

DROWNING OR SUBMERSION

UPDATED 1/2024

ALL PROVIDERS

- Focused history and physical exam
 - Blood glucose, core body temperature and oxygen saturation assessment.
 - Assess the scene for other environmental issues or possible toxins.
- Cardiac monitor, ETCO₂, pulse oximetry monitoring, blood pressure when available.
- Treatment Plan**
 - Safely remove patient from the water
 - Place patient supine
 - Remove wet clothing and wrap in blankets
 - Ensure patient warmth
 - If you are concerned for spinal injury refer to *Spinal Motion Restriction Guideline*.
 - Scuba divers “Dive Computer” or “Dive Logbook” should be transported with the patient.
- Key Considerations**
 - Airway maintenance is the primary consideration.
 - Unlike the “CAB” strategy used in standard cardiac arrest, patients suffering cardiac arrest from drowning require an “ABC” approach with emphasis prompt airway management and supplemental ventilations.
 - **Initiate 5 rescue breaths followed by 30 chest compressions, then use a 30:2 compression: ventilation ratio for adults or 15:2 for children.**
 - There can be co-existing conditions depending on the type of submersion injury including trauma, hypothermia, and intoxication.
 - Hypotension is associated with a worse outcome, monitor closely and treat with **Shock, Sepsis and Fluid Therapy Guideline**
 - Initiation of in-water ventilations may increase survival; however, in-water chest compressions are futile.
 - Submersion in cold water will often cause severe hypothermia, notify receiving hospital so that appropriate resources can be mobilized.
 - Pediatric cardiac arrest due to drowning and hypothermia (temperature <30 C/86 F): consider direct transport to Primary Children’s Medical Center and do NOT rewarm this patient.
 - Adult cardiac arrest due to drowning and hypothermia (temperature <30 C/86 F): consider direct transport to University of Utah Medical Center **or Intermountain Medical Center** and do NOT rewarm this patient.

ADULT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- If breathing spontaneously apply oxygen at 15 LPM via non-rebreather mask to maintain oxygen saturations >95%
- Ventilate with BVM when apneic or exhibiting respiratory distress. Consider a nasal or oral airway

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- ❑ Advanced airway, vascular access and fluid therapy
 - Albuterol 2.5 every 10 minutes via nebulization for bronchospasm/wheezing until symptoms subside
 - Reassess patient after each dose to determine need for additional dosing
- ❑ Consider CPAP in awake patients with respiratory distress

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 - Albuterol 2.5 every 10 minutes via nebulization for bronchospasm/wheezing until symptoms subside. Start with 1.25 mg if age <1yr
 - Reassess patient after each dose to determine need for additional dosing
- ❑ Consider CPAP in awake patients with respiratory distress

PARAMEDIC

- ❑ **Epinephrine 2–10 mcg/min IV/IO** infusion for persistent hypoperfusion. Titrate to maintain a SBP of 90 mmHg or **MAP of 65**.
- ❑ **Push Dose Epinephrine 2-10mcg** as needed to maintain a SBP of 90 mmHg or **MAP of 65**.
- ❑ **Norepinephrine - 0.1-0.5mcg/kg/min IV/IO** for hypoperfusion shock. Titrate up to 30 mcg/min to maintain a SBP >90mmHg.

PARAMEDIC

- ❑ **Epinephrine 0.1–1mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.
- ❑ **Push Dose Epinephrine 1 mcg/kg** as needed to maintain a SBP >70 + (age in years x 2) mmHg after fluid bolus
- ❑ **Norepinephrine 0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg.