



# Child Fatality Prevention System:

Unintentional Drowning Death Data,  
2015 - 2019



---

## 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 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. The CFPS State Review Team develops recommendations for the legislature on how to prevent child deaths in an annual legislative report.

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 unintentional drowning death data from CFPS. Additional CFPS data are available at: [www.cochildfatalityprevention.com/p/reports.html](http://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.<sup>1,2</sup>

## 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.<sup>3</sup> 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:

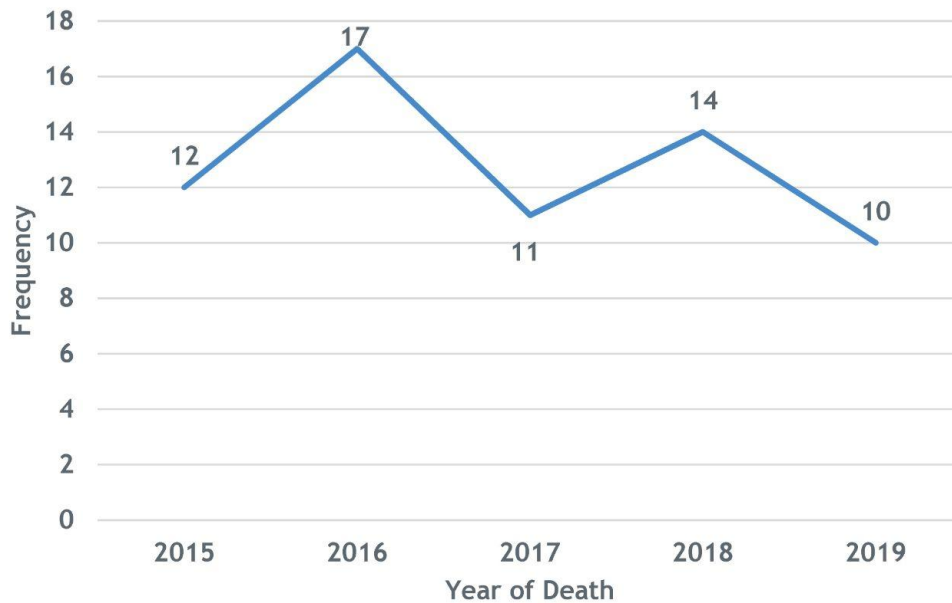
RURAL AND FRONTIER GEOGRAPHY	RACE AND ETHNICITY	SEXUAL ORIENTATION AND GENDER IDENTITY
<p>Limited access to Level 1 trauma centers and mental and behavioral health services.<sup>4</sup></p> <p>Increased stigma associated with mental illness and seeking help.<sup>5</sup></p> <p>Longer response times by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

## Overview of Unintentional Drowning Deaths

From 2015-2019, 64 unintentional drowning deaths occurred among infants, children, and youth ages 0-17 in Colorado. Unintentional drowning deaths for the period ranged from a low of 10 deaths in 2019 to a high of 17 deaths in 2016, and averaged about 13 per year (Figure 1). The rate of unintentional 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 unintentional drowning deaths over the same period (1.1 per 100,000 population).<sup>26</sup>

---

Figure 1. Unintentional drowning deaths occurring among those under age 18 in Colorado by year, 2015-2019 (n=64)



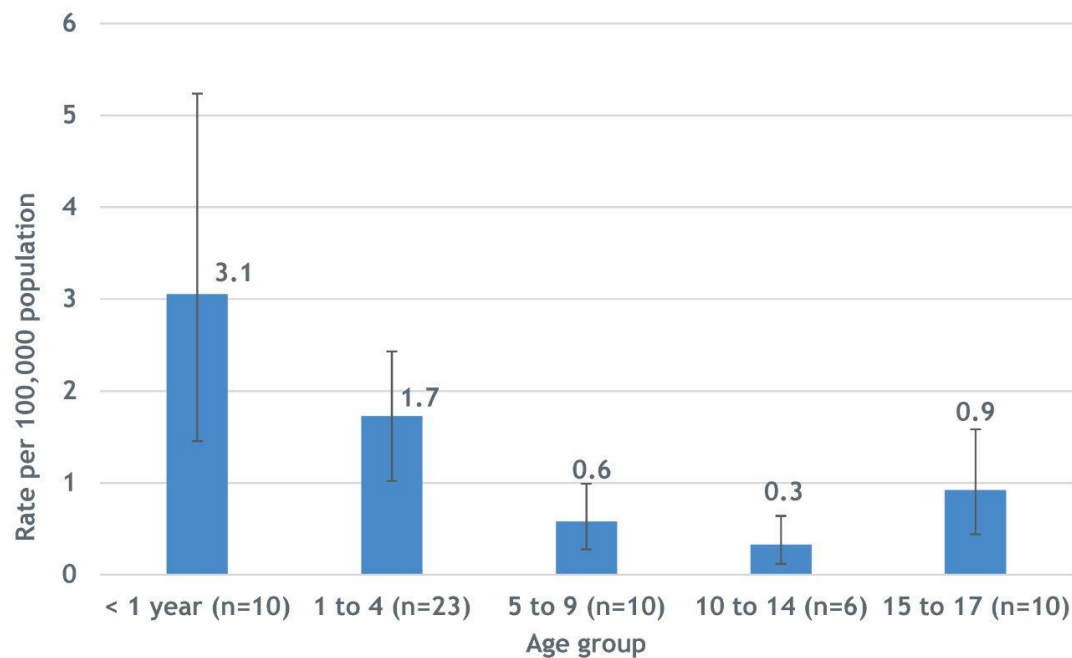
## Demographic Characteristics

### Age

Children ages 1-4 account for the majority of unintentional drowning deaths in Colorado (37.5%, n=24), while 15.6% (n=10) were infants under age 1, 18.8% (n=12) were children ages 5-9, 9.3% (n=6) were youth ages 10-14, and 18.8% (n=12) 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 over 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 (1.7 per 100,000 population) is nearly three times the rate of children ages 5-9 (0.6 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 unintentional drowning deaths occurring in Colorado among Colorado residents under age 18 by age group, 2015-2019 (n=59)



\*Error bars represent 95% confidence limits for rates.

## Sex

Among infants, children, and youth who died by unintentional drowning, 60.9% (n=39) were males. The rate of unintentional drowning death among males (1.1 per 100,000 population) was higher than females (0.8 per 100,000 population), but this difference was not statistically significant.

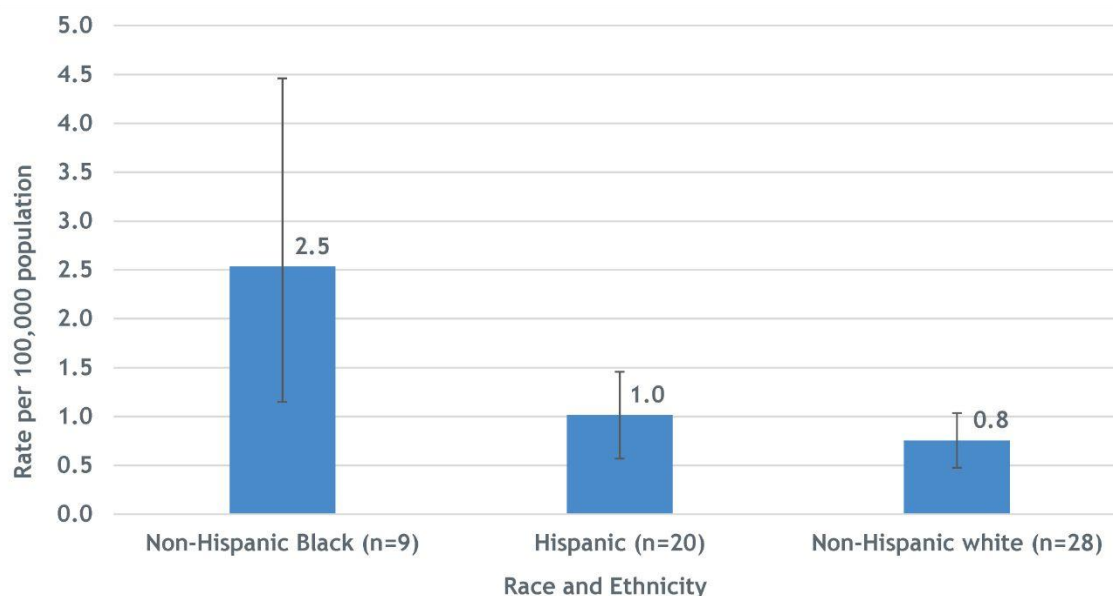
## Race and Ethnicity

**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.<sup>27</sup> Additionally, “Latinx” and “Chicanx” are increasingly used gender inclusive terms, respecting those with a non-binary gender identity.<sup>28,29</sup> 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.<sup>30</sup>

Of the 64 infants, children, and youth who died by unintentional drowning, 48.4% (n=31) were non-Hispanic white, 31.3% (n=20) were of Hispanic origin, and 15.6% (n=10) were non-Hispanic Black.

Colorado observed a significant disparity in the rate of unintentional drowning deaths by race and ethnicity (Figure 3). The rate of unintentional drowning deaths among non-Hispanic Black infants, children, and youth was over three times higher (2.5 per 100,000 population) than for non-Hispanic white (0.8 per 100,000 population). This is consistent with national data showing significantly higher unintentional 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).<sup>31</sup>

**Figure 3. Rates of unintentional drowning deaths occurring in Colorado among Colorado residents under age 18 by race and ethnicity, 2015-2019 (n=59)**



\*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.<sup>32</sup> In Colorado, 60.0% (n=6) of unintentional drowning deaths among non-Hispanic Black infants, children, and youth occurred in a swimming pool, compared to 30.0% (n=6) of Hispanic and 19.4% (n=6) of non-Hispanic white.

The history of racial residential segregation in the United States helps explain why the disparity of drowning of non-Hispanic Black children and youth exists. In the United States, 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 opportunity for

---

employment.<sup>33</sup> 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.<sup>34</sup> Racial segregation leads to concentrated neighborhood poverty,<sup>35</sup> which research has shown is associated with increased risk of unintentional drowning death.<sup>36</sup> Data show 18.5% of Black and 14.3% of Hispanic Coloradoans live below the poverty level, compared to 7.1% of non-Hispanic white Coloradans.<sup>37</sup> 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 United States. In the late 1800s, many states built city pools in working-class white neighborhoods, but noticeably avoided Black, racially segregated neighborhoods.<sup>38</sup> 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.<sup>39</sup>

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.<sup>40</sup> The consequences of racial discrimination at swimming pools are still impacting communities of color today.<sup>41</sup> Black children and youth are less likely to take swimming lessons and learn about water safety, culminating in higher risk of unintentional drowning.<sup>42,43,44</sup>

## 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.<sup>45</sup> 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 2015 and 2019, the majority of Colorado residents under age 18 who died by unintentional drowning in Colorado resided in an urban county (81.4%, n=48), 13.5% (n=8) lived in a rural county, and 5.1% (n=3) lived in a frontier county. Although not statistically significant, the rate of unintentional drowning deaths among infants, children, and youth residing in a frontier county (2.2 per 100,000 population) was higher than those residing in a

---

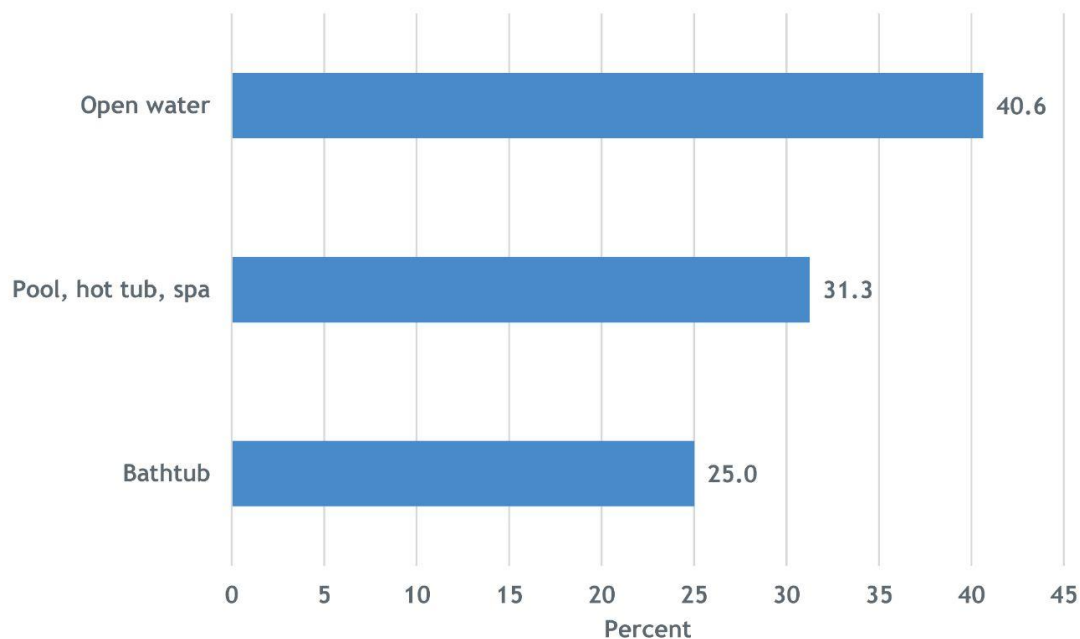
rural (1.3 per 100,000 population) or urban county (0.9 per 100,000 population). Readers should interpret this data with caution, as the frontier and rural rates represent very few deaths, decreasing the stability of the rates.

This rate data is consistent with national data showing higher unintentional drowning rates in rural areas. From 2015 to 2019 in the United States, the most rural areas (1.7 per 100,000 population) had an unintentional drowning rate among those under age 18 that was nearly twice as high as the most urban areas (0.9 per 100,000 population).<sup>46</sup> 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,<sup>47</sup> which may impact emergency response to drowning incidents.

## Unintentional Drowning Circumstances

Open water environments, including lakes, rivers, ponds, creeks, quarries, gravel pits, and canals, were the most common drowning locations (40.6%, n=26), followed by pools, hot tubs, and spas (31.3%, n=20) and bathtubs (25.0%, n=16) (Figure 4).

**Figure 4. Location of unintentional drowning deaths occurring among those under age 18 in Colorado, 2015-2019 (n=64)**





---

About 88.5% (n=23) of those who died in open water and 85.0% (n=17) 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, 46.2% (n=12) were unable to swim. Of those who died in a pool, hot tub, or spa, 60.0% (n=12) 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 75.0% (n=12) of these bathtub drowning deaths.

CFPS teams determined 31.3% (n=20) of unintentional drowning deaths met the criteria of child maltreatment (abuse or neglect). The majority of unintentional drowning deaths where child maltreatment was a factor occurred among infants and children under age 5 (85.0%, n=17). All of the unintentional 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](http://www.cochildfatalityprevention.com/p/reports.html).

## Conclusion

From 2015 to 2019, unintentional drowning was the sixth 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 unintentional 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 unintentional drowning deaths among infants, children, and youth. To learn more about the prevention strategies recommended by CFPS, view the 2021 Legislative Report ([www.cochildfatalityprevention.com/p/reports.html](http://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](#).”

*For more information and CFPS data, please contact the CFPS Support Team at the Colorado Department of Public Health and Environment:*

*Sasha Mintz, Child Fatality Prevention System Epidemiologist | [sasha.mintz@state.co.us](mailto:sasha.mintz@state.co.us)*

---

## References

1. Braveman, P. (2014). What are health disparities and health equity? We need to be clear. *Public health reports*, 129(1\_suppl2), 5-8.
2. American Public Health Association. Health Equity. Retrieved from: <https://www.apha.org/topics-and-issues/health-equity>.
3. Bailey, Z. D., Krieger, N., Agénor, M., Graves, J., Linos, N., & Bassett, M. T. (2017). Structural racism and health inequities in the U.S.A.: evidence and interventions. *The Lancet*, 389(10077), 1453-1463.
4. Rost, K., Fortney, J., Fischer, E., & Smith, J. (2002). Use, quality, and outcomes of care for mental health: The rural perspective. *Medical Care Research and Review*, 59(3), 231-265.
5. Cantrell, C., Valley-Gray, S., & Cash, R. E. (2012). Suicide in rural areas: risk factors and prevention. *Rural Mental Health: Issues, Policies, and Best Practices*. New York, NY: Springer.
6. Mell, H. K., Mumma, S. N., Hiestand, B., Carr, B. G., Holland, T., & Stopyra, J. (2017). Emergency medical services response times in rural, suburban, and urban areas. *JAMA surgery*, 152(10), 983-984.
7. Cantrell, C., Valley-Gray, S., & Cash, R. E. (2012). Suicide in rural areas: risk factors and prevention. *Rural Mental Health: Issues, Policies, and Best Practices*. New York, NY: Springer.
8. Beck, L. F., Downs, J., Stevens, M. R., & Sauber-Schatz, E. K. (2017). Rural and urban differences in passenger-vehicle-occupant deaths and seat belt use among adults—United States, 2014. *MMWR Surveillance Summaries*, 66(17), 1.
9. Palacios, J. F., & Portillo, C. J. (2009). Understanding Native women's health: Historical legacies. *Journal of Transcultural Nursing*, 20(1), 15-27.
10. Pager, D., & Shepherd, H. (2008). The Sociology of Discrimination: Racial Discrimination in Employment, Housing, Credit, and Consumer Markets. *Annual Review of Sociology*, 34, 181-209.
11. Williams, D. R., & Collins, C. (2016). Racial residential segregation: a fundamental cause of racial disparities in health. *Public Health Reports*, 116(5), 404-16.
12. Collins, C. A., & Williams, D. R. (1999, September). Segregation and mortality: the deadly effects of racism?. In *Sociological Forum* (Vol. 14, No. 3, pp. 495-523). Kluwer Academic Publishers-Plenum Publishers.
13. Larson, N. I., Story, M. T., & Nelson, M. C. (2009). Neighborhood environments: disparities in access to healthy foods in the U.S. *American journal of preventive medicine*, 36(1), 74-81.
14. Greder, K., de Slowing, F. R., & Doudna, K. (2012). Latina immigrant mothers: Negotiating new food environments to preserve cultural food practices and healthy child eating. *Family and Consumer Sciences Research Journal*, 41(2), 145-160.

- 
15. White, K., Haas, J. S., & Williams, D. R. (2012). Elucidating the role of place in health care disparities: the example of racial/ethnic residential segregation. *Health Services Research, 47*(3pt2), 1278-1299.
  16. Williams, D. R., & Mohammed, S. A. (2013). Racism and health I: Pathways and scientific evidence. *American behavioral scientist, 57*(8), 1152-1173.
  17. Acevedo-Garcia, D., Lochner, K. A., Osypuk, T. L., & Subramanian, S. V. (2003). Future directions in residential segregation and health research: a multilevel approach. *American journal of public health, 93*(2), 215-221.
  18. Collins, C. A., & Williams, D. R. (1999, September). Segregation and mortality: the deadly effects of racism?. In *Sociological Forum* (Vol. 14, No. 3, pp. 495-523). Kluwer Academic Publishers-Plenum Publishers.
  19. King, M. (2017). Under The Hood: Revealing Patterns Of Motor Vehicle Fatalities In The United States. *Publicly Accessible Penn Dissertations. 2396*. Retrieved on June 19, 2019 from: [repository.upenn.edu/edissertations/2396](http://repository.upenn.edu/edissertations/2396).
  20. Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychological bulletin, 129*(5), 674.
  21. Kelleher, C. (2009). Minority stress and health: Implications for lesbian, gay, bisexual, transgender, and questioning (LGBTQ) young people. *Counselling psychology quarterly, 22*(4), 373-379.
  22. Sadowski, M. (2020). Safe is not enough: Better schools for LGBTQ students. *Harvard Education Press*.
  23. Kates, J., Ranji, U., Beamesderfer, A., Salganicoff, A., & Dawson, L. (2015). Health and access to care and coverage for Lesbian, Gay, Bisexual and Transgender (LGBT) individuals in the U.S.
  24. Hatzenbuehler, M. L., & Pachankis, J. E. (2016). Stigma and minority stress as social determinants of health among lesbian, gay, bisexual, and transgender youth: research evidence and clinical implications. *Pediatric Clinics, 63*(6), 985-997.
  25. Moazen-Zadeh, E., Karamouzian, M., Kia, H., Salway, T., Ferlatte, O., & Knight, R. (2019). A call for action on overdose among LGBTQ people in North America. *The Lancet Psychiatry, 6*(9), 725-726.
  26. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2019 on CDC WONDER Online Database, released in 2020. Data are from the Multiple Cause of Death Files, 1999-2019, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on Jan 5, 2021 9:39:30 AM.
  27. Overview: Colorado Birth Certificates and Death Certificates, Vital Records. Retrieved from: [drive.google.com/file/d/1GqFYL473YSJp-gwj9bE5arvNzoQg3O9K/view](https://drive.google.com/file/d/1GqFYL473YSJp-gwj9bE5arvNzoQg3O9K/view).
  28. Padilla, Y. (2016, April 18). What does “Latinx” mean? A look at the term that’s challenging gender norms. Complex. Retrieved from [www.complex.com/life/2016/04/latinx](http://www.complex.com/life/2016/04/latinx).

- 
29. Salinas Jr, C., & Lozano, A. (2019). Mapping and recontextualizing the evolution of the term Latinx: An environmental scanning in higher education. *Journal of Latinos and Education*, 18(4), 302-315.
  30. Office of Health Equity, Colorado Department of Public Health and Environment, Health Inequities Fact Sheet 2019: Latinx Coloradans Fact Sheet. Retrieved from: [drive.google.com/file/d/1z1b15A9hGaRxxv4XTTa9BiPnz5lwjvfr/view](https://drive.google.com/file/d/1z1b15A9hGaRxxv4XTTa9BiPnz5lwjvfr/view).
  31. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2019 on CDC WONDER Online Database, released in 2020. Data are from the Multiple Cause of Death Files, 1999-2019, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on Jan 5, 2021 9:39:30 AM.
  32. Gilchrist, J., & Parker, E. M. (2014). Racial/ethnic disparities in fatal unintentional drowning among persons aged ≤ 29 years—United States, 1999-2010. *MMWR. Morbidity and mortality weekly report*, 63(19), 421.
  33. Allard, S. (2009). *Out of reach: Place, poverty and the New American Welfare state*. New Haven, CT: Yale University Press.
  34. Brown, K. S., Kijakazi, K., Runes, C., & Turner, M. A. (2019). Confronting Structural Racism in Research and Policy Analysis. *Urban Institute*. Retrieved from [www.urban.org/sites/default/files/publication/99852/confronting\\_structural\\_racism\\_in\\_research\\_and\\_policy\\_analysis\\_0.pdf](http://www.urban.org/sites/default/files/publication/99852/confronting_structural_racism_in_research_and_policy_analysis_0.pdf).
  35. Bailey, Z. D., Krieger, N., Agénor, M., Graves, J., Linos, N., & Bassett, M. T. (2017). Structural racism and health inequities in the U.S.A: evidence and interventions. *The Lancet*, 389(10077), 1453-1463.
  36. Karb, R. A., Subramanian, S. V., & Fleegler, E. W. (2016). County poverty concentration and disparities in unintentional injury deaths: a fourteen-year analysis of 1.6 million U.S. fatalities. *PloS one*, 11(5).
  37. U.S. Census Bureau; American Community Survey, 2019 American Community Survey 1-Year Estimates, Poverty Status in the Past 12 Months, Table S1701. Retrieved from [data.census.gov](https://data.census.gov).
  38. Wiltse, J. (2007). *Contested waters: A social history of swimming pools in America*. Univ of North Carolina Press.
  39. Wiltse, J. (2014). The Black-White swimming disparity in America: A deadly legacy of swimming pool discrimination. *Journal of Sport and Social Issues*, 38(4), 366-389.
  40. Wiltse, J. (2007). *Contested waters: A social history of swimming pools in America*. Univ of North Carolina Press.
  41. Hastings, D. W., Zahran, S., & Cable, S. (2006). Drowning in inequalities: Swimming and social justice. *Journal of Black Studies*, 36(6), 894-917.
  42. Martin, N. T., & Witman, D. (2010). Factors affecting minority drowning. *International journal of aquatic research and education*, 4(1), 3.
  43. Saluja, G., Brenner, R. A., Trumble, A. C., Smith, G. S., Schroeder, T., & Cox, C. (2006). Swimming pool drownings among U.S. residents aged 5-24 years: understanding racial/ethnic disparities. *American journal of public health*, 96(4), 728-733.

- 
44. Brenner, R. A., Trumble, A. C., Smith, G. S., Kessler, E. P., & Overpeck, M. D. (2001). Where children drown, United states, 1995. *Pediatrics*, 108(1), 85-89.
  45. Colorado Rural Health Center. (2018). Colorado: County Designations, 2018. Retrieved from:  
[coruralhealth.wpengine.netdna-cdn.com/wp-content/uploads/2013/10/2018-map.pdf](http://coruralhealth.wpengine.netdna-cdn.com/wp-content/uploads/2013/10/2018-map.pdf).
  46. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2019 on CDC WONDER Online Database, released in 2020. Data are from the Multiple Cause of Death Files, 1999-2019, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on Jan 5, 2021 9:39:30 AM.
  47. Mell, H. K., Mumma, S. N., Hiestand, B., Carr, B. G., Holland, T., & Stopyra, J. (2017). Emergency medical services response times in rural, suburban, and urban areas. *JAMA surgery*, 152(10), 983-984.