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A new look at survival times during cold water immersion

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Abstract

This paper presents an expanded dataset for survival times during cold water immersion. In 1946, the first set of human data for cold water survival was derived from the US Navy medical reports during WWII. Although this is the largest and most widely used data source, it has only 23 data points and immersion times are less than 5.5 hour for water temperature below 20°C. For the new dataset, data (i.e., immersion times, water temperatures, clothing worn, and in some cases, body masses, heights, and survival times for the deaths witnessed by survivors) was retrieved from 12 well-documented incidents of accidental immersions which involved 22 survivors and 21 deaths. These data were combined with the 1946 dataset to create the expanded dataset which included 122 data points. Analysis of the dataset revealed critical details pertinent to cold water survival: 1) immersion times, up to 75 hours, at water temperatures below 20°C, were longer than most immersion times documented in the 1946 dataset; 2) thermal protection (wetsuit or drysuit), high body mass, and partial immersion may significantly impact survival