**Small-Scale and Niche Market Pork Production Bulletin No. 10; April 1, 2016**
Virginia Tech- Tidewater Agricultural Research and Extension Center, Suffolk, VA

# Quarantine Procedures for the Small-Scale Pig Farm

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## Introduction

Pig-to-pig contact is the most common way diseases are transmitted on the farm. Disease outbreaks cost money in the form of increased pig death rates, greater veterinary care expenses, and lost production (in other words, poorer growth rates and longer times necessary to achieve desired market weights, decreased feed conversion efficiency [pounds of feed needed to produce a pound of live weight gain], etc.). Pigs brought onto the farm from outside sources, or pigs that have left the farm and are allowed to return, may be carrying diseases that the rest of the herd has no immunity against. These diseases can quickly spread throughout the entire farm. Accordingly, any pigs brought onto the farm represent a significant disease threat, and this may be particularly true if the health of the farm of origin is poor or unknown. On the other hand, the incoming pigs may have no immunity against diseases specific to the new farm, and they may themselves become ill following introduction.

If possible, it is best to maintain a closed herd to prevent the introduction of new diseases. A closed herd is one in which replacement breeding gilts are selected internally, artificial insemination (**AI**) is used to bring new genetics onto the farm, and feeder pigs are not purchased from outside sources and comingled with the resident herd. However, this may not feasible or practical for the small-scale or show pig producer. Moreover, AI decreases, but does not totally eliminate, the possibility of bringing new diseases into a herd. For example, porcine reproductive and respiratory syndrome (**PRRS)** may be transmitted by semen used for AI (Maes *et al.*, 2008).

Instituting an effective isolation or quarantine period is a proven means of preventing the introduction and spread of new diseases when pigs are brought onto the farm. A quarantine period is a brief period of isolation in which the incoming pigs are vaccinated and monitored for signs of disease symptoms prior to introduction into the general herd. It also allows the producer time to have pigs blood tested and to identify any diseases that a pig may be carrying, and gives the incoming stock a grace period to gain immunity to the farm's normal disease load. Establishing an on-farm quarantine period requires increased space and facilities, labor, and attention to detail, but may also prevent costly disease outbreaks and maintain the health of the herd.

## Benefits of a Quarantine Period

Transport of pigs and introduction into a new herd is generally a stressful event (Wittish *et al.*, 2014). Stress is caused by the duration of transport, changes in housing, diet, and feeding management, and fighting with unfamiliar pigs in order to establish a new social order. Prolonged or severe stresses are known to impair function of the immune system, and this has been shown to be particularly true for pigs that are more submissive when fighting (McGlone *et al.*, 1993; Tuchscherer *et al.*, 1998). Stressed pigs also shed more pathogens in their feces (Callaway *et al.*, 2006; Dowd *et al.*, 2007), meaning that a pig carrying a new disease may be even more contagious to the new herd. A quarantine period minimizes the stress of introduction and allows the pig a more ordered transition to the management and husbandry practices of the new farm.

A quarantine period also provides the producer time to monitor the pig for symptoms of a disease, and this will be especially beneficial when the health status of the farm of origin is poor, questionable, or unknown. Even pigs that appear healthy to the naked eye may in fact be carrying diseases and be contagious to other swine. This was well demonstrated by a case study conducted by U.S. Centers for Disease Control at the 2009 Minnesota State Fair swine show. With consent of the owners, 57 pigs checked into the fair were nasal swabbed and tested for serological prevalence of influenza A H1N1 (the so called "swine flu"). Eleven of the asymptomatic pigs (19%) tested positive for influenza A H1N1, even though all had been approved as "visually healthy" by an on-site veterinarian (Gray *et al.*, 2012). Pigs carrying this strain of the virus may be contagious to other pigs up to 3 days prior and at least 7 days after expression of clinical symptoms, meaning that a disease originating in a pig displaying no disease symptoms has the capacity to infect other pigs with which it comes into contact. In another example, two-thirds of the 235 pigs brought to an Ohio county fair in 2007 broke with influenza A H1N1, even though all the pigs were deemed healthy by visual inspection prior to introduction (Vincent *et al.*, 2009).

## Essentials of a Swine Quarantine Period

The basics of a swine quarantine period are contained in the *Biosecurity Guide for Pork Producers* published by the National Pork Board. The document is available online for no charge at:

http://www.pork.org/production-topics/swine-health/pig-health-management/biosecurity-farm/

The *Biosecurity Guide* consists of a series of questions relating to a certain topic, and based on producer's responses, rates the farm as either "Unacceptable", "Questionable", "Adequate", or "Excellent" for the given topic. For example, duration of isolation is considered unacceptable if less than 30 days. In contrast, periods of 30 to 60 days are considered adequate, and a period greater than 60 days, excellent. The guide was designed with large, commercial production in mind, but the principles may be implemented on the small-scale farm or 4-H show pig herd as well.

A summary of fundamental quarantine procedures outlined in the *Biosecurity Guide for Pork Producers* that may be easily adopted on the small-scale swine farm is included in Table 1. A brief explanation of individual methods for these procedures is also included below.

*Location and Disease "Barriers"*

An effective quarantine location may be as simple as a pen or pasture located 300 yards or greater more from the resident herd. Increasing the distance between the quarantine and the permanent herd provides a greater geographic barrier to disease transfer, and decreases the risk of aerosolized disease transmission. A list of infectious diseases known to be transmitted long distances through airborne spread is listed in Table 2. This table includes only diseases that have been shown to infect pigs after long-distance aerosolized spread. The list does not include diseases that are known to be transmitted through the air at short distances (only a few feet or yards), such as atrophic rhinitis, pleuropneumonia, or salmonella.

If possible, indoor quarantine locations are preferred over those outdoors. Completely enclosed indoor locations may be better cleaned and disinfected multiple times if needed. Indoor quarantines also help to reduce the potential for disease transfer through animal and insect vectors such as birds, rodents, cats, feral pigs, and flies. Strategic placement of vegetative buffers have been suggested to improve the efficacy of outdoor quarantine areas (Funk *et al*., 2003), although evidence to support this strategy is anecdotal and has yet to be confirmed experimentally.

Swine caretakers can also enforce a barrier to disease transfer by working the permanent herd (the "clean" pigs) before the quarantined pigs (the "dirty" pigs), and by limiting the passage of carrier objects between sites. Equipment such as sorting boards and feed scoops may carry organic matter that can facilitate the spread of disease. Diseases can also be transported on boots and clothing, and disposable boot covers and coveralls are an inexpensive means to create a barrier to disease spread. Similarly, medical equipment such as syringes and needles used to give injections to pigs in the permanent herd should not be used in the quarantine location, and vice versa.

*Veterinarian Communication and Testing Procedures*

Communication of the vaccination and disease exposure history between the seller's and buyer's veterinarians is an important component of animal sales, and even more so if the pigs are travelling across state lines or between regions with different disease threats. Pigs that are sold without veterinary health papers should be considered greater risks for introducing diseases, and extending the quarantine duration for these pigs is warranted. Finally, a veterinarian can help schedule the appropriate timing of blood tests and vaccinations. Because recently vaccinated pigs may display blood markers similar to those of diseased pigs, it is important to coordinate the vaccination and blood collection and testing schedules correctly to avoid potentially confounding results.

**Table 1**: Fundamentals of a swine quarantine protocol
(*Adapted from the Biosecurity Guide for Pork Producers [National Pork Board]*)

| | | Unacceptable | Questionable | Adequate | Excellent |
|---|---|---|---|---|---|
| **Proximity to Other Swine** | Less than 300 yards | | X | | |
| | Greater than 300 Yards | | | X | |
| | Greater than 2 miles | | | | X |
| **Indoor / Outdoor?** | Completely outdoors | | X | | |
| | Both indoor and outdoor | | X | | |
| | Totally enclosed indoors | | | | X |
| **Pig Flow** | Continuous flow | X | | | |
| | All-in / all-out with no cleaning between groups | | X | | |
| | All-in / all-out with cleaning, disinfection and downtime | | | | X |
| **Duration of Isolation** | Less than 30 days | X | | | |
| | 30 - 60 days | | | X | |
| | Greater than 60 days | | | | X |
| **Health Communication** | No contact with source herd veterinarian | X | | | |
| | Periodic communication with source herd veterinarian | | X | | |
| | Pre-shipment communication from source herd veterinarian | | | X | |
| | Continued update of source herd status to recipient herd veterinarian | | | | X |
| | Communication between source and recipient herd veterinarians prior to shipment and prior to entry into the herd | | | | X |
| **Health Monitoring during Isolation** | Blood testing only | | X | | |
| | Visual monitoring only | | X | | |
| | Blood testing and visual monitoring | | | X | |
| | Blood Testing and visual monitoring continued during acclimation | | | | X |
| **Blood Testing during Isolation** | Only on arrival | X | | | |
| | Once around 14 days post-arrival | | X | | |
| | Once prior to entry into the herd | | | X | |
| | 14 Days post-arrival and again prior to entry into the herd | | | | X |
| **Blood Test Results** | Pigs are introduced to herd prior to availability of test results | X | | | |
| | Pigs are introduced to herd prior to veterinarian interpretation of test results | | X | | |
| | Pigs are not introduced before veterinarin interpretation of test results | | | | X |
| | Acclimation procedures are developed with veterinarian and followed prior to introduction into the herd | | | | X |

**Table 2. Maximum Known Aerosolized Transmission Distance of Common Swine Diseases[1]**

| Disease | Maximum Distance Recovered[2] |
|---|---|
| Aujezsky's Disease (Pseudorabies) | 5.6 miles |
| Enzootic Pneumonia (*M. hyopneumonia*) | 5.7 miles |
| Influenza | 1.3 miles |
| Porcine Reproductive and Respiratory Syndrome (**PRRS**) | 5.7 miles |
| Porcine Epidemic Diarrhea Virus (**PEDv**) | 10.0 miles |
| Transmissible Gastroenteritis (**TGE**) | 3.0 miles |

[1] Adapted from Stärk, 1999; Otake *et al.*, 2010; and Alonso *et al.*, 2014.
[2] Represents maximum distance at which infectious agents have infected naïve pigs or have been recovered in the air under biologically ideal temperature and relative humidity conditions.

## Conclusion

Pigs are commonly transported between small-scale farms for breeding purposes or as feeder pigs to be grown to market, but it is important to remember that pigs brought onto the farm for any reason may pose health risks to the established herd. Pigs can act as carriers of diseases that may be accidentally introduced into the permanent herd. For these reasons, establishing a brief quarantine period to acclimate the arriving pigs to the new environment will help prevent disease spread. A good quarantine will require greater farm labor and attention to detail, but will also promote the health of the herd and limit the costs associated with disease.

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