

2021 Joint NAHLN/NADPRP Projects

Number of Projects Awarded: 7
Amount of Funds Awarded: \$4,335,504

Funding Priorities: The 2021 Joint NAHLN/NADPRP funding priority targeted projects supporting the development and/or evaluation of point-of-care diagnostic tests to enhance the nation’s ability to quickly detect high-consequence FADs and accelerate response and containment efforts.

Project Title	State	Awarded Amount	Project Summary
The use of field-deployable diagnostic tests for detecting African Swine Fever Virus infections in pigs	Connecticut	\$590,129	Commercially available fluorogenic-probe hydrolysis qPCR assays and an isothermal insulated qPCR assay designed to detect the African swine fever virus (ASFV) will be evaluated as pen side tests. This project will be conducted using clinical samples from domestic pigs at Mizoram, India, where ASF is considered endemic.
Development of a novel multiplex point-of-care testing for the simultaneous detection of avian influenza virus and avian paramyxovirus type 1	Georgia	\$217,972	The overall goal of this proposal is to develop and validate a multiplex reverse-transcription loop-mediated amplification (RT-LAMP) for the detection of AIV and APMV-1. The specific objectives of the proposal are to: 1. Develop and validate single-plex RT-LAMP assays for the detection of AIV and APMV-1, 2. Develop and validate multiplex RT-LAMP assay for AIV and APMV-1, and 3. Incorporate lateral flow assays for the simultaneous visualization of AIV and APMV-1 amplification products on a lateral flow strip. This proposal will bridge the gap in point-of-care diagnostics with the development of an RT- LAMP for the simultaneous detection, and differentiation AIV and APMV-1 in a single reactiontube that can be used in resource-limited settings.
Point-of-care detection of African swine fever virus: a paper-based device for molecular diagnostics	Indiana	\$1,000,000	In this project, the team will build a paper-based point-of-care diagnostic test that will detect ASF within 30 minutes. This paper-based device will detect the DNA of the ASF virus using an isothermal molecular amplification method and provide a colorimetric output. In this project, the team will characterize this novel point-of-care diagnostic device in the lab and in the field and compare it to standard lab-based methods. The paper-based diagnostic will be simple enough that producers and veterinarians could use it for surveillance of ASF in the field and prevent the spread of the disease through the herd.
Improving national capacity for early detection of foreign animal disease incursions: critical evaluation of field accuracy, standard of procedures, risks, challenges, and opportunities for the implementation of point of care platforms for NAHLN target diseases.	Minnesota	\$999,346	We propose to evaluate the implementation of a combined EPS-POC system in an ASF endemic setting and in the US, giving special consideration to the implementation of processes in NAHLN laboratories and in coordination with APHIS and private partners. Three POC systems will be evaluated in the US and in an ASF- endemic setting, including a low-cost, high throughput pen drive test, a confirmatory test, and a sequencing device. Results here, involving two NAHLN laboratories, will help evaluate the accuracy, and set up standards of procedures (SOPs) and understand potentials and limitations for the implementation of an EPS-POC system in the US. The evaluation will consider the performance of the tests, and will emphasize aspects related with the collection and flow of data and between the private and public sector to develop SOPs that ensure a safe and secure management and use of information.

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FMDsure: A simple and easy to use molecular diagnostic assay for rapid detection of Foot and-Mouth disease virus in ruminants	Minnesota	\$554,768	The goal of this project is to develop a field appropriate molecular diagnostic kit (FMDsure) for the detection of all seven serotypes of FMDV at point-of-care (POC). The proposed assay will be based on reverse transcription loop mediated isothermal amplification (RT-LAMP) technology and reactions will be carried out on a small, benchtop instrument, AmpliFire (Agdia, IN). In addition, a rapid sample preparation method, appropriate for use at POC will also be developed. Total assay time will be 30 minutes (including sample prep) with minimal hands-on time and without need of any additional equipment. Results will be displayed on-screen as positive or negative for FMDV, minimizing user interpretation. Performance of FMDsure assay will be evaluated by testing field samples and results will be compared with that of reference method (real time RT- PCR). Successful completion of this project will lead to development of a diagnostic kit which will allow producers and field veterinarians to monitor heal and easily, resulting in significant savings and greatly increase food safety.
Development of a molecular point-of-care diagnostic test and a mapping platform for Foot and mouth disease (FMD) detection and tracking	Oklahoma	\$473,289	Oklahoma Animal Disease Diagnostic laboratory is requesting funding for the development of a point of care (POC) FMD diagnostic assay that is integrated with a geolocation and interactive mapping platform. Development of a POC diagnostic assay will enhance disease testing locally and will aid in making quick decisions regarding animal movements. The interactive mapping platform will provide county-wise data on animal populations and will suggest safe land transport routes considering the different animal species affected, their local population density, and road conditions. Development work on the POC assay will use synthetic RNA segments from FMD virus and also actual clinical samples tested on-site with the help of our collaborators in Cameroon. The proposed project will involve a multidisciplinary team of researchers and will build upon ongoing research activities including a project previously funded through the 2019 farm bill. The team will include researchers from OADDL, Dept. for Geography and Dept. of Agricultural Economics at Oklahoma State University as well as an industry collaborator (MobileDetect Bio Inc.) and international partner (Cameroon Academy of Sciences). Successful completion of this project will provide the capacity to rapidly detect FMD locally. Once a disease outbreak has been declared, the mapping platform will provide animal health authorities with real-time information for rapidly making animal movement decisions.
Development of a National of Point-of-Care (POC) Diagnostic Testing Framework and Assessment of Economic Impacts for Importation of Current Foreign POC Testing Methodologies for Foreign Animal Disease Outbreaks	Texas	\$500,000	This project will solicit national and international experts to develop such a process, refine it via expert elicitation, and then validate it via a tabletop exercise. The result will be the establishment of a national POC testing framework for FADs which can be utilized to evaluate and/or modify point-of-care FAD diagnostic tests that may be used to respond to a future disease outbreak.