Protecting the nation’s animal agriculture industry from foreign animal disease (FAD) is a critical responsibility of state and federal governments of the US. The nation is home to over 2 million farms that house livestock and poultry types that are susceptible to FADs such as avian influenza, foot-and-mouth disease, and African swine fever (ASF).\(^1\) Given the recent number of outbreaks and global spread (including the Western Hemisphere for the first time in 40 years), ASF has received heightened concern and attention to preparedness and response planning.\(^2\) African swine fever is a viral hemorrhagic disease that affects domestic swine and wild boar. Clinical disease can manifest as high fever, vomiting, diarrhea, abortion, hemorrhage, and death. Mortality rates can reach 100% in the acute form of the disease and 30% to 70% in the chronic form.\(^3\) The US economic impact of ASF, when including potential disruption to export markets, has been estimated at $50 billion.\(^4\)

While FAD preparedness is a key activity of the USDA-APHIS, recent outbreaks of ASF within the

**ABSTRACT**

Foreign animal disease (FAD) preparedness is a high priority for state and federal governments to ensure the protection of the nation’s livestock industry. Highly contagious diseases such as African swine fever (ASF) have been the focus of recent advancements in FAD preparedness, including the development of disease-specific response plans. At the state level, FAD response plans provide a framework to help ensure a rapid and coordinated response that considers the resources and realities of that state; however, preparing a comprehensive plan requires collaboration across multiple agencies and sectors that can be difficult to operationalize. To initiate systematic state-level ASF response plan writing and identify gaps in preparedness, university and industry stakeholders partnered with the Ohio Department of Agriculture and USDA to develop the Ohio African Swine Fever Response Plan Workshop. A linear planning model was used to implement the workshop in May 2021. All planning and workshop activities were conducted fully virtually, prompted by public health restrictions in response to COVID-19. Sixty-four participants, representing multiple sectors and stakeholder groups including state/federal/industry animal health officials, emergency management, environmental protection, and academia, contributed to the workshop. Spanning 3 days, participants identified current response capabilities and areas requiring additional planning for an effective state-level response. The workshop generated recommendations from a multisectoral perspective for subcommittees tasked with developing standard operating procedures for the Ohio ASF Response Plan. The methodology and resources used to plan, implement, and evaluate the workshop are described to provide a model for state-level response planning.

**Keywords:** African swine fever, foreign animal disease, response, preparedness, workshop
Dominican Republic and Haiti have stimulated an increased capacity for ASF-focused preparedness such as expanded funding, laboratory partnerships, and development of outbreak response plans in the Americas. The design, development, implementation, and evaluation process for FAD response plans and preparedness activities can be conducted through various methods, including tabletop exercises, workshops, functional exercises, webinars, and field training.

In line with a one-health approach, which mobilizes multiple sectors and disciplines to tackle health threats, preparedness planning and response activities benefit from multisectoral collaboration. State-wide emergency plans seek to achieve unity of purpose through coordination and integration across stakeholders; this shared planning community increases synchronization and helps ensure that the scope and execution of a plan are feasible. This level of collaboration, however, can be difficult to operationalize due to lack of information sharing, imbalanced participation, and other barriers.

Recently, stakeholders from the private sector, nongovernmental organizations, federal and state governments, and academia convened the Ohio African Swine Fever Response Plan Workshop ("workshop") to aid the Ohio Department of Agriculture (ODA) and Ohio-based USDA-APHIS Veterinary Services in the development of the state response plan. The methodology and resources used to plan, implement, and evaluate the workshop are described herein to provide a model for state-level response planning. The methodology can be applied to different disease-response (and other emergency) planning activities in the agricultural and public health sectors to determine current state-level capabilities, promote integrated planning-based discussions, and aid in collaborative decision-making using a multisectoral approach.

**Workshop Design and Development**

The methodology used for planning and executing the workshop was divided into 6 sequential phases: (1) prepare, (2) organize, (3) design, (4) review, (5) implement, and (6) evaluate. The logic model framework, commonly used in public health program planning and evaluation, was used to graphically depict the inputs, activities/outputs, and outcomes associated with each phase (Figure 1).

**Phase 1: Prepare**

The preparation phase marks the initiation of the process. The inputs necessary for the preparation phase include personnel, financial resources, reference materials (e.g., FAD PReP African Swine Fever Response Plan), and project management tools. A development team ("D-team") was assembled in September 2020, which included the State Veterinarian, Assistant State Veterinarian, USDA Area Veterinarian in Charge (AVIC)–Ohio, USDA-APHIS Veterinary Services Emergency Coordinator–Ohio, industry executives from commodity organizations (e.g., the Ohio Pork Council), and members of the Department of Veterinary Preventive Medicine at The Ohio State University (OSU), who led the coordination of this multistakeholder team. The D-team established a monthly meeting schedule to determine workshop priorities, including objectives, focus topics, target audience, and proposed timeline for developing the Ohio African Swine Fever Response Plan Workshop.

**Figure 1**—Logic model produced for the design and development of the Ohio African Swine Fever Response Plan Workshop.
liverables. Concurrently, research on ASF and other FAD preparedness and response plans (Ohio and other states) was conducted.

The D-team discussed the timeline of an ASF outbreak, seeking to identify priority areas that required attention for plan development based on stakeholder input. As a consequence of this process, 4 primary objectives were selected for the workshop: (1) assess the capabilities and efficiency of the state Animal Disease Diagnostic Laboratory (ADDL) during an ASF outbreak response, (2) discuss logistics and planning for depopulation activities during an ASF outbreak response, (3) determine appropriate (and compliant) methods for carcass disposal based on local conditions, and (4) analyze the organization and movement of data and issuance of permits for properties with established premise identification numbers. Each objective was addressed through specific topics (eg, sampling, surveillance, response triggers, and continuity of business) that would become components of an FAD response plan following the discussion by subject matter experts (SMEs) and workshop participants.

The primary target audience was determined to include producers, industry leaders, animal health officials, veterinarians, emergency managers, and environmental specialists within the state.

**Phase 2: Organize**

During the organization phase, the D-team determined workshop logistics using project management–based documents, including a work breakdown structure (Supplementary Material S1) and stakeholder communication plan (Supplementary Material S2). The work breakdown structure included workshop objectives and related activities, parties responsible for each activity, and the estimated time to complete. The communication plan ensured that the D-team received regular stakeholder input throughout workshop development. During the organization phase, a virtual platform (Teams; Microsoft Corp) was used for real-time file sharing and communications.

Additional workshop details were determined in the organization phase, including the event dates, format, and agenda. Due to restrictions on large gatherings during the COVID-19 pandemic, a virtual format was selected to conduct the workshop. Multiple modalities, including large-group facilitated discussions and small-group (breakout) discussions, were selected to engage participants and facilitate knowledge sharing. Each day was scheduled similarly and alternated between more active (eg, breakout group discussions) and more passive sections (eg, status reports) in terms of engagement to appeal to individual preferences and provide opportunities for multiple modes of data collection (Supplementary Material S3). Status reports were intended to provide an overview of the topic and updates on recent or ongoing research. Personnel were identified to provide subject matter expertise aligned with the workshop objectives or to provide organizational and technical support during the workshop (eg, facilitator, evaluator, and notetaker).

To manage participant registration, an online platform was created and linked to electronic “save-the-date” messages and invitations distributed 3 and 2 months prior to the event, respectively. The D-team distributed workshop invitations among their constituents. To ensure the target audience was reached, as well as to facilitate the creation of breakout discussion groups, basic demographic information was collected for each registrant, including their organization/agency, sessions to be attended, and need for accommodations (if applicable).

**Phase 3: Design**

The design phase focused on creating the workshop content. A master presentation was developed using PowerPoint (Microsoft Corp) and consisted of introductory information, information capture details, SME presentation slides, and questions to prompt participant discussion. A facilitator copy of the presentation was also developed and included time stamps that reflected significant benchmarks from the agenda. A master list of targeted questions was developed in alignment with the workshop objectives with the purpose of identifying gaps and logistical concerns within each topic area. This list was reviewed by stakeholders and SMEs to exclude questions that already had explicit answers, were of minimal relevance, or should otherwise not be prioritized for discussion.

Question prompts used a fictitious (but feasible) scenario of how an ASF outbreak could start and followed the timeline of critical activities in the first 72 hours of a response (Figure 2). An example scenario was as follows: What if the outbreak begins by identification of a suspect case on a large commercial operation that spans multiple state lines? A separate set of prompts was developed for the breakout groups to discuss and report back during the brief-back session. These prompts encouraged participants to share ideas and pose additional questions. Online surveys were developed to capture additional participant feedback anonymously and distributed at the end of each day (Supplementary Material S4) and at the workshop conclusion (Supplementary Material S5). Daily surveys (3) related to each day’s respective topic and the postworkshop feedback survey sought to gain feedback on overall workshop dynamics.

**Phase 4: Review**

The purpose of the review phase was to finalize the workshop content and rehearse logistics prior to the event. The D-team hosted practice sessions with the presenting SMEs and the event facilitator to ensure familiarity with the virtual platform and workshop schedule. Registration information was used to create breakout groups, each consisting of 5 to 8 participants. Breakout groups were preassigned to ensure diversity of profession, experience, and organization. A recorder and spokesperson were also predetermined for each breakout group to provide the brief back. Workshop support material (eg, SME biographies and FAD PREP resources) was distrib-

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Workshop Implementation and Evaluation

Phase 5: Implement

The workshop was implemented over 3 days (May 25 to 27, 2021), providing ample time for information delivery, discussions, evaluation, and breaks; this schedule also allowed for delineation of topics by day, such that participants and SMEs could plan and prioritize their attendance. While most participants registered and attended all 3 days, some attended those dates/sessions that directly pertained to their role in the industry. Overall, 64 unique participants registered for the event; day-to-day attendance ranged from 51 to 61 participants (Table 1).

Each day, introductory slides provided a review of the daily agenda, workshop goals and objectives, information capture mechanisms and recording notifications, as well as rules of engagement.

Day 1: Response triggers, diagnostic laboratory capability, sampling, and surveillance—The objective for Day 1 was to assess the efficiency and capabilities of the state ADDL and sampling/surveillance efforts, as these represent important bottlenecks during an outbreak response. Status reports were delivered by the State AVIC (USDA) and the Assistant State Veterinarian (ODA). Presentations outlined possible response triggers and the initial activities that follow. A representative from the Ohio ADDL delivered a status report on the laboratory’s capability for ASF testing. This update provided information on appropriate sample submissions, testing capacity, and laboratory communications. The large-group discussion included prompts detailing various scenarios for how an outbreak could begin and the logistics associated with these possibilities.

The latter portion of the day included a status report by a USDA veterinary medical officer outlining

- Who will be transporting samples?
- What biosecurity measures must be implemented during transportation of samples?
- What agencies need to be notified of a presumptive positive?
- How will veterinarians/producers be kept informed throughout the response?
- How will comments and concerns from the public be received and addressed?

Figure 2—Sample questions designed to prompt discussion among participants in the Ohio African Swine Fever Response Plan Workshop based on critical activities in the first 72 hours of a US African swine fever response14 (image attribution: USDA).

Table 1—Ohio African Swine Fever Response Plan Workshop registration by profession/agency affiliation, May 25 to 27, 2021.

<table>
<thead>
<tr>
<th>Profession/agency affiliation</th>
<th>Registrations (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Ohio Department of Agriculture</td>
<td>18</td>
</tr>
<tr>
<td>Ohio Environmental Protection Agency</td>
<td>2</td>
</tr>
<tr>
<td>Ohio Emergency Management Agency</td>
<td>1</td>
</tr>
<tr>
<td>Federal</td>
<td></td>
</tr>
<tr>
<td>USDA</td>
<td>8</td>
</tr>
<tr>
<td>Industry</td>
<td></td>
</tr>
<tr>
<td>Veterinarians</td>
<td>10</td>
</tr>
<tr>
<td>Other representatives</td>
<td>6</td>
</tr>
<tr>
<td>Academic</td>
<td></td>
</tr>
<tr>
<td>University faculty</td>
<td>6</td>
</tr>
<tr>
<td>Graduate/professional students</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
</tr>
</tbody>
</table>
sampling requirements (eg, transportation and sample types) and surveillance zones for ASF. These topics were further explored during the breakout group discussions and focused on the logistics of transporting the sample from the farm to the lab as well as the personnel and resources required for sampling/surveillance activities. Breakout groups used prompts to discuss individual concerns, resources, and logistics of diagnostic laboratory capability, sampling, and surveillance from the perspective of the participants’ agency/organization.

**Day 2: Depopulation and carcass disposal**—The objectives for Day 2 were to discuss logistics and planning for depopulation activities and determine appropriate methods for swine carcass disposal within the state. Both depopulation and disposal are complex activities with significant legal and regulatory constraints, as well as considerable demands regarding personnel, equipment, supplies, logistics, and funding. The status report for depopulation was delivered by an OSU faculty member who described methods of depopulation outlined in the AVMA Guidelines as well as ongoing depopulation research conducted within the OSU College of Veterinary Medicine in partnership with the National Pork Board. Large-group discussion for depopulation prompted participants on feasible methods within Ohio, necessary equipment needed, options for obtaining resources, personnel responsible for performing depopulation activities, and the consideration of alternative methods that are currently being researched.

The carcass disposal status report was delivered jointly by SMES from the OSU and USDA and provided information on the legal options for carcass disposal within Ohio following emergency depopulation. An overview of the standard disposal options (incineration, landfill, rendering, burning, composting, deep burial, and aboveground burial) was provided. Options not currently available, including burial, incineration, and alkaline hydrolysis, were briefly discussed, as well as emerging techniques and related topics, such as storage, transport, and carcass management tools.

Large-group discussion for disposal prompted participants on topics similar to the depopulation discussion, as well as on-site and airspace security during disposal and depopulation activities. Two breakout group sessions were held on Day 2; groups were prompted to discuss individual concerns, resources, and methods feasible within the state for depopulation and disposal.

**Day 3: Continuity of business, Secure Pork Supply Plan, permitting, and data management**—Day 3 objective was to analyze the organization and movement of data and permitting processes. Permitting is another important bottleneck that directly affects the timely and secure movement of animals during an outbreak. Coordination between state and federal animal health officials, industry, producers, and other stakeholders (eg, law enforcement and emergency management) is critical to maintain continuity of business (COB). Status reports were provided on the Secure Pork Supply Plan and current requirements and procedures for permit submission and approval; reports were presented by an OSU faculty member and ODA veterinary medical officer, respectively. Large-group discussion prompted participants on challenges of developing, reviewing, and accessing Secure Pork Supply plans, permitting process logistics and requirements, and the transition from a 72-hour standstill to the COB process.

Data management, the final workshop session, provided a status report by a USDA-APHIS Epidemiology Officer and included general outbreak data management and information on platforms such as Emergency Management Response System 2.0, AgView, and USAHERDS. Large-group discussion was focused on communication between the various data platforms and types of data that must be readily available in an outbreak (eg, animal movement records).

Day 3 ended with a breakout group discussion. Groups were prompted to discuss concerns, resources, and challenges pertaining to COB and data management. The workshop was finalized with an overview of the next steps in the development of the Ohio ASF Response Plan. These steps included committee/subcommittee formation, organization and summarization of workshop information, production of an ASF Workshop After-Action Report for use by the ASF Response Plan Committee and D-team, initiation of Ohio ASF Response Plan writing, and conduct of ongoing exercises to test the drafted response plan.

**Phase 6: Evaluate**

Several methods of information capture were used during the workshop and included live recording (with participant notifications), real-time note-taking by observers, online participant feedback surveys (daily and postworkshop), and postworkshop evaluation by trained observers using a template (Supplementary Material S6). All data were consolidated and stored within the virtual platform and accessible to the D-team upon workshop completion.

Online participant surveys were distributed using the survey software Qualtrics XM (Qualtrics International Inc). Thirteen participants completed the postworkshop feedback survey (20% response rate). Most (92%) survey respondents attended all 3 workshop days. Mean ratings of survey questions are shown (Table 2). Respondents’ major takeaways from the workshop included the importance of interdisciplinary collaborations for enhanced communication, ensuring there are multimodal capabilities for varying response scenarios, and incorporation and engagement of industry partners. Respondents felt that the highest priority areas for ASF response planning included increased input and outreach with industry (n = 6), general communications and coordination across sectors/stakeholders (3), depopulation/disposal (3), and laboratory capacity (1).

The D-team reviewed the surveys and evaluations to determine whether the workshop goals and objectives were achieved and identify areas for improvement. An after-action review was conducted.
with the D-team to debrief, identify and assign action items, and review the next steps in ASF response plan writing. A formal report (the After-Action Report), including survey results and evaluator and notetaker summaries, was generated and provided to the response plan-writing subcommittees to assist with development of the Ohio ASF Response Plan.

Discussion
The Ohio African Swine Fever Response Plan Workshop identified opportunities for further research and discussion around the state’s response capabilities. Additionally, areas where Ohio is on the leading edge of FAD preparedness (eg, depopulation and carcass disposal research) were highlighted, suggesting opportunities for collaboration and outreach beyond the state. Information derived from the workshop was immediately utilized to advance the state’s ASF planning efforts through topic-specific subcommittees that were coordinated by the State Veterinarian and AVIC. Thus, topic selection and organization within a workshop require careful consideration. The subcommittees were developed on the basis of response plan components, and in turn, several workshop objectives and topics matched the subcommittee sections. This alignment was important in producing discussion points that were directly relevant to the ASF plan. Inevitably, certain topics were excluded from the workshop (eg, virus elimination and epidemiologic tracing), given scheduling constraints.

The COVID-19 pandemic necessitated the virtual workshop delivery; however, this modality has both advantages and limitations. Remote participation increased accessibility to participants who may be more geographically distant or whose schedules would otherwise prevent their continuous participation. Seasonal demands of veterinarians and industry representatives (eg, farrowing and fairs/shows) need to be considered regardless of the modality, but virtual options may increase the likelihood of participation. Additionally, virtual delivery eliminates or reduces costs associated with facilities, transportation, and accommodation. Reduced costs, depending on whether they are absorbed by host organizations or participants, can also increase the number and diversity of attendees.

On the other hand, fully virtual workshops may decrease engagement by some participants. Participants can be vulnerable to distractions within their environment. Participants may also experience issues with the technology (eg, internet connectivity) or videoconferencing fatigue that hampers their experience. While virtual meeting platforms have increased in use during the COVID-19 pandemic, participants may not be familiar with a selected platform. Selecting a virtual format to conduct a workshop may require training for presenters and detailed instructions provided to participants before the event.

For program planning and evaluation, the logic model framework provided a structured, linear approach to project management. Focusing on a single phase at a time allowed activities to be easily coordinated among the D-Team. The logic model framework outlined the target deliverables for each phase and provided visualization of the overall planning process. This approach is beneficial for FAD response planning events that cover a range of topics, require multiple days to conduct, and include participants from multiple agencies or sectors. Additionally, this framework can be layered with readily available tools, templates, and guidance documents that exist for emergency preparedness and planning, such as those available through the Homeland Security Exercise and Evaluation Program.

Considerations for implementing a logic model framework should be made, however, as workshop coordination may not always be linear. This methodology also requires project managers to obtain well-defined stakeholder expectations and early identification of deliverables prior to conducting project activities. When utilizing this methodology, it is important to consider that project planning occurs up-front, leaving little flexibility for changes once a phase is complete.

This workshop implemented multiple modes of information collection to optimize participant engagement and utility of the event for advancing Ohio’s ASF Response Plan writing. On all 3 days, direct written remarks from the participants were received along with recorded notes generated by the discussions through designated evaluators and notetakers. It is important to consider, however, whether recording prevented more “free-flowing” dialogue due to the sensitivity or political nature of certain topics. Some studies on qualitative research methods have indicated that, in some circumstances, note-taking by experienced, well-trained personnel may produce comparable data quality as audio-recorded transcripts, without the influence a recording device may introduce. The authors suggest that future planning workshops

Table 2—Responses received by Ohio African Swine Fever Response Plan Workshop participants on the postworkshop feedback survey, using a scale from 0 (not at all) to 10 (extremely); n = 13.

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Mean (SD)</th>
</tr>
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<tbody>
<tr>
<td>How well did the workshop achieve its stated objectives?</td>
<td>7.92 (1.82)</td>
</tr>
<tr>
<td>How helpful was the workshop overall in furthering Ohio’s African swine fever planning efforts?</td>
<td>7.54 (3.63)</td>
</tr>
<tr>
<td>How easily were you able to provide inputs (questions/concerns/opinions) either in writing or verbally during this workshop?</td>
<td>8.00 (1.68)</td>
</tr>
<tr>
<td>How prepared for an African swine fever outbreak response did you feel Ohio was BEFORE this workshop?</td>
<td>4.38 (1.27)</td>
</tr>
<tr>
<td>How prepared for an African swine fever outbreak response do you feel Ohio is AFTER this workshop?</td>
<td>6.15 (1.23)</td>
</tr>
</tbody>
</table>
implement a multimodal data capture plan, however, as the participants’ ability to provide their inputs was a reported strength of the event.

Overall, the workshop largely achieved its aims on the basis of outputs produced, level of engagement between diverse stakeholders, and the direct feedback from participants. It is important to note, however, that an outcome of such an activity may be the discovery of more questions. Building a follow-up plan or activity, such as the subcommittee working groups, into the planning phases is recommended to continue momentum, particularly when a workshop is designed to move a particular topic forward.

**Recommendations**

Foreign animal disease response planning is a critical activity that requires coordination at the state level as high-consequence diseases, such as ASF, continue to threaten the livestock industry in the US. State-level activities, such as workshops, will serve as a key component of preparedness; therefore, planning and execution of these events should be conducted systematically to enhance their effectiveness and efficiency. Multisectoral engagement from workshop conceptualization to evaluation will aid in identifying gaps, encouraging collaboration between stakeholders, and eventually developing a robust response plan. Veterinarians, agricultural representatives, and others involved in emergency preparedness can utilize this methodology for response planning program design and development.

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Supplementary Materials

Supplementary materials are posted online at the journal website: avmajournals.avma.org