

Contact: Rachel Boon

REQUEST TO CREATE NEW CENTER AT IOWA STATE UNIVERSITY: NATIONAL INSTITUTE OF ANTIMICROBIAL RESISTANCE RESEARCH AND EDUCATION

Action Requested: Consider recommending approval of the request by Iowa State University to establish the National Institute of Antimicrobial Resistance Research and Education (NIAMRRE) in the College of Veterinary Medicine at Iowa State University.

Executive Summary: Iowa State University was selected through a competitive application process overseen by Association of Public and Land Grant Universities (APLU) and the American Association of Veterinary Medical Colleges (AAVMC), which requires that ISU establish the National Institute for Antimicrobial Resistance Research and Education. The Council of Provosts and Board office have reviewed the proposal and recommend approval.

Background: Iowa State University (ISU) was awarded the designation of serving as host institution for the National Institute for Antimicrobial Resistance Research and Education (NIAMRRE) based on a competitive selection process by the Association of Public and Land Grant Universities (APLU) and the American Association of Veterinary Medical Colleges (AAVMC). The NIAMRRE will extend ISU's AMR Consortium, established in 2015, which currently includes partners from University of Iowa (SUI), University of Nebraska Lincoln (UNL), the University of Nebraska Medical Center (UNMC), the Mayo Clinic, and the United State Department of Agriculture's Agricultural Research Service (USDA ARS).

Need for proposed center. Antibiotics are one of the greatest discoveries of humankind and have resulted in life-saving interventions in infectious diseases, ultimately saving many human and animal lives. Additionally, antimicrobials are important for modern animal agriculture and have been widely used for the prevention, control and elimination of animal diseases. However, the value of these 'wonder drugs' is rapidly diminishing due to the drastic increase in antimicrobial resistance (AMR), threatening human and animal health and incurring multi-billion dollar medical costs and economic losses annually. In fact, a recent comprehensive analysis of the impact of AMR found that "by 2050, 10 million lives a year and a cumulative 100 trillion USD of economic output are at risk due to the rise of drug-resistant infections if we do not find proactive solutions now to slow down the rise of drug resistance"¹. AMR is truly an ecosystem problem, impacting human, animal, and environmental health, and for this reason addressing the problem requires multidisciplinary team work and research designs. A key outcome of a Joint APLU | AAVMC Task Force on Antibiotic Resistance in Production Agriculture was the recommendation to develop a national institute focused on seeking answers to these pressing questions.

The institute will have a long-term existence at ISU. AMR is considered by the World Health Organization (WHO) and the Center for Disease Control (CDC) to be one of the greatest challenges for human, animal and environmental health. Antibiotics have become a necessity in our current public health paradigm, and given that infectious disease will not decrease, finding new means of keeping individuals healthy without inducing antibiotic resistance will likely increase in need.

Proposed center activities and objectives. The NIAMRRE vision is to drive collaborative and integrative research, education and engagement to solve antimicrobial resistance (AMR)

¹ Tackling Drug-Resistant Infections Globally: Final Report and Recommendations of the Review on Antimicrobial Resistance, available at amr-review.org

challenges for the benefit of global society using a One-Health approach. The NIAMRRE mission is to provide local, national and international leadership in combating antimicrobial resistance, generating evidence-based solutions for antimicrobial stewardship, contributing to improvements in the health of animals, humans and the environment (One Health), and facilitating economically and socially sound policy development and implementation.

Relationship of proposed institute to University's Strategic Plan. The NIAMRRE inherently connects with ISU's missions of research, education and translation of discoveries for the public good. The work also directly addresses several of the ISU Grand Challenge priority research themes, specifically *Enabling Healthy Lives* and *Building Sustainable Human and Natural Ecosystems*. Furthermore, the collective collaboration between ISU, SUI, UNL, UNMC, the Mayo Hospital, and the USDA ARS highlight and leverage the strengths both ISU and SUI related to One Health and animal agriculture.

Relationship of proposed institute to existing centers/institutes. While operating independently and having a distinct focus, the new NIAMRRE institute leverages and is synergistic with several other ISU centers/institutes. For example, the Center for Food Security and Public Health has a broad scope on preparedness for diseases that threaten public health and food animal production that complements the activities of the NIAMRRE while also acting as an outlet for dissemination of the outcomes of the institute related to antimicrobial resistance. The NIAMRRE has a more focused vision on the specific roles of antibiotics and resistance play in food security and public health. Likewise, the Nanovaccine Institute provides potential solutions that could mitigate the development of AMR (by preventing disease through vaccination), but is very different in scope than NIAMRRE.

Unique features of Iowa State University to support the proposed institute. First, the AMR consortium that has existed at ISU for over three years has demonstrated the ability to engage and coalesce multiple academic, government and private entities all interested in AMR research and education into a cohesive consortium. The experience and knowledge gained through establishing the consortium allows the institute to quickly and easily assimilate additional partners.

Second, the current institute members represent a significant proportion of the livestock production that occurs in the US. Long-term interactions and partnerships with these livestock industries provide an ideal foundation and platform for education and research efforts.

Third, the partner institutions already include unique resources that provide a framework for the proposed efforts of the institute and for which we already have a longstanding public record of focused One-Health efforts. These include: a) the Center for Food Security and Public Health (Iowa State University College of Veterinary Medicine); b) the USDA National Center for Animal Health (Ames, IA); c) USDA Meat Animal Research Center (Clay Center, NE); d) the Center for Emerging Infectious Disease (based at SUI); e) the Iowa State University Veterinary Diagnostic Laboratory (Ames, IA and currently the largest veterinary diagnostic laboratory in the country); f) the University of Nebraska Veterinary Diagnostic Laboratory (Lincoln, NE); and g) the Clinical Bacteriology and Infectious Disease Research Unit at the Mayo Clinic in Rochester, MN.

Personnel. An initial team of four dedicated individuals will work to establish the institute. Dr. Paul Plummer, currently a tenured faculty member at ISU, will serve as the Institute director. He will dedicate 4-5 months of effort per year to overseeing and developing the institute. A full-time associate director will devote 100% of their time to recruitment of members, traveling to Washington, D.C. or other areas to seek extramural funding, visiting stakeholders and overseeing the support staff and office. This individual will also liaison with the governmental affairs representatives from each membership institution and the APLU and AAVMC lobbyists to assure

a strong and consistent legislative message. A full-time program assistant will provide administrative and budget support while also serving as the first point-of-contact for inquires and day-to-day management of the office. Finally, a full-time communications specialist will be responsible for communications, material development and member communications. These individuals will serve more than 100 research and education faculty at ISU, UNL, SUI and Mayo, to carry out the exciting research the institute will conduct.

Facilities. NIAMRRE’s managing staff will have offices at the ISU Research Park. Participating faculty members will use their own laboratory and office space for conducting institute activities.

Equipment. No new equipment is required.

Cost. The funds for the establishment of the NIAMRRE are allocated through university and college resources, as well as commitments from the UNL. At ISU, this represents a commitment to the University’s focus on addressing grand challenges related to health and sustainability that connect to long-standing core strengths in veterinary medicine, agriculture and engineering. As such, the start-up funding commitments for the initial three years total \$275,000 per year. In addition, the UNL has committed \$250,000 per year.

While the initial development and implementation of the institute will leverage internal funding from ISU and UNL, Institute leadership is working with APLU and AAVMC to garner additional external funds from foundations (e.g., PEW, Wellcome, Foundation for Food and Agriculture Research), federal funding agencies and membership fees from partners. The Institute should be self-sufficient within the three-year period. Given the tremendous outpouring of support and interest in this national consortium, as well as the active engagement of major national organizations that sponsor this consortium, this goal is achievable.

The table below assumes an annual 3% increase in costs.

Total Costs	Total Costs	Sources of Funds
Year 1	\$525,000	ISU and UNL
Year 2	\$540,000	ISU, UNL and revenue generated
Year 3	\$556,000	ISU, UNL and revenue generated
Year 4	\$572,000	Revenue generated
Year 5	\$589,000	Revenue generated

Evaluation plan. Institute leadership will measure and evaluate impact and, in discussion with the full membership, anticipate using the following approaches:

- Use the existing and well-documented external review of impacts method outlined by the NSF IUCRC model (see <https://projects.ncsu.edu/iucrc/ResourcesForEvaluators.htm>). This approach uses an external evaluator to objectively assess impacts and provide feedback to the center administration.
- Work with the Institute’s executive and steering committees to monitor and assess impact.
- Work with program staff to document impacts such as grant funding, membership numbers, publications, collaborative research projects, numbers of stakeholders impacted by extension and outreach activities, impact on underrepresented minority groups, new IP and technology transfer, and the number of trainees working in the program and their employment after graduating.