



MICHIGAN STATE UNIVERSITY: Prevention of work-related injuries & illnesses through research & investigation

INVESTIGATION/RESEARCH

Prevent Work-Related Asthma from Styrene Exposure

From 1988 to 2026, 30 cases of work-related asthma (WRA) from exposure to styrene were identified in Michigan. In Michigan, WRA from styrene exposure is primarily associated with work in plastic parts or boat manufacturing. Workers can be exposed to styrene via inhalation as well as through skin contact. The International Agency for Research on Cancer (IARC) has determined that styrene is a probable human carcinogenic (Group 2A). Examples of WRA from exposure to styrene:

- A male in his 30s developed WRA two years after beginning to work at a boat manufacturing facility. He built and repaired yachts. He would sand the hulls, paint, apply fiberglass to holes and rebuild walls on the boats. He wore a mask with a charcoal filter. Within two years of doing this work, he developed wheezing, cough, chest tightness and shortness of breath. He sought treatment at an emergency department three times. He was prescribed multiple asthma medications. He was reassigned to a new job, and his symptoms improved although he still required the same amount of asthma medication. He never smoked cigarettes. A MIOSHA enforcement inspection at the facility found exposures to styrene above the permissible limit, and 24% of co-workers interviewed during the inspection were bothered at work by daily or weekly shortness of breath, wheezing or chest tightness, or developed new-onset asthma since working at the facility.
- A female in her 20s developed WRA five years after beginning to work at a pool and spa manufacturer. Her duties included spraying resin, drilling and spraying foam. She sometimes wore a paper mask when performing these duties. She was prescribed an inhaler and quit this job. Since then, her symptoms improved, and she required less asthma medication. She smoked a half a pack of cigarettes a day since her late teens. A MIOSHA enforcement inspection at this workplace found exposures to styrene above permissible limits. The company was also cited for inadequate ventilation, an inadequate respirator program, an inadequate hazard communication program, the absence of eye wash stations, and improper record keeping.

TO PREVENT THE DEVELOPMENT OF WORK-RELATED ASTHMA FROM STYRENE EXPOSURE

- **Employers should recognize** that individuals working with styrene *and co-workers in the vicinity* can develop WRA from exposure to styrene, even when exposures are within OSHA's permissible exposure limit (PEL). The Michigan OSHA PEL is 50ppm. The federal OSHA PEL is 100ppm.
- **Employers should use engineering controls such as providing appropriate, task-specific ventilation as well as personal protective equipment such as appropriate NIOSH-approved respirators in addition to gloves and clothing impermeable to styrene** to minimize exposures.
- **Get involved!** Workers who work around styrene should familiarize themselves with their company's health and safety programs/policies, styrene's safety data sheet (SDS), ventilation options and personal protective equipment.
- **Health care professionals should take a detailed occupational history** of workers who present with adult-onset asthma, including industry, job title, *tasks performed*, and any reported exposures.
- **Health care professionals, employers and employees should also be aware** that skin contact as well as breathing styrene can cause sensitization.

DID YOU KNOW?

- The MIOSHA PEL for styrene is 50ppm, which is lower than the federal OSHA PEL of 100ppm.
- Workers who develop WRA from styrene who are removed from exposure are likely to continue to have symptoms but are less likely to get worse.
- 40% of the workers with WRA from styrene had at least one trip to the Emergency Department, and 30% required hospitalization.
- A third of the workers continued to work in the same environment after their WRA diagnosis.
- WRA commonly occurs in work areas that are within OSHA PELs.
- Emerging industries where styrene is used include windmill blade manufacturing and 3D printing.

MIOSHA: Air Contaminants for General Industry Standard:
https://www.michigan.gov/leo/0,5863,7-33678421_11407_15368-39941--,00.html

Public Health Statement for Styrene:
<https://www.atsdr.cdc.gov/ToxProfiles/tp53-c1-b.pdf>

Federal OSHA Overview of Styrene:
<https://www.osha.gov/SLTC/styrene/>

NIOSH Overview of Styrene:
<https://archive.cdc.gov/#/details?url=https://www.cdc.gov/niosh/topics/styrene/default.html>