ARTICLE:
- Citation: Tipton, MJ. Golden, FS. A proposed decision-making guide for the search, rescue, and resuscitation of submersion (head under) victims based on expert opinion. (2011) Resuscitation 82: 819-824.
- Country: UK
- Funding Sources: Non Reported

PURPOSE:
- Research Question(s): How long should a search/rescue for a drowning victim continue before resuscitation becomes unlikely?

DESIGN:
- Study Design: Systematic Review

SETTING / SUBJECTS:
- Research Setting: University
- Subjects:
  - Study population: Survivors (full neurologic recovery) of prolonged submersion (>4 minutes) injury.
  - Inclusion / Exclusion criteria: N/A.
  - Number (control / intervention groups): N/A
  - Demographics: All inclusive
  - Attrition: N/A.

METHODS:
In making a clinical guideline, the authors of this article had three main methodologies:
- Review of pre-existing guidelines for submersion injuries (domestic and international)
- Literature Review: Reviewed electronic journal databases for submersion/drowning case reports and media files. Limited search to survivors (full neurologic recovery) of prolonged submersion (>4 mins).
Consensus meeting: Meeting held with over 50 representatives of health organizations with the objective to over expert consensus opinion for guidelines of search, rescue, and resuscitation of submersion victims.

DATA ANALYSIS:
N/A

RESULTS:

- With respect to pre-existing guidelines, few exist. In the US, the Lifesaving Association’s standard of practice is a 1 hour search for submersion victims in “normal swimming water temperature”. Brazil has a similar time range. In the UK, the current time frame is that rescue/resuscitation efforts can cease after 90 minutes.

- Results from the literature review reveal that out of 43 cases of survival after prolonged submersion, individuals have better survival and can sustain longer submersion at lower temperatures. No reports of individuals surviving for greater then 22 minutes were found for patients who drowned in water > 6 degrees Celsius. While temps < 6 degrees Celsius had more cases (thus more survivors) and submersion times had a broader range (including up to 66 minutes in one case).

- From reviewing pre-existing guidelines, overview of case reports and expert consensus opinion, authors proposed a new guideline for submersion victims:

  If the water is warmer than 6 deg Celsius (42.8 F) continue search and resuscitation efforts for 30 minutes and if it’s 6 degrees or colder continue efforts for 90 minutes.

- Limitations: There are multiple limitation to this study:

  1) Many cases reviewed did not include water temp or submersion time so were not directly included in guideline formation.
  2) Guidelines do not take into account treatment methods which can range from basic CPR to ECMO and thus do have an affect on survivorship (particularly full neurologic function).
  3) Age plays a large role in submersion injuries as children have a higher incidence of drowning then adults and have also been found to have better rates of survival. The authors’ guidelines however have no age factor.

IMPLICATIONS FOR PRACTICE:

The decision-making guideline established in this paper is heavily focused towards rescuer and first responders that are in the field actively searching for and rescuing/recovering drowning victims. As emergency physicians, we are less likely to be the ones applying these guidelines in the pre-hospital seating. However, this paper is a
nice summary of submersion survival cases and offers clinicians a good marker on when search/rescue/resuscitation may be futile. This might be relevant in a medical control scenario for example. Furthermore, this paper offers us a glimpse towards the prognostic outlook for submersion victims that are being resuscitated in our critical care bays.

**LEVEL OF EVIDENCE / DECISION FOR USE:**
- Background
- **Level of Evidence:**
  - IIA  Evidence obtained from at least one well-designed controlled study without randomization