

# Understanding and preventing drowning in Ghana



Executive summary



# Executive summary

## Introduction

Drowning<sup>1</sup> is the third leading cause of unintentional injury death globally with over 235,000 estimated annual drowning deaths worldwide. The estimated drowning death rate in the World Health Organization Africa Region is the second highest in the world, estimated to be more than twice as high as the rate in the Americas. Although the burden of drowning is believed to be high in this region, the true size and extent of the problem are not well understood because data on drowning in African countries are limited. Drowning prevention strategies require adequate data on the burden and circumstances of drowning to help ensure data-driven prevention efforts.

This large-scale drowning data collection effort in Ghana was conducted to better understand which populations and activities should be the focus of further research, and what types of drowning interventions are likely to have the greatest impact. Data were collected through a retrospective review of existing administrative records at the district level, drowning case finding and interviews at the community/household level, and focus group discussions at the community level.

Specifically, the study aimed to:

1. Establish the availability of drowning data in existing national and district-level data sources
2. Describe the burden of drowning in Ghana through:
  - Estimating a national fatal drowning rate
  - Describing high risk groups
3. Describe the circumstances of fatal and non-fatal drowning in Ghana
4. Identify potential contextually appropriate drowning prevention interventions for Ghana

## Methods

We conducted a retrospective descriptive analysis of data on fatal and non-fatal drowning cases abstracted from existing district-level administrative records and data collected through individual interviews at the community/household level. Data collection occurred in 52 (out of 260) districts randomly selected from three strata: coastal (districts that have an ocean coastline), inland water (districts that border or contain major lakes or rivers), and dry (districts that do not have a coastline or major lake or river, but may contain other bodies of water such as small lakes/ rivers, ponds, dams, and wells); resulting in a representative sample of Ghana's population, geography, and diversity of water bodies.

---

<sup>1</sup> van Beeck et. al. define drowning as “the process of experiencing respiratory impairment from submersion/immersion in liquid; outcomes are classified as death, morbidity and no morbidity.” [1]

# Executive summary

Thirty-three trained data collectors abstracted data for all reported cases of drowning—fatal and non-fatal—for a three-year period (January 1, 2019 to December 31, 2021) from district-level administrative offices. Administrative data sources included station diaries and registers of the following agencies/organizations in the study districts:

- Ghana Police Service
- Ghana National Fire Service
- National Disaster Management Organization (NADMO)
- Births and Deaths Registry
- Mortuaries in district hospitals

To identify cases that may not have been captured in the administrative records, data collectors worked with community health workers and gatekeepers (i.e., local chiefs and assembly members) to identify drowning cases in communities, and conducted structured interviews with family members, friends and/or witnesses of fatal drowning cases and survivors of non-fatal drowning. These interviews were conducted for all drowning cases (including those not reported in the records) for the three-year period (January 1, 2019 to December 31, 2021). Duplicate cases in the dataset that arose from drownings being reported in more than one source were matched on the following variables (name, age, sex, date of drowning incident, location of drowning incident, and incident summary) and combined to create a deduplicated dataset with unique cases.

## Results

### ● **Objective 1:** Establish the availability of drowning data in existing national and district-level data sources

Between January 1, 2019 and December 31, 2021, 952 drowning cases (906 fatal and 46 non-fatal) were identified in administrative records. Most cases were captured from inquest registers of the Ghana Police Service, mortuary registers, and NADMO records. Administrative data routinely captured demographic information, including name, age, sex, and drowning incident information, including date and location of drowning, but did not routinely include information on circumstances of the drowning (e.g., activity at time of drowning). The name of the person who drowned was known for 89.8% of cases, exact age for 80.1% of cases, exact or estimated age for 89.4% of cases, sex for 97.4% of cases, and location of drowning for 87.6% of cases.

There were 761 drowning cases identified through community case finding and interviews (508 fatal and 253 non-fatal) resulting in a total across both administrative sources and interviews of 1,713 drowning cases (1,414 fatal and 299 non-fatal). More fatal cases ( $n = 906$ , 64.1%) were identified through administrative records than through community case finding and interviews. More non-fatal cases ( $n = 253$ , 84.6%) were identified through community case finding and interviews.

After removing duplicate records, the unique, deduplicated dataset of 1,413 drowning cases constituted 82.5% of the original total cases, indicating that 17.5% of cases were duplicates.

### ● **Objective 2:** Describe the burden of drowning in Ghana through estimating a national fatal drowning rate and describing high risk groups

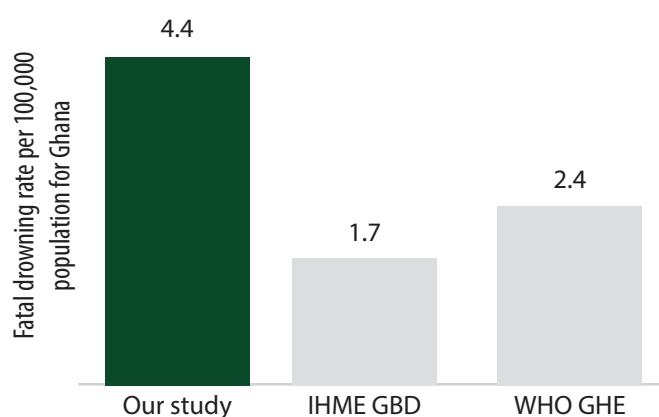
From January 1, 2019 to December 31, 2021, 1,413 unique drowning cases were identified in the 52 study districts:

- Fatal: 1,134 (80.3%)
- Non-fatal: 279 (19.7%)

## Executive summary

This means an average of about 378 drowning deaths and 93 non-fatal drownings occurred each year in the study districts.

We calculated a national fatal drowning rate for Ghana of **4.4 per 100,000 population per year** (95% CI: 3.4–5.4). This estimate is substantially higher than the 2019 Institute for Health Metrics and Evaluation (IHME) Global Burden of Disease (GBD) estimate (1.7/100,000 population, 95% CI: 1.2–2.4) and the 2019 World Health Organization (WHO) Global Health Estimates (GHE) estimate (2.4/100,000) for Ghana. Applying the same rate of 4.4 deaths per 100,000 to the total population, we estimate that 1,360 people died from drowning in Ghana each year during the 2019–2021 study period.



Based on fatal drowning rate of 4.4 per 100,000 population per year, we estimate



**1,360 people died from drowning each year in Ghana**

which means drowning deaths may be **undercounted by over 800** each year

For the following subpopulations, estimated rates are based on the 52 districts where data collection occurred and are not nationally representative.

Fatal drowning rates by geographic strata (coastal, inland water, dry) were higher in inland water (6.1 per 100,000 population per year) and coastal (5.4 per 100,000 population per year) districts compared to dry (2.3 per 100,000 population per year) districts. Rates by district ranged from 0.0 to 26.3 fatal drownings per 100,000 population per year.

The average age of individuals who fatally drowned was 23 years. The average age of non-fatal drowning was 29 years.

Fatal drowning rates were highest among:

- Young adults 20 to 34 years of age (4.3 deaths per 100,000 population per year)
- Young children 0 to 4 years of age (4.2 deaths per 100,000 population per year)
- Adults 35 to 49 years of age (4.1 deaths per 100,000 population per year)

Non-fatal drowning rates were highest among:

- Adults 20 to 34 years of age (1.7 non-fatal cases per 100,000 population per year)
- Adults 35 to 49 years of age (1.5 non-fatal cases per 100,000 population per year)



# Executive summary

The majority of both fatal (n = 935, 84.2%) and non-fatal (n = 235, 85.1%) drowning cases were male.

- The fatal drowning rate among males was 7.3 per 100,000 population per year compared to a fatal drowning rate among females of 1.3 per 100,000, nearly four times lower.
- The non-fatal drowning rate was also higher among males than among females (1.8 vs. 0.3 cases per 100,000 population per year).

## ● Objective 3: Describe the circumstances of fatal and non-fatal drowning in Ghana

The most common locations of fatal drowning were:

- Rivers (n = 330, 31.3%)
- The ocean (n = 185, 17.6%)

The most common locations of non-fatal drowning were:

- The ocean (n = 149, 53.4%)
- Rivers (n = 64, 22.9%)

Other frequent locations of fatal and non-fatal drowning were dams, pits, and wells.

Fatal drowning among children 0 to 4 years of age most frequently occurred in water/septic tanks and pits (n = 25, 19.8% each), and wells (n = 21, 16.7%). Fatal drowning among children and adolescents 5 to 14 years of age and 15 to 19 years of age often occurred in rivers (5 to 14: n = 54, 28.0%; 15 to 19: n = 38, 38.0%). Half of all fatal drownings among adults 50 to 64 years of age and 65+ occurred in rivers.

The most common activities associated with drowning were swimming and boating.

Across all study districts, there were 306 swimming-related drownings:

- 282 (92.2%) fatal
- 24 (7.8%) non-fatal

Almost half of all drownings associated with swimming were reported in coastal districts (n = 149, 48.7%). When swim skill was known (n = 138), 120 (87.0%) individuals who drowned were reported to have been a weak swimmer or did not know how to swim.

Across all study districts, there were 302 boating-related drownings (e.g., related to fishing from a boat, traveling by boat, recreational boating):

- 110 (36.4%) fatal
- 192 (63.6%) non-fatal

The **fatal** drowning rate in Ghana was **4.4 per 100,000 population** per year



**Males** were **4x more likely to die from drowning** than females



**Adults 20-34** years and young **children under 5** were at the highest risk



Drowning most frequently occurred in **rivers** and **the ocean**



**Swimming** and **boating** were the most common activities associated with drowning



# Executive summary

The most common boating-related activity associated with fatal drowning was traveling by boat (n = 63, 57.8%), and with non-fatal drowning was fishing from a boat (n = 131, 68.2%). The most common factor that contributed to boating incidents was bad weather (n = 191, 86.0%). When personal floatation device (PFD) (e.g., lifejacket) use was known (n = 284), no cases were reported to have been wearing a lifejacket at the time of drowning.

Mining was a frequently reported activity associated with drowning, particularly in inland water districts. A total of 30 mining-related drownings were reported during the study period. The majority were fatal cases (n = 26, 86.7%) with mining constituting 6.3% of fatal drownings among males 17 to 55 years of age. Over three-quarters (76.9%) of all mining-related drownings occurred in illegal mining pits.

## ● Objective 4: Identify potential contextually appropriate drowning prevention interventions for Ghana

Eight focus group discussions (FGDs) were conducted to gain insight on the cultural and contextual factors of drowning in Ghana, beliefs surrounding drowning, and the feasibility/appropriateness of potential interventions. Sixty-four representatives from target groups that might be impacted by drowning participated in the facilitated discussions: inland water and coastal fisherfolk, small-scale miners, frequent boat transport users, community members in two riverside communities, rescue divers, and representatives from each of the administrative offices from which drowning data were collected in this study.

Participants identified alcohol consumption, lack of or limited use of lifejackets, lack of or poor swimming ability, and limited access to swim skill training as key factors that contribute to drowning in Ghana. Weather was also discussed as a contributor to drowning incidents. Specifically, unpredictable wind patterns and currents were identified as important factors in drowning among fisherfolk, and flash flooding was identified as a key issue affecting communities across the country. Sociocultural beliefs (e.g., witchcraft, curses) were frequently identified as contributors to drowning. Participants suggested several strategies that they felt could reduce drowning in Ghana including:



Increasing public awareness of drowning risks



Improving supervision of children



Building bridges across bodies of water



Increasing access to and use of lifejackets



Improving boating regulations



Addressing traditional beliefs associated with drowning



Improving safe water rescue skills among professional and lay rescuers



Fencing bodies of water

Despite indicating that poor swimming ability contributes to drowning in Ghana, participants did not identify swimming lessons as a possible prevention strategy.



# Executive summary

## Conclusions and considerations for prevention

This study yielded novel information about drowning in Ghana, including previously unknown information on burden and circumstances of drowning. We systematically collected data from national and district-level offices of five major governmental agencies and supplemented existing records with data collected from community case finding and interviews, which contributed to more complete data on the burden and circumstances of drowning in Ghana.

We calculated a national fatal drowning rate for Ghana of **4.4 per 100,000 population per year** (95% CI: 3.4–5.4), a rate substantially higher than existing estimates. Results suggest that drowning most frequently occurred among males, young adults, and young children in Ghana. The most common locations of drowning were rivers and the ocean. The most frequent activities associated with drowning were boating, recreational swimming, traveling near water and playing near water. None of the boating-related drowning cases were reported to have been wearing a lifejacket at the time of the incident and many persons who drowned did not know how to swim or were described as a weak swimmer.

Drowning is a multisectoral (e.g., health, public safety, industry, education, transportation) issue. All stakeholders could benefit from developing a national water safety strategy and action plan. The strategy could address matters of leadership and coordination, funding, advocacy, awareness raising, prioritization, target setting, and monitoring and evaluation. Future work on implementing policies, programs, and activities that prevent drowning events from occurring would be valuable not only in coastal and inland water districts, but also in districts categorized as “dry.” The following activities could be considered in a national water safety strategy for Ghana:



Recreational swimming can be made safer through the effective and safe implementation of basic swimming and water safety skills training programs. Increased community awareness of the importance of having these skills to prevent drowning is a critical step to introducing such a training program. Establishing and implementing a lifeguard training curriculum and stationing trained lifeguards at public beaches and swimming pools can also make recreational swimming safer.



Water transport and fishing can be made safer by setting and enforcing safe boating regulations and supporting increased availability and use of lifejackets.



Communities can be made safer by installing appropriate covers on water and septic tanks and exploring the use of a community daycare model to increase supervision of young children to prevent drowning in this age group.



Record keeping on drowning can be improved by encouraging the public to report drowning cases to the designated authorities and encouraging administrative agencies to record cause of death and other crucial information in all records. Improved reporting and record keeping on drowning in Ghana can inform the design, implementation, and evaluation of drowning prevention efforts.



Extensive flooding in the Volta river basin

CDC Foundation, Centers for Disease Control and Prevention, and Kwame Nkrumah University of Science and Technology (Kumasi, Ghana)

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official positions of the CDC Foundation or the U.S. Centers for Disease Control and Prevention. Financial support for this study was provided by the CDC Foundation through a grant from Bloomberg Philanthropies.

National Foundation for the Centers for Disease Control and Prevention, Inc. Understanding and Preventing Drowning in Ghana: Executive Summary. Atlanta, GA: National Foundation for the Centers for Disease Control and Prevention, Inc; 2023



# **Understanding and preventing drowning in Ghana**

**Executive summary**