

IAV-S SURVEILLANCE PROGRAM ASSESSMENT – 2015

Why PAA Did This Review

Currently, surveillance of influenza A virus in swine (IAV-S) is supported with funding APHIS received through the U.S. Department of Health and Human Services (HHS) as part of a fiscal year (FY) 2009 supplemental appropriation. That funding source will likely be exhausted during FY 2016.

Anticipating this change in IAV-S resources, pork industry representatives inquired in late 2014 what APHIS' plans were for the program going forward and expressed their support of its continuation. Subsequently, the Veterinary Services (VS) Deputy Administrator's Office requested an assessment to determine what results had been achieved by the program to date; analyze what changes were needed, if any, as IAV-S surveillance is transitioned into part of a larger comprehensive swine surveillance program; and provide insight into future budget formulation efforts.

In this review, we describe the achievements and outcomes generated through enhanced IAV-S surveillance activities led by APHIS since 2009. We also summarize program, cooperator, and key stakeholder views on the current and desired future state of IAV-S surveillance in the United States. And, we identify primary cost factors driving the program's budget, information that may assist in future resource planning.

The more technical aspects of the program—and their scientific merit—are being reviewed by a qualified, independent professional not associated with this assessment. VS management intends to combine the results of both reviews to aid future program planning and funding deliberations.

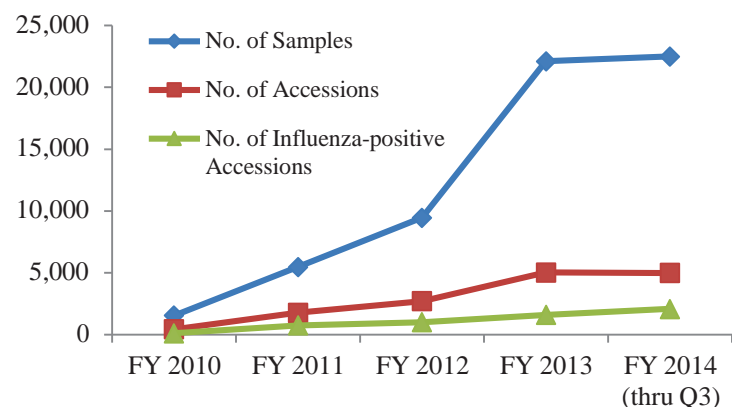
Ultimately, this report provides information to be used by VS officials to help them plan for the program's future, by identifying key areas for consideration.

Program Description

Influenza (flu) is a contagious viral disease that causes respiratory infection and is transmissible between animals and humans. Occasionally, flu viruses from different species recombine to form new strains that human and/or animal populations have little resistance to. Because of their physiology, swine can serve as one of the mixing vessels that allow these types of “viral reassortment” events to occur. For this reason, human and animal health officials are particularly interested in the flu (sub)types circulating in pig populations. In 2009, a pandemic outbreak of influenza in humans occurred, and scientists determined the outbreak virus was the result of one of these reassortment events. They also determined that pig populations were susceptible to the same viral strain. However, when they tried to do additional analysis of the new flu strain against flu viruses already circulating in the U.S. swine herd, they identified significant data gaps—little information was available about IAV-S and, what was available, was not centralized or organized usefully.

In the wake of the 2009 influenza pandemic, HHS transferred \$25.75 million to APHIS to support an IAV-S surveillance program in U.S. pigs. Since then, program officials have built a network of collaborative relationships inside and outside the Agency to help them meet three main objectives: to (1) monitor the genetic evolution of endemic IAV-S; (2) make IAV-S isolates available for research; and (3) develop diagnostic reagents, assays, and vaccine seed stock. The figure below illustrates the number of diagnostic samples (individual animals) the program has tested from commercial swine, as well as the number of accessions (herds) this represents and the number of accessions that tested positive.

Number of Samples and Accessions Tested for IAV-S, FY 2010 – FY 2014



Program Results: As illustrated by the graph, the number of samples voluntarily submitted for testing has increased each year,

which has allowed the program to monitor the genetic evolution of IAV-S more comprehensively than scientists could before. With a greater number of samples, the program has also identified numerous new IAV-S isolates, which are now available to researchers and others to access through VS' viral repository. And, these sample submissions have led to the development of new IAV-S diagnostic reagents and assays.

Largely, we found the program achieved many of the goals and objectives program officials set out for themselves. We determined that the program was able to fully meet 5 out of 9 of the goals or objectives established in their strategic plan, partially meet 3 more, and 1 was unmet. Some of the program's primary achievements include:

- Establishing strong lines of communication between public health and animal health organizations to share information related to IAV-S and other zoonotic diseases;
- Ensuring a better understanding of endemic and emerging IAV-S viruses in the national swine herd; and
- Helping advance IAV-S diagnostics and vaccine development.

Despite these overall good results, there continue to be opportunities to improve in certain areas, especially in areas related to data management. In addition, there has been a gradual erosion in what is perhaps the program's greatest accomplishment—its ability to foster transparency and communication among Government, industry, and academia stakeholders—and the swine industry still lacks access to a broad-spectrum, commercial IAV-S vaccine.

Stakeholder Views: Most of the stakeholders we spoke with believe this program has been very beneficial, providing value that stretches well beyond generating basic IAV-S diagnostic results. The predominantly held views include:

- The program has perpetuated advances in swine and influenza research and diagnostics;
- The program is supporting future vaccine development;
- The program may—in time—help lower respiratory ailments in pigs and subsequently reduce the use of antibiotics in the national herd; and
- The program has had a positive impact on enhancing trade, improving public relations for the swine industry, and increasing the amount of information available for safeguarding human health.

Program Future: The conditions present in 2009 warranting a robust national surveillance program are still largely present today and sufficiently relevant for USDA to continue some level of program support. Among other things:

- IAV-S continues to be an economic impact on the swine industry;
- New subtypes of IAV-S resulting from viral genetic shift or drift continue to threaten animal health; and
- Scattered reports of human infection with influenza viruses linked to swine have appeared, which causes concerns about the disease's zoonotic potential.

Program Changes: Our analysis did not reveal the need for cardinal changes to the program design or strategy. A key attribute of the current program design is its ability to scale up or down, depending upon the resources made available. As VS makes these resourcing decisions, our analysis revealed four main areas that should be considered:

- **Build upon existing networks:** As the program moves forward it should actively work to preserve the One Health relationships established by the IAV-S program.
- **Enhance communication and transparency:** VS program officials should revisit how and when it disseminates IAV-S surveillance information and communicates with key stakeholders.
- **Improve data management:** Current data management practices limit the overall value and utility of the IAV-S program. Opportunities exist to improve data submission, collation, analysis and dissemination.
- **Focus on resource efficiency.** Cooperators and stakeholders believe program inefficiencies exist that, if addressed, could provide significant cost savings while allowing for comparable IAV-S surveillance insights.

Conclusion: Given the focus and nature of this review, we do not offer specific audit findings or recommendations. Instead, the results of this report should be considered together with independent IAV-S technical review that was completed. Given the scalable nature of the IAV-S program, the resourcing level should be established and then the information from these two documents should be used as VS plans the future of IAV-S surveillance. Regardless, stakeholders should be a part of program design and planning moving forward..