

Citation

LaMontagne, A., Oakes, J., & Turley, R. (2004). Long-term ethylene oxide exposure trends in U.S. hospitals: Relationship with OSHA regulatory and enforcement actions. *American Journal of Public Health, 94*(9), 1614–1619.

Highlights

- The study's objective was to examine differences in hospital worker exposures to ethylene oxide (EtO) after the implementation of the 1984 and 1988 OSHA EtO standards.
- The authors used a random effects model to examine changes over time in hospital worker exposures to EtO.
- The study reported a steady, statistically significant decline in EtO exposures for the first several years after each OSHA standard was set.
- The quality of evidence presented in this study is low. This means we are not confident that changes in worker EtO exposures over time are attributable to OSHA's implementation of EtO standards.

OSHA Enforcement Activities and Outcomes

The study examined differences in hospital worker exposures to EtO after the implementation of the 1984 and 1988 OSHA EtO standards. The 1984 OSHA standard set a permissible exposure limit of 1 part per million (ppm) and an action level of 0.5 ppm for EtO work shift exposures (time-weighted average parts per million over 8 hours). The 1988 OSHA standard set a short-term excursion limit of 5 ppm for EtO (time-weighted average parts per million over 15 minutes). EtO is a known human carcinogen, a potential reproductive hazard, an allergic sensitizer, a potential asthmagen, and a potent neurotoxin. A large concentration of EtO-exposed workers are in hospitals because EtO is used to sterilize heat- and moisture-sensitive medical supplies.

Features of the Study

The authors used a random effects model to examine changes over time in hospital worker exposures to EtO after the implementation of the 1984 and 1988 EtO standards. The model included a random effect for each hospital and examined changes over time in the EtO exposures that exceeded OSHA standards.

The authors used EtO exposure measurements from one of the principal commercial vendors of passive EtO-monitoring devices. This vendor has approximately 50 percent market share and the sample included hospitals in all 50 states and the District of Columbia. Work shift measurements were available for 2,265 hospitals, and short-term measurements were available for 1,735 hospitals between 1984 and 2001.

Findings

- The study found a steady, statistically significant decline in EtO exposures for the first several years after each OSHA EtO standard was set.
- Work shift exposures continued to decrease beyond the initial period. However, short-term excursion exposures began increasing in 1996.

Considerations for Interpreting the Findings

This study describes trends over time, but it does not examine the causal impact of the introduction of EtO standards on EtO exposures. It is possible that the changes over time in worker EtO exposures could have occurred without the adoption of OSHA standards, for example, because hospitals adopted alternative sterilization procedures or technologies over time. Because OSHA standards were implemented for all hospitals at the same time, there is no comparison group that was unaffected by the EtO standards and could be used to rule out this possibility.

Causal Evidence Rating

The quality of causal evidence presented in this study is low. This means we are not confident that changes in worker EtO exposures over time are attributable to OSHA's implementation of EtO standards. To provide more convincing causal evidence that meets CLEAR criteria, the study could have used a suitable comparison group, such as a set of states that already had such standards in place and would not have been affected by the introduction of new standards.