

NATIONAL PORK BOARD

Request for Proposals – General Call 2016



DEADLINE: Tuesday, November 17th– 5:00 pm CST

The National Pork Board is soliciting research proposals dealing with these categories:

- ANIMAL SCIENCE – Animal Science**
- ANIMAL SCIENCE – Swine Nutrition**
- ANIMAL WELFARE – Animal Welfare**
- PORK SAFETY – Post-Harvest**
- PORK QUALITY – Pork Quality**
- PUBLIC HEALTH – Antibiotic Use/Resistance***
- PUBLIC HEALTH – Influenza**
- PUBLIC HEALTH – MRSA**
- PUBLIC HEALTH – Other Zoonotics**
- PUBLIC HEALTH – Worker Health & Safety**
- SWINE HEALTH – General Swine Disease**
- SUSTAINABILITY - Manure**
- SUSTAINABILITY - Water**
- SUSTAINABILITY - Other**

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NOTES:

Proposal selection will occur in February 2016.
Notification of grant awards will be done in March 2016.

Project funding will begin May 1, 2016.

Requests for second-year funding must be resubmitted.

***Antibiotic Use & Resistance Proposals selection will be in early January and contracts will start February 1, 2016.**

ANIMAL SCIENCE

*The Animal Science Committee of the National Pork Board is soliciting proposals in the areas of **Feed Efficiency and Mitigation of the Impact of Seasonality on Productivity**. Proposals must be submitted in the required format to be considered. Projects may cover multiple-years for completion of an entire project. However, proposals for multi-year projects are expected to detail project deliverables and budgets on a year-to-year basis. If proposed projects are for completion of multi-year efforts already in-progress, the proposal must include a narrative of progress and accomplishments to date of the overall research effort. This may be accomplished by including copies of interim or final reports from previously funded research efforts as appendices to the submitted proposal. Proposals will be reviewed by panels of experts for scientific soundness and by pork producers for industry application. Proposals may be returned to the investigator with suggested/requested revisions prior to final funding decisions. Funding for accepted projects will follow final approval by the National Pork Board.*

Proposals are solicited in these areas only. Proposals submitted that do not adhere to this area will not be considered further.

ANIMAL SCIENCE – Swine Nutrition

Feed Efficiency

Below is a **ranked** list of research priorities to be addressed by the Feed Efficiency research. Submitted proposals must bring fundamental knowledge to application to improve feed efficiency and reduce variation in feed efficiency. Achievement of these priorities will require a variety of disciplines including but not limited to nutrition, nutritional physiology and biochemistry, immunology, mathematical modeling and ingredient chemistry. Proposals utilizing a multidisciplinary approach are highly encouraged. Proposals should reference key concepts such as caloric efficiency, digestive physiology, ingredient value, dynamic or predictive estimates of nutrient value and disease-related diversion of nutrients. Applied growth assays should be conducted in commercial-like conditions and with sufficient replication to make statistically appropriate conclusions. Nursery trials will be given higher consideration when subsequent finishing performance is monitored and carcass data collected. In order to be considered for funding, submitted proposals must show evidence of sufficient statistical power in relation to primary project objectives, clearly define the role of the study in meeting the objective to deliver cost effective technology, and address one or more of the following research priorities:

- 1) Nutrient extraction from low energy feedstuffs including but not limited to the effect of dietary factors on digestibility, gut function and enzyme supplementation
- 2) Novel feed processing methods or emerging technologies having direct field application in reducing the cost of feed
- 3) Mechanisms or development of technologies for enhancing quantification of feeding values of dietary ingredients
- 4) Interaction of nutrition and health including, but not limited to, the effect of nutrition on animal performance, caloric efficiency, nutrient requirements and/or disease persistence when animals are faced with a health challenge

ANIMAL SCIENCE – Animal Science

Mitigation of the Impact of Seasonality on Productivity

Seasonal variation affects all producers and all phases of production but, producers have few tools to address seasonal loss in productivity and profitability. Seasonal variation in temperature leads to substantial variation in productivity (average daily gain, feed efficiency and days on feed), pork quality (fat quality as evidenced by iodine value, marbling and belly thickness) and reproductive efficiency (farrowing rate, litter size and sperm production). The following areas of production have been given priority by the Animal Science Committee of the National Pork Board as being the most responsive to seasonality:

- 1) Reduced weight gain and impaired feed efficiency leading to higher input costs, increased days on feed and lighter market weights
- 2) Reduced pork quality as evidenced by reduced marbling, belly firmness and elevated iodine values and altered fatty acid profiles of carcass fat
- 3) Reduced breeding herd efficiency through impaired reproduction as evidenced by prolonged return to estrus, reduced conception rate, higher fall out rate and reduced sperm number and quality.

Submitted proposals must bring fundamental knowledge to application to mitigate the impact of seasonality on productivity in one or more of these areas. Successful investigation in this area will likely require a variety of disciplines including but not limited to environmental monitoring, nutritional intervention, nutritional physiology and biochemistry, mathematical modeling, fatty acid analysis of feeds and carcass fat; proposals should reference these key concepts. Proposals utilizing a multidisciplinary approach are highly encouraged. Preference will be given for research trials conducted in commercial-like conditions and with sufficient replication to make statistically appropriate conclusions. However, the Committee recognizes that smaller-scale research using environmental chambers may be a necessary approach to answering some of the more basic questions. Submitted proposals must show evidence of sufficient statistical power in relation to primary project objectives and clearly define the role of the study in meeting the objective to deliver cost effective technology.

Further Information

- Preference will be given to projects that involve academic and commercial collaboration, except where discovery is needed to establish principles necessary for additional research
- Projects spanning more than one year are not discouraged so that a project is provided sufficient time to deliver desirable outcomes. However, funding of a multi-year project must be justified, with second and third year funding being dependent on sufficient progress of the prior year
- Preference will be given to projects addressing priorities of highest value and/or spanning more than one priority
- A description of methods to assess the economic impact of the research on the swine industry should be included in each proposal. This may necessitate the inclusion of an agriculture economist on the research team.

For information regarding this solicitation, please contact Chris Hostetler by Email (chostetler@pork.org) or by phone at (515) 223-2606.

ANIMAL WELFARE

*The Pork Checkoff Animal Welfare Committee is requesting proposals on issues impacting the welfare of swine. Specific research areas of interest are listed below. All proposals submitted **must** address at least one of the specific research subtopics of interest described below.*

All submitted projects should be multidisciplinary in their approach and should include neuroscience, performance, physiology, and behavior when applicable. Experimental designs must have all the appropriate controls to be considered for funding. Proposed methodologies need to be described in detail and behavioral methods and physiological assays used in the study need to be validated. Proposals need to also include power calculations to validate the proposed sample size. Projects that have cooperative arrangements with industry are strongly encouraged and will be prioritized. All approved projects using animals in research for any purpose must be reviewed by an Animal Care and Use Committee (ACUC) or equivalent. An ACUC approval is not only required for future publication of results in a peer reviewed journal, it also ensures a high standard of care for animals used in research in accordance with federal regulations and policies.

The Animal Welfare Committee has \$355,000 to fund swine welfare related research. There is no exact funding limit for submitted proposals but the budget request should be appropriate and justified for the work that is being proposed. Researchers are encouraged to find matching funds or in-kind contributions to the project.

Newly submitted multi-year proposals should provide a clear overall vision and objectives for the entire project with a detailed plan of work and budget outline for each of the proposed years. If proposed projects are seeking second-year funding of a previously funded project, the proposal must include a discussion of progress and accomplishments realized from the research efforts to date toward success of the overall research effort. This may be accomplished by including copies of interim or final reports from previously funded research efforts as appendices to the proposal submitted.

Proposals must be submitted in the required format to be considered. All eligible proposals will be reviewed by a panel of peers for scientific soundness and validity. Final funding decisions will be made by the National Pork Board. Further enquiries regarding this solicitation can be directed to Sherrie Webb by email swebb@pork.org or by phone: 515/223-3533.

1. Management of Compromised Pigs and Timely Euthanasia

- Identify and characterize barriers that lead to caretakers not performing on-farm euthanasia in a timely manner.
- Determine optimal management, transport fitness and conditions for cull or compromised pigs to minimize stressors associated with end of production handling, mixing and transportation.
- Develop management practices or tools that make handling or moving compromised pigs easier for the pig and their caretakers.

2. Painful Procedures and Pain Management

- Identify the relationship between tail docking practices and incidence of tail biting behavior in a commercial production setting. Specifically, quantify the impact of leaving tails intact on animal welfare and tail biting behavior, cull and mortality rates, and carcass quality and value at the harvest plant. Quantify the pain response of pigs that have been tail docked or severely tail bitten.

- Identify and validate alternative methods or practices to tail docking that effectively and reliably eliminate tail biting behavior.
- Develop and evaluate potential alternatives or modifications of castration procedures that provide for the well-being of the pig and still maintain acceptable pork quality.
- Identify and validate physiological and behavioral indicators of pain in piglets 0 to 10 days of age.
- Quantify the pharmacokinetic properties of different types of analgesics and local anesthetics for piglets 0 to 10 days of age.
- Evaluate the effectiveness of different classes of analgesics (e.g. NSAIDs, local anesthetics, etc.) to reduce the pain associated with castration and/or tail docking.

3. Weaned or Feeder Pig Transport

Proposals should address the impacts of handling and transport before, during and after transport as measured by effects on ADG, ADFI, FE, health status, mortality, and/or incidence of culls. Proposals should address at least one of the following objectives for weaned pigs (3-5 wks of age) or feeder pigs (10-12 wks of age):

- Determine and quantify the main factors and time periods during transit (24hr prior, during, or 24hr post) that result in weaned or feeder pig mortality.
- Determine the proper use of bedding and weather boards/plugs in controlling the internal environment of the trailer so as to provide for the thermal comfort of the pig during cold, moderate, and warm temperatures. Targeted temperatures should reflect those commonly experienced during the winter in the Northern region and/or summer in the Southern region of the U.S.A.
- Determine and evaluate proper use of cooling mechanisms in controlling the internal environment of the trailer during loading and transport so as to provide for the thermal comfort of the pigs during warm and hot temperatures. Targeted temperatures should reflect those commonly experienced during the summer and fall in the Midwest and Southern regions of the U.S.A.
- Develop and evaluate technologies and/or techniques that contribute to a low stress handling system that promotes self-movement by the pigs. This includes group sizes, ramp design and angles, handling tools, etc.
- Determine best management practices for transporting weaned pigs that are weaned at 2 weeks of age or earlier or have PEDV or other health challenges. This includes special handling considerations, equipment design and managing the internal environment of the trailer so as to provide for the thermal comfort of the pig.

4. Aggressive and Damaging Behaviors (ear/flank/tail biting)

- Explore the impact of genetic influence on the incidence of aggressive and damaging behaviors. This includes inter- and intra-line variation.
- Determine causation factors for ear, flank, or tail biting behaviors which may include, but is not limited to, impacts of feeder space, air quality, temperature and humidity, space allowance, group size, variation of animal size, human interaction, and access to enrichment.
- Explore strategies to reduce aggression during mixing of sows, weaned, or feeder pigs.

5. Farrowing Housing

Housing systems used during farrowing and lactation must accommodate for the well-being of the sow and her litter. The focus of this priority is to optimize the environment of a farrowing housing system for the sow

and piglets and prevent pre-weaning mortality rather than comparing housing designs. Please note that proposals should evaluate behavior, physiology and productivity of the sows and piglets.

- Modify existing or design new sow housing systems for farrowing and lactating sows and their litters that improve individual well-being, management/labor, lifetime productivity and reproductive and lactation performance. Systems should consider the well-being of the both the sow and her piglets. Special areas of focus include, but are not limited to:
 - Sow microenvironment that promotes sow comfort and accommodates nesting behaviors
 - Piglet creep area design and microenvironment management needed for various weaning ages.
 - Farrowing housing designs that promote positive sow-piglet interactions while decreasing pre-weaning mortality

6. Sow Shoulder Lesions

Prevention

- Investigate and quantify the exact timeline and rate of progression of shoulder lesion development and identify the critical time-points for risk assessment and intervention.
- Explore flooring types that promote sow movement (standing, postural adjustment) to aid in prevention of sow shoulder lesion development and minimize piglet mortality.
- Explore methods for cooling sows in hot weather, which may include in-floor cooling, water drips, or the strategic use of fans/air flow, that promote sow comfort and aid in prevention of sow shoulder lesion development.
- Identify methods for maintaining good sow body condition throughout lactation, including regular monitoring of BCS and feed systems that promote feed consumption during lactation.
- Determine the heritability of shoulder ulcers and the susceptibility of different North American genetic lines.
- Investigate any genetic differences in conformation and structure of the shoulder joint and any correlation with the incidence of shoulder lesions.

Treatment and Healing

- Optimize existing or develop and evaluate new therapy options for treating shoulder lesions. Therapies should promote wound healing and improve sow comfort by minimizing pain.

Financial Implications

- Analyze the financial costs to industry associated with shoulder lesions specifically quantifying such factors as impact of early culling and the sow replacement, medication costs, loss of production, additional labor, and loss of carcass value.

7. Other Animal Welfare Topics – This is an open category for research ideas that apply to any of the six main topics of this RFP but may not be specifically mentioned in that category. Proposals submitted in this category must be relevant to U.S. pig production, must focus on the evaluation of swine well-being, and must address at least one of the main RFP topics:

- management of compromised pigs and timely euthanasia,
- painful procedures and pain management,
- weaned or feeder pig transport,
- aggressive and damaging behaviors,
- farrowing housing, and
- sow shoulder lesions

PORK QUALITY AND SAFETY

*The Pork Safety, Quality and Human Nutrition Committee is requesting proposals **in the following areas only**. Specific research topics are listed below, not in priority order. All proposals submitted **must** address at least one of the specific research topics of interest described below. **Novel approaches and concepts to the research topics are encouraged.***

There is no exact funding limit for submitted proposals, but the budget request should be appropriate and justified for the work that is being proposed. Researchers are encouraged to find matching funds or in-kind contributions to the project. Multi-disciplinary proposals are encouraged.

Proposals must be submitted in the designated format to be considered. Projects may cover multiple-year efforts. For multi-year projects, project expected deliverables and budgets should be broken down by year. Proposals will be reviewed by panels for scientific soundness and for industry priority. Proposals may be returned to the investigator with suggested/requested revisions prior to making a final funding decision. Funding for accepted projects will follow final approval by the National Pork Board. Further enquiries regarding this solicitation can be directed to Dr. Steve Larsen by email: slarsen@pork.org or by phone: 515/223-2754.

Researchers should expect to hear back from the Committee by the end of March. Proposals are solicited in the following area only. Proposals submitted that do not relate to this area will not be evaluated, scored or considered for funding. The topics below are NOT listed in priority order:

PORK QUALITY

Updating the Pork Chain Quality Audit

- 1) The pork industry has funded past research to develop an audit process in order to assess pork quality throughout the entire pork chain. The Committee would like to update the information gained from those initial pork chain quality audits. Below is a list of topics for researchers to consider when developing a proposal:
 - a. The goal of the initial pork chain quality audit was to conduct a quality audit of slaughter barrows and gilts (their carcasses, cuts and dress-off/offal items for the U.S. pork industry). The audit was conducted in two phases:
 - b. Phase I was an extensive literature review of the factors affecting pork quality. This information encompasses all factors which influence quality in every sector – production, slaughter, fabrication, processing and retail.
 - c. Phase II was to identify key members of the pork distribution chain and to solicit from them, in the form of face-to-face interviews and/or questionnaires, help in identifying specific quality concerns. Pork industry leaders were also asked to identify future goals/strategies needed by each segment to improve pork and pork by-product quality.
 - d. Those that participated in the survey were:
 - i. North American Meat Institute, the Food Marketing Institute, the United States Hide, Skin and Leather Association, United States Meat Export Federation and the National Restaurant Association
 - ii. Purveyors that merchandise wholesale pork to the food service industry
 - iii. Packers and Processors
 1. This included procurement procedures, slaughter floor audits, cooler audits and fabrication audits.
 - a. Examples: live weight, dressing percentage, live hog/carcass condemnations, skin problems, trimming, bruising, abscesses back fat thickness, carcass muscle percentage, ham weight, loin weight, belly weight, seam fat, marbling, color/texture, trimmable defects, internal parasite prevalence, etc.

PORK SAFETY – Post Harvest

What is the national prevalence estimate of *Salmonella spp.* in lymph nodes from market hogs and sows?

- 1) The pork industry has funded proposals in the past to estimate the salmonella prevalence in lymph nodes from market hogs and sows. The Committee would like to update its previous information. Below is a list of topics for researchers to consider when developing a proposal:
 - a. Sampling scheme
 - i. Which lymph nodes are you going to test and why?
 - ii. For each positive lymph node, what serotype or serotypes are present?
 1. What is the genetic diversity of those serotypes and their respective resistance patterns?
 - b. Testing methodology
 - i. Describe the testing methodology
 - ii. Describe the performance of the test
 - c. Seasonality
 - i. Will sampling occur over multiple seasons or just one?
 - d. Locations (Midwest, South, East, Southwest, etc.)
 - i. Will sampling occur over multiple locations or just one?

Understanding *Salmonella* I 4,[5], 12:i:-

- 1) Over the past few years, we have seen the salmonella serotype I 4,[5], 12:i:- increase in testing prevalence. The industry wants to gain a better understanding as to why this specific serotype is increasing in prevalence. The Committee is encouraging researchers to submit a proposal to investigate the ecology/evolution of this serotype to help explain why it is increasing in prevalence within the U.S. Below is a list of topics for researchers to consider when developing a proposal:
 - a. What makes this serotype unique compared to other serotypes?
 - b. Resistance pattern to antibiotics, packing/processing and environmental pressures
 - c. Ability to cause disease
 - d. How does it adapt to its environment?
 - e. Does it outcompete other serotypes?
 - f. Do typical control procedures on the farm and during processing reduce/eliminate this serotype?

Improving the shelf-life of pork products?

- 1) The Committee is interested in research to extend the shelf-life of both fresh and processed pork products. Extending the shelf-life of pork products will help achieve needed time to reach domestic and international markets. Below is a list of topics for researchers to consider when developing a proposal:
 - a. What products are you evaluating?
 - i. Fresh vs. processed
 1. Chops
 2. Roasts
 3. Primals
 4. Bacon
 - b. What is the cost associated with extending shelf-life?
 - c. Need to evaluate both microbiological and quality/organoleptic characteristics
 - d. Sampling scheme
 - i. What time points are you going to sample?
 - ii. How often?
 - e. Testing methodology
 - i. Describe the testing methodology
 - ii. Describe the performance of the test
 - f. What packaging type(s) are you evaluating?
 - g. What criteria will you use to determine the end of the product's shelf-life?

PUBLIC HEALTH – Antibiotic Use & Resistance*

*** Antibiotic Use & Resistance Proposals selection will be in early January and contracts will start February 1, 2016.**

The National Pork Board Producer/Public Health and Workplace Safety (PPHWS) Committee is requesting proposals in the area of **antibiotic use and resistance**. Specific research topics are listed below, not in order of priority. All proposals submitted **must** address at least one of the specific research topics of interest described below. **Novel approaches and concepts are encouraged.**

The PPHWS Committee has committed funding in 2016 to specifically address antibiotic use and resistance research in pork production.

- There is no funding cap for submitted proposals, but the budget request should be appropriate and justified for the work that is being proposed.
- Researchers are encouraged to find matching funds or in-kind contributions to the project. Multi-disciplinary proposals are highly encouraged. Collaboration between different institutions also is encouraged.
- Proposals that include provisions for analysis of the economic impact of the research to the swine industry are encouraged. This may be accomplished by inclusion of an agriculture economist on the research team.

To be considered, proposals must be submitted using the online system and following the guidelines described in the *Instructions & Format* document on www.pork.org/research. Proposals that do not follow the guidelines will not be reviewed. Proposals will be reviewed for scientific soundness and for industry priority. Proposals may be returned to the investigator with suggested/requested revisions prior to making a final funding decision. Funding for accepted projects will follow final approval by the National Pork Board. Further inquiries regarding this solicitation can be directed to Dr. Jennifer Koeman by email jkoeman@pork.org or by phone: 515-223-2600.

The research topics below are NOT listed in priority order:

1. Studies to analyze and assess disease prevention uses of antibiotics at therapeutic doses in pork production to optimize swine health and public health.
 - a. Assess swine health (including clinical and subclinical disease), swine welfare, food safety, and pork quality outcomes arising from prevention uses of antibiotics versus not having these uses available for target bacterial pathogens and by antibiotic class and formulation.
 - i. A likely implication of not having disease prevention uses available to swine producers is that more individual animal treatments may be required; therefore, this particular outcome must be explicitly addressed (see also item (2) below).
 - b. Develop objective criteria to support the decision making process in choosing to apply a disease prevention treatment for select bacterial pathogens (by antibiotic class and formulation).
2. Studies to analyze and assess mass (e.g. whole group) antibiotic administration via feed or water versus individual pig parenteral antibiotic administration to optimize swine health and public health.
 - a. Assess herd health, herd welfare, environmental exposure, food safety, pork quality, and worker health and safety outcomes of mass (feed- or water-based) versus individual animal parenteral antibiotic administration for select bacterial pathogens by antibiotic class and formulation.
 - b. Evaluate the effect of injection versus no injection on pork (meat) quality.
 - c. Develop objective criteria to support the decision making process in choosing mass versus individual antibiotic administration for select pathogens by antibiotic class and formulation.
 - d. Investigate improvement or development of alternatives to injections to address worker health and safety and drug efficacy.
3. Studies to evaluate and improve antibiotic record keeping on the farm.

- a. Evaluate on-farm challenges to antibiotic record keeping.
 - b. Identify strategies to improve antibiotic record-keeping practice for continuous improvement of responsible antibiotic use on the farm.
4. Studies to characterize and assess the environmental fate of antibiotics, antibiotic metabolites, antibiotic-resistant bacteria, and antibiotic-resistant genes on swine farms.
- a. Consider antibiotics, bacteria and genes relative to common regimens used in pig populations.
 - b. Include assessment of the fate and transport in soils, surface water runoff and/or leaching to groundwater when manure is applied to land in accordance with best management practices and manure management plans. Additionally, contributing factors such as climate and method of manure application should be considered.
 - c. Evaluate mitigation steps to reduce environmental impacts in pork production.
5. Exploration of strategies to protect herd health and minimize the need for antibiotics. For example, strategies may include alternative feed- or water-based therapeutics, vaccination, environmental controls, etc.

PUBLIC HEALTH – Worker Health and Safety and Zoonotic Diseases

The Producer/Public Health and Workplace Safety (PPHWS) Committee is requesting proposals **in the area of worker health and safety and zoonotic diseases**. Specific research topics are listed below, not in priority order. All proposals submitted **must** address at least one of the specific research subtopics of interest described below. **Novel approaches and concepts are encouraged.**

The Producer and Public Health Committee has \$200,000 to fund producer/public health, worker health and safety and zoonotic diseases research.

- There is no exact funding limit for submitted proposals, but the budget request should be appropriate and justified for the work that is being proposed.
- Researchers are encouraged to find matching funds or in-kind contributions to the project. Trans-disciplinary proposals are highly encouraged.
- Proposals that include provisions for analysis of the economic impact of the research to the swine industry are encouraged. This may be accomplished by inclusion of an agriculture economist on the research team
- **To clearly differentiate from proposals addressing swine health issues**, proposals submitted in the area of producer/public health, workplace safety and zoonotic disease should explain for the Producer/Public Health and Workplace Safety Committee (which will make funding decisions), **how the study will impact/protect public health**. Applicants should use non-scientific language for this purpose.

To be considered, proposals must be submitted using the online system and following the guidelines described in the Instructions & Format document on www.pork.org/research. Proposals that do not follow the guidelines will not be reviewed. Projects may cover multiple-year efforts. For multi-year projects, project expected deliverables and budgets must be broken down by year. If proposed projects are for completion of a multi-year proposal already in-progress, the proposal must include a discussion of progress and accomplishments realized from efforts to date toward success of the overall research effort. This may be accomplished by including copies of interim or final reports from previously funded research efforts as appendices to the proposal submitted. Proposals will be reviewed by panels for scientific soundness and for industry priority. Proposals may be returned to the investigator with suggested/requested revisions prior to making a final funding decision. Funding for accepted projects will follow final approval by the National Pork Board. Further enquiries regarding this solicitation can be directed to Dr. Jennifer Koeman by email jkoeman@pork.org or by phone: 515-223-2600.

The research topics below are NOT listed in priority order:

PUBLIC HEALTH – Worker Health and Safety

1. Worker Health and Safety
 - a. Studies, surveys or other methods to characterize workplace health and safety good production practices.
 - i. Studies should include a quantitative assessment of the outcome of employing the specific good production practice(s).

PUBLIC HEALTH – Influenza

1. Influenza
 - a. Studies to determine the interspecies transmission of influenza virus (i.e. from people to pigs and pigs to people).
 - i. Studies may assess viral ecology, risk factors associated with infection (e.g. what is the potential risk of transmission to barn workers), host susceptibility and/or host restriction for interspecies transmission.
 - b. Studies to assess the impact of interventions on reducing interspecies influenza transmission and/or or studies to identify potential **new** interventions for mitigation of interspecies transfer of influenza virus in pork production facilities.

- i. Studies may access vaccination policy/vaccine use in people and pigs, worker sick leave policy, worker temperature monitoring, hand washing and other physical barriers on the interspecies transmission of influenza in pork production facilities.
- c. Studies, surveys or other methods to characterize influenza dynamics in exhibitors and their pigs through the show pig/exhibitor lifecycle (e.g. at purchase, on-farm, in exhibition settings).
 - i. Studies may focus on identifying epidemiologic links to increased or decreased risk of infection for humans or pigs and address strategies to reduce the potential for transmission between human and pigs and pigs and human.

PUBLIC HEALTH – MRSA

1. Methicillin-resistance *Staphylococcus aureus* (MRSA) and multi-drug resistance *Staphylococcus aureus* (MDRSA)
 - a. Studies to advance knowledge of staphylococcal biology (not limited to MRSA) in the swine production environment.
 - b. Studies to better understand the pathways of swine worker occupational exposure to *Staph aureus* (including MDRSA and MRSA) susceptibility to colonization, factors prolonging carriage/colonization in both humans and pigs, and feasible interventions to reduce the risk of *S. aureus* colonization of workers in pork production facilities.
 - c. Studies to better understand the health impacts of swine worker occupational exposure to *S. aureus* (including MDRSA and MRSA)

PUBLIC HEALTH – Other Zoonotic Diseases

1. Other Zoonotic Diseases
 - a. Studies of the prevalence, diagnosis, epidemiology and/or human health risk for emerging and re-emerging zoonotic diseases associated with pigs.
 - b. Studies to evaluate intervention methods in pork production to protect humans from zoonotic agents that they may be exposed to in pork production facilities.

Note: Proposals for other zoonotic diseases should justify why the topic is relevant to the swine industry and how the study will impact/protect producer, public health, or worker safety.

SUSTAINABILITY

The Sustainability Committee solicits proposals in the following areas. The Committee anticipates having \$375,000 to fund sustainability and environment related research. There is no exact funding limit for submitted proposals but the budget request should be appropriate and justified for the work that is being proposed. Researchers are encouraged to find matching funds or in-kind contributions to the project. Newly submitted multi-year proposals should provide a clear overall vision and objectives for the entire project with a detailed plan of work and budget outline for each of the proposed years. If proposed projects are seeking second-year funding of a previously funded project, the proposal must include a discussion of progress and accomplishments realized from the research efforts to date toward success of the overall research effort. This may be accomplished by including copies of interim or final reports from previously funded research efforts as appendices to the proposal submitted.

Proposals must be submitted in the required format to be considered. All eligible proposals will be reviewed by a panel of peers for scientific soundness and validity. Final funding decisions will be made by the National Pork Board. Further inquiries regarding this solicitation can be directed to Allan Stokes by email astokes@pork.org or by phone: 515/223-3447. Proposals may be returned to the investigator with suggested/requested revisions prior to making a final funding decision.

SUSTAINABILITY - Manure

1. Alternative manure management practices which may include:
 - processing to make manure transportation more practical and cost effective
 - manure nutrient stabilization or separation and recovery
 - practical and cost effective on-farm energy generation/use from manureResearch proposed must include analysis for potential impacts on carbon, water and land footprints, potential for scale-up to commercial farm operations and cost implications for implementation.
2. Development of a producer decision aide tool similar in concept to the Air Management Practices Assessment Tool available through the Pork.org website for best management practices for managing lagoon bio-solids and addressing nutrient content (N, P & K), odor mitigation, land effects and costs of implementation.

SUSTAINABILITY - Water

1. Technologies/practices for on-farm manure recycling and water re-use for building cleaning and animal watering. Research must include analysis for potential impacts on carbon, water and land footprints, potential for scale-up to commercial farm operations and cost implications for implementation.
2. SUSTAINABILITY – Manure

SUSTAINABILITY – Other

1. A field-to-fork life cycle assessment of the carbon, water and land footprints of a diet including pork versus a diet with pork replaced by alternative foodstuffs providing equivalent nutritional value.

2. A field-to-fork comparative life cycle assessment on the production of a 4 ounce serving of pork product in the European Union and the United States, and including the cost of production.

SWINE HEALTH – General Swine Disease

The National Pork Board recently established a Strategic Plan for 2015 – 2020. As part of that Strategic Plan, specific goals were determined to be the main focus for the National Pork Board: Build Consumer Trust; Drive sustainable Production; and Grow Consumer Demand. The goal, “Drive Sustainable Production” is of high priority to and can be directly impacted by the Swine Health Committee. Therefore, as part of the efforts to address this goal, two key targets will be the basis for the General Swine Disease call for proposals for 2016.

The targets are:

- 1. By 2020, the National Pork Board will develop, with key stakeholders, the identification and diagnostic tools, surveillance and mitigation strategies for the potential elimination of the top domestic swine diseases.*
- 2. By 2020, the National Pork Board will provide pork producers with research results, tools and information to improve the productivity of the U.S. swine herd as measured by the following based on the 2015 Industry Productivity Analysis:*
 - a) 10 percent decrease in pre-weaning mortality and nursery mortality*
 - b) 10 improvement in caloric efficiency in grow-finish feed efficiency*
 - c) Improvement in sow lifetime productivity from 30 pigs/sow/lifetime to 42 pigs/sow/lifetime*

Endemic diseases of swine can negatively impact producer profitability by reduced feed efficiency and average daily gain, by increased death loss or by increased cost of production to manage diseases. The National Pork Board Swine Health Committee is requesting proposals on issues that directly address the goals of the 2015 Strategic Plan. Specific research areas for the General Swine Disease call are listed below. All proposals submitted must address at least one of the specific research subtopics of interest described below.

Newly submitted multi-year proposals should provide a clear overall vision and objectives for the entire project with a detailed plan of work and budget outline for each of the proposed years.

For projects seeking second-year funding of a previously funded project, the proposal must include a discussion of progress and accomplishments realized from the research efforts to date toward success of the overall research effort. This may be accomplished by including copies of interim or final reports from previously funded research efforts as appendices to the proposal submitted.

Investigators are encouraged to leverage their research efforts by including additional swine pathogens in the experimental design if the experiment can accommodate it and it is appropriate to do so.

Proposals must be submitted in the required format provided with the RFP in order to be considered. Proposals that do not directly address the listed priorities will NOT be considered for funding. All eligible proposals will be reviewed by a panel of peers for scientific soundness and validity. A total of \$350,000 is available for the call for proposals. Final funding decisions will be made by the National Pork Board Swine Health Committee. Further enquiries regarding this solicitation can be directed to Lisa Becton by email lbecton@pork.org or by phone: 515-223-2791.

Strep suis:

- 1) Identify the virulence factors/genes responsible for pathogenesis.
- 2) What is the best method to incorporate those genes into vaccines for *S. suis* or are there other effective alternatives for control?

- a) How to determine which is the “right” isolate to use for best protection and potential cross protection?
- 3) What treatment options or antimicrobial alternative interventions exist for *S. suis* infections in antibiotic free herds?

Enteric Diseases of Swine:

1) Ecoli

- a) Identify the mechanism of action for oral *E coli* vaccines and how to take advantage of that for implementation of vaccines.
- b) Identify mechanism that reduce proliferation of *E. coli* and can be utilized in normal production methods.

2) Rotavirus

- a) Develop Group specific (A, B & C) assays that can measure the change in immune response and antibody levels following vaccination/exposure to help ensure maximum efficacy of the intervention.
- b) Define the herd level disease/pathogenesis of Group C in young pigs considering dam and pig immune status, parity, P & G serotype/genotype.

3) SECD

- a) What is the impact of age on effective acclimatization? How long does immunity last depending upon age at the time of acclimatization?
- b) What is the post-epidemic epidemiology of herds that still experience outbreaks?
 - i) What is occurring during second subsequent outbreaks of PEDV at the same farm?
 - ii) Characterize the immune status in herds experiencing recurrent outbreaks? What is happening with the herd vs. individual sow?

Mycoplasmal diseases:

1) Mycoplasma hyopneumonia

- a) What is the most effective method to introduce negative gilt replacements into a positive sow herd to minimize the subsequent shedding of *Mycoplasma* to the offspring of primiparous gilts? Points to consider include:
 - i) Continuous flow sites vs. AIAO
 - ii) Develop methods to effectively provide natural exposure for negative gilts prior to entering a positive herd.
 - (1) Is the use of seeder pigs effective for consistent exposure?
 - (a) Is there a protocol that can provide for the consistent inoculation of seeder pigs?
 - (2) How many positive pigs per negative gilt to get exposure?
 - (3) Development of rapid and accurate diagnostic testing to confirm gilt exposure.
 - (2) Development of rapid and accurate diagnostic testing to confirm gilt exposure.
 - iii) Impact of vaccine strategies and timing of administration (age) as part of an acclimatization strategy: single dose vs. two dose vaccine.
- b) What is the most effective method to reduce the shedding and transmission of a *M. hyopneumonia* to piglets when in lactation? Points to consider include:
 - i) Is there a parity effect of shedding in lactation: i.e. gilt vs. sow?
 - ii) Does cross-fostering alter shedding patterns of *Mycoplasma*?
 - iii) Does the amount of shedding correlate to colonization and subsequent risk of clinical disease in the piglets?

- iv) Determine the impact of parity on maternal immunity (P1s vs. older parities) for piglet vaccination effectiveness

2) **M. hyosynoviae and M. hyorhinis**

- a) Develop antibody assays for M. hyorhinis and M. hyosynoviae.
- b) What is the PCR prevalence in oral fluids and is there a correlation of PCR results from oral fluids and clinical signs?
- c) What is the pathogenesis of the disease?
- d) What treatment options or antimicrobial alternative interventions exist for Mycoplasmal lameness in antibiotic free herds?

Influenza A Virus – Swine:

- 1) What is the impact of gilt entry into IAV-S positive herds for whole herd stability over time?
 - a) What is an effective gilt acclimatization method to maintain stability for IAV-S in herds and to minimize shedding of the virus in farrowing?
 - b) Is it possible to achieve successful booster utilizing commercial vaccines?
- 2) Investigate host range restriction to identify mechanisms by which non-swine adapted viruses infect and adapt to swine.
- 3) Identify genetic changes important for antigenic drift or pathogenicity in swine or other hosts.
- 4) Investigate adjuvants or immune-modulatory agents that result in robust immune responses (mucosal delivered, long lived, broadly cross-protective and/or reduce the number of vaccine boosters).
- 5) Investigate broadly cross protective HA stalk protein candidate vaccine antigens.

