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Key Points From the 48th Annual George A. Young Swine Health and Management Conference, August 16, 2007

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Key Points From the 48th Annual George A. Young Swine Health and Management Conference, August 16, 2007

Bruce W. Brodersen[1]

Summary

The conference focused on biosecurity with particular attention to porcine reproductive and respiratory syndrome virus (PRRSV) and porcine circovirus type 2 (PCV2). Speakers included faculty from the University of Minnesota, Iowa State University, and Kansas State University and veterinary practitioners from Iowa and Minnesota. Many of the topics focused on details relating to on-farm and off-farm biosecurity measures. Economic impacts of PRRSV and PCV2 infections were discussed in terms of specific case reports.

Dr. Tom Gillespe — PCVAD: When immunology goes wrong, life on the farm becomes very expensive

Dr. Gillespie spoke about porcine circovirus associated disease (PCVAD). Porcine circovirus type 2 (PCV2) is necessary for PCVAD but is not the only risk factor. Clinical expression in a herd often lasts up to two years. Circovirus may have been around since 1991 and there is serologic evidence that suggests PCV2 has existed since 1969. Clinically, disease due to PCV2 was first recognized in Canada. What has allowed this virus to be a major pathogen in such a short time is not really known. Porcine reproductive and respiratory syndrome (PRRS) virus exacerbates PCV2 infection. Some serotypes appear to be more virulent than others.

Clinically, there is respiratory disease without much coughing and porcine dermatitis nephropathy syndrome. Occasional diarrhea, mummies with myocarditis, and doubled mortality rate are all part of case definition. Vaccination appears to reduce reproductive losses.

Costs of PCV2 infection

In one case, mortality increased three standard deviations above normal (from 1.6 to 4.85%) in 11 – 16 week-old pigs infected with PCV2. Pigs exhibited classic lesions and clinical signs of PCVAD and increased culling rate. Feed efficiency and average daily gain decreased. Total cost per pig was about $6.60 plus lost opportunity costs and increased fixed costs.

Transmission

PCVAD is transmitted from fecal to oral even in non-clinical pigs. There can be more than one strain present at the same time. Maternal antibody provides variable protection. Pigs can be congenitally infected. Semen transmission does not appear to be a high risk.

Vaccination

If there is a vaccine, what is the value? Anecdotally, vaccinated finisher pigs are heavier pigs and "look" better. Mortality dropped from 8.78 to 2.4%, average daily gain, feed efficiency and carcass leanness improved in one trial. Vaccinated groups perform more uniformly in terms of growth performance and carcass merit. The role of sow vaccination is uncertain.

Dr. Derald Holtkamp — The PRRS Risk Assessment Tool for the Breeding Herd: Practical Applications and Lessons Learned

In 2002, development began on a tool for the sow herd by Boehringer Ingelheim™ who then offered it to American Association of Swine Veterinarians (AASV) in 2005. Later AASV and Iowa State University agreed to establish a disease risk assessment tool and databases of completed PRRS risk assessments held by AASV.

A database was built and associations to production situations were made. Hazards defined by the tool included: Distance to other farms, aerosolized virus, and passing trucks possibly leading to an adverse outcome.

Consequences of PRRS infec-

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tion included costs in gilt supply and genetics; cost of the PRRSV elimination project; diagnostic testing, early culling, lost breeding herd productivity, wean to finish productivity loss; transportation and logistical costs; increased medication; and vaccination.

The value of risk assessment was increased communication between veterinarians and producers and their personnel. The tool provides a framework for critical review including an analysis of gaps in biosecurity, risk comparison among farms, and demonstrated improvement in biosecurity and in decision making.

How the tool has been used

Ninety-five veterinarians have been trained to use the tool. Over 700 assessments are in the database. A Web version is being developed. Among available reports, there are site reports, benchmarking reports, and risk factors organized for internal risk and external risk.

Studies conducted

Four studies have been conducted. They include 1) quantifying risk factors relative to PRRS-negative status, 2) an industry education program for understanding risk factors to breaks in herds naïve to PRRSV, 3) a cross-sectional study of positive herds to evaluate the association between risk factors and a case definition, and 4) developing PRRS control strategies.

Future plans

Plans are to improve the tool for use in the breeding herd and expand it to grow finish pigs and other diseases.

Dr. Robert Morrison — Regional Eradication of PRRS: A Pilot Project

The objective was to determine the prevalence of PRRS, assess distribution of the virus and determine if veterinarians and producers would test their herds. The project was conducted in the east half of Rice County and Stevens County in Minnesota. In Rice County, all expenses were paid, while in Stevens County producers funded the program.

In Rice County, 90% of the herds were tested at least once. There has been limited spread of the virus since. In Stevens County, numerous swine herds have left the industry; several herds have eliminated PRRS since 2004.

Challenges

Challenges to the eradication project included: 1) identifying local opinion leaders to determine if they support the program, 2) some producers respect the opinion of leaders, 3) overcoming suspicion, 4) determining if 90% participation is sufficient, 5) getting participants to attend quarterly meetings, 6) unwillingness of some producers to invest to eliminate PRRS, 7) positive or variable PRRS status in a region initially, and 8) show pigs bringing virus back to farm.

Outcome of this project

From this project, it was learned that three important factors need to be considered before starting an elimination project : 1) Choose a region where there is limited pig movement into a region, 2) Begin with the end in mind and 3) Set some goals regarding: PRRS control, stability of infection in sow herds, and if a long term goal is to be PRRS-free.

The rewards of this project included breaking down barriers in communication among producers. The producers shared data and were collectively smarter. There was movement toward PRRS-free status. Thirteen of 15 farms produced more pigs per year after PRRS was eradicated. There was decreased cost of production with reduced antibiotic usage, improved pig welfare, and increased worker morale.

For future PRRS elimination projects, the question remains who should pay for testing, sequencing virus, correspondence, and any other expenses that are incurred.

Summary

1) Adequate knowledge exists to eliminate PRRS, 2) selection of correct geographic area is critical, 3) the region must have a low risk of re-infection, 4) more success stories with low eradication expenses are needed, and 5) meetings and education are important.

Dr. Andy Holtcamp — Filtration for Disease Prevention

There are numerous reports of indirect transmission of diseases in the literature, suggesting aerosol transmission. Some of these organisms are *Actinobacillus pleuropneumoniae, Mycoplasma hyopneumoniae,* pseudorabies virus, swine influenza virus (SIV), PRRS virus, and foot and mouth disease virus.

Due to the history of three prior PRRS breaks in four years at a boar stud, a decision was made to install a positive pressure ventilation system in the stud. The events that lead to each break could usually be tracked. Along with installation of a positive pressure ventilation system, general biosecurity measures needed to be enforced. These included perimeter fences, limited entries, no pigs within 5 miles, personnel wear removable boots from the car to the office, supplies disinfected, removed from box and 48-hour down time, 72-hour down time for personnel, and eight week isolation period on boars.

When selecting an engineer, it was discovered some engineering firms are just trying to keep their construction crews busy and university personnel are often too busy to commit to a project. It is important to find a firm who has your interest in mind.

There are three stages to a high efficiency particulate air (HEPA) system: prefilter, intermediate filter, and the actual HEPA filter. HEPA filters remove 99.97% of particles 0.3 microns in diameter. It was determined it would be too costly to cool the building by conventional air conditioning. Prefilters need to be changed yearly in order to protect the HEPA filters. Intermediate filters are connected directly to HEPA filters. To date, the HEPA filters still look brand new after three years. Fans need to be designed to ensure there are no back drafts due to high winds. When loading pigs out of the

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building, outlets need to be closed so all exhaust air exits via the chute.

It cost $52,000 to convert a barn to this system. There needed to be four times the number of inlets over what had been in the previous ventilation system. There exist filters which are 95% as effective as HEPA filters and cost half of HEPA filters. Some operations may want to consider this, but it was decided not to use the less effective filters. Another consideration is operation (electricity) costs, which were estimated to be about three times that of no filtration.

Previously, there had been three different strains of PRRS enter the boar stud in four years. After filters installed, there have been no breaks in PRRS but two breaks of SIV.

Summary

We still need to still pay attention to biosecurity. The cost of depopulation of a boar stud was estimated to be $320,000, so utilization of the HEPA system was cheap compared to depopulation of a boar stud after a PRRS outbreak.

Dr. Dick Hesse — Research Considerations for Biosecurity

Discussion centered on containment of porcine circovirus during an experimental infection in order to prevent noninfected control pigs from becoming infected. A demonstration on fomites as a means of transmission of infectious agents was given using the Glo-germ™ system.

Porcine circovirus is very stable and can withstand heating at 133°F for an hour. Therefore, it is very difficult to contain in an experimental situation where there are infected and non-infected pigs in close proximity. In order to completely contain the virus, complete shower in and out practices between all rooms were utilized. Hoses with foamers containing Virkon™ disinfectant were placed in hallways. Rooms were arranged so negative animals were farthest away from the positive animals. When leaving the hallway, disinfectant was sprayed to cover the workers' trail. Footbaths were always kept filled with fresh disinfectant (5% solution Clorox™). It was discovered that it was necessary to maintain door seals so there was no spray under the door during room cleaning. Pens were arranged inside the rooms so they can be washed with spray directed away from the door. There needs to be sinks in all rooms to clean and disinfect equipment. When leaving a room, equipment is double-bagged and disinfected.

Decontamination of a room between experiments includes using a Hotsy™ with a detergent to remove any organic matter. This is followed by disinfection with Clorox and then Virkon™. Let the room dry and then rinse before animals are placed in a room.

Demonstration of spread of infectious agents utilizing Glo-Germ™

A demonstration focused on the spreading of the virus. Means of spread included aerosol, tracking, splashing, and a simple handshake. During registration, a pen was "contaminated" to show how fomites would be a source of infection. Other demonstrations included spread by needles and hog snares. Simple rinsing of needles, syringes, and snares was shown to be ineffective. Splatter from spraying floors was shown as a means of virus spread. Towels and other cleaning material can also serve as a source of infection. Door knobs, handshake, and foot traffic were also shown to be a means of spreading virus. One may use Rit™ dye instead of Glo-Germ™; however, Rit™ dye doesn't go into solution as well.

Dr. Joel Nerem — Practical Approaches to Biosecurity from a Practitioner's Perspective

Why biosecurity?

PRRS cost to the swine industry has been estimated to be $560,000,000 per year. It is estimated to cost $300-500K to eradicate PRRS from a 3,000-sow unit. Benefits of biosecurity also include improved animal welfare, public perception, and worker morale. Every farm is at risk. Biosecurity can be divided into two areas of interest: off-farm biosecurity and on-farm biosecurity.

Off-farm practices of biosecurity

Practices that can aid off-farm biosecurity include: 1) strict monitoring of incoming gilts and semen, 2) thoroughly washing and disinfecting trailers, 3) having trailers dedicated for each sow farm, 4) strict adherence to protocol, 5) controling farm access using a "Biosecurity Update" (A Biosecurity Update categorizes each farm's health status so people know the order of farms to visit.) and 6) mortality disposal may consist of composting, incineration, or rendering. If using a rendering pick-up, there needs to be an on-farm side and an off-farm side so there is no crossover of traffic between off- and on-farm personnel or vehicles.

On farm practices of biosecurity

Clean side — dirty side concept — how do you get things from the dirty to clean side? Initially, the clean and dirty transition points need to be defined. It is important to document what needs to be done to prevent disease transfer, and to train the staff accordingly.

There are four transition points where there is entry into facilities. A sign-in sheet is used to document who, what, and when regarding entries.

1. Personnel — supply showers and locked doors (key pads).
2. Materials and equipment — when bringing materials and equipment on site, identify a period of time for decontamination and for down time.
3. Incoming genetic material — test semen on every collection day (random semen samples) and hold it until negative results are obtained.
4. Replacement gilts — quarantine and test (bleed on arrival and three to four weeks later).

Other points to consider: Wash and disinfect live haul transport chutes; use barn lime in winter since it is not practical to wash and disinfect in extremely cold weather; haul dead stock and garbage out at end of day when personnel go home. Concerning

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manure removal, follow biosecurity guidelines, including cleaning equipment before arrival on farm. Regarding pest control, prevent spilled feed, keep weeds mowed, utilize rodent bait boxes (rotate rodenticides), and eliminate trash.

Successful biosecurity is based on communication, commitment, consistency, and accountability. A biosecurity checklist audit can be used to help ensure biosecurity.

To move forward, utilization of new technology such as vaccine, air-filtration, industry investment, and communication to share ideas needs to occur. For continued success, there needs to be producer leadership.

Speaker Information

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