**Expert opinion used to characterize potential CSF outbreak**

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The National Surveillance Unit (NSU) recently incorporated the use of expert-opinion methodology to characterize the potential biological consequences of a classical swine fever (CSF) outbreak in U.S. commercial swine. NSU assembled and interviewed the panel of 18 experts regarding the characteristics and consequences of an outbreak both in the presence and absence of current surveillance activities, and under the present swine production system and veterinary diagnostic laboratory testing structure. Absence of current surveillance activities was defined as a scenario characterized by passive surveillance, reporting of suspect cases, and subsequent foreign animal disease (FAD) investigations as the only processes in place to identify a potential CSF case.

Opinions from the expert panel were compiled into uncertainty distributions to capture not only the most frequent answers, but also the less frequent opinions, which were used to represent the variability around central values. Results of the expert opinion process were incorporated into a disease spread model to characterize the magnitude of a potential CSF outbreak under the conditions recommended by the experts. Output from the disease spread model was used to estimate vaccine requirements for the National Veterinary Stockpile in the event of a CSF outbreak in commercial swine in Iowa and North Carolina.

The panel consisted of 18 experts, including:

- Two representatives from the National Pork Board
- One World Organization for Animal Health (OIE) CSF expert
- Two representatives from the Veterinary Diagnostic Laboratory system
- Three swine practitioners with experience in both small swine operations and) large commercial operations in the United States and/or Mexico
- Five representatives from the National Veterinary Services Laboratories (NVSL) and the Foreign Animal Disease Diagnostic Laboratory (FADDL)
- One representative from the VS Regional staff

- One representative from the National Center for Animal Health Programs swine staff
- Three representatives from the Centers for Epidemiology and Animal Health - two from the National Animal Health Monitoring System and one from NSU

Each individual or group of experts was guided through a questionnaire designed to address nine general topics. The experts' responses to each of the topics are summarized below.

### A. Probability of a CSF outbreak in the US

Seven out of 18 experts concluded that the probability of a CSF outbreak is low (1 outbreak in 30 years or more), 6 out of 18 indicated there was a medium probability (1 outbreak sometime between 4 and 30 years), and none of the experts considered that there is a high probability (1 or more outbreaks in 4 years or less). Three experts did not provide an answer to this question.

### B. Location of first incursion

Fourteen experts believed that the first incursion would occur in southern U.S. border States with later spread into corn/swine-producing States by means of immigrant work force. The remaining experts suggested the following as likely routes of CSF entry:

- Feral swine and garbage feeders primarily in Texas, Florida, and other southern States, such as North Carolina, South Carolina, and Arkansas (2/18),
- Intentional introduction in major swine-producing States such as Iowa and North Carolina (1/18), and
- Airport hubs that handle flights from Caribbean/Central American origin (1/18).

### C. Strain virulence

Most experts (15/18) suggested that a potential CSF outbreak could be caused by a low virulence strain. These strain types are more prevalent in Central America and the Caribbean, where experts believe U.S. infection would be most likely to originate from.

Three experts indicated that the causing strain could be of medium or high virulence, depending on whether infection comes from Central America or Asia, respectively.

### D. Time to first detection

Seven experts provided no opinion on this topic. The 11 experts who addressed the time to first detection in the presence of surveillance suggested an average of 4 weeks, with a range between 10 and 90 days. Only four experts provided insight on the time to first detection in the absence of surveillance, suggesting an average of 4 months, with a range between 1 and 6 months.

### E. Detection issues

Among the discussed issues affecting early detection of CSF were: [a] the similarity in clinical appearance of CSF to other endemic diseases, (e.g., porcine reproductive and respiratory syndrome, erysipelas, salmonella, porcine circovirus associated disease, etc.) which confuses and delays diagnosis; [b] the lack of producer and veterinarian awareness of CSF; [c] the scarcity of correct tissue submission for CSF testing (tonsil); [d] the existence of laboratory testing quotas that limit the number of surveillance samples tested in any given fiscal year; [e] the excess number of untargeted vs. targeted samples tested, and [f] the longer than expected turnaround of test results (observed 4 to 11 days vs. expected 24 to 48 hours).

### F. Outbreak duration

The experts who addressed this topic suggested that outbreak length in the presence of current surveillance activities could range from 4 months to 2 years, with the vast majority indicating that it would take 1 year to control and 2 years to eradicate the disease.

No information was obtained about the length of a CSF outbreak in the absence of surveillance; experts were either unwilling to address this question or addressed it using very broad, general terms that could not be used in the modeling process.

### G. Control/Response

Most of the experts who addressed the issue of outbreak response/control suggested depopulation of younger pigs (i.e., nursery) and vaccination down to the bottom of the

production cycle (i.e., finishers and sows) as methods of control in the event of a CSF outbreak. Two experts, however, strongly felt that vaccination should be avoided and that depopulation should be the only response. On the other hand, one expert indicated that depopulation should not be used under any circumstance; instead, the only control method implemented in the event of an outbreak should be vaccination with very large—10-20 km—vaccination rings.

### H. Trade impact

The 11 experts who elected to address the impact of a potential CSF outbreak in the United States suggested that: [a] international trade will be compromised for at least 1 year, [b] the U.S. will lose at least 30 percent of the export markets initially, [c] proof of freedom and reopening trade markets will require at least 6 months of surveillance, and [d] producers will lose approximately $25 per head during trade restrictions.

### I. Disease Characteristics under Experimental and Field Conditions

Three panel members provided expertise exclusively on disease characteristics under field and experimental conditions. The most notable clinical signs of disease caused by low virulence strains in natural, endemic conditions are reproductive failure and abortions in sows. Under experimental conditions, the first evident clinical symptom is high fever, followed by nasal discharge, skin discoloration, diarrhea, reduced appetite, and tendency to huddle. Weight loss is an important clinical indicator: inoculated pigs weighed 40 percent less than the controls. Experimental infection studies had typically been conducted in weanling pigs (35-40 lbs) and carried out for 40 to 60 days; therefore, experimental information was limited in scope. Virus was isolated from tonsils during the whole length of the experiment and seroconversion invariably occurred between 14 to 21 days post infection.

As the opinions provided by this panel indicated, the clinical presentation of CSF has drifted with time to a form that is almost indistinguishable from other swine endemic diseases. Routine surveillance and increased awareness of the disease by producers and animal health officials are central to early detection and rapid control of a potential incursion of CSF in U.S. commercial swine populations.