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Industrial Hog Barns - Communicable Diseases Occupational Health Considerations

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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 the risk of communicable diseases 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.

As a general principle, the concentration of humans or animals close to each other enhances potential spread of microorganisms among members of the group. It also creates greater potential for infecting surrounding life forms, even those of different species. The conditions created also may become a breeding ground for new, more infectious or more resistant microorganisms.

Communicable diseases can be transmitted from hog waste to workers

Published studies have documented a variety of contaminants, microbial agents, and harmful health effects in those exposed to pigs as part of their work. The risk to acquire communicable disease from pigs increases if workers work with large numbers of hogs. Some workers come into contact with hundreds or thousands of hogs each day. It is often difficult to assess the risk because workers may not know which hogs have infections. Pigs can appear to be healthy but may still be carrying disease.

Animal wastes (manure, urine, carcasses, and reproductive tissues) can contain micro-organisms that pose health risks to workers from infection and microbial toxins. The evolution of industrial hog barns increases the frequency and volume of animal contact by workers when compared to small scale operations. This trend has been associated with an increased prevalence of some fecally transmitted diseases from hogs to people.

Pen cleaning, solid and liquid waste handling, and land application of wastes can result in worker contact with animal feces that can be harmful. Carcass disposal, feeding, assistance with birthing, and animal slaughter can also expose workers to infected animal tissues.

Many infectious organisms that cause disease in animals can cause illness in people. These include bacteria, viruses, and protozoan parasites. The following table highlights sources of common diseases for workers within the hog industry.

Table 1. Sources of Common Diseases on Farms

Infectious Diseases Resulting from Direct Contact with Animal Wastes or Inhalation of Bioaerosols	Most Common Animal Source
Salmonellosis	Cattle, chickens, but all species possible
Yersiniosis	Pigs
Leptospirosis	Cattle, pigs
Brucellosis	Cattle, pigs
Erysipeloid	Pigs, turkeys
Listeriosis	Ruminants
Streptococcal meningitis	Pigs
Pasteurella aerogenes	Pigs

Adapted from Animal Handlers. State of the Art Reviews. Occupational Medicine.
By Dana J. Cole et al. p 425

The prevalence of the salmonella **bacteria** in animal feces can be as high as 80% in some industrial hog barns. The risk of salmonella illness in livestock workers is theoretically high. A new strain of salmonella is increasing in both animals and humans in Canada and in many other countries. It causes severe diarrhea in both animals and humans. This new strain is of concern because it is resistant to several medications normally used to treat this illness. This contributes to a much higher death rate than more typical strains of salmonella.

Other diseases caused by bacteria such as erysipelothrix rhusiopathia and streptococcal meningitis are related to occupational exposure to hogs. There is evidence that the former is increasing as the hog industry expands.

A strain of Hepatitis E virus (HEV) closely resembles the human HEV. This **virus** is widespread in pig populations in the United States.

In addition, a newly described virus in the Paramyxoviridae family has caused stillborn piglets. Fever and viral antibodies were noted in workers following exposures to the Paramyxoviridae infected tissues. Recently, a Nipah virus infection occurred in concentrated hog herds in Malaysia and Singapore which killed both hog workers and hogs.

There is a growing body of evidence that viral interactions between animals and people may be more common than previously thought. The best known is the influenza virus. Its viral genetic material can re-assort in swine and then re-infect people. Hogs are an important mixing vessel for several influenza viral strains.

Influenza viral infections occur in wild bird species in many parts of the world. Interspecies transmission and reassortment of influenza A viruses have been reported to occur between swine, humans and wild and domestic fowl. The human influenza viruses responsible for the 1918, 1957 and 1968 pandemics contained gene segments closely related to those of avian influenza viruses.

Recent outbreaks of virulent strains of influenza have arisen from industrial hog and poultry raised in close proximity. International teams of environmental scientists have warned that the proximity of poultry to hogs could hasten the spread of avian flu to humans.

Industrial hog barns concentrate large numbers of animals together and this facilitates both genetic re-assortment and transmission. The transmission of influenza is a continuing concern. Whether it comes to humans from hog or birds or from birds via hogs, or humans to hogs; strains are likely to evolve that are highly transmissible and harmful to create another pandemic.

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 communicable diseases being transmitted from hogs to workers.

Employers should:

- involve workers in identifying and addressing workplace risks to their health
- select waste management processes and equipment in the barns, lagoons and spray fields that minimizes direct contact of animal wastes by workers and the community.
- ensure well-planned cleaning routines to reduce exposures to hog waste and fluids
- train workers about potential diseases and how to prevent exposures

- provide appropriate and accessible protective wear for workers (such as masks, gloves, protective eye wear and rubber boots). All fecal and reproductive wastes and animal carcasses are potentially bio-hazardous materials and should be handled appropriately
- provide convenient and accessible hand washing facilities
- offer immunization against influenza to workers annually

Overuse of antibiotics in hogs production

The mass application of antimicrobials to hogs has greatly increased over the years in industrial hog barns. Animal producers use the same antibiotics for hogs that are used for people. The routine use of antibiotics can contribute to the development of resistant pathogens. Resistant organisms are less likely to be killed by antibiotics.

Therapeutic antibiotic administration at high levels for the duration of an illness is obviously an important aspect of veterinary care. However, most antibiotic use is designed to promote growth. This type of prolonged use of antibiotics, at low levels in the form of medicated feed in hog production, presents a risk of not killing the bacteria while promoting resistant strains. The resistant strains can pass readily from one kind of bacteria to another. Thus workers in hog barns may become colonized with resistant organisms and pass them on to coworkers, family, or friends.

Scientists have compared medicated feed in industrial hog barns with barns not using medicated feed and observed a 3-fold higher concentration of resistant bacteria in the exhaust air from those barns using medicated feed. Tetracycline resistant genes within industrial hog barn were also present in the adjacent manure lagoon, as well as the ground water downstream of the lagoon.

Mounting evidence is confirming the view, long held in the public health community, that antibiotic use in animals can substantially reduce the efficacy of antibiotics used to treat human disease. This non-therapeutic use of antibiotics has increased the risk for the emergence of new or more virulent strains and has been identified as a key factor in the development of antibiotic resistance.

Several recent studies clearly demonstrate the transmission of multidrug-resistant pathogens from hogs to humans. And their authors conclude that the transmission of some drug resistant organisms from hogs to hog farmers may be frequent. In a 2005 , in the Netherlands, a drug resistant bacteria was spread from pigs to workers to family including transmission from a hospitalized patient to a nurse.

In 2005 air samples from an industrial hog barn were examined. Several types of bacteria were analysed for resistance to five antibiotics. Of note, 98% of the samples displayed resistance to two or more of the other four antibiotics that were commonly used as growth promotants in hogs. It is also important to note 37 of the 124 samples were resistant to all four of the antibiotics. None of the samples were resistant to the fifth drug that has not yet been used in hog production as a growth promotant.

Resistant microorganisms have already reduced the effectiveness of several classes of antibiotics for treating infections in humans and hogs. The many bacteria resistant to multiple antibiotics has heightened concern. In some cases there are few or no antibiotics available to treat resistant pathogens.

Escalating resistance has raised concern that we are entering the “post antibiotic era”. We may be entering a period where there would be no effective antibiotics available for treating many life-threatening infections in humans. Antibiotic resistance is increasing among most human pathogens and can be traced to use and overuse of antibiotics. In 2001, the Union of Concerned Scientists estimated that 87% of all antibiotic use is for animals while the remainder is for human use. Subsequently, in 2003, the National Academy of Sciences concluded: **“clearly, a decrease in antimicrobial use in human medicine alone will have little effect. Substantial efforts must be made to decrease the inappropriate overuse in animals as well”**.

Antibiotic resistance is an important challenge to both human and animal health. The Union of Concerned Scientists, Health Canada and the American Medical Association all endorse that changes are warranted to the ways that antimicrobials are regulated, distributed and used in animals.

The World health Organization has called for human and veterinary antimicrobials be sold only under prescription. This organization has also called for a rapid phase out of the use of antimicrobials as growth promotants and for prudent use guidelines for veterinary care.

This approach can work. Sweden banned the use of antibiotics as feed additives for growth promotion in 1985. Its research demonstrates that the banning of growth promotants did not lead to a increased use of antibiotics when needed for treating sick hogs in the subsequent eighteen years.

Consumer awareness and discernment about healthy food choices is growing. In 2007, the Bon Appetit Management Company announced that under a new policy, it will only buy beef that has never been exposed to antibiotics or growth hormones. The company is now looking for natural pork producers.

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 embrace and plan for an ethical and sustainable economy.

Reflecting this broad perspective of healthy workplaces, healthy workers and healthy communities, and in keeping with the spirit of the precautionary principle that is embedded in both the provincial Environment Act and the Sustainable Development Act, the Occupational Health Centre recommends that the CEC:

ensure 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 communicable diseases 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.

Initiate independent research that gathers local knowledge from workers in hog barns, community residents, as well as expertise from occupational, community health and environmental specialists based on the Manitoba context. Complex interconnectedness of both the problems and the potential solutions requires an understanding of the overall picture and a corresponding holistic approach.

Advocate to prohibit the overuse of antibiotics in hog production.

- Support a shift in current thinking about the value of antibiotic-free meat products. Product labeling should be made more comprehensive and explicit so that consumers can identify the product and make selections according to their value system.
- Create a mentoring system for sharing proven successful practices that promote healthy workplaces, healthy workers, and healthy communities. Visit and learn from countries (Sweden and Denmark) that have experienced successful transitions to antibiotic free meat production.
- Phase out of the non-therapeutic use of antimicrobials as growth promoters in the hog industry.
- Adopt a prescription only availability of antimicrobials in the hog industry.

Mandate environmental impact statements for proposed hog barns that includes occupational/environmental health, social justice, and socioeconomic issues. Manure from industrial hog barns becomes a toxic soup of chemicals, sediments, and antibiotic resistant pathogens that can quickly pollute surface and ground water, endangering workers, the community and the whole environment. Move hog production further towards environmental sustainability.

Limit animal density per watershed.

- Restrict the co-location of industrial hog and poultry operations on the same site and set appropriate separation distances.

Regulate water contamination by hog waste and manure. Hold corporate owners financially responsible for spills of waste into surface water especially if they contaminate drinking water. Require bonding of manure storage basins for performance and remediation to ensure restoration a vacated manure lagoons. Solid tanks or reservoirs rather than earthen waste lagoons are needed to prevent manure contamination of surface and ground water with infectious agents or antibiotic resistant genes. Pharmaceuticals can remain present in manure and leachates for long periods of time.

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

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.

Promote diversity. Promoting a diversified livestock strategy in Manitoba can also minimize the negative impacts from any one stock on community and worker health.

Decisions to issue permits for industrial hog barns should be considered in public meetings and decided by the community. Acting locally makes sense.