



Biosecurity and Health Management on U.S. Swine Operations

Biosecurity includes the use of certain management practices to prevent the introduction of new disease and the spread of existing disease on swine operations. Examples of these practices include: proper handling of new breeding stock; the use of multiple-site production; proper pig flow management; strict rodent control; and controlling human and vehicle entry between and within operations.

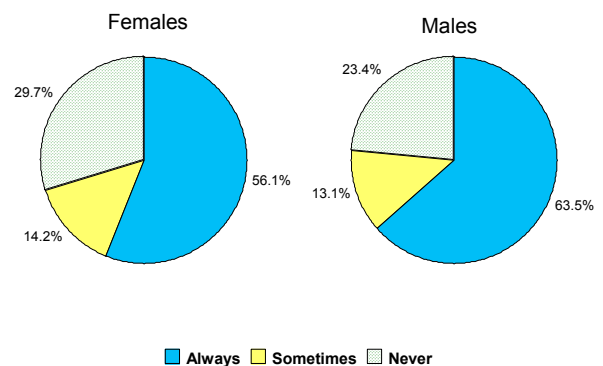
The USDA's National Animal Health Monitoring System (NAHMS) collected data on swine health and management practices from a stratified random sample of swine production sites in 17 states¹ as part of the Swine 2000 study. These sites represented 94 percent of the U.S. pig inventory and 92 percent of U.S. pork producers with 100 or more pigs. Overall, 2,499 swine production sites participated in the first interview from June 1, 2000, through July 14, 2000. A second interview was completed by 895 of these sites between August 21, 2000, and November 3, 2000. A final interview was completed by 799 of these sites between December 1, 2000, and February 28, 2001. For estimates in this report, small, medium, and large sites refer to sites with less than 2,000, 2,000 to 9,999, and 10,000 or more pigs in total inventory, respectively. For estimates involving breeding females, small, medium, and large sites refer to sites with less than 250, 250 to 499, and 500 or more breeding females, respectively.

Isolation and Health Testing

A common threat to biosecurity of the breeding herd is the addition of new animals. Isolating incoming animals prior to introduction into the herd minimizes the risk of disease entry. During isolation, animals can be observed for clinical signs of disease, tested for pathogens they may be carrying, and acclimated to organisms already present in the breeding herd.

Typically, new breeding females were introduced onto 51.5 percent of small sites, 80.5 percent of medium sites, and 90.2 percent of large sites. The majority of these sites always isolated newly arriving females, while almost 30 percent never isolated them (Figure 1).

Figure 1. Percent of Sites* by Frequency of Isolating New Breeding Animals.



*Sites that received new breeding females/males

The Swine 2000 study found that 66.6 percent of small sites (those with less than 250 breeding females that introduced new breeding females) either isolated them always or sometimes, compared to 78.8 percent of medium sites and 84.3 percent of large sites.

New breeding males were added to 86.3 percent of sites. Almost two-thirds of these sites always isolated new breeding males, while less than one-quarter never isolated new breeding males. For sites that introduced new breeding males, 75.6 percent of small sites either isolated them always or sometimes, compared to 78.8 percent of medium sites and 84.7 percent of large sites.

¹Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, Pennsylvania, South Dakota, Texas, Wisconsin.

There was little difference between the length of time breeding females and males were isolated. Large sites tended to isolate their new arrivals longer than small sites. For instance, new breeding females were isolated for an average of 35 days on small sites compared to 51 days on large sites.

For sites that isolated or quarantined new breeding animals, 43.5 percent tested all new females and 51.8 percent tested all new males either before or after isolation.

Acclimatization

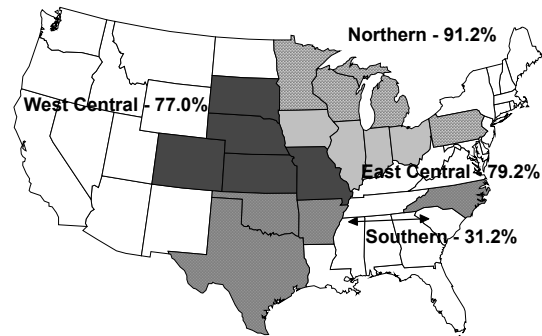
Acclimatization introduces new breeding stock to viral and bacterial pathogens present on the receiving farm. The Swine 2000 study found that 84.1 percent of sites that isolated new breeding females vaccinated them as part of the acclimatization process. Other practices used commonly to acclimate gilts were: exposure to cull females (49.0 percent of sites); feedback of feces from other swine (25.1 percent of sites); feedback of mummies/placentas/stillborns (11.3 percent of sites); and exposure to sick pigs (7.7 percent of sites).

Use of Artificial Insemination and Sources of Semen

Artificial insemination (AI) reduces the risk of disease transfer between the boar and breeding female. However, certain pathogens can be transmitted in semen. Nearly one-fourth (23.2 percent) of all sites with sows or gilts used AI; however, this varied tremendously by site size. Most large sites (91.3 percent) used AI, while 61.4 percent of medium sites and only 12.1 percent of small sites used it.

Nearly three-fourths (72.9 percent) of sites that used AI purchased semen, while 17.1 percent collected semen on-site and 20.8 percent collected semen off-site, such as with an owner boar stud. Some sites used more than one semen source. There were significant differences among the different regions regarding the source of purchased semen. More than three-fourths of sites in the northern, west central, and east central regions purchased semen, but less than one-third of sites in the southern region purchased semen (Figure 2).

Figure 2. Percent of Sites that Purchased Semen,* by Region.



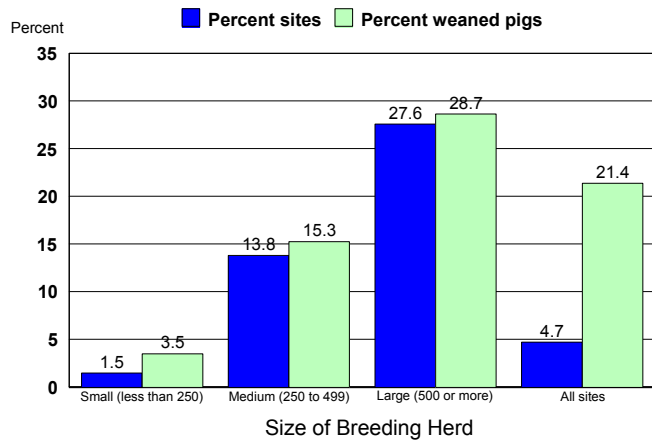
*For sites that used AI, percent of sites that purchased semen from December 1, 1999, through May 31, 2000.

Use of Separate Sites and Segregated Early Weaning (SEW)

The Swine 2000 study found that 36.4 percent of sites with farrowing facilities moved weaned pigs to “separate-site” nurseries. Of sites with nurseries, 50.0 percent moved pigs to separate-site grower/finisher facilities. Three-quarters of large sites (10,000 or more pigs) used a separate site for either nursery or grower/finisher facilities, while less than half of small sites did so.

Segregated early weaning (SEW) is an important disease-control management strategy. For this study, sites that had a **maximum** weaning age of 20 days or less and moved weaned pigs to a separate-site nursery were defined as SEW sites. Overall, only 4.7 percent of sites used SEW; however, many more large sites used SEW than medium or small sites. Because of this, 21.4 percent of all **weaned pigs** and 28.7 percent of pigs on **large sites** were raised using SEW (Figure 3).

Figure 3. Percent Sites* and Percent Pigs Where Maximum Weaning Age was 20 Days or Less and Pigs were Moved to a Separate-site Nursery, by Size of Breeding Herd.**



*Sites with farrowing phase
 **Based on number of pigs weaned

Sources of Weaned Pigs

Weaned pigs may enter the grower/finisher phase of production from several sources. The biosecurity practices of these sources and the risk associated with using multiple sources should be considered. More pigs entering the grower/finisher units from December 1999 through May 2000 (52.8 percent of pigs) came from farrowing or nursery units that belonged to the site (either on or off the site) than any other source. Feeder pig producers (both contract and non-contract) supplied 40.8 percent of pigs that entered grower/finisher units. Only 0.7 percent of all pigs originated from an auction, salebarn, or livestock market.

Over three-quarters (76.1 percent) of sites that obtained pigs from off-site units or feeder-pig producers obtained pigs from only one other source. Only 16.3 percent of sites acquired pigs from two sources, and 7.6 percent received pigs from three or more sources. Large and medium sites tended to use more sources for pigs than small sites. For sites that received feeder pigs from more than one source, 43.2 percent commingled pigs from different sources in the same building.

Pig Flow Management

All-in/all-out management means that every animal is removed from a room, building, or site prior to restocking. These facilities are then cleaned and disinfected before placing new animals in them, which greatly reduces the transmission of

diseases between different groups of animals. This type of pig flow management was used on 51.1, 60.2, and 53.7 percent of sites that had farrowing, nursery, and grower/finisher phases, respectively, accounting for 79.4, 87.4, and 83.0 percent of all farrowed females, nursery pigs, and grower/finisher pigs.

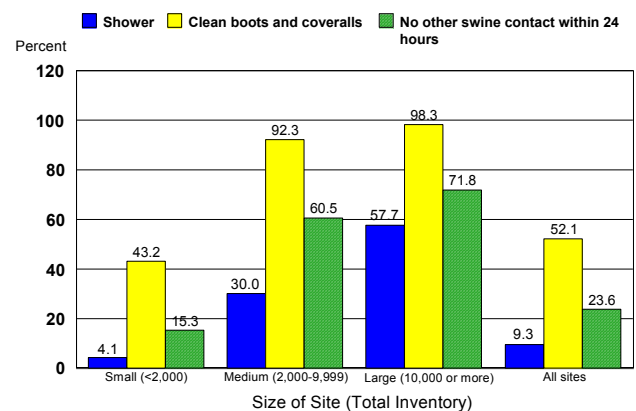
To further decrease the chance of disease transmission among different groups of pigs, 16.6 percent of sites with weaned market pigs used wean-to-finish buildings to reduce the need to re-sort and move pigs.

Visitor and Employee Restriction

Nearly two-thirds (65.5 percent) of sites restricted entry to swine facilities by allowing access to employees only. For sites that allowed visitors, large sites (57.7 percent) were much more likely than small sites (4.1 percent) to require that visitors shower before entry. Almost all large sites (98.3 percent) required visitors to wear clean coveralls and boots before entry, while only 43.2 percent of the small sites did so.

To prevent visitors from accidentally introducing organisms, such as through nasal secretions, a 24-hour “no-swine-contact” period prior to entering the swine facilities was required on 23.6 percent of sites that allowed visitors (Figure 4).

Figure 4. Percent Sites* Requiring Preventive Measures of Visitors Before Entry Into Swine Facilities, by Size of Site.



*For sites that did not restrict entry to employees only

To prevent employees from accidentally introducing diseases into the herd, 89.7 percent of all sites did not allow employees to have contact with swine not owned or managed by the operation. For large sites, the percentage was 96.4 percent.

Cleaning and Disinfection of Livestock Trucks

Trucks entering the site can be a serious biosecurity risk. Overall, 56.8 percent of sites allowed trucks transporting livestock to enter the site perimeter. Small sites were more restrictive than large sites. Only 52.0 percent of small sites allowed trucks or trailers transporting livestock to enter the pig site, whereas 79.6 percent of medium sites and 86.8 percent of large sites did so.

Thorough cleaning and disinfection of livestock trucks and trailers before entry into a swine site can reduce the risk these vehicles pose to swine. Most sites required trucks be cleaned before entering the pig site, particularly the inside. However, fewer sites required disinfection of trucks. For sites that allowed trucks on the premises, small sites were less likely than large sites to require cleaning or disinfection of trucks (Table 1).

Table 1. Percent of Sites* Requiring Cleaning and/or Disinfection of Livestock Trucks and Trailers.

Required Practices	Percent Sites			
	Size of Site (Total Inventory)			
	Small (Less than 2,000)	Medium (2,000-9,999)	Large (10,000 or More)	All sites
Clean inside of truck	58.2	87.7	96.3	65.4
Disinfect inside of truck	37.2	77.1	90.5	47.0
Clean outside of truck	46.9	77.0	91.4	54.4
Disinfect outside of truck	25.6	59.2	68.9	33.8

*For sites that allowed trucks or trailers transporting livestock onto the pig site.

Carcass Disposal

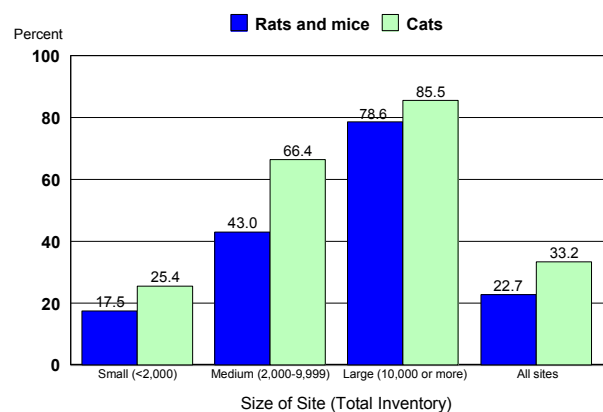
Dead pigs were most commonly disposed of by having a renderer pick up the carcasses at the operations. This method accounted for the disposal of 40.4 percent of dead preweaned pigs and 55.9 percent of dead weaned or older pigs. Having a renderer pick up carcasses outside the operations accounted for the disposal of only 12.7 percent of dead preweaned pigs and 12.1 percent of dead weaned and older pigs.

Rodent Control and Exclusion of Cats from Facilities

Rodents, cats, and some wildlife may serve as a reservoir for various swine diseases. A well-designed rodent control program is essential for all swine operations. The most common method of rodent control was bait or poison (88.5 percent of sites) followed by cats (60.6 percent of sites), despite the fact that cats may spread disease to swine. Using cats to control rodents was much more common on small sites (68.0 percent) than on medium (25.9 percent) or large (5.2 percent) sites.

The percentage of sites where all buildings used to house swine were constructed and maintained to keep out cats or rats and mice increased as the size of the site increased (Figure 5).

Figure 5. Percent Sites Where All Swine Buildings Were Constructed and Maintained to Keep Out Cats or Rats and Mice, by Size of Site



Overall, 46.4 percent of sites maintained all feed storage buildings in a manner that kept out rats and mice, and 58.6 percent of sites maintained all of these buildings to keep out cats.

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