicides in 1997. That rate of 3 per 100 000 (over 5 children per day) makes the United States first among developed countries in juvenile homicide. In fact, the US rate is dramatically out of line, nearly double the rate of the country with the next highest rate.[2] The United States' lead in child homicide is related to the generalized American prowess in lethal violence: The homicide rate for all persons is 6.8 per 100 000, 3 times higher than any other developed country.

Murder is a crime that does not have higher rates in childhood than adulthood, unlike other violent crimes such as rape, robbery, and assault.[3] However, homicide is the only major cause of childhood death to have increased in incidence in the last 30 years. Although deaths due to accidents, congenital defects, and infectious diseases fell over the last generation, during much of the period up until the 1990s, growing numbers of children were being murdered. Homicide is currently high among the 5 leading causes of childhood mortality, accounting for 1 out of every 23 deaths for those younger than 18 years. More young children (from birth through 4 years) now die from homicides than from infectious disease or cancer, and homicides claim the lives of more teenagers than any other cause except accidents. However, since 1993, juvenile homicide joined the general trend of homicide since 1991 and began to drop (**Figure 3-1**).

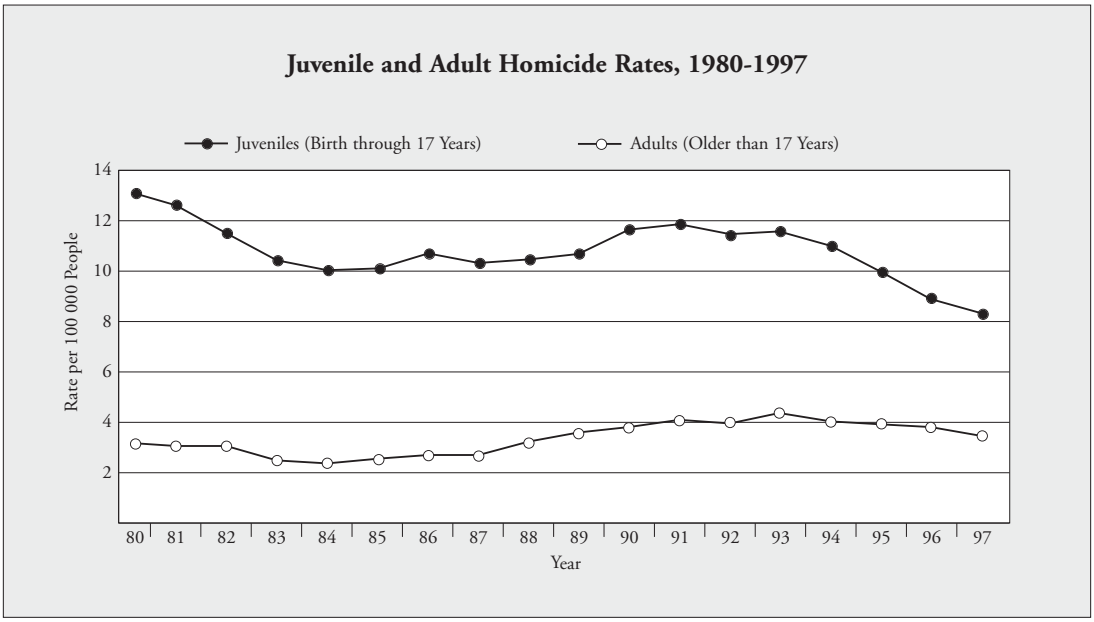

Figure 3-1. *Homicide rates of adults and children. Data show the general downward trend of child homicides since 1993. Data from Snyder & Finnegan.*[4]

Overall, juvenile homicides are among the most unequally distributed form of child victimization, with certain groups and localities experiencing the overwhelming brunt of the problem. Minority children are particularly affected, with nonwhites making up 52% of all child homicide victims.[4] Even after the recent decline, overall rates for black children (9.1 per 100 000) and Hispanic children (5 per 100 000) dwarf the rate for whites (1.8 per 100 000) (**Figure 3-2**). The distribution is uneven geographically, as well. The states with the highest rates (Nevada, Illinois, and Louisiana) have rates 6 times higher than those with the lowest (**Table 3-1**). The District of Columbia has 9 times more child murders than the national average. Large cities have levels that greatly exceed those of rural areas. In 1997, 85% of all US

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