ANNUAL REPORT

Public Health Child Fatality Review Program

Public Health Child Fatality Review Program 2017 Annual Report

2015 Child Deaths in Kentucky from the Public Health Office of Vital Statistics

Kentucky Department for Public Health
Division of Maternal and Child Health

November 2017

Kentucky Public Health
Prevent. Promote. Protect.

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http://chfs.ky.gov/dph/mch/cfhi/childfatality.htm

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The Kentucky Child Fatality Review Program 2017 Annual Report is prepared by the Department for Public Health, Child Fatality Review and Injury Prevention Program pursuant to Kentucky Revised Statute (KRS) 211.684. The Department for Public Health would like to acknowledge the time and effort of many individuals who contributed to the completion of this 2017 Annual Report. Data used in this report is for calendar year 2015, which is the latest year of completed vital statistics records that are available. The data are still preliminary and numbers could change.

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Thanks to all members and consultants of the State Child Fatality Review Team who volunteer their time and efforts in reviewing this data and reducing child fatalities across the state.

THE KENTUCKY DEPARTMENT FOR PUBLIC HEALTH CHILD FATALITY REVIEW PROCESS

The goal of the Kentucky Department for Public Health's Child Fatality Review (CFR) program is ultimately to decrease child deaths through prevention efforts. This is accomplished by monitoring aggregate data from vital statistics in order to identify trends and emerging issues related to fatalities that may be preventable in Kentucky. In collaboration with key partners, this data analysis is applied to the development of recommendations and community interventions that may help prevent future injuries and child deaths.

The Kentucky Department for Public Health established the State CFR Team through legislation in 1996. In accordance with KRS 211.684, this team is a voluntary, multidisciplinary body that may assume certain duties, including:

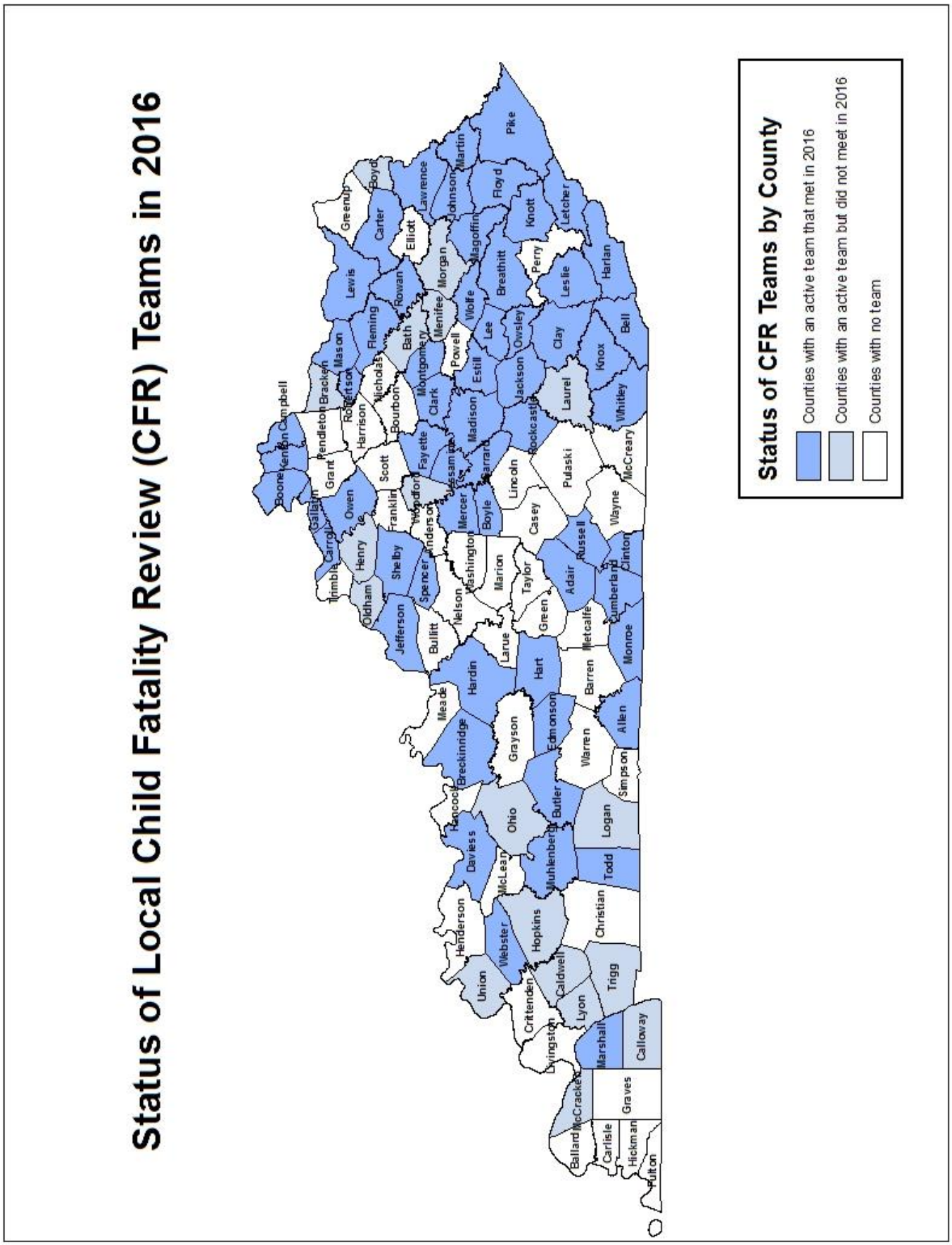
- facilitating the development of local child fatality review teams, which may include training opportunities and technical assistance;
- developing and distributing model protocols for local child fatality review teams that investigate child fatalities;
- reviewing and approving local protocols prepared and submitted by local teams;
- analyzing data regarding child fatalities to identify trends, patterns, and risk factors;
- evaluating the effectiveness of adopted prevention and intervention strategies; and
- making recommendations regarding state programs, legislation, administrative regulations, policies, budgets, and treatment and service standards, which may facilitate the development of strategies for the prevention and reduction of the number of child deaths.

The Kentucky Department for Public Health CFR Program supports the State CFR Team who work to ensure a strong child fatality review and injury prevention system throughout Kentucky. Local development of child fatality review teams, who review child deaths at the local level, continues to be one of the most important infrastructure-building responsibilities of the State CFR Team. According to KRS 211.686, local child fatality review team composition includes multidisciplinary representation from coroners, law enforcement, health departments, Department for Community Based Services, Commonwealth and county attorneys, medical professionals, and others deemed important by the local team to carry out its purpose.

A local child fatality review team is called together by the coroner to assist in gathering as much information as possible to determine the most accurate manner and cause of a child's death. Team members have the opportunity to share information, discuss and prioritize child health and risk factors, and promote local education and community-based prevention programs. The goal of the program is to have local teams in every county so that implementation of local initiatives for injury prevention occur. Currently, 78 counties have an active local child fatality review team of which 60 met in 2016 (Map 1). The State CFR Team reviews all death data collected by the program, identifies trends occurring in communities, and develops strategies that will help save the lives of children across the Commonwealth.

KRS 211.684 requires the Kentucky Department for Public Health CFR Program to prepare an annual report that includes a statistical analysis of the incidence and causes of child fatalities in the Commonwealth and recommendations for action. This report does not include information that would identify specific child fatality cases; however, it is a trend analysis of the data with a focus on opportunities for prevention. This 2017 Child Fatality Review Annual Report presents information from vital statistics data on child deaths from calendar years 2011-2015 (the most recent year with completed data from the Kentucky Office of Vital Statistics). The data are still preliminary and numbers could change. The State CFR Team reviewed the data and recommendations were developed. Although data in this report are through 2015, prevention activities outlined in the report are current.

MAP OF CHILD FATALITY REVIEW TEAMS IN KENTUCKY



Map 1

EXECUTIVE SUMMARY
OVERVIEW OF THE 2015 DATA

TRENDS IN DEATHS AMONG KENTUCKY CHILDREN

There were 606 deaths among Kentucky children in 2015. Table 1 shows the number of deaths by age group since 2011. Deaths among Kentucky's infants and children have fluctuated from year to year, likely due to random variation in the data. The changes from year to year in each age group are not statistically significant.

Table 1

Child Deaths by Age Group and Year, 2011-2015*

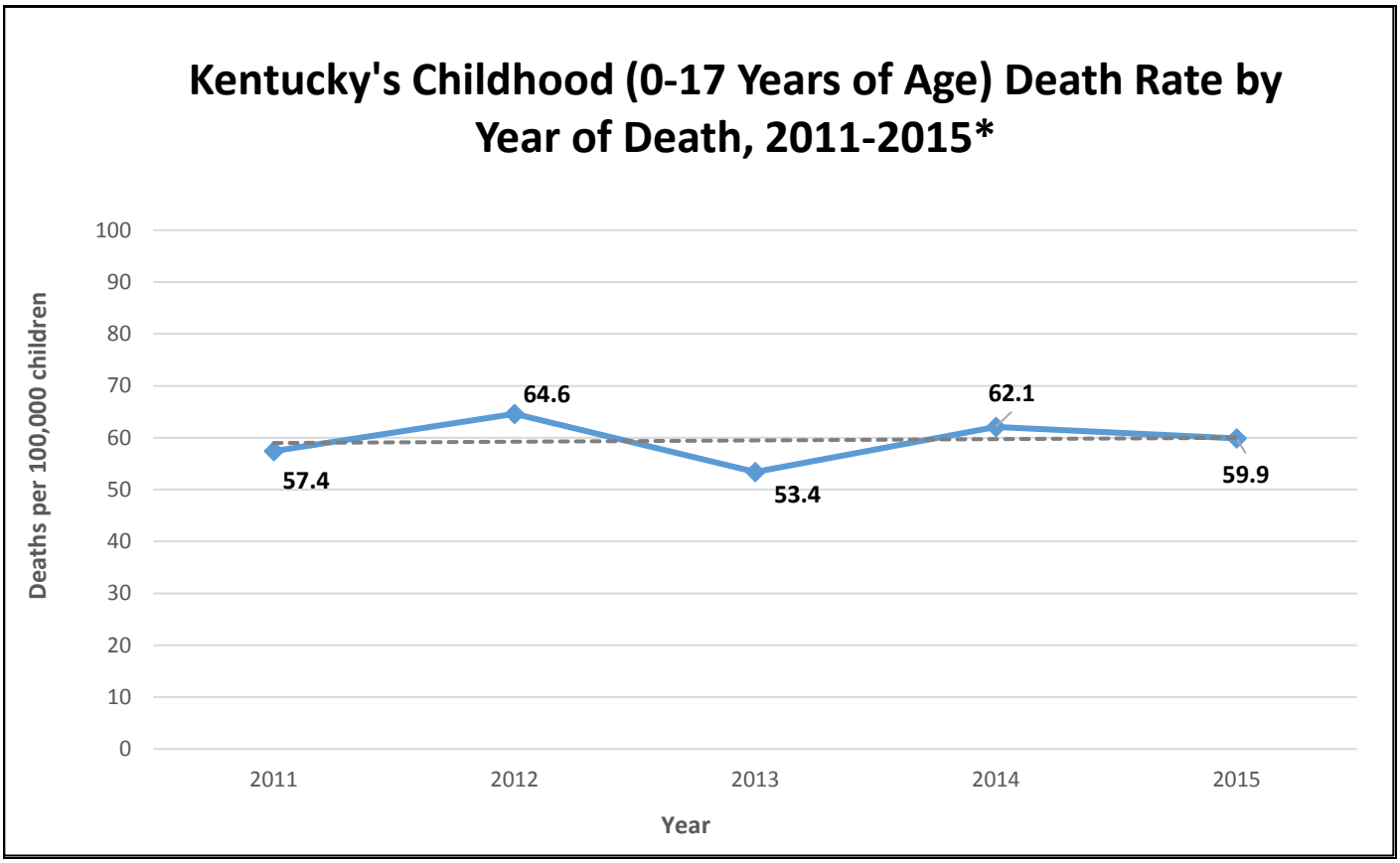
Age Group	2011	2012	2013	2014	2015
<1 Year (Infants)	370	412	364	416	379
1-4 Years	86	67	60	53	69
5-9 Years	32	45	35	48	37
10-14 Years	44	51	48	47	55
15-17 Years	55	82	35	65	66
Total	587	657	542	629	606
Childhood Death Rate[α] per 100,000	57.4	64.6	53.4	62.1	59.9

***Note: 2011-2015 data are preliminary and may change**
[α]Note: Childhood death rate is the number of deaths adjusted for the population of children in the age group within a certain timeframe.
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015; Kentucky State Data Center, Population Estimates 2011-2015 (Denominator Data); Additional infant deaths identified through KY Medicaid Claims Data Warehouse for Years 2011-2015.

EXECUTIVE SUMMARY
OVERVIEW OF THE 2015 DATA

The death rate is the number of deaths adjusted for the population of children in the age group. In comparing 2011 to 2015, Kentucky's overall childhood death rate for children birth to 17 years of age has slightly increased from 57.4 deaths per 100,000 in 2011 to 59.9 deaths per 100,000 in 2015 (Chart 1). However, this increase is not statistically significant and the overall trend has remained relatively stable over time.

Chart 1



***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015; Kentucky State Data Center, Population Estimates 2011-2015; Additional infant deaths identified through KY Medicaid Claims Data Warehouse for Years 2011-2015.

EXECUTIVE SUMMARY
OVERVIEW OF THE 2015 DATA

CHILD DEATHS BY AGE GROUP

Infant deaths
The largest number of child deaths occur among infants, as illustrated in Chart 2. Infant deaths or infant mortality (deaths occurring before the first birthday) totaled 379 for 2015. On average, infant deaths represent 64% of all child deaths in Kentucky in a given year. The majority of infant deaths are from medical conditions such as prematurity, congenital anomalies (birth defects), and Sudden Unexpected Infant Death (SUID).

Deaths among young children ages 1-4 years of age
The total number of deaths for the 1-4 years of age group has shown no significant changes in the last five years. In an average year, children ages 1-4 years of age group comprise 11% of all child deaths (Chart 2). In Kentucky, motor vehicle collisions are the leading cause of death among children ages 1-4. Birth defect-related deaths are the next leading cause of death among children in this age group, followed by drowning (data presented on page 14, Table 2). Potentially preventable deaths, such as those from fires and homicides, also occur among children ages 1-4, although the numbers of deaths are small and vary from year to year.

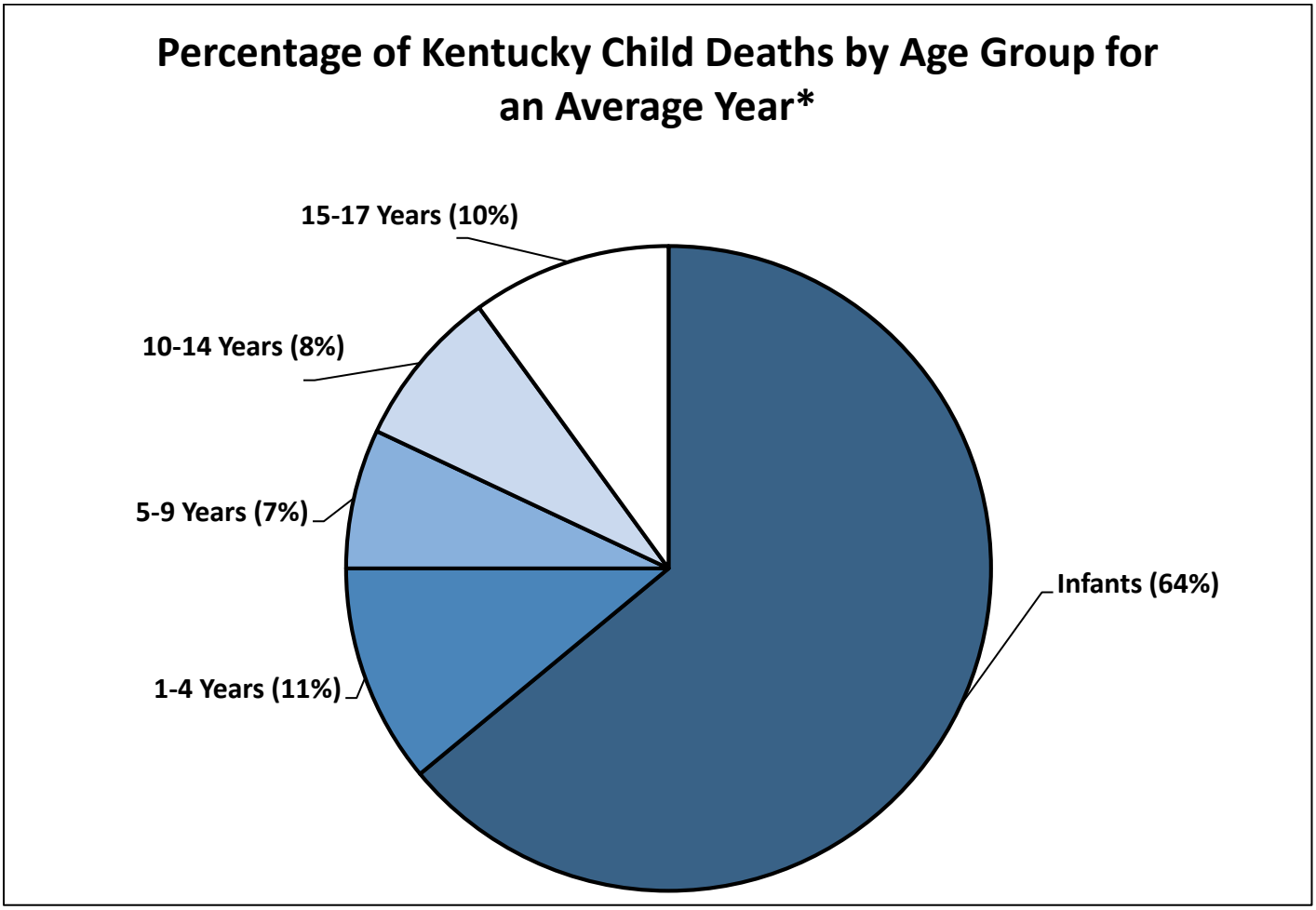
Deaths among young children ages 5-9 years of age
The total number of deaths for children ages 5-9 years has shown no significant changes in the last five years. On average, the 5-9 years of age group comprises 7% of the total number of Kentucky childhood deaths (Chart 2). Motor vehicle collisions are the leading cause of death among Kentucky's children ages 5-9. Cancer-related deaths are the next leading cause of death among children in this age group, followed by infectious diseases (data presented on page 14, Table 2). Potentially preventable deaths, such as those from fires, drowning, and homicides, also occur among children ages 5-9 years of age, although the numbers of deaths are small and vary from year to year.

Deaths among children ages 10-14 years of age
In an average year, 8% of all child deaths in Kentucky occur among children ages 10-14 years of age (Chart 2). This has not significantly changed in the last 5 years. Motor vehicle collisions remain the leading cause of death among Kentucky's children 10-14 years of age. The second leading cause of death among this age group is cancer. Homicide and suicide occur in this age group in smaller numbers and vary from year to year (data presented on page 14, Table 2).

Deaths among children ages 15-17 years of age
In an average year, 10% of all Kentucky child deaths occur among children ages 15-17 years of age (Chart 2) and has not had significant change in the past 5 years. Motor vehicle collisions remain the leading cause of death among Kentucky's children 15-17 years of age. The second leading cause of death among this age group is suicide. Homicides in this age group occur in smaller numbers and vary from year to year (data presented on page 14, Table 2).

Motor vehicle collisions, homicides, and suicides are potentially preventable deaths. Each of these causes of death for these age groups will be addressed in detail later in this report.

Chart 2



***Note: A typical year is determined by taking the average number of deaths for each age group for 2011 through 2015 combined. 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015; Additional infant deaths identified through KY Medicaid Claims Data Warehouse for Years 2011-2015.

TAKING A CLOSER LOOK

CAUSES OF DEATH BY AGE GROUP

The majority of all child deaths (birth through 17 years of age) occur among infants (children under the age of 1). This is true for Kentucky as well as the nation. Because the majority of infant deaths are due to prematurity or other medical conditions, they are classified as non-injury deaths. The three leading causes of infant deaths in a typical year in Kentucky are prematurity-related conditions, birth defects, and SUID (Table 2). The number of SUID cases has been increasing, and in a typical year, SUID cases now average the same as deaths due to birth defects. This rise in SUID cases is highly concerning because these deaths have the most potential for prevention. SUID cases are described in more detail on pages 22-25 of this report.

The majority of deaths among children older than 1 year of age are due to injury-related causes. These deaths are significant as they have the potential to be prevented. Motor vehicle collision deaths are the most common cause of death for children ages 1-17. Child deaths by age group are reviewed in detail on pages 26-49 of this report. Of concern is the increasing number of suicides, which are now occurring at younger ages. In 2015, 58% of firearms deaths were due to self-harm (suicide).

Table 2

Average Leading Causes of Death among Kentucky's Children by Age Group for a Typical Year*						
Cause of Death	**<1 Year**	**1-4 Years**	**5-9 Years**	**10-14 Years**	**15-17 Years**	**Total**
Prematurity-Related Conditions[ǂ]	98	0	0	0	0	**98**
Birth Defects	83	7	2	2	1	**95**
SUID[α]	83	0	0	0	0	**83**
Perinatal Conditions	54	2	1	0	0	**57**
Motor Vehicle Collision	1	8	8	10	19	**46**
Cancer	1	5	6	9	4	**25**
Homicide	5	5	2	5	4	**21**
Disease of Nervous System	6	4	2	3	2	**17**
Suicide	0	0	0	5	11	**16**
Circulatory Disease	8	1	1	2	4	**16**
Disease of Respiratory System	7	3	2	2	1	**15**
Drowning	1	6	2	1	2	**12**
Infectious Disease	6	0	4	0	2	**12**
Metabolic Disorder	4	2	2	2	2	**12**
Fire	0	5	2	1	1	**9**
Undetermined	0	2	1	1	1	**5**
Poisoning	0	1	0	1	2	**4**
Suffocation**	0	2	0	1	1	**4**
Other/Missing[∞]	27	12	7	8	5	**59**
Total	**384**	**65**	**42**	**53**	**62**	**606**

Note: Infant deaths identified through Medicaid claims were excluded from analysis because of missing cause of death.
***Note:** A typical year is determined by taking the average number of deaths for each age group by cause for 2011 through 2015 combined. 2011-2015 data are preliminary and may change.
[ǂ]**Note**: Prematurity related deaths are those where the infant was born before 37 weeks gestation with the cause of death assigned to one of the following ICD-10 codes; P000, P010, P011, P015, P020, P021, P027, P070-73, P102, P220-29, P250-79, P280, P281, P360-369, P520-23, P77, and K550.
[α]**Note:** SUID Category includes only deaths to infants (<1 year of age) where the cause of death was coded as SIDS (R95), Accidental Suffocation in Bed (W75), Undetermined (R99), Other specified threats to breathing (W83), and Unspecified threat to breathing (W84).
****Note:** Suffocation includes accidental suffocation and strangulation in bed among the young (1-5 years of age); trapped or confined to a low-oxygen environment; inhalation and ingestion of food and other objects causing obstruction of respiratory tract; hanging and strangulation of undetermined intent; and other accidental hanging and strangulation (choking game, entangled in a strap, hypoxyphilia, etc.).
[∞]**Note:** Other/Missing includes other systemic disorders; convulsions; failure to thrive; non-motor/non-transport accidents; falls; complications from medical procedures; unspecified events; sequelae of motor vehicle collisions, assault, and undetermined events; and those cases where the cause of death was missing.
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

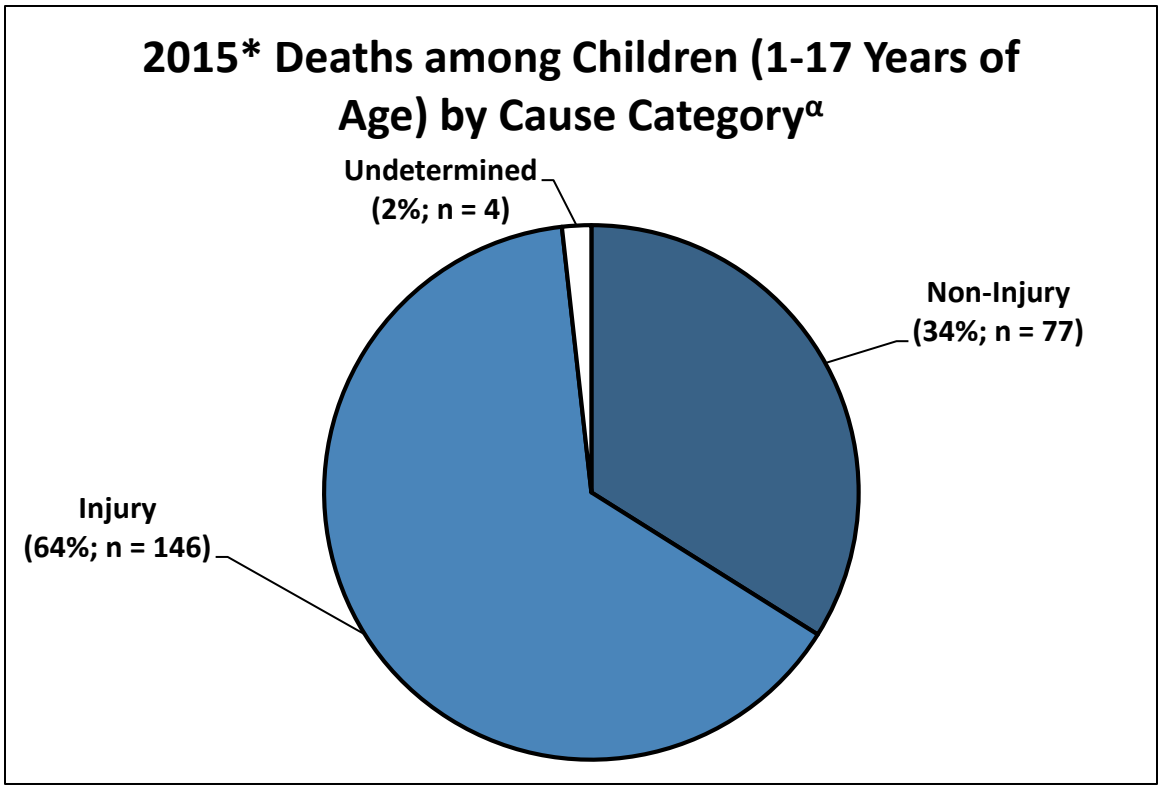
CATEGORIES OF CHILD DEATHS BY AGE GROUP

The Centers for Disease Control and Prevention (CDC) group deaths into two major categories, injury or non-injury, according to the cause of death.

- **Non-Injury Deaths** include causes of death that are the result of natural processes such as disease, prematurity, or birth defects. Non-Injury deaths accounted for 34% of deaths in Kentucky children ages 1-17 in 2015 (Chart 3). Some of these non-injury deaths include cancer and other medical conditions, such as infectious diseases and digestive and respiratory disorders. Non-injury deaths are less likely to be preventable than injury-related deaths.
- **Injury Deaths** include motor vehicle collisions, drowning, homicide, suffocation (includes choking, airway blockage, and unsafe sleep), fire, and others. A major focus of this report is on injury deaths because they are potentially preventable. In Kentucky, injury deaths accounted for 64% of all deaths among 1-17 year olds in 2015 (Chart 3). Injuries can be unintentional (accidental) or intentional (non-accidental). The category of intentional injury includes deaths from homicide (including child abuse) and suicide. The category of unintentional injury includes motor vehicle collisions, suffocation, drowning, and fire. Unintentional injury can also occur from falls, exposures to chemicals, or forces of nature. According to the CDC, unintentional injury is the leading cause of death from 1 until age 44 years of age (Richmond-Crum, Joyner, Fogerty, Ellis, & Saul, 2013).

Injury-related causes of death have historically accounted for the majority of deaths among children 1-17 years of age. Injuries are potentially preventable and therefore prevention efforts should be focused on reducing deaths among this age group. In 2006, there were 148 injury deaths (data not shown) and in 2015, there were 146 injury deaths among Kentucky's children 1-17 years of age. Despite current prevention methods, the number of injury deaths among Kentucky children have remained unchanged for nine years.

Chart 3



***Note: 2015 data are preliminary and may change**

$^{\alpha}$**Note:** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING.**

Data Source: Kentucky Vital Statistics, Death Certificate Files 2015.

RACIAL DISPARITIES IN CHILD DEATHS

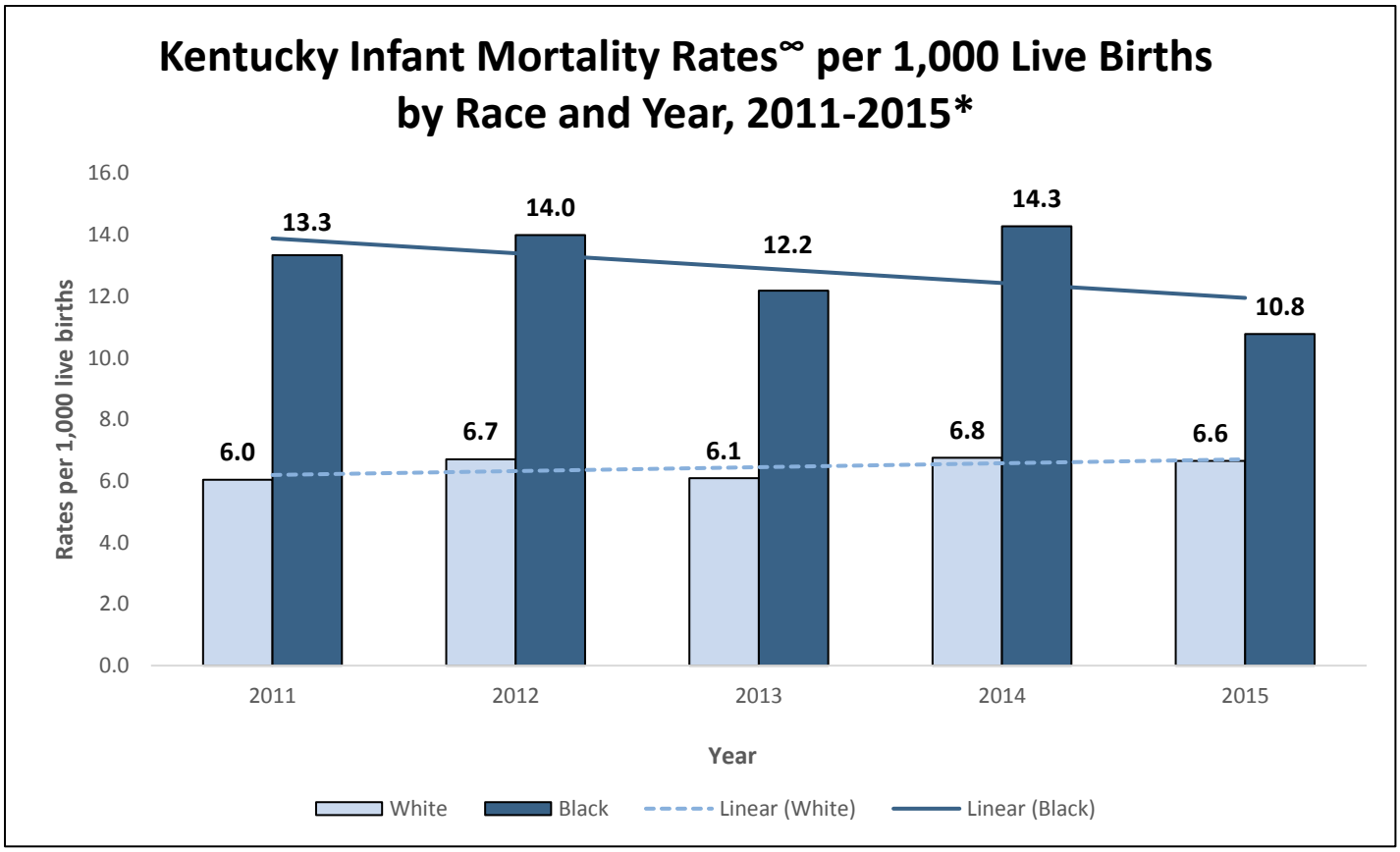
Trends show there are disparities in the death rate among black and white children. In Kentucky, as well as the nation, infant deaths are a major component of racial disparity among all childhood deaths.

Disparities in infant mortality

Nationally, black infants die at twice the rate as white infants. One of the biggest disparities nationally is found in deaths due to low birth weight, from which black infants die at nearly three times the rate as their white counterparts (MacDorman & Mathews, 2011). Across the country, the preterm birth rates among black women are 48% higher than the rate among all other women (March of Dimes, 2016).

In Kentucky, black infants continue to be almost twice as likely to die as white infants (Chart 4). Kentucky's 2015 infant mortality rate for white infants was 6.6 deaths per 1,000 live births, while the rate for black infants was 10.8 deaths per 1,000 live births (Chart 4). Although it appears that this racial disparity gap might be narrowing among infant deaths, the preliminary data for 2016 do not follow this trend (data not shown).This disproportionate burden highlights the need for prevention efforts targeted towards Kentucky's black infant population.

Chart 4



***Note: 2011-2015 data are preliminary and may change**

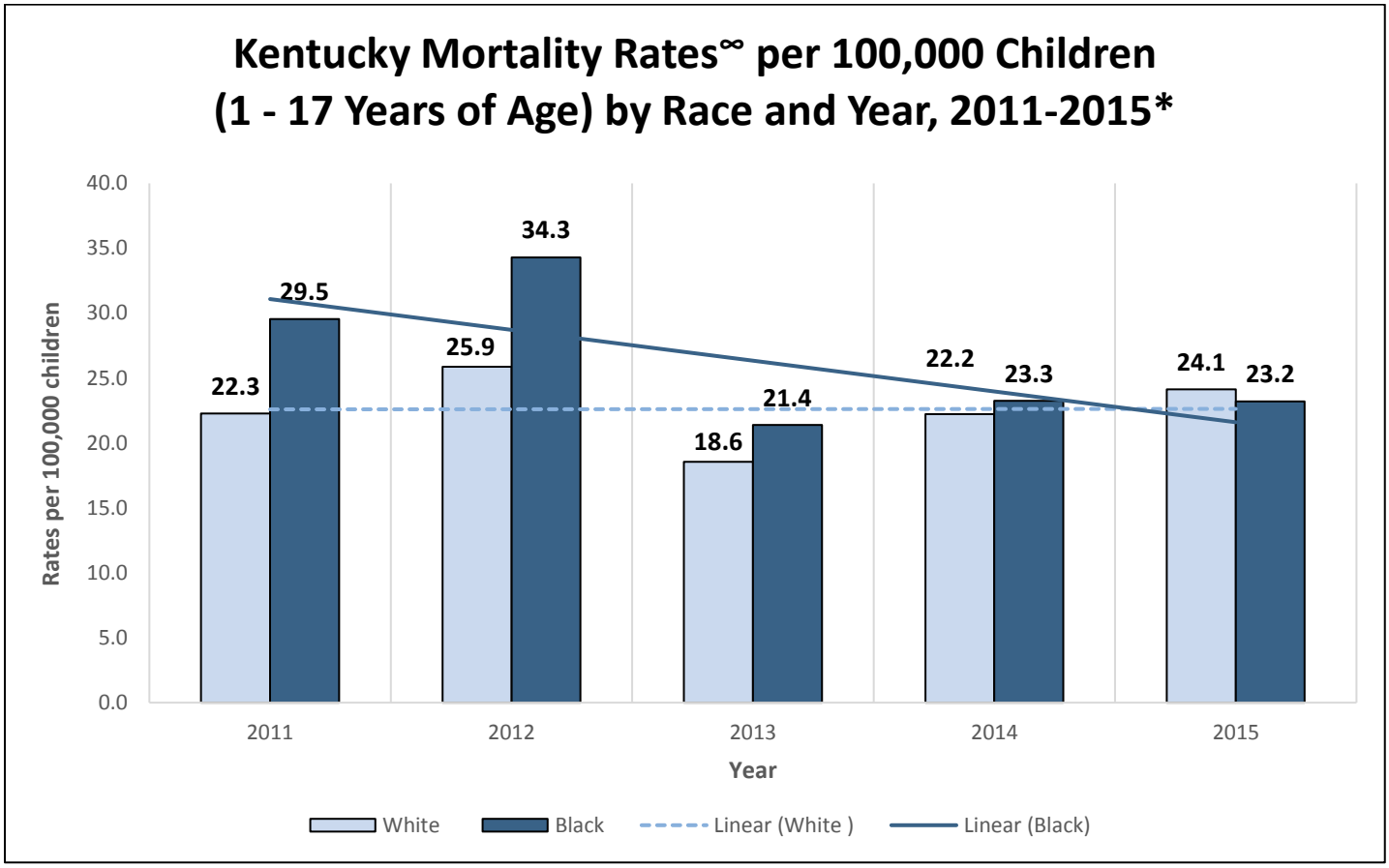
∞**Note:** Only Black and White Infant Mortality Rates are presented. All other races are excluded so rates presented do NOT equal Kentucky's overall Infant Mortality Rates.

Data Source: Kentucky Vital Statistics, Birth Certificate Files 2011-2015 and Death Certificate Files 2011-2015.

Disparities in child deaths (ages 1-17 years of age)

Although the gap in racial disparity is not as large among Kentucky children ages 1-17 years as it is among Kentucky's infants, the racial disparity is still present. In 2015, deaths among black children occurred at a slightly lower rate than deaths among white children (Chart 5). However, the preliminary data for 2016 do not follow this trend. The mortality rate for black children is much higher in 2016 at approximately 33 deaths per 100,000 children and the mortality rate for white children is slightly lower in 2016 at approximately 24 deaths per 100,000 children (data not shown).

Chart 5



***Note: 2011-2015 data are preliminary and may change**

∞**Note:** Only Black and White Infant Mortality Rates are presented. All other races are excluded so rates presented do NOT equal Kentucky's overall Child Mortality Rates.

Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015; Kentucky State Data Center, Population Estimates by Race 2011-2015.

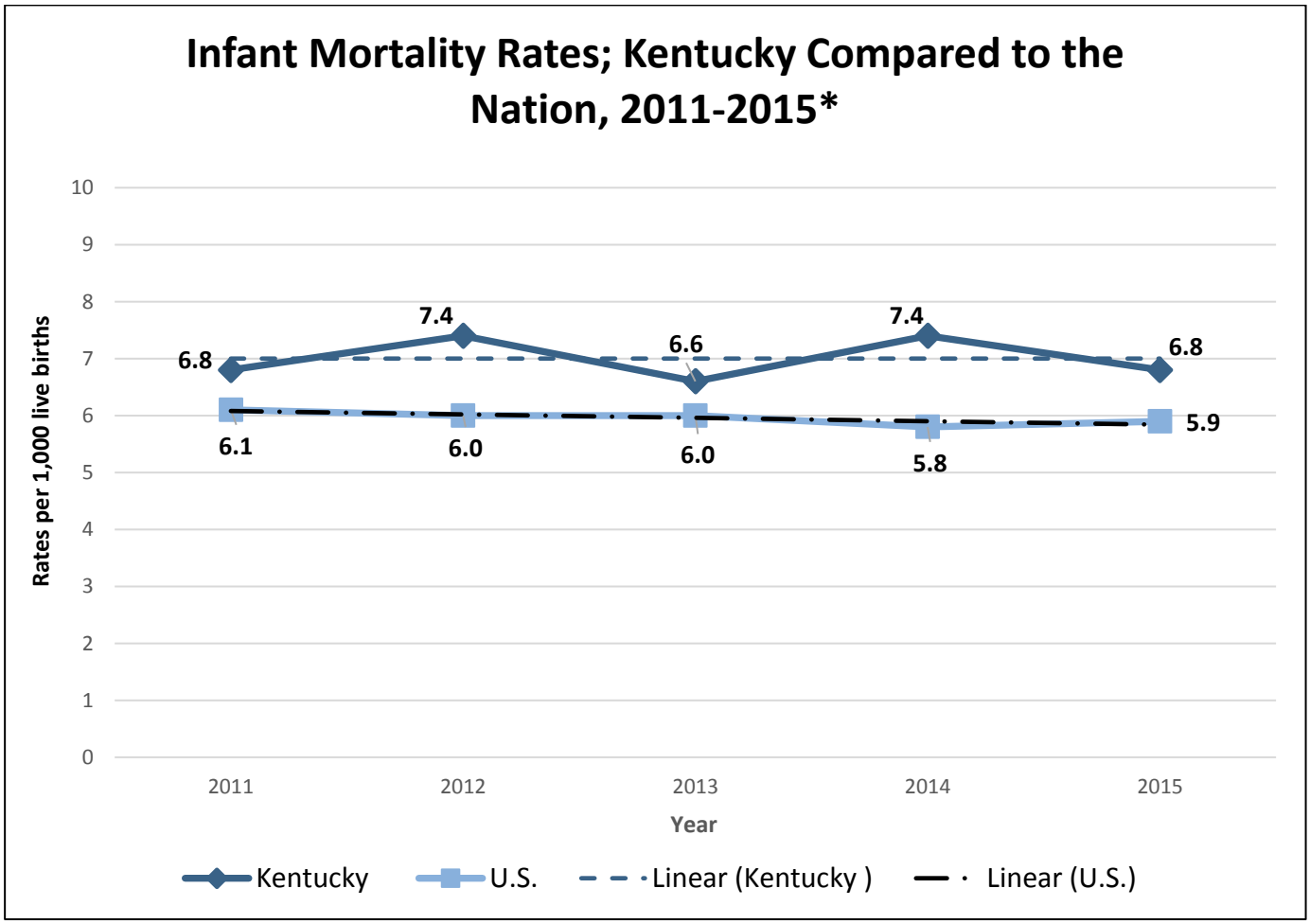
Of note, the five leading causes of death among Kentucky white children (1-17 years) in 2015 were motor vehicle collisions, suicide, cancer, homicide, and congenital anomalies, respectively. However, the five leading causes of death among Kentucky black children were motor vehicle collisions, drowning, cancer, homicide, and diseases of the respiratory system, respectively. In 2015, all deaths due to suicides occurred in white children. In 2015, deaths due to homicide occurred among Kentucky's black children at nearly the same rate of homicide deaths among Kentucky's white children. This differs from 2014, when homicide deaths among black children occurred at nearly five times the rate of homicide deaths among white children. This highlights that homicides among black children might be declining while homicides among white children might be increasing. As numbers vary from year to year, we will continue to monitor this trend.

TRENDS IN KENTUCKY'S INFANT MORTALITY RATE

The infant mortality rate (IMR) is the number of infant deaths for every 1,000 live births and is seen as the best indicator of a state's overall health, social, and economic environment. In previous years, Kentucky's infant mortality rate has been close to the national rate. However, in recent years the infant mortality rate in Kentucky has remained higher than the national infant mortality rate. Kentucky's most current infant mortality rate is 6.8 deaths per 1,000 live births (2015), while the U.S. rate is much lower at 5.9 deaths per 1,000 live births (Chart 6). This adverse trend is concerning.

There are multiple factors influencing the state's infant mortality rate. Nationally, Kentucky has one of the highest rates of smoking during pregnancy, which can cause miscarriage, premature birth, and/or low birth weight and is associated with an increased risk of birth defects (Centers for Disease Control and Prevention, 2014d). Smoking, both during pregnancy and in the home after birth, increases the risk of Sudden Infant Death Syndrome (SIDS) (Centers for Disease Control and Prevention, 2014d).

Chart 6

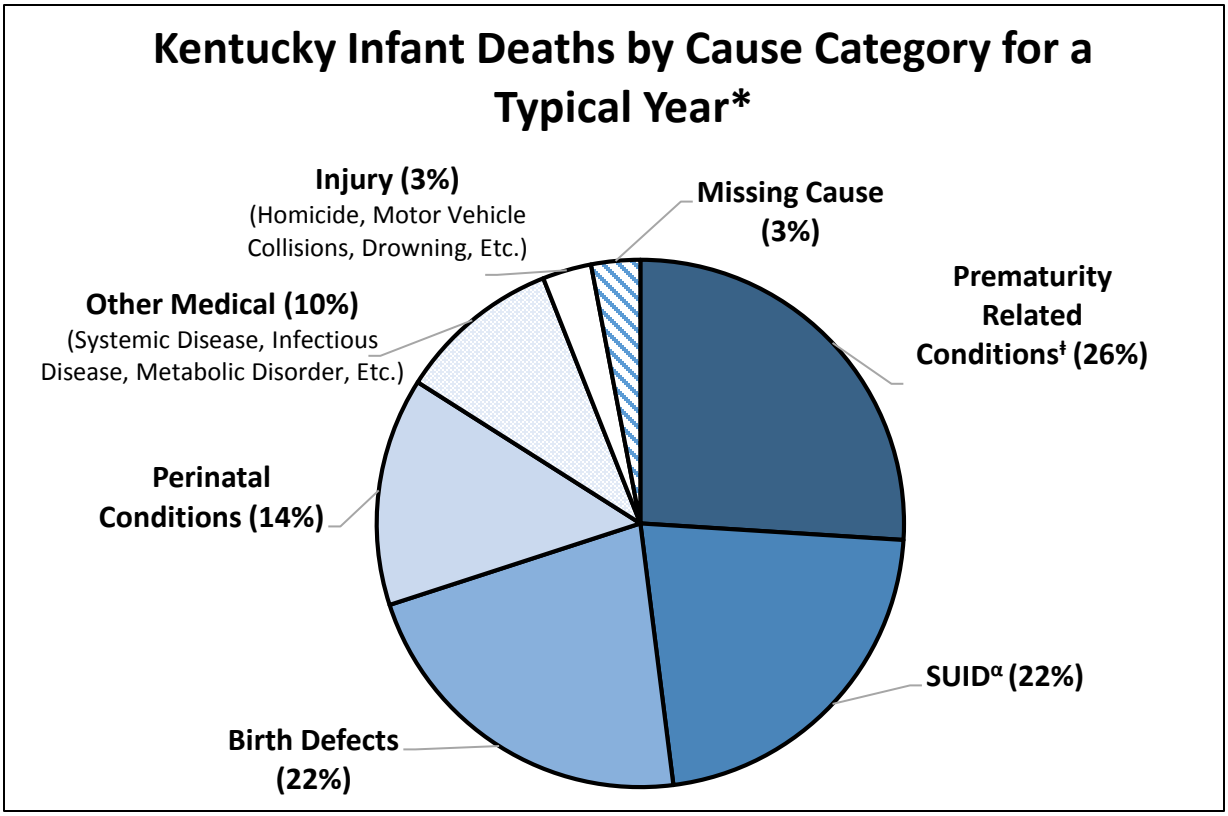


***Note**: **2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate files, Years 2011-2015; Additional infant deaths identified through KY Medicaid Claims Data Warehouse for Years 2011-2015; National Center for Health Statistics, Deaths Final Data 2011-2014; US 2015 Infant Mortality Rate: Xu JQ, Murphy SL, Kochanek KD, Arias E. Mortality in the United States, 2015. NCHS data brief, no 267. Hyattsville, MD: National Center for Health Statistics. 2016.

INFANT DEATHS/INFANT MORTALITY

The three leading causes of infant death in Kentucky are prematurity-related conditions, SUID, and birth defects (Chart 7). Since infant deaths comprise over half of all childhood deaths, the three leading causes of death among infants are also the three leading causes of death among all children. The majority of deaths among infants are due to medical or natural causes. As shown in the chart below, injury-related deaths only account for 3% of all infant deaths in Kentucky.

Chart 7



***Note: A typical year is determined by taking the average number of deaths for each age group by cause for 2011 through 2015 combined. 2011-2015 data are preliminary and may change**

α**Note:** SUID Category includes only deaths to infants (<1 year of age) where the cause of death was coded as SIDS (R95), Accidental Suffocation in Bed (W75), Undetermined (R99), Other specified threats to breathing (W83), or Unspecified threat to breathing (W84).

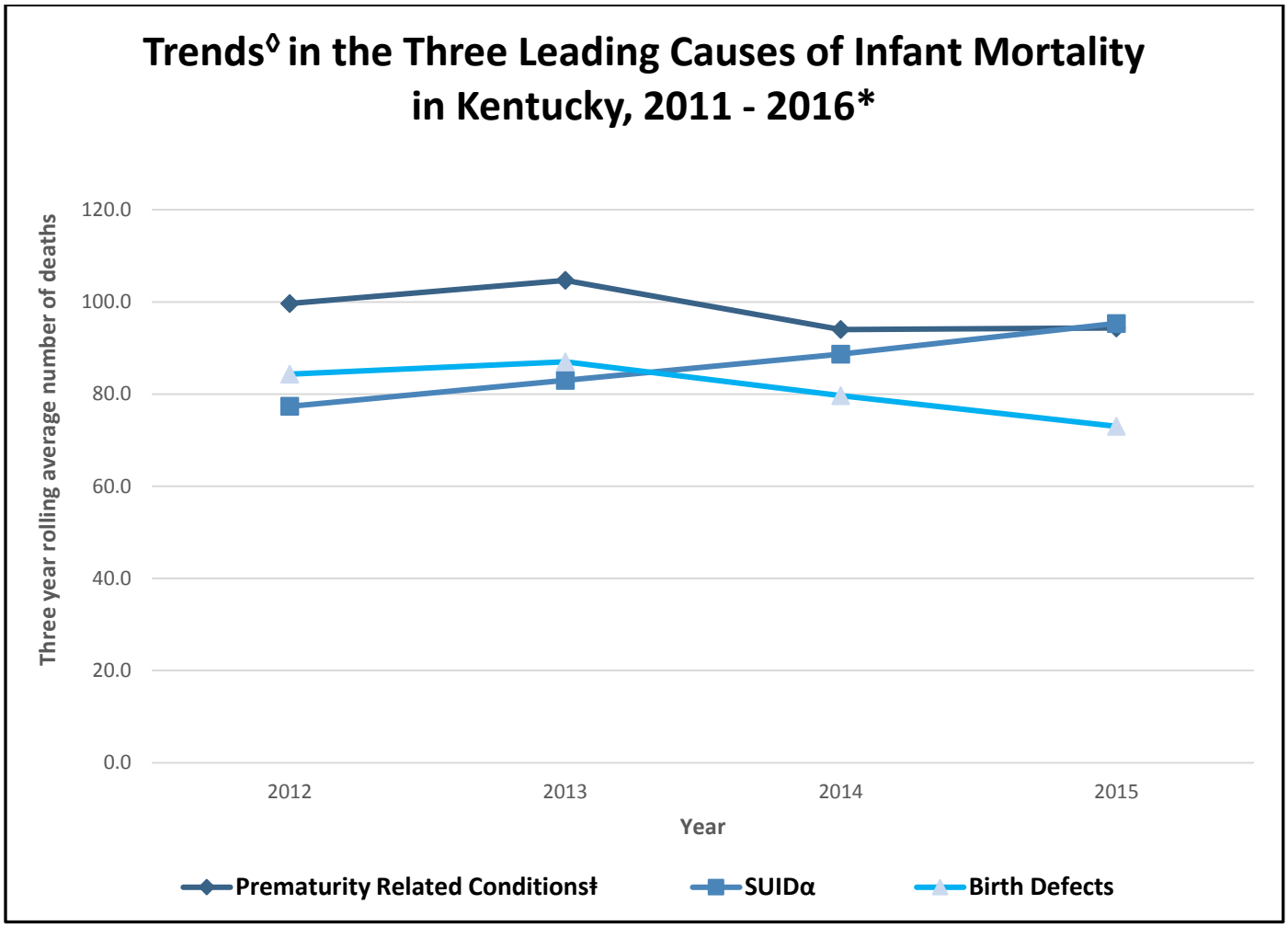
‡**Note**: Prematurity related deaths are those where the infant was born before 37 weeks gestation with the cause of death assigned to one of the following ICD-10 codes; P000, P010, P011, P015, P020, P021, P027, P070-73, P102, P220-29, P250-79, P280, P281, P360-369, P520-23, P77, and K550.

Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

INFANT DEATHS/INFANT MORTALITY

Chart 8 depicts a three-year rolling average for the three leading causes of infant mortality. This graph shows that deaths due to birth defects are decreasing, while SUID cases are increasing. The data reveals that prematurity-related deaths are the most common cause of death for Kentucky infants. However, the death of infants due to SUID surpassed deaths due to prematurity-related conditions in 2015. The data is preliminary and it is important to note that the numbers may change. Kentucky differs from the nation in this trend, where SUID remains the third leading cause of infant death.

Chart 8



***Note: 2011-2016 data are preliminary and may change**

◊**Note:** A three-year rolling average has been plotted to present the trend in Kentucky's three leading causes of infant deaths from 2011-2016. Therefore, the data point at 2012 is really a yearly average of 2011, 2012, and 2013, the data point for 2013 is the yearly average of 2012, 2013, and 2014, and 2014 is 2013, 2014, and 2015 and so on and so forth.

‡**Note**: Prematurity related deaths are those where the infant was born before 37 weeks gestation with the cause of death assigned to one of the following ICD-10 codes; P000, P010, P011, P015, P020, P021, P027, P070-73, P102, P220-29, P250-79, P280, P281, P360-369, P520-23, P77, and K550.

α**Note:** SUID Category includes only deaths to infants (<1 year of age) where the cause of death was coded as SIDS (R95), Accidental Suffocation in Bed (W75), Undetermined (R99), Other specified threats to breathing (W83), and Unspecified threat to breathing (W84).

Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2016.

INFANT DEATHS/INFANT MORTALITY

PREMATURITY-RELATED DEATHS

Pregnancy gestation, the time for the baby to develop before birth, normally lasts 38-41 weeks for humans. Births that occur before 37 weeks gestation are preterm or premature. Births at 37 and 38 weeks are early term, while those at 39 weeks or greater are full term. Prematurity-related deaths currently remain the most common cause of death for Kentucky infants. The March of Dimes reports that the United States has a preterm birth rate of 9.6%, and is rated as a "C" (March of Dimes, 2016). In Kentucky, the March of Dimes reports that 10.8% of all births are premature which was rated as a "D". The March of Dimes 2020 goal for prematurity is a rate of 8.1%.

The Kentucky Department for Public Health has worked with the Kentucky March of Dimes on its Healthy Babies are Worth the Wait (HBWW) program since 2006. In fiscal year (FY) 2017, seven counties participated in the HBWW Maternal and Child Health package by working to reduce early elective delivery and prematurity. The earlier the baby is born, the higher the risk of disability or death. Therefore, as gestational age increases the rate of infant mortality will decrease (Centers for Disease Control and Prevention, 2014b). Being born premature, even by just a few weeks, can increase the risk of complications and death. Early elective deliveries, or non-medically indicated deliveries, are births that occur before 39 weeks of pregnancy. Early elective deliveries are a rising concern and significantly increase health risk for the mother and baby. Infants born before 39 weeks are at risk for many serious health complications because vital organs, such as the brain, lungs, and liver, are not fully developed. Approximately 50% of cortical brain volume growth occurs between 34 and 40 weeks. Infants born between 37 and 40 weeks are at increased risk of health, feeding, and transition issues including infant mortality (Association of State and Territorial Health Officials, 2014).

Common factors that increase the likelihood for preterm birth include: infections, poor nutrition, lack of socio-economic resources, domestic violence, smoking during pregnancy, substance abuse, and medical disorders (Centers for Disease Control and Prevention, 2014b). The identification of risk factors for poor outcomes is critical to minimizing infant mortality and morbidity. Access to care for the mother before, during, and after pregnancy is critically important for prematurity prevention and positive outcomes for both mother and child. Early access to prenatal care, the identification of high-risk pregnancy conditions, and preventative counseling are essential in the improvement of perinatal outcomes. Prenatal care is a key strategy to prevent maternal and infant morbidity and mortality and in promoting health and well-being of infants through adulthood.

Addressing social determinants of health has emerged as a key strategy to improve birth outcomes and reduce disparities. Social determinants of health are being addressed by local health departments through various community resources and include:

- referring to smoking cessation classes for pregnant women or other caregivers in the home;
- referring the expectant mother to the Health Access Nurturing Development Services (HANDS) home visitation program to provide support for prenatal care, resources, parenting education, screening for domestic violence, depression, and more;
- referring the expectant mother for medically assisted treatment programs within the community;
- ensuring access to prenatal care;
- screening for depression and referring to community mental health centers for evaluation or treatment; and,
- connecting the expectant mother to local transportation partners to ensure transportation is not a barrier to prenatal care.

SUDDEN UNEXPECTED INFANT DEATHS IN KENTUCKY

Typically, people know sudden unexpected infant death as SIDS, or Sudden Infant Death Syndrome. The CDC defines SIDS as the sudden death of an infant less than one year of age. The death cannot be explained after a thorough investigation has been conducted, including a complete autopsy, examination of the death scene, and review of the clinical history. However, with advances in medicine and better data available on infant deaths, the CDC has now broadened the focus on infant sleep-related deaths to include not only SIDS, but also accidental suffocation in bed and "undetermined." These deaths are classified within the designation of SUID and typically occur while the infant is sleeping. According to the CDC, it may be difficult to separate SIDS from other types of sudden unexpected infant deaths. Differentiating accidental suffocation in bed from SIDS, even when a thorough investigation is conducted, can be challenging. Many SUID cases are potentially preventable by implementing safe sleep practices. Another challenge for Kentucky that contributes to increasing SUID cases is smoking during pregnancy. In a national study, 23%-34% of deaths due to SIDS were attributable to smoking in pregnancy (Dietz et al., 2010); so the high rates of smoking in Kentucky place our infants at increased risk.

Using the broader category of SUID, these infant deaths are the second leading cause of death among Kentucky's infants. SUID cases have decreased from 94 deaths in 2014 to 88 deaths in 2015 (Table 3), but preliminary data for 2016 reveal an increase to 103 cases (data not shown). The proportion of these cases with at least one sleep-related risk factor present has remained high.

Table 3

Number of SUID[α] Cases by Type and Presence of Risk Factors, 2011-2015*					
	2011	**2012**	**2013**	**2014**	**2015**
Type of SUID[α] Case					
SIDS	52	45	55	57	55
Undetermined	12	10	20	26	21
Asphyxia[ǂ]	13	16	9	11	12
Total Number of SUID[α] Cases	**77**	**71**	**84**	**94**	**88**
Sleep-Related Risk Factors Present[∞]					
Sharing sleep surface at time of death	41	33	46	47	50
Surface not designed for infant sleep	50	40	56	67	64
Hazards in sleep area	30	32	48	52	57
Sleep position (prone or side)	25	23	22	30	26
At Least One Risk Factor Present	**63**	**56**	**75**	**89**	**80****

***Note: 2011-2015 data are preliminary and may change**

[α]**Note:** SUID Category includes only deaths to infants (<1 year of age) where the cause of death was coded as SIDS (R95), Accidental Suffocation in Bed (W75), Undetermined (R99), Other specified threats to breathing (W83), or Unspecified threat to breathing (W84).

[ǂ]**Note:** Asphyxia includes deaths where the cause of death was coded as Accidental Suffocation in Bed (W75), Other specified threats to breathing (W83), and Unspecified threat to breathing (W84).

[∞]**Note:** Categories under the Sleep-Related Risk Factors are not mutually exclusive

****Note**: 4 cases in 2015 were missing risk factor data.

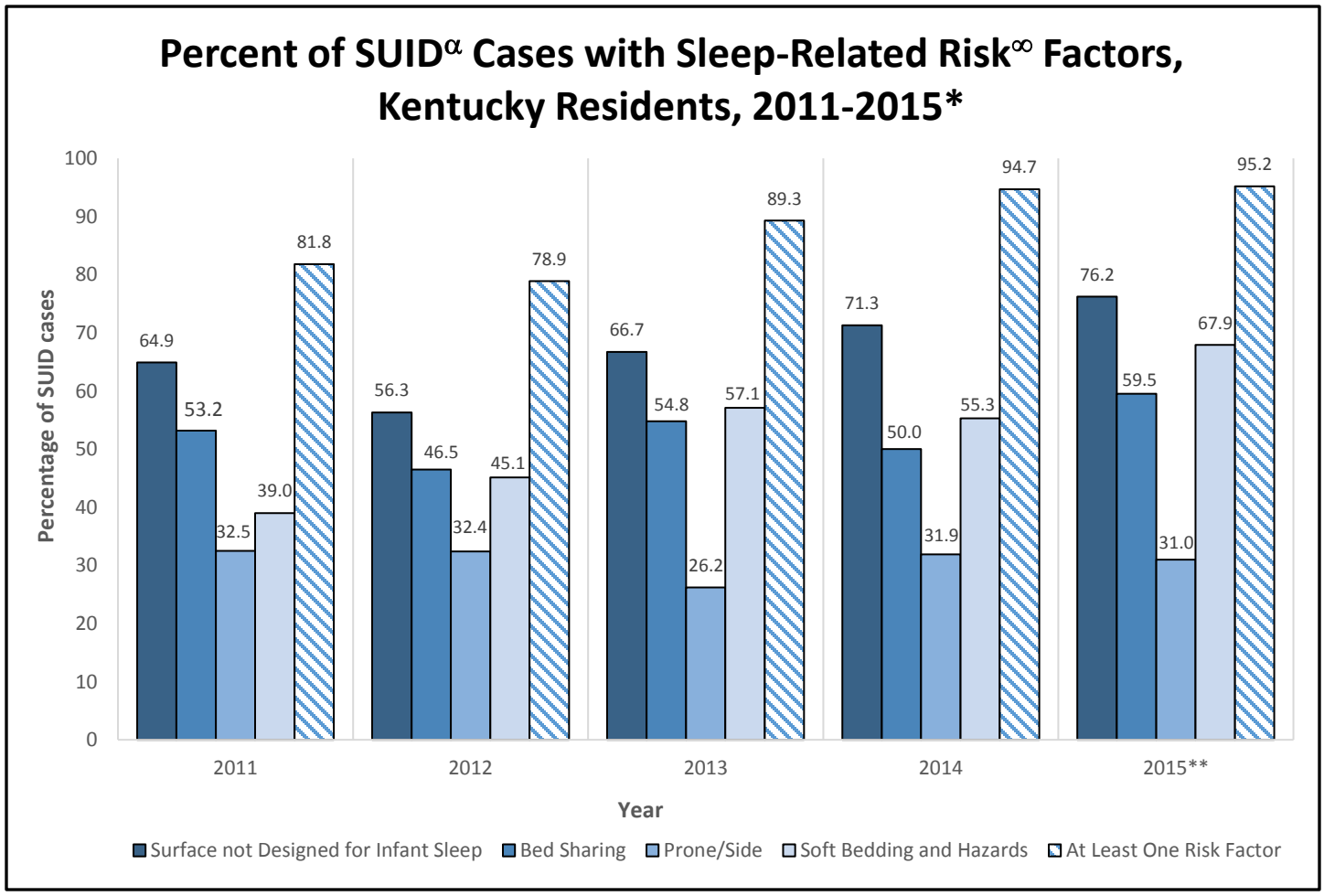
Data Source: Kentucky Vital Statistics, Death Certificate File 2011-2015; Coroner's Reports; Child Fatality Review Team Reports; and Kentucky Medical Examiner's Reports, 2011-2015.

Sleep-related risk factors are present in almost all SUID cases

Kentucky's data from 2015 demonstrates that over 95% of these deaths had documentation of at least one sleep-related risk factor (Chart 9). In fact, there are often two or more hazardous risk factors present for the majority of deaths due to SUID. Common risk factors found in sleep-related deaths are:

- infant not put to sleep on their back (placed on stomach or side position instead);
- infant sleeping on a surface not designed for infant sleep (adult bed, sofa, recliner, etc.);
- sharing a sleep surface (bed, sofa) at the time of death with an adult or another child;
- hazards (pillows, blankets, bumper pads, and stuffed animals) in the sleep area; and
- smoking in the home.

Chart 9



α**Note:** SUID Category includes only deaths to infants (<1 year of age) where the cause of death was coded as SIDS (R95), Accidental Suffocation in Bed (W75), Undetermined (R99), Other specified threats to breathing (W83), or Unspecified threat to breathing (W84).

∞**Note:** Categories under the Sleep-Related Risk Factors are not mutually exclusive

***Note: 2011-2015 data are preliminary and may change**

****Note**: 4 cases in 2015 were missing risk factor data and thus were excluded from the denominator data (N=84).

Data Source: Kentucky Vital Statistics, Death Certificate File 2011-2015; Coroner's Reports; Child Fatality Review Team Reports; and Kentucky Medical Examiner's Reports, 2011-2015.

From 2011-2015, approximately 30% of the SUID cases were placed on their stomach (prone) or side for sleep (Chart 9). This indicates that the majority of the SUID cases were placed on their back to sleep which may be a result of the “back to sleep” message. However, the percentage of SUID cases with the risk factor of soft bedding has increased from 39% in 2011 to nearly 68% in 2015. Surfaces not designed for infant sleep were present in three out of every four SUID case that occurred in 2015. While many people do not see the dangers of sharing a sleep surface with an infant, it is significant that over half of the SUID cases have this documented as a risk factor (Chart 9). Prevention efforts focusing on safe sleep and reducing known risks are occurring across the state. Educating parents and caretakers about safe sleep, as well as modeling safe sleep in hospital settings, are key strategies to reduce SUID.

SUID CASE REGISTRY GRANT

In 2015, Kentucky became one of 14 states awarded a CDC grant that funds a State SUID Case Registry in order to better understand sudden unexpected infant death. There are four main goals for this grant and they include:

- identification of all Kentucky resident unexpected infant death cases;
- multidisciplinary review of all identified cases;
- collection of consistent data elements on every case; and
- utilization of SUID data to inform data-driven policy development and procedural best practices.

One core feature of the case registry work plan in Kentucky was the formation of a State SUID Case Review Team. This team was charged with developing a comprehensive protocol to review all SUID cases and identify potential prevention strategies.

For 2016, of the 103 identified cases, 96 cases had case reviews completed. Sleep-related risk factors were present in 94% of these SUID cases. The most common risk factors were objects in the sleep environment (present in 74% of the cases) and the infant sleeping on a surface not designed for infant sleep (present in 65% of the cases).

The State SUID Case Review Team remains active to review identified cases. The team will develop a report outlining the work of the team, case demographics, and prevention recommendations. Targeted work for 2017 falls into three broad categories: increasing timely and comprehensive reporting, dissemination of data/information about the registry to internal and external sources, and increasing local CFR teams. Specific activities include:

- increasing coroner and local health department reporting of SUID cases;
- developing strategies to obtain information on Kentucky residents that die out-of-state;
- developing best practice guidelines for SUID case review;
- increasing the number of local teams;
- increasing instances where the current Sudden Unexpected Infant Death Investigative Report Form (SUIDI-RF) is completed comprehensively;
- increasing information provided and timeliness of information from local teams;
- implementing internal quality assurance report;
- increasing dissemination of SUID registry information to internal and external sources; and
- enhanced tracking of local prevention work.

What does Safe Sleep look like?
The "Back to Sleep" campaign, which began in 1992, has been successful in reducing infant deaths attributed to unsafe sleeping by more than 50% since its introduction (National Institute of Child Health and Human Development, 2015). As a result of new scientific research, the American Academy of Pediatrics (AAP) guidelines were revised and broadened in 2016 to become the "Safe to Sleep" program (Task Force on Sudden Infant Death Syndrome, 2016). These recommendations include:

- Infants should always be placed on their backs; in their own bed; on a firm sleep surface; and without pillows, comforters, or other soft surfaces;
- Keep the infant's crib, bassinet, or play yard free of soft objects, toys, and loose bedding. Bumper pads, quilts, blankets, and pillows are potential hazards for the infant;
- Smoking is a common risk factor found in deaths occurring during sleep. There should be no smoking during or after pregnancy, and there should be no smoking around the infant;
- Room sharing with the infant is appropriate but do not share the bed. Infants should be alone in a crib, bassinet, or play yard;
- Breastfeeding has many benefits to both the mother and infant and can reduce the risk of SUID. The infant should always be placed back in a safe sleep environment after feeding;
- Consider giving the infant a clean, dry pacifier when placing the infant down to sleep. There is no need to replace it during sleep if the pacifier falls out;
- Set the room temperature so the infant does not become too hot. The infant should be dressed appropriately for sleep; should be dressed in no more than one layer more than the caregiver; and
- Avoid products that claim to reduce the chance of SIDS as most have not been tested for safety. Home monitors do *not* reduce the risk of SIDS and should not be used for that purpose.

The Safe to Sleep materials, endorsed by the AAP, are available at no cost from the National Institute of Child Health and Human Development (NICHD) at http://www.nichd.nih.gov/sts.

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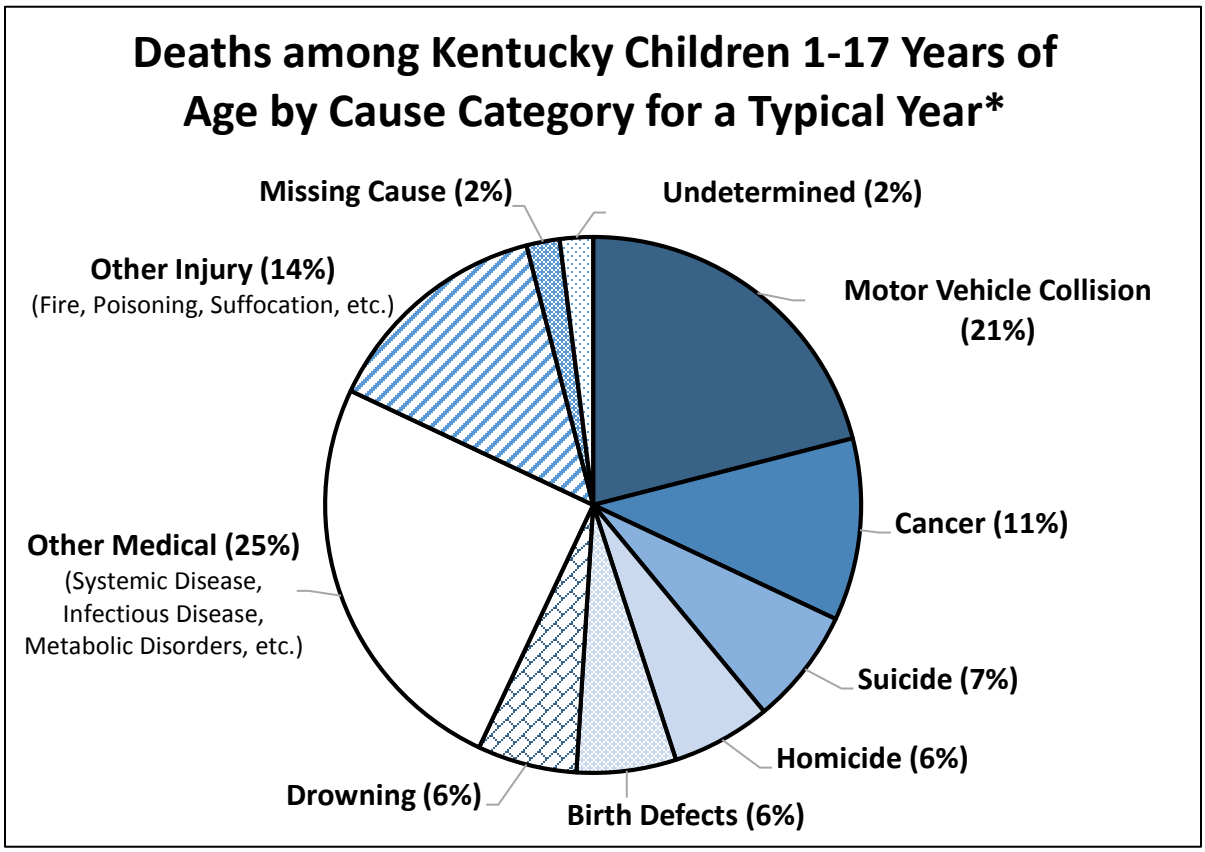
OVERVIEW OF KENTUCKY CHILD DEATHS BY CAUSE

Injuries account for most deaths in children ages 1-17 years of age. The CDC reports that injury is the number one killer of children and teens (Centers for Disease Control and Prevention, 2013). Although child injury death rates have decreased 29% nationally in the last decade (Richmond-Crum, et al., 2013), child injury death rates in Kentucky have remained relatively stable. Injury remains a major under-recognized public health problem facing our country today.

The most common cause of injury death among children ages 1-17 years of age is motor vehicle collisions, which account for approximately 21% of all childhood deaths in Kentucky (Chart 10). There are smaller proportions of deaths due to homicide, suicide, and drowning among this same age group. Injury deaths, whether unintentional or intentional, may be preventable.

Chart 10



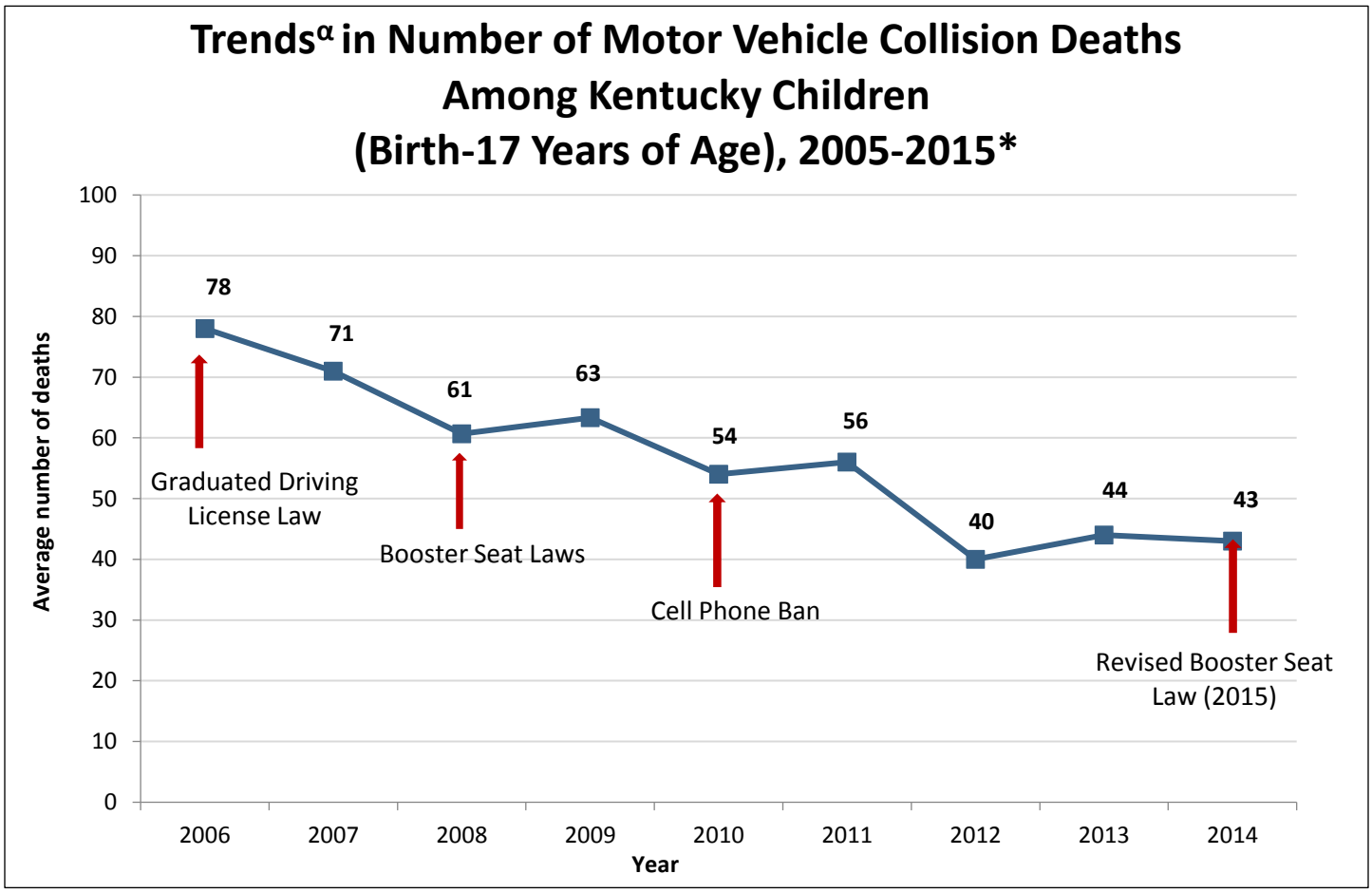
***Note: A typical year is determined by taking the average number of deaths for each age group by cause for 2011 through 2015 combined. 2011-2015 data are preliminary and may change.**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

Two "other" categories (Other Medical and Other Injury) were created to capture causes of death that vary over time and do not occur with high frequency. Some causes of death that are grouped into the "other medical" category include infectious disease, heart disease, and metabolic disorders. Fire, poisoning, suffocation, and other external causes are included in the "other injury" category and are typically not leading causes of death among Kentucky's children 1-17 years of age.

MOTOR VEHICLE COLLISION DEATHS

Motor vehicle collisions are one of the leading causes of injury-related death in children ages birth-17 years of age both nationally and in Kentucky. Motor vehicle collision (MVC) deaths include fatal injuries from being the driver or passenger of a motor vehicle involved in a crash or from being struck by or falling off a moving vehicle.

Chart 11



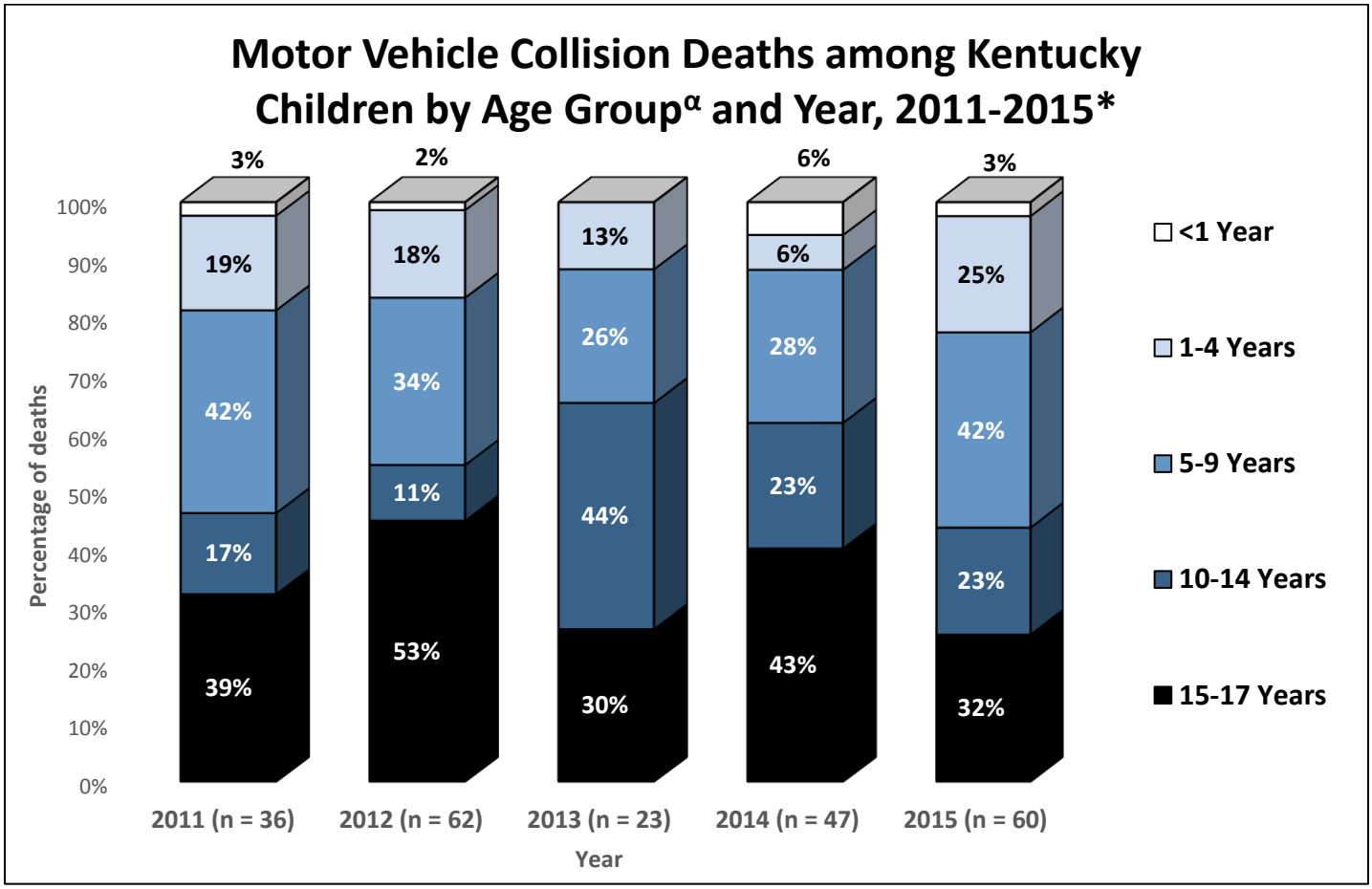
[α]**Note:** A three-year rolling average has been plotted to present the trend in Kentucky's motor vehicle collision deaths from 2005-2015. Therefore, the data point at 2006 is a yearly average of 2005, 2006, and 2007, the data point for 2007 is the yearly average of 2006, 2007, and 2008, and 2008 is 2007, 2008, and 2009 and so on and so forth.
***Note: 2009-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2005-2015.

Kentucky child deaths related to MVCs have seen a decline of 45% since 2005, as depicted on Chart 11. Similarly, the National Highway Traffic Safety Administration (NHTSA) reported that from 2006 to 2015 the number of motor vehicle fatalities among young drivers 15–20 years of age decreased by 46% (National Highway Traffic Safety Administration, 2017c). Initiatives such as the graduated driving license law, booster seat law, and the cell phone ban for teen drivers (noted on Chart 11) are recognized factors influencing this decrease.

DEATHS IN CHILDREN

There was an increase in motor vehicle collision deaths among Kentucky's children from 2013 to 2015 (Chart 12). However, preliminary data for 2016 indicates that the number of MVCs has plateaued (data not shown). The Kentucky Department for Public Health CFR Program will continue to monitor this trend.
Kentucky's children aged 5 to 9 years of age (booster seat ages) comprised 42% of all Kentucky childhood MVC deaths in 2015 (Chart 12). In June 2015, the revised booster seat law (KRS 189.125) took effect, which requires the use of booster seats for children under the age of eight (8) years of age who are between forty (40) and fifty-seven (57) inches in height. At age nine, the decision should be made on an individual basis whether the seat belt fits the child correctly without a booster seat, since almost no child has achieved adult height by age nine. Correctly used child safety seats can reduce the risk of death by as much as 71% (Safe Kids Worldwide, 2013a).

Chart 12



Due to Rounding, Numbers may not Equal 100%
α**Note:** There was no statistically significant difference in the percentage of deaths for each age group for 2015 compared to previous years; Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015

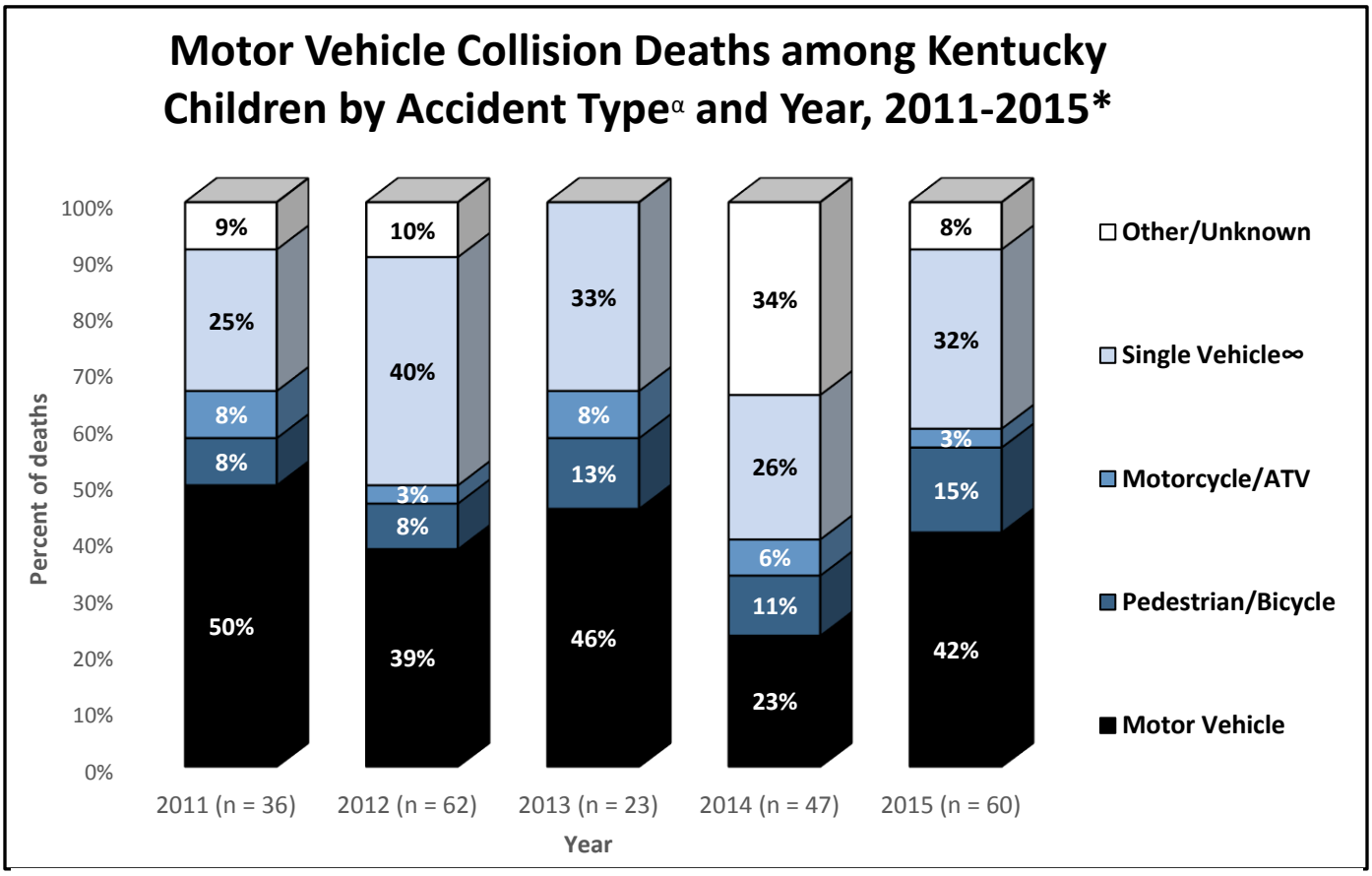
Children 10 to14 years of age accounted for 23% (Chart 12) of the total Kentucky child MVC deaths. Children within this age range should remain buckled and continue to ride in the back seat at least through 12 years of age. Thirty-two percent of Kentucky child deaths due to MVCs in 2015 occurred among teenagers 15-17 years of age (Chart 12). Current efforts in Kentucky to reduce the number of deaths of young drivers include the graduated driver's license initiative, a cell phone ban for drivers under 18 years of age, and driver safety

programs that address risk factors for youth drivers. Common patterns such as distracted driving and lack of restraint use are observed between the fatal collisions among Kentucky's teens (15-17 years of age) and others across the nation.

The majority of MVC deaths among Kentucky children occur when two vehicles collide. The second leading collision type that results in a childhood death is single vehicle collision (Chart 13). Single vehicle collisions include collisions due to an overturned vehicle in the roadway, vehicle ran off the roadway, and vehicle that hit a fixed object. Of the 42 childhood motor vehicle collision deaths involving one or more vehicles in 2015, 37% of these collisions had no restraint usage documented (data not shown).

It is important to note the increase in motor vehicle collision deaths involving pedestrians and bicycles. In 2011, only 8% of Kentucky's motor vehicle collision deaths among children involved pedestrians or bicyclists and in 2015, these deaths increased to 15% of all motor vehicle collision deaths among Kentucky children (Chart 13).

Chart 13



***Note: 2011-2015 data are preliminary and may change**
α**Note:** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
∞**Note:** Single vehicle includes accidents due to overturned vehicle in roadway, vehicle ran off roadway, and vehicle hit a fixed object
Data Source: Kentucky State Police Criminal Identification/Records Branch, Kentucky Fatality Analysis Reporting System 2011-2015.

Motor vehicle crashes involving teen drivers

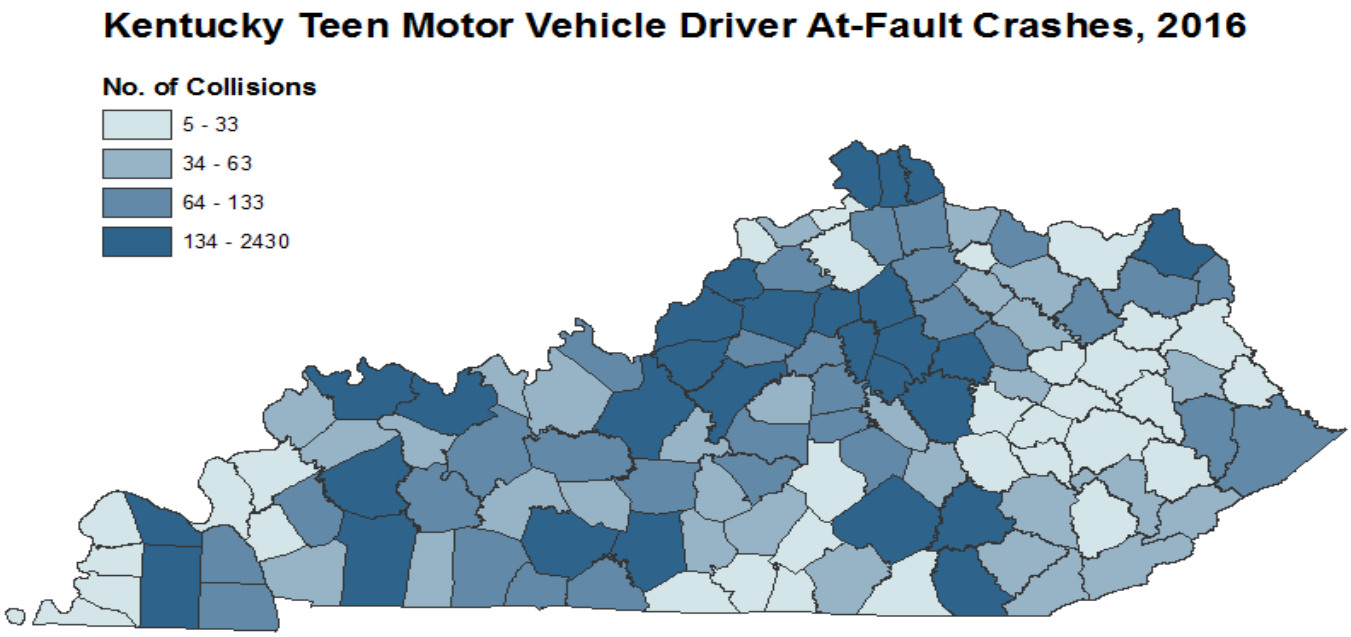
A teen driver was involved in nearly 50% of Kentucky's single vehicle fatal collisions in 2015 (data not shown). The majority of crashes were due to running off the roadway or overcorrecting. This statistic highlights motor vehicle related deaths involving inexperienced drivers. Nationwide, teenage drivers who died due to MVCs increased 9% from 2014 to 2015 (National Highway Traffic Safety Administration, 2017c).

A NHTSA study reported that teenage drivers were 2.5 times more likely to engage in risky behaviors while driving with one passenger and 3 times more likely to participate in these activities with multiple passengers (Goodwin, Foss, & O'Brien, 2012) .

Data from NHTSA (National Highway Traffic Safety Administration, 2017a, 2017b, 2017c) noted:

- 46% of young drivers (15-20 years of age) who died were not restrained;
- 32% of young male drivers were speeding at the time of the fatal crash;
- 26% of young driver fatalities had positive blood alcohol concentrations;
- 22% of young drivers who died were driving with an invalid driver's license at the time of the crash; and
- 9% of teen drivers were distracted (e.g., by passengers, cell phone use, etc.) at the time of the crash.

Map 2



Count is based on the number of at-fault teen drivers involved in a motor vehicle collision. A teen is defined as a Kentucky resident 16-19 years old. Produced by the Kentucky Injury Prevention and Research Center, a bona fide agent for the Kentucky Department for Public Health. June 2017. Data Source: Collision Report and Analyis for Safer Highways (CRASH) file, Kentucky State Police [2016]. Data are provisional and subject to change.

Data from the Kentucky Injury Prevention and Research Center (KIPRC) (Map 2) depicts areas of Kentucky in which teen drivers are at-fault during a MVC. As shown on the map, teen driver crashes are high in both urban and rural areas, and appear to coincide with major highways in the state (Bush & Bunn, 2017).

Child passenger safety

Since 2011, the NHTSA and the American Academy of Pediatrics (AAP) have made the following recommendations for child passenger safety:

- Infants and toddlers should ride in a rear-facing car seat until 2 years of age or until he/she reaches the top height or weight limit allowed by the car seat manufacturer.
- Once a child outgrows the rear-facing car seat, he/she is ready to travel in a forward facing car seat with a harness.
- When a child is too tall for a car seat or too heavy for the harness weight specified by the manufacturer, he/she should graduate to a belt-positioning booster seat.
- For safest travel, a child should remain in a booster seat until he/she is big enough to fit in an adult seat belt properly, with the lap belt lying snugly across the thighs and shoulder belt snug across the collarbone (usually between the ages of 8-12 years of age).
- For greatest safety, parents are advised to avoid advancing to the next phase prematurely and to wait until the size of the child dictates the need to transition into the next phase.
- Children should ride in the back seat at least through 12 years of age (American Academy of Pediatrics, 2015).

DEATHS IN CHILDREN

CHILD MALTREATMENT DEATHS

Child maltreatment is highest among the youngest and most vulnerable. Young children and infants, who die as result of child maltreatment, including those who die from neglect and physical abuse, are homicide deaths. However, neither child maltreatment nor homicide is typically entered as the cause of death on the death certificate. This is because investigations necessary to make those determinations have not been completed at the time the death certificate is filed. As a result, these deaths are often submitted as “undetermined” or “assault by unspecified means” for the official cause on the death certificate. Child deaths that have fractures or a constellation of symptoms may only have the symptoms listed on the certificate and may not be listed in the vital statistics files as a child maltreatment death even though the trauma was caused from abuse. Making a determination that child maltreatment or homicide was involved in a fatality requires a collaborative effort from the coroner’s office, law enforcement, and the Department for Community Based Services (DCBS). The data in this section represents data as collected by DCBS on deaths from child abuse. Another group making determinations on these deaths is the External Panel for the Review of Child Fatalities and Near Fatalities, housed in the Justice Cabinet, and their recommendations can be found in their annual report at https://justice.ky.gov/Pages/Reports.aspx. A designated staff person for Maternal and Child Health is a member of both the External Panel for the Review of Child Fatalities and Near Fatalities and the State CFR team. As a member of both groups, this person facilitates collaboration between the two groups so they are complementary.

In Kentucky, child maltreatment deaths remain a major concern due to the violent nature of these deaths and the potential for prevention. In 2015, there were a total of 38 fatalities and near fatalities substantiated by DCBS (child fatality and near fatality records as of 5/22/2017); which is a 22% decrease from the DCBS fatalities and near fatalities reported for 2014.

Neglect was a factor in 63% of the 38 cases and physical abuse was a factor in the remaining 37%. Fifteen, or 39%, of the 38 cases of neglect or abuse resulted in a fatality. Of the 38 fatalities, 50% occurred among infants, 39% among 1 to 4 year olds, 3% among 5 to 9 year olds, 8% among 10 to 14 year olds, and 0% among 15 to 17 year olds. Fifty-five percent of these cases occurred among males.

Abusive head trauma accounted for 16% of the 38 cases, which is approximately the same number of abusive head trauma cases reported in 2014. Physical abuse accounted for an additional 18% of these cases. Overdose due to lack of supervision and neglect accounted for 21% of the 38 fatalities and near fatalities. Over 65% of the 2015 DCBS cases had documentation of substance abuse as a risk factor.

The National Child Abuse and Neglect Data System (NCANDS) collects data on child fatalities that result from maltreatment nationally. In federal fiscal year (FFY) 2015, an estimated 1,670 children died of abuse and neglect in the United States (Child Welfare Information Gateway, 2017). NCANDS data reports that children under three years of age accounted for nearly 75% of all maltreatment deaths. Maltreatment deaths are highest within this age group because the youngest children are the most vulnerable due to dependency and small size.

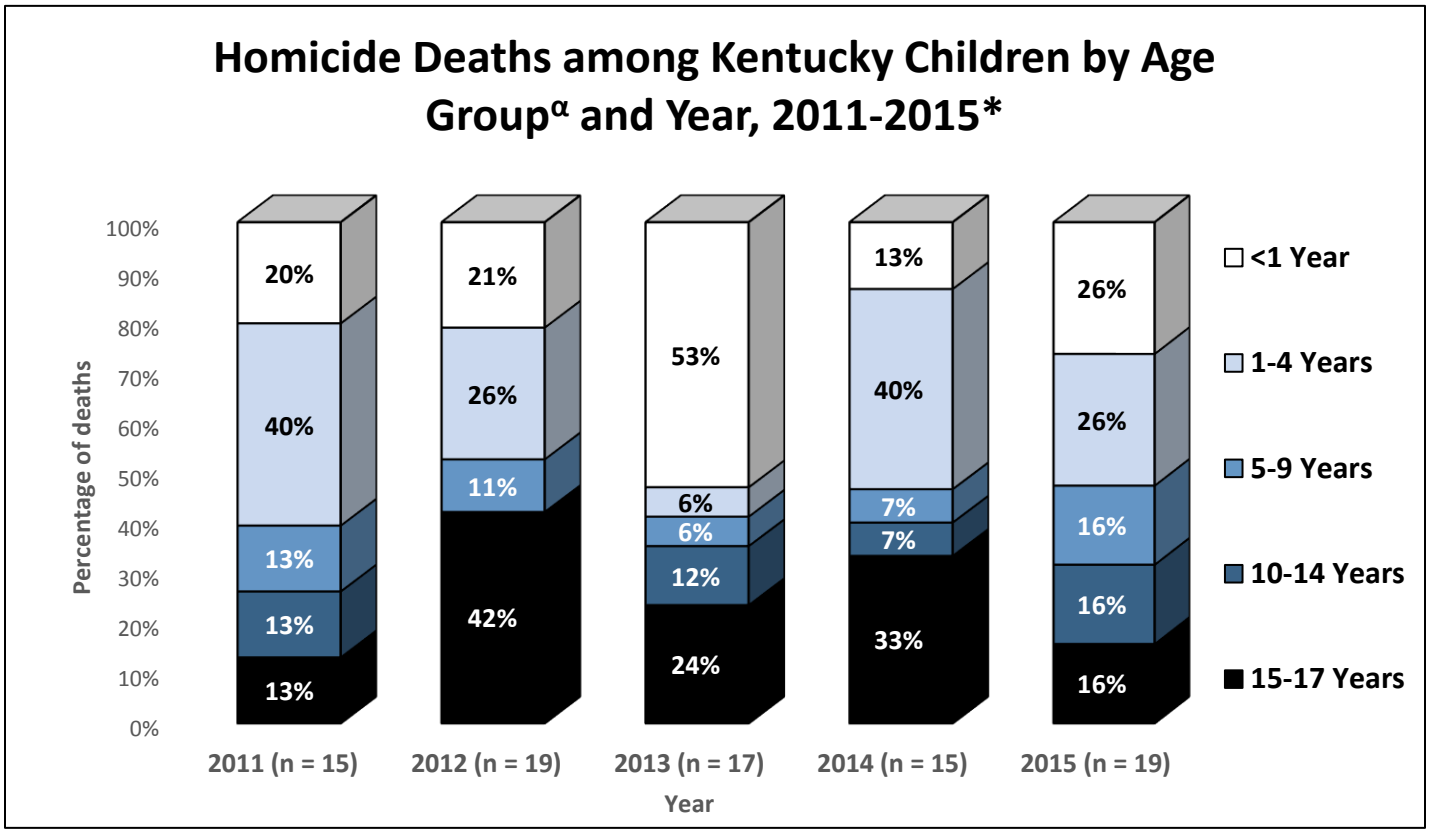
HOMICIDE DEATHS

The chart below reflects homicide data as collected by the Office of Vital Statistics. As with child maltreatment, many of these deaths are undetermined for the cause of death on the death certificates. Homicide is often not identified as the cause of death on the death certificate due to on-going investigations by law enforcement and DCBS.

The total number of homicide deaths has remained relatively consistent over time. However, the age group in which these homicides have occurred has fluctuated. In 2013, the largest proportion of homicides occurred among infants, while in 2014 the largest proportion occurred among children 1-4 years of age. In 2015, homicide deaths were more evenly divided between the age groups (Chart 14).

The percentages depicted on Chart 14 should be interpreted with caution as they are based on small numbers. The numbers may be an underrepresentation because they are based solely on the primary cause of death codes (X85-Y09) on the death certificate. Some homicides may be classified under other causes (e.g., undetermined, poisoning, suffocation, etc.) because that is what is indicated as the primary cause of death on the death certificate.

Chart 14

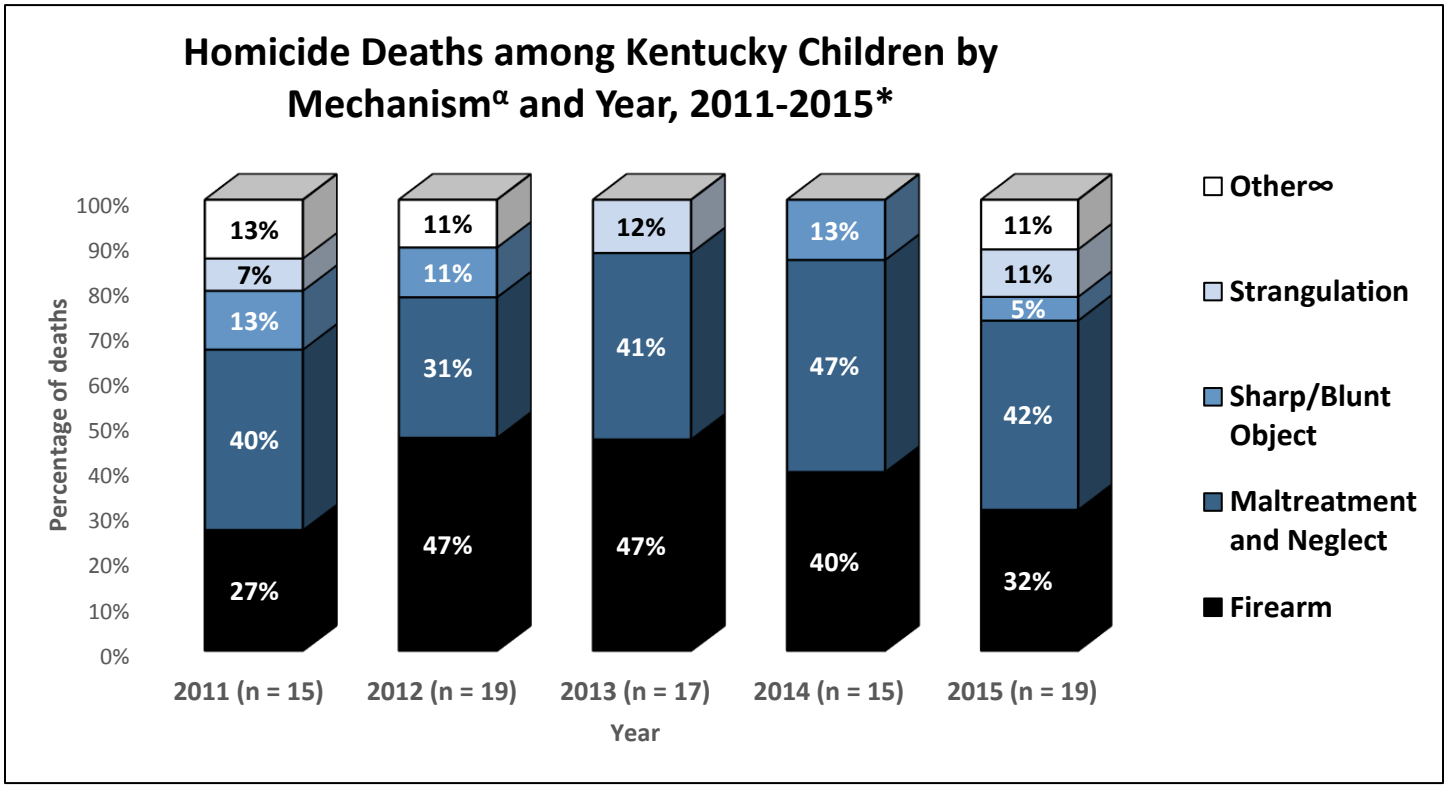


α**Note:** There was no statistically significant difference in the percentage of deaths for each age group for 2015 compared to previous years**.** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

Mechanism used in child homicide

Chart 15 illustrates the mechanism used in homicides of Kentucky children by year for 2011 to 2015. Thirty-two percent of the 2015 homicide deaths among Kentucky children were the result of a firearm. Although it appears that homicide due to firearm might be decreasing among Kentucky's children, this trend is not apparent in the preliminary 2016 data in which 50% of the child homicides were committed by a firearm (data not shown). Nationally, 82% of juvenile (12-17 years of age) homicides occur by the use of a firearm (Office of Juvenile Justice and Delinquency Prevention, 2017). Firearm deaths are potentially preventable by educating families and children about gun safety.

Chart 15



[α]**Note:** There was no statistically significant difference in the percentage of deaths for each mechanism category for 2015 compared to previous years**.** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**

***Note: 2011-2015 data are preliminary and may change**

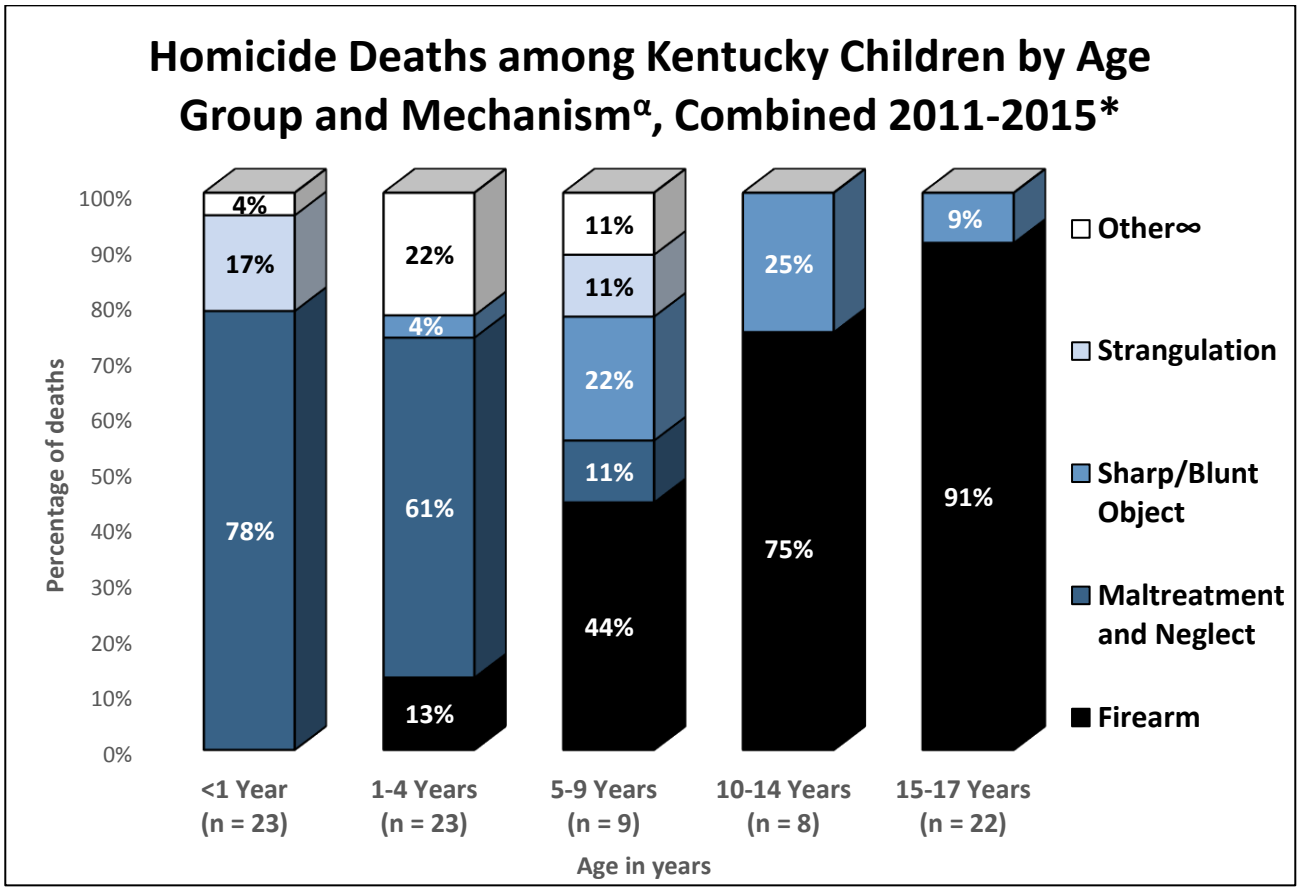
[∞]**Note:** Other category includes homicides in which the mechanism was unspecified, poisonings, fire, and vehicular homicide

Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

The Office of Juvenile Justice and Delinquency Prevention (OJJDP) reported that homicide is most common among the youngest and oldest children. In 2015 (latest data available), 43% of U.S. juvenile homicide victims were five years of age and under, and 41% were 15-17 years of age (Office of Juvenile Justice and Delinquency Prevention, 2017). A substantially larger proportion of victims five years of age and under were killed by family members than victims 15–17years of age (68% vs. 7%). Nationally, the homicide rate for black children was nearly five times the rate of white children. This disparity was consistent across all victim age groups. Although black youth account for about 16% of the juvenile population, they are victims in 47% of juvenile homicides.

Chart 16 presents Kentucky childhood homicides by mechanism and age group for the combined time period of 2011 through 2015. In combining the five years of data, it is evident that homicides due to maltreatment and neglect occur most often among Kentucky's younger children (less than 5 years of age) and homicides due to firearms occur most often among Kentucky's older children (5-17 years of age). The proportion of homicide deaths committed by use of a firearm increases along with increases in age.

Chart 16



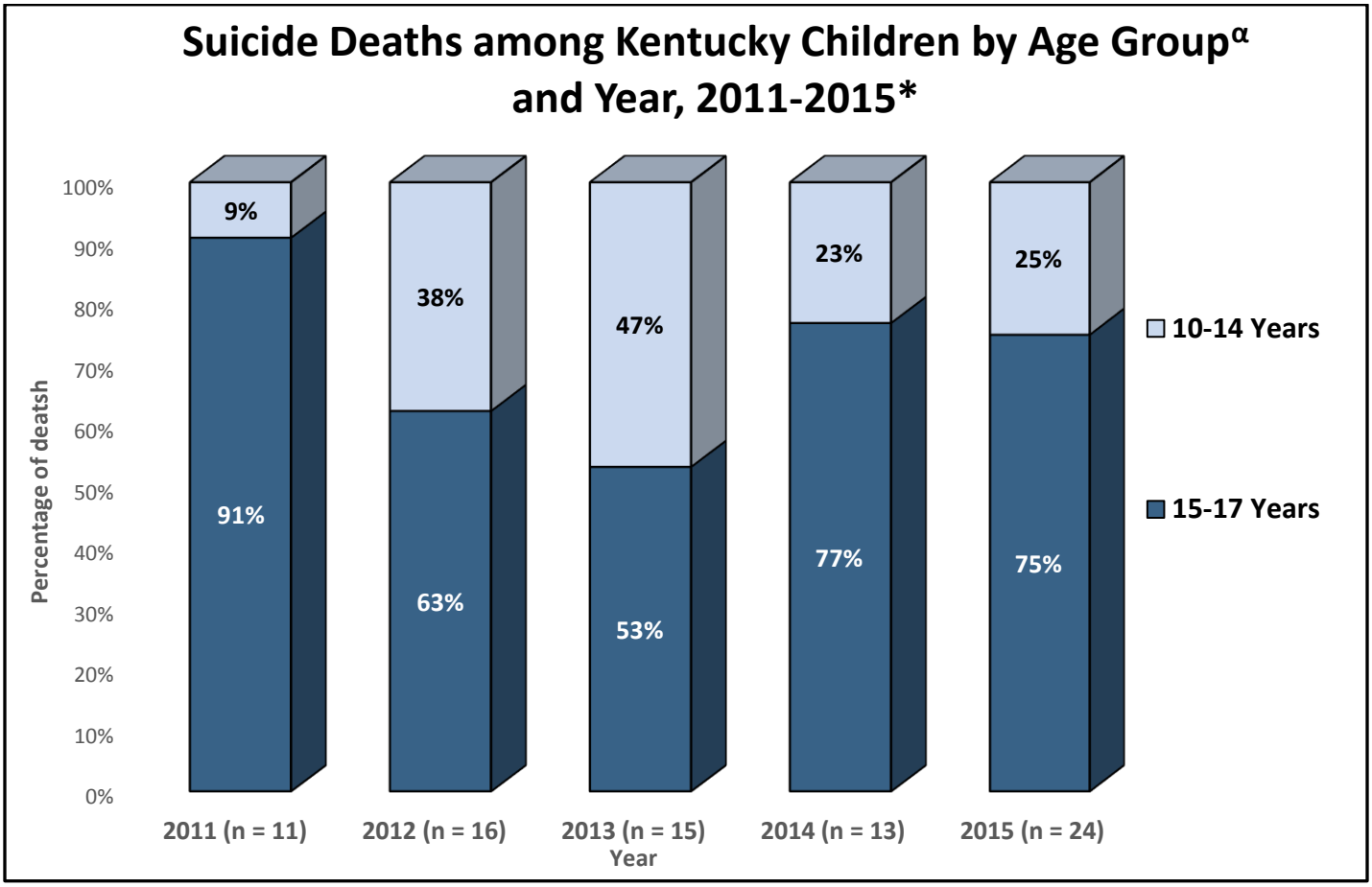
[α]**Note** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
[∞]**Note:** Other category includes homicides in which the mechanism was unspecified, poisonings, fire, and vehicular homicides
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

The CDC recommends continual use of evidence-based, primary prevention strategies to eliminate youth violence. Utilizing the public health sector to reach the highest-risk youths with effective evidence-based prevention strategies is particularly critical to reduce the number of juvenile homicides, both nationally and statewide (David-Ferdon C & Simon T.R., 2014).

SUICIDE DEATHS

Nationally, suicide is the third leading cause of death for youth 10-24 years of age. In Kentucky, suicide is the second leading cause of injury-related death among those 10-24 years of age and numbers are increasing. Of the suicide deaths in Kentucky, thirty-two youth,10-14 years of age, and 388 persons, (15-24 years of age), died in 2015, according to the Web-based Injury Statistics Query and Reporting System (WISQARS). The number of Kentucky youth who ended their own lives nearly doubled from 13 in 2014 to 24 in 2015 (Chart 17). Preliminary data for 2016 indicate that the youth suicide rate in Kentucky remains high. This increase warrants immediate prevention activities for families and schools.

Chart 17

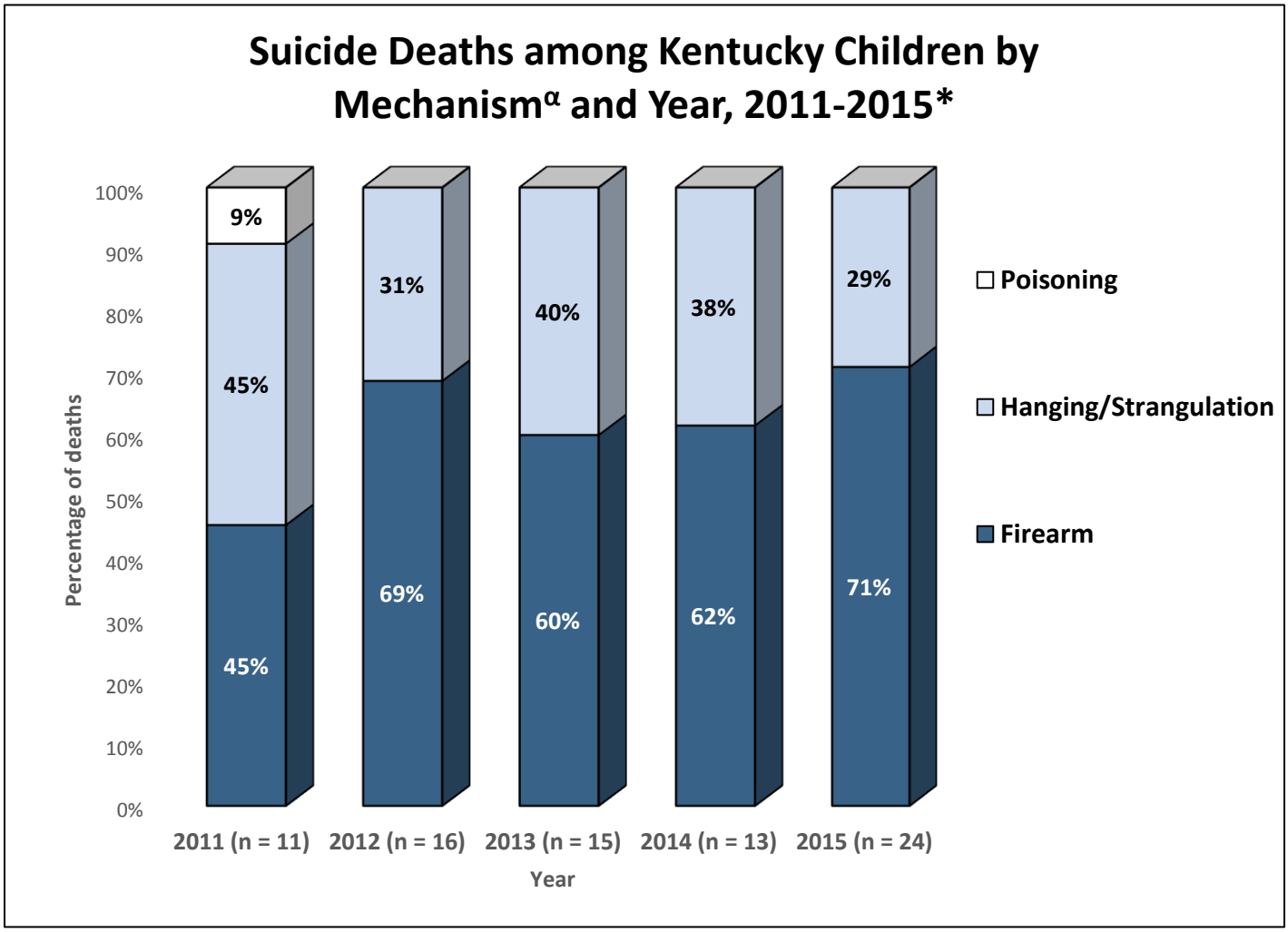


α**Note:** There was no statistically significant difference in the percentage of deaths for each age group for 2015 compared to previous years**.** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

Mechanism Used in Child Suicide

Firearms and hanging/strangulation are still the primary methods used in youth suicides in the state. There was a slight increase in firearm suicides from 62% in 2014 to 71% in 2015 (Chart 18). From 2011–2015, 63% of Kentucky youth suicides involved firearms, which suggests a prevention strategy of reducing firearm access. In contrast to the nation, Kentucky has never had poisoning/overdose as a major youth suicide issue. Despite the significant heroin and opiate overdose deaths among Kentuckians, from 2012–2015, there were no reported teen overdose (poisoning) suicides.

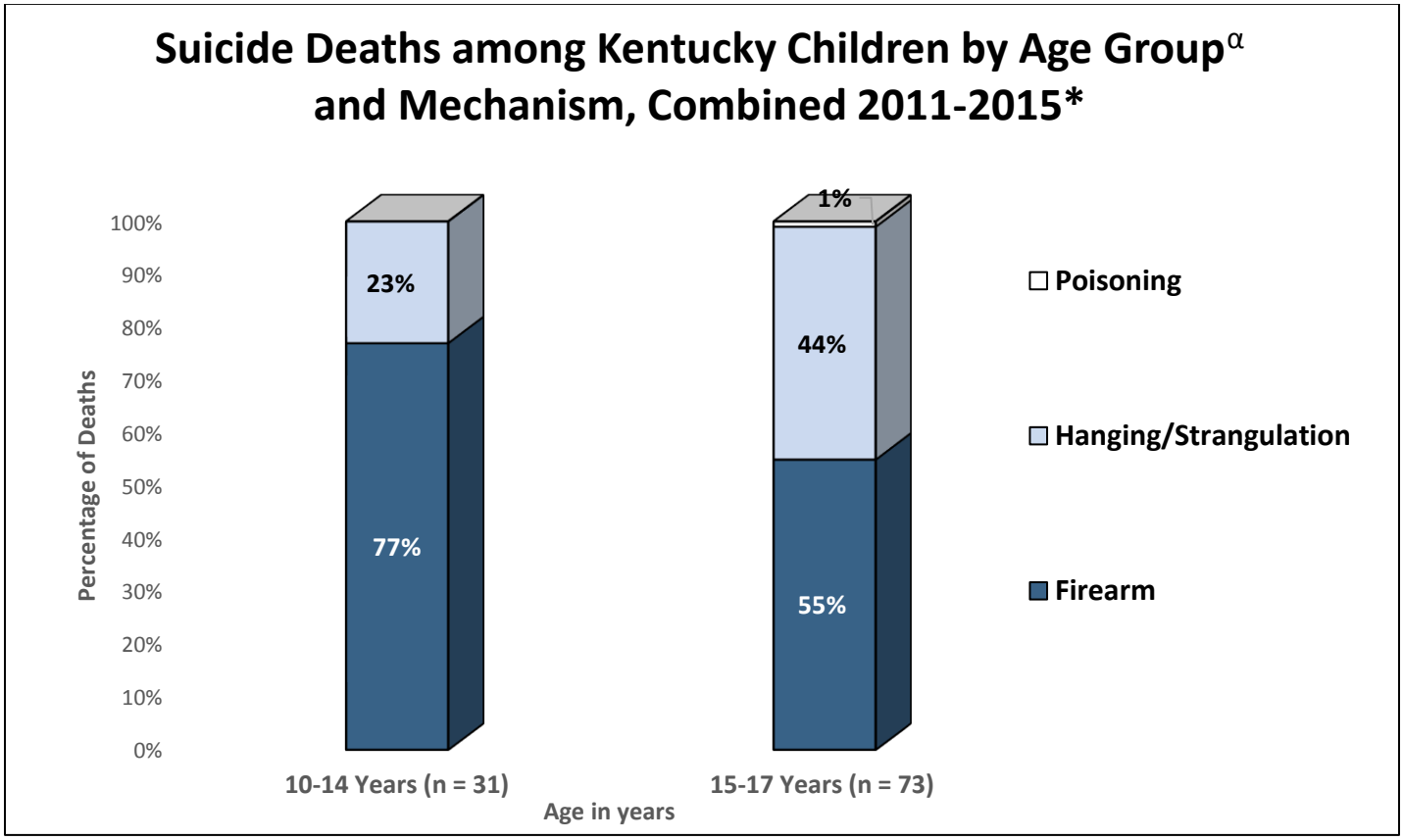
Chart 18



α**Note:** There was no statistically significant difference in the percentage of deaths by mechanism for 2015 compared to previous years. Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

Combining the data from 2011-2015 provides a more accurate depiction of the youth suicide trends occurring in Kentucky. Chart 19 reveals that youth suicides due to firearms occur at a higher rate among the younger age group of children 10-14 years of age. Suicide due to hanging/strangulation is more common among youth 15-17 years of age (44%) compared to youth 10-14 years of age (23%). These data reveal that prevention efforts for each age group need to be tailored to the needs/risks of the population.

Chart 19



***Note: 2011-2015 data are preliminary and may change**

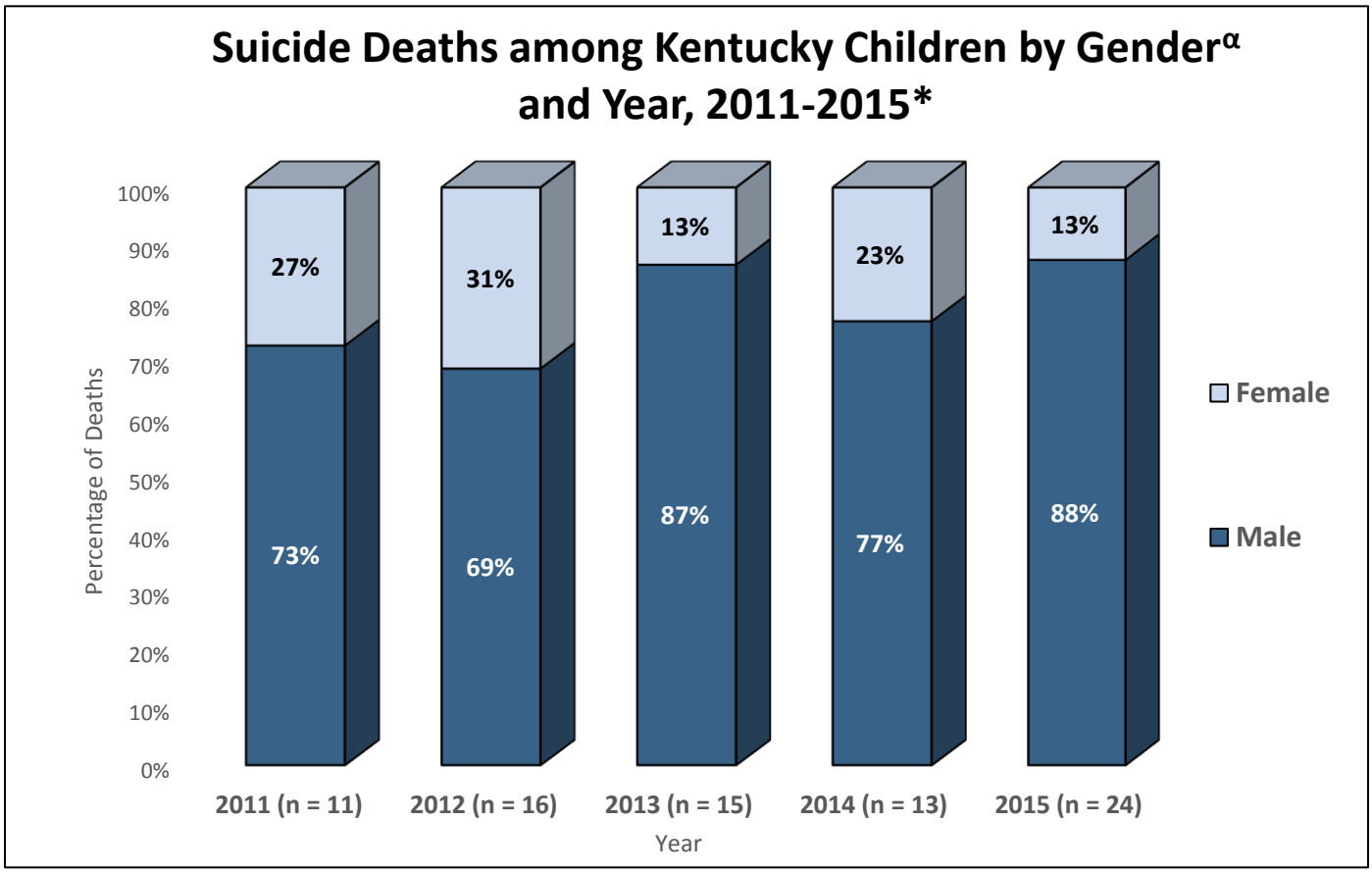
[α]**Note** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**

Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

Suicide and gender

The majority of Kentucky's youth suicides occur among males (Chart 20) and white children (data not shown). In the past 5 years, 80% or greater of the youth suicides in Kentucky occur among white children and in 2015, 100% of the youth suicides occurred among Kentucky's white children (data not shown). Suicide among children 10-17 years of age has risen from 2011 through 2015. The trend shows that on a national and state level, males 15-19 years of age are three times more likely to commit suicide than females in the same age group. In the 10-14 years of age group, males are twice as likely to commit suicide as females (Centers for Disease Control and Prevention, 2016a).

Chart 20



[α]**Note:** There was no statistically significant difference in the percentage of deaths by gender for 2015 compared to previous years. Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

Suicide risk factors

Some of the known risk factors for suicide include history of previous attempts of suicide, family history of suicide, depression and/or other mental illness, substance misuse, stressful life event, easy access to lethal methods, and incarceration (Centers for Disease Control and Prevention, 2016c). Children in the juvenile justice system and those in foster care are at increased risk as well (Pecora, 2009; Pilowsky & Wu, 2006).

In 2014, the CDC reported that youth who report frequently bullying others, and youth who report being bullied frequently are both at increased risk for suicide-related behavior. The Substance Abuse and Mental Health Services Administration (SAMHSA) recently cautioned about the growing concern that bullying was

overshadowing the role of other factors in suicide, and emphasized the need to consider other mental health issues as well. CDC research indicated that linking suicide with bullying as a direct cause and effect minimized other possible issues that may lead to suicide such as depression, substance misuse, problems at home, and trauma history. The CDC suggests utilizing a more integrated approach for prevention of suicide and youth violence with a focus on shared risk and protective factors such as individual coping skills, family and school social support, and supportive school environments (Centers for Disease Control and Prevention, 2014c).

During the 2015-2016 school year in Kentucky, there were 18,842 reported incidents of bullying or harassment, similar to the 18,842 incidents reported in the 2014–2015 school year (Kentucky Department of Education, 2016). Recognizing that bullying is a serious health and safety issue in the Commonwealth, the Kentucky Youth Bullying Prevention Task Force was established by Executive Order in September 2014 to study bullying in schools and recommend practices and policies to help provide safer, harassment-free schools. In October 2015, the Task Force issued its final report, concluding that bullying is a community-wide public health issue, rather than a school specific issue, and recommended that the Commonwealth use a public health approach to address the problem. In July 2015, Senate Bill 228 went into effect. This bill requires school districts to report every incident of bullying, regardless of outcome.

In 2014, questions regarding mental health and suicidal thoughts were added to the Kentucky Incentives for Prevention (KIP) survey (Sanders Jr et al., 2017); thus, providing a baseline measurement. According to this survey, psychological distress among 10th graders increased from 18% in 2014 to 20.6% in 2016 (data not shown)(Sanders Jr, et al., 2017). As seen in Table 4, those who reported suicidal ideation over the past year remained nearly the same at 15.4% in 2016 compared to 15.3% in 2014 (Sanders Jr, et al., 2017). The number of students who report making a plan over the past year about how they would attempt suicide remained unchanged from 2014 to 2016 at 12.5%. The number of students who responded yes when asked if they had made a suicide attempt over the past year remained steady between 2014 and 2016 at approximately 8%. While the survey indicates no substantial changes in overall suicidal thoughts and behaviors, these data continue to be analyzed by region, demographic population, and other environmental factors to identify trends.

Table 4

2016 Kentucky Incentives for Prevention Self-harm and Suicide Attempt Survey Results								
	Grade 6		Grade 8		Grade 10		Grade 12	
	2014	2016	2014	2016	2014	2016	2014	2016
Have you ever cut or harmed yourself on purpose?	8.6%	8.7%	17.0%	16.1%	20.2%	20.8%	16.4%	18.9%
During the past 12 months, did you ever seriously consider attempting suicide?	5.8%	6.4%	13.1%	12.9%	15.3%	15.4%	11.7%	13.1%
During the past 12 months, did you make a plan about how you would attempt suicide?	4.2%	4.7%	10.4%	10.1%	12.5%	12.5%	9.4%	10.2%
During the past 12 months, how many times did you actually attempt suicide?	3.8%	**4.2%	7.8%	**7.3%	8.0%	**8.2%	5.3%	**5.7%

****Note:** Percentage listed reflects those that answered they have seriously harmed themselves, seriously considered suicide, made a plan to attempt suicide, or actually attempted suicide at least one time).
Data Source: 2016 KIP Survey: Statewide Trends Related to Substance Abuse, School Safety, and Gambling (2004-2016).

DEATHS IN CHILDREN

Suicide is a very complicated issue, particularly when involving children. Suicide prevention involves not just the parents or the school officials but everyone in the community that may have contact with an at-risk child. Mental illness stood out as the most frequent risk factor for death by suicide, followed by relationship and school problems. Trends found to be especially alarming are the increased number of youth suicides in Kentucky, suicides occurring at an earlier age, and the use of firearms as a means of suicide by females. We will continue to monitor these trends.

In response to the increase in youth suicide deaths, partnerships have been developed and a number of initiatives to increase capacity and enhance surveillance capabilities are underway. First, a suicide data and surveillance committee has been established to identify existing sources of suicide death and attempt data. This committee, in an effort to improve surveillance, aims to set uniform definitions of reporting this data to improve consistency across data sources. This committee strives to develop, at the state level, a multidisciplinary child suicide fatality review team to examine all suicide deaths not reviewed at the local level.

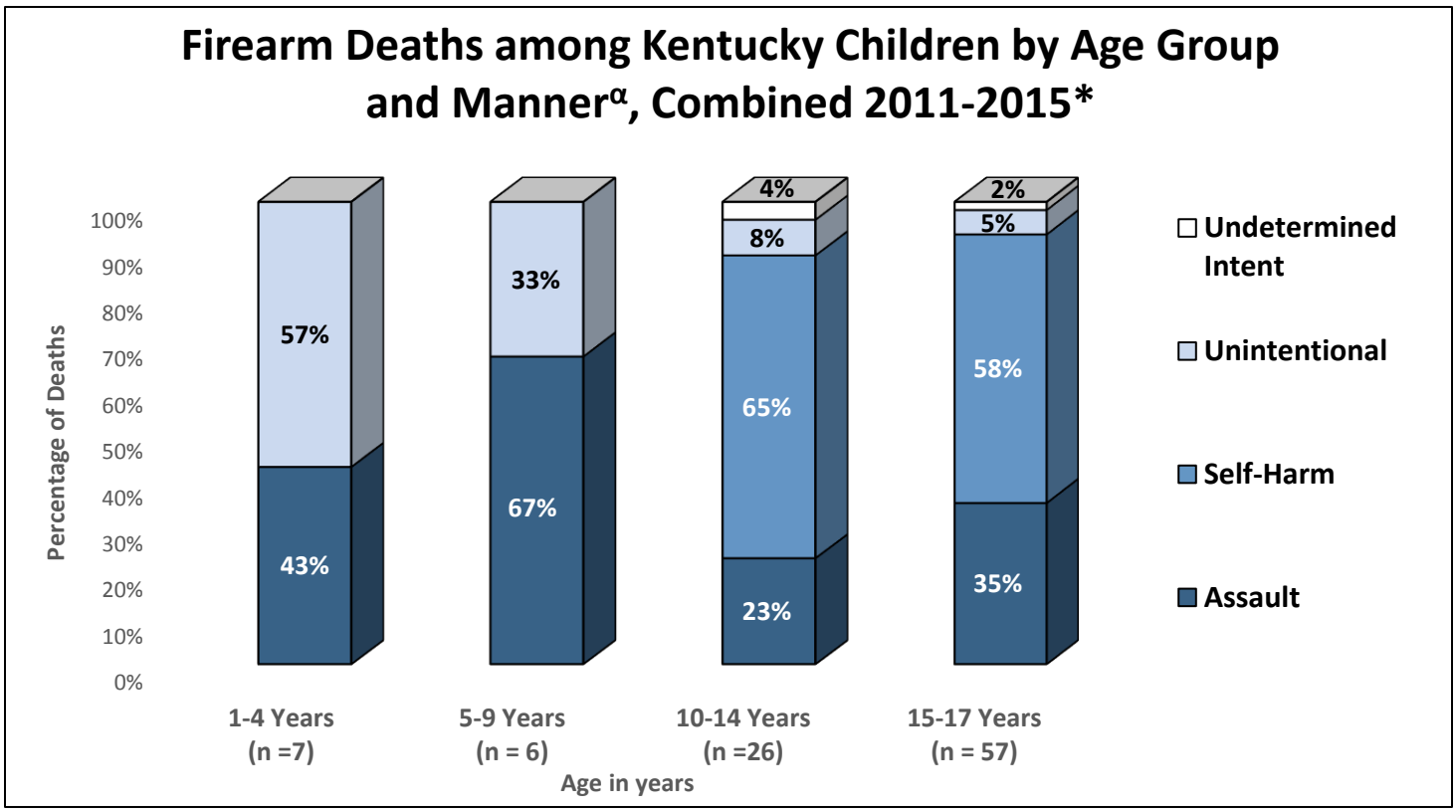
The Department for Behavioral Health, Developmental and Intellectual Disabilities, Division of Behavioral Health and the Department for Public Health, Division of Maternal and Child Health have collaborated with health department educators and the Child Safety CoIIN (Collaborative Innovation and Improvement Network) to incorporate the Sources of Strength, an evidence-based program, into schools. This program focuses on strengths and resiliency, and will empower students with coping skills they may not currently have. Sources of Strength is a peer-led, evidence-based prevention program. The program moves beyond a singular focus on risk factors by utilizing a true prevention model that strengthens protective factors around young individuals so that when times get hard they have strengths to rely on. The program promotes the idea that many strengths are more powerful than one, and aims to activate and mobilize these strengths in ways that positively change individuals and communities. It is projected that approximately 100 schools will have implemented the peer-led youth resiliency program by the end of the 2017-2018 school year.

FIREARM DEATHS

Firearm deaths include unintentional injury (accidental discharge when hunting, cleaning firearms, or children having access to firearms) as well as deaths due to suicide and homicide. Firearm deaths occur among children ranging from 1-17 years of age. Regardless if the death is determined to be accidental or purposeful, the same issues of safe storage and firearm accessibility are often present. Firearms are often not stored safely. They should never be stored in an unlocked container or in the same location as ammunition. Children of any age should not have access to firearms and ammunition.

The majority of Kentucky childhood firearm deaths occur among children 15-17 years of age, followed by children 10-14 years of age (Chart 21). Self-harm firearm deaths comprised the majority of all firearm deaths in these two age groups. Unintentional firearm deaths are highest among children 1-4 years of age and assault by firearm is highest among children 5-9 years of age (Chart 21).

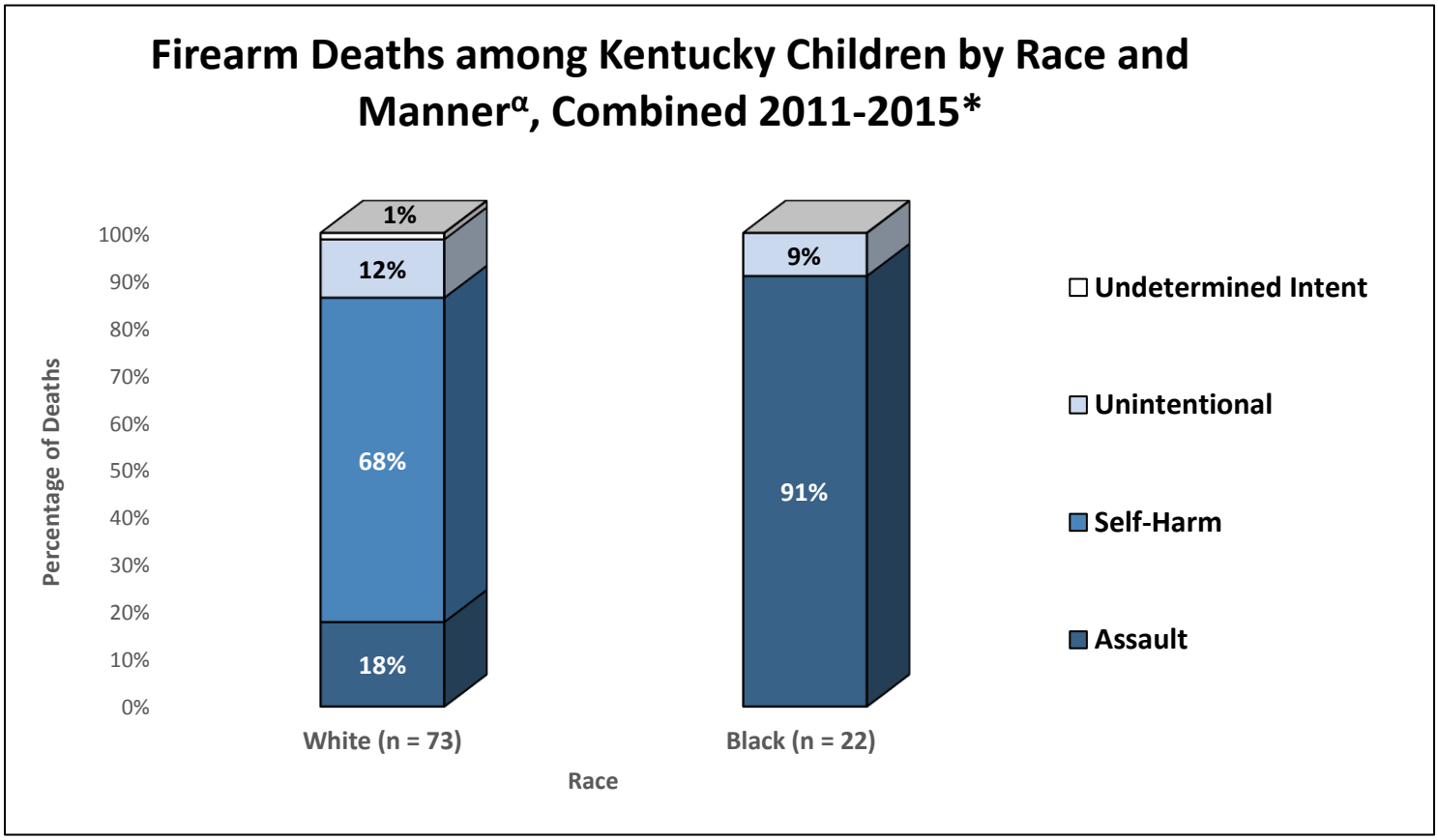
Chart 21



[α]**Note** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

When analyzing firearm deaths by race, it is notable that 91% of firearm deaths of Kentucky's black children were due to an assault with a firearm while only 18% among white children were due to assault (Chart 22). It is also notable that the deaths with a firearm of white children were three times higher than the deaths of black children in this timeframe (Chart 22). However, 68% of deaths attributed to firearms among white children were due to self-harm while there were no self-harm firearm deaths among Kentucky's black children during this timeframe. This highlights two very different areas to focus prevention efforts in regards to firearm deaths among Kentucky's black and white children.

Chart 22



***Note: 2011-2015 data are preliminary and may change**

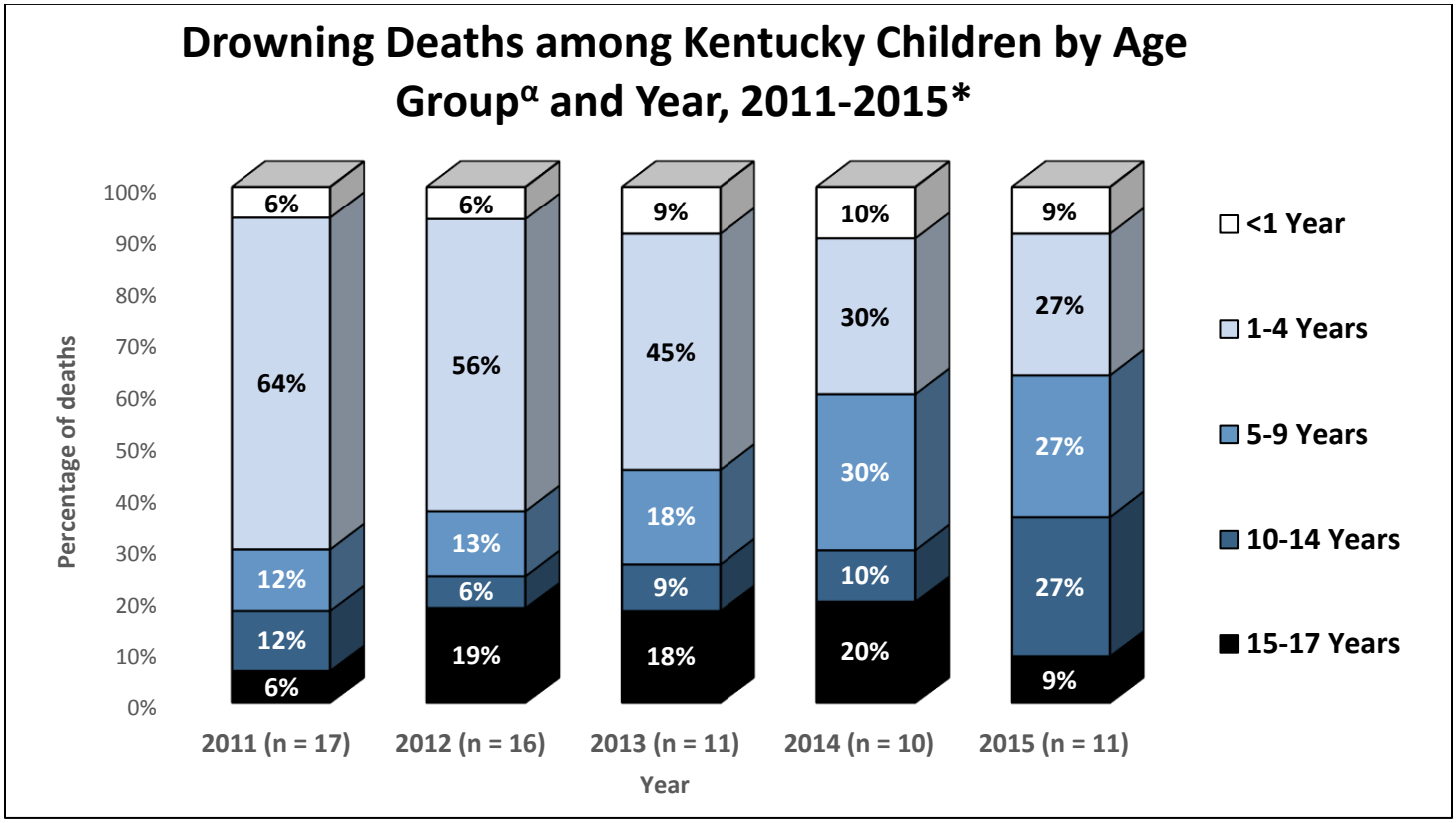
[α]**Note** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**

Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

DROWNING DEATHS

In 2015, there were 11 Kentucky children who died from drowning. While drowning deaths have decreased since 2011, they have not shown any significant difference from year to year (Chart 23). From 2011-2015, drowning deaths occurred at a higher rate among Kentucky children 1-4 years of age than any other child age group. However, drowning deaths among this age group appear to be decreasing while drownings among the 5-9 years of age group are showing an increasing trend (Chart 23). In 2015, the drowning deaths among Kentucky children were evenly dispersed among the 1-4 year, 5-9 year, and 10-14 years of age groups. The most common factors contributing to drowning deaths are lack of supervision, lack of physical safety barriers, and inability of a child to swim (Safe Kids Worldwide, 2013b).

Chart 23



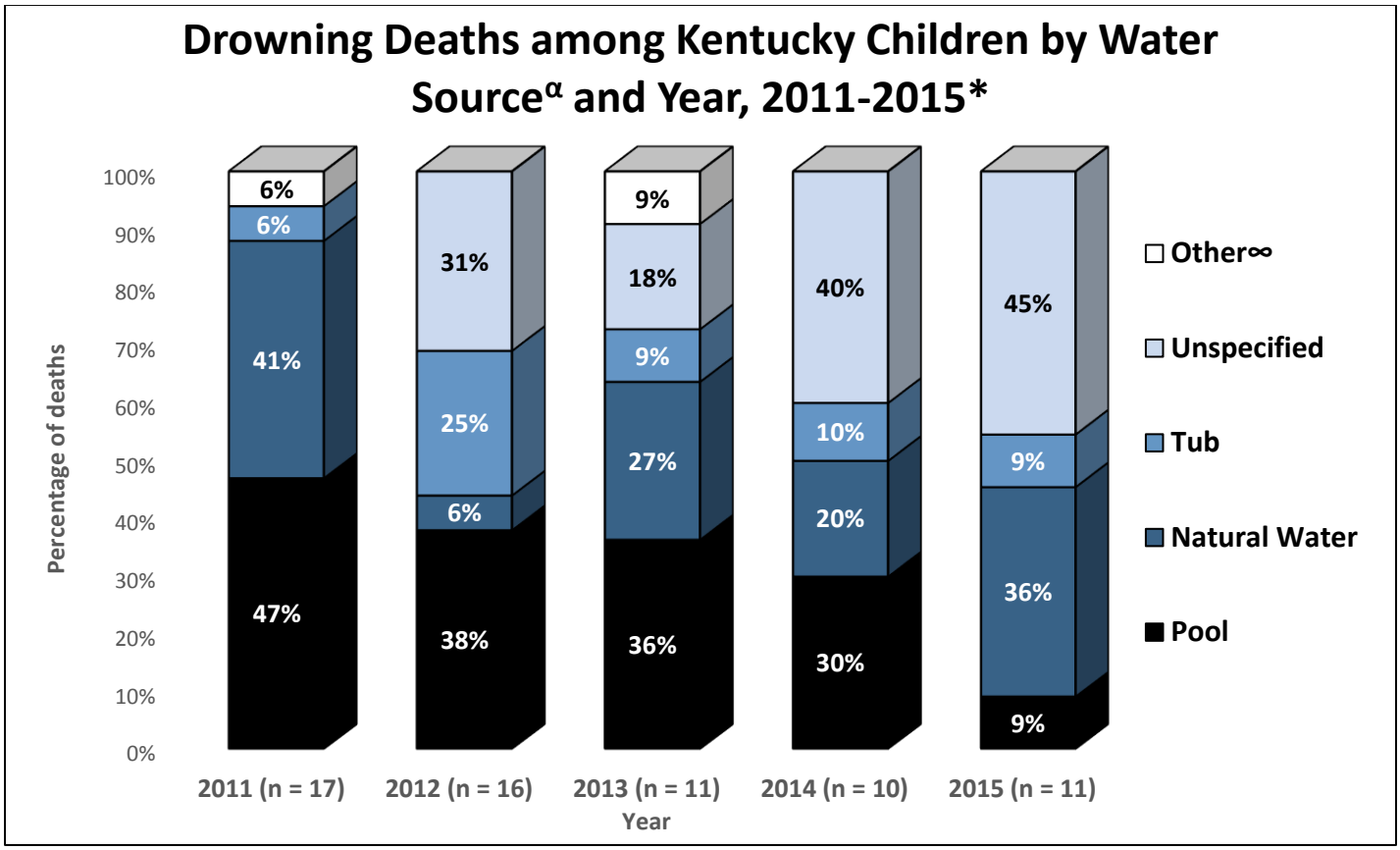
[α]**Note:** There was no statistically significant difference in the percentage of deaths by age group for 2015 compared to previous years. Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

DEATHS IN CHILDREN

Historically, the majority of drowning deaths among Kentucky children have occurred in a pool. Nationally, children 1-4 years of age were more likely to drown in a swimming pool than any other water source (Xu, 2014). However, in 2015 the majority (36%) of the drowning deaths among Kentucky children occurred in natural water (Chart 24). It is important to note that a large proportion of child drowning deaths in 2015 were missing documentation pertaining to water source. Drowning deaths related to boating accidents is another area of focus for prevention efforts. In Kentucky, the large number of rivers, lakes, and potential boat rentals to persons who may not be equipped to pilot a boat in high or swift waters or around dams is of concern.

As expected, the majority of drowning deaths in Kentucky occur during the summer months (May, June, July, and August). Prevention initiatives should start before this peak season for swimming, boating, and other water-related activities.

Chart 24



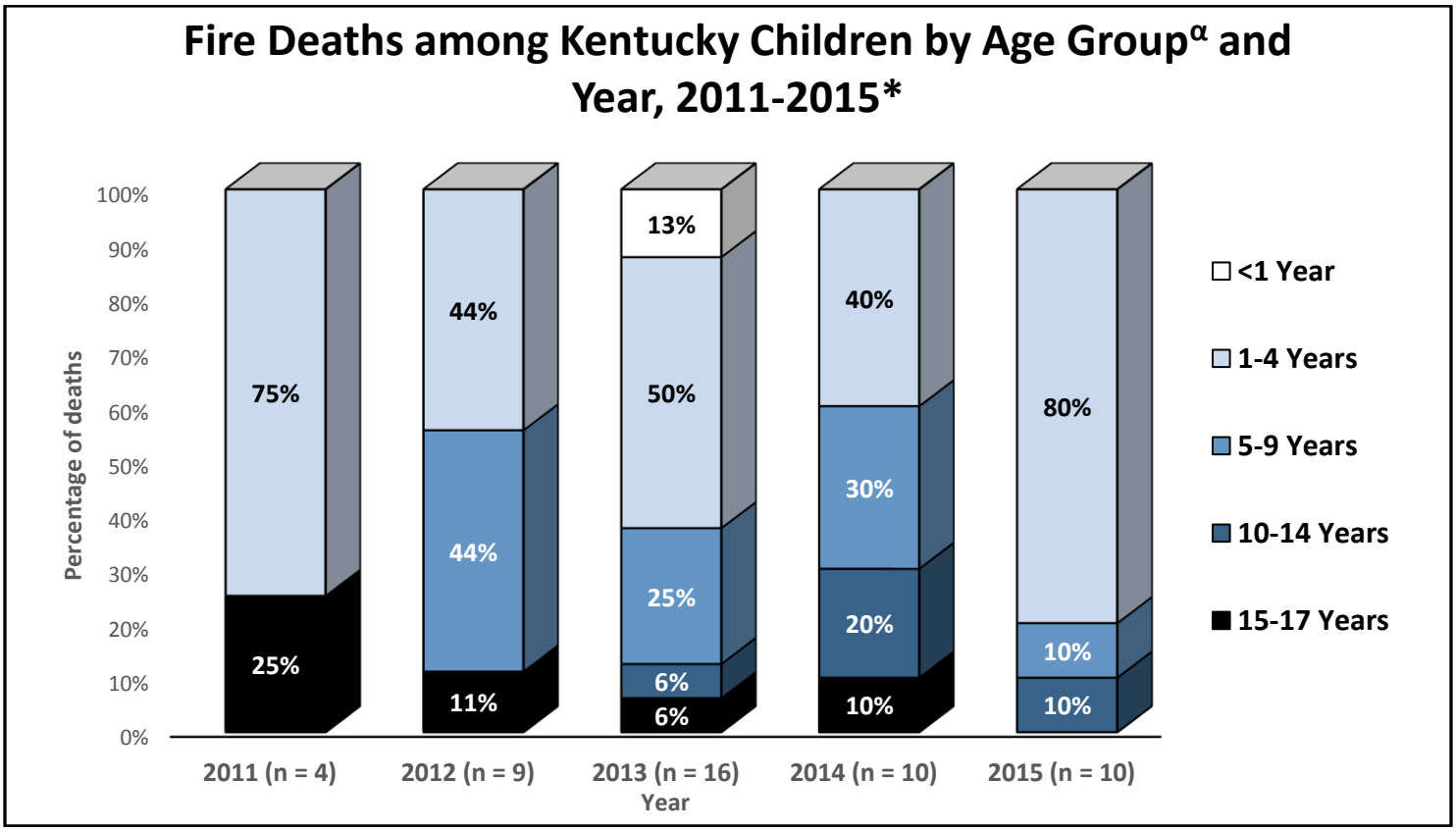
[α]**Note:** There was no statistically significant difference in the percentage of deaths by water source for 2015 compared to previous years. Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**

[∞]**Note:** Other category includes drownings that occurred in a bucket and undetermined intent.
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2014.

FIRE DEATHS

In 2015, 10 Kentucky children lost their lives in seven fires. The majority (80%) of the children who died due to fire in 2015 were 1-4 years of age (Chart 25). This is similar to the nation with children under five years of age accounting for 80% of all child fire deaths. Fire is an issue in Kentucky year-round, as fires occurred from February through November in 2015, with the greatest loss of life being in September and October.

Chart 25



α**Note:** There was no statistically significant difference in the percentage of deaths by age group for 2015 compared to previous years. Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: 2011-2015 data are preliminary and may change**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

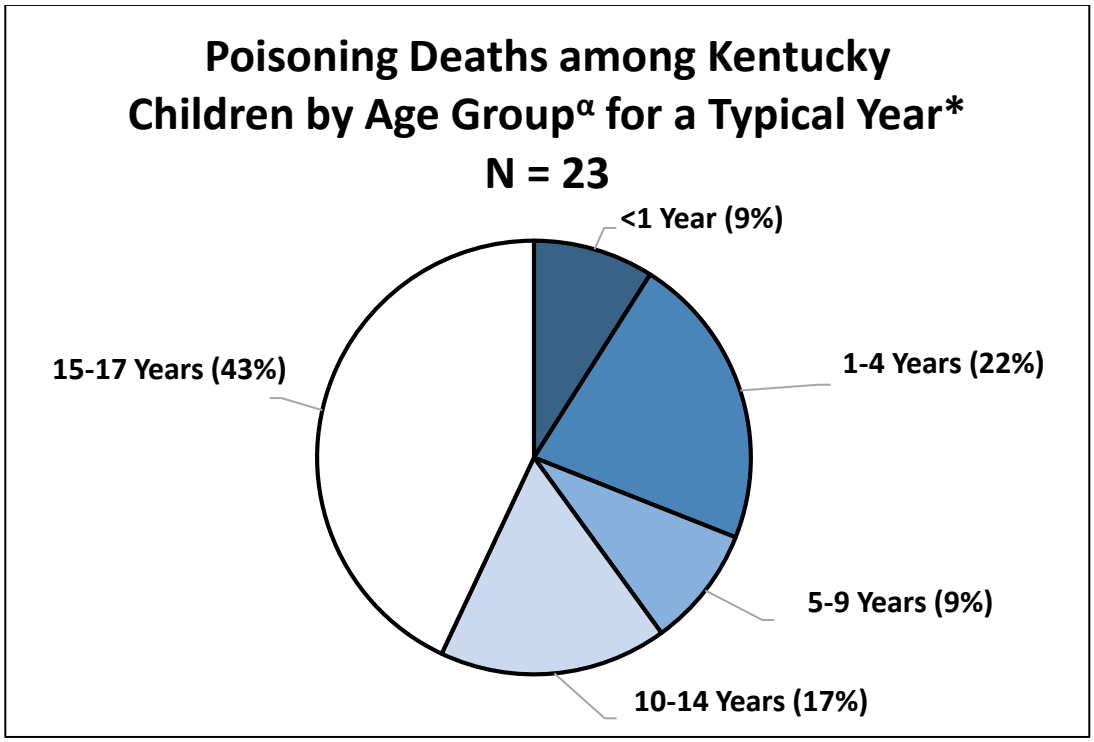
Nationally, 44% of children who die from fires or burns are four years of age and under (Safe Kids Worldwide, 2015a). Every day in the U.S., at least one child dies from a home fire. (Safe Kids Worldwide, 2016). More than 8 out of 10, (87%) of all fire-related deaths, nationally, are due to home fires, which spread rapidly and can leave families as little a two minutes to escape once an alarm sounds (Safe Kids Worldwide, 2015b). Cooking equipment is the leading cause of home fires and home fire injuries (Ahrens, 2016). Risk factors for fire death include malfunctioning or absent smoke alarms, living in poverty, and residence in rural areas (Ahrens, 2014).

POISONING DEATHS

According to CDC, over 300 children (0 to 19 years of age) in the United States receive treatment in an emergency department and two children die from poisoning every day (Centers for Disease Control and Prevention, 2016b). Poisonings occur from more than chemicals in the home. Everyday items, such as household cleaners and medicines, can be poisonous to children. Medication dosing mistakes and unsupervised ingestion of medication are common ways that children are poisoned. Active, curious children will often investigate and sometimes try to eat or drink anything that they can access (Centers for Disease Control and Prevention, 2016b).

The number of childhood poisoning deaths that occur in a single year in Kentucky is low. Therefore, the chart below presents the average of childhood poisoning deaths from 2011 to 2015 combined by age group. During this five-year timeframe, there were 23 deaths due to poisoning among Kentucky children. This maybe an under-representation of the true childhood poisoning deaths in Kentucky because under-reporting and misclassification on the death certificate are limitations in the data. As you can see in Chart 26, poisonings are not isolated to young children. Children aged 15-17 years represent the largest proportion of all childhood poisoning deaths in Kentucky, followed by children in the 1-4 year old age group (Chart 26).

Chart 26

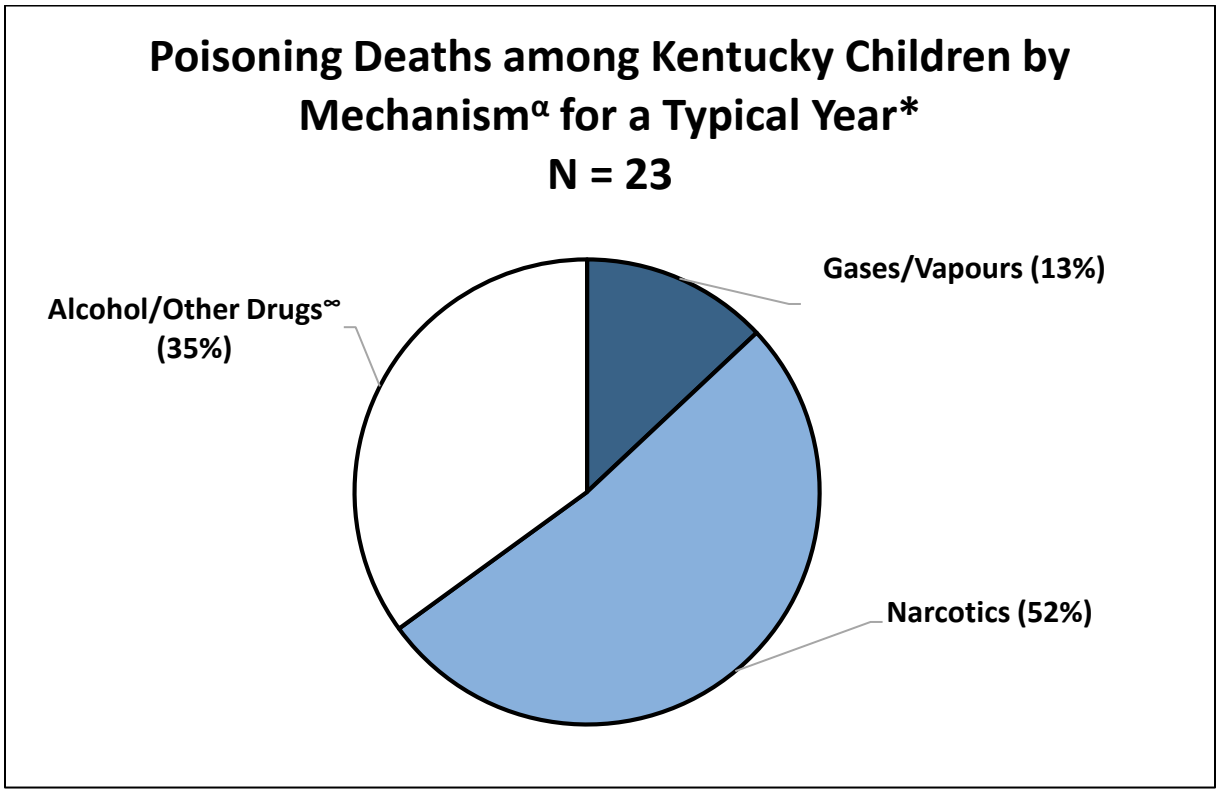


$^{\alpha}$**Note:** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**
***Note: A typical year is determined by taking the average number of deaths for each age group by cause for 2011 through 2015 combined. 2011-2015 data are preliminary and may change.**
Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

DEATHS IN CHILDREN

Chart 27 reveals that the majority of poisoning deaths among Kentucky children are due to the ingestion of narcotics (52%), followed by poisoning involving alcohol and other drugs (35%). It is important to note that a large percentage of these poisoning deaths involved multiple substances (data not shown).

Chart 27



[α]**Note:** Data based on 20 or fewer deaths **ARE NOT STATISTICALLY VALID FOR INTERVENTION PLANNING**

***Note: A typical year is determined by taking the average number of deaths for each age group by cause for 2011 through 2015 combined. 2011-2015 data are preliminary and may change.**

[∞]**Note:** Other drugs include cough medicine, antidepressants, inhalation of a propellant, and unspecified substances

Data Source: Kentucky Vital Statistics, Death Certificate Files 2011-2015.

Poisoning Prevention Tips

- **Lock medicines and toxic products up and away**
  Keep medicines and toxic products, such as cleaning solutions and detergent pods, in their original packaging where children cannot see or have easy access to them.

- **Know the number**
  Place the nationwide poison control center phone number, 1-800-222-1222, on or near every telephone in your home and program it into your cell phone.
  - If you suspect a child has been poisoned and the child remains awake and alert, call the poison control center. They can be reached 24 hours a day, seven days a week.
  - Call 911 if you have a poison emergency and your child has collapsed or is not breathing.

- **Read the label**
  Follow label directions carefully and read all warnings when giving medicines to children.

- **Don’t keep it if you don’t need it**
  Safely dispose of unused, unneeded, or expired prescription drugs and over the counter drugs, vitamins, and supplements. To dispose of medicines mix them with coffee grounds or kitty litter and throw them away. You can also turn them in at a local take-back program or during National Drug Take-Back events.

PREVENTION EFFORTS

A review of child deaths, both at the local and state level, is intended to advance knowledge of how these deaths occurred and determine what can be learned to prevent future child deaths. Everyone has a role in preventing these deaths and providing a safe and healthy environment in which Kentucky's children can grow and thrive. The following are some examples of actions taken around the state to prevent child deaths.

Prematurity Prevention

- Kentucky's Healthy Babies are Worth the Wait Program (HBWW) is a best practice in Maternal and Child Health. HBWW began as a pilot project in Kentucky in 2006 and was adopted by the March of Dimes (MOD) as a signature program, resulting in seven sites as full partners across Kentucky. Replication of this program in other states has occurred. These efforts help prevent prematurity and reduce early elective deliveries (delivery before 39 weeks gestation without a medical indication). March of Dimes collaborates in this effort with the Kentucky Department for Public Health, the Kentucky Hospital Association, and the Kentucky Perinatal Association. While making progress, the Commonwealth still has higher rates of prematurity and early elective delivery than the national average. For more information, see www.prematurityprevention.org or www.marchofdimes.com.

- March of Dimes has collaborated with Kentucky Department for Public Health to identify three counties that have high preterm birth rates in which innovative strategies may be developed to prevent preterm births. The local health department and hospital in these counties will collaborate on November 6, 2017 to make a plan to lower preterm birth rates in these counties over the next two years. This effort will involve hospitals, local health departments, faith-based groups, and other community organizations connected to preterm birth.

- Kentucky has participated in the CoIIN to reduce infant mortality. Strategies include addressing social determinants of health, reducing preterm and early term births, and a safe sleep initiative for reducing SUID. The collaboration has allowed Kentucky to participate with other states and share ideas and strategies. As part of the Safe Sleep CoIIN, a multidisciplinary task force was assembled to provide guidance for the development of the Safe Sleep Kentucky campaign.

- Text4baby is a free text-messaging program that provides health messages during the prenatal and postpartum period, including messages focused on preterm birth prevention, maternal and infant nutrition, and safe sleep. The service is provided through a partnership of the National Healthy Mothers, Healthy Babies Coalition the Department of Health and Human Services, and the White House Office of Science and Technology Policy. The Kentucky Department for Public Health is a national partner of Text4baby and promotes this program through local health departments and healthcare providers.

Sleep-related Infant Death Prevention

- The most concerning trend in infant mortality data is the rise in sleep-related infant deaths, many of which are preventable. The number of sleep-related infant deaths is nearly equal to the number of infant deaths each year from prematurity. The Kentucky Department for Public Health, with numerous partners, implemented a Safe Sleep Campaign statewide in October 2015 in an effort to reduce these preventable deaths. The campaign focuses on the ABCDs of safe sleep [**A**=alone, **B**=on their back, **C**=in a clean, clear crib (includes bassinette or play yard), and **D**=dangers (drinking, drug use or other caregiver impairment)]. Ongoing messaging is available on various social media sites. In 2017, Kentucky Department for Public Health implemented a statewide media safe sleep campaign that also focuses on the ABCD's of Safe Sleep. This campaign has distributed Safe Sleep education in print as well as television and radio, among other traditional methods. Safe Sleep now has a Facebook page that has had over 1,500,000 safe sleep video views and more than 7,000,000 impressions. Kentucky Department for Public Health also offers a website that promotes Safe Sleep for infants that can be viewed at www.safesleepky.com. Free materials promoting Safe Sleep can be found at this website.

- Kentucky's External Panel for the Review of Child Fatalities and Near Fatalities has reviewed cases of sleep-related infant deaths in which the caregiver is impaired from substance abuse. The caregiver may put the baby in bed with them, markedly increasing the risk of overlay and suffocation of the infant. The Safe Sleep Campaign continues to address this issue in Kentucky.

- Kentucky local health departments are implementing safe sleep improvement projects to reduce infant mortality from unsafe sleep practices by educating community agencies that provide childcare, parent classes, or work with their hospitals to assure the newest information on safe sleep provided to parents and caregivers. Last year local health departments reported working with over 400 community partners across the state. Kentucky Department for Public Health developed the Cribs for Kids package that allows local health departments to work with community partners and identify families who are unable to provide a safe sleep environment for infant(s) in their home. This collaborative package will provide the family with a Cribs for Kids kit which includes a safe crib/pack and play, safe sleep education, and follow up services.

- Hospitals are being encouraged to model safe sleep practices and become certified by the National Safe Sleep Hospital Certification Program. Implementing policies for safe sleep in hospital nurseries and neonatal intensive care units leads to a dramatic increase in safe sleep practices among parents. Materials, including sample policies, are free and available at www.cribsforkids.org.

Motor vehicle death prevention

Kentucky Injury Prevention and Research Center, (KIPRC) a bona fide agent for Kentucky Department for Public Health, leads the Kentucky's Safe Kids Coalition. The Safe Kids Coalition assists rural county health departments to build a sustainable local child passenger safety (CPS) program that includes hot car safety, child safety seat usage, and additional topics. Coordination and leadership on statewide injury policy and prevention issues are expected by National Safe Kids and the reach of injury prevention is amplified through emphasis on training agencies that reach the public. The three Safe Kids Coalitions are long-standing partners in programs of CPS that include safety in and around cars, promotion of booster seat use and teen driving safety. Safe Kids Coalition also works with the Kentucky Office of Highway Safety to ensure a continuing supply of nationally certified CPS technicians are available to address the leading cause of child death and injury. Kentucky Department for Public Health is networking with the Kentucky Office of Highway Safety and KIPRC on a Child Safety Collaborative Innovation & Improvement Network (CS CoIIN) to decrease serious injury and/or deaths of children in Kentucky due to child passenger safety and teen driving. This collaborative effort uses best practices, looks at trend data and best evidence then creates tangible aims for both topic areas. Participants of the CS CoIIN strategy teams develop a plan of action for recruiting key participants, collect data for monthly reports and engage in networking efforts that will determine if the changes they implement will represent an improvement in child safety.

Child maltreatment prevention

The CDC recommends that communities approach child abuse prevention by seeking to create safe, stable, and nurturing relationships and environments. These are considered "Essentials for Childhood", or conditions necessary to ensure children reach their full potential. In this approach, communities develop strategies to promote the types of relationships and environments that help children grow up to be healthy and productive citizens so that they, in turn, can build stronger and safer families and communities for their children (Centers for Disease Control and Prevention, 2014a). Kentucky engages in efforts to promote safe, stable, and nurturing environments; supports families promoting school readiness; and preventing child abuse and neglect. These include the Health Access Nurturing Development Services (HANDS) home visitation program and Kentucky Strengthening Families (KYSF). All families experience times of stress, and research demonstrates that children grow and learn best in families who have the support and skills to deal with such stress.

PREVENTION EFFORTS

- Kentucky Strengthening Families (KYSF) is a statewide initiative with the mission to strengthen families by enhancing protective factors that reduce the impact of adversity and increase the well-being of children and families through family, community, and state partnerships. This initiative serves as a response to the Adverse Childhood Experiences study and is built upon a nationally-recognized strategy, Strengthening Families: A Protective Factors Framework, which is coordinated by the Center for the Study of Social Policy. KYSF represents a multi-disciplinary partnership of over 20 national, state, local, public, and private organizations dedicated to embedding six research-based protective factors into services and supports for children and their families. The KYSF protective factors are: 1) Parental Resilience, 2) Social Connections, 3) Knowledge of Child Development, 4) Concrete Support in Times of Need, 5) Social and Emotional Competence of Children, and 6) Nurturing and Attachment.

  In 2013, Kentucky began this work by developing a Kentucky Strengthening Families Leadership (KYFS) Team including agencies that serve families, family organizations, and family advocates who are committed to promoting strength based, family driven values and principles while they promote the adoption of the initiative. In January 2014, the KYFS Leadership Team developed a strategic plan to move the Kentucky Strengthening Families initiative forward in the Commonwealth. Through annual strategic planning, the KYFS Leadership Team has empowered four workgroups, a family informed system, training and technical assistance, system integration and evaluation, and messaging and awareness workgroup, to implement the work. In April 2017, KYSF hosted a summit of community partners to learn more about this initiative and to promote this movement in local and regional communities. During this summit, KYSF expanded its resources beyond young children to include an introduction of the Youth Thrive protective factor framework that emphasizes protective and promotive factors as a pathway to well-being during adolescence and in the transition to adulthood. The KYSF summit was attended by local health department staff, Commission for Children with Special Health Care Needs, Department for Community Based Services staff from all three divisions, Preschool Regional Training Centers, Administrative Office of the Courts, Family Resource and Youth Services Centers, public schools, faith-based providers, non-profit human service providers, universities, Medicaid Managed Care Organizations, and more.

  Additionally, the KYSF Leadership Team workgroups continue to explore avenues for ensuring accountability and building a KYSF professional learning collaborative network. Recent expansion of the implementation of KYSF Parent Cafés was assisted by mini-grants from the Governor's Office of Early Childhood. KYSF Parent Cafés continue to build excitement and promote interest in the initiative. To learn more about KYSF, please visit: https://kidsnow.ky.gov/professionals/kysf/Pages/default.aspx.

- Prevent Child Abuse Kentucky (PCAK, www.pcaky.org) provides prevention and awareness resources statewide throughout the year. The month of April, Child Abuse Prevention Month, is designated as a time to focus on prevention awareness. PCAK coordinates and supports these awareness activities through local and statewide partnerships. In 2016, PCAK documented April awareness activities in all 120 Kentucky counties. At least 62 regional and local media outlets (newspaper, TV, etc.) provided coverage of Child Abuse Prevention Month events. These efforts involved support from statewide leaders such as the Governor and Kentucky Attorney General in addition to engagement of hundreds of local schools, local health departments, local elected officials, and child advocates. In 2016, over 78,246 pieces of materials were distributed across the Commonwealth designed to educate and promote awareness of child abuse and neglect. During this same year, PCAK staff provided training to over 1,600 participants addressing a variety of prevention related topics. Statewide access to PCAK's prevention services are enhanced through a network of 117 partners in prevention. Included in those partners are parent educators who provide the evidence-based Nurturing Parenting Curricula to nearly 1,300 families identified as at-risk families. In addition to regional trainings provided by PCAK, staff provided a statewide conference on child abuse prevention; the Kids Are Worth It! ® Conference. The 2016 conference was attended by 572 individuals. With support from Kentucky Safety and Prevention Alignment Network (KSPAN), the conference featured renowned child abuse pediatrician, Dr. Carol Jenny. In addition to training participants as part of the

conference, Dr. Jenny provided two Grand Rounds Session at Kentucky Children's Hospital and provided training to pediatric residents at Norton Children's Hospital.

- In 2016, there was continued focus on reducing the occurrence of pediatric abusive head trauma (PAHT) in Kentucky. In FY 2016, PCAK distributed over 17,000 informational "*Never Shake a Baby*" brochures to hospitals, local health departments, and other child serving agencies. Kentucky partners are also working collaboratively to increase the number of birthing centers using evidence informed practices to educate the parents of newborns about the dangers of shaking and strategies to soothe an infant. This approach has been shown to reduce incidence of PAHT by 47% (Dias et al., 2005). These collaborative efforts included a letter to hospital administrators on the availability of resources to implement hospital-based parent education programs. Representatives from Kentucky Department for Public Health, PCAK, KSPAN/KIPRC, Kosair Children's Hospital, and UK Children's Hospital signed this letter. Subsequently, the Kentucky Child Fatality and Near Fatality External Review Panel sent a letter to all hospitals and birthing centers encouraging them to adopt this best practice. With support from PCAK and KSPAN, staff from the Children's Hospital Foundation Office of Child Advocacy have begun providing training and technical assistance to hospitals across Kentucky. Resources provided to birthing centers include "Calm Baby Gently" board books, brochures/posters, parent education videos (Hope for Tomorrow and Period of PURPLE Crying), and a DVD player for patient use.

- The Kentucky Health Access Nurturing Development Services (HANDS) program provides home visits by family support workers and nurses or social workers to pregnant women and the family until the child turns three. Independent evaluations continue to show many health improvements for mother and baby as well as reductions in child maltreatment. Kentucky HANDS is an evidence-based model for home visiting, meaning that positive outcomes met academically-stringent studies.

- Educational materials used by various programs to promote safe sleep include:
  - The Safe Sleep video from National Institute on Child Health and Human Development (NICHD).
  - The Kentucky "What Does a Safe Sleep Environment Look Like" handout.
  - The video "The Period of PURPLE Crying."
  - The brochure "Never Shake a Baby" from Prevent Child Abuse Kentucky.

- Through the MCH Title V program, nurses in local health departments educate parents and caregivers about Abusive Head Trauma. Using the Period of PURPLE Crying program, parents are educated on ways to help soothe a crying baby as well as strategies to keep the baby safe when a caretaker gets frustrated, such as allowing another caretaker to take the baby or placing the baby in its safe sleep space and walking away for a few minutes.

Suicide prevention

- Kentucky's Zero Suicide in Healthcare initiative is about organizations and systems working together to make suicide a "never event" in programs and systems of care that include emergency departments; medical-surgical units; primary care and general medical settings; behavioral health entities; crisis services; primary, secondary, and post-secondary education; justice systems; workplaces; and others. In collaboration with community mental health centers, regional forums occurred across the Commonwealth to open dialogue within and across various systems of care regarding continuity of care, increasing awareness and knowledge of suicide prevention, informing clinical practices, and ultimately saving lives.

- Many programs are underway in Kentucky to address youth suicide and community coalitions are tackling the problems from several angles. These efforts focus on utilizing the strategic prevention framework and collaborative systems of care approaches to assess needs and build capacity to meet the needs of at-risk

youth at whichever point they enter the system. Points of entry include schools, mental health providers, health care providers, or other community agencies.

Peer-led youth programming is available through *Sources of Strength* to build resiliency, as well as striving to change the culture of schools to support those at risk of suicide. *Signs of Life*, *Lifelines*, and *More than Sad* programs support schools in implementing evidence based curriculum to reduce suicide risk. *Question Persuade Refer* and *Applied Suicide Intervention Skills Training* provides training for community members and school staff to identify those at risk and connect them with appropriate care. Other programs strive to address ways to address system change. *Zero Suicide Framework* focuses on increasing agency capacity to provide suicide safe care and warm handoffs between providers.

- Communities should support screening for mental health issues in children in schools. The Kentucky Department for Behavioral Health, Developmental and Intellectual Disabilities continues to provide technical assistance and training resources for the delivery of gatekeeper trainings such as QPR (Question, Persuade and Refer) and ASIST (Applied Suicide Intervention Skills Training) to community-level organizations.

Fire safety

Primary prevention is to prevent fires from starting in the first place. The next layer of prevention is detection, which makes escape a possibility. The lack of working smoke alarms continues to contribute to residential fire deaths in Kentucky and is of importance because of the large stock of older housing with rapid burn rates.

Estill County and Irvine Fire Departments installed almost 1,000 smoke alarms as part of fire safety education during home visits in 2015. Fire safety education was provided to the homeowner by the firefighters as they installed the fire alarm. Additional education was provided in a local elementary school. Coordination and funding for this project and the alarms was from a grant obtained by the Injury Free Coalition for Kids of Lexington at Kentucky Children's Hospital. Funding came to the Injury Free Coalition through a grant from Federal Emergency Management System (FEMA)/Michigan Public Health institute/IFCK. Referrals for the program were received from the local elementary school, health department, and senior citizen center. More than 50% of the homes visited by firefighters did not have a single working smoke alarm. The project reports, completed by these fire departments, is alarming because it depicts a much worse situation than data reported nationally by the National Fire Protection Association. Almost none of those homes were rental property, where statistics might be even worse despite some degree of code protection. The Kentucky Injury Prevention Research Center (KIPRC) and the State Fire Marshall's Office offer additional points to consider for prevention:

- Smoke detectors are a proven way to prevent some fire deaths. Communities can develop efforts to install smoke detectors in houses that do not have them. In addition, ensure batteries are changed at least annually in houses with smoke detectors.
- Help health departments, social services, and medical providers educate large families or families living in crowded housing to be especially careful about bedding near any heat source, such as a space heater, baseboard heater, or wood stove.
- Assist families in understanding and developing a family-specific fire safety plan that includes deciding which adult will find and exit with which child or dependent elder and where outside the house the family will gather.
- Provide families with education and warnings on flammable materials, such as pesticides, aerosols, and cleaning liquids that could be potential fire hazards, particularly if the product becomes soaked into carpets, walls, or upholstered furniture.

State and local fire officials should continue to work closely with KIPRC and local health departments to ensure that fire safety education and smoke alarm installation reach the highest risk rural and urban households.

RECOMMENDATIONS

Based on a review of child fatality data for 2015 and related trend data, the State CFR Program makes the following recommendations for the prevention of child deaths in Kentucky.

Recommendation #1 – Suicide prevention:
Teen suicide rates are rising and the number of younger children committing suicide is increasing. There are many factors associated with teen suicide. It is imperative that parents, educators, and service providers from all systems of care that interact with children and youth are aware of the warning signs and are equipped to talk to children in crisis.

- Providers in both healthcare and behavioral healthcare should use the unique opportunities available to them to screen and assess for suicide risk and ensure that at-risk youth receive competent suicide treatment and management within and across systems of care (zerosuicide.com).
- School systems should have protocols for addressing suicide, which include evidence-based screening tools and resources. Middle schools should be included to target the younger children who are contemplating suicide (Substance Abuse and Mental Health Services Administration, 2012).
- Development of a multi-disciplinary State Suicide Review Team to ensure the review of all youth suicides not reviewed at the local level by the local child fatality review team.

Recommendation #2 - Safe Sleep Program:
In 2017, Kentucky Department for Public Health implemented a statewide media safe sleep campaign that focuses on the ABCD's of Safe Sleep. This campaign has distributed Safe Sleep education in print as well as television and radio, among other traditional methods. The campaign utilizes a Facebook page and a website that reaches out to professionals as well as non-traditional partners such as grandparents or foster parents.

Unsafe sleep practices are a leading cause of infant death. Recommendations for the prevention of sleep-related deaths are as follows:

- Birthing hospitals should participate in the Cribs for Kids® National Safe Sleep Hospital Certification program, which recognizes hospitals that demonstrate a commitment to reducing infant sleep-related deaths by promoting best safe sleep practices and by educating on infant sleep safety. By becoming certified, a hospital has demonstrated that it is committed to being a community leader and is proactively eliminating as many sleep-related deaths as possible. See more at: http://www.cribsforkids.org/hospitalinitiative/
- Healthcare providers, childcare providers, and other community organizations should provide the most current and evidence-based Safe Sleep materials free of charge, which are accessible from the Eunice Kennedy Shriver National Institute of Child Health and Human Development. These materials should be used to educate communities and families about safe sleep practices. https://www.nichd.nih.gov/sts/Pages/default.aspx or www.safesleepky.org
- Health care providers who care for substance-exposed infants or infants diagnosed with Neonatal Abstinence Syndrome should encourage birthing facilities to develop opportunities for the mother-infant dyad to allow the mother to practice safe sleep and calming the infant (abusive head trauma prevention). In addition to assuring education is provided to these families, providers and birthing facilities should assure the mother has a crib, pack-n-play, or bassinette for safe sleep and document where the infant will be sleeping after discharge. This should be asked again in follow-up visits after discharge.
- Childcare serving agencies, domestic violence shelters, and emergency shelters should have infant safe sleep policies that follow the national safe sleep practices recommended by the American Academy of Pediatrics.

Recommendation #3 – Local child fatality review teams:

Strengthen current local CFR team reviews through site or web based support, training and collaboration with local health department CFR coordinators to build teams in areas lacking a team. Develop processes for reporting and review of a death across agencies or county lines.

- Engage coroners to call together a local CFR team in their area if one does not already exist. Provide up-to date-training, current forms required by statute, and a doll for reenactment of infant sleep-related deaths. Link coroners with their local health department CFR coordinator.

- Encourage local health department CFR coordinators to consider forming a Community Action Team to review child deaths when the coroner cannot be engaged to do CFR.

Recommendation #4 – Firearms:

To improve and increase educational efforts related to firearm storage, access for minors, gun related homicides, suicides, or accidental deaths.

- Parents and caregivers who choose to have guns in the house should be encouraged to follow gun safety procedures at home by keeping firearms locked up with ammunition stored separately. They should also practice and model gun safety in front of children and use gun safety locks supplied by many local police and sheriff departments.

- Healthcare and behavioral health providers should inquire about firearms in the home at each visit and provide education regarding the safe storage of firearms and limiting accessibility of these to minors unless supervised.

TRAININGS OFFERED FOR INJURY PREVENTION

Continuing Education Program on Sudden Infant Death Syndrome (SIDS) Risk Reduction

- The *Eunice Kennedy Shriver* National Institute of Child Health and Human Development and its partners developed a FREE continuing education (CE) program on SIDS risk reduction for nurses available at http://www.nichd.nih.gov/SIDS/Pages/sidsnursesce.aspx

- Pharmacists can access this free continuing education (CE) activity, developed by the NICHD and its pharmacist partners, which explains the latest research on SIDS and SIDS risk reduction and outlines how pharmacists can help spread safe sleep messages to parents and caregivers in just a few minutes. https://www.nichd.nih.gov/news/resources/spotlight/Pages/080911-education-activity-pharmacists.aspx

- Child care providers can access a free training on safe sleep developed by Healthy Child Care America at http://www.healthychildcare.org/PDF/SIDSAccessFlyer.pdf using the promotional code SIDSCCP.

Pediatric Abusive Head Training (Meets Kentucky State law requirements) and Child Maltreatment

- Free one hour training on pediatric abusive head trauma (PAHT) training for physicians is offered at http://www.nortonhealthcare.com/pediatric-abusive-head-trauma.

- Online training for healthcare/other child care providers for PAHT, titled “Understanding Abusive Head Trauma”, course ID number 1029168 can be accessed at https://ky.train.org.

DEFINITION OF TERMS

- **Cause of Death** – Event that causes a physical problem, no matter how brief or prolonged, that leads to a child's death. Categories for cause of death are injury deaths and non-injury deaths.
    - **Injury Deaths –** more likely to be preventable than non-injury deaths, including but not limited to: suffocation, poisoning, drowning, fire, child abuse, suicide, homicide, and vehicular collisions.
    - **Non-Injury Deaths** – deaths that are the result of natural processes such as disease, prematurity, or congenital anomalies (birth defects).
- **Child** – A person between 0 and 17 years of age (all references to "child" in this report specify which age group/range).
- **Disparity** – Term used to describe the difference or inequity between two groups.
  Example: If the infant death rate was lower in white infants compared to the infant death rate in all other races, a racial disparity exists because one racial group (all other races) has a higher rate of infant death compared to another racial group (white infants).
- **Infant** – A person under 1 year of age.
- **Infant Mortality** – Death of an infant before his or her first birthday.
- **Infant Mortality Rate** – Number of infant deaths per 1,000 live births for a specified time.
- **Rate** – Measure that indicates how often an event is occurring during a certain time period; it is calculated by taking the count of an event during a specific time period and dividing this number by the population that is at risk for experiencing the event during the time period. Rates are often expressed in units of 10, such as per 100, per 1,000, or per 100,000.
    - *Example: The infant death rate is expressed as the number of deaths that occurred among infants 1 to 364 days old who were born alive during a given year divided by the number of live births that occurred in the same year multiplied by 1,000. Therefore, if 200 infants died during 2015 and there were 16,000 live births during the same year, the infant death rate would be 12.5 deaths per 1,000 live births (calculated by taking 200 divided by 16,000 and multiplying by 1,000).*
- **Sleep-Related Risk Factors** – These are hazards which create an unsafe sleep space for an infant and include: bed-sharing, use of sofa/couch or other surface not designed for infant sleep, soft bedding or presence of stuffed animals in sleep environment, use of an adult bed, and placed prone (on stomach) or side position; which can create an unsafe sleep environment.
- **Sudden Unexpected Infant Deaths (SUID)** - defined as deaths in infants less than 1 year of age that occur suddenly and unexpectedly, and whose cause of death are not immediately obvious prior to investigation. SUID includes these categories:
    - Sudden Infant Death Syndrome (SIDS): a sudden, unexplained death of an infant less than 1 year old. It is a diagnosis of exclusion, meaning that after an extensive review of the infant's medical history, a complete autopsy, and a death scene investigation no cause can be identified.
    - Accidental Suffocation in bed: a result of another person lying on the baby, wedging of the baby, or the baby's face in a soft surface such as a pillow, blanket, or bumper pad.
    - Undetermined: there is no anatomic, toxicological or metabolic cause of death but there is other compelling information, investigative omission, or physical evidence that is concerning and suggests that death was not a natural death.

DATA AND METHODOLOGY

Data Sources: Data contained within this report are for Kentucky residents 0 to 17 years of age from 2011 through 2015. The sources of this data include Vital Statistics Death Certificate files, coroner's reports, Child Fatality Review Team reports, Kentucky Medical Examiner's reports, and Kentucky Medicaid Claims Data Warehouse. Population data used to determine death rates were obtained from Vital Statistics Birth Certificate files and the Kentucky State Data Center for 2011 through 2015. Cause of death are classified based on the International Classification of Diseases 10th revision (ICD-10). National data presented in this report were obtained from the National Vital Statistics Reports published by the National Center for Health Statistics and the Centers for Disease Control and Prevention (CDC).

Analytic Methods: Within this report, results are presented in the form of a count, percentage, rate, or three-year rolling average for various causes of death by age group.

Rates are used to relate the number of cases of a disease or outcome to the size of the source population in which they occurred. A rate is defined as a ratio in which there is a distinct relationship between the numerator and denominator, and some measure of time is included.

The **infant mortality rate** provides an estimated prevalence of infant deaths per 1,000 live births in a given timeframe and is calculated as follows:

$$\frac{\text{Total number of infant deaths x 1,000}}{\text{Total number of live births}}$$

A **childhood mortality rate** provides an estimated prevalence of childhood deaths for a specified age group per 100,000 children within that same age group in a given timeframe and is calculated as follows:

$$\frac{\text{Total number of child deaths x 100,000}}{\text{Total number of children in the population}}$$

A **three-year rolling average** is used to increase the case counts per data point, which can improve the stability of the estimates. The result is a somewhat smoothed trend that is less likely to be skewed by outliers. An example calculation for the years 2011-2013, which would be identified as the 2012 data point, is below:

$$\frac{\text{(Number of deaths in 2011 + Number of deaths in 2012 + Number of deaths in 2013)}}{3}$$

Limitations: Certain limitations exist with death certificate data and should be acknowledged when interpreting results. The timeliness of completion of the death certificate and accuracy of completed information on the certificate serve as barriers. Physician interpretation of mortality causal events may differ, which could lead to variation in coding the primary cause of death. Determining one specific underlying cause of death among decedents with multiple chronic diseases can become problematic since the etiologic sequence of disease may be unclear and one single disease may not adequately describe the cause of death. For injury-related causes of death (such as homicides, suffocation, and suicides), the investigations that occur around these cases could be lengthy and delay the determination of the primary cause of death.

Another limitation of the data reported in this publication is that analysis of the deaths by cause category is solely based on the primary cause of death field on the death certificate and does not include supplemental causes of death. This could lead to under-reporting of certain causes of death. For example, an infant with a congenital heart defect that is born preterm may have prematurity as the primary cause of death with congenital anomalies listed as a supplemental cause of death. Since this report is based only on the primary cause of death, this infant would be counted in the prematurity deaths but not in the congenital anomaly deaths.

The lag time in receiving the official death certificate on Kentucky residents that die out-of-state is another limitation of this data. Analysis is based solely on the records housed in Kentucky's Office of Vital Statistics (OVS). Therefore, if data on residents that die out-of-state have not been received by OVS prior to analysis of the data for this report then these deaths are not included, resulting in under-reporting. For this and the reasons listed above, the data presented in this report are preliminary and may change.

Lastly, many figures throughout this report contain data based on small numbers. Rates and percentages based on small numbers are unreliable due to random error. Minimal increases or decreases in these numbers from year to year may dramatically affect the rate or percent resulting in what appears to be a significant change. However, the differences in the data from year to year are not statistically significant and should be interpreted with caution.

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