

RESPIRATORY CARE

The Science Journal of the American Association for Respiratory Care

2007 OPEN FORUM Abstracts CARBOXYHEMOGLOBIN LEVELS IN SMOKERS VS. NON-SMOKERS IN A SMOKING ENVIRONMENT

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Background: Carbon monoxide, found in cigarettes, has 245 times more affinity for hemoglobin than oxygen. Carboxyhemoglobin (COHb) is hemoglobin combined with carbon monoxide. A normal COHb level for non smokers is <1.5%. Cigarette smokers can have COHb levels between 3-15%. [1] We were curious to see how non-smokers exposed to cigarette smoke were affected by this affinity of hemoglobin for carbon monoxide.

Method: We visited four establishments where cigarette smoking was not prohibited and measured COHb levels in both smokers and non-smokers. Because none of the locations had a “No Smoking” section, the smell of cigarette smoke was very noticeable. We used the Rad-57™ Pulse CO-Oximeter (Masimo Corporation, Irving, CA) for all of our measurements. This is a fairly new and popular device that measures COHb in whole numbers. Using the Rad-57,™ we tested 15 people at each location and at the end of the study we had measured COHb levels on 33 smokers and 27 non-smokers. Each COHb level was measured for one minute using a digital sensor while the participant was seated and resting comfortably. Prior to starting our study, we obtained a control value by measuring COHb levels on fifty non-smoking college students and professors in a well ventilated, non-smoking environment. All fifty subjects in our control group had a COHb level of one percent.

Results: The average COHb of the 33 smokers was 5.04%, while the average value for the 27 non-smokers in a smoking environment was 2.49%. COHb levels ranged from 1-6 % in the non-smokers and 1-14% in the smoking group.

Conclusion: Non-smokers in a smoking environment had a COHb level that was nearly two and one half times higher than that of our control group, indicating that non-smokers are not exempt from the effects of cigarette smoke in the atmosphere.

Discussion: We found it interesting that there was an increased disparity in COHb levels between smokers and non-smokers at the third and fourth locations compared to the first two locations. There are many variables that could have caused the greater disparity, including

how long the non-smoker was at the location, cubic footage of the establishment, whether or not there was an adequate ventilation system, proximity of the smoker to the non-smoker, and total number of smokers at the site.

1. Pearce AC, Jones RM. Smoking and anesthesia: preoperative abstinence and perioperative morbidity. *Anesthesiology* 1984;61:576-584.

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