



Call for Research Funding Proposals Wean-to-Harvest Biosecurity Program

SHIC's mission includes analysis of swine health data and targeted research to benefit the US pork industry. SHIC-funded Swine Disease Monitoring Reports' aggregate data show breeding herd breaks of PRRS and PED tend to follow breaks in wean-to-harvest sites. A SHIC-funded project detailed how PRRS and PED negative pigs placed on wean-to-harvest sites become infected after placement. Further, SHIC's Rapid Response Program investigation of the *Actinobacillus pleuropneumoniae* outbreak in the Midwest exposed deficiencies of wean-to-harvest biosecurity that contributed to disease spread. Proactively enhancing wean-to-harvest biosecurity will help control the next emerging disease in the US pork industry and improve US swine herd health.

SHIC, along with the Foundation for Food & Agriculture Research ([FFAR](#)), a non-profit organization established in the 2014 Farm Bill to build public-private partnerships that fund bold research addressing big food and agriculture challenges, and Pork Checkoff, is funding a Wean-to-Harvest Biosecurity Program to be implemented over the next two years. SHIC, FFAR and Pork Checkoff are soliciting proposals to investigate cost-effective, innovative technologies, protocols, or ideas to implement biosecurity during the wean-to-harvest phase of production.

The research priorities that follow focus on site and transportation biosecurity. They cover three areas – bioexclusion for preventing disease introduction on the farm, biocontainment for preventing disease spread from the farm to reduce risk to neighboring facilities, and transportation biosecurity for preventing disease movement from markets and other first points of concentration back to the farm. We are seeking novel tools across all three areas for a comprehensive biosecurity approach.

Proposals are expected to define current practices and propose innovative and novel protocols or technologies that address the research priorities and that may have a cost, efficiency, or implementation advantage. Herd health status monitoring, instead of disease outbreak incidents, can be used to demonstrate biosecurity-effectiveness and an economic analysis can be used to demonstrate cost-effectiveness. Collaborative projects that include **pork industry, allied industry and/or academic public/private partnerships**, that demonstrate the most **urgency and timeliness of completion** and that show **efficient use of funds**, will be prioritized for funding. If project duration is extended to assess seasonal effects, a justification for timeline should be clearly stated.

There is a pool of approximately \$2.3M available for the research. Proposals are capped at \$200,000 but individual proposals may be higher with sufficient justification for a project that will be unique, high impact and have industry-wide benefit.

The proposal template and instructions for completion and submission can be found at www.swinehealth.org **The deadline for proposal submission is 5:00 PM CDT, December 16, 2022.** For questions, contact Dr. Paul Sundberg at psundberg@swinehealth.org or (515) 451-6652 or Dr. Megan Niederwerder at mniederwerder@swinehealth.org or (785) 452-8270.

Wean-to-Harvest Biosecurity Research Program

Site Biosecurity Research Priorities

- Perform an industry-wide assessment to define the current bioexclusion standards and protocols applied to prevent the predominant pathogen introduction routes in the wean-to-harvest phase, including an estimate of degree of implementation and compliance nationally and regionally, to characterize the breadth and variation of currently implemented baseline practices.
- Personnel biocontainment and bioexclusion
 - Compare implementation and compliance incentives and/or rewards and their successes, shortcomings, or adoption barriers across sites or systems to help understand worker motivation to consistently execute biocontainment and/or bioexclusion protocols.
 - Apply traceability of personnel and/or equipment across sites in a production or contract servicing network to identify highest biocontainment and/or bioexclusion risks and validate mitigation protocols or technologies to address the risks.
 - Investigate innovative, biosecurity-effective, and cost-effective alternatives to the “shower in” and “shower out” facilities and protocols currently used by personnel – find an enhanced “next generation” PPE or Danish Bench system.
 - Investigate biocontainment or bioexclusion engineering controls (modifying equipment, physical barriers, site design, ventilation, robotics, or other technologies) that will help overcome labor shortages and the need to share personnel across sites in a production or contracting service network.
 - Investigate innovative ways to ensure labor is implementing biocontainment and bioexclusion protocols and policies correctly.
- Facility biocontainment and bioexclusion
 - Identify biosecurity-effective and cost-effective options for retrofitting or renovating current production site designs to increase biocontainment or bioexclusion during the wean-to-harvest phase. Among the considerations could be modifications that enhance loading/unloading protocols, chute facilities, mortality removal, personnel entry/exit, supply entry, etc. Consultation with construction companies with expertise in swine farms is encouraged.
 - Investigate novel, biosecurity-effective, and cost-effective methods of 1) preventing pathogen introduction onto farms through incoming air and ventilation, other than air filtration, that can be adapted to current wean-to-harvest facility designs (bioexclusion) and/or 2) decreasing aerosol pathogen dispersal and infectivity in air from wean-to-harvest sites during an outbreak (biocontainment).
 - Demonstrate the cost-effectiveness and feasibility of implementing prioritization of scheduling from high biosecurity deliveries to low biosecurity deliveries within trucking networks with the objective of minimizing the need for complete washing and disinfection of trucks.

- Site mortalities
 - Investigate innovative engineering or facility design solutions for preventing pathogen transmission between mortality holding boxes and their surrounding environment and the growing pig facilities from which the mortalities originate.
 - Explore containment materials, technologies, and equipment to reduce contamination of the environment through management of mortality mechanical vectors, aerosols, excretions, and secretions during rendering pickup and transport.
- Equipment, environmental and supply biocontainment and bioexclusion
 - Investigate novel, less-labor and less-time intensive technologies and/or protocols for cleaning and disinfection of pens, barns and/or equipment, including confirmation of pathogen inactivation from the technologies and/or protocols.
 - Investigate point-of-care diagnostic assays, or other novel contamination sensing technologies, and sampling design, for determining if pens, equipment, or supplies are contaminated or disinfected.

Wean-to-Harvest Biosecurity Research Program

Transport Biosecurity Research Priorities

- Biosecurity of truck driver
 - Identify and track pathways for pathogen introduction or movement from driver activities within the truck, at loading/unloading, and/or within a production company network or across a contracting service network and validate technologies or techniques to decrease these risks.
 - Investigate and validate innovative ways to cost-effectively clean and disinfect nonpig contact areas of the truck, including the tractor cab and storage compartments of the tractor and trailer and their contents.
 - Investigate innovative facility designs that inherently increase biosecurity during pig loading (modifying chute or loading area, permanent infrastructure, designing physical barriers) or novel disinfection techniques or technologies for the loading area or portable/permanent chute that will increase biosecurity of the loading process or increase effectiveness of staged loading.
- Efficiency of truck wash
 - Investigate innovative ideas to increase throughput in truck wash facilities. Projects need to include demonstrating increased throughput while maintaining or improving efficacy across trailer configurations and styles.
 - Examples could include:
 - Engineering, mechanical, or robotic solutions
 - Modification of cleaning and disinfection procedures, alone or in combination with thermal assisted disinfection and drying
 - Cost-effective novel disinfectants or disinfecting technologies

- Wash facility designs or operational procedures that lower inherent biosecurity risks while maintaining or improving efficiency. Examples may include facility designs that optimize water use efficiency, shorten disinfection time, improve the flow of trucks and people, and/or include segregation of clean and dirty areas
 - Investigate cost-effective technologies that can be applied to existing trailer designs and configurations to improve ease of cleaning and disinfection.
 - Examples could include cost-effective alternatives that eliminate the need for bedding or use novel bedding materials (other than wood shavings) and/or floor coverings or floor coatings that could be more efficiently removed or cleaned to facilitate trailer cleaning and disinfection.
 - Investigate sampling and testing strategies for tractors and trailers and new technologies for sensing contamination or measuring effective disinfection of transport equipment.
- Alternatives to fixed truck wash facilities
 - Design or demonstrate deployable techniques, mobile systems or temporary structures for interior trailer cleaning and disinfection with water that are either season-specific or, preferably, that can be applied across seasons and that provide solutions to waste and bedding removal, water sourcing, and wastewater management.
 - Consideration should be given to:
 - Technologies and techniques to focus on cleaning and disinfection efficacy
 - Time needed to complete the cleaning and disinfection process
 - Cost of implementation
 - Design or demonstrate deployable techniques, mobile systems or temporary structures for interior trailer cleaning and disinfection without water that are either season-specific or, preferably, that can be applied across seasons that consider waste and bedding removal. When applying cleaning and disinfection processes, potential impact of application on the lifespan of the truck and trailer equipment should be assessed.
 - Consideration should be given to:
 - Technologies and techniques to focus on cleaning and disinfection efficacy
 - Time needed to complete the cleaning and disinfection process
 - Cost of implementation
 - Examples may include the sequence or combination of mechanical blow out or vacuuming of trailer contents, scraping, application of heat or steam, and/or fogging or gas disinfectants, along with shrouding or other innovative ways to facilitate disinfection.
- Biosecurity of first points of concentration
 - Investigate and validate innovative techniques and/or technologies that can be applied at the unloading docks at markets, packing plants, and other first points of concentration, including entry and exit to these sites, to decrease the pathogen load and the opportunity for tractors and trailers to transfer pathogens from these facilities back to the farm.
 - Objectively track and demonstrate high risk driver and plant personnel traffic patterns and movements and investigate interventions to mitigate these risks. Among other mitigations,

implementing electronic technologies to eliminate the need for physical document transfer between driver and plant could be considered.

- Investigate diagnostic sampling or monitoring protocols to identify areas of highest concentration of pathogens within packing plants or secondary markets.
- Investigate alternative trailer designs which decrease the likelihood of pathogen transfer between the plant and trailer, such as designs which increase the ease of unloading pigs and eliminate the requirement of personnel entering the trailer to help unload pigs.