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Carbon Monoxide Monitoring and Emergency Treatment (COMET)

Every year, thousands of patients seek treatment for carbon monoxide (CO) poisoning in the emergency department (ED). Currently, the gold standard to measure CO levels is a blood draw, which is time demanding and expensive. The purpose of this study is to evaluate the accuracy of a FDA approved, non-invasive method of measuring CO levels compared to a blood draw in ED patients with suspected CO poisoning. Specifically, we are analyzing the accuracy of Massimo's Radical 7 carboxyhemoglobin finger clip (Rad-7). Previous studies show the limits of agreement obtained exceed those as being clinically acceptable ($\pm$3%), but have been hindered by small sample size, predominantly dark skinned populations, and limited patients with carboxyhemoglobin values greater than 15%.

Research associates enrolled eligible ED patients with CO poisoning symptoms by using a patient database (PRISM). Once enrolled, the research associate took three readings on the participant using the Rad-7, while the nurses simultaneously performed an intravenous blood draw (or within five minutes of the first Rad-7 reading). Subjects were excluded for a time difference greater than 5 minutes between the blood draw and the first Rad-7 reading, spMet readings exceeding 1.6, and if the subject had nail polish on.

In this study, we have enrolled 217 subjects, with 115 subjects eligible for analysis. The bias of the Rad-7 readings had an average difference of 0.97 from the blood draw. The standard deviation is 4.92, with a trend towards greater differences in higher levels. Overall, we have found that SpCO readings on the Rad-7 device are not within 3% of the blood carboxyhemoglobin value, outside the clinically acceptable range.