

# Noninvasive Carboxyhemoglobin Monitoring: Screening Emergency Department Patients for Carbon Monoxide Exposure

Partridge R, Chee KJ, Suner S, Sucov A, Jay GD. *Respiratory Care*. 2006; 51(11): 1332.

## Introduction

Symptoms of carbon monoxide toxicity (COT) are variable and non-specific and so are often confused with the symptoms of other common illnesses like flu. It is likely, therefore, that many cases of COT go undiagnosed by healthcare professionals, even though it is the most common type of accidental poisoning in the United States. The researchers utilized a new monitor, the Masimo SET Rainbow Rad-57 Pulse CO-Oximeter, to noninvasively measure carboxyhemoglobin in the blood of all ER admissions at their hospital, to determine the prevalence of unexpected cases of COT.

## Methods

Pulse oximeters in the Emergency Department (ED) of an urban, academic hospital (with 95,000 annual visits) were replaced with Masimo SET Rainbow Rad-57 Pulse CO-Oximeters, prior to a retrospective chart review. Nurses were instructed to use the Rad-57 Pulse CO-Oximeter to noninvasively measure the carboxyhemoglobin levels (SpCO) of all adult patients presenting to the ER over a 3-month period, in order to determine if unsuspected cases of COT could be detected.

## Results

Over the three-month period, over 10,000 emergency room patients were monitored for carboxyhemoglobin as part of the intake procedure. Nine of these patients, who presented with non-specific symptoms or unrelated complaints, were found to have toxic COHb levels with the Masimo Rad-57 Pulse CO-Oximeter. The toxic levels ranged from 16-33% and were confirmed with blood gas analysis. The sources of the CO exposures in the patients with COT were later identified and were usually in the home. Additionally, all patients with presumed toxic COHb levels due to smoke inhalation were identified with the Masimo Rad-57. Thirteen patients had false positive SpCO values with the Masimo Rad-57 (based on laboratory CO-Oximetry), but no false negatives were observed.

## Conclusions

If the rate of unexpected CO poisonings found in this study was indicative of all US hospitals, it would equate to as many as 50,000 cases of unsuspected CO toxicity annually, nationwide. In this study, the Masimo SET Rainbow Rad-57 Pulse CO-Oximeter provided an easy and effective means of identifying both suspected and unexpected cases of COT as part of the ED patient admissions process. According to the authors of this study, "noninvasive testing for COT can be performed at ED triage...Unsuspected COT may be identified using noninvasive COHb screening and the prevalence of COT may be higher than previously recognized."