

Drowning Physiology

Drowning: Death due to submersion in liquid (usually water)

Some interesting statistics:¹

- 99% of all drownings occur in unsupervised water
- almost half of all drownings occur in the company of others (mostly adults)
- almost half of all drownings occur less than two metres from safety
- over 80% of all drowning victims are male
- most victims never intend to get wet
- highest risk category are males 18-34 years old
- nearly 40% of all drownings involve alcohol
- over half of victims who drowned while boating were not wearing lifejackets

Why do people drown?

Drowning can happen to all sorts of people for all sorts of reasons. An infant can fall into a small puddle of water and can be drowning in the blink of an eye with no way to get up. A child might swim out further into open water than they can swim back. A drunken person can dive into shallow water and break his or her neck. A storm might come up unexpectedly and overturn a small fishing boat.

Those are just a few examples of why people drown. Accidental drowning is usually caused by a bad choice made one or more people involved.

What happens when people drown?²

Wanting to breathe but not being able to, is one of the worst feelings one can have. It generally causes panic, fear, and irrational thought. Someone who is drowning will hold their breath as long as they can. Once they cannot hold it any longer, large amounts of water may be swallowed, followed by vomiting and aspiration. The level of oxygen in the bloodstream decreases, and the person quickly loses consciousness.

Types of Drowning:

Dry: After the victim breathes in water, it contacts the larynx which has a natural defense mechanism, called a *laryngospasm*. The larynx (vocal chords) expand to block the airway, thus often preventing water from entering the lungs in.

Wet: With many patients, the laryngospasm relaxes as the person loses consciousness, and water enters the lungs at that point.

Summary of the drowning process:

1. *Panic* and violent struggle to return to surface
2. Period of *Calmness*
3. *Swallowing* of fluid, followed by vomiting
4. *Terminal Gasp*
5. *Unconsciousness*
6. *Possible Seizures*
7. *Death*

*The time that this takes is variable, but it could be **as little as 12 to 20 seconds** from the first panic to unconsciousness.³

¹ BC Lifesaving Society (2000)

² The following information is adapted from the Occupational First Aid text (1999) p.301 and Canadian Heart and Stroke Foundation BLS Instructor Resource (2002) p.7-19

³ BC Lifesaving Society

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Near-Drowning:

If the process described above is interrupted, and death is averted, it is generally called a near-drowning experience. There is however a third type of drowning that can still occur:

*Secondary Drowning*⁴

In secondary drowning, the victim breathes some fluid into the lungs. This is called *aspiration*. After that, *pulmonary edema* can occur, which is the pooling of fluid around the lungs. This will obstruct the ability of the lungs to exchange oxygen, and result in difficulty breathing.

Secondary drowning can occur from as little as a tablespoon of fluid in the lungs. The key symptoms include difficulty breathing, pain in the chest area, coughing, and dizziness/anxiety.

Assessment of secondary drowning:

1. Check Breathing - get the victim to take a couple deep breaths and check for any pain or discomfort
2. Check History - ask if your victim inhaled any significant amount of water
3. Monitor Patient - look for any difficulty breathing, coughing or chest pain

Treatment of Secondary Drowning:

1. Monitor Breathing.
2. Position of comfort (POC). Usually semi-sitting position is preferable
3. Oxygen. Secondary drowning can quickly cause hypoxia.
4. Rest & Reassurance. This person was just in a traumatic experience.

Rescue of a Drowning Non-Swimmer:⁵⁶

Primary Goal is Quick Support

1. Because this process can happen so fast it is very important that we both recognize and react very quickly.
2. As lifeguards, we can use a contact carry immediately. This is because we are trained in how to do so, and it is much quicker. But most importantly, it is because we have **trained back-up** available for help.
3. It is very important that the rescuer maintain the victim's head and shoulders above the water in order to ensure a clear airway, and also to calm the victim down. This should be accomplished within approximately 15 seconds of recognition.
4. **Every D.N.S. rescue needs back-up.** Another lifeguard will always go directly to the victim until the first lifeguard says that they are ok on their own. The first lifeguard is only ok if they have the head and shoulders out of the water.
5. The lifeguards involved must maintain good communication in case the victim experiences any complications.
6. The first lifeguard must assess the victim's breathing and check for any immediate signs secondary drowning. They must also explain the signs and symptoms to the patient and tell them to see a doctor *immediately* if any of those signs develop.
7. The lifeguard must also get a thorough history from the victim.
8. The lifeguard must then prevent the situation from happening again. (ie. education and redirection)
9. The lifeguard may have to phone parents depending on the situation, and age of the victim.
10. The rescue should be completed with as little interruption to the public and to pool coverage as possible.

⁴ This information is found in the Lifesaving manual on page 8-4

⁵ Information on the rescue of a DNS is located in pages 43-50 in the ALERT manual. Page 47 talks specifically about the 'Pia carry.'

⁶ The procedure for the rescue of a DNS is based on the MUST SEES located on page 10 of the NLS Standards manual.