USDA-ARS National Program 103 – Animal Health
Assessment Report
July, 2012

Panel members:

Ernie Bailey, Professor of Immunogenetics and Genomics, Department of Veterinary Science, University of Kentucky

Craig Carter (Chair), Director, Veterinary Diagnostic Laboratory & Professor, Epidemiology, Department of Veterinary Science, University of Kentucky

Nancy Cox, Associate Dean for Research, College of Agriculture, University of Kentucky

Paul Gibbs, Professor, Infectious Diseases and Pathology, University of Florida (recently retired)

Julie Helm, Poultry Specialist Veterinarian, Livestock Poultry Health, Clemson University

Chuck Massengill, Member and Bi-National Committee Coordinator for TB and Brucellosis, National Cattleman's Beef Association

Paul Plummer, Ruminant Professor, Iowa State University

Paul Sundberg, Vice President, National Pork Board

The Review Panel (RP) met on Jul 25-26, 2012 to conduct a review and assessment of USDA-ARS NP 103 (Animal Health) research conducted in the period from 2007-2011. The Chair traveled to Beltsville for the meeting while the balance of the panel joined by teleconference and webinar. The RP is comprised of six university scientists external to the ARS and representatives of two national animal agricultural associations. The panel members were hand chosen for their demonstrated knowledge and experience in the eight disciplines (components) being reviewed encompassing poultry, swine, dairy cattle, beef cattle, small ruminants, equine, and wildlife.

The RP was provided with an accomplishment report prepared by USDA-ARS in advance of this meeting that focused on the eight major components within the national program. The ARS guidance was that individual projects were not to be assessed. Rather, the RP's report should provide an overall assessment of progress made in each component using the anticipated products from the action plan as a yardstick.

Each Component of NP 103 was assigned a primary and secondary reviewer. In addition, an expert was assigned to each subject species (Appendix I). Prior to the meeting, RP members composed a document on their primary and secondary component assignment which was later pasted into a Google Docs file maintained centrally by USDA-ARS staff. RP members were asked to provide feedback in seven basic areas (but not limited to) as follows:

- ✓ Component impact – Low, Medium, High (as per ARS scoring guidelines, Appendix II)
- ✓ Relationship to Action Plan
- ✓ Quality of research—i.e. how well did we do it?
- ✓ Relevance to customers' needs—i.e. were customers' needs met?
- ✓ Technology transfer and adaption—were the products of NP103 research delivered and adopted?
- ✓ Impact—did NP103 research impact the scientific community, agricultural producers, and/or regulatory agencies?
- ✓ Based on the impact of NP103 research, should ARS continue the kinds of research listed in NP103?

During the meeting on Jul 25, 2012, both reviewers for each component presented their findings followed by a general RP discussion. The RP Chair and ARS staff took copious notes during the discussion. At the close of discussion for each component, the Chair asked for a consensus on the impact score before moving on the next component. The Chair summarized the RP's findings from the Jul 25 meeting in a draft Executive Summary for their review via teleconference on the morning of Jul 26. On the afternoon of the same day, the Chair debriefed the National Program Team. Following the Beltsville meetings, the Chair prepared a draft of the final report for review by the RP. After approval by the RP, the final report was submitted to USDA-ARS.

The RP enjoyed studying the 5-year (2007-2011) Action Plan and Accomplishment Report relating to the National Program 103 on Animal Health. ARS research scientists continue to pursue and complete important research projects which are critical to the improvement and furtherance of animal agriculture and human health. Significant accomplishments have been made on many of the projects as evidenced by the exciting research findings listed, many peer-reviewed scientific articles that have been published, and impact on other country's programs. In as much as the overall tenor of this review report is positive, the panel has identified some areas for improvement and has made some suggestions for the future.

The RP is very grateful to the National Program Leaders and members of the ARS staff including Cyril Gay, Eileen Thacker, Christina Woods, Betsy Wiley, Tracy Havermann, and Susan Chesney for all their assistance in planning this review and for their guidance in the generation of this report. The RP has considered it an honor and a privilege to have been a part of this important effort.

Executive Summary

Suggestions for Future Accomplishment Reports—

- ✓ Careful authoring by National Program leaders to be sure to include significant projects that are underway or have been completed.
- ✓ Include total number publications, patents, etc related to each component in the accomplishment report.
- ✓ Provide more tech transfer information in the report.

Suggestions for Instructions/Guidance for the Review Panel-

- ✓ Explain why publication dates are sometimes skewed over time in a component.
- ✓ Coach the RP to be more aware of the content of appendices (e.g. complete citation lists).
- ✓ Provide PowerPoint and more detailed instructions for review process early in the panel schedule.
- ✓ Provide sample documents/reports from prior program reviews.

Component 1. Biodefense Research

Impact-- High

Problem Statement 1A: *Foreign Animal Diseases*

Problem Statement 1B: *Emerging Diseases*

Strengths:

- ✓ Excellent prioritization of research targets.
- ✓ Remarkable progress in light of diminishing funds.
- ✓ Responsive to emerging agents.
- ✓ Sequential publications building on each other.
- ✓ CSF vaccine and pork safety during H1N1 great examples of government research aiding the private sector.
- ✓ Historical note-- USDA-ARS has been researching some of these agents since the 60's (e.g. AI).

Weaknesses/Suggested Improvements:

- ✓ Find ways to increase funding?
- ✓ Provide scientists with more opportunities for international collaboration?
- ✓ Prioritize travel funding to allow ARS scientists to provide leadership by participating in international scientific meetings.

Component 2. Animal Genomics and Immunology

Impact-- Low

Problem Statement 2A: *Mastitis*

Problem Statement 2B: *Avian Tumor Viruses*

Strengths:

- ✓ PRRS resistance/susceptibility project (Lunney et al) very strong, cutting edge—a model for this component.

Weaknesses/Suggested Improvements:

- ✓ Most projects listed did not relate to immunology or genomics, not in line with action plan.
- ✓ Scientific approaches have no emphasis on developing new knowledge using genomics tools.
- ✓ Non-immunologic/genomic projects included in this section (e.g. BSE, antimicrobials).
- ✓ Note-- Scoring this section "Low" in no way lessens the importance of immunology and genomics in animal health research. Suggest utilizing a more rigorous definition and application of the science for much-needed genomics/immunology research projects.

Component 3. Prevention and Control of Zoonotic Diseases

Impact—High (This rating reflects all research by ARS on zoonotic diseases, not just the 3 diseases listed)

Problem Statement 3A: *Brucellosis*

Problem Statement 3B: *Leptospirosis*

Problem Statement 3C: *Tuberculosis*

Strengths:

- ✓ Overall ARS accomplishments in zoonotic disease research across all components are admirable.

Weaknesses/Suggested Improvements:

- ✓ Possibly too much emphasis on "legacy" zoonoses? (TB, brucellosis, leptospirosis).
- ✓ Major zoonoses allocated to other components (e.g. TSE's, AI)—zoonoses should be considered under one component.

Component 4. Prevention and Control of Respiratory Diseases

Impact: High

Problem Statement 4A: *Ruminant Respiratory Diseases*

Problem Statement 4B: *Porcine Respiratory Diseases*

Problem Statement 4C: *Poultry Respiratory Diseases*

Strengths:

- ✓ All projects fulfilled the objectives in the action plan.
- ✓ Diagnostics/vaccines produced for livestock and poultry respiratory issues.
- ✓ Projects matched stakeholder needs (2005).
- ✓ Good dissemination of research by publications and meetings.
- ✓ Positive impact very evident internationally.

Weaknesses/Suggested Improvements:

- ✓ Note—model component, difficult to criticize.
- ✓ Garner more funding, continue the great work.

Component 5. Prevention and Control of Reproductive and Neonatal Diseases

Impact: Med/High

Problem Statement 5A: *Bovine Viral Diarrhea (BVD)*

Problem Statement 5B: *Neosporosis*

Problem Statement 5C: *Reproductive Health of the Dairy Cow*

Strengths:

- ✓ Persistently infected (PI) wildlife as source of BVDV for cattle suggests possible new risks.
- ✓ ARS dairy research during the last decade changed the way the industry looks at hypocalcemic management.

Weaknesses/Suggested Improvements:

- ✓ Presentation of results not as strong as it could be.
- ✓ Suggested *Neospora* abortion control outcome not clear.
- ✓ Mixing metabolic and infectious in one component possibly confusing.
- ✓ Multiple commodity groups in same component makes prioritization difficult.
- ✓ Publications listed did not extend past early years of the cycle.
- ✓ Reviewer surprised that other significant ARS BVD research done at Ames is not included.

Component 6. Prevention and Control of Enteric Diseases

Impact: Med/High

Problem Statement 6A: *Johne's Disease*
Problem Statement 6B: *Enteric Diseases of Poultry*

Strengths:

- ✓ Researchers identified new markers for pathogens which may lead to new vaccines/diagnostics.
- ✓ Use of metagenomics to identify new agents in turkey guts may lead to more successful diagnostic/treatment/prevention modalities.
- ✓ Novel parenteral treatments may improve gut health and reduce the need for antibiotics.

Weaknesses/Suggested Improvements:

- ✓ Publications listed did not extend past early years of the cycle.
- ✓ Findings are intermediate steps leading to outcomes desired by stakeholders.
- ✓ Impact on industry stakeholders were not described in the report.

Component 7. Prevention and Control of Parasitic Diseases
Impact: Medium
Problem Statement 7A: *Drug Resistant Gastrointestinal (GI) Parasitic Diseases*
Problem Statement 7B: *Hemoparasitic Diseases*

Strengths:

- ✓ Work to eliminate the Persistently Infected (PI) state of *Babesia* in horses is very significant work.
- ✓ National survey provides a new baseline on anthelmintic resistance. This topic is of great importance.
- ✓ Anti-tick gene insertion into *Babesia* organisms very creative in the path toward a bovine babesiosis vaccine.

Weaknesses/Suggested Improvements:

- ✓ Most publications are from 2008-2010.
- ✓ The RP members had not heard about the poultry coccidiosis vaccine. More information dissemination and technology transfer activity needed?
- ✓ No evidence of building scientific studies into a program that relate to each other.

Component 8: Transmissible Spongiform Encephalopathies
Impact: High
Problem Statement 8A: *Scrapie*
Problem Statement 8B: *Chronic Wasting Disease (CWD)*
Problem Statement 8C: *Bovine Spongiform Encephalopathy (BSE)*

Strengths:

- ✓ Revelation that ARS research identified the first case of genetic BSE and a potential spontaneous TSE in cattle are very important findings.

- ✓ Diagnostics to detect classical and atypical BSE forms very significant work, aiding in trade (e.g. US cases atypical).
- ✓ Work on possible interspecies transmission of TSE agents important. More work should be conducted.
- ✓ Scrapie prions in goat placenta, major impact.
- ✓ Impact on other researchers (reference the collaboration with APHIS and a team of Italian researchers, ARS has shown that the United States and Italian diagnostic techniques are equivalent in identifying classical, H-type and L-type BSE, an important contribution that helped identify the April 2012 atypical L-type BSE case in California—reference pages 66-67 in the NP 103 Accomplishment Report). Trading partners will likely adopt some of this research information into their national programs.

Weaknesses/Suggested Improvements:

- ✓ Important genomics and disease resistance ARS work in Iowa not listed for some reason.
- ✓ Cost effective methods of inactivating TSE agents was not addressed in the report but is of major impact for consumers.