



FOUNDATION FOR  
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RESEARCH



## **H5N1 Risk to Swine Research Program Request For Research Proposals November 6, 2024**

The Swine Health Information Center has partnered with the Foundation for Food & Agriculture Research and the Pork Checkoff to fund a \$4M research program to enhance prevention, preparedness, mitigation, and response capabilities for H5N1 influenza in the US swine herd.

Launched in 2015 with Pork Checkoff funding, the mission of the Swine Health Information Center (SHIC) is to protect and enhance the health of the US swine herd by minimizing the impact of emerging disease threats through preparedness, coordinated communications, global disease monitoring, analysis of swine health data, and targeted research investments. The Foundation for Food & Agriculture Research (FFAR) is a non-profit organization established in the 2014 Farm Bill to build public-private partnerships that fund bold research addressing food and agriculture challenges.

As part of SHIC's strategic mission to respond to emerging disease threats, SHIC monitors disease outbreaks nationally and internationally for their potential risks to the US swine herd. An emerging disease identified as a priority for US pork industry prevention and preparedness is H5N1 influenza due to the growing number of diverse mammalian species susceptible to infection and the unprecedented 2024 H5N1 outbreak impacting dairy herds across the US.

Historically, H5N1 has been primarily maintained globally in wild migratory birds with outbreaks in commercial poultry operations. A multistate outbreak of H5N1 influenza in dairy cows began on March 25, 2024, in Texas. Whole genome sequencing of the dairy herd isolate identified Eurasian lineage goose/Guangdong clade 2.3.4.4b, genotype B3.13. Since March 2024, the outbreak of H5N1 in US dairy cattle has spread rapidly across at least 339 dairy herds in 14 states affecting lactating cows and causing mastitis, reduced milk production, decreased feed consumption, lethargy, and fever. This recent expansion of H5N1 into a novel livestock species resulting in a novel clinical presentation warrants the need for a close investigation of this virus and its potential for incursion into US commercial swine herds.

On October 30, 2024, USDA reported the first detection of H5N1 in a pig on a small Oregon backyard farm where pigs were co-housed with poultry and other livestock. Although the farm is a non-commercial operation and the pig was not intended for the commercial food supply, this furthers the concern for potential incursion into US commercial swine herds. Research priorities for H5N1 are designed to further strengthen US swine industry prevention and preparedness as well as inform response efforts should H5N1 be introduced into the commercial swine herd.

Understanding the potential impacts of H5N1 on pork production directly addresses SHIC's mission to protect the health of the US swine herd and mitigate the risk of this emerging disease. Critical research investments are necessary to prevent H5N1 incursion, ensure rapid and accurate detection of H5N1, inform stakeholder response, mitigate production losses on farm, identify effective control measures, and develop clear messaging to consumers on the safety of pork.

SHIC/FFAR/NPB are inviting proposal submissions from qualified researchers for funding consideration to address H5N1 Risk to Swine research priorities described in the detailed Request for Research Proposals (RFP) below, including topic areas of 1) vaccines, 2) clinical presentation, 3) mammary transmission, 4) surveillance, 5) introduction risks, 6) caretakers, 7) biosecurity, 8) pork safety, 9) production impact, and 10) pig movements.

**Proposals should clearly state which of the below SHIC/FFAR/NPB H5N1 Risk to Swine Research Priorities will be addressed through the project.** Collaborative projects that include the pork industry, allied industry, dairy or poultry industries, academic institutions, and/or public/private partnerships are highly encouraged. Projects that demonstrate the most urgent and timeliness of completion, provide the greatest value to pork producers, and show efficient use of funds will be prioritized for funding. Projects are requested to be completed within a 12 – 18 month period with sufficient justification required for extended project duration.

Total funding available for the SHIC/FFAR/NPB H5N1 Risk to Swine Research Priorities outlined below is \$4M. **Individual awards are capped at \$250,000, but proposals may exceed cap if sufficient justification is provided.** Matching funds are encouraged but not required; the \$250K cap applies to only those funds requested from SHIC/FFAR/NPB. All projects should strive to have a high impact, show value to pork producers, and have pork industry-wide benefit.

**The deadline for proposal submission is 5:00 PM CT on December 31, 2024.** The proposal template and instructions for completion and submission can be found at [www.swinehealth.org](http://www.swinehealth.org). For questions, please contact Dr. Megan Niederwerder at [mniederwerder@swinehealth.org](mailto:mniederwerder@swinehealth.org) or (785)452-8270 or Dr. Lisa Becton at [lbecton@swinehealth.org](mailto:lbecton@swinehealth.org) or (515)724-9491.

### **SHIC/FFAR/NPB H5N1 Risk to Swine Research Priorities**

1. ***Vaccines for Swine.*** Investigate the potential for cross-protection against H5N1 through use of currently available IAV vaccines or natural infection with endemic strains of swine influenza (H1N1, H3N2, H1N2); develop novel vaccines for use in swine against H5N1; identify the correlates of vaccine protection for H5N1 in swine to evaluate vaccine efficacy; quantify vaccine capability to decrease public health and livestock risk and allow differentiation of vaccinated from infected animals (DIVA).
2. ***Clinical Presentation in Pigs.*** Develop challenge models and conduct controlled experimental infection studies to characterize H5N1 clinical presentation of pigs at different production stages (boars, gestation, farrowing, suckling, weaned, nursery, grow-finish) to determine incubation period, clinical signs, mortality rate, shedding, tissue tropism, contact transmission, disease interventions, and pathologic lesions.
3. ***Mammary Transmission.*** Determine the H5N1 replication and shedding potential in the mammary glands of pregnant sows through cell culture or tissue receptor studies or challenge models; assess transmission risk from sows to nursing piglets through colostrum and milk; evaluate impact of infection on sow milk production.
4. ***Diagnostic Surveillance.*** Determine the most sensitive and specific sample type for early and rapid detection of H5N1 incursion in commercial swine; investigate population and environmental samples such as lagoon effluent for estimating prevalence; investigate syndromic surveillance for case compatible VDL submissions; use statistical modeling to

develop surveillance strategies to confirm virus elimination from herds; evaluate PCR and antibody-based assays for differentiation from swine endemic IAV.

5. ***Introduction and Transmission Risks.*** Perform a risk assessment to evaluate and prioritize hazards for potential incursion of H5N1 into swine herds, such as unpasteurized milk, dairy waste products such as whey, wildlife scavengers, feral swine, wild migratory birds, rodents/pests, proximity to poultry or dairy farms, mixed species farms, operational connections between poultry or dairy farms (shared personnel or housing, contract crews, equipment, supplies), contaminated surface water or feed, manure management.
6. ***Caretakers of Pigs.*** Identify best practices for prevention of zoonotic transmission of H5N1 between animal caretakers and swine, including ease of access to enhance use of human seasonal influenza vaccines; identify most effective personal protective equipment for mucus membranes (face mask, face shield, eye protection glasses), hands, and personnel clothing with applicability to on-farm conditions.
7. ***Biosecurity Practices.*** Develop best practices for reducing the risk of H5N1 introduction and transmission on swine farms, such as downtime protocols for personnel between poultry or dairy farms, mixed species operational practices, reducing wild bird access or using deterrents for wildlife, eliminating bird nests and roosts, cameras for monitoring wildlife access to mortalities, water treatments or feed mitigants, storage and maintenance of feed and feed bins, cleaning/disinfection of pens and transport vehicles.
8. ***Safety of Pork.*** Investigate potential for H5N1 in different pork products from cull sows and market hogs, including various cuts, processing techniques, food handling, and cooking recommendations for consumer messaging on safety of pork.
9. ***Mitigating Production Impact.*** Identify strategies to minimize production impact and spread of H5N1 in swine, such as supportive veterinary treatment of infected herds (whole herd versus targeted population), herd closure, methods for All-In/All-Out production sites, segregated early weaning, depopulation and repopulation.
10. ***Business Continuity.*** Determine most effective methods for swine movements from exposed herds across the production chain while minimizing risk of H5N1 spread, such as diagnostic testing protocols for incoming shipments, transport certification, farm quarantine, or pre-movement isolation; identify low and high-risk movements based on production phase, single or multi-source, proximity, and access to at-risk populations.