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'Water, Water Everywhere' Pre-trip and trip planning

Professor Richard Franklin

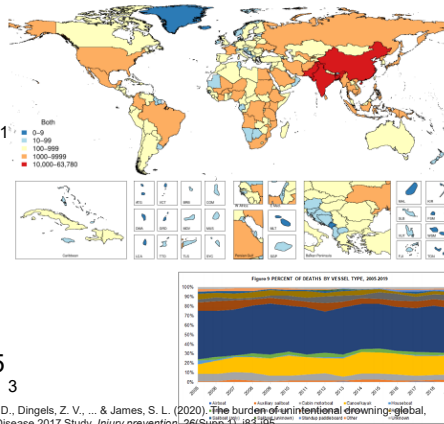
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Learning Outcomes

- Understanding of the Burden of drowning and definitions
- Explore pre-travel preparation for engagement with water
- Appraise the risks around water
- Develop strategies to keep people safe in, on or around water

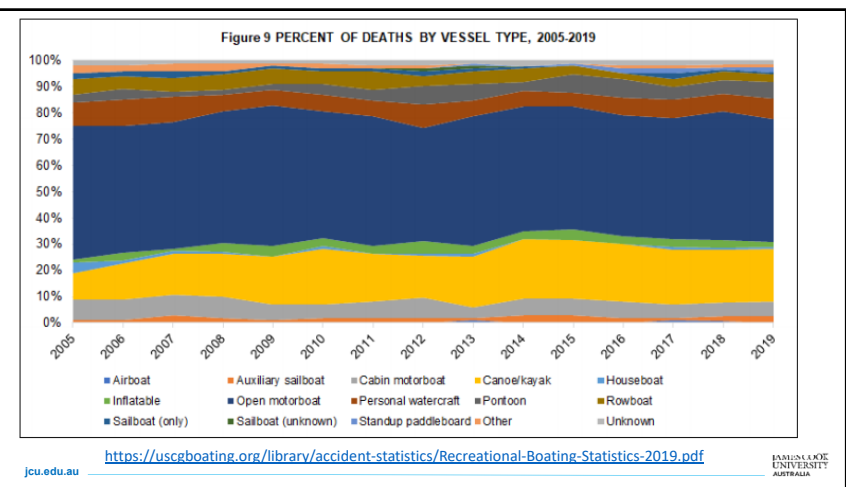
Epidemiology

- There are over 295,000 drowning deaths per annum ¹
- Children 1-4 years, non-swimmers, oldies at greatest risk
- Exposure
- Wilderness – ~9/ & ~.15/100,000 visits ²
- Canoeing – 2019 – US – 125 (107 drowning) ↓ 141 in 2009 ³



1. Franklin, R. C., Peden, A. E., Hamilton, E. B., Bisignano, C., Castle, C. D., Dingels, Z. V., ... & James, S. L. (2020). The burden of unintentional drowning: global, regional and national estimates of mortality from the Global Burden of Disease 2017 Study. *Injury prevention*, 26(Suppl 1), i83-i95.
2. Montalvo, R., Wingard, D. L., Bracker, M., & Davidson, T. M. (1998). Morbidity and mortality in the wilderness. *Western journal of medicine*, 168(4), 248.
3. Franklin, R. C., & Leggat, P. A. (2012). The epidemiology of injury in canoeing, kayaking and rafting. *Epidemiology of Injury in Adventure and Extreme Sports*, 58, 98-111.

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Review of Terms

- Primary – death from drowning occurs in the water
- Secondary - is delayed death from drowning, due to complications OR death occurring in minutes to days after initial recovery
- Dry drowning or Without aspiration - is defined as laryngeal spasm with no or little aspiration of water OR from respiratory obstruction and asphyxia from a liquid medium
- "Wet drowning" or "With aspiration" indicates that aspiration of fluids has occurred
- "Cold water drowning" is defined as drowning in an outside body of water during the autumn, winter, and early spring months with a patient core temperature of less than or equal to 32°C on arrival to the emergency department. Some use water temperature <20 °C
- Salt vs. fresh water - Describes kind of water in which incident occurred
- Active vs. passive (or silent) - "Active" refers to a witnessed drowning event in which victim makes some motion. In "passive" victim is found motionless
- Intentional vs. non-intentional - Describes cause
- Fatal vs. non-fatal - Describes outcome
- Submersion vs. immersion - "Submersion" suggests head was submerged in water vs. "immersion" suggests head was out of water
- With and without hospitalization - Describes whether or not victim was admitted to hospital
- Iceberg phenomenon - "Iceberg phenomenon" is described as people who have been submerged but have subsequently not died from drowning
- Immersion frigida - "Immersion frigida" is defined as death from cooling in water
- Immersion syndrome/immediate disappearance syndrome - Occurs when syncope is provoked by sudden contact with water at least less than 5°C presumably from bradycardia, tachycardia or arrhythmia
- Save - Rescue of victim from water by someone who perceived individual to be a potential victim of submersion injury

Ref: Papa, L., Hoelle, R., & Idris, A. (2005). Systematic review of definitions for drowning incidents. *Resuscitation*, 65(3), 255-264.

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Acceptable terms (1981)

- drown(ing) without aspiration: to die from respiratory obstruction and asphyxia while submerged in a fluid medium;
- drown(ing) with aspiration: to die from the combined effects of asphyxia and changes secondary to aspiration of fluid while submerged;
- near-drown(ing) without aspiration: to survive, at least temporarily, following asphyxia due to submersion in a fluid medium;
- near-drown(ing) with aspiration: to survive, at least temporarily, following aspiration of fluid while submerged.

Modell JH. Drown versus near-drown: discussion of definitions. *Crit Care Med* 1981;9:351-2

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Drowning Definition

- "Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid."
- Furthermore, drowning outcomes should be classified as: death, morbidity, and no morbidity.

van Beeck, E. F., Branche, C. M., Szpilman, D., Modell, J. H., & Bierens, J. J. (2005). A new definition of drowning: towards documentation and prevention of a global public health problem. *Bulletin of the World Health Organization*, 83, 853-856.

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Complications following drowning

- Acute Kidney Injury (43% of 'near-drowning' ¹).
 - Resuscitation and mechanical ventilation
 - Seawater ingestion
- Acute respiratory distress syndrome (ARDS) (2-18% ²)
- Pneumonia (increased with mechanical ventilation ³)
- Hypothermia
- Neurological Complications

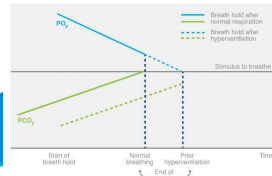
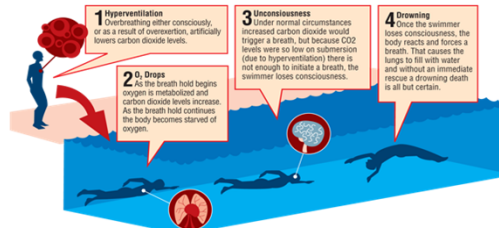
1. Gorelik, Y., Darawshi, S., Yaseen, H., Abassi, Z., Heyman, S. N., & Khamaisi, M. (2018). Acute renal failure following near-drowning. *Kidney international reports*, 3(4), 833-840.
2. Chiumello, D., Carlesso, E., & Gattinoni, L. (2014). Ventilatory Management of ARDS After Drowning. In *Drowning* (pp. 705-712). Springer, Berlin, Heidelberg.
3. van Berkel, G., van der Werf, T. (2014). Risk factors and treatment of Pneumonia. . In *Drowning* (pp. 725-730). Springer, Berlin, Heidelberg.

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Shallow Water Blackout – How does it happen?

Shallow Water Blackout: How it Happens
Prolonged underwater breath-holding can be deadly, here's what happens.



- The CO₂ sensor is the most sensitive.
- Hyperventilation i.e. 'blowing off' too much CO₂ before submerging can interfere with the sensor which is not triggered early enough to prevent blackout.

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Water Wilderness Preparation

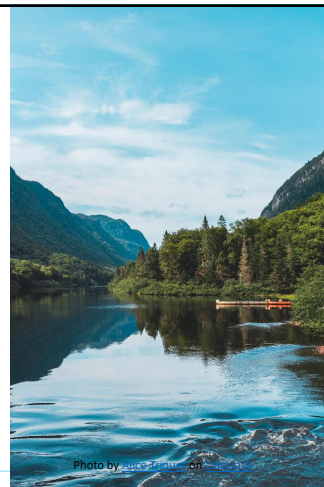
- Pre-trip
 - Medical
 - Swimming skills
 - Rescue
 - Supervision
- Getting there
 - Driving
 - Boating
 - Walking
- Trip
 - Near – canyoning, Fishing, Drinking
 - On – Canoeing, rafting, boating
 - In – Swimming, diving, snorkeling, stings, and bites

Photo by [Nils Leonhardt](#) on [Unsplash](#)

Medical Preparation

- Physical fitness
- Existing medical conditions
 - Epilepsy
- Medications
- Alcohol
- Risk taking
- Safety
- Hypothermia
- CPR / Oxygen / Defibrillator
- First aid kit

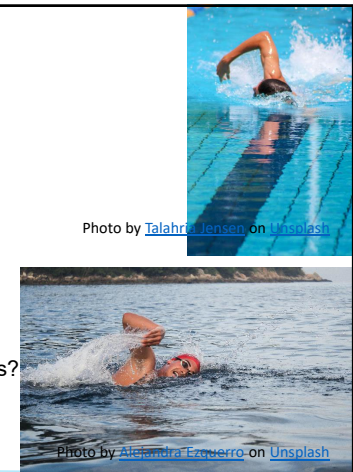
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Swimming skills

- Can the float?
- Can they swim any distance?
 - How far? / How long? / What conditions?
 - Using what strokes?
- Getting in / getting out
 - Muscle strength?
- Muscular condition?
 - Physical (e.g. Shoulders) /
 - Medical (e.g. epilepsy or Cardiac conditions?)
- Medications? – Multiple
- Cuts / lacerations

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Rescue

- What, when and how?
- Equipment?
- Practice



NEWS

Just in Coronavirus Watch Live Politics World Business Analysis Sport Science Health Arts Fact Check Other

NSW EXPOSURE SITES Keep up to date with the latest COVID-19 exposure sites in NSW

Rescuers dumbfounded by men who survived month at sea in esky

Rescuers were dumbfounded by two men who survived a month at sea in an esky, after being rescued off the coast of Phillip Island.

Man survived

Two QLD Men Survive Boat Capsizing By Holding Onto An Esky And Chair

And the footage is incredible.

By Emily Brooks
Updated 10:45pm AEST 11 September 2020

VISION

Two Men Stranded At Sea South Stranded Men, QLD

Two men and a chair have survived the sea for a month, after being rescued off the coast of Phillip Island.

A quick-thinking tradie saved the life of a stranger drowning off the coast of Phillip Island using a lot of smarts, a lot of courage and one well-placed Esky.

Ben Dennis was working on renovations to the Seaside restaurant and cafe in Newhaven on Sunday night when he heard a sound coming from the nearby jetty.

Photo by [Ben Dennis](#) on [Instagram](#)

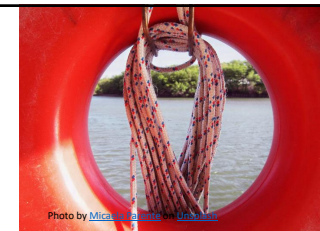
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Rescue

- Talk /shout – reassure the person and let them know where to go.
- Reach – if close enough use something to reach out to the person, this might be a stick or an oar
- Throw – this could include throwing a rope that you can pull them back in or a flotation device they can use to stay afloat
- Wade – this involved getting into the water, but going no further than you can stand and throw a rope or flotation device and talk to the person.
- Row – if available using a board, boat, canoe etc to go out and rescue the person.
- Swim- as suggested this involves swimming to the person, you should be careful of the person you are rescuing as they may pull you under in panic if you get too close.
- Tow – this is a last resort and involves bring the person back to shore with you. Note: the last two steps (swim and rescue should only be attempted by people who know what they are doing).



Rescue



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Key elements of supervision

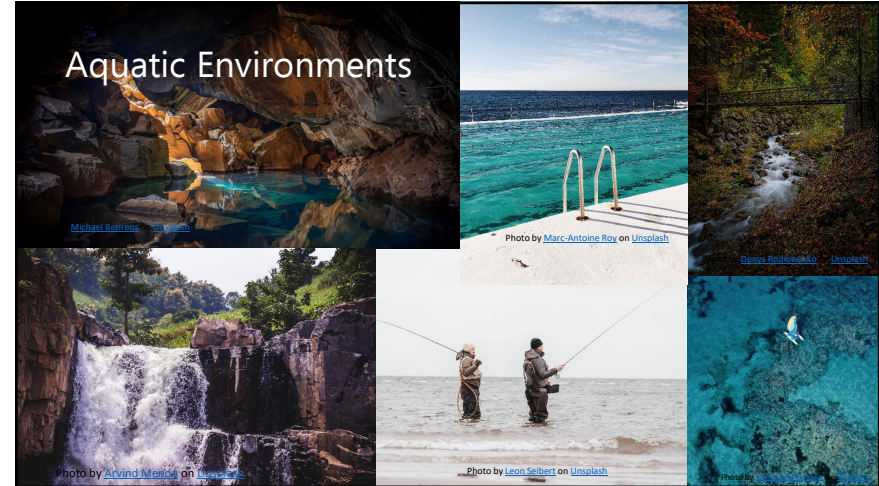
- Proximity
 - Always be within arms reach of your child
- Attention
 - Always keep your attention on your child, this is not an occasional glance while reading a magazine
- Continuity
 - Check children on a regular basis
 - Never leave their presence if they are under 5
- Preparation
 - Do you have all you need to be able to supervise



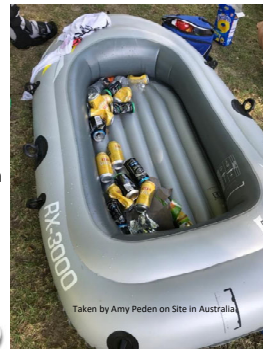
Bugeja, L., & Franklin, R. C. (2013). An analysis of stratagems to reduce drowning deaths of young children in private swimming pools and spas in Victoria, Australia. *International journal of injury prevention and safety promotion*, 20(3), 282-294.

Franklin, R. C., Pearn, J. H., & Peden, A. E. (2017). Drowning fatalities in childhood: the role of pre-existing medical conditions. *Archives of disease in childhood*, 102(10), 888-893.

Aquatic Environments



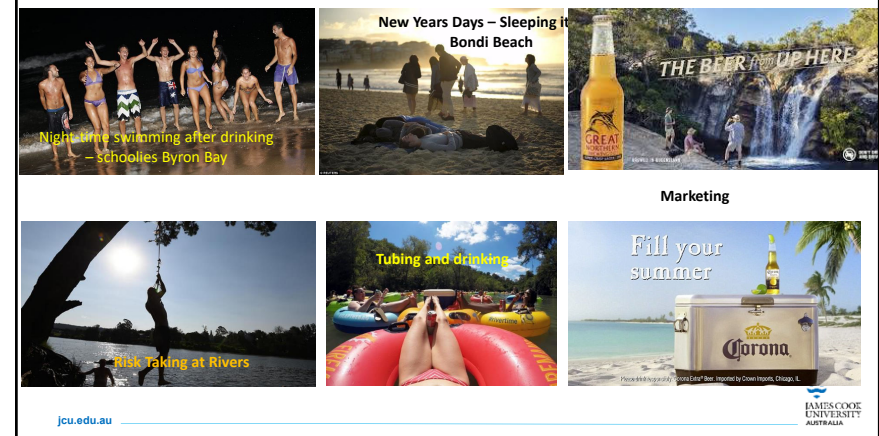
- Impairs Judgement
 - Distorts perception of risk and own abilities
- Increases Risk Taking Behaviour
 - Removes inhibitions
- Reduces Coordination
 - Numbs the senses, leads to unsteadiness, harder to swim
- Impairs Reaction Time
 - Depressant, slows the rate the brain processes information
- Reduces the Effectiveness of CPR
 - Resuscitation methods less likely to work as body metabolises alcohol and nervous system depressed
- Vasodilator
 - Warms you up, more likely to stay in cold water for longer



Taken by Amy Peden on Site in Australia

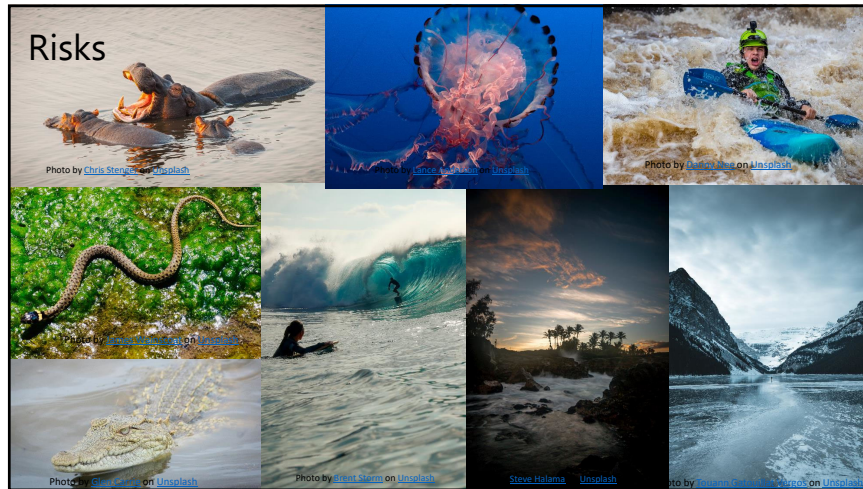
jcu.edu.au Peden, A. E., Franklin, R. C., & Leggat, P. A. (2017). Alcohol and its contributory role in fatal drowning in Australian rivers, 2002-2012. *Accident Analysis & Prevention*, 98, 259-265.

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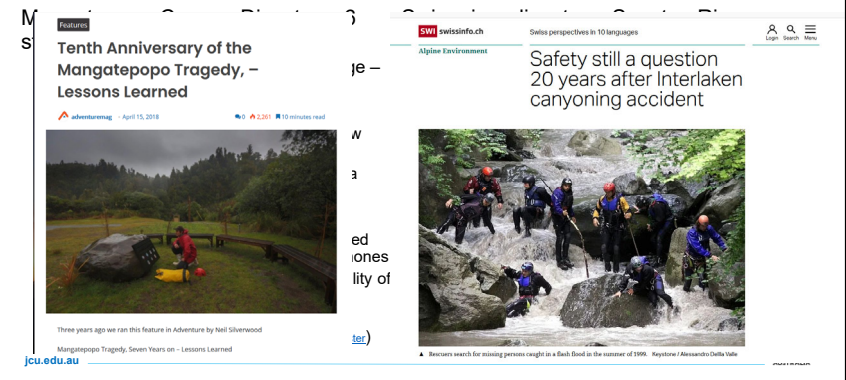


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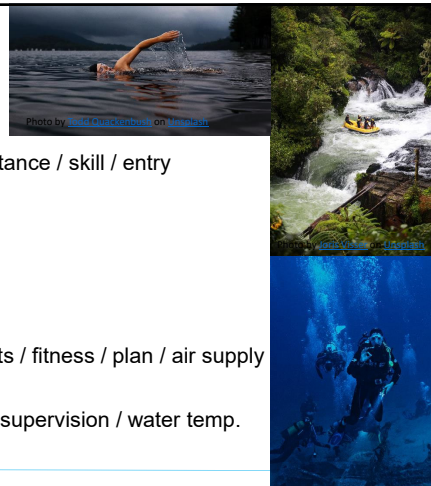


Cannoning Disasters



Control Measures

- Swimming
 - Swimming ability / conditions / distance / skill / entry
- Surfing
 - Ability / board type / conditions
- Paddle Sports
 - Vessel / conditions / skill / plan
- Diving
 - Practice / check / equipment / limits / fitness / plan / air supply
- General
 - Breath Holding / alcohol / buddy / supervision / water temp.



Lif jackets

- Age / swimming ability
- Level of risk
 - Storms / swimming ability / risk of capsizing / falling overboard / water temperature
- Vessel
 - No barriers / lifelines / rails / safe harness
 - Canoe / rowing / paddle boards / fishing / PWC /
- Type of water
 - Enclosed / alpine / open / crossing coastal bars
- Time of day

- Choosing the right lifejacket

- Buoyancy
- Performance
- Use

- Inflatable

- Australian standards:

- Level 50S or above on enclosed waters
- Level 100 or above on open waters.
- Dogs



Rules

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EPIRB / PLB

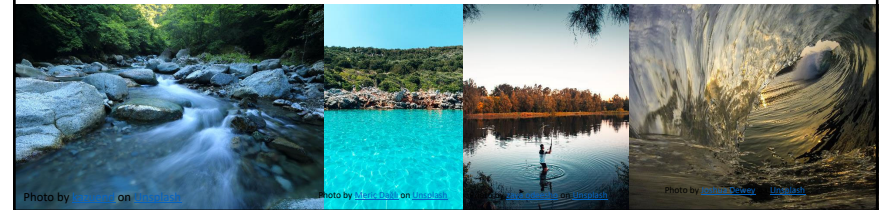
- Emergency Position Indicating Radio Beacon (EPIRB)
 - Use as a last resort
 - Pinpoint your location (GPS)
 - Emits a continuous and distinctive radio distress signal, for at least 48 hours
 - Use maritime, land and air expeditions
 - They float
 - Manual activation (some with contact with water)
- Personal Locator Beacon (PLB)
 - Same as EPIRB
 - Smaller
 - Personal use
 - < range
 - 24 hours



• <https://www.boatsafe.com/epirbs-bet-life/>
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Summary

- Burden of drowning and definition
- Pre-trip planning - medical
- Challenges during a trip – alcohol - Canyoning
- Rescues / Children / Safety / Life jackets / EPIRB's



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'Water, Water Everywhere' Pre-trip and trip planning

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