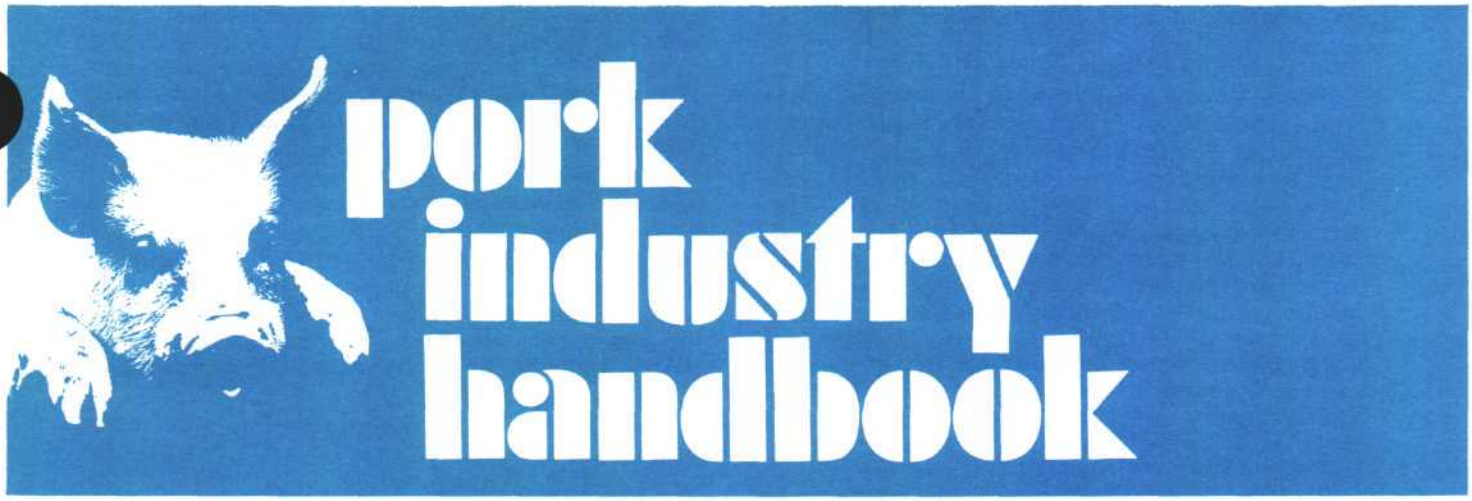

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Environmental Sanitation and Management in Disease Prevention

Authors
George W. Meyerholz, USDA, Extension Service, Washington, D.C.
Jack M. Gaskin, University of Florida

Reviewers
David M. Bedell, University of Georgia
Glenn Elliott, Galivants Ferry, South Carolina
Dennard R. Hill, Seaford, Delaware
Wayne Rawson, Milledgeville, Illinois

Mounting evidence suggests that outbreaks of infectious diseases in swine are usually multicausal—a combination of bacterial, viral and parasitic agents influenced by stresses, nutrition, environmental factors and management practices. The interaction of these factors often determines if swine will have a disease and how severe it will be.

Practices that increase resistance and immunity, reduce stresses and decrease exposure to infectious agents will help reduce swine disease losses. Routine cleanliness, disinfection, and other sanitation practices reduce the spread of diseases. Isolation practices, the "all-in, all-out" system and other management practices can be used advantageously. Stresses such as chilling and dampness should be minimized to keep pigs comfortable, warm and dry. Proper diagnosis and total assessment of disease problems are necessary to design prevention and control programs to reduce losses. Medication and vaccination programs may be indicated. A total swine herd health program that fits individual needs should be adopted.

Sanitation is the foundation for an effective swine herd health program. The broad definition of sanitation is the employment of hygienic measures to promote health and prevent diseases. Sanitation is more than cleaning and disinfecting; it denotes practices that result in a reduction of microorganisms. The pork producer with knowledge of disease agents and methods of transmission can apply management strategy to maximize benefits of sanitation programs and disinfection.

Transmission of Infectious Diseases

Infectious diseases are transmitted by both direct and indirect contact. Some diseases such as atrophic rhinitis and mycoplasmal pneumonia are spread primarily by direct contact of one animal with another. Others are transmitted indirectly on clothing, hands, boots and shoes or through contamination of feed, water, vehicles, soil, bedding, air, utensils and premises. Leptospira and other disease agents may be carried from one premise to another in streams. Rodents also may be a factor. Birds have been shown to transmit TGE and salmonellosis. External parasites and insects may also transmit disease.

Swine that recover from infectious diseases may harbor organisms, shed them for varying lengths of time and serve as a source of infection for other swine. Swine dysentery, pseudorabies and brucellosis are examples of carrier state diseases. Diagnostic testing and other methods of identifying carrier animals may be desirable to eliminate diseases from the herd.

Stresses of various types may affect a pig's resistance and ability to produce immunity. Stresses increase corticosteroid secretions which interfere with defense mechanisms by reducing the number of certain white blood cells and interfering with antibody formation.

Survival of Organisms

Some organisms can survive for long periods of time in the environment, sometimes for years. However, survival times are extremely variable. When a specific disease problem occurs in the herd, the survival time, carrier state in the animal, and method of transmission should be assessed to identify special sanitation requirements needed to aid control and prevention. The choice and strength of a disinfectant can be influenced by specific disease problems. For example, the spore-forming organism that causes anthrax is extremely resistant to common disinfectants. Also, the tuberculosis organism and certain viruses may require special consideration. Parasite eggs are extremely resistant but thorough cleaning will remove most of them from the environment and reduce numbers significantly.

Pathogenic (disease-causing) organisms usually favor a temperature close to that of the host animal. However, TGE virus is fragile in a warm environment and seems to survive better in a cold or frozen climate. This accounts for the increased prevalence in winter. Parasite eggs have been shown to hatch at temperatures as low as 40-50°F. These and other examples indicate that cold is not usually a deterrent to survival or transmission of disease agents. In fact, low temperatures prolong the lives of most organisms and freezing actually preserves bacteria, mycoplasmas and most viruses.

The ultraviolet rays of the sun are very effective in destroying infectious agents. However, they do not penetrate deeply and do not pass through glass. Direct sunlight

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can be used effectively to destroy microorganisms on surface areas and at no cost to the producer.

Environmental Effects

The size of the exposure dose of infective organisms is a factor with some diseases in overwhelming resistance or immunity. Therefore, reducing the number of microorganisms in the environment is important. In some cases, complete elimination of pathogenic organisms is desirable and possible. Several factors influence numbers and survival of disease-causing organisms in the environment.

Moisture and high humidity favor survival and transmission of organisms. On floors and walls, drying helps to reduce numbers of organisms. Lower humidity favors drying: therefore, proper ventilation that reduces humidity while still maintaining the desired environmental temperature has a positive effect on sanitation and the comfort of the animal. Higher humidity also favors transmission of airborne disease agents. These may be contained in moisture droplets that settle faster. Therefore, ventilation plays an important role in reducing humidity and displacing air that contains a high concentration of organisms. The drying effect decreases numbers of microorganisms on surfaces and reduces animal stress. However, if ventilation results in temperatures that are too cold, this predisposes animals to respiratory diseases. In winter months in northern climates, it is very difficult to keep the air sanitary and the building warm enough at a reasonable cost.

High density of animals and continuous use of facilities can be a problem. Pork producers should follow recommendations for space requirements for weight or type of swine. Facilities may be emptied, completely cleaned and disinfected and rested to help break disease cycles. The "all-in, all-out" system offers this opportunity especially with smaller modular units in farrowing houses, nurseries and finishing units. Small rooms and pens are easier to empty for more efficient cleaning and disinfecting.

Dust, because it is irritating to the respiratory tract, may be a predisposing factor to disease and should be kept to a minimum. Dirt lots should be rotated annually at least. Concrete lots and pens should be cleaned thoroughly and disinfected between groups of swine. Clean up and pick up around the premises; trash is not only unsightly but may harbor rodents or cause injury.

Design and Construction of Facilities

The proper design and construction of swine facilities is very important in preventing diseases. Buildings should be placed on well drained sites. Drainage systems should be designed so that water and runoff from one group of swine does not reach another. There are many examples of disease problems where waste water or urine transmitted disease from one group to another.

Building materials should be selected for durability and ease of cleaning. Durability is important to prevent wear and damaged areas that harbor infectious agents. For example, a high quality concrete mix should be used to avoid corrosion by acids in manure.

Solid floors should be sloped for proper drainage and ease of cleaning. Floors that allow standing water invite filth and sanitation problems. Slotted or wire floors generally work well and offer a sanitary advantage by reducing manure accumulation. However, wood and concrete slats are sometimes difficult to clean and disinfect. Walls should be constructed of durable materials that are easy to clean. Solid partitions, particularly between farrowing crates, and individual hog houses help prevent the spread of infectious diseases.

Special Sanitation Practices

Vacating facilities is helpful in breaking the disease cycle especially when combined with thorough cleaning and disinfecting. Many of the disease-causing organisms found in a farrowing house or finishing floor cannot survive very long outside the host animal's body. When all swine are removed, organisms in the environment will rapidly decrease in number. The facility should be kept empty for 3 to 4 weeks or longer for best results, but even a few days are helpful. Rotation of pastures, feeding floors and farrowing pens will also help in reducing the number of parasite eggs and infectious agents. Many pork producers indicate that "down time" for sanitation and resting of facilities is not a viable economic alternative in intense swine operations except for the more serious disease outbreaks.

Cleaning and disinfecting is essential to control the accumulation and spread of disease-causing microorganisms. Sometimes it provides the only successful solution to breaking the disease cycle and controlling infectious diseases. Thorough cleaning and proper choice and use of a disinfectant are very important.

Footbaths are helpful in preventing the spread of diseases from one production unit to another or from farm to farm when visitors must enter the premises. When constructing new facilities, a footbath could be included in the floor or alleyway. Cresols, synthetic phenols, aldehydes and chlorhexidine are satisfactory disinfectants for use in footbaths. The disinfectant solution should be kept fresh; replace frequently or whenever organic material accumulates.

Washing sows with warm soap or detergent and mild germicidal solutions before placing in farrowing stalls is a valuable management practice. This cleans the sow, removes parasite eggs and minimizes exposure of newborn pigs to microorganisms on the sow when nursing. The farrowing house should have a washing stall at its entry for washing sows immediately before they enter the farrowing house.

Dead animals and afterbirth can be a source of disease for other swine. They should either be removed immediately by a licensed rendering company; completely burned; or buried approximately three feet deep, well away and downgrade from any source of drinking water, and covered with a generous supply of quicklime before fill dirt is added. Pet animals and predators should be prevented from carrying dead animals from one farm to another.

Management Practices

New animals added to the herd are a potential source of new diseases. Some precautions should be taken:

- Buy healthy animals. Avoid mixing animals from multiple sources.
- Test breeding swine for brucellosis, leptospirosis and pseudorabies before purchase. A health certificate showing all tests and vaccinations should be obtained at the time of purchase.
- Make sure the swine are properly identified and delivered in a clean disinfected truck.
- Isolate newly purchased swine for 30-60 days at least 300 ft. from other swine. Retest before adding to the herd. Never bring newly purchased sows or boars into a farrowing house or expose baby pigs to new animals.
- Keep visitors out of hog lots and swine facilities. Keep rubber boots, disinfectants, and a change of clothing available for those who must enter the premises.

Other management practices support sanitation and the prevention of diseases. These include:

- Protecting feed and water from contamination with manure and urine from swine and from droppings of birds and rodents.
- Regular deworming of the swine herd.
- Spraying or dipping for lice and mange.
- Grouping pigs of similar ages together in small units and moving them through the production system to market.
- Observing animals frequently for signs of disease.
- Isolating and treating sick animals.
- Keeping animals comfortable.
- Vaccinating for diseases that are a threat to the herd.
- Medicating feed or water, as necessary, to control specific disease problems.
- Utilizing diagnostic services and regular supervision of herd health by a veterinarian.

Good husbandry and proper nutrition also support sanitation and animal health. They enhance resistance, decrease stresses and reduce transmission of diseases.