

What can you do to control your exposure?

Workers can control their exposure in swine barns by applying appropriate ventilation practices, performing housekeeping procedures, and using personal protective equipment.

A swine barn ventilation system is primarily used to maintain a constant temperature for optimal swine health. To manage contaminants, all ventilation sources (i.e., manure pit fans, ceiling inlets) need to be functioning and used.



Workers need to wear appropriate personal protective equipment when working in a hazardous environment where contaminant concentrations

surpass regulatory exposure limits. When contaminant concentrations exceed industry-recommended limits, a particulate



respirator and/or air-purifying respirator with a particulate and ammonia filter will adequately reduce a worker's exposure when the equipment is correctly used and maintained.

For more information, please visit:

<http://www.public-health.uiowa.edu/gpcah/research/center-funded/>



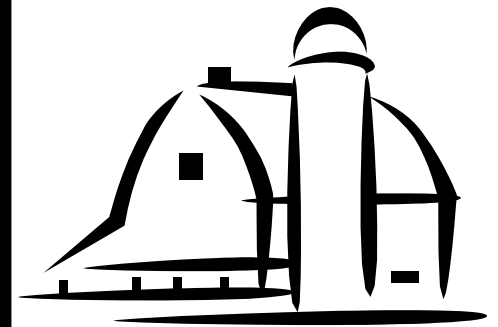
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Your Work,
Your Health:

Worker Exposure
in Swine Barns



Working in Swine Barns

An increase in large-scale confined animal feeding operations (CAFOs) has led to an increase in the amount of time spent inside CAFO facilities performing tasks. Air contaminants inside CAFOs are generated from feeding operations, swine excretion, manure pits, and other operations occurring within these spaces.



Contaminant concentrations differ depending on factors such as management and ventilation practices, size of the operation, feed and waste handling procedures, tasks included in a work shift, and season.

In the Midwest, high contaminant concentrations occur inside these CAFOs during winter due to lower ventilation rates to maintain temperature and reduce heating costs, which in turn increases the exposure risk for workers.

Workers need to consider this increased exposure risk during the winter to understand and apply appropriate control techniques to minimize health risks.

What are you being exposed to?

Workers are exposed to multiple contaminants generated in swine barns. Dusts, composed of feed and fecal material, are suspended in the air along with waste gases that are generated inside the swine CAFO. Gaseous contaminants that are of primary concern include ammonia (NH₃), hydrogen sulfide (H₂S), and carbon dioxide (CO₂). These hazardous gases are produced by degenerating manure along with animal respiration. Heaters may also generate carbon monoxide (CO).

Is there variation in exposure?

Contaminant concentrations have been shown to be higher during the winter months due to decreased ventilation in swine barns. Concentrations vary over time and location. An increase in carbon dioxide concentrations over the course of a day has been measured, and higher dust levels are potentially related to the swine feeding when manually loading gravity feeders. Additional factors can change contaminant concentrations in swine barns, including an increase in the level of activity of the animals, handling manure, and facility maintenance and cleaning.



What are potential health effects?

Occupational exposures within CAFOs have been demonstrated as harmful to worker health, particularly the respiratory system.

The Occupational Safety and Health Administration (OSHA) recommends exposure limits (not to be exceeded over 8-hour workdays) for individual contaminants. Industry guidelines have been recommended to account for health effects of the complex mixtures of contaminants in swine CAFOs.

Individually, these contaminants may act as an irritant to the respiratory tract at concentrations typical of swine production in CAFOs. Additionally,

Contaminant	OSHA PEL	Industry Guidelines*
Respirable dust, mg/m ³	5	0.23
CO ₂ , ppm	5000	1540
NH ₃ , ppm	50	7
H ₂ S, ppm	10	---
CO, ppm	50	---

OSHA – regulatory permissible exposure limit (PEL)

**Donham, et al. 1989*

both acute and chronic respiratory diseases have been identified in workers who are exposed to a complex mixture of dusts and waste gases generated by the swine. Bronchial inflammation, chronic bronchitis, airflow obstruction, and a decrease in pulmonary function have been identified in swine confinement workers.

Work-related respiratory symptoms have a clear dose-response relationship with the number of daily hours spent working inside confinement operations, indicating that an increase in symptoms results as the amount of work time increases.