Nitrous Oxide and the Greenhouse Effect

To the Editor:—In recent years, much attention has focused on the possibility that N₂O is a harmful pollutant in the operating room environment. Consequently, modern anesthesia machines are equipped with scavenging systems designed to vent N₂O and other gases to the external atmosphere. It has come to our attention that, while this practice certainly reduces the exposure of operating room personnel to possibly harmful anesthetic gases, it does not prevent us from contributing to the exponentially increasing concentration of N₂O in the global atmosphere.

In the last decade, several meteorological studies have suggested that N₂O is becoming a major atmospheric pollutant with potentially serious consequences. First, along with CO₂, N₂O traps thermal radiation escaping from the earth's surface contributing to the "greenhouse" effect that is thought to be responsible for the alarming warming trend in the global climate. Second, N₂O destroys ozone through a series of chemical reactions that occur in the upper atmosphere. Concern over depletion of stratospheric ozone, which protects all life on the surface of the earth from the deleterious effects of ultraviolet radiation, has risen considerably in the last few months. Measurements of the ozone level in areas of the antarctic stratosphere revealed that the concentration was only 3% of the seasonal norm. Thus, it is important to consider whether...


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current anesthetic practices could be contributing to this global long-term problem.

By far, most anthropogenic N₂O is released from the denitrification of agricultural fertilizers and the combustion of fossil fuels. It is estimated that these processes produce approximately 10 × 10¹⁹ moles of N₂O each year.¹ While precise figures for the utilization of N₂O as an anesthetic are not available, it is instructive to develop a rough estimate. If half of the 2.1 × 10⁹ surgical procedures performed yearly in the U. S. A. were each carried out with N₂O flowing at 2 l/min for a duration of 2 h, this would result in the venting of 1.3 × 10⁸ moles of N₂O yearly. Considering that the number of anesthetics per capita worldwide is less than in the U. S. A. and the use of N₂O is limited primarily to industrialized countries, the worldwide use of N₂O may approximate five times that of the U. S. A. If so, total release of N₂O to the atmosphere could be in the range of 0.5–1.0 × 10⁹ moles/year or less than 1% of the total global production of N₂O.

While this figure seems to minimize the contribution of anesthesia to atmospheric N₂O, we should not become complacent. Excessive atmospheric pollution could well disturb the delicate balance between N₂O production and N₂O absorption by natural geological and atmospheric "sinks."¹ Given the fact that N₂O has an extremely long transit time in the atmosphere of over 100 years,¹ future N₂O emissions could have real impact.

† Personal Communication. American Hospital Association, Chicago, IL.

It is clear that N₂O continues to find merit as an important component of current anesthetic practice and the theoretical considerations presented here should not outweigh the benefit of its use in a particular setting. Nevertheless, as more becomes known about the effects of N₂O on the ozone layer, it may become prudent to install systems to decompose or absorb the N₂O contained in scavenged anesthetic gases. In the meantime, we suggest that environmental pollution with N₂O should be minimized by using low-flow anesthetic techniques whenever feasible.

SCOTT J. SHERMAN, M.D., PH.D.
BRUCE F. CULLEN, M.D.
Department of Anesthesiology
University of Washington
School of Medicine
Harborview Medical Center
Seattle, Washington 98104

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A Simple Technique to Eliminate Needle Stick Injuries

* McCray E, Winslow N, Solomon SL, Martone WJ, Onorato IM, Munn VP: Prospective evaluation of health-care workers with perinatal or mucous-membrane exposure to blood from patients with acquired immunodeficiency syndrome. International Conference on AIDS, Atlanta, GA, April 14-17, 1985

To the Editor—Needle stick injuries are an occupational hazard for anesthesiologists. Most needle stick injuries occur when the needle is being recapped.⁴ Furthermore, the fluid in intravenous tubing should be considered contaminated because of possible previous backflow of blood.¹ Any needle used to administer medicines into intravenous tubing should also be considered contaminated. The Center for Disease Control has recommended that forceps should be used to recap needles,² but the naked, contaminated needle is still dangerous. We suggest the following technique to eliminate contaminated needles.

The anesthesiologist needs two designated areas in the operating room. A table in the operating room is usually designated the clean area. It is not to be touched by contaminated gloves, and is a distance away from the operative field or any contaminated substances. Needles are kept only on the clean area, and are for mixing