

Incidence of Carbon Monoxide Poisoning in the United States

To the Editor:

It is commonly written in the medical literature that carbon monoxide (CO) poisoning results in 3,700 deaths annually in the United States, and causes 10,000 less severely poisoned individuals to seek medical attention or to miss at least a day of normal activity. A 1991 study from the Centers for Disease Control supported the mortality figure, reporting an average of 3,744 deaths annually during the decade of the 1980s (1).

The estimate of 10,000 nonfatal cases annually came into question when it was found that 2,355 individuals with acute CO poisoning were treated in U.S. hyperbaric chambers in 1992 (2). If 10,000 cases were indeed the denominator for this population, it would suggest that nearly one-quarter of symptomatic patients with CO poisoning were treated with hyperbaric oxygen (HBO₂). This seemed unlikely, especially when a survey of hyperbaric treatment facility medical directors revealed that only the most severely poisoned patients are generally selected for treatment with HBO₂ (2).

The 10,000-case estimate became even more doubtful after it was discovered that only 6.9% of patients coming to emergency departments in three Pacific Northwest states were treated with HBO₂ (3). The incidence of the disease seemingly was greater than commonly described.

It was not clear where this estimate of national disease incidence originated. Review of the the clinical literature on CO poisoning over the past several years found 18 papers quoting the 10,000 case annual figure. If the sources quoted by these authors are examined closely, it can be seen that most of them reference each other (Fig. 1). Two papers quote Centers for Disease Control "fact sheets" from the 1970s, but 15 quote papers which sequentially reference earlier publications. Eventually, all can be traced to one 1974 publication.

That original paper is a report on CO contamination of the home living environment (4). The figures commonly quoted for annual CO incidence (10,000 nonfatal and 3,700 fatal cases) are mentioned in the paper's introduction, but without providing a source for the data. Through the Internet, I contacted one of the surviving authors of that commonly quoted 1974 paper, Floyd B.

Oglesbay. Personal communication revealed that the estimate of 10,000 cases annually in the United States originated from data collected by the Injury Control Program of the Public Health Service in the late 1960s. In the "Carbon Monoxide Program Action Kit" developed by the Public Health Service in 1969, the estimate of 10,000 cases per year was noted to be "based on the scant evidence available" and representative of "only a portion of the true number".

This demonstrates clearly the importance of quoting original sources when referencing earlier work, especially when referring to an epidemiologic estimate of the prevalence of disease incidence. Because several authors, including myself, have failed to go back to the original source, an outdated estimate of disease incidence has been repeated in the medical literature for over 30 yr. Not only is the figure old, but it may not even have been accurate when it was originally published. It has recently been estimated that there are over 40,000 emergency department visits in the United States annually for CO poisoning (3). When one considers that not all patients seek medical care, that they may be seen in medical facilities other than emergency departments, and that they may not be accurately diagnosed when they do seek medical care, the incidence of CO poisoning is certainly many fold greater than 10,000 cases per year.

NEIL B. HAMPSON, M.D.
*Virginia Mason Medical Center
Hyperbaric Medicine Department
Seattle, Washington*

REFERENCES

1. Cobb N, Etzel RA. Unintentional carbon monoxide-related deaths in the United States, 1979 through 1988. *JAMA* 1991; 266:659-663.
2. Hampson NB, Dunford RG, Kramer CC, Norkool DM. Selection criteria utilized for hyperbaric oxygen treatment of carbon monoxide poisoning. *J Emerg Med* 1995; 13:227-231.
3. Hampson NB. Emergency department visits for carbon monoxide poisoning. *J Emerg Med* 1998; 16:695-698.
4. Schaplowsky AF, Oglesbay FB, Morrison JH, et al. Carbon monoxide contamination of the living environment: a national survey of home air and children's blood. *J Environ Health* 1974; 36:569-573.

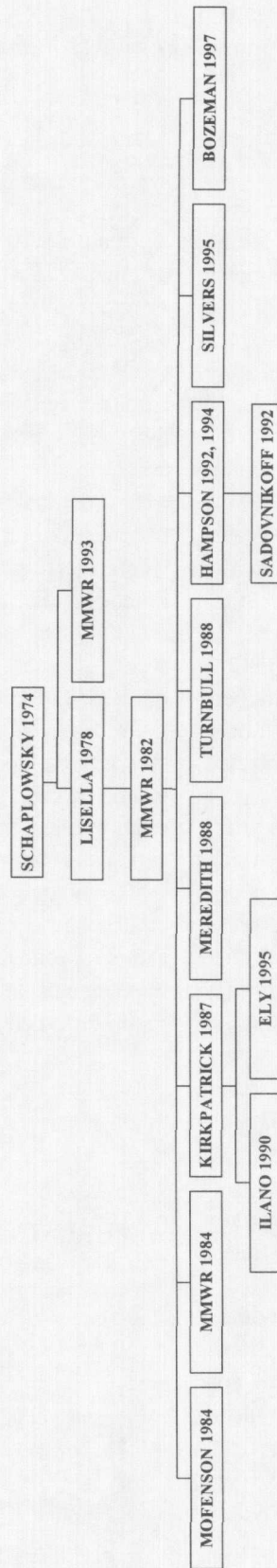


FIG. 1—Reference tree for authors quoting 10,000 CO poisoning cases in the United States annually.