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# Davidson County Child Death Review

## Data Report 2020



*Metro Public Health Dept*  
Nashville/Davidson County

Protecting, Improving, and Sustaining Health

## **Davidson County Child Death Review Data Report, 2020**

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# Preface

## Mission

The mission of the Davidson County Child Death Review Team (CDRT) is to provide a better understanding of how and why children die in order to find ways to help reduce the number of preventable child deaths. This is accomplished through comprehensive and multidisciplinary reviews of the circumstances surrounding each death.

## Background

The CDRT is empowered by State statute (T.C.A. 68-42-101) and Mayoral Executive Order to conduct reviews of deaths to resident children under the age of 18 years in order to achieve the following goals:

1. Ensure an accurate inventory of child fatalities by demographics, geographic locations, causes, and manners.
2. Support adequate child death investigations.
3. Enable multi-agency collaboration, cooperation, and communication at the state and local levels to address child fatalities.
4. Analyze patterns and trends in total and cause-specific child fatalities with greater emphasis on preventable deaths related to abuse and neglect, unsafe sleeping environments, and inadequate medical care or public health services.
5. Enhance community awareness of the epidemiology of childhood mortality, and public understanding of why and how children die.
6. Develop recommendations and community-based prevention initiatives to reduce child fatalities among Davidson County residents.

## About This Report

This report first summarizes the key issues, recommendations, and actions resulting from the CDRT's detailed review of each child death occurring in Davidson County during 2020. The report then presents quantitative results from the epidemiological analysis of child fatalities with an emphasis on describing the cause and manner of death, preventability, context, and modifiable risk factors associated with the deaths.

# Findings, Actions, and Recommendations Resulting from CDRT Reviews

Each year, based on the findings of child death reviews, the CDRT makes recommendations for policy, infrastructure, and service changes in an effort to prevent future childhood mortality. The Tennessee Department of Health (TDH) State Child Fatality Review Team consolidates recommendations from local fatality review teams and uses them to guide legislative, programmatic, and policy agendas for Tennessee.

At the local level, the Davidson County CDRT facilitates the implementation of recommendations through direct interaction with the agencies and organizations involved, or through contacts and partnerships with appropriate community groups. Findings, recommendations and actions made by the CDRT in 2020 are presented in Table 1 below.

**Table 1. Findings, Actions, and Recommendations of the Davidson County CDRT, 2020**

Findings	Recommendation/Action
<ul style="list-style-type: none"> <li> <b>Service Provision and Availability:</b> Reviews led the CDRT to ask if resources were available in the community to support parents and caregivers of children with autism.           </li> </ul>	<ul style="list-style-type: none"> <li>           Research revealed that there are supportive programs in the community for parents and caregivers of children with autism. Resources include the following: a) <a href="#">Autism Tennessee</a> which provides virtual workshops and a resource connection and support line; b) <a href="#">Kidcentral TN</a> has a list of resources for people with developmental disabilities, with a special focus on autism; c) <a href="#">Triad</a> is a treatment and research institute for autism located in the Vanderbilt Kennedy Center; and d) <a href="#">First Choices</a> provides supports designed to allow people with intellectual and developmental disabilities to live independently as much as possible.         </li> </ul>
<ul style="list-style-type: none"> <li> <b>Injury Prevention:</b> The CDRT observed several cases where infant car seats were improperly used. The Team requested additional information on car seat misuse and car seat fitting programs in the county.           </li> </ul>	<ul style="list-style-type: none"> <li>           Research indicated that in Tennessee, an estimated 77% of car seats are misused in a way that could reduce their effectiveness. Davidson County does not have a permanent car seat fitting station; fitting services are offered by appointment only, or during periodic community events. Appointment-based fitting stations are located at the Juvenile Justice Center and the police department. Hesitation among some         </li> </ul>

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community members to visit these law enforcement related facilities could create barriers to use. Given high rates of car safety seat misuse, and that Davidson County lacks the option of a permanent fitting station that can be easily accessed by local families who are seeking this service, the CDRT recommends the creation of permanent car seat fitting stations in the county through a partnership with the Nashville Fire Department.

- **Service Provision and Availability:** Reviews revealed a consistent lack of documentation of home visiting referrals in cases where team member expertise judged that home visiting would have been an appropriate intervention. The Team was often unable to determine if a) an appropriate home visiting referral was made, and b) if that referral was accepted or declined.
- The CDRT recommends that every Metropolitan Nashville Government agency that serves families during pregnancy, at the time of birth and/or early childhood, and from 0 to 4 years of age, offer referrals for home visiting services to 100% of the families it serves. Respecting the autonomy of individuals, all offered services are voluntary and the referral may be declined. Each agency shall document in its applicable reporting mechanisms (e.g. case notes, patient records, contact logs, etc.) when the referral was offered and the individual's response.
- **Domestic Violence Prevention:** Reviews raised concerns that the communication between different systems in cases of domestic violence could leave gaps that could impair efforts to protect victims and families attempting to exit violent situations. A workgroup was formed in 2019 to investigate these issues further and craft recommendations.
- In 2020, the CDR Domestic Violence and Child Welfare workgroup developed 8 recommendations; all were approved by the CDRT. The recommendations are:
  - #1: The Department of Children's Services (DCS) makes psychological harm allegations a priority 1 response as immediate psychological danger. (Change in DCS policy 14.3(b) and staff training)
  - #2: The Metro Nashville Police Department (MNPd) makes an automatic referral to DCS when responding to a domestic violence incident if there is a child in the household. (Creation of new policy and staff training)
  - #3: The Metro Office of Family Safety (OFS) creates and facilitates a memorandum of understanding (MOU) process with other Metro child welfare agencies (DCS, MNPd, Metro Nashville



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Public Schools (MNPS), etc.) to collaborate for appropriate support for children who are present at a domestic violence incident.

- #4: The MNPD makes the “Handle with Care” (HWC) notification including the specific disclosure of necessary child welfare information to appropriate MNPS staff so additional care and supports can be provided. (Change in the notification information shared with MNPS; Create a new MNPS policy that changes how MNPS responds to a HWC notification that includes a mandatory check-in with a counselor, behavioral health specialist, or social worker).
- #5: DCS makes any referral that is associated with domestic violence a Priority 1 response due to the volatility of domestic violence conditions. (Change in DCS policy 14.3(b) and staff training).
- #6: The OFS provides detailed insight into the benefits of an Order of Protection for a child and potential harm escalation to their clients.
- #7: Safety Plan Redesign: When DCS has an open case related to domestic violence/interpersonal violence and an individual refuses additional domestic violence services such as shelter or hotel placement, DCS will mandate domestic violence/interpersonal violence safety planning for children be done prior to their case being closed. The OFS will create a standard domestic violence/interpersonal violence safety plan for children.
- #8: Create an information sharing mechanism between the Domestic Abuse Death Referral Team and the CDRT where there are overlapping cases. (Create a downstream feedback loop).

- **Violence Prevention:** Reviews suggested a lack of interpersonal, conflict resolution, and coping skills

- MNPS has a robust Social and Emotional Learning (SEL) department. SEL has been prioritized in the district to ensure that

among youth. The CDRT requested information on social and emotional learning services in schools.

adults and children learn to embody self-awareness, social awareness, self-management, responsible decision-making, and relationship skills. School counselors and social workers offer classroom lessons on a variety of topics to promote social and emotional development, including healthy relationship and coping skills. They also provide small student groups and individual counseling support on a variety of topics and presenting behaviors that include these topics. Fidelity checks are used to monitor implementation of SEL approaches in schools. MNPS is not aware of any SEL or counseling supports for home school families; families seeking these services must utilize private providers.

- **Suicide Prevention:** Reviews raised questions regarding suicide prevention training offered to school staff. The Team requested additional clarification about required trainings on suicide prevention in MNPS.

- All MNPS employees receive the required 2 hours of Suicide Prevention and Awareness training annually. All social workers, school counselors, and school psychologists receive additional annual training and are knowledgeable in assessing suicide risk and behavior as well as providing support for students in crisis and non-crisis situations. Students in need of higher levels of care are referred to appropriate community-based services. Schools also offer training to educators and parents on how to recognize and respond to suicidal and self-harming behaviors. Schools do not offer medication management, but contract with two school-based mental health providers to provide that service.

- **Suicide Prevention:** Reviews raised questions about the systems available to help suicidal youth. The CDRT requested additional information regarding the systems of care available for suicidal youth in crisis.

- Mobile crisis is a community-based service that will meet the youth and family where there are. Calls to the triage line connect concerned persons with a Masters level clinician who will conduct a brief assessment and determine the next steps. These steps could include referrals to outpatient services or a more in-depth assessment in-person or virtually. The assessment includes examination of the presenting issue, the mental status of the

youth, and the systems that surround the youth. Dispositions could include referrals to outpatient or inpatient psychiatric care depending on the circumstances. Every assessment regardless of disposition includes a safety and treatment plan for the youth and family. At least one follow-up call occurs with all cases within the first 24 hours.

## Report Highlights

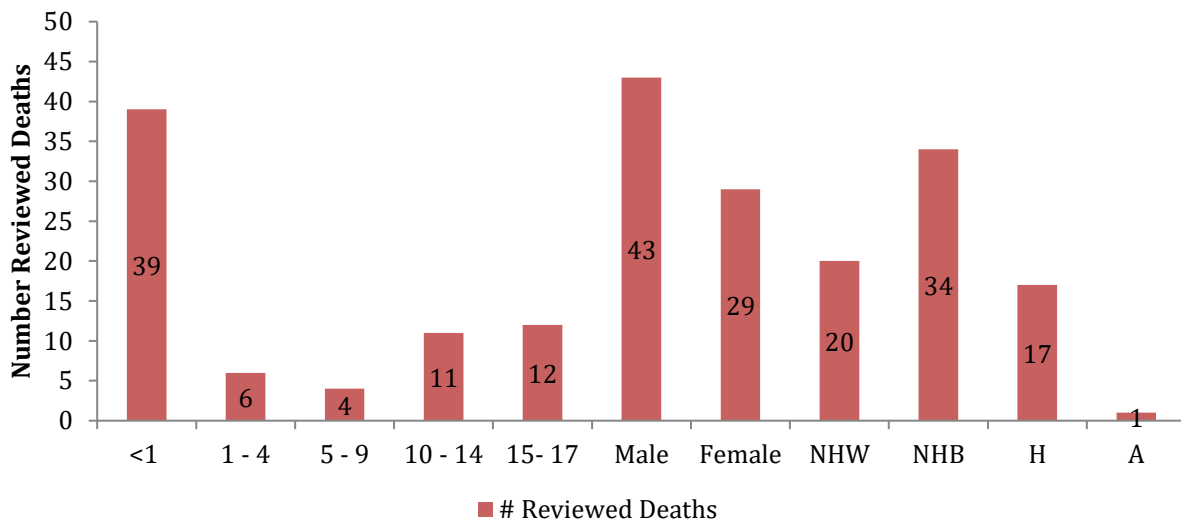
- In 2020, the CDRT reviewed 72 child deaths. Over half of these deaths (39 deaths, 54.2%) occurred to infants under 1 year of age.
- The mortality rate for children aged 0 to 17 years in Davidson County in 2020 (66.7 deaths per 100,000) was 10.8% lower than the previous year. However, this rate remains higher than the rates for Tennessee and the United States.
- The CDRT determined that 52.8% of the child deaths reviewed in 2020 were preventable. The high proportion of preventable deaths highlights the ongoing need for a thoughtful review of each death to understand the risk factors and circumstances leading to injury and illness or death and identify opportunities for prevention.
- In 2020, the mortality rate for Non-Hispanic Black (NHB) children was 101 deaths per 100,000, compared to 37.9 for Non-Hispanic White (NHW) children. NHB children were 2.7 times more likely to die than NHW children. This disparity persisted over the 5-year period from 2016 to 2020.
- In 2020, the NHB infant mortality rate was 11.8 deaths per 1,000 live births, and the NHW infant mortality rate was 3.1. During 2016-2020, NHB infants were, on average, 3.7 times more likely to die than NHW infants. The disparity decreased from 5.5 in 2019 to 3.8 in 2020.
- The CDRT reviewed 1 death in 2020 due to COVID-19 infection in 2020. This death occurred in a child with multiple co-morbidities.
- Approximately 43% (17 deaths) of infant deaths reviewed in 2020 were sleep-related, and of those 94.1% occurred when infants were placed to sleep in unsafe bedding.
- Of the total reviewed, 9 deaths (12.5%) resulted from unintentional injuries, including suffocation (5 deaths), and motor vehicle crashes (4).
- There were 12 deaths (16.7% of total reviewed) related to violence (i.e., homicides and suicides). Most of these deaths occurred to males (8 deaths), children aged 15 to 17 years (6 deaths), and NHB children (7 deaths).
- A third of the reviewed deaths (24 deaths, 33.3%) showed some evidence of maltreatment, defined as abuse, neglect, lack of supervision, or negligence. In 87.5% of these deaths, the child's biological parent or primary caregiver was implicated.

# Executive Summary

## Overall Child Mortality

The CDRT reviewed 72 deaths that occurred to children in Davidson County in 2020. The first year of life appears to be the most vulnerable for Davidson County’s children, accounting for 54.2% of all deaths under the age of 18 years (Figure 1). Children aged 15-17 years had the next highest percentage of deaths at 16.7% followed by children aged 10-14 years (15.3%). Children aged 1-4 years and 5-9 years had the lowest percentage of deaths (8.3% and 5.6% respectively). More males (59.7%) than females (40.3%) died in 2020.

**Figure 1. Number of Reviewed Deaths by Age, Sex, and Race/Ethnicity, Davidson County, TN, 2020**



Data Source: MPHD, Child Fatality Review Database System

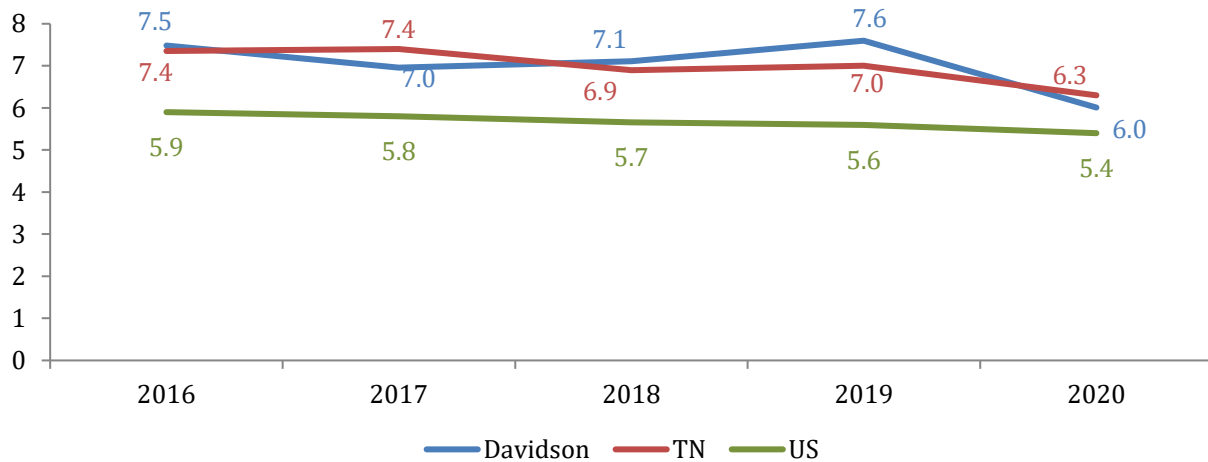
In 2020, similar to previous years, there were racial and ethnic disparities in child fatalities within the county (Figure 1). NHB children represented a disproportionately higher percentage of the total reviewed deaths compared to NHW children (47.2% vs. 27.8%), followed by Hispanic children (23.6%).

Despite a one-year drop in the mortality rate for NHB in 2020, the annual mortality rate for NHB children was 2.7 times higher than for NHW children, up from 1.5 times higher in 2016. The disparity increase was due to a larger drop in the mortality rate for NHW between 2016 and 2020. For NHB children, the rate dropped slightly from 105.9 per 100,000 in 2016 to 101 in 2020 (4.6% decrease). For NHW children, the rate decreased from 69.1 per 100,000 in 2016 to 37.9 in 2020 (45.2% decrease).

### Infant Mortality

In 2020, the infant mortality rate was 6.0 deaths per 1,000 live births, a 21% decrease from the previous year (7.6 deaths per 1,000 live births). The five-year (2016-2020) infant mortality rates in Davidson County were similar to those for Tennessee, and were higher than national rates. In 2020, for example, the infant mortality rate in Davidson County (6.0 per 1,000 births) was 11% higher than the rate for the nation (5.4 per 1,000 births) (Figure 2).

**Figure 2. Infant Mortality Rates per 1,000 Live Births, Davidson County, Tennessee, and the US, 2016-2020**



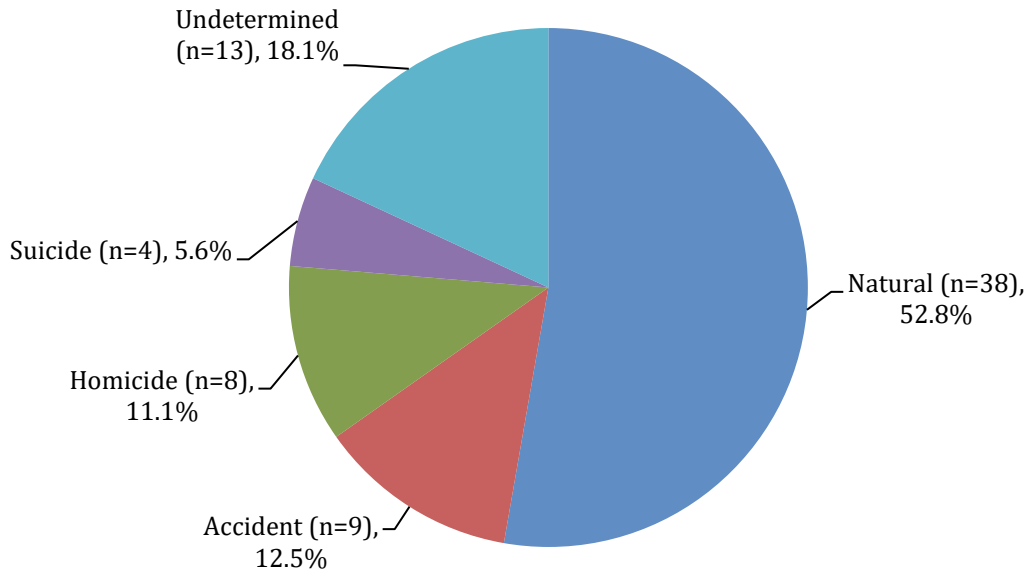
Data Sources: Vital records provided by Tennessee Department of Health; Tennessee and US rates from CDC Wonder.

Between 2016 and 2020, mortality rates among NHB infants decreased from 12.1 to 11.8 deaths per 1,000 live births. The rates among NHW infants decreased from 5.8 to 3.1 per 1,000 live births, and the rates among H infants increased from 5.4 to 6.4 per 1,000 live births (Figure 8, page 23). The spike in mortality seen in 2019 for NHB infants resolved in 2020, with rates decreasing to levels lower than those reported in 2016. Although the ratio between NHB and NHW infant mortality rates also decreased from 5.5 in 2019 to 3.8 in 2020, NHB infants died at a rate nearly 4 times that of NHW infants. Additionally, H infants died at a rate 2 times that of NHW infants.

### Manner of Death

In 2020, most reviewed deaths in Davidson County resulted from natural causes (52.8%), followed by accidents (12.5%), homicides (11.1%), and suicides (5.6%) (Figure 3). Additionally, 18.1% were categorized as undetermined because their cause and manner remained unknown after autopsy and death scene investigation.

**Figure 3. Percent of Reviewed Deaths by Manner of Death, Davidson County, TN, 2020**



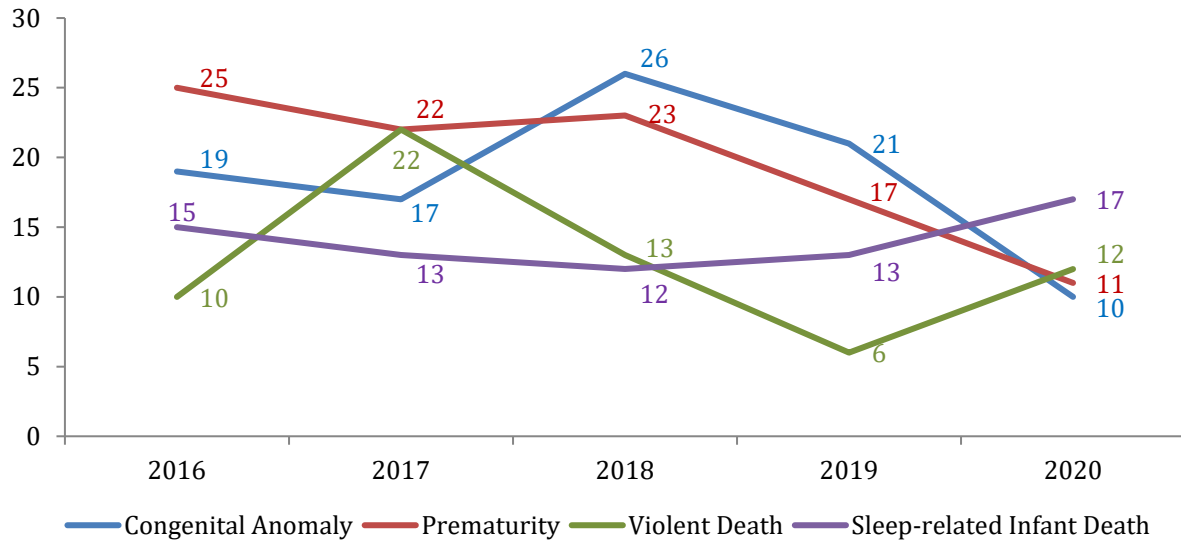
Data Source: MPHD, Child Fatality Review Database System

### *Cause of Death*

Among the 38 natural deaths in 2020, the leading causes were prematurity (28.9%), congenital anomalies (26.3%), and cancer (10.5%). Among the 9 deaths due to unintentional injury, suffocation was the leading cause (5 deaths), followed closely by motor vehicle crashes (4 deaths). There were 8 homicides and 4 suicides in 2020. Firearms were the leading mechanism of death for homicides (5 of 8 deaths), while strangulation was the leading mechanism of suicide deaths (3 of 4 deaths).

Figure 4 displays the 5-year trend in the number of infant and child deaths for 4 leading causes of death from 2016 through 2020. Although, the number of sleep-related infant deaths (SRID) increased 30.8% from the previous year (2019: 13 deaths; 2020: 17 deaths), the 5-year increase was considerably less (13.3% since 2016). Deaths due to prematurity decreased 56% from 25 in 2016 to 11 in 2020. Similarly, the number of deaths due to congenital anomalies decreased 47.4% from 19 in 2016 to 10 in 2020. Violent deaths, defined as homicides and suicides together, increased 20% from 10 in 2016 to 12 in 2020; the number of deaths in 2020 was 2 times higher than 2019.

**Figure 4. Number of Reviewed Deaths for Selected Causes, Davidson County, TN, 2016-2020**



Data Source: MPHD, Child Fatality Review Database System



## Introduction

The Child Death Review process brings together a multidisciplinary team to examine child deaths in the community to understand why children die and focus on prevention efforts that reduce childhood injury, illness, and death. Information on each death is collected from a wide range of agencies and medical providers and carefully reviewed. The process allows for the identification of inefficiencies and gaps in medical care and social support systems, as well as gaining understanding of the broader health issues in the community and modifiable risk factors associated with child deaths.

### Data Sources and Data Analyses

This report is based on the 2020 child death review data for Davidson County. Child mortality is defined as the death of a child between 0 and 17 years of age. Infant mortality is defined as a death occurring within the first 12 months of life.

For the current analysis, the death of a child was reviewed if:

- The child resided in Davidson County at the time of death;
- The child was between 0 and 17 years; and
- The death occurred in Tennessee.

In addition, infant deaths were reviewed if they were born on or after 23 weeks gestation or at a weight equal to or greater than 500 grams.

Approximately 82% of all child deaths occurring in Davidson County meet the above criteria and are reviewed. As such, data presented in this report might be slightly different from the data in other published reports based on different data sources (e.g., vital records).

Data from child death reviews were analyzed to provide the frequency distribution of deaths by demographic characteristics (i.e., age, gender, race/ethnicity) and the manner and cause of death.

Mortality rates per 100,000 children and infant mortality rates per 1,000 live births were based on total deaths recorded in the mortality and natality files for Davidson County. The rates for 2020 were compared with rates for the previous 5 years to examine the trend from 2016 through 2020. The geographic distribution of child deaths was also analyzed in conjunction with the Childhood Opportunity Index 2.0 (COI) to determine the intersection between low neighborhood opportunity and high numbers of deaths.

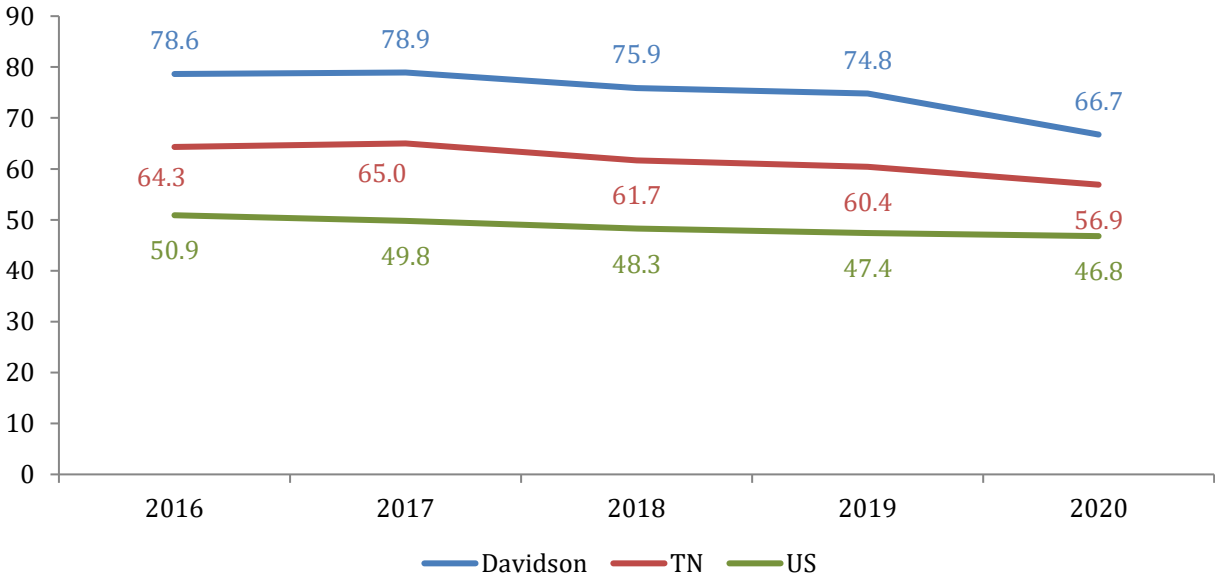
Further details regarding the analysis can be found in the Technical Notes section of this report.

# Child Mortality

## Overall Mortality

The overall mortality rates for children aged 0 to 17 years in Davidson County in 2020 declined 15% from the rate in 2016, from 78.6 to 66.7 per 100,000 (Figure 5). Davidson County mortality rates are consistently higher than rates for Tennessee and the United States. In 2020, the rate for Davidson County was 17.2% higher than the rate for Tennessee and 42.5% higher than the national rate.

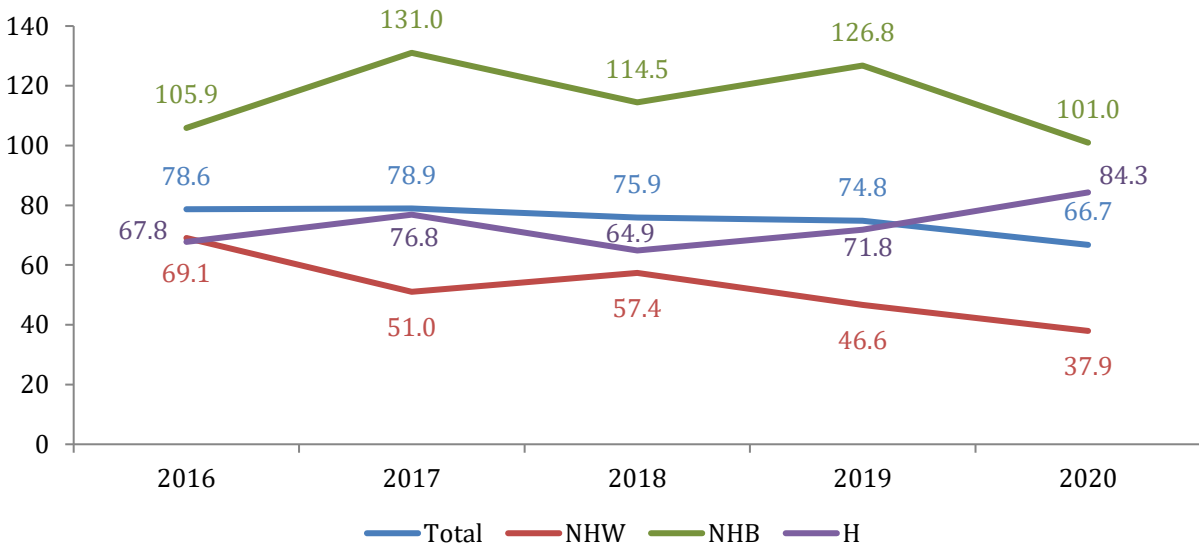
**Figure 5. Mortality Rates per 100,000 Children Aged 0-17 Years, Davidson County, Tennessee, and the US, 2016-2020**



Data Sources: Vital records provided by Tennessee Department of Health; Population based on American Community Survey 1-year estimates except for 2020, which is based on NCHS bridged-race population estimates; Tennessee and US rates from CDC Wonder.

Racial and ethnic disparities in childhood mortality in Davidson County persisted during 2016 to 2020 (Figure 6), with NHB children dying at a rate that was, on average, 2.3 times higher than the rate of NHW children. Mortality rates for NHB children decreased slightly (105.9 to 101.0 per 100,000) between 2016 and 2020 while the rate for NHW children decreased 45.2% (69.1 to 37.9 per 100,000). Hispanic child mortality rates increased 24.3% for the same period (67.8 to 84.3 per 100,000).

**Figure 6. Mortality Rates per 100,000 Children Aged 0-17 Years by Race/Ethnicity, Davidson County, TN, 2016-2020**



Data Sources: Vital records provided by Tennessee Department of Health; Population based on American Community Survey 1-year estimates except for 2020, which is based on NCHS bridged-race population estimates.

***Manner of Death***

Manner of death is a way of categorizing deaths based on the circumstances under which a death occurred. This is assigned by either the physician certifying the death or the medical examiner conducting the autopsy. Each death is classified as one of the following manners: Natural, Accident, Homicide, Suicide, or Undetermined.

Of the 72 deaths reviewed in 2020, 38 (52.8%) were classified as natural, 9 (12.5%) as accidental, 8 (11.1%) as homicide, and 4 (5.6%) as suicide. When data were stratified by sex, age, and race/ethnicity, natural causes remained the leading manner of death in every subgroup, except for children aged 5 to 9 years, among whom the number of natural and accidental deaths was the same (2 deaths). (Table 2).

**Table 2. Number of Reviewed Deaths by Manner of Death among Children Aged 0-17 Years, Davidson County, TN, 2020**

	Manner of Death					Total (n=72)
	Natural (n=38)	Accident (n=9)	Suicide (n=4)	Homicide (n=8)	Undetermined (n=13)	
<b>Age Group</b>						
<b>&lt;1 yr</b>	21	5	0	0	13	39
<b>1-4 yrs</b>	5	0	0	1	0	6
<b>5-9 yrs</b>	2	2	0	0	0	4
<b>10-14 yrs</b>	5	1	1	4	0	11
<b>15-17 yrs</b>	5	1	3	3	0	12
<b>Race/Ethnicity</b>						
<b>NHB</b>	15	6	0	7	6	34
<b>NHW</b>	8	1	3	1	7	20
<b>Asian</b>	1	0	0	0	0	1
<b>Hispanic</b>	14	2	1	0	0	17
<b>Sex</b>						
<b>Male</b>	21	7	1	7	7	43
<b>Female</b>	17	2	3	1	6	29

Data Source: MPHD, Child Fatality Review Database System

As shown in Table 2, there were marked differences in the demographic distribution of child fatalities by manners of death. Infants accounted for over half of natural deaths (21 of 38 deaths, 55.3%). Teens aged 15 to 17 years accounted for the highest percentage of suicides (3 of 4 deaths, 75%), and children aged 10 to 14 years accounted for the most homicide deaths (4 of 8 deaths, 50%). Except for deaths due to suicide or those classified as undetermined, NHB children consistently had the highest number of deaths when compared to other racial/ethnic groups.

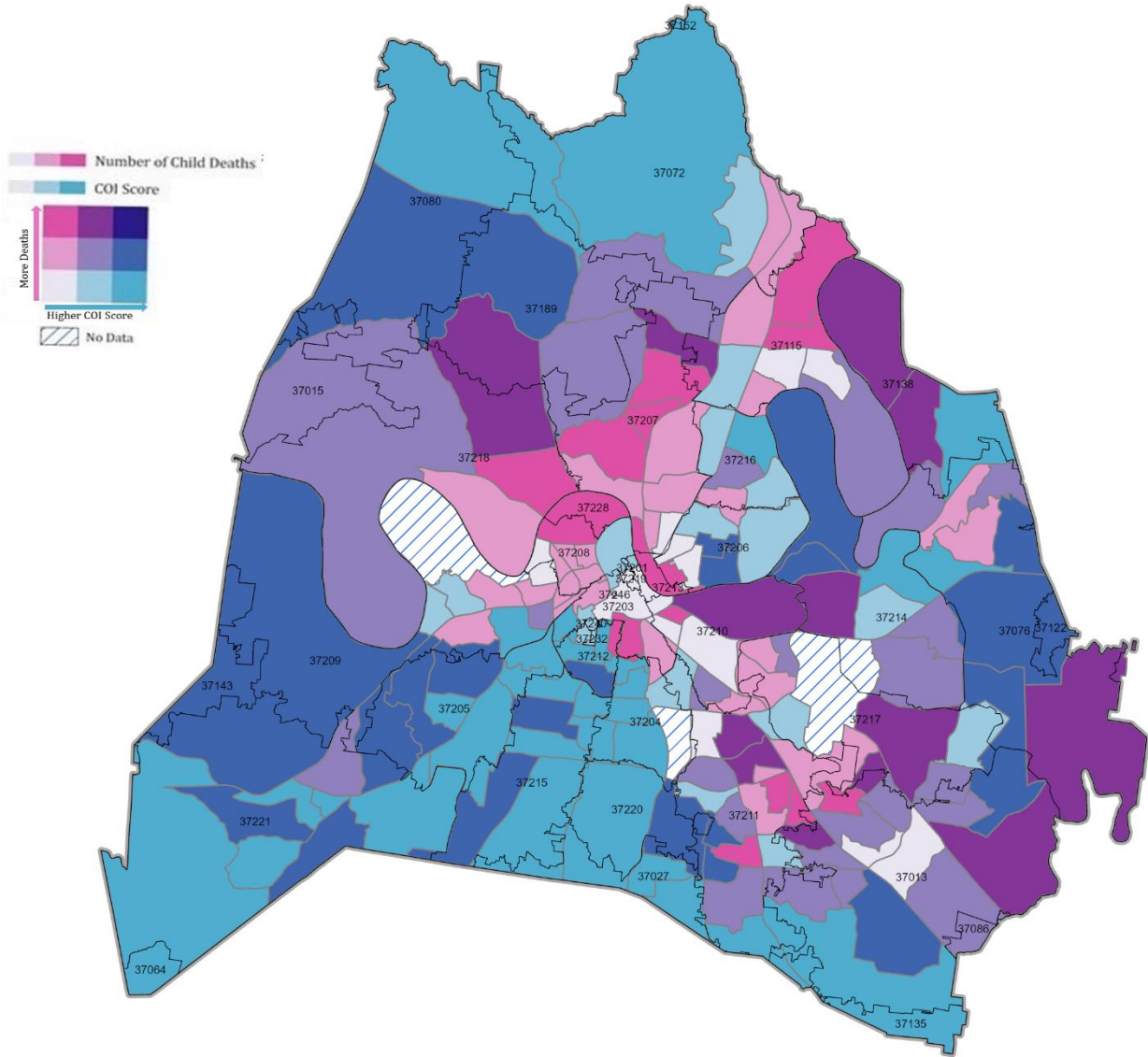
Deaths classified as undetermined accounted for 18.1% of all deaths reviewed in 2020. All deaths with an undetermined manner were infants; 12 involved unsafe sleeping environments. It was unclear if the remaining death was caused by homicide or an accident.

### **Mapping Child Mortality and the Childhood Opportunity Index**

Where a child lives can influence their development, the quality of their childhood experiences, their health and education, and their social norms and expectations for the future. Supportive neighborhood resources and conditions have been shown to enhance the effect of protective family factors and mitigate the effects of adverse family circumstances. The Childhood Opportunity Index 2.0 (COI) quantifies neighborhood opportunities for children along three domains: education, health and environment, and socio-economic. Lack of meaningful opportunity in these domains is represented by a low COI score. Census tracts are scored on 29 different indicators which are summed to create the overall COI. Scores are then ranked and census tracts are marked as low, medium, or high opportunity areas. A list of the specific indicators included in the index is provided in the appendix, and further details about the source of the index are available in the Technical Notes section of this report.

Neighborhood resources are not equally distributed in Davidson County, which helps to explain the geographic disparity in child mortality. Figure 7 displays the distribution of the COI combined with the number of child deaths by census tract. Areas with low opportunity and high numbers of child deaths are shaded in dark pink. Areas with high opportunity and low numbers of child deaths are shaded in teal. The analysis shows that areas with the highest number of child deaths and the lowest childhood opportunity scores were located in the central, southeastern, and northeastern parts of the county. Areas with no residents, which include airports and the train station, are marked with crosshatches.

**Figure 7. Number of Child Deaths and Childhood Opportunity Index According to Resident Address at the Time of Death, Davidson County, TN, 2016-2020**



Map Notes:  
Created by the Division of Epidemiology, MPH D

Data Sources:  
1) MPH D, Child Fatality Review Database System  
2) [datadiversitykids.org](http://datadiversitykids.org)  
3) Metro Planning Department

# Infant Mortality

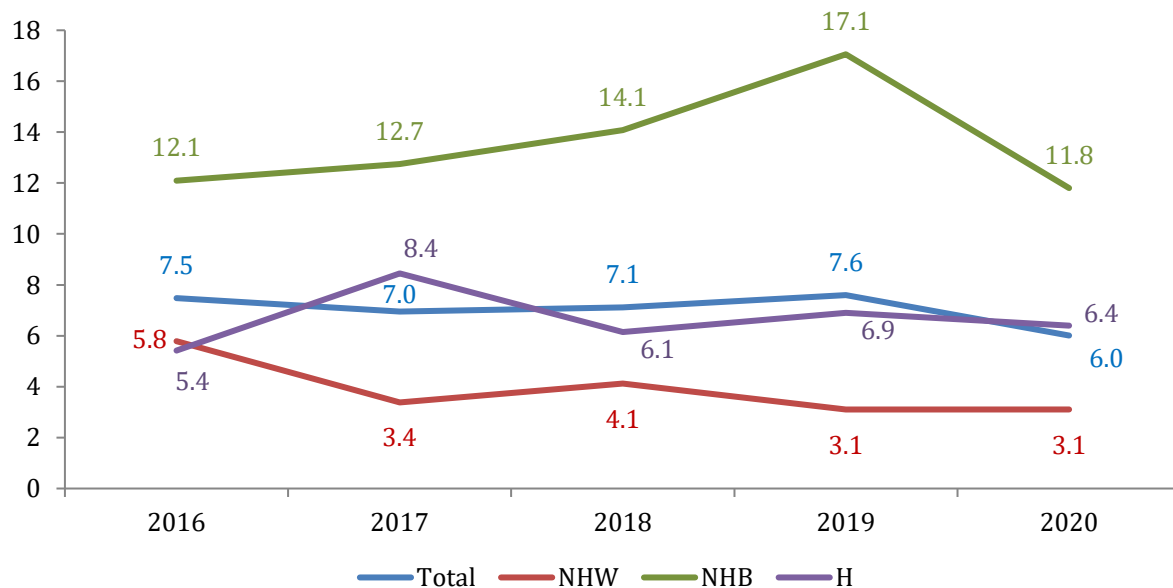
## Overall Infant Mortality

The CDRT reviewed 39 infant deaths in 2020, representing 54.2% of all reviewed deaths. As presented in Figure 2, the infant mortality rate in Davidson County was 6.0 per 1,000 live births in 2020, which was a 21% decrease from the previous year (7.6 per 1,000 live births).

From 2016 to 2020, infant mortality rates in Davidson County were similar to the rates for Tennessee and consistently exceeded national rates. In 2020, for example, Davidson County's rate was 11% higher than the national rate (Figure 2, page 14).

As shown in Figure 8, widening racial and ethnic disparities in infant mortality seen in 2019 decreased in 2020. The infant mortality rate for NHB infants decreased from 17.1 to 11.8 per 1,000 live births, while the rate for NHW infants remained unchanged (3.1 per 1,000 live births). Infant mortality rates among H infants decreased from 6.9 to 6.4 per 1,000 live births. Nevertheless, in 2020, the NHB infant mortality rate was 3.8 times higher than that for NHW infants. Similarly, the mortality rate for H infants in 2020 was 2.1 times higher than that for NHW infants.

**Figure 8. Infant Mortality Rates per 1,000 Live Births by Race/Ethnicity, Davidson County, TN, 2016-2020**



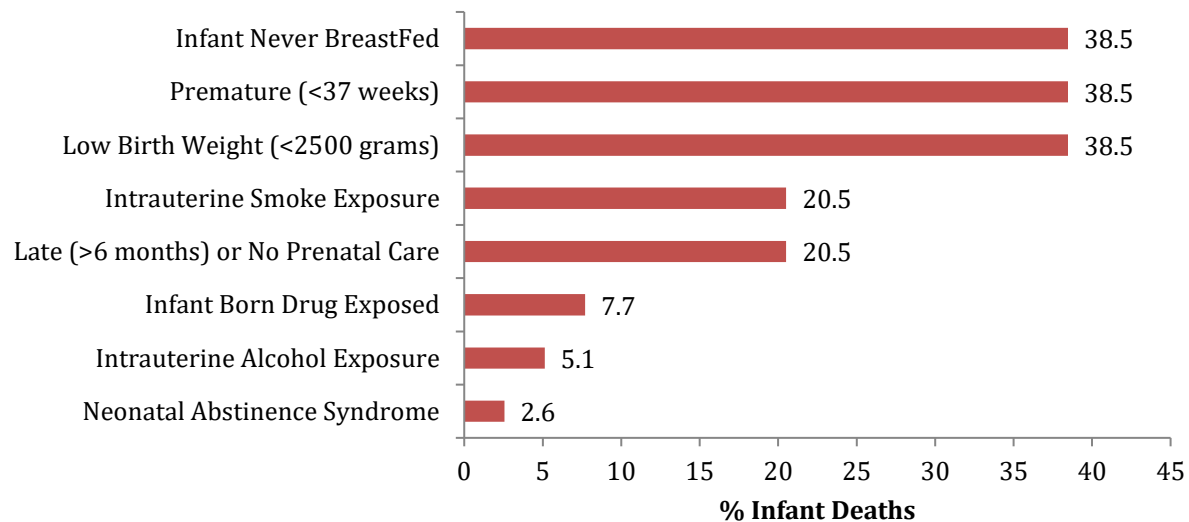
Data Sources: Vital records provided by Tennessee Department of Health.

### Factors Associated with Infant Deaths

Infant vitality is influenced by a wide range of factors including maternal health and behaviors, maternal substance use (e.g., smoking, drug abuse), access to pre- and post-natal care, issues related to labor and delivery, and housing conditions. This section of the report presents data on factors associated with infant deaths based on information obtained from CDRT reviews, irrespective of the cause and manner of death.

As shown in Figure 9, prematurity, low birth weight, and never having been breastfed were the predominant risk factors, which each occurred in 38.5% of the total reviewed infant deaths. These percentages are higher than the rates of preterm birth (10.8%), low birth weight (8.9%), and never having been breastfed (11.2%) in Davidson County. Additionally, 20.5% of reviewed infant deaths were associated with intrauterine smoke exposure whereas the maternal smoking rate in Davidson County overall was 4.2%. Other substance exposure among infant deaths included drugs (7.7%) and alcohol (5.1%); 2.6% of reviewed cases were diagnosed with neonatal abstinence syndrome. Having late or no prenatal care was noted among 20.5% of mothers with infant deaths, which was higher than the percentage of having late or no prenatal care among all mothers in Davidson County (8%).

**Figure 9. Risk Factors Associated with Infant Deaths, All Causes, Davidson County, TN, 2020**



Data Source: MPHD, Child Fatality Review Database System

Approximately 43% of infant deaths in 2020 in Davidson County were sleep-related (17 deaths). Review identified several factors that created an unsafe sleeping environment, such as co-sleeping, soft bedding, and a sleep position other than on the back. Practicing safe sleep habits for infants is a key component of any intervention to reduce infant mortality. A more detailed examination of sleep-related infant deaths is provided later in this report.

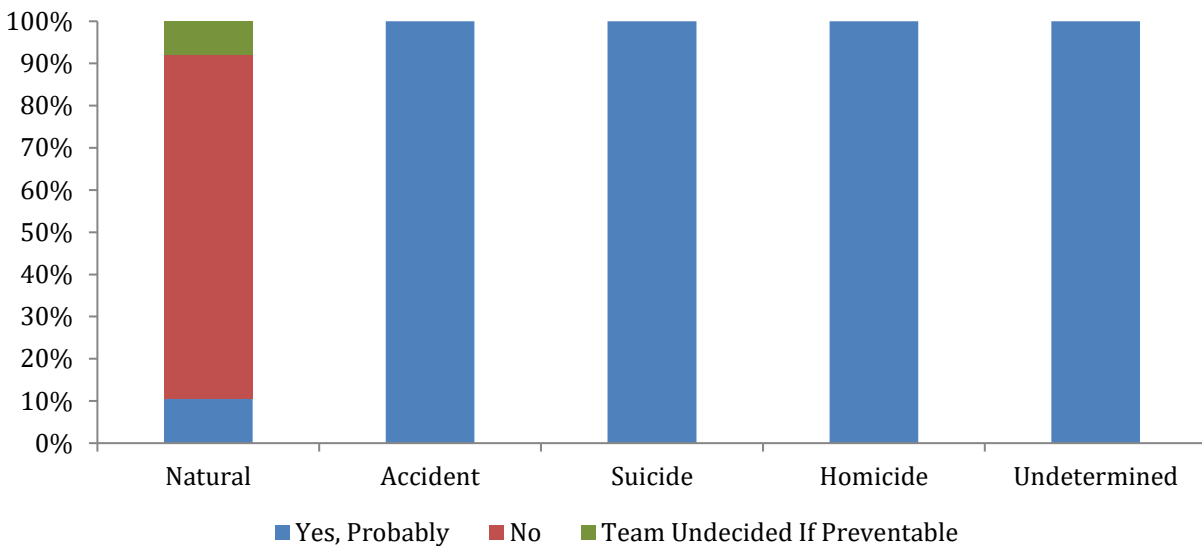


## Preventability

The CDRT reviewed each death to determine if the death was preventable. A death is deemed preventable if an individual or a community could have identified and modified risk factors and reasonably changed the circumstances leading to death.

The CDRT determined that 38 (52.8%) of the total 72 deaths reviewed in 2020 were preventable. Additionally, the CDRT could not determine preventability in 3 deaths (4.2%) (Figure 10). Notably, 100% of accidents, homicides, suicides, and undetermined deaths were preventable. This includes sleep-related deaths, for which the manner of death was often classified as accidental or undetermined.

**Figure 10. Reviewed Child Deaths by Manner of Death and Preventability, Davidson County, TN, 2020**



Data Source: MPHD, Child Fatality Review Database System

## Detailed Review of Deaths by Manner and Cause

As stated previously in this report, certifying physicians or medical examiners classified deaths into one of five manners of death: natural, accident, homicide, suicide, or undetermined. The undetermined manner typically includes several sleep-related infant deaths, and other cases where the manner was not clear; sleep-related infant deaths are discussed in later section of this report. The remaining undetermined deaths are not discussed further. The frequency distribution of deaths by manner is discussed earlier in this report (Figure 3, Table 2). The following sections describe the specific causes of death within each manner.

### Deaths Due to Natural Causes

A total of 38 deaths reviewed by the CDRT in 2020 were due to natural causes, representing 52.8% of the total reviewed deaths. As shown in Table 3, 55.3% of those deaths occurred to infants, 55.3% occurred to males, and 39.5% occurred to NHB children, closely followed by H children (36.8%). The leading natural causes of death were prematurity (11 deaths, 29%), and congenital anomalies (10 deaths, 26.3%). Cancers accounted for 10.5% (4 deaths). Other conditions (13 deaths) accounted for 34.2% and included neurological conditions (3 deaths, 7.9%), heart conditions, influenza, diabetes, perinatal conditions, COVID 19, renal disease, and pulmonary disease (1 death each, 2.6%). In 2 deaths (5.3%), the natural mechanism of death was undetermined.

**Table 3. Number of Reviewed Deaths Due to Natural Causes by Specific Cause, Summary for Children Aged 0-17 Years, Davidson County, TN, 2020**

	Natural Causes of Death					
	Total (n=38)	% of Reviewed Deaths	Congenital Anomaly (n=10)	Prematurity (n=11)	Cancer (n=4)	Other Causes (n=13)
<b>Age Group</b>						
<1 yr	21	55.3	7	11	0	3
1-4 yrs	5	13.2	1	0	0	4
5-9 yrs	2	5.3	1	0	1	0
10-14 yrs	5	13.2	1	0	1	3
15-17 yrs	5	13.2	0	0	2	3
<b>Race/Ethnicity</b>						
NHB	15	39.5	4	6	0	5
NHW	8	21.1	3	0	1	4
Asian	1	2.6	0	0	1	0
Hispanic	14	36.8	3	5	2	4
<b>Sex</b>						
Male	21	55.3	5	7	4	5
Female	17	44.7	5	4	0	8

Data Source: MPHD; Child Fatality Review Database System

## COVID-19

Within natural deaths, COVID-19 is a specific cause; however, the CDRT recognizes that the COVID-19 pandemic had wide-ranging impacts on the health and well-being of children. This section summarizes the findings of the CDRT on the impact of COVID-19 on service delivery and social systems in the county.

One child died from COVID-19 infection; this was a medically fragile child with multiple comorbidities. Maternal COVID-19 infection while pregnant was noted in 1.4% of cases, and COVID-19 was noted to have indirectly contributed to the death in 2.8% of cases. Review of all 72 child deaths occurring in 2020 indicated that COVID-19 had no direct impact on 93.1% of cases.

Figure 11 provides a timeline of pandemic mitigation efforts in Davidson County. Of the reviewed deaths, 25% were in an area with an official stay-at-home order in place at the time of the child's death. In 5.5% of cases disruptions to educational and social services were observed, and in 4.1% of cases changes in the timing and delivery of medical care were noted.

Other reviewed deaths appeared to be less directly impacted by the pandemic and mitigation efforts; however, the Team acknowledges that the effects of the pandemic were likely more widespread than available records can document. Nonetheless, case review highlighted a spectrum of issues related to service delivery, which are highlighted in the following paragraphs.

Issues with medical care included reports of missed or delayed well-child visits which, in turn, delayed the administration of age-appropriate vaccines. Missed visits also delayed the detection and treatment of other illnesses. Elective surgical care was delayed for some.

A similar pattern was noted in the delay or avoidance of prenatal care visits, and visits for routine maternal health care and maintenance of chronic health conditions. Impacts on maternal social support were also noted with hospitals restricting the number of people who were allowed to be with the mother during labor and delivery. As a consequence, fewer family members received discharge education, including information on safe sleep.

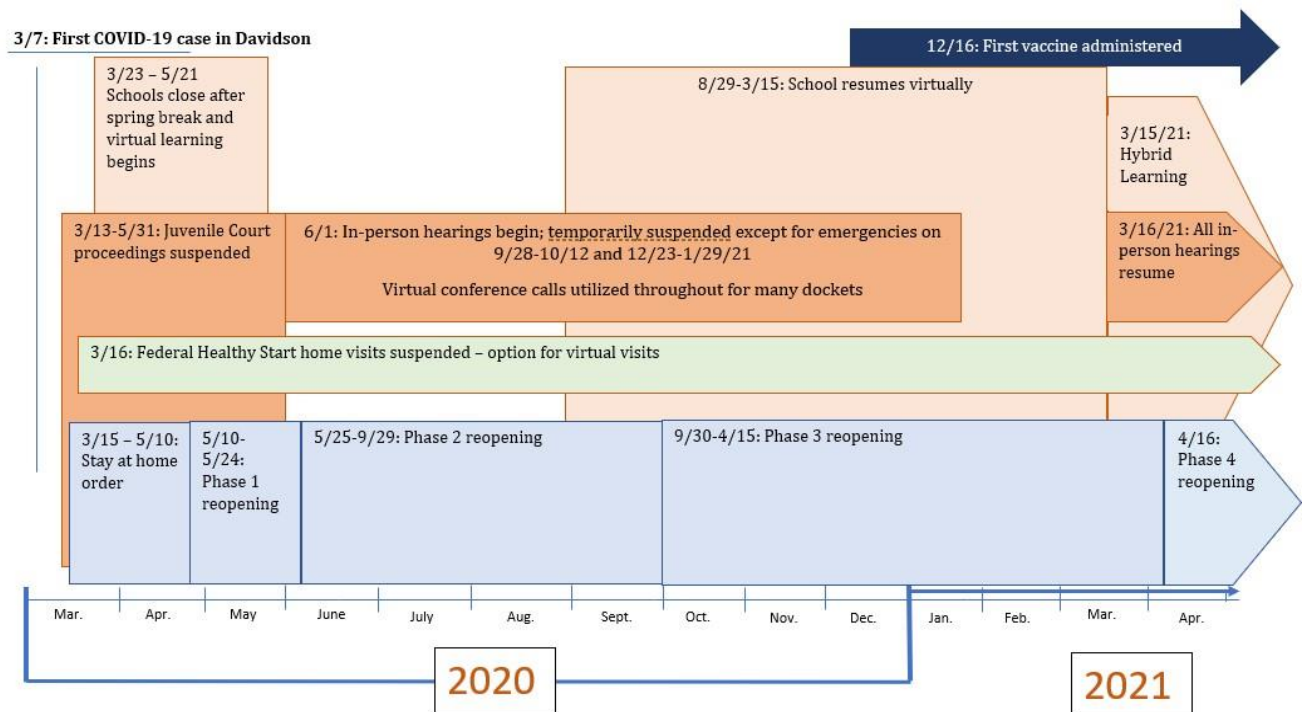
School closures and the subsequent shift to virtual learning disrupted the social network and activities for school-aged children. In some cases the shift created barriers to providing additional services to children and their families, such as nutritional support and mental health services.

Other infant, child, and family support services such as home visiting shifted away from an in-person model to using virtual platforms for service delivery. This reduced opportunities for first-hand observation of infants' home and sleeping environments. This reduced the ability of home visitors to identify and address specific issues that would have been detected with an in-home visit. Similarly, DCS noted that clients received face-to-face visits

for the initial contact only; once the family was enrolled and receiving services, visits were conducted virtually.

The CDRT recognizes that the pandemic required systems to respond rapidly to dynamically changing situations in such a way that protected both the public and employees. However, reviews suggested that in-person contact, in both school and home settings, and uninterrupted medical care are important factors in providing social, medical, and caregiving support and should be considered priorities.

**Figure 11. Davidson County COVID-19 Community Timeline**



## Deaths Due to Accidents

The CDRT reviewed 9 deaths due to accidents in 2020, representing 12.5% of the total reviewed deaths. The leading causes of accidental death were suffocation (5 deaths, 55.6%), followed by motor vehicle crashes (4 deaths, 44.4%) (Table 4). Male children (7 deaths, 77.8%), infants under 1 year of age (5 deaths, 55.6%), and NHB children (6 deaths, 66.7%) had the highest percentages of accidental deaths compared to other subgroups.

**Table 4. Number of Reviewed Deaths Due to Accidents by Cause, Summary for Children Aged 0-17 Years, Davidson County, TN, 2020**

<b>Deaths Due to Accidents</b>				
	<b>Total (n=9)</b>	<b>% of Reviewed Deaths</b>	<b>Suffocation (n=5)</b>	<b>Motor Vehicle (n=4)</b>
<b>Age Group</b>				
<b>&lt;1 yr</b>	5	55.6	4	1
<b>1-4 yrs</b>	0	0	0	0
<b>5-9 yrs</b>	2	22.2	1	1
<b>10-14 yrs</b>	1	11.1	0	1
<b>15-17 yrs</b>	1	11.1	0	1
<b>Race/Ethnicity</b>				
<b>NHB</b>	6	66.7	4	2
<b>NHW</b>	1	11.1	0	1
<b>Asian</b>	0	0.0	0	0
<b>Hispanic</b>	2	22.2	1	1
<b>Sex</b>				
<b>Male</b>	7	77.8	3	4
<b>Female</b>	2	22.2	2	0

Data Source: MPHD; Child Fatality Review Database System

### **Motor Vehicle**

The CDRT reviewed 4 deaths due to motor vehicles. The child was a passenger in 2 incidents, on a bicycle for 1 incident, and a pedestrian in 1 incident. Speeding was cited as a contributing factor in 2 incidents, and recklessness and driver distraction were cited in 1 incident each. Poor weather, failure to maintain proper lane, overcorrection, and cellphone use while driving were each cited in 1 incident. Drug or alcohol impairment was noted in 2 incidents. Driving conditions were normal in 2 incidents, and wet in 1 incident. One incident noted inadequate lighting. The actions of the child caused the crash in 1 case, another driver was responsible for the crash in 1 incident, and in 2 incidents the child's driver was responsible for the crash. In 1 incident the child's driver was operating the vehicle while drug or alcohol impaired. Similarly, the other driver was drug or alcohol impaired in 1 incident. For the 2 incidents where seatbelt use was appropriate, correct use was evident in 1 incident, and in 1 incident seatbelts were not used. The necessary car seat was used incorrectly in 1 incident. A helmet was needed and not used in 1 incident.

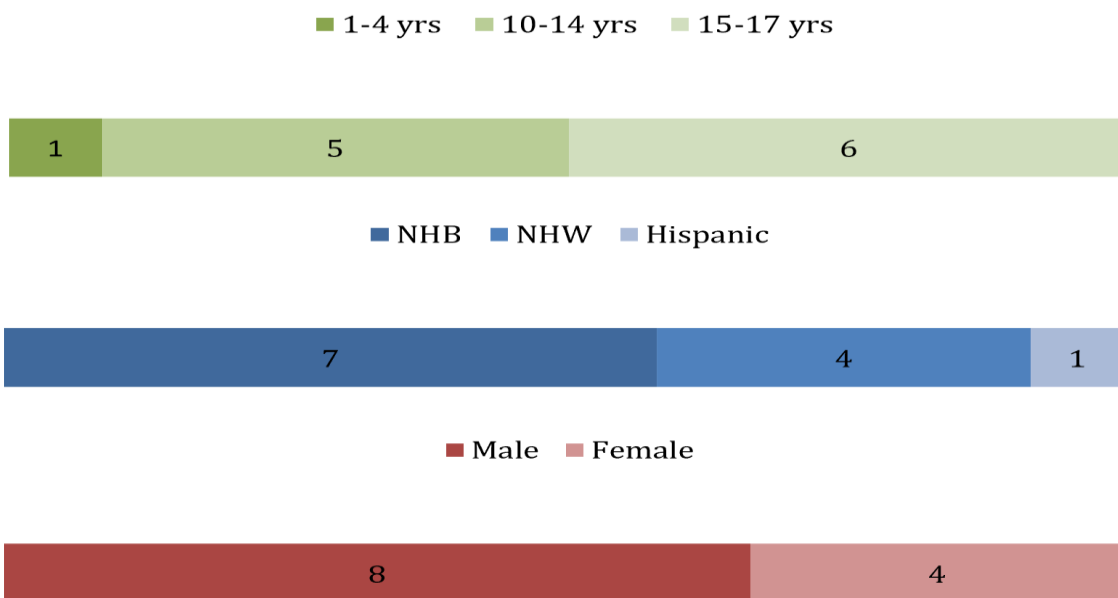
### **Suffocation**

The CDRT reviewed 5 child deaths due to accidental suffocation. One death was due to accidental strangulation, and the remaining four deaths were sleep-related. Further discussion can be found in the sleep-related death section of the report.

## Deaths Due to Violence—Homicides and Suicides

The CDRT reviewed 12 deaths (16.7% of all reviewed 2020 deaths) that occurred to children as the result of violence. Deaths occurred most frequently among children aged 15-17 years (6 deaths), followed by the 10-14 (5 deaths) age group. More deaths occurred to males (8 deaths), and NHB children (7 deaths) (Figure 13). Regarding the mechanism of death, violence-related deaths consisted of homicides and suicides, which are described in detail below. A single death may have multiple contributing factors; therefore, the categories are not mutually exclusive.

**Figure 12. Demographic Distribution of Violent Deaths for Children Aged 0-17 Years, Davidson County, TN, 2020**



Data Source: MPHD, Child Fatality Review Database System

### Homicides

In 2020, 8 deaths were due to homicide, representing 66.7% of deaths due to violence and 11.1% of all reviewed deaths. Most of these deaths occurred to males (7 deaths), NHB (7 deaths), and children aged 10 to 14 years (4 deaths), closely followed by youth aged 15 to 17 years (3 deaths).

Firearms were used in 5 incidents, physical assault was used in 2 incidents, and a motor vehicle was used in 1 incident. Motives for the homicides included commission of a crime (5 incidents), an argument (1 death), child abuse (1 death), and a drive-by shooting (1 incident).

Most of the homicides were committed by someone known to the victim. The child's stepparent and sibling were each cited in 1 incident, and another 3 incidents involved an acquaintance of the child. The relationship of the perpetrator to the child was unknown in 3 incidents.

Weapon use was commonly noted to occur during the commission of another crime (7 incidents). Cited crimes were robbery, interpersonal violence, and the drug trade (1 incident each). Additional crimes included auto theft and illegal gun sales (3 incidents each).

Detailed reviews revealed that victims were often experiencing one or more behavioral, social, or school-related issues prior to death. The victim was noted to have problems in school in 6 deaths; two victims experienced academic issues, 5 were noted to have issues with truancy, 3 were previously suspended from school, and 4 were noted to have behavioral issues. Additional issues cited included a history of substance abuse (6 incidents), and a history of criminal or delinquent activity (4 incidents). Two victims were noted to have spent time in juvenile detention, and 4 had been placed outside the home prior to death. Seven of the children were previous victims of child maltreatment. Child maltreatment is discussed in detail later in this report.

In some of the homicide deaths, the victims or their families were receiving services from public agencies prior to death. Five had received prior mental health services, and the Department of Children's Services (DCS) was noted to be involved with 2 families at the time of the incident (e.g., investigating allegations of child abuse and neglect, providing foster-care or family preservation services, or ensuring child safety).

## Suicides

There were 4 suicide deaths in 2020, representing 33% of all deaths due to violence and 5.6% of all deaths reviewed. The majority of suicide deaths occurred to children aged 15 to 17 years (3 deaths), NHW children (3 deaths), and females (3 deaths).

With regard to mechanisms of death, 3 deaths were due to strangulation, and 1 death was due to poisoning.

Two victims had previous nonfatal suicide attempts, and 3 victims had communicated suicidal thoughts or intentions. In 3 cases, the suicide was known to be premeditated, and none of the suicide acts was likely to have been observed by others. Changes in behavior prior to the suicide were noted in 1 incident, the child talked about suicide in 1 incident, and in 2 incidents the child experienced a known crisis in the 30 days prior to death.

Similar to homicide victims, suicide victims were noted to have social, behavioral, or school problems prior to death. Three victims experienced problems in school including academic issues (1 incident), truancy (3 incidents), previous school suspensions (2 incidents), and behavioral issues (2 incidents). Additional issues cited included a history of self-harm or mutilation (2 incidents), substance abuse (2 incidents), and diagnosed mental health

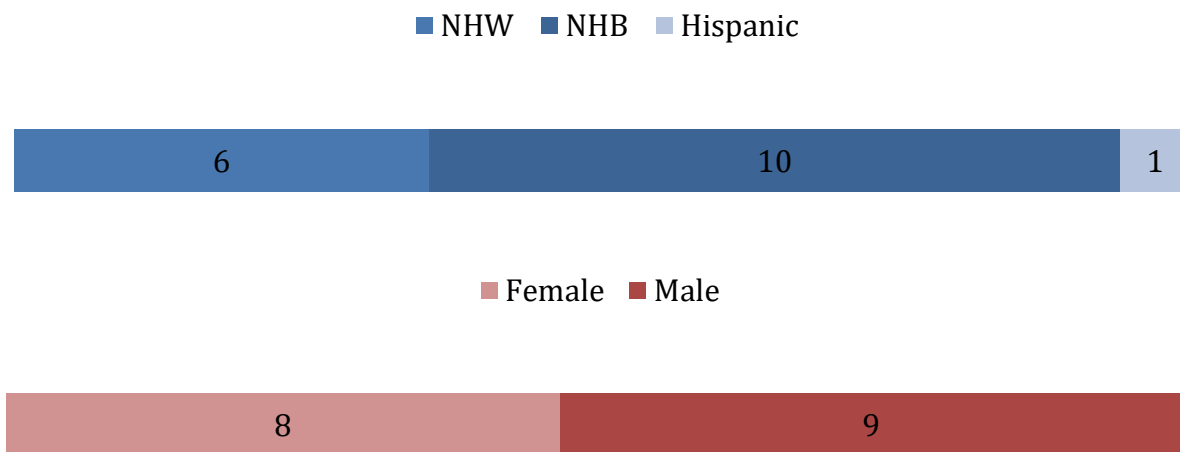


disorders (2 incidents). In 1 incident the child was a previous victim of child maltreatment. Child maltreatment is discussed in detail later in this report. In 2 suicide deaths, the victims had received prior mental health services. None of the families was noted to be involved with DCS prior to the death.

## Infant Deaths Due to Sleep-Related Factors

Of the 39 infant deaths reviewed by the CDRT in 2020, 17 (43.6%) were determined to be sleep-related. The manner of death was accidental in 4 deaths, and the remaining 13 deaths were categorized as undetermined. Of these 17 deaths, most (10 deaths) occurred to NHB infants, and males (9 deaths) (Figure 12).

**Figure 13. Demographic Distribution of Sleep-Related Infant Deaths, Davidson County, TN, 2020**



Data Source: MPHD, Child Fatality Review Database System

Table 5 displays the frequency of selected sleep-related factors that contributed to the deaths. With regards to sleeping places, 94.1% of sleep-related deaths occurred in unsafe bedding. Additionally, 76.5% occurred when the child was sleeping somewhere other than a crib or bassinette, including an adult bed (41.2%), couch (23.5%), playpen (5.9%), or infant swing (5.9%). A crib or other safe place to sleep was available in the home in 70.6% of cases. In 11.8% of cases, the home was overcrowded, which may have significantly reduced the space available for a crib or pack-n-play placement.

**Table 5. Selected Factors Involved in Sleep-Related Infant Deaths, Davidson County, TN, 2020**

<b>Factors Involved in Sleep-Related Infant Deaths</b>		
	<b>Total (n=17)</b>	<b>% of Reviewed Deaths</b>
<b>Sleeping in unsafe bedding</b>	16	94.1
<b>Not in a crib or bassinette</b>	13	76.5
<b>Not sleeping on the back</b>	11	64.7
<b>Sleeping with other people</b>	8	47.1
<b>Crib present in the home</b>	12	70.6
<b>Exposed to second-hand smoke</b>	7	41.2
<b>Residence overcrowded</b>	2	11.8
<b>Supervising adult was drug or alcohol-impaired</b>	1	5.9

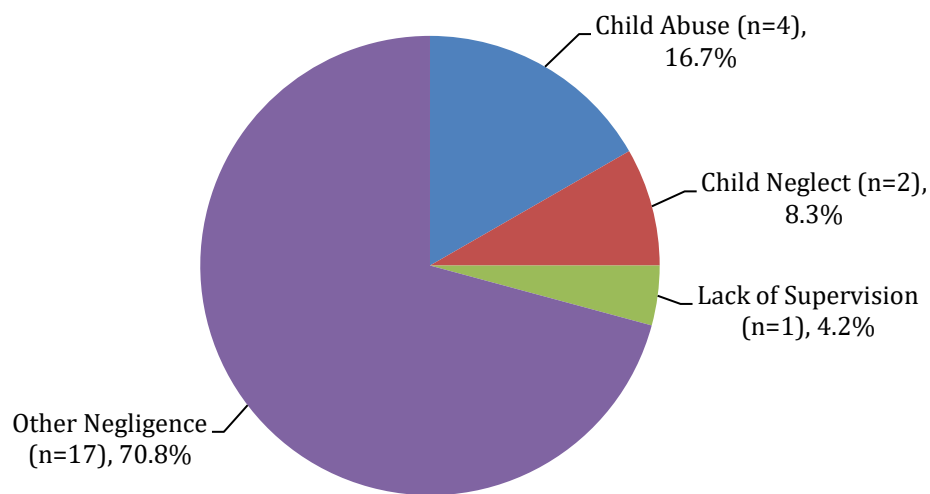
Categories are not mutually exclusive  
 Data Source: MPHD; Child Fatality Review Database System

Additionally, 64.7% of infants were not sleeping on their backs, and 47.1% were sleeping with other people at the time of death. Approximately 41% of the infants were exposed to second-hand smoke in the home. One infant was under the care of a drug or alcohol-impaired adult at the time of death.

## Child Abuse and Neglect

Among the 72 deaths reviewed, the CDRT found 24 deaths (33.3%) having some evidence of maltreatment, defined as abuse, neglect, or other form of negligence. Of those 24 deaths, 8.3% involved child neglect, 16.7% involved child abuse, 4.2% involved a lack of proper supervision, and 70.8% involved other negligence such as exposure to unsecured medication in the home, exposure to water or motor vehicle hazards, or unsafe bedding (Figure 14).

**Figure 14. Percentage of Deaths with Evidence of Child Maltreatment among Children Aged 0-17 Years, Davidson County, TN, 2020**



Data Source: MPHD, Child Fatality Review Database System

Table 6 displays the demographic information for reviewed deaths associated with child abuse, child neglect, lack of supervision, or other negligence. The majority of these deaths occurred to infants (83.3%), and NHB children (54.2%). The distribution of deaths was evenly split between males and females (50% each).

**Table 6. Number of Reviewed Deaths with Evidence of Child Maltreatment among Children Aged 0-17 Years, Davidson County, TN, 2020**

<b>Deaths with Evidence of Maltreatment (n=24)</b>		
	<b>Total</b>	<b>% of Reviewed Deaths</b>
<b>Age Group</b>		
<b>&lt;1 yr</b>	20	83.3
<b>1-4 yrs</b>	1	4.2
<b>5-9 yrs</b>	1	4.2
<b>10-14 yrs</b>	2	8.3
<b>15-17 yrs</b>	0	0.0
<b>Race/Ethnicity</b>		
<b>NHB</b>	13	54.2
<b>NHW</b>	8	33.3
<b>Asian</b>	0	0.0
<b>Hispanic</b>	3	12.5
<b>Sex</b>		
<b>Male</b>	12	50.0
<b>Female</b>	12	50.0

Data Source: MPHD, Child Fatality Review Database System

In 87.5% of the deaths, the offender was the child’s biological parent or primary caregiver. In the remaining cases, the offender was the child’s supervisor at the time of death (12.5%). In 4.2% of the deaths, the person causing or contributing to the death of the child was drug or alcohol-impaired. DCS was involved with the family prior to death in 8.3% of the incidents. Among children exposed to other negligence (17 deaths), 88.2% involved unsafe sleeping environments, and 5.9% each involved motor vehicle hazards or maternal substance abuse during pregnancy.

## Conclusion

The CDRT strives to understand both the causes of death among Davidson County's children and the landscape of community systems and services that support them. Our goal is to identify strategies and systems changes that can prevent future tragic outcomes and excess injury and suffering among children. The data contained in this report highlight several key areas that warrant further attention and indicate a need for the community to prioritize childhood morbidity and mortality as a strategic focus.

Despite declines in the childhood mortality rate in Davidson County, rates were consistently higher than rates for Tennessee and the nation. Disparities in overall child mortality and infant mortality between NHB and NHW children are persistent, and over half of the total reviewed 2020 deaths were determined to be preventable, including approximately 44% of all infant deaths, which were related to unsafe sleep environments or practices.

The year 2020 presented unique and dynamic challenges due to the COVID 19 pandemic. The community experienced a complex combination of an overburdened healthcare system, pandemic mitigation efforts, and changes in both health seeking behaviors and healthcare and social support system delivery. These issues, in turn, hampered efforts to provide services. The Team recognizes the herculean efforts of the medical and social service providers during the pandemic. Without their dedicated efforts, the outcomes in this report would likely be much worse. However, it is important to acknowledge that the mosaic of circumstances related to COVID-19 had an impact on the health and wellbeing of children and their families in Davidson County.

The review process allowed identification of key areas for future interventions to reduce the number of preventable deaths. These include, among others, efforts to increase first-trimester prenatal care utilization, interventions to increase the utilization of safe sleep practices among infants, promotion of vehicle safety, and support of programs, policies, and practices in the community aimed at reducing community violence. The COVID-19 pandemic highlighted deficiencies in the ability of systems to respond rapidly to emerging threats in such a way that minimizes the impact of service delivery to families.

# Technical Notes

## Data Sources

The data presented in this report are compiled from many different sources. Errors in the data are sometimes identified and corrected through the review process. For this reason, the data presented in this report might differ from data published from other sources.

Data from reviews are abstracted into a standard data collection form and entered into a database hosted by The National Center for Fatality Review and Prevention.

National and State level comparison data are from the National Vital Statistics System Database, CDC WONDER, and reports from the Tennessee Child Fatality Review Team.

Childhood and infant mortality rates were calculated from the Davidson County vital records files; those estimates include deaths excluded from CDRT review. Population estimates for 2016 through 2019 are from the American Community Survey (ACS); single-year estimates are used to calculate child mortality rates where appropriate. For 2020 data, the National Center for Health Statistics (NCHS) bridged-race population estimates are used since ACS single-year estimates for that year were unavailable. Infant mortality rates are calculated from the total number of infant deaths divided by the total number of live births.

The Childhood Opportunity Index (COI) 2.0 measures neighborhood resources and conditions important for child development at the census tract level. The index includes 29 indicators across 3 domains and is available for nearly all neighborhoods in the United States. COI scores were geospatially analyzed in conjunction with the frequency of child deaths and symbolized in the map (Figure 7). Technical notes for the COI, supporting documentation, and a mapping utility, can be found at [diversitydatakids.org](https://diversitydatakids.org).

## Data Limitations

The indicators in this report are based on county-level data, and as such, the numbers can be small. Rates based on counts less than 20 are considered unstable and should be interpreted with caution; percentages and rates may change drastically from year to year.

## Data Interpretation

Death is the final outcome of a continuum of circumstances, and the data collected by the CDRT represents this extreme. Therefore, caution should be used when extrapolating these results to the general population. However, the data collected by the CDRT illustrate areas where the systems, policies, and practices of a community fail to protect children adequately. As such, this information provides valuable evidence to promote and advocate for systems change.

## References

- AAP Task Force on Sudden Infant Death Syndrome. (2016). SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*, *138*(5)(e20162938).
- Ahmad FB, Cisewski JA, Minino A, Anderson RN. (2021). Provisional Mortality Data -- United States, 2020. *MMWR Morb Mortal Wkly Rep* 2021;70:519-522.
- Centers for Disease Control and Prevention. (n.d.). *10 Leading Causes of Death by Age Group, United States - 2020*. Retrieved March 7, 2022, from <https://webappa.cdc.gov/sasweb/ncipc/leadcause.html>
- Centers for Disease Control and Prevention. (2021). *Sudden Unexpected Infant Death and Sudden Infant Death Syndrome*. Retrieved March 7, 2022, from <https://www.cdc.gov/sids/data.htm>
- Centers for Disease Control and Prevention. (2021.). *Violence Prevention*. Retrieved March 7, 2022, from <https://www.cdc.gov/violenceprevention/youthviolence/fastfact.html>
- Curtin SC, Heron M, Minino AM, Warner M. (2018). Recent Increases in Injury Mortality Among Children and Adolescents aged 10-19 years in the United States: 1999-2016. *National Vital Statistics Reports*, *67*(4).
- Ehlman DC, Yard E, Stone DM, Jones CM, Mack KA. (2022). Changes in Suicide Rates -- United States, 2019 and 2020. *MMWR Morb Mortal Wkly Rep* 2022;71:306-312.
- Murphy SL, Kochanek KD, Xu J, Arias E. (2021). Mortality in the United States, 2020. *NCHS Data Brief, no 427, December 2021*.
- Noelke, C., McArdle, N., Baek, M., Huntington, N., Huber, R., Hardy, E., & Acevedo-Garcia, D. (2020). Child Opportunity Index 2.0 Technical Documentation. Retrieved from [diversitydatakids.org/research-library/research-brief/how-we-built-it](https://diversitydatakids.org/research-library/research-brief/how-we-built-it).
- Sheats KJ, Wilson RF, Lyons BH, Jack SP, Betz CJ, Fowler KA. (2022). Surveillance for Violent Deaths - National Violent Death Reporting System, 34 States, Four California Counties, the District of Columbia, and Puerto Rico, 2018. *MMWR Surveill Summ* 2022;71(No. SS-3):1-44.



Task Force on Sudden Infant Death Syndrome. (2011). SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*, 128(e1341).

Tennessee Department of Health. (2021). *2021 Child Fatality Annual Report: Understanding and Preventing Child Deaths in Tennessee*. Nashville: Tennessee Department of Health.

U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2022). *Child Maltreatment, 2020*.

## Appendix

### Appendix 1. Organizations and Agencies Serving on the Child Death Review Team

Participating Organizations	
Metro Public Health Department	Tennessee Suicide Prevention Network
Metro Nashville Police Department	Monroe Carrell Jr. Children's Hospital at Vanderbilt
Metro Nashville Public Schools	Vanderbilt University Medical Center
Metro Office of Family Safety	St. Thomas Midtown Hospital
Metro Social Services	TriStar Centennial Medical Center
Office of the District Attorney Nashville	Metro Nashville General Hospital
Juvenile Court of Metropolitan Nashville and Davidson County	Children's Clinic East
Nashville Fire Department	Nurses for Newborns
Davidson County Medical Examiner's Office	Child Protective Investigative Team
Department of Children's Services	Youth Villages
Nashville Children's Alliance	

## Appendix 2. List of COI 2.0 indicators and domains

	INDICATOR	DESCRIPTION
EDUCATION	<b>Early childhood education (ECE)</b>	
	ECE centers	Number of ECE centers within a 5-mile radius
	High-quality ECE centers	Number of National Association for the Education of Young Children (NAEYC) accredited centers within a 5-mile radius
	ECE enrollment	Percent 3- and 4-year-olds enrolled in nursery school, preschool or kindergarten
	<b>Elementary education</b>	
	Third grade reading proficiency	Percent third graders scoring proficient on standardized reading tests, converted to National Assessment of Educational Progress (NAEP) scale score points
	Third grade math proficiency	Percent third graders scoring proficient on standardized math tests, converted to NAEP scale score points
	<b>Secondary and postsecondary education</b>	
	High school graduation rate	Percent ninth graders graduating from high school on time
	Advanced Placement (AP) course enrollment	Ratio of students enrolled in at least one AP course to the number of 11th and 12th graders
	College enrollment in nearby institutions	Percent 18-24 year-olds enrolled in college within 25-mile radius
	<b>Educational and social resources</b>	
	School poverty	Percent students in elementary schools eligible for free or reduced-price lunches, reversed
	Teacher experience	Percent teachers in their first and second year, reversed
Adult educational attainment	Percent adults ages 25 and over with a college degree or higher	
HEALTH & ENVIRONMENT	<b>Healthy environments</b>	
	Access to healthy food	Percent households without a car located further than a half-mile from the nearest supermarket, reversed
	Access to green space	Percent impenetrable surface areas such as rooftops, roads or parking lots, reversed
	Walkability	EPA Walkability Index
	Housing vacancy rate	Percent housing units that are vacant, reversed
	<b>Toxic exposures</b>	
	Hazardous waste dump sites	Average number of Superfund sites within a 2-mile radius, reversed
	Industrial pollutants in air, water or soil	Index of toxic chemicals released by industrial facilities, reversed
	Airborne microparticles	Mean estimated microparticle (PM2.5) concentration, reversed
	Ozone concentration	Mean estimated 8-hour average ozone concentration, reversed
	Extreme heat exposure	Summer days with maximum temperature above 90F, reversed
<b>Health resources</b>		
Health insurance coverage	Percent individuals ages 0-64 with health insurance coverage	
SOCIAL & ECONOMIC	<b>Economic opportunities</b>	
	Employment rate	Percent adults ages 25-54 who are employed
	Commute duration	Percent workers commuting more than one hour one way, reversed
	<b>Economic and social resources</b>	
	Poverty rate <sup>a</sup>	Percent individuals living in households with incomes below 100% of the federal poverty threshold, reversed
	Public assistance rate <sup>a</sup>	Percent households receiving cash public assistance or Food Stamps/Supplemental Nutrition Assistance Program, reversed
	Homeownership rate <sup>a</sup>	Percent owner-occupied housing units
	High-skill employment <sup>a</sup>	Percent individuals ages 16 and over employed in management, business, financial, computer, engineering, science, education, legal, community service, health care practitioner, health technology, arts and media occupations
Median household income <sup>a</sup>	Median income of all households	
Single-headed households	Percent family households that are single-parent headed, reversed	

Notes: Some indicators are reversed when combining them into the index so that more of that indicator always means more opportunity. <sup>a</sup>These five indicators are combined into an economic resource index. Table adapted from the Child Opportunity Index 2.0 Technical Documentation.