CHILD FATALITY PREVENTION SYSTEM: DROWNING DEATH DATA, 2016 - 2020

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Introduction

The Child Fatality Prevention System (CFPS) is a statewide network that focuses on preventing child deaths. Housed at the Colorado Department of Public Health and Environment (CDPHE), CFPS consists of local review teams, a State Review Team, and the CFPS state support team at CDPHE. Local teams and the CFPS State Review Team include community members and field experts. These teams complete case reviews of infant, child, and youth deaths in Colorado to describe trends and patterns and create strategies to prevent future deaths. As part of the case review process, CFPS partners develop and share out recommendations for how to prevent child deaths annually.

The system reviews all deaths that occur in Colorado among infants, children, and youth under age 18. CFPS does not review deaths of Colorado residents that occur out of state. This is different from other reports of child death data and other Colorado government data sources. As a result, the data presented in this data brief might not match other statistics reported at both the state and national levels.

This data brief provides an overview of drowning death data from CFPS. Additional CFPS data are available at: www.cochildfatalityprevention.com/p/reports.html.

For purposes of this brief, ***inequities*** are defined as systemic, avoidable, and unjust factors that prevent people from reaching their highest level of health. ***Disparities*** are differences in health outcomes between people related to social or demographic factors such as race, ethnicity, gender, sexual orientation, or geographic region. Measuring disparities helps measure our progress toward achieving equity.[1,2]

The impact of policies and systems on child deaths

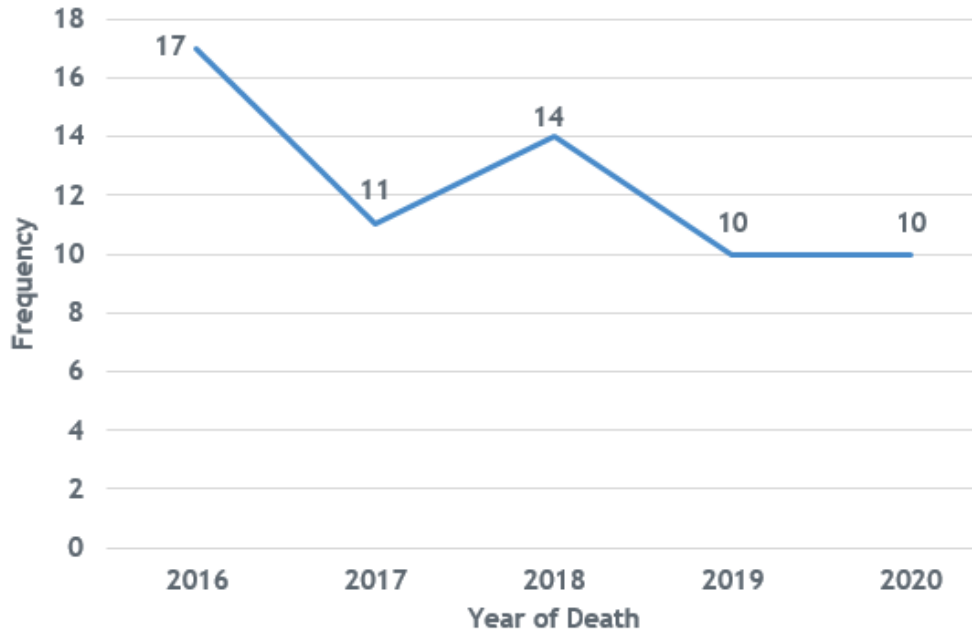
Generations of social, economic, and environmental inequities contribute to the deaths of infants, children, and youth.[3] People exposed to these factors (outlined in the table below) experience additional harm, resulting in higher rates of death. When interpreting the data, it is critical to not lose sight of these systemic, avoidable, and unjust factors. Researchers work towards understanding how geography, race, ethnicity, sexual orientation, and gender identity correlate with health. It is critical that data systems like CFPS identify and understand the life-long inequities that persist across groups in order to eliminate them. When limitations in the data system exist due to how data are collected, or because data are not collected, CFPS strives to provide additional context and research about how inequities impact child deaths. By changing policies and systems that create and perpetuate inequities, CFPS can reduce the number of child deaths that occur in Colorado. Examples of these inequities include, but are not limited to:

RURAL AND FRONTIER GEOGRAPHY	RACE AND ETHNICITY	SEXUAL ORIENTATION AND GENDER IDENTITY
Limited access to Level 1 trauma centers and mental and behavioral health services.[4] Increased stigma associated with mental illness and seeking help.[5] Longer response times by emergency medical services.[6] **→ These and other factors contribute to higher death rates in rural areas, including suicide[7] and passenger vehicle deaths.[8]**	Racism, discrimination, and historical trauma.[9,10] Limited access to high-quality education,[11] employment opportunities,[12] healthy foods,[13] culturally traditional foods,[14] and health care.[15] Chronic stress.[16] **→ These factors result in lasting health impacts for people of color that include infant mortality,[17] high rates of homicide and gun violence,[18] and increased motor vehicle deaths.[19]**	Discrimination, stigma, and bias.[20] Rejection from family, friends, and community.[21] Non-inclusive school curricula and anti-harassment policies.[22] Insufficient access to LGBTQ+-informed health care.[23] **→ This chronic social stress that LGBTQ+ children and youth experience influences health across the lifespan, including higher rates of suicide[24] and substance use.[25]**

Overview of Drowning Deaths

From 2016-2020, 62 drowning deaths occurred among infants, children, and youth ages 0-17 in Colorado. **Data on drowning deaths in this brief do not include those deaths that are intentionally caused such as those deaths that are the result of homicide or suicide.** Drowning deaths for the period ranged from a low of 10 deaths in 2019 and 2020 to a high of 17 deaths in 2016, and averaged about 12 per year (Figure 1). The rate of drowning deaths for the period was 0.9 per 100,000 population. This rate did not change significantly from year to year and was not significantly different than the national rate of drowning deaths over the same period (1.1 per 100,000 population).[26]

Figure 1. Drowning deaths occurring among those under age 18 in Colorado by year, 2016-2020 (n=62)



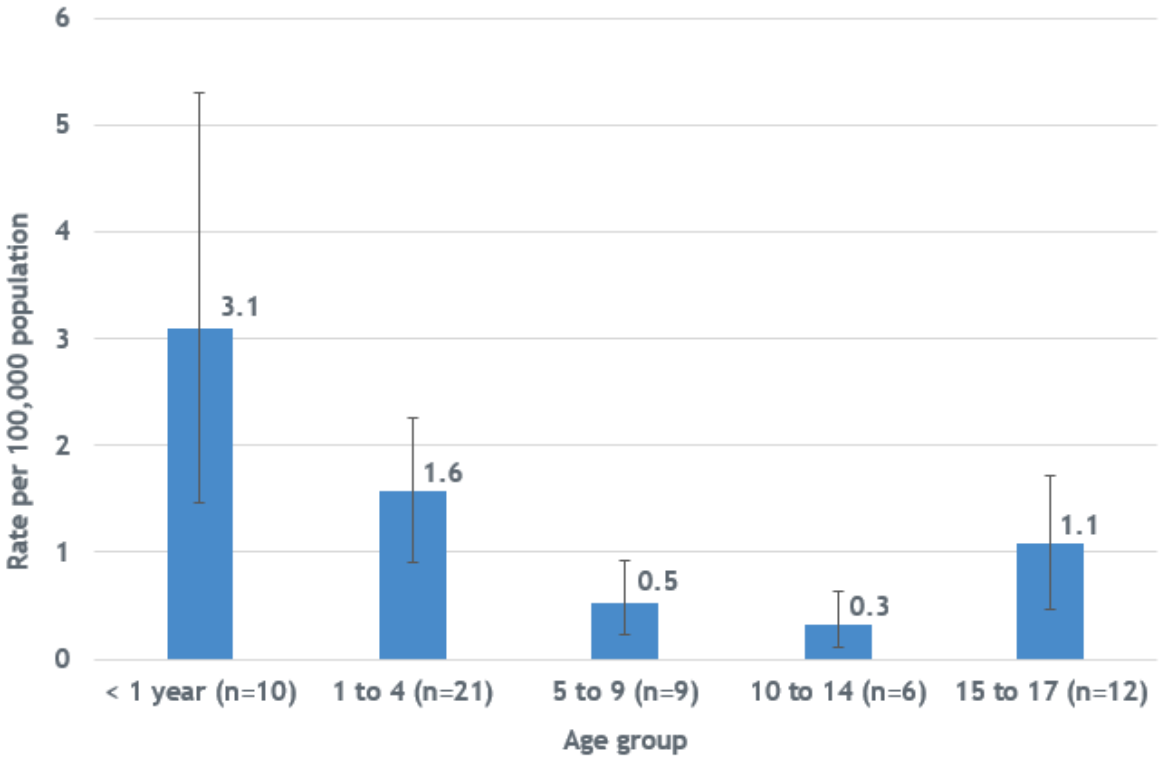
Demographic Characteristics

Age

Children ages 1-4 account for the majority of drowning deaths in Colorado (33.9%, n=21), while 16.1% (n=10) were infants under age 1, 17.7% (n=11) were children ages 5-9, 9.7% (n=6) were youth ages 10-14, and 22.6% (n=14) were youth ages 15-17.

There were statistically significant differences in rates across age groups, with the youngest age groups having significantly higher rates when compared to the older age groups. The highest rates were observed among infants (3.1 per 100,000 population), at nearly ten times the rate observed for children ages 10-14 (0.3 per 100,000 population). Additionally, the rate observed among children ages 1-4 (1.6 per 100,000 population) is over three times the rate of children ages 5-9 (0.5 per 100,000 population) (Figure 2). These rates are derived from small numbers and can vary substantially if additional deaths occur within a particular age group.

Figure 2. Age-specific rates of drowning deaths occurring in Colorado among Colorado residents under age 18 by age group, 2016-2020 (n=58)



*Error bars represent 95% confidence limits for rates.

Sex

Among infants, children, and youth who died by drowning, 66.1% (n=41) were males. The rate of drowning death among males (1.2 per 100,000 population) was higher than among females (0.6 per 100,000 population), but this difference was not statistically significant.

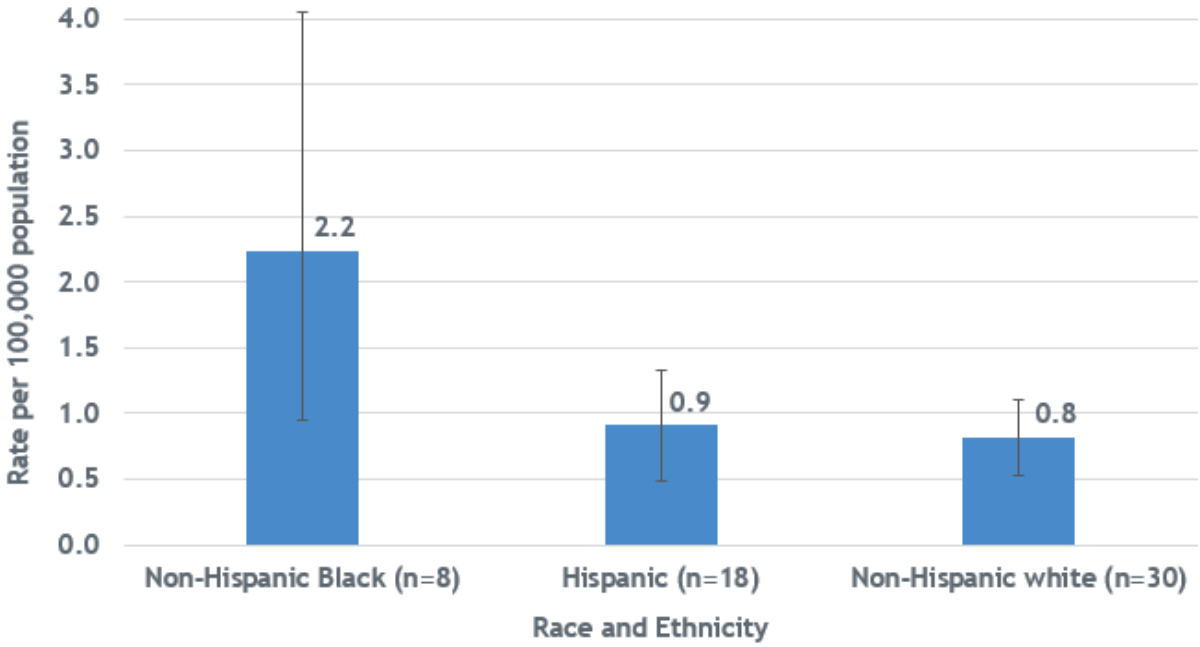
Race and Ethnicity

A note about terminology: Hispanic ethnicity as collected on the Colorado death certificate includes those that identify as Mexican, Mexican American, Chicano, Chicana, Puerto Rican, Dominican, Cuban, Central American, South American, Latin American, Spanish, and other Latin or Hispanic descent.[27] Additionally, "Latinx" and "Chicanx" are increasingly used gender inclusive terms, respecting those with a non-binary gender identity.[28,29] To ensure clarity, this report uses "Hispanic" throughout the data section to reflect how CFPS data are collected from the death certificate and to align with terminology used in cited literature and research.[30]

Of the 62 infants, children, and youth who died by drowning, 51.6% (n=32) were non-Hispanic white, 29.0% (n=18) were of Hispanic origin, and 14.5% (n=9) were non-Hispanic Black.

Colorado observed a disparity in the rate of drowning deaths by race and ethnicity (Figure 3). The rate of drowning deaths among non-Hispanic Black infants, children, and youth was nearly three times higher (2.2 per 100,000 population) than for non-Hispanic white (0.8 per 100,000 population), but this difference was not statistically significant. This pattern is consistent with national data from 2016-2020 showing higher drowning rates among non-Hispanic Black (1.7 per 100,000 population) infants, children, and youth when compared to non-Hispanic white (1.1 per 100,000 population).[31]

Figure 3. Rates of drowning deaths occurring in Colorado among Colorado residents under age 18 by race and ethnicity, 2016-2020 (n=58)



*Error bars represent 95% confidence limits for rates.

Nationally, non-Hispanic Black children and youth are significantly more likely to drown in swimming pools when compared to other racial and ethnic groups.[32] In Colorado, 55.6% (n=5) of drowning deaths among non-Hispanic Black infants, children, and youth occurred in a swimming pool, compared to 38.9% (n=7) of Hispanic and 12.5% (n=4) of non-Hispanic white.

The history of racial residential segregation in the U.S. helps explain why the disparity of drowning of non-Hispanic Black children and youth exists. In the U.S., Black families are likely to live in communities that are highly segregated with limited access to basic needs assistance, mental health and substance abuse treatment, and opportunities for employment.[33] Racialized residential segregation is largely driven by discriminatory federal,

state, and local policies, such as redlining, that create unjust geographic divisions among racial and ethnic groups.[34] Racial segregation leads to concentrated neighborhood poverty,[35] which research has shown is associated with an increased risk of drowning death.[36] Data show 16.8% of Black and 14.8% of Hispanic Coloradoans live below the poverty level, compared to 7.7% of non-Hispanic white Coloradans.[37] Future research is needed to better understand the link between poverty and unintentional injury.

Racial residential segregation is also closely tied with the social history of swimming pools in the U.S. In the late 1800s, many states built city pools in working-class white neighborhoods, but noticeably avoided Black, racially segregated neighborhoods.[38] This was followed by a surge in the construction and popularity of resort-like public swimming pools in the 1920s and 1930s. These pools, with their grassy lawns and sundecks, attracted millions of swimmers. It was at this time, however, that cities began to racially segregate swimming pools, either by official policy or by violence and intimidation of Black swimmers. When city pools were court ordered to racially desegregate in the 1940s and 1950s, attendance at the pools plummeted, causing many to shut their doors. White families who had regularly used the city pool retreated to private pools and swim clubs. Once again, white families had open access to these private pools, while racial discrimination severely restricted access for Black families.[39]

This history of racism resulted in swimming being passed down through generations among white families, but never becoming a component of recreation or culture in Black families.[40] The consequences of racial discrimination at swimming pools are still impacting communities of color today.[41] Black children and youth are less likely to take swimming lessons and learn about water safety, culminating in higher risk of drowning.[42,43,44]

Geography

To calculate statistics by geographic location within the state, counties in Colorado are categorized as urban, rural, or frontier, according to standards applied by the Colorado Rural Health Center.[45] All counties that are not designated as parts of Metropolitan Areas are considered rural. Frontier counties are further classified as those with a population density of six or fewer persons per square mile. It is worth noting that these county designations are limited in that they do not account for the geographic nuance experienced by several large counties in Colorado (e.g., Arapahoe, El Paso, Larimer, Mesa) that have both populous urban centers and broad rural areas.

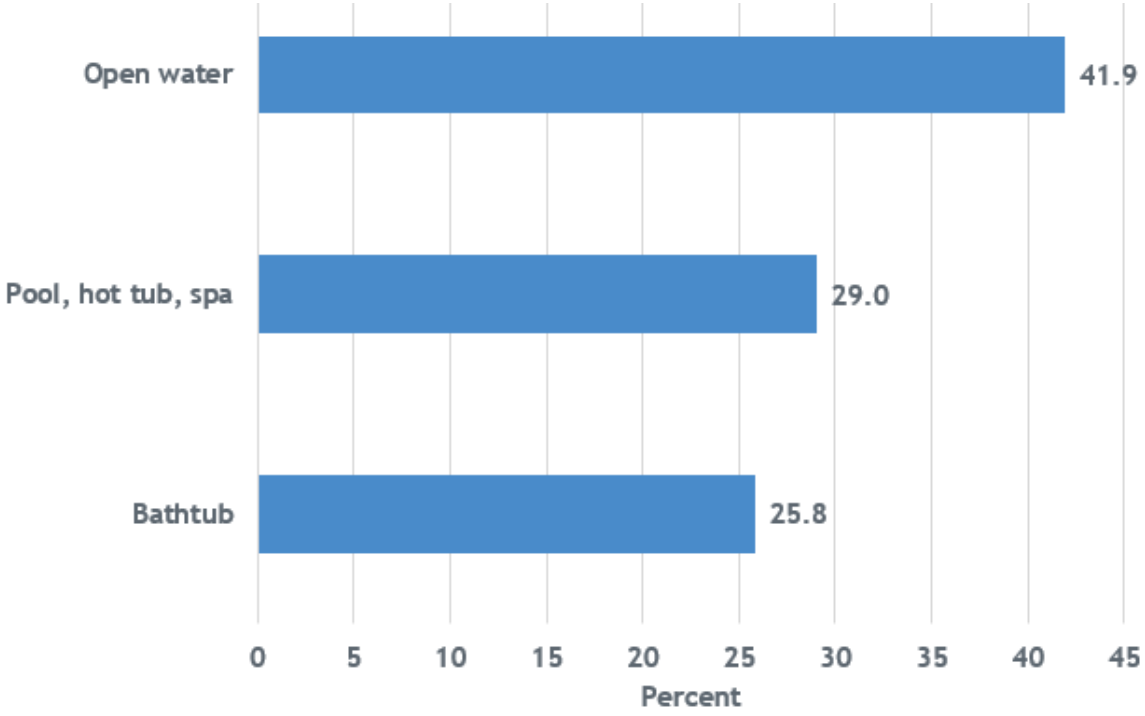
Between 2016 and 2020, the majority of Colorado residents under age 18 who died by drowning in Colorado resided in an urban county (84.5%, n=49) and 13.8% (n=8) lived in a rural county. Although not statistically significant, the rate of drowning deaths among infants, children, and youth residing in a rural county (1.3 per 100,000 population) was higher than those residing in an urban county (0.9 per 100,000 population). Readers should interpret this data with caution, as the rural rate represents very few deaths, decreasing the stability of the rate.

This rate data is consistent with national data showing higher drowning rates in rural areas. From 2016 to 2020 in the U.S., the most rural areas (1.7 per 100,000 population) had a drowning rate among those under age 18 that was nearly twice as high as the most urban areas (0.9 per 100,000 population).[46] These disparities may be due to increased access to open water environments in rural areas, which may not have physical barriers or warning signs about entering the water. Rural and frontier areas also experience limited access to Level 1 trauma centers and longer response times by emergency medical services to the scene of an incident,[47] which may impact emergency response to drowning incidents.

Drowning Circumstances

Open water environments, including lakes, rivers, ponds, creeks, quarries, gravel pits, and canals, were the most common drowning locations (41.9%, n=26), followed by pools, hot tubs, and spas (29.0%, n=18) and bathtubs (25.8%, n=16) (Figure 4).

Figure 4. Location of drowning deaths occurring among those under age 18 in Colorado, 2016-2020 (n=62)



About 92.3% (n=24) of those who died in open water and 77.8% (n=14) of those who died in a pool, hot tub, or spa were not known to be wearing or using a personal flotation device, including U.S. Coast Guard approved jackets, cushions, or life-saving rings, or those not approved, such as swim rings, inner tubes, or air mattresses. Of the 26 infants, children, and youth who died in open water, 30.8% (n=8) were unable to swim. Of those who died in a pool,

hot tub, or spa, 61.1% (n=11) were unable to swim. Of all bathtub drowning deaths, 50.0% (n=8) occurred among infants under age 1 and 25.0% (n=4) occurred among children ages 1-4. A bathing aid, such as a bathtub seat or ring, was not known to be used in 81.3% (n=13) of these bathtub drowning deaths.

CFPS teams determined 27.4% (n=17) of drowning deaths met the criteria of child maltreatment (abuse or neglect). The majority of drowning deaths where child maltreatment was a factor occurred among infants and children under age 5 (94.1%, n=16). All of the drowning deaths where child maltreatment contributed were due to neglect. Additional CFPS data on child maltreatment is available at: www.cochildfatalityprevention.com/p/reports.html.

Conclusion

From 2016 to 2020, drowning was the seventh leading cause of death reviewed by CFPS among those under age 18 in Colorado. Open water environments were the most common drowning locations, followed by pools, hot tubs, and spas and bathtubs. The highest drowning rates were observed among infants and children under age 5 and among non-Hispanic Black infants, children, and youth. Upstream prevention strategies that address social and structural inequities can reduce drowning deaths among infants, children, and youth. To learn more about the prevention strategies recommended by CFPS, view the 2022 Legislative Report (www.cochildfatalityprevention.com/p/reports.html). To learn even more about the inequities that contribute to child deaths, view the CFPS report "*The Role of Policies and Systems in Child Deaths in Colorado*."

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