

Master of Public Health
Integrative Learning Experience Report

***DEVELOPING KANSAS' PLANS FOR TRANSBOUNDARY
ANIMAL DISEASE OUTBREAK RESPONSE***

by

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Summary

Key functions of public health agencies are the development of programs and procedures at both the national and state level, guided by science, to prevent and control Transboundary animal diseases (TADs). Recent efforts in the United States have focused on developing emergency vaccination plans for Foot and Mouth Disease (FMD) outbreaks and programs for training of swine workers to collect surveillance samples in the event of commercial swine TAD outbreaks. I worked with the Kansas Department of Agriculture (KDA) Division of Animal Health (DAH) to develop plans and procedures for two different, yet related projects. I developed a detailed standard operating procedure for the implementation of the Certified Swine Collector Program. This program trains swine workers to support surveillance efforts in the event of a TAD outbreak in commercial facilities, relieving veterinarians to focus on the outbreak investigation. I also restructured KDA's Foot and Mouth Disease emergency vaccination plan and performed a gap analysis to assist them in preparation for an upcoming national tabletop vaccination exercise. My primary objective was to provide the framework for the successful implementation of programs protecting animal health, food security, and public health.

Subject Keywords: Foot and Mouth Disease (FMD), outbreak preparedness, vaccination, swine, surveillance.

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Chapter 1 - Literature Review

. Key functions of state and US animal health agencies are the development of programs and procedures at both the national and state level, guided by science, to prevent and control Transboundary animal diseases. TADs that target agricultural animals, such as cattle or swine, can result in production and economic losses (World Organization for Animal Health, 2012). The Food and Agriculture Organization (FAO) of the United Nations defined TADs as “epidemic diseases which are highly contagious...and have the potential for rapid spread, irrespective of national borders, causing socio-economic and possibly public health consequences” (Emergency Prevention System: TADs, 2021). Agricultural animals are sources of nutritional food for families and income for producers so TADs that cause severe disease or mortality threaten food security (Torres-Velez, Havas, Spiegel, & Brown, 2019) Recent TAD preparation efforts in the United States have focused on developing emergency vaccination plans for Foot and Mouth Disease (FMD) outbreaks and programs for training of swine workers to collect surveillance samples in the event of commercial swine TAD outbreaks.

State agricultural departments are tasked with ensuring a safe food supply for both animal and plant products, while ensuring safe and responsible practices. The Kansas Department of Agriculture (KDA) has been functioning in one form or another since 1857 (Kansas Historical Society, 2013). While originally organized to deal with animal claims and road maintenance, KDA’s responsibilities now include functioning as a regulatory agency to ensure “responsible and judicious use of pesticides and nutrients”, protect Kansas’s natural and cultivated plants, ensure responsible use of state waters, and ensure a safe food supply (Kansas Department of Agriculture, 2016). Out of 12 divisions and programs, the Division of Animal Health (DAH) is tasked with animal disease control, animal facilities inspection, and managing brands (Division of Animal Health, 2016). Veterinarians within KDA-DAH are responsible for the programs that prevent and respond to animal disease outbreaks, conduct epidemiologic investigations, and conduct surveillance programs (Kansas Department of Agriculture, 2016). My preceptor for this Field Experience was Dr. Sara McReynolds, the Assistant Animal Health Commissioner for KDA. Her background experience includes working as a mixed animal practitioner, completion of a PhD in epidemiology, and working as an assistant state veterinarian for North Dakota.

1.1 Certified Swine Sample Collector Program

The swine industry contributes significantly to the U.S. economy and introduction of a TAD could be catastrophic. In 2009, the United States Department of Agriculture (USDA) estimated that \$14.4 billion dollars of farm income was from the sale of swine (USDA-APHIS; CFSPH, 2011). Most commercial swine are raised in a concentrated animal feeding operation (CAFOs) (National Association of Local Boards of Health, 2010). Swine CAFOs are intensive “just-in-time” operations, meaning that there is a constant flow of animals through the various stages of production to slaughter (USDA-APHIS; CFSPH, 2011). The stages of production are often separated by miles between different facilities. According to the USDA, this model improves biosecurity and efficiency of operations, as each site is dedicated to a single stage of production (USDA-APHIS; CFSPH, 2011). The USDA reports that 71% of pigs enter their final stage (finisher stage) at a separate location from where they were born. This results in extensive intra- and interstate movement for thousands of animals every day. A stop-movement of just a few days secondary to a swine TAD outbreak, could cause massive overcrowding and other animal welfare issues (USDA-APHIS; CFSPH, 2011). Current TADs of concern to the swine industry include Classical Swine Fever (CSF), African Swine Fever (ASF), or Foot and Mouth Disease (FMD)

CSF is a highly infectious disease of swine caused by a pestivirus (Spickler, Classical Swine Fever, 2015). Clinical disease includes fever, weakness, anorexia, hemorrhages of the skin, and cyanotic discoloration of the snout, ears, and tail (Spickler, Classical Swine Fever, 2015). CSF was eradicated from the U.S. in 1978, but threat of reintroduction persists as the disease is endemic in Asia, South America, and Central America (USDA-APHIS, 2020). Economic losses arise from abortions, poor health, and mortality rates that vary with the strain of the virus. The virus is easily spread through oral or nasal routes but can also enter through the mucosa and abrasions (USDA-APHIS, 2020). There is no treatment and pigs who have recovered clinically may continue to spread the virus (Spickler, Classical Swine Fever, 2015).

ASF is an arboviral infectious disease of pigs of increasing concern. Originally circulating in sub-Saharan Africa, it has now spread through the domestic swine and wild boar populations in Asia and Europe (USDA-APHIS, 2019). It is a hemorrhagic disease with clinical signs similar to CSF, including reddened skin, cyanosis of extremities, fever, and bloody diarrhea (Torres-Velez, Havas, Spiegel, & Brown, 2019). ASF is primarily spread by direct contact, however soft-body ticks in the genus *Ornithodoros* have played a role in transmission in Africa. (Spickler, African Swine Fever, 2019). Spread is also facilitated through infected

uncooked pork products (Spickler, African Swine Fever, 2019). Outbreaks of ASF in countries with naïve swine populations, such as the U.S., are at risk of severe economic impacts due to the high mortality rate and the economic costs of eradicating the disease (USDA-APHIS, 2019).

FMD is a viral disease impacting cloven hoofed animals. It is a highly contagious disease but rarely fatal (Spickler, Foot and Mouth Disease, 2015). The virus, of the genus *Aphthovirus* in the family Picornoviridae, is transmitted in all secretions and excretions of infected animals, including but not limited to saliva, milk, feces, and urine (Mahy, 2005). Infection of a susceptible animal results in fever and painful vesicles erupting in and around the mouth, on the feet, and on the mammary glands (Mahy, 2005). Swine are considered amplifying hosts as they shed large quantities of viral particles, making them significant contributors to the spread of disease (Spickler, Foot and Mouth Disease, 2015). FMD affects species beyond swine and will be discussed further later in this chapter as it pertains to outbreak response planning.

Commercial swine operations in the U.S. could see catastrophic results if any of the aforementioned TADs are introduced into the population. Despite the high biosecurity measures of most commercial producers, the structure of the industry as a connected series of CAFO's and the highly infectious nature of these viruses means a large number of animals could be impacted before the disease is detected. In the event a TAD is detected, State Animal Health Officials (SAHOs) would likely institute a stop-movement order to prevent continued spread of the disease as animals are transported between the different stages of production (KDA-Division of Animal Health, 2018). While necessary, these stop-movement orders if continued too long, could result in overcrowding and necessitate euthanasia of affected animals (USDA-APHIS; CFSPH, 2011). It would be imperative, therefore, to lift the stop-movement for as many facilities as possible, as rapidly and efficiently as possible, while maintaining necessary biosecurity to prevent disease spread. A strong surveillance system, with repeated sampling and laboratory testing, to determine if a facility is free of disease is required.

In the event of an outbreak, state and local resources are likely to become exhausted and veterinary support will be in high demand. Currently in the United States, swine-focused veterinarians either collect or oversee the collection of swine samples to test for domestic diseases on production sites. Kansas contributes 2.7% of the nation's total swine population, ranking number 10 (Shahbandeh, 2020). There are approximately 1,000 swine farms in Kansas, with 150 of these facilities representing 99% of the state's pig inventory (Kansas Pork Association, 2021). As of February 2021, Kansas has 833 USDA category II accredited

veterinarians authorized in the state to issue health certificates for interstate and international movement of livestock and poultry. However, the actual number available to support a commercial swine outbreak is potentially much lower, dependent on whether they are comfortable and competent working with swine and their willingness to assist in an outbreak. During a TAD outbreak, not only do sample collection requirements increase, but biosecurity regulations and downtime requirements also increase. Pre-positioned, well-trained personnel could provide the necessary support to perform the surveillance sampling needed to return unaffected facilities to normal operations more promptly.

The National Poultry Improvement Plan (NPIP) set a precedent that makes it feasible for the swine industry to use existing caretakers and producers of swine in the outbreak response. Established in 1935, the NPIP is a voluntary testing and certification program between the states and the USDA that has worked to improve flock performance, breeding, and eliminate a variety of diseases (USDA APHIS, 2020). The objective of the program is to set the standards for flocks and breeding stock to be certified as “free” from the specified diseases (USDA APHIS, 2020). The code of federal regulations that covers the NPIP permits the state to employ “qualified persons as State Inspectors to perform the qualification testing of participating flocks.” To meet the demand for sampling and testing of thousands of birds, the NPIP established the Authorized Testing Agent, a trained and designated person who is permitted to test flocks, specifically for *Salmonella Pullorum-Typhoid* (9 CFR, 2018). The testing agents are trained and tested prior to authorizing them to perform routine testing.

The precedent set by the NPIP facilitated a multi-state agreement led by the National Pork Board (NPB) to utilize similar support in the event of a commercial swine TAD outbreak. Certified Swine Sample Collectors would be individuals trained by USDA Category II accredited veterinarians according to a standardized program to collect diagnostic samples and submit to a specified laboratory in the event of a CSF, ASF, or FMD outbreak in the U.S. The curriculum and training materials are under development by the NPB; however, it is incumbent on individual states to establish the procedures for initiating and maintaining certification of collectors. By using individuals employed at each swine facility, this program overcomes the hurdle presented by increased biosecurity and frees veterinarians to focus efforts on infected or contact premises. If the certified sampler program is successfully implemented and maintained before a TAD outbreak, the swine industry would be better prepared to meet the rapid increase in sampling requirements and reinstate movement of unaffected premises as quickly as possible.

1.2 FMD Emergency Vaccination Plan

Diseases impacting more than one species and production system require extensive planning and coordination to control and eradicate the disease. Development of an FMD emergency vaccination plan is an example. FMD is a globally significant infectious disease of cloven-hoofed animals with historic outbreaks occurring in every livestock region of the world, except New Zealand (Spickler, Foot and Mouth Disease, 2015). Once found worldwide, it has been eradicated from specific parts of the world, including the U.S. (Grubman & Baxt, 2004). The first report of outbreaks in the U.S. occurred in 1870. There were nine outbreaks in the U.S. before strict stamping-out and quarantine procedures successfully eradicated the disease in 1929 (Segarra & Rawson, 2001).

The significance of FMD to animal health and agriculture lies in its highly infectious nature and the production losses secondary to infection that threaten food security. Though most mature animals recover from the initial illness in 2-3 weeks, production losses persist long after recovery. Producers may see up to a 33% reduction in milk output, and abortions secondary to infection reduce calf crops and milk yield (World Organization for Animal Health, 2012). Infection can also result in chronically reduced growth rates and failure to thrive (World Organization for Animal Health, 2012). Failure to eradicate the disease results in exclusion from international markets (Field Experiences with Emergency FMD Vaccination, 2015). FMD control is considered global public good because it benefits all countries. As a result, the World Organization for Animal Health (OIE) developed control policy recommendations to obtain an FMD-free status and open international trade (World Organization for Animal Health, 2012). The OIE also developed recommendations for countries to regain their FMD-free status following an outbreak. These recommendations have evolved as recent outbreaks have identified alternative control measures to the traditional stamping-out (Grubman & Baxt, 2004).

FMD is a viral disease caused by the FMD virus, from the genus *Pithovirus* and in the family *Picornoviridae* (Spickler, Foot and Mouth Disease, 2015). The virus exists in 7 major serotypes (O, A, C, SAT1, SAT2, SAT3, and Asia 1) and has more than 60 strains (Mahy, 2005). Exposure to one serotype does not confer immunity to other serotypes, making prophylactic vaccination to prevent disease problematic. Susceptible animals include cattle, pigs, sheep, goats, buffalo, and cervid species (Spickler, Foot and Mouth Disease, 2015).

Disease morbidity is extremely high among a susceptible population, occasionally approaching 100% (Spickler, Foot and Mouth Disease, 2015). The virus is transmitted in all secretions and excretions of infected animals, including but not limited to saliva, milk, feces, and urine (Mahy, 2005). It enters the host animal through inhalation, ingestion, mucous membranes, or abrasions of the skin. Infection of a susceptible animal results in fever and painful vesicles erupting in and around the mouth, on the feet, and on the mammary glands (Mahy, 2005). The disease is rarely fatal, except to young animals who develop myocarditis (Spickler, Foot and Mouth Disease, 2015). However, recovered mature animals may exhibit decreases in milk production, chronic lameness, mastitis, and loss of condition (World Organization for Animal Health, 2012). Cattle appear to be maintenance hosts, requiring less viral particles to become infected (Spickler, Foot and Mouth Disease, 2015). Swine, however, are considered amplifying hosts as they shed large quantities of viral particles, making them significant contributors to the spread of disease (Spickler, Foot and Mouth Disease, 2015). Sheep and goats rarely exhibit clinical signs and it is unclear whether they can maintain FMD for a long period (Spickler, Foot and Mouth Disease, 2015).

Control and eradication efforts during an outbreak may be complicated by the survivability of FMD virus in the environment and the duration of the latent period of infection in comparison to the incubation period. FMD virus can survive in the environment for an average of 3 months under favorable conditions and can easily be spread between farms and species via fomites such as clothing or equipment (Spickler, Foot and Mouth Disease, 2015). The incubation period, defined as the time from infection to appearance of clinical signs ranges from 2-14 days, based on the dose and route of transmission (Mahy, 2005). However, the latent period, defined as the time from infection to shedding viral particles may be shorter (Spickler, Foot and Mouth Disease, 2015). As a result, preclinical shedding may spread the virus for almost 2-4 days before the disease is identified and control measures implemented. Diagnosis of FMD requires sampling of the vesicles and skin and identification of the virus and specific serotype through Enzyme-Linked Immunosorbent Assays (ELISAs) and Reverse-Transcriptase Polymerase Chain Reaction (RT-PCR) (World Organization for Animal Health, 2012). No treatment exists and prevention efforts generally focus on policy and trade measures to prevent infected animals or animal products from entering disease-free countries (Spickler, Foot and Mouth Disease, 2015).

Arguably some of the most notable FMD outbreaks used to guide global policy and recommendations on outbreak control are the 2001 outbreaks in the United Kingdom and

Uruguay. The United Kingdom outbreak began in February 2001, though it went for at least 3 weeks before identification (Grubman & Baxt, 2004). This delay resulted in spread of FMD serotype O to 16 out of 23 counties in England. With stamping out as the primary control strategy in order to return quickly to FMD-free status, the United Kingdom ultimately slaughtered 6 million animals (Grubman & Baxt, 2004). The outbreak took approximately 7 months to control, with the last case documented at the end of September 2001 (Field Experiences with Emergency FMD Vaccination, 2015). The economic cost of the outbreak varied between 12.3-13.8 billion U.S. dollars, due to direct production losses and lost tourism secondary to the stop-movement (Grubman & Baxt, 2004). In stark contrast, Uruguay quickly moved to vaccination as a method to stop the outbreak secondary to FMD serotype A (Sutmoller & Olascoaga, 2002). The initial stamping out strategy was halted by farmers who opposed the loss of their livestock. Uruguay changed the strategy to ring vaccination, and eventually vaccination of all cattle in the country (Sutmoller & Olascoaga, 2002). Despite having numbers of infected premises similar to the United Kingdom outbreak, Uruguay was able to halt the outbreak in 4 months with significantly lower animal and economic losses, however eradication took more than a year (Field Experiences with Emergency FMD Vaccination, 2015). The outbreak ultimately cost Uruguay 244 million U.S. dollars and a total of 6,900 animals were destroyed (Field Experiences with Emergency FMD Vaccination, 2015). The opposing response strategies and subsequent economic costs depicted in Table 1.1 highlights the need to explore FMD vaccination as an outbreak control technique. In fact, an official investigation by the United Kingdom government determined that vaccination should be incorporated into future control strategies (Grubman & Baxt, 2004).

Table 1.1 Comparing the Impacts of 2001 FMD Outbreaks

	United Kingdom	Uruguay
<i>Method of response</i>	Stamping-out	Vaccination & targeted stamping-out
<i>Number of confirmed loci</i>	2,030	2,057
<i>Duration of outbreak</i>	7 months	4 months
<i>Cost of outbreak</i>	\$12.3-\$13.8 billion	\$244 million
<i>Animals destroyed</i>	6 million	6,900

Vaccination as a control strategy has only recently become a goal in the United States. Working with the FMD virus for both research and vaccine development has been complicated by a 1948 law banning the existence of live FMD virus in the continental U.S. (Segarra & Rawson, 2001). In 1982, the North American Vaccine Bank (NAVB) was established in an agreement between Canada, Mexico, and the U.S. (Segarra & Rawson, 2001). The NAVB made vaccines available to each country should they experience an FMD outbreak. The supplies from this bank are unlikely to adequately cover the need should an outbreak arise. With passage of the Agriculture Improvement Act of 2018, the National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB) was established (U.S. Department of Agriculture, 2020). This is a vaccine bank exclusive to the U.S. that makes a larger number of doses available. The first purchase of vaccine in the bank started in July 2020 with goal of storing 10-25 million doses of each of the 10-12 highest risk strains (U.S. Department of Agriculture, 2020). Past outbreaks have demonstrated that vaccination is a viable strategy for FMD control and the establishment of the NAVVCB makes this strategy more realistic for the U.S.

The goals of the U.S. FMD response plan look much different in 2020 than they did 20 years ago. Stamping-out is no longer the preferred option for control, depending on the extent of the outbreak. As the lead agency for TAD outbreaks and response, USDA Animal and Plant Health Inspection Service (APHIS) establishes the goals, priorities, and plan recommendations for specific diseases. The goals of USDA-APHIS's FMD response plan is to detect, control, and contain the outbreak as quickly as possible using strategies that do not disrupt animal agriculture, the food supply, the economy, all while protecting public health (U.S. Department of Agriculture, 2020). Vaccination now plays a larger role in this plan, made possible by the establishment of the NAVVCB. Vaccination alleviates some of the issues that come from depopulation strategies such as carcass disposal, loss to producers, loss of genetic stock, and interruption of food supplies (U.S. Department of Agriculture, 2020). The USDA provides goals and recommendations but the states are sovereign and would make the final decision on what and how those recommendations are implemented. State animal health officials are updating FMD response plans to reflect the strategies recommended by the USDA. Updating KDA's emergency vaccination plan in preparation for a national tabletop exercise was a significant focus of my field experience.

Chapter 2 - Learning Objectives and Project Description

My experience with KDA-DAH began in January 2021 and ended in April 2021. My daily activities and responsibilities for this Field Experience mirrored some of the expected duties of a veterinarian employed by KDA-DAH. This involved meeting with stakeholders, preparation for tabletop exercises, and establishing the standards and policies for programs. In early meetings with Dr. McReynolds, we discussed my past experiences, current interests, and KDA projects currently open. From that discussion, two different, yet related, projects were identified to which I could make a contribution. Specifically, I would provide valuable input to their emergency planning by developing standards for a Certified Swine Sample Collector program and I would lay the foundational work for Kansas to expand on its FMD emergency vaccination plan. With those projects in mind, we identified learning objectives and ideal products for each project.

The learning objectives for my experience included:

- Understand the scope of work for a State Veterinarian
- Understand the details required to develop standard operating procedures for implementation in an emergency setting
- Identify knowledge gaps in public understand of response plans
- Understand the challenges of operating in a multi-agency and inter-professional environment
- Understand how to evaluate gaps in emergency response plans and develop guidance to close those gaps prior to an emergent event
- Understand the challenges of nesting local and state objectives within a national framework
- Construct state plans that nest within a national initiative.

Working with KDA provided me with insights on how states build and nest their programs within the federal framework provided by USDA and the state legislature, in order to meet the needs of Kansas farmers. This work can be very detailed, laborious, and requires constant collaboration within the KDA divisions and with outside organizations. A key feature of my experience were the frequent meetings needed for coordination. I attended the weekly office updates, in which each member provided updates on their various projects planning and feedback purposes. I attended a joint KDA-USDA meeting in which representatives from both agencies discussed updates and challenges on shared programs. I also led planning meetings

to review the products and details of my project. This was a key component of my experience, as I learned how to effectively set a meeting agenda and lead discussions in which changes were suggested and decisions made. Dr. McReynolds provided me with the support and freedom to address the office as a key member of the team, despite not being an active employee.

2.1 Certified Swine Sample Collector Program Standard Operating Procedures

The first project I focused on was to develop the standard operating procedures (SOP) by which Kansas would implement a Certified Swine Sample Collectors Program. The foundations of this project came from a multi-state agreement and leadership from the NPB to train swine facility workers to assist during a commercial swine outbreak. Successful development and implementation of the program would ultimately free veterinary assets to respond to active infections while also meeting increased sample collection requirements. In addition, certified collectors would enable facilities within outbreak control areas to submit the samples needed for surveillance and ultimately obtain movement permits necessary to continue operations. While the curriculum and training materials were being developed by the NPB, KDA needed to determine how to implement the training program in Kansas, monitor compliance, and effectively utilize these individuals during an outbreak.

A critical piece of this project was coordinating with the laboratory that provides diagnostic support in the event of an outbreak. The Kansas State Veterinary Diagnostic Laboratory (KSVDL) is part of the National Animal Health Laboratory Network (NAHLN), a nationwide network of labs that are interconnected and use standardized protocols and procedures (National Animal Health Laboratory Network Strategic Plan, 2018). NAHLN laboratories provide the diagnostic support for food, animals, plant health, and water (National Animal Health Laboratory Network Strategic Plan, 2018). I had the opportunity to participate in, and lead, meetings with KSVDL representative, Dr. Kelli Almes, to determine how KDA and KSVDL would work together for the training program and during an outbreak. These meetings highlighted the importance of discussing communication and logistical challenges of the program prior to an emergency. I was also faced with the challenge of incorporating the hands-on training of preparing and shipping samples for laboratory diagnostics in a manner that did not burden KSVDL.

Using the results of meetings with KSVDL and the program framework from the NPB, I developed a detailed SOP that would guide KDA personnel, KSVDL, veterinarians, and swine workers on expectations and implementation activities of the program. The intent of the SOP was to establish the minimum standard to be considered a certified swine sampler, how training should be conducted, assessed and documented, and how certified swine samplers would be used in an outbreak. The original plan was to introduce the SOP to swine veterinarians who would lead the training for their facilities prior to the completion of my field experience. However, time constraints prevented completion of the initial review. To date, I have led an internal KDA meeting in which the SOP and some of the ancillary materials were evaluated and edited.

2.2 FMD Emergency Vaccination Plan

The second project I supported was the development of Kansas' FMD emergency vaccination plan. In order to better understand components of a strong vaccination plan, I researched USDA guidance on FMD plans and reviewed other existing state plans. Iowa and California have had the benefit of completing tabletop exercises on this topic and kindly provided their lessons learned. In addition, Dr. McReynolds and I met with Ms. Lisa Quiroz, the Program Manager of the Emergency Preparedness and Response Section with the California Department of Food and Agriculture (CDFA). She provided great resources and some strategies they were exploring to navigate the challenges presented by the logistical operations. I quickly appreciated that a vaccination plan is a massive project that would not be completed in my short field experience. Therefore, my goal was to create a foundation that included the components of KDA's earlier plan, input from California and Iowa's plans, and my input on gaps or unanswered questions present.

Momentum for states to develop and test their FMD vaccination plans has picked up in the last two years as the Agriculture Improvement Act of 2018 established the NAVVCB as well as the National Animal Disease Preparedness and Response Program (NADPRP) to "boost the nation's efforts to keep high-consequence animal diseases from entering and spreading in the U.S." (USDA APHIS, 2021). This made funds available to state departments of agriculture to conduct training and participate in exercises. Kansas participated in a national table-top FMD vaccine exercise in May 2021, and I participated in the pre-webinar and workshop discussions in preparation for the event. The goal was to restructure KDA's FMD vaccination plan to apply and review during the exercise. I also participated in Veterinary Service National Training and

Exercise Program (VS NTEP) workgroups that focused on developing the FMD Vaccine Field Deployment Tabletop Exercise used to test states' vaccination plans. These virtual workshops improved my understanding of the extensive collaboration and coordination needed to create and test emergency response.

In early meetings with Dr. McReynolds on the topic, we discussed the current lessons that could be learned from the COVID-19 vaccination operations in the United States. Some of the challenges we identified were the logistics of transporting, handling, and storage of vaccine as well as public perception. We ultimately sought to answer the question of what stakeholders, specifically veterinarians, producers, and members of industry, understood about the FMD response plan, the decision to vaccinate, their role in implementation of the plan, as well as their feedback on the plan. I was tasked with developing two surveys, one for veterinarians and one for producers to gather this feedback. The results of the surveys would be analyzed and used to develop information campaigns to improve awareness of the plan and involvement in strategy development. In addition to the surveys, the decision was made to host meetings with industry stakeholders in preparation for the exercise.

Chapter 3 - Results

3.1 Certified Swine Sample Collector Program SOP

After meeting with KSVDL and reviewing program materials from the NPB, I developed a comprehensive SOP detailing how the Certified Swine Sample Collector program would function in Kansas (Appendix 1). The most efficient way to establish the program standards was to determine how certified samplers would be utilized in the event of a commercial swine TAD outbreak. This included how facilities would be notified to utilize certified collectors, what samples to collect, and what diseases to test for. It also detailed how KDA and KSVDL would communicate to verify that submitted samples were collected by USDA category II accredited veterinarian or a currently certified collector before samples were tested. The second part of the SOP detailed how swine workers would be trained, the logistics involved, and the minimum requirements for certification. Development of the SOP instigated the drafting of additional documents to assist the program.

The first document drafted to support the SOP included a laboratory submission assessment (Appendix 2). One of the challenges of this training program was obtaining feedback for trainees on their performance in preparing and submitting lab samples in a manner that did not create additional work for the swine facility or KSVDL. Packages with broken containers, leaked contents, and/or poorly fixed tissues slows down diagnostic testing and impairs the emergency response efforts. From discussions with Dr. Almes of KSVDL, we knew that routine shipments often contained poorly packaged and, sometimes, damaged samples. Training materials used for instruction were developed by the NPB but did not address methods for skill assessment. We developed a plan that allowed trainees to submit samples and receive feedback on the quality while not adding extra samples to those needed for routine surveillance. I created a laboratory submission assessment that trainees could send in a package with routine surveillance samples. The laboratory accessioning staff would complete the form and return the completed document to the facility veterinarian as feedback on the shipment quality. In addition, submission of this form with samples was made optional, at the discretion of the veterinarian conducting training. A minimum standard of reviewing the proper technique for preparing and packing samples was described.

With the implementation of any kind of certification program, it is incumbent on the managing organization to monitor compliance with the standards. As part of the SOP, I needed to establish how certified collectors were verified by the training veterinarian and how those

names were reported to KDA. In addition, I had to establish a timeline and standards for recertification. I created a form documenting the training including the names of the individuals who successfully completed the requirements and signature from the training veterinarian verifying their confidence in the certified collectors' skills (Appendix 3). This form would be the record maintained by the veterinarian and submitted to KDA for tracking. Names and dates are to be tracked by KDA and facilities would be prompted to renew certification of their staff during the review of their secure food supply plans. Collectors are required to be recertified annually. The list of currently certified collectors could then be provided to KSVDL in the event of a commercial swine outbreak to verify against submitted samples prior to testing. The form and framework enable KDA to monitor certified collectors and ensure that samples submitted in an outbreak come from trained individuals, and are of sufficient quality to ensure more accurate testing.

Finally, I developed a laboratory submission form to be utilized by certified samplers during an outbreak to ship samples (Appendix 4). This form would be managed and maintained by KDA and given to specific facilities only in the event of a commercial swine outbreak. Receiving this form, along with additional guidance, would serve as notification to authorized sites to utilize their certified collectors for sample collection and to ultimately obtain a movement permit and return to operation. Use of this form would allow KDA to control the use of certified collectors, answer pertinent questions regarding the facility's need for testing, and help the lab rapidly identify and prioritize sample submission related to the outbreak.

3.2 FMD Emergency Vaccination Plan

The FMD vaccination plan is a massive project requiring constant collaboration and coordination with different stakeholders. I began to appreciate the extent of the undertaking while attending the NADPRP and VS NTEP workshops. Attendees in these workshops included numerous state and federal veterinarians working on various aspects of their response plans. I gathered information in meetings from the lessons learned by those states further along in the planning process, such as California and Iowa. Iowa was one of the first states to utilize their plan in a tabletop exercise and shared their experiences with other states. Engaging with stakeholders early in the process was critical to gaining cooperation with response efforts. Prior to their exercise, representatives from Iowa Department of Agriculture and Land Stewardship (IDALS) met separately with USDA category II accredited veterinarians, producers, and representatives from their dominant industries. A challenge they faced was actively engaging

the interest and participation of those groups early in the planning process. California also shared their insights gained from developing a vaccination plan. In meetings with Ms. Lisa Quiroz, Program Manager of the Emergency Preparedness and Response Section for Animal Health Branch at CDFA she explained that a key gap in their readiness was the logistics of receiving, handling, and shipping vaccine throughout the state and warehouse operations. To overcome these hurdles, CDFA is exploring contracts with a third-party logistics vendor.

In the event of an FMD outbreak, states would submit vaccine requests to USDA-APHIS detailing their vaccination strategy, numbers of vaccines required, and a warehouse for receipt of shipment. Bulk shipments of vaccine would be sent by the manufacturer to the warehouse specified, but it is incumbent on the state get the vaccines to the necessary premises and into the animals. This requires extensive cold storage capacity, inventory management, breakdown of the shipment into smaller lots, cold chain maintenance, and chain of custody documentation. Knowledge of warehouse operations and substantial manpower are needed to facilitate the effort. As a result, KDA explored working with a third-party logistics vendor. The Supply companies have extensive experience in managing large inventory, maintaining cold storage, and shipping to individual customers. I had the opportunity to participate in early discussions between KDA and a third-party logistics vendor as the requirements and scope of work were developed. Regional and local businesses can play a critical role in emergency response plans and appropriate partnerships can free state agency assets to focus resources on other aspects of the response.

With feedback from Iowa, California, and the virtual workshops, I began restructuring KDA's vaccination plan and identifying gaps. Prior to my Field Experience, KDA-DAH had developed an initial vaccination plan. The document provided a broad overview for how Kansas would coordinate their vaccination operations. It was completed in 2019 and lacked the detail needed for how the vaccine would be received and distributed throughout Kansas. Since that time, clearer guidance on program expectations have been passed down from USDA-APHIS and lessons learned from other states necessitate updating of the document. The first step was to clearly understand each step in the response process. For that I developed a process map depicting the work flow of each phase of the vaccination plan (Appendix 5). While not an entirely linear operation, the process map served to define each step in the plan. Next, each step in the process map would need to be thoroughly described.

To restructure the plan, I created an outline based on the process map previously developed (Appendix 6). Within each section I sought to answer the following questions:

1. What initiates this step of the plan?
2. What factors have to be considered for decision making in this step?
3. What actions take place in this step?
4. How are these activities accomplished?
5. When does this step end?

Using the original plan developed by KDA in 2019, I sought to answer those questions with the decisions already made. If the original plan did not contain clear guidance, then I included input from Iowa's plan, shared by IDALS. Due to their previous experience in the tabletop vaccine exercise, Iowa's plan offered a lot of great options to consider in the development of Kansas' plan. Finally, I reviewed the entire document and identified gaps in the existing plan. The critical gaps are detailed below:

1. Vaccine prioritization and goals
2. Organization charts
3. Establishment and utilization of a vaccination advisory board
4. Vaccine logistics
5. Feedback and participation from stakeholders

Vaccine Prioritization

It will be logistically impossible to vaccinate 100% of susceptible animals in the event of an outbreak. Further, it may not make scientific sense to vaccinate every animal as different species contribute to the transmission of the virus in different ways. USDA developed a guidance document to assist states with the decision of which species, ages, and production systems on which to focus valuable resources (USDA-APHIS, 2020). It is not reasonable to set hard limits on how vaccines will be used in Kansas prior to an outbreak, as the situation can be extremely fluid. However, communication of the factors determining the vaccination prioritization structure to all necessary stakeholders could manage expectations and alleviate conflict. It would also speed delivery to critical elements of the disease chain. The primary factors to be used for vaccination prioritization were established in a KDA-DAH working group, based on USDA recommendations. These factors need to be shared with field veterinarians, producers, and industry.

Organization Charts

The FMD vaccination response will be a multi-agency effort, requiring departments of agriculture, transportation, health, environment, and law enforcement to name a few. A thorough understanding of the organizational hierarchy for each of the groups in the response is

required. For example, early versions of the vaccination plan described vaccination strike teams responding to individual premises and supervising vaccination operations. However, the document does not describe how these teams will be manned, the numbers of personnel required, and the responsibilities for each position. Further, the plan describes both a planning team and a policy group assisting the emergency operations team with determining the vaccination strategy based on the category of outbreak. The plan does not adequately describe who makes up each of these groups and whether they are, in fact, the same thing. Developments and updates to these organization charts will require input from multiple state offices and is beyond the scope of this project. However, these issues were communicated to KDA as a source of confusion within the plan.

Establishment and utilization of a vaccination advisory committee

Decisions of vaccine prioritization and use should be based on scientific evidence and minimize impact to Kansas' animal agriculture economy as much as possible. Regular review of the latest studies and recommendations regarding FMD control is required. Both Iowa and California describe a vaccine advisory committee to ensure the vaccination strategy is based on scientific evidence and to regularly review emerging literature on the topic. However, the existing Kansas plan does not describe a group dedicated to this task. Ideally, this committee would consist of representatives from each of the major animal industries, KDA-DAH representatives, epidemiologists, disease modelers, agriculture economists, veterinary diagnostic laboratory representatives, and FMD subject matter experts. The responsibilities of the committee would include regular meetings to review the science behind FMD vaccination and forming a consensus on prioritization and guiding vaccine use during an outbreak. While KDA is considering the costs and benefits of utilizing this group, the committee has not yet been established and is beyond the scope of this project.

Vaccine logistics

The most complicated and yet vital part of the vaccination plan is the method by which vaccine will be transported to each animal and administered. This step requires extensive planning and coordination, contingency plans, and adherence to strict requirements such as maintenance of cold chain and chain of custody. Plans for delivery of vaccines and equipment to each site hinges on available warehouses within the state with the necessary capacity for storage. Development of a detailed logistics plan is beyond the scope of this project. However, KDA has initiated conversations with a 3rd party logistics vendor, though the scope of work and expectations have not been established. Development of a contingency plan using state

emergency resources is also necessary in the event partnership with a 3rd party fails. Finally, the plan needs to detail who will administer vaccines and how that will be accomplished on each site. KDA plans to utilize USDA accreditation category II veterinarians to oversee the vaccine administration but will leverage staff on each premises to the greatest extent possible. This places a large responsibility on the veterinarians to engage with producers on the development of herd vaccine plans and determine what, if any, assistance will be required. The veterinarians will also be responsible for the documentation and tagging of each vaccinated animal. This plan must be detailed and socialized with Kansas veterinarians.

Feedback and participation from stakeholders

Successful implementation of this vaccination plan requires input and participation from all stakeholders involved. Engaging the different groups early in the planning process ensures questions and concerns are addressed. A plan that rapidly controls the outbreak while minimizing hardship and economic loss to as many groups as possible would be a goal to strive for. The lack of stakeholder engagement was reviewed at length in a KDA-DAH working group with plans to set meetings with representatives from each of the animal agriculture industries in Kansas. Surveys were also utilized to gain feedback from stakeholders on the plan.

During the planning phase of my Field Experience with KDA-DAH, I explored producer feedback and understanding regarding potential emergency vaccination for FMD. Utilizing vaccines to control an outbreak can help minimize economic losses and prevent mass euthanasia of livestock, but has also has ramifications on trade and the value of the animal. Based on the mixed reception by the public for COVID-19 vaccination, efforts in education and communication preceding an outbreak may be necessary to improve stakeholder support and compliance with the plan. The Animal Health Protection Act (7 U.S.C. 8301 et seq.) authorizes the Secretary of Agriculture to “carry out operations and measures to detect, control, or eradicate any disease or pest of livestock” (U.S. Department of Agriculture, 2020). Under the code, FMD vaccination could be carried out, even without agreement from the owner, assuming it is necessary to control the outbreak. This approach of forced vaccination in the face of owner refusal would seem to be highly unlikely and could result in abandonment of the vaccination effort. However, addressing the questions and concerns of owners in advance garners support for the plan and minimizes conflict. Surveys of producers and veterinarians to determine their current understanding of the FMD response plan were proposed to KDA?

Separate brief surveys were developed and customized to producers and veterinarians (Appendix 7). The objective of each survey was to determine what producers and veterinarians

in Kansas knew about FMD response plans and the potential for vaccination. This survey data was not intended to be used for publication but for internal KDA planning. Therefore, it did not meet the federal definition of research and did not require KSU Institutional Review Board review and approval. The survey was developed in Form site©, a web-based platform that allows the user to create forms and surveys. The link to the veterinary survey was distributed to a group email containing USDA category II accredited Kansas veterinarian. Distribution of the producer survey was more problematic and less direct. The producer survey link was posted in KDA-DAH's routine newsletter, as well as on social media platforms. At the conclusion of my Field Experience, 23 veterinarians had completed the survey but there was only 1 response from producers. The producer survey will be distributed to participants invited to the upcoming stakeholder meetings to be completed in advance in hope of improving the response rate but will not be discussed further in this report.

The veterinary FMD response plan survey was shared through an email group containing approximately 833 Kansas veterinarians on March 18th. There were 21 responses within the first 5 days and 2 more followed toward the end of the month, with a current response rate of 2%. The results of the survey are potentially impacted by response bias in which there are possible differences between veterinarians that responded and those that didn't. These differences may influence the lack of response (Dohoo, Martin, & Stryhn, 2014). Non-response can occur for a variety of reasons including refusal to participate, the method by which the survey was administered, participants forgot about it, or only those most interested in the topic of the survey choose to respond. As a result, it is difficult to draw strong conclusions from this survey. Figure 3.1 shows USDA accreditation categories of the respondents. With the majority (21/23 veterinarians) being level II. The primary species seen in their practices were distributed as shown in Figure 3.2. Both interesting and concerning, the numbers of individuals who were unfamiliar with the Kansas FMD Response Plan was just under 50% (10/23) of the respondents. Additional questions about the specifics of the plan fared slightly better with around 7 individuals being unaware of potential stop-movement orders or the use of vaccine. It is possible the respondents were generally aware of USDA FMD response plan recommendations but were not aware of how Kansas, specifically, will implement it. Support from category II accredited veterinarians is extremely important but not all of them will be comfortable providing assistance during an outbreak (figure 3.3). Only 18 of the 23 respondents were comfortable assisting with vaccination operations. Reasons given for not being comfortable with assisting in the response included personally owning susceptible species who could then be secondarily infected or due

to a clinical focus in companion animals. Overall, the trends in the survey responses show a need and opportunity to do more outreach with private veterinary community regarding the FMD response plan to improve understanding and garner support.

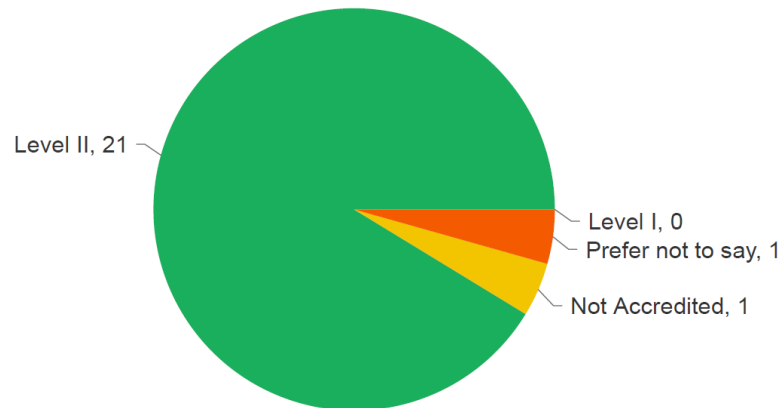


Figure 3.1 Breakdown of respondents' USDA-APHIS accreditation categories

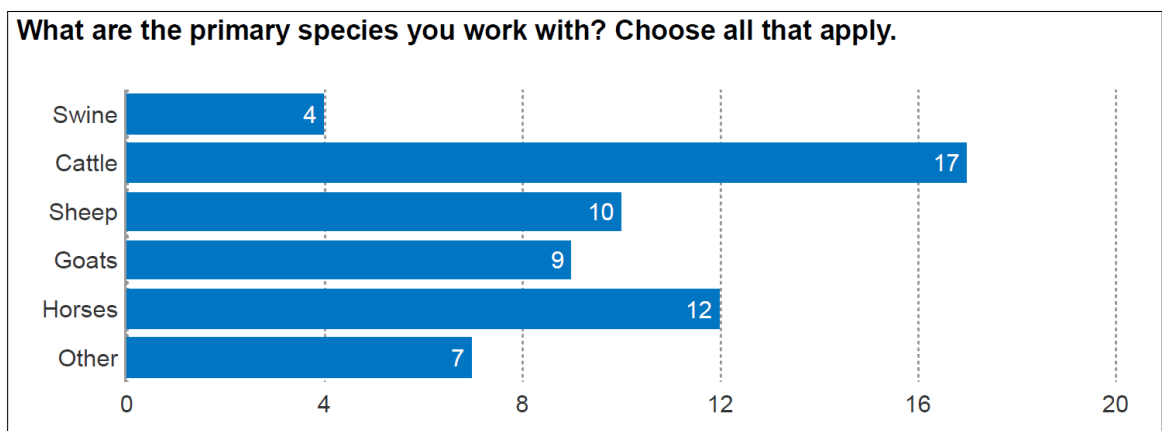


Figure 3.2 Breakdown of species seen in clinical practice by respondents

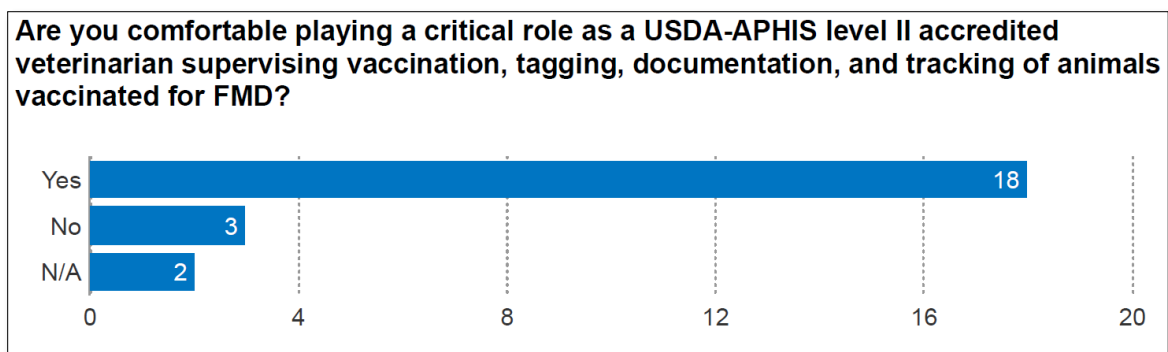


Figure 3.3 Respondents' comfortable assisting with vaccination, tagging, documentation, and tracking of animals

Chapter 4 - Discussion

Creation of policy and procedure may appear a tedious task but it is an essential one to clearly define standards and authorities, unify efforts, and establish and improve communication. Prior to this field experience, I had been only slightly acquainted with the coordination and work necessary to develop these technical documents. Working with KDA-DAH gave me the opportunity to explore how the science and epidemiology of infectious diseases is used to inform standards and programs to control them. I also better understood the complexity of this highly coordinated effort, requiring input from the federal government, multiple state agencies, private industry, animal owners, and veterinarians. I had the opportunity to explore how states coordinate with federal authorities and shape unique plans within the limits of the federal programs. With each of my projects, I provided KDA-DAH with a solid foundational document that can be applied and tested during disaster preparedness exercises.

4.1 Certified Swine Sample Collector Program SOP

The Certified Swine Sampler Program presented some unique challenges to overcome. The first was implementing this program in a way that did not impair commercial swine operations or the diagnostic laboratory supporting them. This challenge was addressed by making the program both voluntary and beneficial to swine producers. While not required to conduct training, having certified samplers on site in the event of an infectious disease outbreak enables the facility to obtain movement permits more rapidly. Another challenge was establishing how KDA-DAH would monitor the program for effectiveness and compliance. Setting program requirements, yet not applying oversight is a wasted effort. This was addressed by recommending review of each facility's certified sampler list at the same time that the secure food supply plan is reviewed annually. This enables KDA representatives to submit reminders to the facility of when recertification is due. Finally, I had the challenge of working inter-professionally with KSVDL to nest a state program seamlessly into laboratory operations. This was a much easier task to undertake due to the assistance and expertise of Dr. Almes. Multiple meetings and written communication were exchanged to review program intent, challenges, and review products. Her feedback and participation were critical to development of an effective plan.

At the conclusion of this Field Experience, I provided KDA-DAH with a detailed SOP for program implementation and use in the event of an outbreak. I also contributed supplemental materials for the program such as a certification documentation form for record-keeping, a laboratory shipment assessment to facilitate training and feedback, and a laboratory submission form. The next steps for this program would be to present the details to swine veterinarians and industry for their feedback. Ideally, information on the feasibility of implementation and perceived value of participating will be important. Their initial feedback can be used to adjust the program before full implementation. However, it will also be important to re-evaluate the performance of the program at a later date to determine its effectiveness and develop possible process improvements.

4.2 FMD Emergency Vaccination Plan

Developing the FMD vaccination plan was a massive undertaking and impossible to complete in a short Field Experience. The final plan will be a complex set of coordinating operations and will require input from numerous experts to outline each step. A key step in the FMD vaccination plan development will be holding stakeholder meetings. This will be an opportunity to address knowledge gaps and concerns of the different animal agriculture industries and field veterinarians. The surveys developed as part of my Field Experience were one of the first steps towards opening those conversations and gathering the necessary information. Face-to-face meetings might have better served to get immediate information but the web-based surveys did improve geographic outreach and were the best option in a time of recommended social distancing.

Developing a response plan is a difficult process as the teams try to predict likely scenarios of disease spread and likely points of plan failure. Using scenario planning techniques to evaluate other state plans and exercises can help identify key outcome drivers. I was able to look at the lessons learned by Iowa in their first state exercise, such as engaging stakeholders early, and some recommendations made by CDFA. There is also a wealth of lessons to be learned from the current COVID-19 pandemic. While the specifics of the vaccination plan differ between livestock and humans, the veterinary community has an opportunity to assess how human health agencies handled challenges presented by maintaining cold chain, chain of custody, vaccine storage, and vaccine prioritization. With this wealth of information, it is easy to encounter “analysis paralysis” in which the pros and cons of a decision are weighed to such an

extent that no decision is made. This experience showed me the importance of making the best decision possible in the planning process and then testing it in state and national exercises.

While I was unable to address every unanswered question in the plan, I provided KDA-DAH with a strong foundation to utilize and test in the May 2021 tabletop vaccine exercise. I outlined the plan in a brief process map to improve understanding. The shell document is then broken down into each step of the plan, providing KDA-DAH the opportunity to answer what will be accomplished, how it will be done, and who is responsible for oversight. I highlighted critical planning gaps that needed to be prioritized before the upcoming National exercise. I also provided recommendations based on feedback from two different states working through the same process. The document contains links or copies of necessary resources to accomplish the plan, such as the NVS vaccine request form, herd management plans, etc. KDA-DAH should be able to use this document to guide further planning, ultimately creating a one-stop document that guides the entire process.

Setting standards for different outbreak prevention and response programs lays the foundation to protect food security, economic security, and, ultimately, public health. Diseases like FMD or CSF can have public health impacts even without directly infecting humans. Animal protein and products are key factors in a balanced and healthy diet, especially in young children. Meat, milk, and eggs have highly bioavailable nutrients such as protein, iron, vitamin A, and fatty acids and can alleviate nutritional challenges, regardless of socioeconomic status (Leroy & Barnard, 2020). Animals also provide a source of income and economic security to a family, especially in developing countries. Infectious diseases that impact animal production, through illness and fatalities, can undermine the economic and food security of countries (Torres-Velez, Havas, Spiegel, & Brown, 2019). This Field Experience highlighted the importance of the regulatory role of state agriculture departments and the implementation of the policies they develop to protect food and economic security.

Chapter 5 - Competencies

Student Attainment of MPH Foundational Competencies

Competency 2: Select quantitative and qualitative data collection methods appropriate for a given health context.

Qualitative data collection methods were utilized to develop the veterinarian and producer FMD response plan surveys. The surveys were developed to gain an understanding of what was known about the potential to vaccinate for FMD and willingness to participate. While quantitative data can be transformed into useable statistics, surveys that collect qualitative data can be used to understand underlying opinions and motivations. Qualitative data can also be analyzed to uncover trends in thought. These surveys were designed to be short and easily understood. While focus groups could also have been used to gather some of the same information, distributing web-based surveys improved the timeliness for response and permitted a greater geographic reach. Current social distancing recommendations from the Centers for Disease Control and Prevention secondary to the on-going COVID-19 Pandemic also prevented gatherings of large groups.

Competency 4: Interpret results of data analysis for public health research, policy, or practice.

Data analysis of the veterinarian FMD response plan survey was completed to identify trends. The qualitative results were collected and developed into bar charts for quick understanding. Potentially related questions were evaluated through cross tabulation such as whether a respondent was USDA category II accredited and whether their answers reflecting awareness of the FMD response plan. Despite the poor response rate for the short surveys on the FMD response plan, there was a general trend identified reflecting a lack of awareness of the plans and an opportunity for outreach. These results can guide talking-points for future meetings with private veterinarians.

Competency 13: Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes.

Stakeholder involvement in development of any program or policy can be key in garnering support and compliance. The FMD response plan requires prioritization of finite resources to specific industries, species and ages. This can create conflict if not appropriately

addressed in the planning stages. In the development of the FMD Emergency Vaccination plan for KDA, I recommended the involvement of key stakeholders, including industry representatives, producers, and veterinarians. I encouraged the use of small working groups, focusing on individual industries initially, before combining all of the groups. The goals of these groups would be to communicate the intent of the FMD response plan, answer questions, and collect concerns or challenges that each industry would face in the event of an outbreak. The survey submitted to producers and veterinarians also contributed to this competency. The results could be used to generate talking points for each group. The first stakeholder meetings are now being scheduled and effort is being made to have key individuals participate in the NADPRP tabletop exercise scheduled in May 2021.

Competency #19: Communicate audience-appropriate public health content, both in writing and through oral presentation.

This competency was addressed through the development of standard operating procedures in both projects. These documents were technical in nature and designed to guide specific programs. For the Certified Swine Sample Collectors program, the document will be utilized by KDA, swine veterinarians, and KSVDL to guide procedures and understanding of individual responsibilities. The document is written for technical experts and details how training will be conducted and reported. The FMD vaccination plan document is also highly technical. It will be utilized by KDA, representatives of other state agencies, category II accredited veterinarians, and industry representatives. The plan is laid out in a process map to simplify overall understanding of each step. Ideally, the final document will contain detailed instructions for each step to be utilized by responding parties.

Competency #21: Perform effectively on interprofessional teams.

As part of the Certified Swine Samplers Program, I worked with Dr. Almes from KSVDL. The success of this program hinges on timely submission of quality lab specimens for diagnostics. It requires a functional understanding of laboratory operations once samples are received. These meetings also helped me develop a plan that could support training of swine handlers on sample submission without burdening KSVDL. Finally, this program requires coordination between KDA-DAH and KSVDL in the event of an outbreak to share the listing of certified handlers permitted to submit samples.

Table 5.1 Summary of MPH Foundational Competencies

Number and Competency		Description
2	Select quantitative and qualitative data collection methods appropriate for a given health context.	Qualitative data collection methods were utilized to develop the veterinarian and producer FMD response plan surveys.
4	Interpret results of data analysis for public health research, policy, or practice.	The results of the veterinarian FMD response plan survey reflect a need and opportunity to do more outreach with private veterinary community regarding the FMD response plan to improve understanding and garner support.
13	Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes.	Involvement of key stakeholders was a critical gap identified in the development of the FMD vaccination plan. The survey also contributed talking points to future stakeholder meetings.
19	Communicate audience-appropriate public health content, both in writing and through oral presentation.	Development of technical standard operating procedures for the Certified Swine Sample Collectors Program and the FMD Vaccination Plan.
21	Perform effectively on interprofessional teams.	Meetings with Dr. Almes of KSVDL in the development of the Certified Swine Samplers Program.

Student Attainment of MPH Emphasis Area Competencies

Competency 1: Pathogens/pathogenic mechanisms

A thorough understanding of the pathogen and its mechanism for causing disease is required before developing disease programs. The recommendations made in the program need to be based in science. I began my Field Experience by researching each disease addressed by the projects I contributed to. I initially developed a thorough understanding of infectious agents and their methods for causing disease through my veterinary degree and study of virology, bacteriology, and mycology. This knowledge was reinforced and enhanced by the DMP 770 Emerging Diseases course.

Competency 2: Host response to pathogens/immunology

Thorough knowledge of a host's immune system is necessary to understand methods used by the pathogen to evade detection and cause disease. My instruction in immunology began with the principles of veterinary immunology course taken while completing my Doctor of Veterinary Medicine (DVM) degree. My understanding of this competency was further enhanced during the DMP 770 Emerging Diseases course. While expertise in immunology is not required for the development of an emergency vaccination plan, this knowledge is required by the experts who developed the vaccine and officials developing the guidance for prioritization and use.

Competency 3: Environmental/ecological influences

Climate and other environmental factors are major drivers for the spread of many infectious diseases. Climates can impact vector lifecycles, increasing current populations or driving vectors to new areas, thus enhancing the spread of some infectious diseases. The interaction between humans, domestic animals, and wildlife can enhance the spread of recognized pathogens as well as create opportunities for the spread of emerging pathogens. This understanding of environmental and ecological drivers on infectious disease epidemiology did not play a significant role in my field experience, but was reviewed extensively throughout my veterinary training and current public health coursework. MPH 802 Environmental Health enhanced my understanding of how the climate and human impacts on the environment drive disease patterns. DMP 770 Emerging diseases reviewed how changes in normal ecology, such as habitat encroachment, can provide opportunities for pathogens to cross host species.

Competency 4: Disease surveillance

A significant portion of each project involved disease surveillance. The premise for the Certified Swine Sample Collector Program was to train a group of swine handlers as standby support for a commercial swine disease outbreak. These individuals would collect surveillance samples from facilities outside of the control zones. I researched sampling techniques that would be required for training and discussed surveillance testing with KSVDL to understand what they could support. The foundational knowledge required for this project was acquired through MPH 854 Intermediate Epidemiology and DMP 954 Advanced Epidemiology

Competency 5: Disease vectors

I was first introduced to the concepts of disease vectors while studying for my DVM degree. As many diseases are transmitted through vectors such as mosquitos or biting midges, a basic understanding of their lifecycle and interactions with other organisms within their environment is necessary. This understanding is reinforced when utilizing the principles of One Health as environmental conditions can impact vector populations and, ultimately, the spread of diseases. This competency was also reviewed during the MPH 802 Environmental Health course. Vectors and plants did not play a significant role in the spread of the diseases studied in my field experience or the plans I constructed; however, soft-bodied ticks have been identified as a means of disease spread in Africa.

Table 5.2 Summary of MPH Emphasis Area Competencies

MPH Emphasis Area: Infectious Diseases/Zoonoses		
Number and Competency		Description
1	Pathogens/pathogenic mechanisms	Evaluate modes of disease causation of infectious agents.
2	Host response to pathogens/immunology	Investigate the host response to infection.
3	Environmental/ecological influences	Examine the influence of environmental and ecological forces on infectious diseases.
4	Disease surveillance	Analyze disease risk factors and select appropriate surveillance.
5	Disease vectors	Investigate the role of vectors, toxic plants, and other toxins in infectious diseases.

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Appendix 1



Certified Swine Sample Collector Program

Division of Animal Health

Subject: Certified Swine Sample Collector Program - KDA

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• Purpose of the Program

During a large-scale foreign animal disease (FAD) outbreak, federal and state resources may become exhausted. When this occurs, pork industry veterinarians, producers, and caretakers become critical resources in the sample collection process on their respective production site(s). A sample collection training program assures state and federal animal health officials that producers and caretakers have been trained through a standardized process by category II accredited veterinarians working in the pork industry to correctly collect, handle, and submit samples prior to an outbreak.

In a multi-state partnership, Kansas is taking steps to increase surveillance capacity within the state through the use of specially trained industry personnel. This program enables rapid return to operations for facilities outside of the control zone during an outbreak, while maintaining quality and accuracy of surveillance testing.

• Background

Currently in the United States, swine-focused veterinarians either collect or oversee the collection of swine samples to test for domestic diseases on production sites. Kansas contributes 2.7% of the Nation's total swine population, ranking number 10 (Shahbandeh, 2020). There are approximately 1,000 swine farms in Kansas, with only 150 of these facilities producing 99% of the state's pig inventory (Kansas Pork Association, 2021). As of February 2021, Kansas has 833 USDA level II accredited veterinarians authorized in the state. However, the actual number available to support a commercial swine outbreak is likely much lower, dependent on whether they are comfortable and competent working with swine and whether they would be willing to assist in an outbreak. During an FAD outbreak, not only do sample collection requirements increase, but biosecurity regulations and downtime requirements also increase. This would make it difficult for the few FAD diagnosticians (FADD) and swine-focused veterinarians to perform all the necessary diagnostic investigations and sample collections for the large number of swine farms involved. It will also be impossible for veterinarians to perform the necessary surveillance or regulatory tasks during an FAD response while also maintaining their ongoing herd health and animal welfare programs on their farms. This support gap could be adequately filled with designated and trained personnel at each site who are ready to collect and submit samples.

• Rational for Training Program

During an FAD outbreak, producers and caretakers could be utilized to help address the limited number of FADDs as well as the shortage of swine veterinarians. However, these individuals will need training in sample collection techniques, ideally prior to an outbreak. Trained individuals could assist with control of the outbreak by collecting samples for the purpose of surveillance. This frees veterinary assets to focus their expertise on investigations of contact premises or those with clinically ill animals.

The absence of such a training and certification program is devastating in that it would greatly hinder our ability to respond appropriately to an FAD outbreak. Surveillance testing is critical in

controlling the outbreak as well as for the implementation of the Secure Pork Supply Plan to ensure that affected but uninfected farms meet the conditions of the movement permit. An inadequate disease response inflicts great harm on the industry long-term, negatively impacts animal welfare, jeopardizes livelihoods, and significantly impacts the U.S. economy.

The decision to utilize Certified Swine Sample Collectors in the event of an FAD outbreak will be determined by the Kansas State Animal Health Official (SAHO). Additional information to be provided in the event of an outbreak will include which samples and how many are to be collected. During the outbreak, accredited veterinarians have final oversight and may need to sign off on submission of the samples collected as determined by the SAHO. This relationship will be critical for the veterinarians and Certified Swine Sample Collector.

• Training Program Overview

Category II accredited veterinarians will train producers and caretakers in sample collection and shipment prior to an outbreak. The veterinarians will utilize provided resources for training so stakeholders can be assured all Certified Swine Sample Collectors are trained and evaluated consistently. Participation in this program is voluntary. Fees may be charged by the veterinarian for the training process. The premises is responsible for costs incurred from training. The training program consists of two components that could be conducted together or in separate sessions:

1. Classroom instruction: Producers and caretakers will review standardized videos and handouts provided, under the instruction of their facility veterinarian. The materials are available in English or Spanish and address sample collection types and techniques as well as clinical signs associated with FAD of interest: African Swine Fever (ASF), Classical Swine Fever (CSF), and Foot and Mouth Disease (FMD). In addition, the veterinarian will review the proper preparation and packaging of samples using the resources provided to ensure arrival at the laboratory in good condition. The standards for shipping will be based on guidance from the National Animal Health Laboratory Network (NAHLN) laboratory, Kansas State Veterinary Diagnostic Laboratory (KSVDL). Sample shipments will be in compliance with Federal Aviation Administration (FAA) regulations. Training can be conducted in a group or individual setting.
2. On-farm training: Following completion of the classroom instruction, the veterinarian will demonstrate sample collection. Trainees will practice sample collection and demonstrate competency for the veterinarian to approve them as Certified Swine Sample Collectors. The veterinarian will also demonstrate preparation and packaging of samples and completion of appropriate laboratory submission forms(s).
3. Optional – NAHLN submissions: In the event of an FAD outbreak in Kansas, the designated NAHLN laboratory for sample submission is KSVDL. Producers and caretakers who have completed the classroom and on-farm instruction can request feedback on routine sample submissions on sampling, preparation, packaging, and

documentation. Request for feedback is done by including a shipment assessment (Appendix 1). The form follows the samples throughout KSVDL and feedback on quality of collection and packaging is documented. The completed form is then returned to the veterinarian who conducted the training via email. While not all swine facilities use KSVDL as their primary diagnostic laboratory of choice for routine surveillance, they are encouraged to become familiar with KSVDL requirements and recommendations before an FAD outbreak.

- **Curriculum**

A variety of training resources are available on sample collection and shipment of samples. At a minimum, to be considered a Certified Swine Sample collector, the trainee will be proficient in:

1. Recognizing basic clinical signs for ASF, CSF, and FMD
2. Collection of oral fluids
3. Collection of whole blood and blood swab
4. Collection of nasal swab
5. Collection of laryngeal swabs
6. Collection of vesicular fluid
7. Preparation of samples for shipment
8. Packaging of samples
9. Completion of submission forms
10. Collection of tissues post-mortem, including spleen, tonsils, and lymph nodes (gastrohepatic and renal for ASF; mesenteric, submandibular, and retropharyngeal for CSF)

- **Logistics**

Classroom instruction necessitates the use of a computer with both audio and video capabilities to play training videos. Room capacity necessary is based on number of trainees. The on-farm training will require access to animals for the purpose of demonstrating sampling techniques.

- **Time Requirements**

Classroom instruction can be expected to take up to 2 hours to complete, depending on questions and discussion. On-farm training can be expected to take up to 4 hours or more depending on the number of trainees present. Training can be completed in 1 day or can be split into 2 separate days, as schedules permit.

- **Training Materials**

- **Course work**

Videos and handouts demonstrating collection for each type of sample are available online for Certified Swine Sample Collectors to review during and after training. Videos and handouts are available on www.securepork.org.

- **Supplies**

Supplies necessary to complete this training are listed below. Facilities are responsible for providing their own supplies and will not be reimbursed for cost.

Collection of Oral Fluids <ul style="list-style-type: none"> • 3/8" or 1/2" cotton Rope (3-stranded twisted, undyed, unbleached) • Gallon plastic bag • Cutting tool • Conical sample tube 	Whole Blood Collection <ul style="list-style-type: none"> • Blood tube • Syringe (or Vacutainer™ Hub) • Needles <ul style="list-style-type: none"> ○ Prewear = 20 x 3/4" or 1" ○ Nursery = 16 or 18 x 1.5" ○ Finisher/adults = 18 x 1.5" or longer 	Tissue Samples Post-mortem <ul style="list-style-type: none"> • Necropsy knife (thin, flexible blade) • Knife sharpener • Surgical scissors • Forceps • Screw-top containers • 10% formalin
Tonsillar Scraping <ul style="list-style-type: none"> • Snare • Speculum • Sterile, long-handled spoon • Dacron®/polyester swab • Sample tube containing 3 ml of TBTB 		Sample Shipment <ul style="list-style-type: none"> • Whirl-pak® or zippered bags • Black electrical tape or parafilm to seal specimen tubes • Paper towels or other absorbent material • Fine point permanent marker • Ball point pen • Submission form • Styrofoam cooler • Frozen ice packs • Cardboard box

- **Evaluation and Reporting**

Evaluation will be based on the following criteria:

1. Collectors must be evaluated by the veterinarian on technical skill. During the on-farm training, veterinarians will observe sample collection and evaluate the collector's technique as acceptable or not acceptable.
2. Optional: On their own within 60 days after the written assessment and the sample collection demonstration, Collectors must collect and submit two samples to a pre-arranged NAHLN lab. The NAHLN lab will evaluate the sample quality and integrity based on packaging and handling.

A Collector must satisfactorily pass the on-farm demonstration in a manner that the certifying veterinarian has confidence the individual will perform well in the future in the absence of supervision. Each individual who passes the sample collection assessment should be documented on the KDA Documentation of Training form (Appendix 2) and the completed list will be signed by the certifying veterinarian. Signed forms will be copied and submitted to KDA by email Dr. Sara McReynolds at sara.mcreynolds@ks.gov. Records will be maintained in USA Herds.

- **Renewal/Recertification**

Retraining and certification of Certified Swine Sample Collectors must be completed annually, from the date of the previous training. Veterinarians should take the renewal training as an opportunity to address performance concerns with past sample submissions as well as any updates to the program. Collectors may “test out” of renewal training by demonstrating appropriate expertise with specified sample collection and appropriate packing for shipment. At a minimum, collectors renewing their authorization must demonstrate competency in the following:

1. Recognizing basic clinical signs for ASF, CSF, and FMD
2. Collection of oral fluids
3. Collection of whole blood and blood swab
4. Collection of nasal swab
5. Collection of laryngeal swabs
6. Collection of vesicular fluid
7. Preparation of samples for shipment
8. Packaging of samples
9. Completion of submission forms
10. Collection of tissues post-mortem, including spleen, tonsils, and lymph nodes
(gastrohepatic and renal for ASF; mesenteric, submandibular, and retropharyngeal for CSF)

Collectors who fail to competently perform the above tasks, must complete the classroom and on-farm training for the specific failed topics with the veterinarian. Veterinarians may elect to conduct the full training annually for all personnel, if desired.

Collectors recertified by the veterinarian will be documented on the KDA Certified Sampler List and a copy submitted to KDA following completion of the training.

Recertification of trained Certified Swine Sample Collectors should also occur whenever there is veterinarian turn-over at the premises. The new attending veterinarian should become familiar with the details of the program and be confident in the skills demonstrated by the collectors before recertifying.

- **Oversight**

KDA-DAH will review Certified Sampler Lists for expired training when Secure Food Supply Plans are being renewed. It is ultimately the responsibility of the premises and attending

veterinarian to ensure training is kept up to date. Failure to do so could result in delayed movement permits as the premises would have to wait for an accredited veterinarian to collect and submit samples.

• Program Implementation

In the event of a commercial swine infectious disease outbreak with either Classical Swine Fever (CSF), African Swine Fever (ASF), or Foot and Mouth Disease (FMD), the decision to utilize Certified Swine Sample will be determined by the Kansas State Animal Health Official (SAHO). Premises will be notified individually that they are authorized to use Certified Collectors to obtain movement permits. This notification will include an email containing the KDA/KSVDL laboratory submission form. Only facilities receiving the submission form will be permitted to utilize certified samplers. Additional information to be provided in the event of an outbreak will include:

- a. The suspected or confirmed FAD agent to test;
- b. which samples to collect;
- c. how many animals to sample;
- d. how many negative tests required before movement permits are authorized;
- e. designated laboratory submission form (to be provided to authorized premises during an outbreak)

During the outbreak, accredited veterinarians have final oversight and may need to sign off on submission of the samples collected as determined by the SAHO. Samples submitted that were not specified by the SAHO will not be tested by the laboratory. Samples submitted by any individual who is not a currently trained Certified Collector or Category II accredited veterinarian will not be tested. Submission forms will be checked against the most current list of certified swine collectors documented by KDA for the approved premises at the time of the outbreak. Finally, samples submitted from facilities not specified in the control and surveillance zones will not be tested.

Certified Swine Sample Collectors and veterinarians will use KSVDL as the designated NAHLN laboratory during an outbreak. Collectors and veterinarians will use the KDA laboratory submission form (Appendix 3) that will be provided in the event of an outbreak. Certified Collectors will be required to document their information on the form for verification against the current training list. Use of a premise ID bar code on the form will be required. Premise ID bar codes can be obtained from KSVDL prior to an outbreak and kept on file. UN3373 labels and discount UPS shipping labels can also be obtained by contacting KSVDL.

KSVDL will report laboratory results to KDA, who will then issue the movement permits to the premises.

Premises within the designated control area of an outbreak can request reimbursement for supplies from KDA.

• **Participant Qualifications and Responsibilities**

• **Trainer**

Sample collection trainers must meet the following qualifications:

1. Be a USDA category II accredited veterinarian.
2. Have a valid veterinarian/client/patient relationship (VCPR) with the premises and collectors they certify.
3. Willingness to co-sign the diagnostic sample submission forms for the Certified Collectors they trained, if required by SAHO.
4. Approval from KDA to conduct training.

The responsibilities of a trainer include but are not limited to:

5. Following program requirements when conducting training
6. Scheduling and conducting sample collection training sessions with producers and caretakers
7. Document names and contact information of those approved to collect samples at the conclusion of training on the KDA Certified Sampler List.
8. Submit copy of trainees approved for sample collection to KDA-DAH and maintain records for 1 year.
9. Conduct renewal training with previously certified individuals on an annual basis or in the event of veterinarian turn-over.

• **Certified Swine Sample Collector**

Certified swine sample collectors must meet the following qualifications:

- Be an employee of the facility where they are certified to collect samples.
- Attend a sample collection training session hosted by attending veterinarian for premises.
- Successfully complete hands-on evaluation demonstrating the correct technique to collect samples
- Be approved by the USDA category II accredited veterinarian for the premises.

The responsibilities of a certified swine sample collector include but are not limited to:

- Participation in training and passing the evaluation.
- Properly collecting, packing, and submitting samples during an FAD outbreak, when given permission to do so by the SAHO.
- Follow the direction of the accredited veterinarian for that premises.
- Renew certification annually.
- Optional: submit the sample shipment assessment (appendix 1) with routine surveillance samples to obtain feedback from KSVDL on performance.

• **Laboratory**

The responsibilities of KSVDL in this program include but are not limited to:

- Providing guidance on how samples should be packaged and shipped appropriately.
- Providing shipping labels to facilities when requested.
- Providing premises ID barcodes to facilities when requested.
- Providing feedback on quality of sample collection, packaging, and shipment via the shipment assessment when requested by the facility.

- Verify sample submission from a Certified Collector using the list provided by KDA

• **Kansas Department of Agriculture**

The responsibilities of KSVDL in this program include but are not limited to:

- Review and update standard operating procedure document.
- Communicate updates to standard operating procedure to veterinarians, Certified Collectors, and KSVDL.
- Provide submission form to authorized premises in the event of an outbreak
- Provide KSVDL with current list of Certified Collectors from authorized premises in the event of an outbreak.
- Provide guidance on completion of the sample submission form.

• **Frequently Asked Questions**

• **Are facilities required to participate in this program?**

The intent of this program is to be voluntary for participation. Participation in this program provides facilities with the opportunity to have specially trained staff prepared to collect the necessary samples for movement permits. Facilities that choose not to participate may experience a delay in obtaining permits for movement as a category II veterinarian must be available to collect and submit the necessary surveillance samples.

• **How long does the certification last?**

Trained samplers must renew their certification annually.

• **Where can I find training materials?**

Training materials have been developed and published by with support from the Secure Pork Board and can be found at:

<https://www.securepork.org/training-materials/disease-monitoring-sample/>

• **How do I submit names of trained personnel to KDA-DAH records?**

Each individual who passes the sample collection assessment should be documented on the KDA Certified Sampler List and the completed list will be signed by the certifying veterinarian. Signed forms will be copied and submitted to KDA by email Dr. Sara McReynolds at sara.mcreeynolds@ks.gov. Records will be maintained in USA Herds.

• **How will I know if my facility is permitted to utilize certified samplers in the event of an outbreak?**

Select facilities will be permitted to submit samples using certified samplers based on their location in relation to active outbreaks. Individual facilities will be notified via email by KDA-DAH that they are authorized to use certified samplers. Included in that email will be the laboratory submission form required in the outbreak, along with additional information:

- a. The suspected or confirmed FAD agent to test;

- b. which samples to collect;
- c. how many animals to sample;
- d. how many negative tests required before movement permits are authorized;
- e. designated laboratory submission form (to be provided to authorized premises during an outbreak)
- **What should I do to receive feedback on sample submission if my facility does not use KSVDL routinely?**

KSVDL will be the designated laboratory sample submission in the event of a commercial swine outbreak in Kansas. Facilities that do not routinely submit samples to KSVDL are encouraged to become familiar with KSVDL's standards and requirements before an outbreak occurs.

Facilities can reach out to KSVDL to generate a premise ID barcode. Pre-formatted UPS ground shipping labels can be obtained from KSVDL by contacting them correctly.

• **Primary Program Contacts**

- *Kansas Department of Agriculture*
- *Laboratory*

• References

<http://www.kspork.org/kansas-pork-stats/>

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Appendix 2

• Certified Swine Sample Collectors Program Laboratory Submission Assessment

Name of Facility:			
Premise ID number:		Facility phone:	
Attending veterinarian:			
Veterinarian email:			
Veterinarian phone:			
Packaged by:			

****To be completed by the Laboratory****

Reviewed by: _____

The shipping container was appropriately addressed.	Yes	No
- Sender's name, address, and phone number present.	Yes	No
- Recipient's name address, and phone number present.	Yes	No
The shipping container was appropriately labeled with the biological substance.	Yes	No
- The statement "biological substance, Category B" was present, or labeled "diagnostic specimen"	Yes	No
- A UN3373 diamond label affixed to the box	Yes	No
All labels on the shipping container were covered in clear tape	Yes	No
Shipping container:		
- Leak-proof	Yes	No
- Rigid	Yes	No
- Insulated	Yes	No
Notes:		
Sample submission paperwork was placed in a plastic bag	Yes	No
Sample submission paperwork was placed between the secondary and tertiary containers	Yes	No
Empty space between the secondary and shipping containers was filled with newspaper or bubble wrap	Yes	No
Ice packs included in the shipment if fresh tissues were sent	Yes	No
- Appropriate number of packs to keep fresh tissues cool	Yes	No



Notes:		
Secondary containers were:	Yes	No
- Leak-proof	Yes	No
- Contained absorbent material	Yes	No
- Contained enough absorbent material to capture all liquid contents	Yes	No
Notes:		
Primary containers labeled properly and legibly	Yes	No
- Tissue source	Yes	No
- Date	Yes	No
- Farm information	Yes	No
- Leak-proof	Yes	No
- Screw-top lids	Yes	No
- Padded to prevent breakage	Yes	No
Notes:		
Was the primary container broken, chipped, or cracked?	Yes	No
Was the primary container leaking?	Yes	No
Was there enough formalin to fix all tissues?	Yes	No
Samples appropriate for requested tests?	Yes	No

Additional comments:



Appendix 3

Certified Swine Sample Collector Program Documentation of Training

Name of Veterinarian:

Name of Facility:

Veterinary Practice (if applicable):

Facility Address:

Phone number:

Facility Phone number:

Email:

Premise ID

Date of Training: _____

Name	Type of Training	
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>
	Initial <input type="checkbox"/>	Refresher <input type="checkbox"/>

By signing, I am confirming that all personnel listed on this document have been trained to standard as specified in the Kansas Department of Agriculture, Division of Animal Health Standard Operating Procedure #####

X

Veterinarian Signature

Appendix 4



Commercial Swine Disease Outbreak Submission Form



KSVDL at Kansas State University

1800 Denison Avenue, Mosier D117

Manhattan, KS 66506

Phone: (866) 512-5650

KSVDL USE ONLY Opened by: _____			KSVDL USE ONLY
Courier: <input type="checkbox"/> Courier <input type="checkbox"/> FedEx <input type="checkbox"/> Drop off <input type="checkbox"/> Mail <input type="checkbox"/> UPS	Coolant: <input type="checkbox"/> Coolant pack <input type="checkbox"/> Dry ice <input type="checkbox"/> Frozen <input type="checkbox"/> Warmer <input type="checkbox"/> None	Condition: <input type="checkbox"/> Good <input type="checkbox"/> Broken <input type="checkbox"/> Leaked <input type="checkbox"/> Other: _____	
<input type="checkbox"/> Sow/Breeding <input type="checkbox"/> Nursery <input type="checkbox"/> Finisher <input type="checkbox"/> Farrow to Finish <input type="checkbox"/> Wean to Finish <input type="checkbox"/> Other: _____			

Company: _____

Company Vet/POC: _____

Vet Phone: _____

Premises ID Barcode – REQUIRED

Site Name (if not on label) _____

Clinical signs? ☐ Yes ☐ No

TEST(S) REQUESTED

☐ African Swine Fever PCR
 ☐ Classical Swine Fever PCR
 ☐ Foot and Mouth Disease PCR

INCIDENT AREA/ZONE

☐ Control Area
☐ Surveillance Zone
☐ Free Zone

REASON FOR SUBMISSION

☐ Mortality/Morbidity Event
☐ Surveillance
☐ Post C&D
☐ Post-Restocking

☐ Permitted Movement

 ☐ Into Control Area

 ☐ Out of Control Area

 ☐ Within Control Area

 ☐ To/From Surveillance/Free Zone

SPECIMEN(S) TYPE

FMD

☐ Vesicular tissue
☐ Vesicular fluid/swab

ASF

☐ Whole blood
☐ Blood swab ☐ Blood card
☐ Fresh tonsil
☐ Fresh spleen
☐ Spleen swab
☐ Lymph node (renal or gastrohepatic)

CSF:

☐ Whole blood
☐ Fresh tonsil
☐ Fresh spleen
☐ Lymph node (mesenteric, submandibular, retropharyngeal)

Certified Swine Sample Collector?

☐ Yes ☐ No

Name: _____

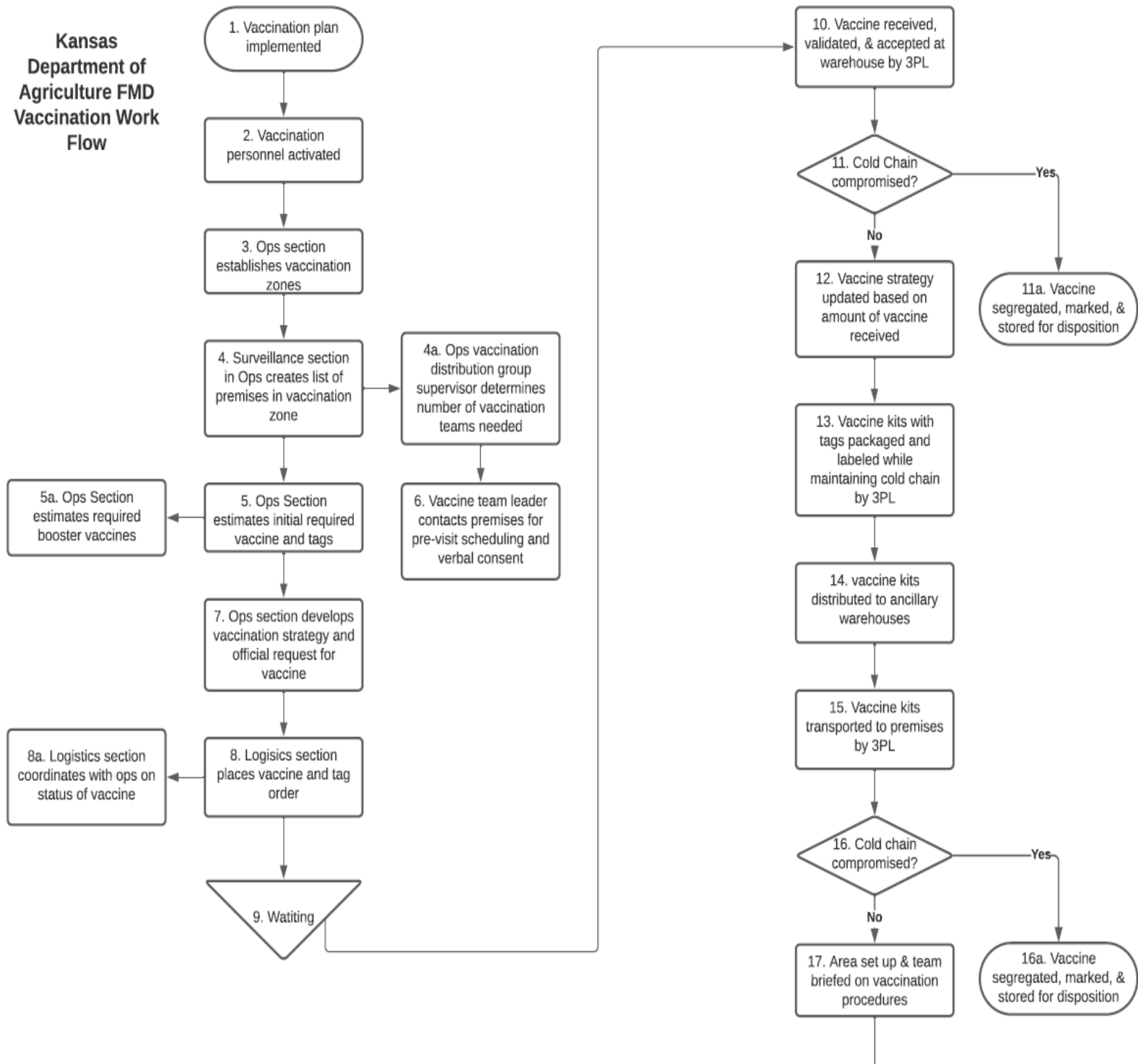
COLLECTION DATE:

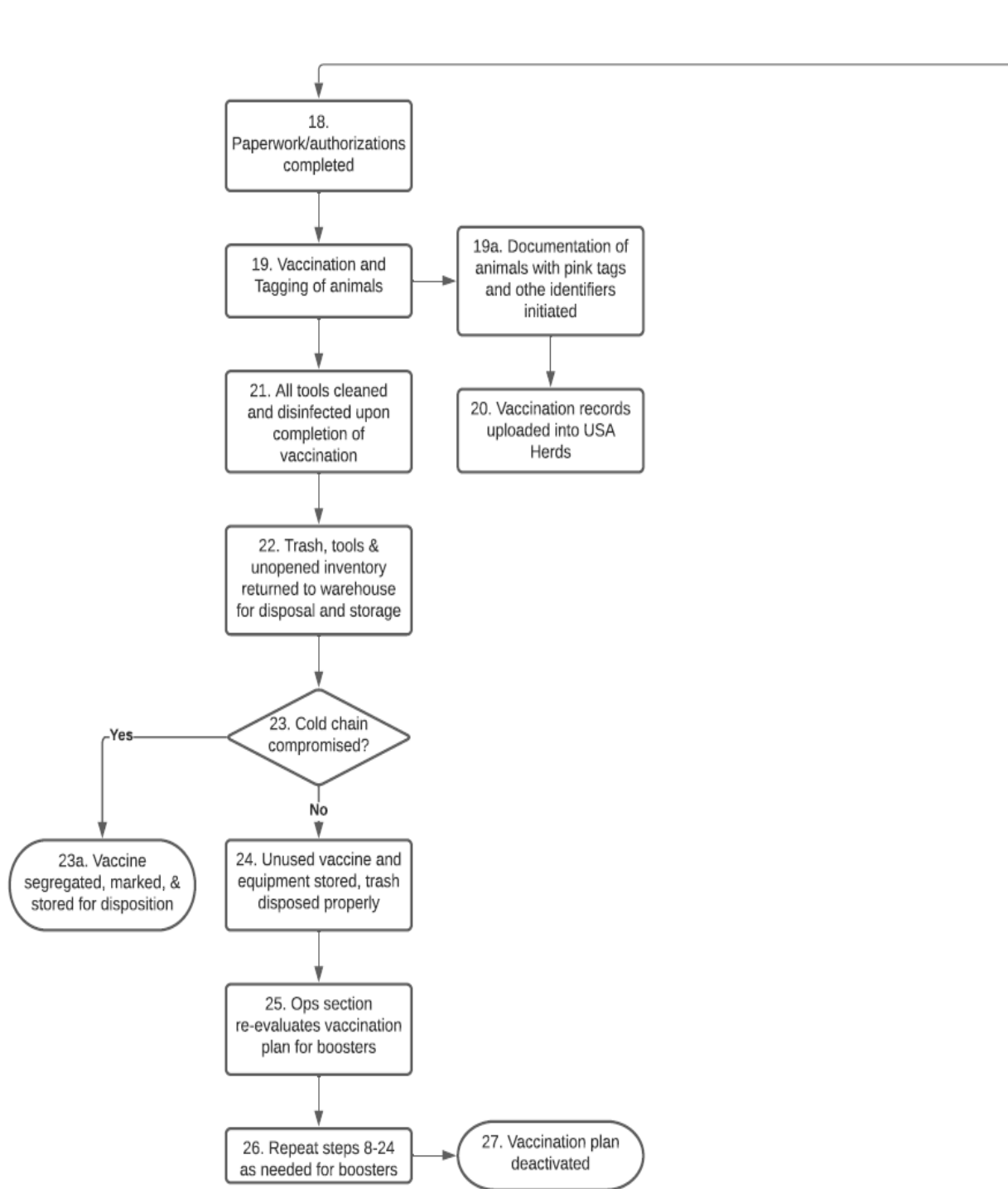
#	Barn / Room ID	Animal / Sample ID	Age/Lot
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

#	Barn / Room ID	Animal / Sample ID	Age/Lot
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Appendix 5

Kansas Department of Agriculture FMD Vaccination Work Flow





Appendix 6



Vaccination Plan

Division of Animal Health

Subject: FMD in North America – KDA Response Actions

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Appendix 7

Foot and Mouth Disease Response Plan Survey

DVM Survey

The purpose of this survey is to determine the understanding by veterinarians of the Foot and Mouth Disease (FMD) outbreak response strategy for Kansas. The information gathered in this survey will assist with the development of an information campaign to improve awareness of the plan and involvement in strategy development. Your input regarding general knowledge of the national and state response plans is greatly valued.

This survey was developed by the Kansas Department of Agriculture, Division of Animal Health (KDA-DAH). The KDA-DAH plays a critical role in shaping the details of the FMD outbreak response strategy of Kansas in order to protect animal welfare and economic interests.

All responses are anonymous and will be summarized by KDA-DAH. This survey is directed at the individual and not facilities or organizations. **It should take approximately 5 minutes to complete.** Please note the survey should be completed in one sitting as the system cannot save your place. We thank you in advance for your contribution.

Demographic Information

What is your U.S. Department of Agriculture - Animal and Plant Health Inspection Service (USDA-APHIS) accreditation level? *

- ☐ Level I
- ☐ Level II
- ☐ Not Accredited
- ☐ Prefer not to say

What are the primary species you work with? Choose all that apply. *

- ☐ Swine
- ☐ Cattle
- ☐ Sheep
- ☐ Goats
- ☐ Horses
- ☐ Other

Understanding of the FMD Response Plan

In the following section, we are trying to determine what stakeholders know about the response strategy to a FMD outbreak.

Are you familiar with the Kansas FMD Response Plan? *

- ☐ Yes
- ☐ No

Are you aware that Kansas will initiate a stop-movement order in the event FMD is detected in North America? *

- ☐ Yes
- ☐ No

Are you aware that vaccination strategies are a viable alternative to culling/stamping out methods? *

- ☐ Yes
- ☐ No

Are you aware that prioritization of animals for vaccination based on species, age, and use may be necessary? *

- ☐ Yes
- ☐ No

Are you comfortable playing a critical role as a USDA-APHIS level II accredited veterinarian supervising vaccination, tagging, documentation, and tracking of animals vaccinated for FMD? *

- ☐ Yes
- ☐ No
- ☐ N/A

Access to Information

The purpose of this section is to provide KDA-DAH with an understanding of information sources available to you on the state's FMD response plan. The information from this section will be used to improve

communication and access to information.

Have you attended a presentation or meeting on the Kansas FMD Response Plan? *

- ☐ Yes
- ☐ No

Who has spoken to you about the Kansas FMD Response Plan? *

- ☐ KDA representative
- ☐ Industry representative
- ☐ USDA-APHIS field veterinarian
- ☐ Other

I know where to find information on the National FMD Response Plan. *

- ☐ Yes
- ☐ No

I know where to find information on the Kansas FMD Response Plan. *

- ☐ Yes
- ☐ No

The KDA website is easy to navigate. *

- ☐ I strongly agree
- ☐ I agree
- ☐ Neutral
- ☐ I disagree
- ☐ I strongly disagree
- ☐ Never visited

The USDA-APHIS website is easy to navigate. *

- ☐ I strongly agree
- ☐ I agree
- ☐ Neutral
- ☐ I disagree
- ☐ I strongly disagree
- ☐ Never visited

Foot and Mouth Disease Response Plan Survey

Producer Survey

The purpose of this survey is to determine the understanding by producers of the Foot and Mouth Disease (FMD) outbreak response strategy for Kansas. The information gathered in this survey will assist with the development of an information campaign to improve awareness of the plan and involvement in strategy development. Your input regarding general knowledge of the national and state response plans is greatly valued.

This survey was developed by the Kansas Department of Agriculture, Division of Animal Health (KDA-DAH). The KDA-DAH plays a critical role in shaping the details of the FMD outbreak response strategy of Kansas in order to protect animal welfare and economic interests.

All responses are anonymous and will be summarized by KDA-DAH. This survey is directed at the individual and not facilities or organizations. **It should take approximately 5 minutes to complete.** Please note the survey should be completed in one sitting as the system cannot save your place. We thank you in advance for your contribution.

Demographic Information

What is your industry? Please choose all that apply: *

- ☐ Beef
- ☐ Dairy
- ☐ Pork
- ☐ Sheep
- ☐ Goats
- ☐ Horses
- ☐ Prefer not to say

What is the total number of animals on your premises or owned by your organization? *

- ☐ Less than 100
- ☐ 100-1,000
- ☐ 1,000-3,000
- ☐ Greater than 3,000
- ☐ Prefer not to say
- ☐ Not applicable

Understanding of FMD

In the following section, we are trying to determine what stakeholders know about FMD, an infectious disease of animals. The answers to these questions will assist with the design of an information campaign.

I am aware of the infectious disease of animals called Foot and Mouth Disease (FMD)? *

- ☐ Yes
- ☐ No

I am aware that FMD poses a significant economic threat to animal agriculture in the United States. *

- ☐ Yes
- ☐ No

I am aware that FMD is not currently in the United States. *

- ☐ Yes
- ☐ No

Understanding of the FMD Response Plan

In the following section, we are trying to determine what stakeholders know about the response strategy to a FMD outbreak.

Are you familiar with the Kansas FMD Response Plan? *

- ☐ Yes
- ☐ No

Are you aware that Kansas will initiate a stop-movement order in the event FMD is detected in North America? *

- ☐ Yes
- ☐ No

Are you aware that vaccination may be an aspect of the disease control response, in addition to euthanasia of infected livestock, in the event of a FMD outbreak? *

- ☐ Yes
- ☐ No

Are you aware that vaccination for FMD might impact the United States' access to international markets? *

- ☐ Yes
- ☐ No

Are you aware that prioritization of animals for vaccination based on species, age, and use may be necessary? *

- ☐ Yes
- ☐ No

Are you aware that animals vaccinated for FMD must be tracked closely for their lifetime? *

- ☐ Yes
- ☐ No

Are you aware that animals vaccinated for FMD would require special ear tags for quick identification? *

- ☐ Yes
- ☐ No

Would you be willing to assist with the vaccination of your animals during an outbreak response? *

- ☐ Yes
- ☐ No

Who do you feel comfortable vaccinating your animals for FMD? Please check all that apply. *

- ☐ Private veterinarian
- ☐ Onsite staff/crew
- ☐ Regulatory Officials (state veterinarians, USDA-APHIS, etc.)
- ☐ Commercial vaccination teams
- ☐ Other

As a producer, what are your primary goals for the FMD response should an outbreak occur? Please select all that apply: *

- ☐ Minimize the loss of animals due to mandatory culling
- ☐ Rapid return to normal operations and movements of animals
- ☐ Rapid return to FMD-free status as defined by the World Organization for Animal Health (OIE)
- ☐ Minimize the impact to animal welfare
- ☐ Other, please explain:

What concerns, if any, do you have regarding Kansas' response strategy in the event of a FMD outbreak. Select all that apply: *

- ☐ I don't have enough information on the plan
- ☐ If vaccination for FMD impacts food safety
- ☐ If there will be movement restrictions on vaccinated animals
- ☐ I don't want my animals tagged
- ☐ No concerns
- ☐ Other, please explain:

Access to Information

The purpose of this section is to provide KDA-DAH with an understanding of information sources available to you on the state's FMD response plan. The information from this section will be used to improve communication and access to information.

Have you attended a presentation or meeting on the Kansas FMD Response Plan? *

- ☐ Yes
☐ No

Who has spoken to you about the Kansas FMD Response Plan in the past? *

- ☐ Industry representative
☐ My veterinarian
☐ Government field veterinarian (state or federal)
☐ Other

What is your primary source for outbreak and animal disease information? Please select all that apply: *

- ☐ Private veterinarian
☐ KDA staff
☐ U.S. Department of Agriculture staff
☐ Industry representative
☐ KDA Division of Animal Health newsletter
☐ Other