



Vaccination Strategies for Pigs Raised on Small Farms

Use these guidelines to help make sure your animals stay in good health for the show season.

Authors: Dave Thompson, MSU Extension Educator; Madonna Benjamin, MSU Extension Swine Extension Specialist; Dan Brown, DVM, 4-Star Veterinary Services

Many diseases in pigs can be prevented or their effects minimized by vaccines formulated specifically for use in pigs. These vaccines provide a management tool that, when used properly, can greatly reduce reliance on the other medications including medically important antimicrobials (that is, those to treat serious infections in people).

Why should you consider vaccinating your herd?

Protecting your swine farm from entry and spread of diseases is critical. Sometimes, despite excellent biosecurity and animal husbandry, pigs can become infected by a disease transmitted by humans (such as human influenza), from the sow (such as circovirus), or from other pigs and vectors. Vaccines prepare your pigs for that possibility by priming their immune system in ways that help them fight off or neutralize the disease or its effects, thus minimizing damage it may cause to the lungs, intestines, or other critical organs.

Most commercial vaccines widely used in pigs have consistently demonstrated excellent efficacy against the bacteria or viruses they target. In surveys designed to determine pig disease cost (due to lost performance, death, or treatment) versus the cost of disease prevention by vaccines, the reported benefits of vaccines consistently exceed their cost by at least 2.5:1 (Miller & Dorn, 1990; Niemi et al., 2018). Exceptions to these findings include vaccines against coronavirus strains that cause porcine epidemic diarrhea (PED) and transmissible gastroenteritis (TGE). These vaccines have not consistently stimulated the correct immune response. Other vaccines that remain controversial for *naïve* (not previously exposed) herds but have shown promise to stabilize an infected herd include the porcine reproductive and respiratory syndrome (PRRS) vaccines.

There are other important reasons for using vaccines to protect your herd. First, swine producers are committed to the well-being of their animals, so it makes sense for them to prevent diseases before their animals contract them. For example, the disease *erysipelas* will cause a high fever and lesions on the skin. As a result, pigs go off feed and some experience pain in the joints. These conditions are fully preventable by vaccinating against *erysipelas*. Second, vaccines reduce the number of pigs that will contract diseases such as *erysipelas* and influenza that can be transmitted to and cause disease in humans. Third, preventing disease by vaccination usually allows animals to be raised using less antimicrobials, including those that are medically important. Reducing large-scale use of medically important antimicrobials, including many of those given as feed or water additives, helps prevent the emergence of antimicrobial-resistant strains of pathogenic bacteria and fungi. This is critical for preserving the long-term efficacy of those agents for future use in both animal and human medicine. This concept is central to the objectives of responsible antimicrobial use programs (such as the Veterinary Feed Directive and the We Care initiative) advocated by U.S. meat and dairy producer organizations.

To contact an expert in your area, visit extension.msu.edu/experts or call 888-MSUE4MI (888-678-3464)

MSU is an affirmative-action, equal-opportunity employer, committed to achieving excellence through a diverse workforce and inclusive culture that encourages all people to reach their full potential. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status. Issued in furtherance of MSU Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Quentin Tyler, Director, MSU Extension, East Lansing, MI 48824. This information is for educational purposes only. Reference to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned.



Why should vaccine-based approaches to disease management never precede or preclude vigorous application of sound biosecurity measures on your farm?

Diseases that infect pigs can enter the farm in many forms, including through other pigs, contaminated feed, delivery trucks or equipment, rodents and other wildlife, and people. They can also come in attached to dust particles that blow in from neighboring farms. These sources of disease are almost impossible to eliminate entirely. However, in many infectious diseases, the *infectious dose* (amount of virus particles or bacteria required to cause disease) largely determines the disease outcome. An infectious dose can be reduced dramatically by consistently practicing preventive farm biosecurity measures (Zangaro & Benjamin, 2021) (<https://www.canr.msu.edu/news/simple-biosecurity-tips-for-your-small-swine-farm>). As prevention typically costs less than treatment, biosecurity should always form the first line of defense against disease on swine farms.

How can you develop a vaccination strategy for your herd?

No single vaccine strategy fits all farms. Disease risk can vary based on geographical areas and pig flow patterns, including entry of new stock. Also, vaccine selection and dose regimen are often dependent on pig age and breeding status. Gilts are typically vaccinated prior to farm entry and again prior to breeding because they may be naïve to current diseases on the farm. Vaccines can provide a quick immune response including antibodies in the colostrum that are passed from the gilt to their first litter. Because maternal antibodies wane in the first 2 to 3 weeks after birth, piglets will likely require another vaccine at weaning. For these reasons, the best advice regarding vaccine products, dosage, and timing, along with information on the risk of specific diseases in your area, will likely come from your veterinarian. It is also useful to consider information provided by your vaccine supplier, swine breeder, feed mill employees, and other local pig farmers.

A general vaccine strategy, summarized in Table 1, includes important diseases that can be prevented using commercially available vaccines. Combination products are available for most of these common diseases, the use of which brings the added benefits of reducing labor, handling stress on the pigs, and the number of injection site lesions. Vaccines are also available for diseases that occur less frequently in U.S. pigs or occur frequently but, for various reasons, don't provide consistent protection from disease (Table 2). Your vet may recommend use of one or more of these vaccines based on conditions in your area or specific to your farm.

Table 1. Swine Vaccines Frequently Recommended for Small-Holder Farms

To contact an expert in your area, visit extension.msu.edu/experts or call 888-MSUE4MI (888-678-3464)



For additional information, visit extension.msu.edu

Stage	Vaccine (pathogen)	Timing (vary by system)	Other considerations
Gilts	<ul style="list-style-type: none"> Flu/PCV2/Myco Parvo/Lepto/Erysipelas E.coli/cClostridium/Past eurella Ileitis and Salmonella 	<ul style="list-style-type: none"> Every 6 months to nonpregnant pigs 5 and 3 weeks before breeding 3 and 6 weeks before farrowing 3 weeks old or older 	<ul style="list-style-type: none"> Commercial vaccines may be available as combination product.
Sows	<ul style="list-style-type: none"> Flu/PCV2/Myco Parvo/Lepto/Erysipelas E.coli/Clostridium/Past eurella Ileitis and Salmonella 	<ul style="list-style-type: none"> Every 6 months to nonpregnant pigs 4 weeks before breeding 3 and 6 weeks before farrowing Every 6 months 	
Boars	<ul style="list-style-type: none"> Flu/PCV2/Myco Parvo/Lepto/Erysipelas 	<ul style="list-style-type: none"> Every 6 months Every 6 months 	
4-H pigs (terminal show) & feeder pigs	<ul style="list-style-type: none"> Flu/PCV2/Myco Erysipelas Ileitis and Salmonella 	<ul style="list-style-type: none"> 3 weeks old or older; 2nd dose may be needed for flu and Myco 3 weeks old or older 3 weeks old or older 	<ul style="list-style-type: none"> Assumes sow was vaccinated for Myco and Erysipelas Water-based available
Show pigs (High risk due to travel to multiple shows)	<ul style="list-style-type: none"> Flu/PCV2/Myco Erysipelas Ileitis and Salmonella PRRS 	<ul style="list-style-type: none"> On arrival and 6 weeks before show 3 weeks old or older 3 weeks old or older One dose 	

Table 2. Situational or Preferential Swine Vaccines to Consider

To contact an expert in your area, visit extension.msu.edu/experts or call 888-MSUE4MI (888-678-3464)



For additional information, visit extension.msu.edu

Vaccine (pathogen)	Stage and timing (approximate)	Other considerations
PRRSv (porcine reproductive and respiratory syndrome virus)	Piglets at weaning, prior to moving into nursery/grower unit	If you are in an area or in contact with pigs or herds that are PRRSv positive, you might vaccinate to protect grower pigs from respiratory form of PRRSv.
PRRSv	Vaccinate the entire herd simultaneously.	If you are in an area that your sow herd is at a high risk to become exposed to PRRSv, consider vaccinating the entire breeding herd (sows, gilts, and boars) with 2 doses of commercial vaccine. All incoming gilts or pigs must be vaccinated before combining with herd.
PEDv (porcine epidemic diarrhea virus)	No vaccine	If your herd is positive for PEDv, consider feedback at 2 and 4 weeks prior to farrowing.
TGEv (transmissible gastroenteritis virus)	No vaccine	If your herd is positive for TGEv, consider feedback at 2 and 4 weeks prior to farrowing.
Atrophic rhinitis	Piglets: 1 and 4 weeks	If administering to gilts: 1 st dose 6 months before breeding If administering to sows: 4 and 2 weeks before farrowing. Intranasal vaccine available for young pigs.
APP (actinobacillus pleuropneumoniae)	No vaccine	Effective commercial vaccines are unproven. Sound management and antibiotics (if needed) recommended.
GPS (e.g., Parasuis)	May depend on signs	Vaccines such as Parasail require the pigs to be free of antibiotics before and after administration.
<i>Streptococcus suis</i>	Sows pre-farrow	Only autogenous vaccines are available for this pathogen.

To contact an expert in your area, visit extension.msu.edu/experts or call 888-MSUE4MI (888-678-3464)



For additional information, visit extension.msu.edu

You vet can help identify which diseases are reliably preventable with vaccines and how to obtain the best options for your farm. Michigan State University Extension recommends that you and your vet work together to develop a vaccination strategy that includes such information as:

- Disease
- Vaccine
- Vendor(s)
- Dosing schedule
- Amount, site, dosing procedure
- Possible injection site reactions to be prepared for
- Required withholding periods

Record this information (as a standard operating procedure, or SOP) and review on a regular basis with your vet to ensure that the plan is up to date. This SOP should be readily accessible to you, farm staff, and anyone else who may need to fill in for you and provide pig care over an extended period.

Management by vaccination of some pig diseases is not straightforward. PRRS may require a nuanced approach to vaccine-based prevention as new variants might be less responsive to vaccines currently available. During 2021, the emergence of new strains has caused high mortality in sow barns, nursery, and grower finishers. If your herds are likely to be exposed, consult with your veterinarian on a vaccination program for weaned, breeding, and incoming animals.

Decisions around vaccination might also benefit from the type of information obtained through surveillance methods that measure disease presence or response. For example, processing fluid, oral fluid (<https://www.canr.msu.edu/news/sampling-oral-and-processing-fluids-to-identify-disease-in-pigs>), or blood sampling results that show an increase in porcine circovirus type 2 (PCV2) in your herd, even in the absence of clinical signs, might signal an emerging problem that can be prevented by vaccination.

Sourcing and storing vaccines for pigs

Your vet is the best source of advice regarding where to purchase vaccines. Store vaccines according to label instructions and always check the expiration date. Most vaccines consist of biological materials suspended in aqueous solvents and are best stored in the refrigerator. Avoid repeated freezing and thawing of the vaccines since this practice can destroy the biological material contained within them.

Administering vaccines to pigs

Before giving vaccines, read the dosing instructions on the label and confirm the expiration date. Record the day's date, pig ID, vaccine administered, lot number, expiration date, dose volume used, and the name of the person delivering the vaccine. Pigs should be healthy at the time of vaccination. Don't vaccinate an animal running a fever. Make sure the intended injection site is clean. Most vaccines have withdrawal times; usually this period is 21 days following injection. This information is clearly stated on the product label and must be followed. Be aware that efficacy of some live vaccines can be compromised by pre- or co-administration of certain antimicrobials. Zinc deficiency can also compromise vaccine efficacy by virtue of the immune-supporting effects of this trace mineral. Your veterinarian will be able to answer questions regarding withdrawal

To contact an expert in your area, visit extension.msu.edu/experts or call 888-MSUE4MI (888-678-3464)



For additional information, visit extension.msu.edu

time requirements and possible interactions between vaccines and antimicrobials or trace minerals.

Most vaccines currently used in pigs are administered into muscle (IM) or just beneath the skin (SC) a few inches behind the ear (Figure 1); a few can be administered intranasally (in the nose) or in water, which can be affected by water treatment protocols. The proper needle size (gauge) and length is based on stage or size of the pig (Table 3). Pork Quality Assurance (PQA) guidelines (National Pork Board, 2022) recommend use of detectable needles when possible. Plan to use each needle no more than 10 times, and discard used needles in a container marked "sharps," designed to prevent needles from spilling out if the container is dropped or turned over. You should never use a bent needle. If a needle breaks during injection and you are unable to remove it, mark the area with a bright color label and alert anyone who might purchase the pig or transport the pig for slaughter. Make sure the butcher is aware of the needle and its approximate location.



Figure 1. Proper location for IM injection of a vaccine in pigs. Photo credit: Casey Zangaro, MSU Extension.

Table 3. Needle sizes & Lengths Recommended by PQA

Intramuscular Injections

Production stage	Gauge	Length
Baby pigs	18 or 20	5/8" or 1/2"
Nursery	16 or 18	3/4" or 5/8"
Finisher	16	1"
Breeding stock	14 or 16	1" or 1.5"

Subcutaneous Injections

Production stage	Gauge	Length
Baby pigs	18 or 20	5/8" or 1/2"
Nursery	16 or 18	1/2"
Finisher	16	3/4"
Breeding stock	14 or 16	1"

Source: National Pork Board. (2022). *PQA Plus education handbook*. (Version 5.0). Pork Checkoff. pork.org, page 22.



Summary

Most important diseases that infect pigs, including those caused by pathogenic viruses and bacteria, can be prevented or their effects reduced by vaccines. Along with a sound biosecurity program, vaccines are the most cost-effective tool for preventing serious disease outbreaks on your farm. In most circumstances, vaccines are effective only when administered before exposure occurs to the specific pathogen it targets. The type of vaccine and dose regimen used can be highly dependent on the stage of pig development, and whether the animal involved is a breeding or nonbreeding animal. Always administer vaccines according to the manufacturer's recommendations and be aware of withholding times for some vaccines. Your vet is the best source of information to consider when developing a vaccination strategy for your farm.

Small farm vaccine resources

Many other resources can further your knowledge of biosecurity for small farms, including:

- Michigan State University Extension Pork Team (<https://www.canr.msu.edu/tag/small-swine-farms>)
- Pork Checkoff (<https://www.porkcheckoff.org/pork-production-management/biosecurity/>)

For help finding a veterinarian in your area who has swine experience, contact National Vet Assoc (NVA) at <https://www.nva.com/contact-us>.

To speak directly with a member of the MSU-Extension Pork Team, contact:

- Beth Ferry, Pork Educator, Berrien County Extension; email: franzeli@msu.edu; phone: 269-876-2745
- Madonna Benjamin, DVM, Swine Extension Veterinarian; email: gemus@msu.edu; phone: 517-614-8875
- Dale Rozeboom, Professor, Department of Animal Science; email: rozeboom@msu.edu; phone: 517-355-8398
- Dave Thompson, Pork Educator, Branch County Extension; email: thom1637@msu.edu; phone: 269-832-8403
- Casey Zangaro, Pork Educator, Gratiot County Extension; email: zangaroc@msu.edu; phone: 989-875-5233

References

Miller, G. Y., & Dorn, C. R. (1990). Costs of swine diseases to producers in Ohio. *Preventive Veterinary Medicine*, 8(2-3), 183–190. [https://doi.org/10.1016/0167-5877\(90\)90010-F](https://doi.org/10.1016/0167-5877(90)90010-F)

National Pork Board. (2022). *PQA Plus education handbook*. (Version 5.0). Pork Checkoff. pork.org.

Niemi, J., Stygar, A., Jones, P., Clark, B., Frewer, L., Chantziaras, I., LeFloc'h, N., de Meyer, D., Kyriazakis, I., & Tranter, R. (2018, November 27). *The economic costs of production diseases in pigs* [workshop].

To contact an expert in your area, visit extension.msu.edu/experts or call 888-MSUE4MI (888-678-3464)



For additional information, visit extension.msu.edu

PROHEALTH industry workshop, Ghent, Belgium. <https://core.ac.uk/download/pdf/185612971.pdf>

Zangaro, C., & Benjamin, M. (2021). *Simple biosecurity tips for your small swine farm*. Michigan State University Extension. <https://www.canr.msu.edu/news/simple-biosecurity-tips-for-your-small-swine-farm>