

# **Industrial Hog Barns - Air Quality Occupational Health Considerations**

MFL Occupational Health Centre, Inc  
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## **Introduction**

**Workers in industrial hog barns will most directly and probably most profoundly be affected by the environmental impacts of the hog industry. The Environment Act should be a valuable legislative tool to help protect the health of workers.**

The hog industry needs to be placed within the context of a sustainable development strategy to ensure the long term health of workers and the affected communities. A comprehensive review of the potential environmental impacts would not be complete without consideration of the occupational health risks related to the industry. The hog industry poses health risks to Manitoba workers that must be addressed.

The MFL Occupational Health Centre (OHC) has established itself as an important community based resource on occupational health and safety for workers and communities in Manitoba. Our Centre has a respected track record of addressing health and safety issues at public hearings and through submitted written documents as part of the public consultative process when legislated changes are being considered.

The OHC is grounded in the belief that those people who share common health concerns must play an active role in addressing those concerns. Further, the community working together is better able to promote the health and well-being of its individual members and the community as a whole.

Finally, the OHC believes that workers should not bear any burden of illness or injury because of their work. We intend to highlight some of the very real and important health considerations of workers in industrial hog barns. The occupational hazards that affect a worker's health also affect the well-being of their family and community.

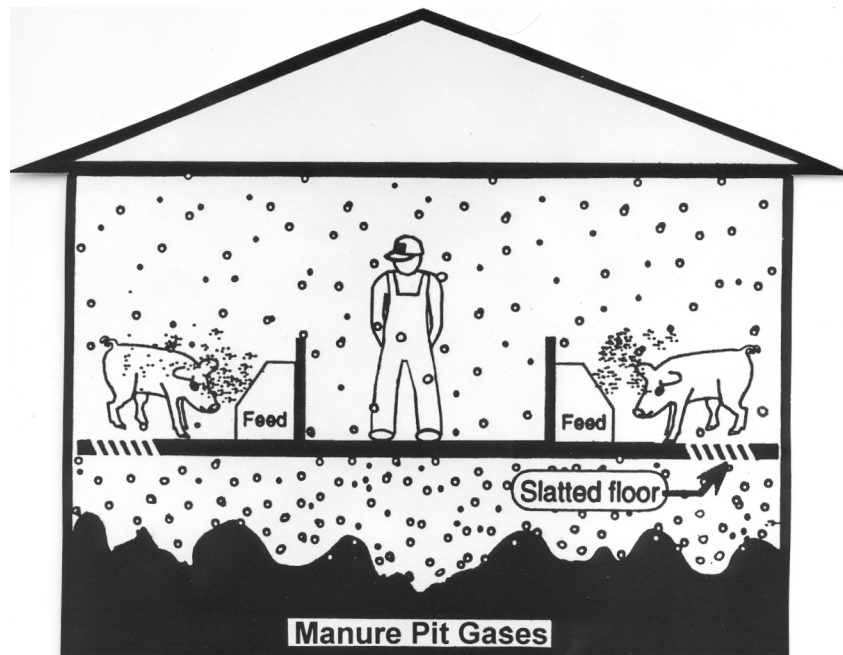
## Health Risks

Workers in the livestock industry perform a wide variety of jobs and are exposed to a wide range of health and safety risks. However, this paper will deal with respiratory problems for workers in hog barns.

### Respiratory Problems for Workers in Hog Barns

Hog production has undergone rapid transformation from family owned operations to large scale industrial enterprises. An increasing percentage of pigs are being raised in large industrial hog barns. Size matters. When something goes wrong in a large hog barn, the potential of risk for occupational and environmental damage is correspondingly large.

Large hog barns are complex environments with a variety of gases and dusts present. It is well documented in the international scientific literature that exposure to the air in large hog barns may cause short and long term harmful health effects in workers.



### Why are some gases and dust in the barn harmful?

Thousands of gases, particles and bioaerosol emissions have been documented in industrial hog barns. Industrial hog barns generate dusts, dander, and gases released from the breakdown of hog feces and urine that contribute to poor air quality if the ventilation in the building is not adequate. In the summer, hot weather increases the amount of gas released from the manure.

Environmental assessments of air quality inside industrial hog barns done during research studies revealed unhealthy concentrations of hydrogen sulfide, ammonia, inhalable particulate matter and endotoxin. It is important to keep exposure to **all** dust and gases as low as possible to minimize health risks to workers.

### **Does air testing help?**

It is best to find out if there is a problem with dusts and gases in the hog barn **before** health problems develop. An exposure limit is the amount of a hazard that **most but not all** workers can be exposed to without harming their health.

**Occupational exposure limits have several limitations and should not be solely relied upon to protect the health of workers in hog barns.** These limitations include

- the lack of appropriate occupational exposure limits for some of the air contaminants including organic dusts
- the inability to adequately account for the health impact of exposure to multiple airborne hazards
- the reality that some workers will experience health problems at exposures that are below the exposure limits

**Although modern barns appear cleaner, the air inside these barns still carries toxic molecules which are harmful to the workers. Cleaner modern industrial hog barns are not less harmful than older ones. In addition, routine spot check air analysis are not sufficient to evaluate the potential toxic effect of barn air.**

### **Harmful effects**

Working in industrial hog barns is often a full time occupation. The higher the levels of harmful dust and gases and the more time that workers spend in the barn then the greater the chance that workers will develop health problems.

**There have been more than 70 papers published on the adverse health effects on workers within industrial hog barns in Canada, United States, most European countries and Australia.**

A small proportion of workers experience acute respiratory symptoms early in their work history sufficiently severe to cause immediate withdrawal from the workplace. To better understand the effects of exposure to air within industrial hog barns, many researchers have exposed healthy volunteers for several hours only once to barn air. Even a **single exposure** induces fever, malaise, drowsiness and thickening of the membranes of the nose and activates an inflammatory response in the lungs.

The **collective body of research** clearly indicates that at least **25% of workers** in industrial hog barns have respiratory diseases including bronchitis, mucous membrane irritation, asthma-like syndrome, and acute respiratory distress syndrome. Notably, organic dust toxic syndrome, related to high concentrations of bioaerosols in industrial barns, occurs episodically in more than **30% of workers**.

Several studies indicate that workers in industrial hog barns have significantly more sick days than controls. Workers that work eight hours or more a day in industrial barns have a higher incidence of impaired airflow and lung inflammation.

**Epidemiological studies** of workers in industrial hog barns have documented increases in morning phlegm, coughing, scratchy throat, burning eyes, wheezing, shortness of breath, and chronic bronchitis compared to individuals that do not work in industrial hog barns. **The severity of respiratory symptoms increases during the winter due to reduced ventilation.**

Several large scale studies indicate **endotoxin** (toxins that are released when organisms die) exposure for workers in industrial hog barns have been associated with both respiratory and systemic symptoms as well as changes in lung function. There is considerable evidence that endotoxin exposure may both exacerbate pre-existing asthma and induce new asthma. Recent studies from Canada suggest that women are more prone than men to develop asthma from working in industrial hog barns.

**Dusts** contribute substantially to the extent and severity of respiratory symptoms for workers in industrial hog barns. Feed particles and fecal matter are the most prevalent components of dusts in industrial hog barns. Other components include dander, moulds, insect parts, and mineral ash. Asthma and hypersensitivity pneumonitis are associated with exposure to organic dusts.

In livestock confinement environments it is important to be aware of the risks associated with **combinations of the various gases and dusts**. The combination of the variety of gases in the confined space may increase the negative health impact of any one type of agent or gas. For example, dust particles may absorb ammonia. Ammonia is water soluble and is usually absorbed by mucous in the upper respiratory tracts when inhaled. This process protects the lungs from the effects of exposure to moderate ammonia. Dust particles, however, and the ammonia absorbed in them are delivered more deeply into the pulmonary system. This scenario allows ammonia to have an impact on the more sensitive deeper areas of the pulmonary system where ammonia would not typically reach.

Exposure to **dust aerosols** during the cleaning inside hog barns can induce an acute inflammatory reaction in the upper airways of workers when using a high pressure cleaner for several hours. The use of a mask reduces but does not eliminate this inflammatory response.

In colder climates, heating may be achieved with propane or other fossil fuels in large hog barns. High dust levels make it difficult to keep heaters and equipment working effectively. The amount of harmful gas in the air may be higher in the winter if less fresh air is coming into the building. Heater and other equipment malfunction and/or inadequate ventilation may result in a build up of carbon monoxide and cause **carbon monoxide poisoning**.

Some **community** environmental air quality assessments have shown **concentrations of hydrogen sulfide and ammonia that exceed Agency for Toxic Substances and Disease Registry recommendations**. There is a growing body of evidence documenting excessive respiratory symptoms in **neighbours** adjacent to industrial hog barns. The pattern of their symptoms is similar to those of the workers working in the barns. Increased prevalence of **childhood asthma** on farms with increasing numbers of hogs has also been documented.

**The CEC needs to ensure that owners of industrial hog barns comply with Workplace Safety and Health legislation. Employers are responsible for the safety and health of all the workers. Employers should keep exposure to all dust and gases as low as possible.**

Owners of industrial hog barns should include worker representatives in the process of identifying job risks and exploring ways to minimize workplace health and safety risks. A critical first step is to identify the source of the problem.

This should be done with the health and safety committee or worker representative. Workers often best understand the hazards of their particular jobs. Employers need to provide all workers with easy to understand information and training about health hazards in the barn. Employers should involve their workers to ensure that procedures and equipment are appropriate and convenient.

#### **Owners of hog barns should:**

- Control exposure to hazards at the source of the hazards by minimizing or eliminating the air contaminant using adequate ventilation systems. Make sure that the mechanical ventilation system has enough capacity to effectively get rid of harmful gases at all times.
- Use respirators only in addition to but not as a substitute for adequate ventilation to protect the health of workers.

Make sure that workers have access to the right type of respirators that fit properly. Instruct workers how to use, clean and maintain the respirators.

- Install gas detectors and test for harmful gases throughout the day in the barn
- Evaluate the health impact of all air contaminants on workers and do not rely solely on occupational exposure limits to determine if the air is safe

## **Danger can also come quickly!**

Hydrogen sulfide is an extremely toxic gas formed by the decomposition of animal waste. Workers may be exposed to hydrogen sulfide when they enter the manure storage pit or when the pit is agitated prior to being emptied. This releases large amounts of hydrogen sulfide into the barn. Workers who survive exposure to excessive amounts of hydrogen sulfide may develop adult respiratory distress syndrome.

Workers will be in immediate danger if there is not enough oxygen. Some workers and rescuers without enough ventilation and the right kind of respirators have become unconscious or died in Manitoba when they entered the manure pit.

**The CEC needs to ensure that owners of industrial hog barns comply with Workplace Safety and Health legislation. Employers are responsible for the safety and health of all their workers. This includes preventing a dangerous exposure to hydrogen sulfide.**

### **Owners of hog barns should:**

- Hire trained professionals to do the most dangerous work such as emptying lagoons or working inside tanks or deep pits.
  - ✓ Make sure the contracted firm provides its workers with appropriate respirators, personal protective equipment and emergency rescue procedures for confined spaces.
  - ✓ Stir and transfer the manure in holding tanks mechanically to reduce worker contact with manure gases.
  - ✓ Ensure all mechanical equipment can be removed from pits and tanks without workers having to enter the pit or tank.
- Post warning signs in all areas at risk. Stand a safe distance outside the tank or building when the manure pit or tank is stirred or emptied.
- Make sure that the level of gases are safe before workers re-enter the hog barn, lagoon, tank or deep pit.

### **Recommendations**

Hog producers have expanded in Manitoba just as environmental scrutiny and public disfavour begin to stunt hog expansion in some other parts of Canada and globally. **We must carefully consider the current and future ecological footprint that will be left by the hog industry in Manitoba.**

Protecting our workers and our environmental heritage up front is in the best interests of all Manitobans in the long run. If the hog industry limits itself to only the short sightedness of the business bottom line then eventually the costs will catch up in some other way. Later most of the health, social and economic burdens of occupational and

environmental illnesses are more likely to be unjustly carried by the worker, families, communities and taxpayers rather than at the source of the problem. We need to both protect the health and safety of workers and concurrently embrace and plan for an ethical and sustainable economy.

*Reflecting this broad perspective of healthy workplaces, healthy workers and healthy communities, the Occupational Health Centre recommends the following:*

In keeping with the spirit of the precautionary principle that is embedded in both the provincial Environment Act and the Sustainable Development Act,

**ensure that current laws, regulations, policies are enforced to protect workers, families, communities and the environment.**

- Both CEC and Workplace Health and Safety Division, Manitoba Labour, should **dedicate sufficient resources and develop expertise** to prevent respiratory problems for workers in hog barns and adjacent community residents.
- Ensure that **occupational health and safety information and training is relevant and accessible** to *all* Manitoba workers in hog barns. Access to information and training must not be limited in any way by language, racial, or cultural barriers.

**Continue with the moratorium on expansion of the hog industry until we know that workers, communities and the environment are protected.**

**Initiate independent research that gathers local knowledge from workers in hog barns, community residents, as well as expertise from occupational, community and environmental specialists based on the Manitoba context.**

Research dialogue should include but not be limited to these considerations:

- Mandate environmental impact statements for proposed hog barns that includes occupational/environmental health, social justice, and socioeconomic issues.
- Decisions to issue permits for industrial hog barns should be considered in public meeting and decided by the community.

**Support the farming of hogs in a way that protects the health of workers and their communities using sustainable, environmentally sound and ethical practices. Support small scale farming operations.** The trend toward large scale livestock operations increases the risk of a number of health problems. By supporting opportunities for smaller scale livestock farms in Manitoba, we can minimize some of the health impacts on workers and the wider community from larger scale operations.