



Rolling 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. The first and second rounds of proposal solicitation, selection, and funding are complete. SHIC, FFAR and Pork Checkoff now offer the invitation for further proposals to investigate cost-effective, innovative technologies, protocols, or ideas to enhance biosecurity during the wean-to-harvest phase of production.

The following updated research priorities focus on site and transportation biosecurity. They cover five targeted areas – 1) Personnel biocontainment and bioexclusion, 2) Mortality management, 3) Truck wash efficiency, 4) Alternatives to fixed truck wash, and 5) Packing plant biocontainment. We are seeking novel tools across any of the five areas to help result in comprehensive biosecurity enhancement.

Continued researchable interests include:

- Packing plant or other first point of concentration biocontainment
- Alternatives to traditional truck wash, including cleaning and disinfection of trailers without water or without heating after initial water flush
- Artificial intelligence or other novel technology to monitor and evaluate biosecurity compliance
- Mortality management
- Industry barriers to biosecurity adoption and compliance

Proposals must identify and include which of the research priorities is being investigated. They are expected to define current practices and investigate innovative and novel protocols or technologies that may have a cost, efficiency, or implementation advantage. Herd health status monitoring, instead of disease outbreak incidence, can be used to demonstrate success of the protocols or technologies and aid in a required economic analysis of 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 the timeline should be clearly stated. Proposals are capped at \$200,000.

Wean-to-Harvest Biosecurity Research Program

Research Priorities

1) 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.
- 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, such as with loading, vaccination, or cleaning and disinfection crews, across sites in a production or contracting service network.
- Identify pathways for pathogen introduction or movement from truck driver activities within the truck, at loading/unloading, or across a contracting service network and validate technologies or techniques to decrease these risks.
- Investigate innovative facility designs that can be retrofitted into existing facilities to inherently increase biosecurity during pig loading (modifying chute or loading area, permanent infrastructure, designing physical barriers) to increase effectiveness of staged loading.

2) Mortality management

- Investigate innovative engineering, containment technologies, equipment, or facility design solutions to prevent mechanical vectors, aerosols, and secretions from causing pathogen transmission from mortality holding boxes, their surrounding environment, and/or rendering pickup to the pig growing facilities.

3) Truck wash efficiency

- Investigate innovative ideas to increase throughput in truck wash facilities. Projects must demonstrate increased throughput while maintaining or improving efficacy across trailer configurations and styles.
 - Examples could include:
 - Engineering, mechanical, or robotic solutions
 - Cost-effective, novel washing or disinfecting technologies
- 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.

4) Alternatives to fixed truck wash

- 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.

5) Packing plant or other first point of concentration biocontainment

- 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 demonstrate decrease of 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.