

Biosecurity, Pig Flow, and Introduction of Stock

Biosecurity

You want to maintain your herd free of specific bacterial, viral, and parasitic diseases. Make the most of isolation; isolation from outside the farm and isolation of different groups of pigs on the farm from each other. It's easy to see potential contamination in the trailer used to haul pigs to market, the feed truck, the new load of feeder pigs or gilts, or the curious visitor. Your own farm may not seem like another source of disease, but it can be just that.

- Pigs coming onto your farm are a risk. Make it a calculated risk (see the text below on livestock introduction) or find alternatives.
- Nursery pigs do not have the immune system to handle all the organisms on your farm, so isolate them from older animals other than their sows. This is another reason to keep the age range of the nursery group tight. Make the most of the passive immunity available through the sow's colostrum, which you can enhance through vaccination and feed-back of feces and placentas during gestation. (See the sections on breeding herd and nursery pigs.)
- There is a reason veterinarians put on clean coveralls and disposable boots when they come to your farm. Anyone from off the farm entering your swine pasture, barn, hoop, or swine yard should do the same. Farmers too should have a separate pair of coveralls and boots for dropping pigs off at the sale barn/collection point as well as for visiting areas of high swine traffic.
- If possible locate your swine facilities and pastures away from neighbors' swine units and from roads highly traveled by trucks that have been on other swine farms.
- If you have feed delivered, know where the truck has been prior to coming to your farm. Seriously consider on-farm grinding.



WoW: “Your chore boots should never leave the farm.”



- Rats, mice, birds, and even cats can carry swine diseases. You may conclude that rodent control makes cats worth the hazard as long as they don't visit other operations. But cats mostly just make the rodents harder to find. Avoid leaving feed bins and feed wagons uncovered. Clean up feed spills promptly. Bird mesh is standard in conventional curtained buildings, and it can also be installed in hoops and barn windows.
- Do not feed any food scraps or garbage.

We have summarized several tried-and-true strategies for increasing herd health through managing the movement of livestock. A review of these is an opportunity to expand on the reasons for each:

Closed Herd

The pig is the primary source of all infections, so closing your herd to outside introductions is one way to minimize introducing disease. PRRS (Porcine Reproductive and Respiratory Syndrome) is a recent reminder that disease can get into your system by many routes. That includes animals you bring onto the farm – gilts, boars, and feeder pigs. That is the reason a number of alternative swine farmers are going to a “closed herd” in which animals do not routinely enter the system. This isn't to say multi-site systems are a bad idea; you just need to define what is “in the system” and what is outside it.

How do you maintain and improve your genetics in a closed herd? Artificial insemination (AI) is an indispensable tool. AI gives you access to almost any genetics you want to utilize. You can even breed some animals for production and others for maternal characteristics that you want to add to your breeding herd. While there are things to know about AI, it is not rocket science. True, it may mean you spend more time observing your sows and gilts. Most farmers moving to a closed herd consider this an acceptable investment for the increased breeding control and biosecurity. Be sure you purchase semen that is certified free of PRRS.

Additionally, you can improve genetics by selecting within your herd. For example:

- One of the most heritable and most important traits is the behavior of the sow. A good sow, with strong maternal traits will raise more pigs. A good sow has nine pigs,

and raises eight. This trait is passed on to your gilts, so select your gilts from your best sows. Strong maternal traits in your gilts will improve “pigs out the door” quicker than selection based purely on production genetics.

- Select the fastest growing gilts in your herd. The rate of growth is a highly heritable trait, compared to the number born alive.
- Gilt selection should begin in their first week of age. By identifying gilts with an ear notch, you can track which gilts came from your best sows. You can also track the age of the gilt to determine which gilts are growing the fastest. The largest gilts in a group may not be the fastest growing, they may just be older. Identification of the gilts will let you quickly determine the age and how fast the gilt grew.

All-in-All-Out (AIAO)

AIAO gives your animals isolation on the calendar. You farrow a large enough group of sows/gilts together that you can fill your nursery and finishing facilities with just those offspring, or maybe you purchase a similarly-sized group of feeder pigs. (Buy them all from one source, and don't mix them with farm-born pigs.) When that group is ready for market, they all go out the door, and you clean the place up.

- If you have surfaces that you can steam clean, so much the better.

First, Close the Herd

Tom and Irene Frantzen, Alta Vista, IA

Tom and Irene Frantzen's farm has evolved over two decades from a fairly diverse conventional operation to a more complex and integrated all-organic system. Tom took the swine herd organic in 1999 and has worked hard to develop the pool of pork producers for the Organic Meat Company (a wholly-owned subsidiary of the CROPP Co-operative). His practice originally was to buy boars and buy open gilts from a single source. Tom and a nearby organic producer shared the boars until 2002.

Production was “terrible,” according to Frantzen, and herd health was the major reason. The operation's animals tested positive for both bad strains of swine flu (H_1N_1 and H_3N_2) and for PRRSV (Porcine Reproductive and Respiratory Syndrome Virus), and these diseases were chronically active. As you would expect, there were problems with death loss and uneven litters.

The gilts tested negative for PRRS before they joined the farm's swine herd, however. In hindsight it is clear that every batch of new, PRRS-naive animals caused a flare-up of PRRS that was already present on the farm.

When Tracy Harper began consulting for CROPP Co-op, she told Tom that it was such a classic case she didn't even want to see his lab work. Frantzen says that Harper told him if he closed the herd his problems would stop. By the beginning of 2004, the Frantzen herd was closed.

Closing the herd has led to additional changes that Frantzen calls positive. When he closed the herd, he had on hand a good supply of boars and sows. However, by mid-2006 he was keeping back his own gilts and boars to breed the same herd they came out of. This inbreeding sacrifices hybrid vigor and over time reduces production. Tom had heard that artificial insemination (AI) was difficult (especially with gilts), but in July 2006, after attending a PFI workshop by Harper, he took the plunge. By the end of the year, the operation was at nearly 100 percent AI. Tom says he gets good litters and – most important for the Co-op – he knows exactly when the pigs will be marketable. The change in his routine to check sows more frequently for heat has been worth it. “AI puts me in control,” says Tom Frantzen.

All-in-All-Out – Making it Work

John and Bernie Kenyon, Mallard, IA

John and Bernie Kenyon started farming in 1979 north of Mallard, IA. Their family now includes five children. The operation consists of ridge-till row crop production and a farrow-to-finish hog operation. The initial hog operation was a conventional one and very common for the time, with Cargill feeding floors for finishing pigs, open lot gestation, and raised deck farrowing crates in a heated Morton building.

Several years later hog prices hit an all-time low during the winter of 1998 and throughout most of 1999. At this time John and Bernie had to make a decision. “Do we get out or do we get bigger?” The Kenyons decided to maintain their operation at a size that was comfortable for them and began raising hogs for Niman Ranch in 2000. However, they knew that they would have to make some changes, not only to their facilities but also in the way that their hogs were raised.

So John and Bernie decided to cut their herd back to one group and farrow only two times per year; late April and early November. They also determined that to make this system work more efficiently, they would start pasture farrowing and convert their raised deck farrowing house into a deep-bedded, free-stall farrowing house. Both of these steps were done partly to meet the standards of Niman Ranch Pork Company. Recently they built a hoop building they will use as a farrow-to-finish structure. Through a full year no pasture lot or building is farrowed in more than once. And all facilities are managed as all-in-all-out (AIAO).

The Kenyons finish the majority of their hogs on a Cargill feeding floor and in their new hoop building. The pigs are placed in the Cargill pens by age and size, while the hoop building is used as a farrow-to-finish facility during half of the year and as a finishing building during the other half. Again, all facilities are managed as AIAO.

John and Bernie also decided to make changes to their breeding program, which is now all artificial insemination (AI). With the help of Dr. Kurt Van Hulzen they have improved their vaccination program and currently vaccinate the market hogs for *Mycoplasma pneumoniae*, *Salmonella*, ileitis and *Erysipelas*, the last three done orally.

By switching to an AIAO system, closing the herd by using AI, and improving their vaccination program, the Kenyons feel that they have been able to maintain both good herd health and herd production while still meeting Niman Ranch’s antibiotic-free standards.

- Hoophouses should be scraped down to the dirt and a layer of ag lime spread before new bedding is added. Some producers only completely clean out the hoops once a year, simply removing wet spots and re-bedding for the other batch. Of course if you clean out a hoop in winter, re-bed immediately to prevent the ground from freezing.
- Leave the cleaned facility empty for at least two weeks to further reduce the pathogen load.
- Holding back the runts and putting them with the next group of pigs is exposing those pigs to the sickest animals of the previous batch. If you keep tail-enders, do so in a spot well away from other production facilities. Visit them last in your round of chores.
- You are going to have many other questions as you move to AIAO. How big a group of sows should I breed to fill my facilities? How many boars do I need? What is the ideal farrowing window? How do I set up a production schedule and work back from there to breeding dates and weaning dates? Any swine vet or Extension swine specialist will have extensive production knowledge of pig flow, record keeping and analysis, and business planning.

See also the forthcoming *Niche Pork Production Handbook* from Iowa State University Extension (<http://www.pnmwg.org>).

Separation by Age

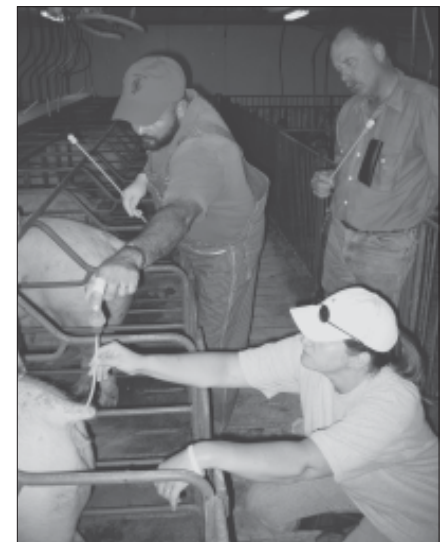
There are production reasons to have age and size uniformity in a group of pigs, but there are herd health reasons as well. How do you manage a nursery group when some animals are young enough to have passive immunity from the sow's colostrum and others are vulnerable? Or if some are too young to vaccinate while others are at the stage it should be done? Additionally, maternal antibody decay is organism dependent¹. That is why timing of vaccination is so critical. If you make up a nursery group or a finishing group from batches of different aged pigs, then the older pigs, which have had time to acquire germs and parasites, share those all at once with the younger pigs. Keep grower pigs away from gilts and dry sows as well.

Production experts suggest a maximum age span of 7-14 days for a group of pigs, and this is also desirable for the health of the herd. There is evidence a one-week spread is best, although that may be difficult to manage practically. However, limiting your sows' exposure to a boar to a maximum of 30 days after they wean, is an easy thing to incorporate that will help reduce the age spread of the pigs. In a 30-day period, a weaned sow will have two opportunities to be bred. Her first opportunity will be 4 to 7 days after weaning. A majority of the sows will cycle in this period. This will be the first group to farrow, and their pigs can be grouped together. The second period the sow has in which to be bred will occur approximately 25 to 30 days after weaning (18 to 21 days after her first cycle). If she does not get pregnant during either opportunity, she is likely not going to get bred. Also, sows that do not get bred within the two cycles after weaning have significantly smaller litters. Leaving a boar in for more than 30 days only results in a bigger spread in your baby pigs, which means more stress and a higher pathogen load.

Even if you raise your own gilts, they may have a lower gastrointestinal parasite load or lower parasite immunity than

¹ For example, passive immunity to PRRS lasts about five weeks. Passive immunity to swine influenza persists 9-12 weeks. Every time baby pigs double their weight, their passive antibody levels are reduced by half.

AI workshop, Research Alliance for Farrowing project.



the sows that have been around for years. You can alleviate the infection potential by treating sows and gilts with a wormer one week before they farrow. (Certified organic swine producers can treat breeding stock only before the third trimester.) In any event, you want to avoid a situation in which naive animals are hit immediately with a parasite load from their mother or their environment. Your strategy as an alternative producer is to expose pigs gradually to parasites and microbes as their growing immune systems strengthen.

Separation of Units and Multiple Sites

Off-Site Farrowing

**Tom and Irene Frantzen, Jerry and Judy Eichenberger,
Alta Vista, IA**

Managing a closed swine herd does not mean you can't cooperate with neighbors. You just need arrangements that protect the pigs. Tom Frantzen and Jerry Eichenberger, Alta Vista, have such an arrangement. Jerry farrows about half of the pigs that Tom finishes.

Tom explains the real reason they got started was not for herd health reasons but because Tom's time and facilities were stretched. Sows weren't getting bred, and litters were small. Having Jerry farrow now allows Tom to better manage the sows he does have. He has put up a hoop house facility for breeding and gestation where he can stall-feed sows individually for body condition. His farrowing barn is in use only four times a year now, allowing cool-down periods that reduce disease pressure.

Although Jerry has a background in hogs, he also has a job in town and is not looking to increase his risk. Tom makes it easier for Jerry by owning the sows, which he purchases from an SPF herd, and by providing the organic feed. Jerry provides the farrowing facility and his labor. Eichenberger also owns his own trailer for delivering feeder pigs to the Frantzen farm. He is paid by the delivered pig.

Tom Frantzen notes that "the big hog set-ups *never* farrow and finish on the same site." He believes in some ways it would be better if he could farrow completely off-site as well. However, the one-way flow of pigs from Jerry to Tom has helped to keep the Eichenberger operation relatively free of health problems. The arrangement has allowed changes on the Frantzen farm that have also reduced disease and increased production. As Frantzen says, "I'd rather manage fewer sows with more information."

Separation might seem impractical on a diversified farm where cropping and different livestock enterprises carry on in close proximity, where one hoop house is 10 feet from the next, or where Cargill-type pens are lined up side-by-side along a concrete pad. Again, you can make sunshine and fresh air work for you. Ten feet of separation is far better than none at all. If you don't fill every Cargill pen, you can break that nose-to-nose contact down the line.

Make sure that a fence is really a fence. This isn't easy with pigs, but all it takes is one little pig wandering all over the operation to share every germ around. There is another equally sinister side when this becomes common, and that is cross-fostering. The wandering pigs find a nursing sow, displace her newborns, and move in. They live high on the hog on milk they don't need, while the sow's piglets starve to death in the straw. At the very least, make sure that nursing sows and their litters are securely fenced. A problem like

this is minimized with a two-week farrowing window.

As mentioned above, some alternative systems are using multiple sites to help ensure biosecurity. In some cases two farmers accomplish this by working together. One only farrows; the other finishes. The finisher never steps foot in the farrowing-only operation, and vice versa. Together they accomplish something that would take a much larger single operation. Wherever you set the boundaries, do not allow employees to own or contact pigs outside of the system, and establish procedures for movement within the system.

Introducing Breeding Stock

If you are not running a closed herd, there are times when animals enter your system. These animals can upset the balance of pathogens and resistance on the farm. Obviously they can bring in disease. But even a clean animal can present problems, because it doesn't necessarily have immunity to the microbial strains found in your operation. At the least, that means that the introduced animal will have to be exposed to, and fight off, each of these pathogen strains. At the worst, bringing a naive animal into a herd that is PRRS-positive may trigger a new flare-up of the disease.

- Communicate with the source herd veterinarian prior to receiving stock.
- Purchase from herds tested and known to be free of PRRS virus, infectious ileitis, *Mycoplasma pneumoniae*, swine influenza viruses (SIV, all three

WoW: “Don’t let the vet (or feed man, or renderer) wear their boots onto the farm.”

Mix Groups at Your Own Risk

Brice and Melanie Hundling, Breda, IA

Brice and Melanie Hundling are a recently married couple farm near Breda, IA. Brice decided to return home after graduating from Iowa State University in the fall of 2003. He looked into a number of options before deciding to put up hoop buildings to finish hogs for different niche markets. Brice currently has three hoop buildings and one open-front building and has purchased and finished hogs for two different niche market groups, Niman Ranch and Pioneer Pork. He also helps his father with his Berkshire farrow-to-finish operation that markets hogs to Eden Natural.

However in order for Brice to be able to have his buildings full throughout the year, he has had to purchase pigs from multiple feeder pig suppliers. Brice has had pigs from three different suppliers on the farm at one time and has even mixed groups of pigs from two different suppliers in one hoop building. If pigs from different suppliers were mixed, they were always mixed after the pigs weighed 120 lbs, Brice figuring that the pigs were past their most vulnerable stage.

During Brice's first year raising hogs for Niman Ranch he purchased two groups of feeder pigs from two different suppliers. The group started off well, but soon he began to notice that pigs were becoming gaunt and even appeared to go “backwards.” After treating a number of the pigs with antibiotics and losing some, he decided to have diagnostic work done. Brice contacted Dr. Kurt Van Hulzen, who posted pigs and sent samples to ISU. The results showed that the pigs were positive for PCV2. However, at that time there was not a good vaccine on the market to protect against PCV2, so Brice was told to do the best he could to control the other vectors that were causing the pigs to die. (PCV2 does not kill pigs by itself but depletes the immune system and allows for other, secondary pathogens to infect the animal, usually resulting in extreme weight loss and eventual death.) Mortality in these groups was extremely high, resulting in significant financial loss. Depending on the diseases present, mixing losses as high as 40% are not uncommon.

(Mixing, continued on next page.)

(Mixing, continued from previous page.)

Today Brice vaccinates for the following diseases to help reduce infections that could be caused by secondary diseases associated with PCV2. All pigs are vaccinated for: *Haemophilus*, *Erysipelas*, *Bordetella* type A & D, *Pasteurella* type A & D, and *Salmonella*. Brice also vaccinates for *Circovirus* when the limited vaccine is available. One of the feeder pig suppliers does vaccinate for *Mycoplasma pneumonia* before the pigs are shipped.

Remember, older pigs spread disease to younger pigs. By comingling pigs of different ages or different sources, you increase the risk of problems. Once you get a disease established on your farm, continuous flow will keep that disease alive. To break that cycle, you have to eventually let the farm/barn/pen sit empty. To help “clean up” his farm after the outbreak, Brice went all-out by hoop (moved all animals out of the hoop before putting new pigs in).

Brice enjoys finishing hogs and looks at it as a major part of his beginning farm operation. He understands that having and occasionally mixing pigs from different feeder pig suppliers is not the best practice. AIAO pigflow is the direction he is heading as soon as he can find a supplier large enough to fill his hoops.

types), infectious rhinitis (*Bordetella* and *Pasteurella*), APP (*Actinobacillus pleuropneumonia*, all serotypes), and that do not show high levels of ascarid parasite eggs by fecal test.

- At least three weeks before arrival, gilts and boars coming into a breeding herd should be vaccinated for:
 - ileitis (*Lawsonia intracellularis*) six weeks prior to entry;
 - SIV, swine influenza virus, (CH1N1, rH1N1, H3N2);
 - *Mycoplasma hyopneumoniae*;
 - PCV (Porcine circovirus).

Vaccinations for SIV, *Mycoplasma*, and PCV are given two times per year to the whole breeding herd; for example, pre-breeding or pre-farrowing. Follow label instructions.

- At a minimum vaccinate new stock for porcine parvovirus (PPV), *Erysipelothrix rhusiopathiae*, *Leptospira canicola*, *L. grippotyphosa*, *L. hardjo*, *L. icterohaemorrhagiae*, and *L. pomona*. These can all be given with one shot. Other vaccinations will depend on your farm’s health status. Follow the label directions but generally give two injections of each vaccine. Do not exceed two injections per week. Complete all vaccinations at least 3 weeks prior to exposure to the main herd.
- Isolate new breeding stock for a minimum of 60 days at a separate site a minimum of 300 yards (preferably 2 miles) from any other pigs.
- Observe the new animals for clinical signs of disease.
- Have blood tests and worm examinations 2 weeks after arrival in isolation, and again before moving into the herd. If ascarid parasite eggs are present, deworm the entire group while in isolation.

- Tend to the new animals after you have chored the other pigs. That keeps you from being a carrier of any disease present in the new animals.
- Feed-back placentas and manure from the farm's farrowing site. Feed-back most effectively exposes stock to gastrointestinal pathogens. The most focused approach is careful diagnosis of the diseases on the farm and development of an autogenous vaccine specific to those strains.
- During the 60-day isolation, if vaccinations are complete run the new animals with or across the fence from cull sows for two weeks. This exposes the new stock to your system's disease complement without risking your most valuable animals. However, because the cull sows have broad immunity they may not carry every disease on the farm.
- Keep new and main herd gilts and sows separated during the first month of gestation. This gives you additional time to spot any problems and puts off the stress of integration until after the embryos have firmly attached to the uterus.

Introducing Nursery and Feeder Pigs

Use the all-in-all-out approach, keeping introduced animals separate from all others and moving them all together off the farm to market. Vaccination protocols should be implemented based on your farm's health status and the source of the new pigs. Standard vaccinations: erysipelas, *Mycoplasma*, Circovirus (PCV2), and *Salmonella choleraesuis*. If you have the option, bring the new feeder pigs to a farm that doesn't already have hogs.

Managing PRRS in Alternative Systems

Kurt Van Hulzen, D.V.M.

There is no silver bullet to eliminating or controlling PRRS. The swine industry has been dealing with this disease for decades, using various strategies in various production systems, often with mixed/marginal results. Smaller, niche-type production systems seem to have an advantage due to their smaller populations and longer time between farrowings. The results of the NRI study later in this guide show only one-third of niche producers surveyed were PRRS-positive, even in pig-dense areas and outdoor production systems. The bullets below are good starting points, realizing that these points cannot be implemented on all farms.

- Closed herd
- Good biosecurity
- Isolate incoming animals with a testing protocol before entry into the herd.
- AIAO by group with a tight age spread (2 weeks).
- Segregate groups with as much distance between them as possible.
- Good relationship with a veterinarian
- Adequate diagnostic testing

