



From Our Readers

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To the Editor:

The "Notice of Intended Change—Carbon Monoxide" [Appl. Occup. Environ. Hyg. 6(10):896–902; 1991] contains Figure 1 showing the relationship between carboxyhemoglobin (COHb) in blood and duration of exposure to various concentrations of carbon monoxide (CO) in ambient air. This figure should be replaced by the original figure of Peterson and Stewart⁽¹⁾ showing such relationships for up to 1000 ppm (0.1%). Figure 1 is in error for 0.5% (5000 ppm) which was not presented by Peterson and Stewart. As given in Figure 1, exposure to 0.5% CO for 60 minutes would result in a COHb level of less than 20%. In fact, at 0.4% CO, a level of 40% COHb was reached in 30 minutes⁽²⁾ which is also as predicted by the equation used by Peterson and Stewart when we performed the calculations.⁽³⁾ As given, Figure 1 shows very little danger from such a high concentration of CO as 0.5% for less than 1 hour, when in fact, 70% COHb (or more) would be reached which would result in death. Figure 1 is also incorrect for 0.05% (500 ppm) showing about 8% COHb after 100 minutes of exposure while the value given by Peterson and Stewart⁽¹⁾ is about 20% COHb. This is also a measured value in humans exposed at this concentration.⁽⁴⁾ Since there is no reference for the origin of Figure 1, it is difficult to track down how the differences have occurred and the large underprediction of COHb level for the high CO concentration of 0.5%. Granted that many variables are used in the equation used by Peterson and Stewart⁽¹⁾ and that various researchers have presented arguments for some modifications,^(5,6) it remains that the data presented in Figure 1 represents a very large departure from measurements made.

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Author's Response

Professor Alarie is correct. There is a mistake in Figure 1. The description of the two top lines in the graph (right-hand side) should read as follows: the top line, 0.05% (not 0.5%); the next line below, 0.02% (not 0.05%) [also see accompanying corrected figure]. This will be printed correctly in the new BEI documentation. The graph by Peterson and Stewart was published in the literature in different modifications, and we picked up the one easiest

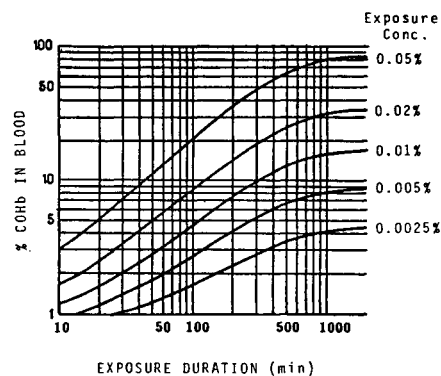


FIGURE 1. Relationship between carboxyhemoglobin in blood and duration of exposure to various concentrations of carbon monoxide in ambient air.

to read which, unfortunately, was in error.

Vera Thomas, Ph.D.

Chair, Biological Exposure Indices
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To the Editor:

We note, with interest, the article "Analysis of PCM Asbestos Air Monitoring Results for a Major Abatement Project" by Perkins et al. [Appl. Occup. Environ. Hyg. 7(1):27–32; 1992]. We compliment the authors on this well-written article. It provides evidence that glove bags alone do not provide sufficient control of asbestos exposures during asbestos abatement activities.

Researchers from the National Institute for Occupational Safety and Health (NIOSH) have evaluated asbestos exposures which occurred when a crew of four workers performed asbestos abatement activities in four public schools. These workers used glove bags to remove asbestos-containing pipe lagging. A NIOSH Technical Report describing this investigation [An Evaluation of Glove Bag Containment in Asbestos Removal. DHHS, CDC (NIOSH) Pub. No. 90–119; October 1990] was released January 1991.

In the NIOSH study, 67 samples were taken in the breathing zone of workers using glove bags to remove asbestos-containing pipe lagging. The results of PCM analyses ranged from 0.002 to 1.41 fibers/cc and averaged 0.35 f/cc. Workers were fitted for and wore half-face respirators during asbestos removal. Concentrations of 39 area samples taken in the rooms while abatement was taking place ranged from 0.002 to 0.816 f/cc. Before abatement was performed, the average airborne asbestos in the rooms ranged from 0.002 to 0.075 f/cc, based on aggressive sampling techniques and PCM analyses. Postremoval concentrations, after initial cleaning, ranged from 0.002 to 0.037 f/cc; fiber concentrations in five of the eight rooms evaluated were

greater after abatement.

Conclusions and recommendations of the NIOSH researchers were similar to those of Perkins et al., namely:

"As used in this study, glove bags did not completely contain airborne asbestos when pipe lagging was being removed."

"... the present study does not provide a basis to specify conditions under which adequate containment can be assured. It is prudent to assume the use of glove bags results in unpredictable exposure levels that may present an exposure hazard and contamination of the work site."

"Because of the uncertainty in controlling exposures during the use of glove bags, it is essential to provide a backup containment system (e.g., isolation, barriers, negative air) and respiratory protection for workers."

An article summarizing the NIOSH research and Technical Report has been prepared and will be submitted shortly to *Applied Occupational and Environmental Hygiene* for publication.

We also agree with Perkins et al. that, undoubtedly, many investigators have performed studies of asbestos abatement or operations and maintenance activities; however, few have published articles documenting the asbestos exposures experienced by workers using glove bags to perform these tasks. We encourage these investigators to publish their findings so that such documented data become available to the occupational and public health community.

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