Field REPORT

ISSUE/1

SIV Gets More Complicated

Diagnosis and Treatment Include Larger Number of Virus Strains

Swine influenza virus (SIV) used to be a seasonal problem — pigs got sick in the fall and winter and then they got over it. Today's mix of SIV strains has turned swine flu into a year-round problem for swine producers.

Dr. Kurt Rossow, Veterinary Diagnostic Medicine, University of Minnesota, reports an above average number of cases of SIV through early December. Recent numbers show 11 percent of cases positive for SIV in September 2003, jumping to 33 percent of cases the first week of December 2003.

"These cases are showing different H1N1 viruses and changes in H3N2 viruses as well," he states. "While it's still out there and needs to be considered, the classic H1N1 (cH1N1) is no longer the predominant SIV type."

Similar patterns are being seen in Iowa. "The SIV samples we've looked at from 2002 and 2003 nearly all appear to be the new reassortant H1N1, rather than classic H1N1," notes Dr. Bruce Janke, Veterinary Diagnostic Laboratory, Iowa State University.

Evolving strains

According to Dr. Marie Gramer, Veterinary Diagnostic Medicine, University of Minnesota, the new reassortant H1N1 (rH1N1) strains are adding to the confusion about SIV and contributing to the problems surrounding its control.

"Multiple strains active in a herd on a nearly continual basis make SIV testing more complicated," says Gramer. "It's difficult to identify strains definitively using only the basic testing procedures."

From July 1 through December 1, 2003, 66 percent of SIV isolates at the University of Minnesota were serotyped as H1, 20 percent as H3, and 22 percent were not able to be serotyped using reference H1N1 and H3N2 antisera.

"It is very possible for one herd to carry multiple SIV strains including cH1N1, rH1N1, H1N2 and H3N2," stresses Gramer. To identify multiple strains present in a herd, the lab must do genetic sequencing of the virus in addition to performing serotyping.

Herd protection

Since 1998, SIV has moved from a single stable virus to a virus with the ability to reconfigure itself to the point where it may avoid control by existing vaccines.

"The new H1N1 strain emerged from a process called genetic reassortment, which occurs when a single cell is infected by two different influenza viruses," explains Dr. Robyn Fleck, a technical service veterinarian at Schering-Plough Animal Health Corporation. "The result is a 'progeny virus' containing genetic material from both 'parents'."

continued

"In other words," she adds, "the outside of rH1N1 looks like a classical H1N1, but its internal genes are derived from H3N2. Reassortant H1N1 also acts differently from the old classical H1N1. It picks up mutations at an increased rate, thereby evading the pig's immune system."

According to ISU's Janke, the positive identification of H3N2 in 1998 made SIV "a two-strain disease in many Midwest herds within 6 months, thus setting the stage for further variations."

'Moving target'

"Today SIV is definitely a moving target," says Dr. Gene Erickson, Rollins Laboratory, Raleigh, N.C. "With the emergence of H3N2, it has become very clear that that virus has very broad ability to reassort with other strains of virus co-circulating in the herd at the same time allowing it to create a new virus."

"We're seeing documented cases in well-vaccinated pigs where the SIV vaccine hasn't offered adequate protection," acknowledges UMN's Gramer. "Their current vaccine didn't necessarily fail, it just didn't cover new strains circulating within the herd."

Recent research from ISU also shows that pigs undergoing active infection with PRRS (porcine reproductive and respiratory syndrome) or PCV2 (Type II porcine circovirus) at the time of vaccination against SIV may have a compromised ability to respond properly to the vaccine.

Many herds rely on prefarrowing SIV vaccination programs to offer protection of pigs through late nursery or early finishing stage but neglect to fully immunize incoming gilts.

"Replacement females need to be brought up to an immune status similar to the sows. Otherwise, the differing immune levels in the sows and offspring will encourage the virus to maintain, or even amplify, itself in the herd," stresses Erickson.

CHECKLIST FOR SIV CONTROL

Today SIV is a problem for swine producers day-in and day-out. "Here at the University of Minnesota Veterinary Diagnostic Lab, we're testing herds where pigs are continually ill with SIV," reports Dr. Marie Gramer of UMN. "These herds require intensive diagnostic work."

Producers and their veterinarians should:

- **Assess signs of clinical illness.**
- **Select pigs in the early stages of illness for testing.**
- **Ask for sequencing to characterize the isolates.**
- **Evaluate vaccines for best control of SIV strains on the farm. The broader the coverage, the less likelihood of SIV breaks.**
- **Develop a management plan for testing and vaccination.**
- **Continue testing to fine tune vaccination timing to avoid maternal antibody interference.**
- **Implement a diagnostic plan with your veterinarian and animal health provider to identify the cause of respiratory outbreaks and identify pathogens (*Mycoplasma hyopneumoniae*, PRRS, PCV2, emerging SIV strains and bacterial co-infections) that may impact perceived vaccine efficacy.**

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