DROWNING PREVENTION RESEARCH PRIORITIES

Problem Description

Drowning is a leading cause of death among children in the United States. More children aged 1 to 4 years die from drowning than any other cause. Drowning is also a leading cause of unintentional injury death for children aged 5 to 14 years. For every child under the age of 18 who dies from drowning, approximately another seven children visit an emergency department for nonfatal drowning. Nonfatal drowning injuries can cause serious outcomes, such as brain damage and long-term disability.

Some racial and ethnic groups are more likely to be impacted by drowning. Among persons under the age of 30, non-Hispanic American Indian and Alaska Native persons and Non-Hispanic Black or African American persons have higher fatal drowning rates than non-Hispanic White persons.

There are multiple factors that might contribute to increased risk of drowning, including not being able to swim, lack of close and constant supervision when children are in or near water, missing or ineffective pool fencing, not wearing lifejackets when boating or among weaker swimmers in natural water, and drinking alcohol while participating in water recreation activities. Drowning risk might also be impacted by other social, cultural, and structural risk factors. To prevent drowning deaths, more research is needed to describe risk factors for fatal and nonfatal drowning, identify effective strategies to prevent drowning, and engage persons at high risk of drowning to increase access to and participation in effective drowning prevention activities.

Research Gaps and Priorities

Describe the **risk and protective factors** associated with fatal and non-fatal drowning with an emphasis on persons who may be at high risk.

From 1999 to 2019, overall drowning death rates consistently decreased. However, drowning deaths among people less than 30 years of age persist and may be increasing for some groups. For example, drowning rates for non-Hispanic Black or African American persons compared to White persons significantly increased from 2005 to 2019, and rates in this group increased by 24% from 2019 to 2020. Individuals with some conditions (e.g., autism spectrum disorder, disabilities) are also at high risk of drowning. To understand what is contributing to some groups having high risk and to prevent future drowning, data to identify risk factors and circumstances of fatal and non-fatal drowning are needed. Analyses of these data can provide insight into how risk factors differ among groups.

The following research questions are posed to guide research aimed at identifying risk and protective factors associated with drowning with an emphasis on persons at high risk:

- What is the usefulness of existing data sources for reporting the burden, circumstances, and risk and protective factors related to drowning?
- How can innovative techniques (e.g., data linkage, machine learning) be employed to improve drowning surveillance and improve our understanding of the circumstances of drowning?
- How can analytic tools (e.g., the social vulnerability index) be employed to improve our understanding of drowning risk factors?
- What risk and protective factors are related to variability in drowning rates among different groups?

Understanding risk and protective factors related to drowning will help us to identify effective evidence-based interventions to reduce the burden of unintentional drowning.

Identify and evaluate **effective strategies** to prevent drowning among persons who are at increased risk of drowning.

Promising drowning prevention strategies include learning basic swimming and water safety skills, installing barriers (e.g., four-sided pool fences that completely surround pools), closely supervising children at all times when in or near water, and wearing lifejackets at all times when boating or among weaker swimmers when swimming in natural water settings (e.g., lakes, oceans). Groups at increased risk of drowning include children aged 1 to 4 years, non-Hispanic American Indian or Alaska Native persons, non-Hispanic Black or African American persons, and persons with certain conditions (e.g., epilepsy, autism spectrum disorder). However, little research exists examining the most effective ways to implement drowning prevention strategies and the facilitators and barriers to implementing these strategies among persons and communities at high risk of drowning.

Key research questions include:

- How can basic swimming and water safety skills most efficiently and effectively be taught to children and youth (including young children aged 1 to 4 years)?

- What are the most effective ways to increase adoption of environmental and equipment-related drowning prevention strategies (e.g., pool fencing, lifejacket use, lifeguard supervision) and what policies may be effective at supporting these measures?
- What individual, relationship, community, and societal factors serve as barriers and facilitators to willingness to adopt drowning prevention strategies (e.g., basic swimming and water safety skills, pool fencing, lifejacket use), especially among persons who are at increased risk of drowning?

Identifying effective ways to implement and to increase access to and uptake of drowning prevention strategies is necessary to reduce the burden of drowning.

Identify how to effectively implement **basic swimming** and **water safety skills training** among persons at increased risk of drowning.

Learning basic swimming and water safety skills is an effective way to reduce drowning. However, limited swimming ability has been identified among various populations. To reduce drowning, it is critical to develop strategies to engage at-risk populations in basic swimming and water safety skills training programs.

To better engage persons at increased risk of drowning in these programs, the following research questions should be addressed:

- What are the community, structural, and cultural barriers to accessing basic swimming and water safety skills programs for persons at an increased risk of drowning, and how can these barriers be overcome for effective program implementation?
- What are the most effective ways to encourage youth and parents/guardians who are at an increased risk of drowning to participate in basic swimming and water safety skills training?
- How can partnerships be leveraged to scale up basic swimming and water safety skills training programs among persons at increased risk of drowning?

Understanding how to engage populations most at risk of drowning and how to remove barriers to participation in basic swim and water safety programs has the potential to reduce the burden of drowning in the United States.

CDC's National Center for Injury Prevention and Control (the Injury Center) advances research to prevent injuries and violence and reduce their consequences. Research includes identification of factors that increase or decrease risk and rigorous evaluation of innovative prevention strategies. The Injury Center translates science into effective policies and programs and guides how to adapt evidence-based strategies to community needs to increase widespread use. The research priorities strategically focus on research gaps that the Injury Center can address to strengthen public health action and impact. The Injury Center research priorities are updated as research and public health needs evolve.

Suggested citation: National Center for Injury Prevention and Control. Drowning Prevention Research Priorities. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2025. Available at https://www.cdc.gov/injury-violence-prevention/programs/research-priorities.html