

# Drowning: Risk Factors & Prevention



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## Definition

Drowning is defined as respiratory impairment from being in or under a liquid<sup>1</sup>. Drowning itself is quick and silent, although it may be preceded by distress which is more visible.

The World Health Organization in 2005 defined drowning as “the process of experiencing respiratory impairment from submersion/immersion in liquid”.

## Pathology

Generally, in the early stages of drowning, very little water enters the lungs: a small amount of water entering the trachea causes a muscular spasm that seals the airway and prevents the passage of both air and water until unconsciousness occurs. This means a person drowning is unable to shout or call for help, or seek attention, as they cannot obtain enough air. The instinctive drowning response is the final set of autonomic reactions in the 20–60 seconds before sinking underwater, and to the untrained eye can look similar to calm safe behavior.

Lifeguards and other persons trained in rescue learn to recognize drowning people by watching for these movements. If the process is not interrupted, loss of consciousness due to hypoxia is followed rapidly by cardiac arrest. At this stage, the process is still usually reversible

by prompt and effective rescue and first aid. Survival rates depend strongly on the duration of immersion.

Drowning is most often quick and unspectacular. Its media depictions as a loud, violent struggle have much more in common with distressed non-swimmers, who may well drown but have not yet begun to do so. In particular, an asphyxiating person is seldom able to call for help. The instinctive drowning response covers many signs or behaviors associated with drowning or near-drowning:

- Head low in the water, mouth at water level
- Head tilted back with mouth open
- Eyes glassy and empty, unable to focus
- Eyes open, with fear evident on the face
- Hyperventilating or gasping
- Trying to swim in a particular direction but not making headway
- Trying to roll over on the back to float
- Uncontrollable movement of arms and legs, rarely out of the water.

## Key facts

Drowning outcomes are classified as death, morbidity and no morbidity.

Global estimates may significantly underestimate the actual public health problem related to drowning.

Children with increased access to water are most at risk of drowning.

## Scope of the Problem

In 2015, an estimated 360 000 people died from drowning, making drowning a major public health problem worldwide. In 2015, injuries accounted for over 9% of total global mortality. Drowning is the 3rd leading cause of unintentional injury death, accounting for 7% of all injury-related deaths. The global burden and death from

drowning is found in all economies and regions, however: low- and middle-income countries account for over 90% of unintentional drowning deaths; most drownings are preventable.

There is a wide range of uncertainty around the estimate of global drowning deaths. Official data categorization methods for drowning exclude intentional drowning deaths (suicide or homicide) and drowning deaths caused by flood disasters and water transport incidents.

In Europe, drowning was used as capital punishment. Drowning survived as a method of execution in Europe until the 17th and 18th centuries. England had abolished the practice by 1623, Scotland by 1685, Switzerland in 1652, Austria in 1776, Iceland in 1777, and Russia by the beginning of the 1800s. France revived the practice during the French Revolution (1789–1799).

## Secondary drowning

Inhaled fluid can act as an irritant inside the lungs. Physiological responses to even small quantities include the extrusion of liquid into the lungs (pulmonary edema)

over the following hours, but this reduces the ability to exchange air and can lead to a person “drowning in their own body fluid”. Certain poisonous vapors or gases (as for example in chemical warfare), or vomit can have a similar effect. The reaction can take place up to 72 hours after a near drowning incident, and may lead to a serious condition or death

## Risk Factors

### Age

The Global report on drowning (2014) shows that age is one of the major risk factors for drowning. This relationship is often associated with a lapse in supervision. Globally, the highest drowning rates are among children 1–4 years, followed by children 5–9 years.

### Gender

Males are especially at risk of drowning, with twice the overall mortality rate of females. They are more likely to be hospitalized than females for non-fatal drowning. Studies suggest that the higher drowning rates among males are due to increased exposure to water and riskier behavior such as swimming alone, drinking alcohol before



1- E.F. van Beeck; C.M. Branche; D. Szpilman; J.H. Modell; J.J.L.M. Bierens (2005), A new definition of drowning: towards documentation and prevention of a global public health problem, 83, Bulletin of the World Health Organization November 2005), 801–880,

swimming alone and boating.

### Access to water

Increased access to water is another risk factor for drowning. Individuals with occupations such as commercial fishing or fishing for subsistence, using small boats in low-income countries are more prone to drowning. Children who live near open water sources, such as ditches, ponds, irrigation channels, or pools are especially at risk.

### Flood disasters

Drowning accounts for 75% of deaths in flood disasters. Flood disasters are becoming more frequent and this trend is expected to continue. Drowning risks increase with floods particularly in low- and middle-income countries where people live in flood prone areas and the ability to warn, evacuate, or protect communities from floods is weak or only just developing.

### Travelling on water

Daily commuting and journeys made by migrants or asylum seekers often take place on overcrowded, unsafe vessels lacking safety equipment or are operated by personnel untrained in dealing with transport incidents or navigation. Personnel under the influence of alcohol or drugs are also a risk.

### Other risk factors

There are other factors that are associated with an increased risk of drowning, such as:

lower socioeconomic status, being a member of an ethnic minority, lack of higher education, rural populations (this association can vary across countries); infants left unsupervised or alone with another child around water; alcohol use, near or in the water; medical conditions, such as epilepsy; tourists unfamiliar with local water risks and features;

## Prevention

There are many actions to prevent drowning:

- Installing barriers (e.g. covering wells, using doorway barriers and playpens, fencing swimming pools etc.) to control access to water hazards, or removing water hazards entirely greatly reduces water hazard exposure and risk.
- Community-based, supervised child care for pre-school children can reduce drowning risk and has other proven health benefits.
- Teaching school-age children basic swimming, water safety and safe rescue skills is another approach. But these efforts must be undertaken with an emphasis on

safety, and an overall risk management that includes safety-tested curricula, a safe training area, screening and student selection, and student-instructor ratios established for safety.

- Effective policies and legislation are also important for drowning prevention. Setting and enforcing safe boating, shipping and ferry regulations is an important part of improving safety on the water and preventing drowning. Building resilience to flooding and managing flood risks through better disaster preparedness planning, land use planning, and early warning systems can prevent drowning during flood disasters.
- Developing a national water safety strategy can raise awareness of safety around water, build consensus around solutions, provide strategic direction and a framework to guide multisectoral action and allow for monitoring and evaluation of efforts.

The WHO released the *Global report on drowning* in November 2014. This was the first time WHO had developed a report dedicated exclusively to drowning. The report pointed out that drowning has been highly overlooked to date, and that a great deal more should be done by governments and the research and policy communities to prioritize drowning prevention and its integration with other public health agendas.

The *Global report on drowning* provides recommendations to governments to tailor and implement effective drowning prevention programs to their settings, improve data about drowning, and develop national water safety plans. The report also points out the multisectoral nature of drowning and calls for greater coordination and collaboration among UN agencies, governments, key NGOs and academic institutions to prevent drowning.

In May 2017, WHO released *Preventing drowning: an implementation guide*. This publication builds on the Global report on drowning and provides concrete guidance for drowning prevention practitioners on how to implement drowning prevention interventions.

### Sources:

<http://www.who.int/mediacentre/factsheets/fs347/en/> - <http://apps.who.int/iris/bitstream/10665/255196/1/9789241511933-eng.pdf?ua=1>

[https://en.wikipedia.org/wiki/Drowning#Secondary\\_drowning](https://en.wikipedia.org/wiki/Drowning#Secondary_drowning)

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