Secure Milk Supply Plans:

Creating Plans Through a Student-Led, Processor-Organized Model

Abstract

Secure Milk Supply (SMS) plans for enhanced biosecurity provide a business continuity strategy for dairy producers in the event of a foot-and-mouth disease outbreak. During the summers of 2022, 2023, and 2024, Washington State University veterinary and undergraduate students created SMS plans for 101 premises representing 70 dairies within Washington. This project's success was dependent upon the collaborative efforts of Northwest Dairy Association field managers who proved to be the bridge between the students and producers. Producers reflected that they appreciated having students as an intermediary between them and state officials, preferring to support education rather than regulation.

Introduction

Biosecurity

Everyday biosecurity protocols are foundational for managing and preventing endemic diseases and risk factors on dairy farms. Everyday plans often contain significant gaps with limited capacity to mitigate transmission of highly contagious foreign animal diseases (FAD). Everyday plans must be enhanced to include more stringent proactive measures, templates, resources, and standard operating procedures to prevent FAD transmission and mitigate risks. Foot-and-mouth disease (FMD) is considered the most contagious disease of livestock, and an FMD outbreak would prove economically devastating to the US agricultural economy (APHIS 2020). As such, FMD serves as the epidemiological model for organizing enhanced biosecurity plans and templates on dairies.

Secure Food Supply (SFS) Plans

Secure Food Supply (SFS) plans provide enhanced biosecurity, surveillance, and movement guidance (CFSPH 2025b). Specific to dairies, the goal of a Secure Milk Supply (SMS) plan for enhanced biosecurity during an FMD outbreak is to provide a workable business continuity plan for dairy producers who have cattle with no evidence of FMD infection in a regulatory control area (SMS Secure Milk Supply 2017a, 2018). SMS plans depend on a line of separation (LOS) dictating that vehicles, livestock, and humans enter through controlled access points with cleaning and disinfection (C&D) stations. SMS biosecurity plans also cover contact information, routine biosecurity training, vehicle and equipment movement, personnel movement, animal movement, accessing animal products, carcass disposal, manure management, rodent and wildlife control, and feed movement.

Creation and Adoption of SFS Plans

The creation and adoption of SFS plans has been an area of national interest, given the potential for detrimental animal health and supply chain disruptions from any FAD outbreak in the US. Specifically, an FMD outbreak in the US would not only diminish meat and milk production but also indefinitely undermine public confidence, collapse domestic markets, shut down agricultural exports, and lead to cumulative losses likely exceeding $100 billion over 10 years (Pudenz et al. 2021). State animal health officials have regulatory oversight of animal and product movement

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during an FMD outbreak and have agreed to the SFS plans as a mechanism for national standardization. These plans aim to safely promote business continuity while minimizing the risk of spreading disease through interstate movement.

SFS plans create a framework for producers, processors, and regulatory officials to prepare in advance for an FAD. Specifically, producers develop a customized, implementable plan, and state animal health officials preapprove those plans for milk and animal permitting, enabling processors to maintain the milk and meat supply chain during an FMD outbreak. SMS preplanning, implementation, and verification prior to an outbreak is critical, as personnel resources for plan writing and approval will be limited during a response. The producer–regulatory official–processor model enhances coordination and communication between all stakeholders, allowing for rapid response and reducing the economic impact of an outbreak.

Evaluations of the early adoption of enhanced biosecurity protocols within both Secure Pork Supply (SPS) plans (Pudenz et al. 2019) and Secure Beef Supply (SBS) plans (Pudenz et al. 2021) have been conducted through the Department of Economics at Iowa State University. Data from a 2019 survey of US swine producers indicated that SPS plan biosecurity adoption is variable and affected by producers' perceptions of the feasibility of implementation of specific biosecurity practices (Pudenz et al. 2019). Producer and operation demographics, acceptance of risk, and complementarity of practices all influenced whether producers adopted recommended SPS plan biosecurity measures. Similarly, results from the SBS evaluation indicated that adoption of enhanced biosecurity practices is generally low, including limited adoption of three strongly recommended pre-outbreak practices: identifying a biosecurity manager, establishing an LOS, and constructing a written, operation-specific enhanced biosecurity plan (Pudenz et al. 2021). Specific to dairies, the USDA National Animal Health Monitoring System (NAHMS) Dairy 2014 study identified gaps in biosecurity preparation, especially with regard to visitors, animal contact, and challenges associated with constructing C&D stations (USDA 2018).

Much of the effort to increase the creation and early adoption of everyday and enhanced biosecurity SFS plans across livestock commodity groups has been driven by state-level outreach utilizing industry representatives, university Extension staff, and others to leverage local information and relationships. The lack of a uniform system for completing SFS plans underlies our focus on describing the novel model utilized to create operation-specific enhanced biosecurity plans inclusive of an LOS on dairies within the state of Washington. In addition to demonstrating this proof of concept that incentivized multiple partners for the development and adoption of SMS plans on dairy farms, we (1) documented frequent challenges identified by dairy producers or managers regarding SMS plan implementation and (2) explored potential farm-specific changes made to current everyday biosecurity protocols to satisfy the SMS plan requirements.

Methods

The Washington State Department of Agriculture (WSDA), Northwest Dairy Association (NDA), and teams of WSU veterinary and undergraduate students and Veterinary Medicine Extension faculty collaborated to create SMS plans for dairies across Washington during the summers of 2022, 2023, and 2024. The process began each summer with NDA field managers enrolling dairies to meet with the students hired as Veterinary Medicine Extension interns. Although dairies of any size can benefit from biosecurity planning, for this project, dairies large enough to fill an entire milk truck were prioritized due to their impact on the supply chain in the event of an FAD outbreak. To prepare for the meetings, the summer 2022 students initially practiced creating SMS plans at two university-affiliated locations under the supervision of the Veterinary Medicine Extension faculty member (McConnel). Each subsequent summer's student team was guided through the process by a previous summer's student during the first week of commercial dairy visits.

Meetings with participating dairy producers or managers were initiated by NDA field managers and led by the students who began with an explanation of the SMS plan, details regarding FMD, and the benefits (e.g., business continuity) of having a proactive WSDA-approved plan in the face of an FAD outbreak. The team then outlined the plan using a customizable template (SMS Secure Milk Supply 2023a). Emphasis was placed on explaining the LOS and the outsized impact it has as a barrier to reducing disease spread. To facilitate a productive conversation regarding the location of the LOS, an easily annotated aerial screenshot was downloaded on an electronic tablet prior to the meeting. Most of the draft plan was created alongside the producer using the tablet while working within a farm's office space. This allowed the students and producers to effectively keep notes and provided an overhead screenshot of the premises upon which the producer highlighted areas for loading and unloading animals and feed, carcass disposal, personnel parking, and C&D stations. The map provided a platform for collaborative problem solving during the planning process. Tours of potential problem areas for maintaining the LOS or other aspects of the SMS plan occasionally were required for clarification. Problem areas included identifying a location for a C&D station, routes for transportation of feed, the path of the milk truck, and dynamic variations in vehicle traffic due to harvest. Most questions in the SMS plan were answered during the process of creating the premise map which increased the efficiency of completing the draft plan.

Many dairies had secondary locations that increased the complexity of the plan and for which a premise map was

created by annotating the main SMS plan as needed. Once a rough draft of the SMS plan was completed with the producer or manager, the student team would depart the farms and complete a final draft of the plan offsite. This included editing the rough draft of the maps, straightening the LOS, using appropriate colors and figures as indicated by the LOS legend, and creating an easy-to-understand final product. Finally, a binder was created which included the final plan, premise map(s), and resources for the producer. Resources included additional SMS plan information (SMS Secure Milk Supply 2017b), an FMD fact sheet (CFSPH 2015), a C&D biosecurity tip sheet (CFSPH 2025a), a supply list, instructions and resources for setting up a temporary C&D station (CFSPH 2025a), Environmental Protection Agency-registered disinfectants for FMD virus (SMS Secure Milk Supply 2023a), a carcass disposal biosecurity tip sheet (CFSPH 2021), movement and entry logs (SMS Secure Milk Supply 2023b), and specific biosecurity signage (CFSPH 2025c). A follow-up meeting was scheduled within a few weeks to deliver the folder containing the SMS plan and associated resources to the producer. During this final visit, the plan was briefly summarized and edited based on producer input. Challenges regarding SMS implementation and potential changes to current biosecurity protocols were documented as well. A digital copy of the SMS plan was provided so producers could update their plan as needed. A de-identified copy was then sent to the WSDA for final approval of the plan. An overall list of preapproved dairies for permitting during an FMD outbreak is maintained by WSDA using farm names without Personally Identifiable Information.

Results

During the summer of 2022, SMS plans were created for 38 farm production units (FPUs) representing 25 dairies within Washington. During the summer of 2023, SMS plans were created for 37 FPUs representing 20 dairies within Washington. During the summer of 2024, plans were created for 26 FPUs representing 25 dairies within Washington. On-farm discussions and mapping were completed in two hours on average, though some visits lasted only one hour and some up to four hours due to variable complexity of production systems, such as the presence of multiple milk houses. After a site visit was completed, it took an additional one to four hours for the students to formally draft the SMS plan and further develop each map.

Challenges to SMS Plan Implementation

There were several potentially challenging areas identified by farmers as they completed the plans. These included identifying a location for the C&D station that would have a combination of adequate drainage, water access, and convenience for vehicles coming on and off the farm. Given the logistical hurdles, some producers did consider preemptively creating a space for a permanent C&D station. Farmers also noted that in the event of an outbreak the movement of calves and heifers to and from offsite growers would prove difficult. Consequently, halting movement during an outbreak would necessitate dairies and offsite growers to house and manage animals for which they are unaccustomed and unprepared to provide care. This fact inevitably led to a discussion regarding the need for backup management plans inclusive of temporary housing and foodstuffs for the dairies, calf ranches, and heifer growers if faced with an FAD outbreak.

Another area to consider was the movement of vehicles during crop harvest. Complications due to custom harvesters inevitably steered the conversation toward keeping harvest vehicles outside of the LOS while keeping routine feed trucks inside the LOS. In general, farmers felt that the high volume of daily vehicle traffic onto their operations would make it challenging to maintain an orderly and efficient flow of traffic across an LOS. To that end, several producers suggested that monitoring the LOS access points would be a logistical issue. Entry points would likely need round-the-clock monitoring during an outbreak, which could lead to potential staffing issues for operations already strapped for qualified employees.

Adaptation to On-Farm Biosecurity

All participants acknowledged the importance of maintaining an SMS plan on-site for promoting business continuity in the event of an FMD outbreak. However, most participants did not plan on incorporating any changes to current, everyday biosecurity protocols in response to making an SMS plan. In some cases, this was due to representatives lacking the power to implement changes rather than a lack of interest. Overall, only two producers specifically mentioned a plan to utilize the resources we provided to set up biosecurity signage, and just a single operator said they were considering incorporating boot washing into the normal routine of their employees. However, several producers did express interest in implementing routine biosecurity training to instill awareness of disease spread and the role of employees in maintaining herd health.

Discussion

This project demonstrated a novel model for incentivizing multiple partners to create SMS plans for dairy farms. The successful creation and approval of SMS plans for 101 dairy FPUs was dependent upon the collaborative efforts of NDA field managers who proved to be the bridge between the participating students and producers. The field managers facilitated the scheduling of meetings,

provided credibility to the conversation including the logistics of milk collection in the event of an FAD outbreak, and possessed invaluable knowledge related to specific dairy practices and management styles. Before each meeting it was helpful to consult the NDA field managers regarding the location of the milk house, the boundaries of the facilities, and additional locations beyond the dairy proper. Importantly, field managers encouraged producers to develop SMS plans by highlighting that these plans would not only help maintain business continuity in an FAD outbreak but also fulfill their obligation to file a biosecurity plan with the NDA per National Dairy Farmers Assuring Responsible Management (FARM) Program requirements.

Allowing students to take the lead in creating the SMS plans was instrumental to the success of this project as well. Producers reflected that they appreciated having students as an intermediary between them and state officials, preferring to support education rather than regulation. Notably, the participating students were able to gain broad insight into dairy production and learned invaluable problem-solving skills. Through the creation of the SMS plans, they developed an appreciation for the nuances and challenges associated with biosecurity and risk mitigation that will inevitably benefit them as they enter the veterinary profession.

Although students played an important role in communication with producers, it was essential to have the support and knowledge of the WSDA personnel. Many producers had questions about closing public roads, combining multiple dairies, compensation during mass mortality events, and other complex, state-regulated areas. WSDA personnel were able to address these questions and the feasibility of different producer proposals to meet permitting requirements for milk movement during an FMD outbreak. It also was solely up to the WSDA to officially approve plans and determine if they were feasible or required emendation.

Within Washington, this student-led, processor/industry-organized model continues to be used for ongoing SFS plan development across commodity groups, including dairy, beef, sheep, and swine, and can be rightsized or modified to address other highly transmissible disease threats, such as African swine fever and highly pathogenic avian influenza (HPAI) in dairy cattle. Given current concerns regarding HPAI in dairy cattle and other mammals, there is a real-time national significance to preparing for emerging or foreign animal diseases. Enhanced biosecurity plans have been foundational for the USDA response model, and producers have been given financial incentives to implement plans to contain and prevent viral spread. Although SMS plans were developed with FMD in mind, they are excellent “off-the-shelf-ready” tools for producers to protect their farms proactively. That said, this project documented frequent issues raised by dairy farmers regarding SMS plan implementation and clearly demonstrated challenges to the early adoption of enhanced biosecurity practices due to producer perceptions of the feasibility of implementation. Specifically, producers indicated that preparing for C&D stations and vehicle movement, particularly during harvest, pose two of the greatest hurdles to SMS plan implementation.

Conclusion

This project verified a proof of concept for a novel model that relies on developing relationships between key partners to create SMS plans for dairy farms. The collaboration of producers, processers, university Extension, state regulatory officials, and students was the foundation for this project’s success in creating operation-specific enhanced biosecurity plans for 101 dairy FPUs. However, producer perceptions of the feasibility of implementation limited their willingness for early adoption of enhanced biosecurity practices.

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