PIG HEALTH TODAY®

ISSUE 23

NEWS ABOUT PIG HEALTH PRODUCTS

An interview with
Noel Garbes, DVM
Senior Technical Services Veterinarian, Zoetis

Why monitor swine herds for PCV2?

Q: Vaccinating for porcine circovirus type 2 (PCV2) has been shown to be effective in most swine herds, so why is it important to monitor for the virus?

NG: Because PCV2 is such a common, resilient virus, it remains a constant threat — even when we think we have it under control. It's true that vaccination reduces the presence of PCV2 and is an effective tool. But farms don't exist in a vacuum, and there's a laundry list of risk factors that can interfere with a vaccine's efficacy. Knowing the risk factors that could impede a vaccine's effectiveness helps to strengthen the farm's vaccination strategy and bolster its success.

Q: What's the biggest risk factor that comes to mind?

NG: It's hard to name just one, but a co-infection with porcine reproductive and respiratory syndrome virus (PRRSv) is certainly one of the most common. We know PRRSv is a virus that can be immunosuppressive. Having that instability in a herd can hamper the likelihood of optimal response to any vaccine.

> "The domino effect of this inadequate vaccine response can cause PCV2, clinical PCV2 or PCV-associated diseases to be seen downstream in vaccinated herds. Routine monitoring for PCV2 therefore gives farms a measure of where they're at and potentially catches a problem before it becomes one."

The domino effect of this inadequate vaccine response can cause PCV2, clinical PCV2 or PCV-associated diseases to be seen downstream in vaccinated herds. Routine monitoring for PCV2 therefore gives farms a measure of where they're at and potentially catches a problem before it becomes one.

Q: What other risk factors need to be considered when vaccinating for PCV2?

NG: Before you can manage risk factors, you need to learn how to identify them.

A risk factor is anything that can affect a vaccine's efficacy — something that will make it vulnerable. But just as important, identifying a risk factor is sort of a heads up that things are happening within the herd or operationally on the farm that need investigation.

Q: Do the same risk factors exist on all farms?

NG: No, they vary from farm to farm, even barn to barn. (See accompanying list.) It's also important to realize that not all vaccination risk factors are created equal.

continued

> "PCV2 has the highest rate of mutation reported for a single-stranded DNA virus. Additionally, recombination is known to occur with this virus, allowing for more changes in the PCV2 genotype."

For example, some risk factors — like the co-infection of PRRS I mentioned earlier — most likely would be indicative of other health problems. But then there are other risk factors that aren't necessarily a reflection of the health of the herd but can still influence a vaccine's efficacy — the timing of the vaccination of replacement gilts, for instance, or poor management practices for newborn piglets.

When we vaccinate sows, we increase their neutralizing antibodies — and that's a positive for shutting down circovirus or reducing shedding. But vaccinating sows is not going to help the piglets unless they get that colostrum into them ASAP. So, it's very important in that first 24 to 36 hours to get colostrum into the pigs, get them dried off and turned over to mom to start nursing. Poor first-day pig care can have implications for immunity down the road. This step is an important one that veterinarians and producers sometimes tend to lose focus on.

Q: What about human error or lapses in management? Do they affect the success of PCV2 vaccination?

NG: Most definitely. Many vaccination risk factors are created unintentionally. Pigs might receive only a partial dose or get missed altogether simply because you're vaccinating so many of them. Workers can lose track of which pigs they've vaccinated or the amount of vaccine that's left.

Insufficient cleaning of facilities — farrowing houses, nurseries, wean-to-finish barns — also comes into play. We know the PCV2 organism is ubiquitous in swine herds. Maybe we can't completely get rid of it, but once it starts accumulating in the environment, we add to the disease pressure and the risk of mutations and recombination leading to new virus strains. PCV2 has the highest rate of mutation reported for a single-stranded DNA virus.[1] Additionally, recombination is known to occur with this virus, allowing for more changes in the PCV2 genotype.[2]

Identifying risks like these and dealing with them will improve vaccination success, as well as help producers avoid issues with PCV-associated diseases. This is where some routine field surveillance could come in; it's an ideal vehicle to accomplish this.

Q: What situations might warrant a farm using field surveillance? Could you give some examples?

NG: Sure, I can give examples. But in practice, it will depend a lot on the farm's situation and the problems it's encountering.

For instance, maybe a farm wants to know what the PCV2 status is for piglets at birth. That status is directly related to how well a vaccine will protect those pigs. If a piglet is PCV2-positive at birth and you give a vaccine, the vaccine can help, but it's not going to be as effective as if you had vaccinated a negative piglet for PCV2 and then that piglet became exposed later down the road when it already had that immune response and immunity built.

Q: Is PCV2 surveillance difficult?

NG: It doesn't have to be. Collecting placental umbilical cord samples can be tricky because contamination can happen if the placenta falls on the floor. Bleeding baby pigs — the 3-pounders — isn't simple, either. So, a good option here for sample collection is processing

continued on back page

RISK FACTORS THAT AFFECT VACCINATION

HIGH RISK

- Past PCV2 challenge in herd
- Unvaccinated gilts
- Lack of PCV2 vaccine booster prior to sow farm entry
- Sows that have never seen PCV2 vaccine
- Viremia at processing
- Co-infection with PRRS, influenza A virus-swine, *Mycoplasma hyopneumoniae*
- Partial dosing of vaccine
- Crowding pigs instead of picking up for vaccination
- Vaccinating at <15 days of age
- Failure to vaccinate/vaccine compliance
- Skill level of vaccination crew
- Suboptimal environment (double stocking, ventilation, etc.)
- Poor cleaning/sanitation procedures (higher environmental load)
- High viral challenge in colostrum
- Malnutrition
- Source-herd disease status
- Developing-gilt viremia/shedding dynamics

MEDIUM RISK

- Timing of vaccination in replacement gilts
- High maternal antibodies (measured by IFA)
- Poor management practices (Delta(1)-piperideine-2-carboxylate, colostrum intake, etc.)
- One-dose vaccination regimen
- Vaccine shipped during extreme temperatures
- Improper vaccine handling/storage
- Extra-label vaccine mixing
- Mixing pigs (different PCV2 statuses, genotypes, etc.)
- Maternal barrows
- Employees with misinformation on PCV2 vaccination
- New genotype introductions (can lead to recombination events)
- Maternal age/parity (lactogenic factors)

LOW RISK

- PCV2-vaccinated sow herd
- Poor biosecurity (rodent control, etc.)
- Unknown feed-sourcing/mitigation strategies

> "Monitoring pigs for PCV2 allows a farm to catch problems before they escalate, saves the farm from having to put out fires and avoids risking a status change on the sow farm."

fluids. Most likely you're already using them for PRRS. You're already castrating and docking tails, so it's easy to collect those fluids weekly and use those samples to get a read on that. But keep in mind that the diagnostics have to be interpreted appropriately. Detection doesn't always mean disease.

Q: Can the amount of PCV2 virus in the bloodstream, known as viremia, also affect vaccine performance?

NG: Yes, it's important to know the viremia level in weaned pigs about to be vaccinated. The goal is to vaccinate healthy animals for the best outcome, and this is an area where routine monitoring could prove useful. For instance, knowing the viremia level can tell us if a farm's vaccine program should be adjusted to two doses.

To keep costs down, a farm could collect serum from 30 due-to-wean piglets once every 90 days. The results of polymerase chain reaction and indirect immunofluorescence assay (IFA) titer testing can help determine how "vaccinatable" the population is as well as establish if there might be any maternally derived antibody impact on vaccination efficacy.

Q: Is it also important to know the viremia status of gilts?

NG: In some cases, yes. Maybe the farms want to find out if gilts that have already been vaccinated could use an extra dose because there is some intermittent shedding happening. What if this shedding goes on during farrowing? What's getting passed on to the piglets? And are new genotypes being brought onto the sow farm?

Monitoring could be done, maybe twice a year. The farm could collect serum from 15 gilts for viremia profiling. Probably gilts of varying ages should be selected for the profiling.

Q: Should veterinarians undertake all of these methods of surveillance if they decide to begin monitoring for PCV2?

NG: Not initially, I would think. They might want to start with just doing one type. Like I said earlier, a lot of this will depend on the dynamics of a specific farm. But I could envision farms over time implementing more than one of these practices because they yield so many benefits.

Monitoring pigs for PCV2 allows a farm to catch problems before they escalate, saves the farm from having to put out fires and avoids risking a status change on the sow farm.

Doing routine surveillance also allows you to observe what's happening over time. Use the processing fluids and do some charting of cycle threshold levels. Some farms may monitor these already, but do they really look closely at test results and use them for evaluation? This is a key step that's maybe missed.

Also, become familiar with the risk factors that can interfere with a vaccine's effectiveness. Understanding all the variables that can impact how well your vaccination strategy will or won't perform is eye-opening.

[1] Firth C, Charleston MA, Duffy S, Shapiro B, Holmes EC. Insights into the evolutionary history of an emerging livestock pathogen: porcine circovirus 2. J Virol. 2009;83(24):12813-12821.

[2] Franzo G, Cortey M, Segalés J, Hughes J, Drigo M. Phylodynamic analysis of porcine circovirus type 2 reveals global waves of emerging genotypes and the circulation of recombinant forms. Mol Phylogenet Evol. 2016;100:269-280. 10.1016/j.ympev.2016.04.028 [PubMed]

For more information, contact Noel Garbes (noel.garbes@zoetis.com) or your Zoetis representative.

toolbox

Toolbox is a series of interviews with veterinarians about their experiences managing antimicrobials, vaccines and other tools for swine health. It is produced by the editors of *Pig Health Today*® on behalf of the US Pork Business of Zoetis.

To contact *Pig Health Today*:
editor@pighealthtoday.com
PIGHEALTHTODAY.COM

To contact Zoetis:
888.963.8471
ZOETISUS.COM/PORK

FSTRA-00210