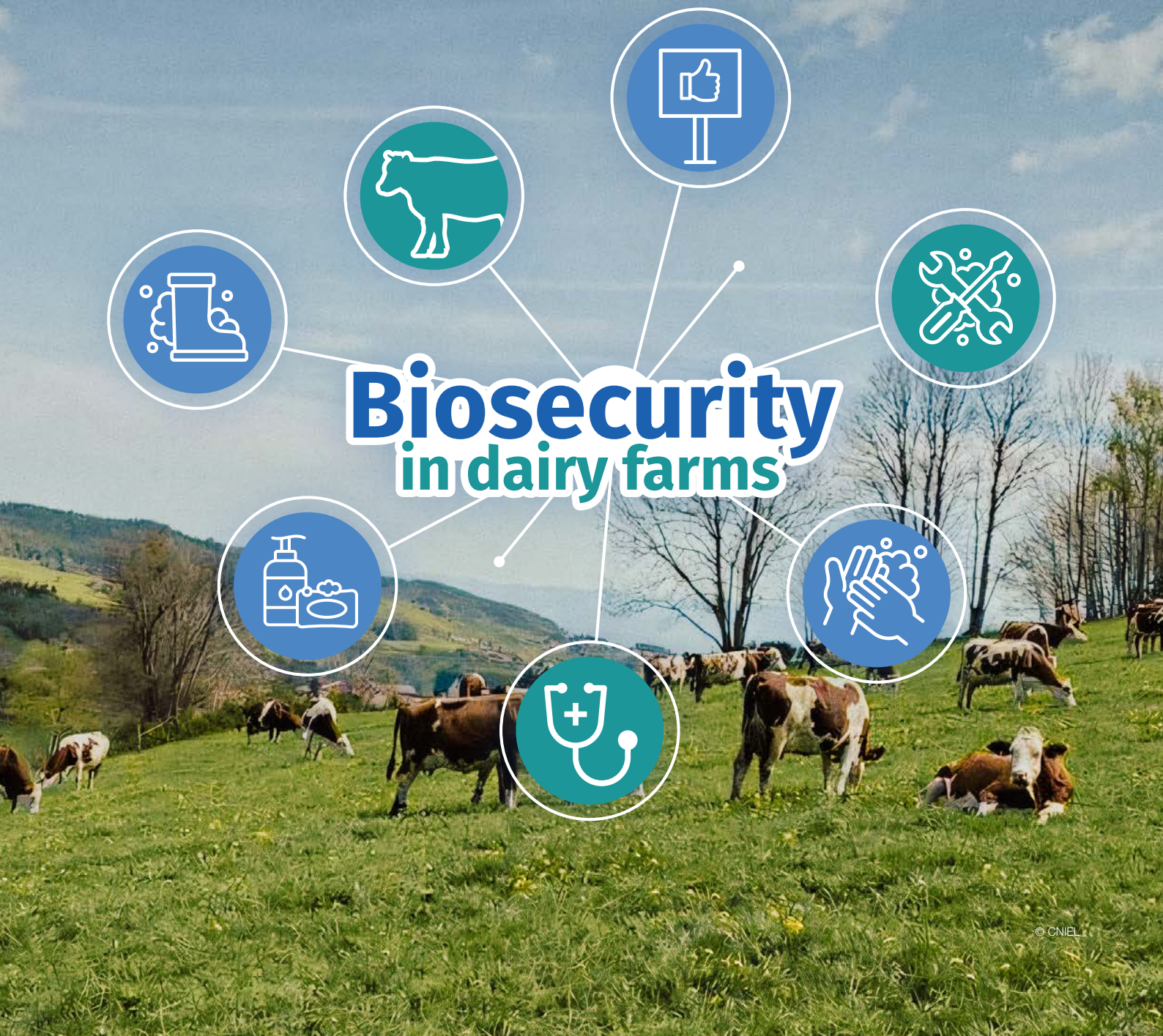
Issue N° 19 - December 2025

IDF ANIMAL HEALTH REPORT

Research progress | Global insights | Expert opinion



PREFACE

MESSAGE FROM THE IDF DIRECTOR GENERAL

Welcome to this new edition of the IDF Animal Health Report. At the International Dairy Federation, we deeply value the daily work of veterinarians, farmers, and specialists who safeguard the health and wellbeing of the livestock that sustain communities worldwide. Their expertise is fundamental, not only to the productivity of our sector, but also to its ability to operate sustainably and responsibly.

Animal health is a cornerstone of sustainable dairy production. Healthy livestock convert feed more efficiently, reduce environmental impact, and contribute to food security by providing safe, high-quality milk. When disease strikes, the consequences ripple across the value chain: production declines, food losses increase, and the environmental footprint per litre rises. Protecting animal health is therefore essential to achieving the Sustainable Development Goals and building resilient food systems capable of withstanding global challenges such as climate change, emerging diseases, and market volatility.

This edition focuses on **biosecurity**, one of the most effective, science-based strategies to prevent disease and promote animal welfare. Biosecurity measures whether controlling animal and visitor movements, improving housing conditions and hygiene, or strengthening herd monitoring form the first line of defence against infectious threats. Prevention reduces the risk of outbreaks; limits pathogen spread and ultimately decreases the need for antimicrobial treatments. In doing so, biosecurity supports responsible antimicrobial stewardship and advances the **One Health** approach, which recognizes the interdependence of human, animal, and environmental health.

Across the globe, dairy farms are adopting innovative tools to reinforce on-farm biosecurity, from digital monitoring systems to data-driven herd management. Yet technology alone is not enough. Effective biosecurity depends on awareness, training, and collaboration among all actors in the dairy chain. Farmers, veterinarians, advisors, researchers, and authorities each play a vital role in designing and implementing practical, fit-for-purpose measures that reflect local realities.

In this report, you will find science-based insights and practical examples demonstrating how robust biosecurity systems protect animal health, enhance farm resilience, and support sustainable dairy production. By linking strategic planning, sector collaboration, everyday management, surveillance, and preparedness, these contributions highlight the sector's commitment to disease prevention, productivity, and long-term sustainability.

By sharing this knowledge, we aim to empower dairy stakeholders to make informed decisions that support healthy animals, prosperous farms, and a sustainable future. Together, by placing prevention and biosecurity at the heart of our efforts, we continue building a resilient dairy sector that delivers safe, nutritious, and sustainable dairy products.

Laurence Rycken
Director General, International Dairy Federation

MESSAGE FROM THE CHAIR IDF SCAHW

Infectious diseases continue to pose a threat to our dairy herds and milk supply globally and so it is fitting that this year's Animal Health Report focuses on Biosecurity. Whether we are dealing with new pathogens crossing species barriers, such as HPAI (H5N1), or long-established pathogens such as FMD, the daily diligence of our farmers and animal health advisors in maintaining best practice in infectious disease control is critical. The articles in this report remind us that best biosecurity practice is made up of critical initiatives at the international, national, regional and farm level. All of these elements need to be functioning effectively to maintain the preparedness and resilience of our animal industries. Unfortunately, many of the fundamental biosecurity tasks at all levels are tedious and time-consuming, and in times of perceived reduced infectious disease threat our diligence tends to wane. The articles in this issue highlight the important work being done across the value chain by our international community to heighten awareness, strengthen surveillance and preparedness, re-invigorate best practice and overcome barriers to adoption of dairy herd and flock biosecurity.

Many thanks to the action team members lead by Line Ferriman, our head office staff and the many contributors to this report. I hope you find the following content as interesting and inspiring as I do.

David Kelton, DVM, PhD, FCAHS
Professor Emeritus
Chair IDF Standing Committee on Animal Health and Welfare

MESSAGE FROM THE ACTION TEAM LEADER

This year, the IDF Standing Committee on Animal Health and Welfare chose to focus on biosecurity, reflecting a timely need to look closely at how we protect animal health in a changing landscape. The recent detection of HPAI (H5N1) in dairy cattle in the United States, along with the ongoing trans-boundary presence of FMD, has shown how quickly risk can move. It is a reminder that prevention remains one of our most reliable tools.

Biosecurity is not solely a checklist — it is a practical discipline shaped by context, constraints and consequences. The contributions in this edition show this clearly: managing FMD in dense dairy regions, adapting protocols in high-risk environments, responding to new disease pathways and planning for cattle movements under pressure. Across these varied settings, a consistent theme emerges — risk reduction depends on clear responsibilities, workable routines and systems designed to hold up when conditions are far from ideal. These experiences highlight an important point: effective biosecurity is built through deliberate choices long before a crisis arrives.

My sincere thanks to the authors whose insight and generosity bring this edition to life. I hope you enjoy it.

Line Ferriman
Action Team Lead
Member of the IDF Standing Committee on Animal Health and Welfare.

INTERNATIONAL AND NATIONAL BIOSECURITY STRATEGY

NORWAY

STRENGTHENING DISEASE SURVEILLANCE AND PREPAREDNESS: A NORDIC DAIRY SECTOR COLLABORATION NETWORK (NMSM)

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UNITING NORDIC EXPERTISE TO TACKLE EMERGING ANIMAL HEALTH THREATS

Each year, representatives from Nordic dairy organizations meet to address shared challenges in animal health within the dairy sector. As herd sizes grow and animal movements become more frequent, the risk of disease transmission increases. Emerging threats like avian influenza and foot-and-mouth disease highlight the critical need for strong and consistent biosecurity measures. Yet, motivating consistent implementation of these measures on farms remains a common challenge.

Pathogens do not respect national borders—and some, carried by vectors, are even less constrained. Understanding the disease landscape and surveillance strategies in neighboring countries is therefore vital for effective preparedness.

Expertise in animal diseases, diagnostics, surveillance, and the dairy value chain can be limited within individual countries. Veterinarians working in dairy organizations play a crucial role as advisors, guiding decision-makers, farmers, fellow veterinarians, and authorities to act swiftly and knowledgeably in times of crisis. While no single organization can hold all the necessary expertise, collaboration across the Nordic region strengthens collective preparedness. By pooling knowledge and resources, our countries are better equipped to respond to emerging threats.

”By sharing knowledge and comparing results across borders, we strengthen our ability to detect, respond to, and prevent animal diseases—together.”

Erik Rattenborg

TRANSLATING SHARED KNOWLEDGE INTO ACTION FOR HEALTHIER NORDIC DAIRY HERDS

The Nordic dairy sector collaboration network (NMSM) aims to strengthen disease surveillance, preparedness, and sustainability in dairy farming through shared expertise, coordinated strategies, and policy support—ensuring knowledge is translated into action for improved animal health and welfare in the Nordic dairy sector.

COLLABORATIVE ACTION AND SUSTAINED SUCCESS: ANNUAL MEETINGS, SHARED STRATEGIES, AND VIGILANCE IN DISEASE CONTROL.

The NMSM network, established in 1967, holds an annual meeting, and this year’s two-day event was hosted in Iceland. On the first day, participants worked in three dedicated groups:

1. Animal health
2. Milk quality
3. Milking technique

The second day brought all participants together for joint presentations on industry-relevant topics, followed by the annual plenary session. The photo shows attendees from all three working groups. The NMSM logo (Figure 1) incorporates the flags of each Nordic country.

In the Animal Health group, key discussions focused on strategies for disease surveillance, animal welfare programs, udder health challenges affecting milk quality, and sustainability documentation. Each country also shared brief updates on current dairy research and how new knowledge is being adopted in the industry. Below are examples of this year’s discussion topics related to biosecurity and animal health.

Motivation of farmers to implement biosecurity measures

All Nordic countries are undergoing structural changes in the dairy industry (Figure 2). While the pace varies, the trend is consistent: herd sizes are increasing, production is becoming more specialized, and animal movements are more frequent. These developments raise the stakes—introducing disease into larger herds has more severe consequences, and maintaining high levels of biosecurity becomes both more challenging and more critical.

A shared challenge across the five countries is motivating farmers to adopt stronger biosecurity measures. Each country has taken a different approach, for example:

- Sweden promotes *Smittsäkrad besättning*, a program to enhance both internal and external biosecurity by self-assessment, bulk milk tank sampling, and veterinary visits for assessment and advice. Currently 62% of dairy farms are enrolled in the program.
- Norway and Finland have integrated biosecurity into their animal welfare programs. These include annual veterinary visits that assess and advise on biosecurity practices.
- Danish law requires farms with over 100 cows to discuss biosecurity issues with the herd veterinarian annually. An industry policy for biosecurity is under preparation.

Ongoing disease outbreaks and disease surveillance

A major European outbreak of Bluetongue (BTV-3) began in the Netherlands in autumn 2023 and spread to Denmark, Sweden, and Norway during the fall of 2024. Information and promotion of vaccination along with surveillance through sampling on farm and in bulk milk has so far given us an overview of the spread. So far, the situation in 2025 has been less dramatic than last year. Other topics discussed in the disease surveillance session included *Mycoplasma bovis*, Streptococcus agalactiae, and Salmonella, along with preparedness strategies for avian influenza and foot-and-mouth disease.

Nordic disease control successes and the challenge of staying alert

The Nordic countries have successfully eradicated or controlled several chronic

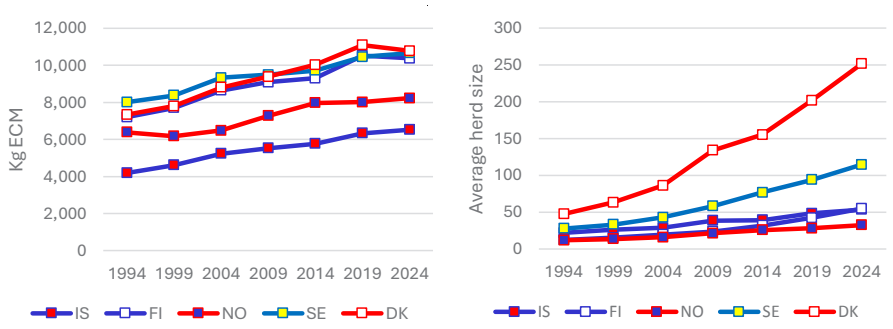
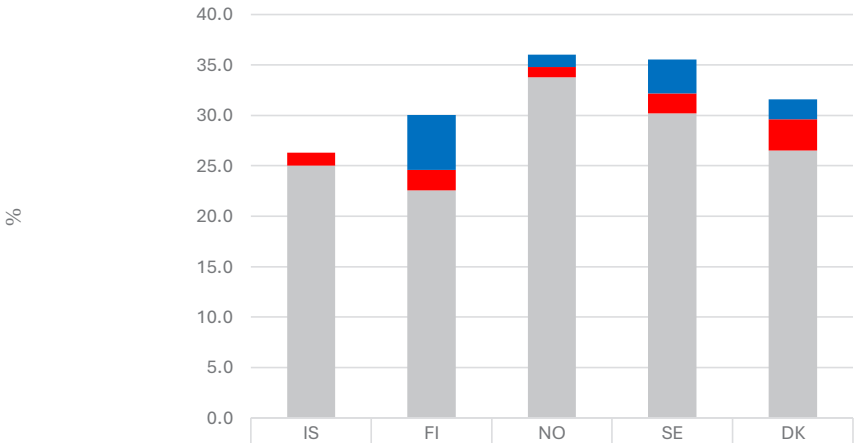


Figure 2: Following the structure development in the Nordic countries.



	IS	FI	NO	SE	DK
Cows euthanized on fram		5.5	1.2	3.4	2.0
Cows dead on farm	1.30	2.04	1.00	1.97	3.10
Cows sent to slaughter	25.0	22.6	33.8	30.2	26.5

Figure 3: Example of key performance indicators compared in yearly NMSM meetings. Replacement rate and cow mortality in dairy herds in the Nordic countries

livestock diseases, including tuberculosis, paratuberculosis, BVD, and ringworm. In Norway, ringworm in cattle has been controlled through vaccination and sanitation, though occasional reintroductions still occur and are followed up. The Healthier Goat programme (2001–2014) led to the eradication of paratuberculosis in goats, and BVD was eliminated through a national control effort from 1993 to 2007, closely aligned with similar programs in other Nordic countries.

However, keeping awareness high for diseases that have been out of sight for years remains a challenge. Early detection depends on alert veterinarians and effective surveillance—such as bulk tank milk sampling where relevant. Continued alertness is essential to prevent reemergence and protect the progress made.

Comparing key performance indicators – a powerful motivation tool

Before the meeting, each Nordic country gathers data on key performance indicators (KPIs) related to udder health, milk quality, and mortality. During the Animal Health session, these figures are compared and discussed—exploring trends, potential causes, and areas for improvement. Naturally, a friendly competition emerges over who performs best.

This year, Denmark unexpectedly overtook Sweden in achieving the lowest bulk milk somatic cell count between the two countries. Other indicators, such as calf and cow mortality (figure 3), served as a wake-up call for some countries, bringing home an important message - *we can do better*.

Ultimately, these indicators are more than just numbers, they are vital benchmarks for sustainability in Nordic milk production. Comparing performance across neighboring countries, whether in calf mortality or somatic cell counts, helps us identify best practices and raise the bar collectively.

COLLABORATION AS THE CORNERSTONE OF RESILIENCE AND SUSTAINABILITY

Collaboration across the Nordic dairy sector offers a unique opportunity to share expert knowledge and strengthen preparedness. No single country can maintain top-level expertise in all areas, but together, we form a robust support network. Despite differences in management, we face common challenges—like emerging diseases and biosecurity gaps. Benchmarking KPIs and sharing strategies, such as responses to avian flu, *Mycoplasma bovis*, or bluetongue, fosters awareness and action. Friendly competition motivates progress, while the network ensures that critical knowledge reaches farmers, advisors, and decision-makers. In this way, collaboration becomes a cornerstone of resilience and sustainability.

HARMONIZING KPIS AND ADVANCING DISEASE SURVEILLANCE

The next NMSM network meeting will take place in Norway in May 2026. In the meantime, the working groups will continue developing key topics to present at next year's gathering.

For the Animal Health group, the focus areas include:

- Ensuring comparability of KPIs, e.g., aligning how calf mortality is calculated across countries
- Mapping disease surveillance practices: which diseases are monitored, what tests are used, and what proportion of herds are investigated
- Publishing Nordic data on milk quality and udder health

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AUSTRALIA

SAFEGUARDING AUSTRALIAN DAIRY: HOW AUSVETPLAN PREPARES THE COUNTRY FOR ANIMAL DISEASE EMERGENCIES

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AUSVETPLAN: AUSTRALIA'S UNIFIED SHIELD AGAINST ANIMAL DISEASE THREATS

Australian Veterinary Emergency Plan (AUSVETPLAN) is Australia's nationally agreed approach to responding to emergency animal diseases (EADs) of national significance. It comprises resources that support efficient, effective and coherent responses to these diseases.

Effective responses to EAD incidents require planning at national, state and territory, and district levels. They also require the involvement of animal health authorities, livestock and affiliated industries, organisations in affected communities, and emergency management organisations.

AUSVETPLAN has been developed and agreed upon by governments and relevant industries in non-outbreak times to ensure that a coherent, efficient and effective EAD response can be implemented consistently across Australia with minimal delay.

DEFINING ROLES AND RAPID RESPONSE IN EMERGENCIES

While the plan is specific to Australia, AUSVETPLAN is a good example of harmonized emergency management, so that during an EAD incident every organization knows their role and responsibilities. It also provides a framework for rapid policy development as unforeseen risks emerge during an EAD Response. Additionally, it provides reference materials for Australian EAD response training and exercises. The plan is available in English on the Animal Health Australia website.

STRATEGIC MANUALS AND COLLABORATIVE PLANNING IN AUSVETPLAN

AUSVETPLAN comprises disease-specific response strategies, operational manuals, enterprise manuals and management manuals.

For each disease listed in the Emergency Animal Disease Response Agreement, a specific response strategy has been developed. These contain the agreed policy (and supporting technical information) for the response to an incident – or suspected incident – of the disease in Australia.

Operational manuals describe in detail the recommended procedures for activities that are common to most emergency animal disease (EAD) responses.

Enterprise manuals, including for dairy, are developed for specific types of enterprises that pose special economic or disease eradication problems, or are important in the spread or impact of

certain EADs. They provide information and guidance on the structure and operations of the relevant type of enterprise, the key risks to enterprises – and posed by enterprises – in EAD incidents, and how these may be managed in an EAD response.

The Control centres management manual provides a management structure for handling an EAD outbreak at national, state and territory, and local levels.

> "AUSVETPLAN is the game plan that Australia has for tackling an Emergency Animal Disease such as Foot and Mouth Disease"
>
> **Peter Dagg**

The Laboratory preparedness manual exists to assist veterinary laboratories to prepare an EAD contingency plan for an EAD emergency.

The continual development of the AUSVETPLAN is led by Animal Health Australia (AHA) in collaboration with government and industry stakeholders at the national, state, and territory levels.

HOW PREPAREDNESS PROTECTS AUSTRALIA'S DAIRY INDUSTRY

Australia has enjoyed a reputation for clean, healthy and disease-free agricultural production systems through our natural advantage of geographic isolation. This has also given Australian producers an edge in a very competitive international environment. Australia's dairy industry underpins regional economies, employing around 37,000 people on farms and in processing, with a strong multiplier effect in rural communities. Milk and milk products

are a major export and domestic food source, so any emergency animal disease (EAD) incursion, such as foot-and-mouth disease or lumpy skin disease, could halt trade, disrupt supply chains and devastate farm incomes. EAD preparedness, via AUSVETPLAN, ensures rapid detection, containment and continuity of processing, protecting animal welfare, market access and consumer confidence. For a sector built on perishable, high-value products, EAD readiness is essential insurance for farmers, processors and regional livelihoods.

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ARGENTINA

CERTIFICATION OF GOOD PRACTICES FOR BOVINE DAIRY PRODUCTION

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INTRODUCTION

In April 2022, based on joint work between specialists in the dairy sector and the Argentine Institute of Standardization and Certification (IRAM), the IRAM 14400 standard was created, called "Good Practices for Bovine Dairy Production" (BPL). This standard allows certifying a set of procedures, conditions and controls that are applied in the dairy farm, with the aim of preserving the safety and quality of the milk produced, the safety of people, animal welfare and care for the environment. In this context, the team of the National Dairy Directorate (DNL) of the Ministry of Agriculture, Livestock and Fisheries (SAGyP), coordinated by the National Director of Dairy Sebastián Alconada, carried out an important management throughout 2024 focused on promoting the proper application of Good Dairy Practices.

CERTIFICATION IN THE PROVINCE OF CÓRDOBA

In relation to the province of Córdoba, this synergy was reflected in a joint work between the DNL, the Provincial Government and Institute of Agricultural Technology (INTA), visiting the establishment "El Lahual" and its dairy farm "San Carlos", located in the town of Villa María. Additionally, in August 2024, the DNL together with the Government of Cordoba and INTA again made the first visit to the "Grupo Mharnes" establishment, also located in the Cordoba town of Villa María.

CERTIFICATION TIMELINE

After the initial analyses, both establishments began working individually with the consulting company SER COW TECH (specialized in dairy production technologies), led by DVM Eial Izak and Agr. Eng. Kevin Díaz Cervigni. A consultant carried out a diagnosis for each farm and communicated the results, allowing both establishments to begin the necessary improvement actions to meet the required guidelines.

Once the farms believed they had fulfilled all outstanding requirements, they were visited by IRAM's specialized auditor, Agr. Eng. Enrique Kurincic, on November 27 and 28, 2024. Following this audit, IRAM issued the official certificate along with the final report for each establishment.

These two dairy farms are noteworthy as the first in Argentina to receive IRAM certification in Good Practices for Bovine Milk Production.

WHAT DOES THE REGULATION EVALUATE?

- Facility requirements: floors, lighting, feeders, drinking troughs, holding pen, milking parlor, milk room, electrical installations, integrated pest management, etc.
- Staff requirements: hygiene, risks and first aid, health, safety, welfare, training, etc.
- Requirements for animals: food and water, breeding, reception and dispatch of animals, milking and herding conditions, mastitis control and prevention plan, animal health, etc.
- Traceability: identification of animals, identification of treated animals, traceability of inputs, etc.
- Input requirements: Chemicals and veterinary products.
- Waste management: waste products, veterinary product packaging, chemical packaging, inorganic solid waste, slurry management, etc.
- Environmental management: efficient use of natural resources, energy and agricultural inputs, crop rotation, phytosanitary products, fertilizers, meteorological information, management and efficient use of water.

CONCLUSIONS

Good Dairy Practices allow to achieve environmental, economic and social sustainability for processes in the production unit, which results in safe products of the expected quality. The possibility opens up for the Argentine dairy sector to comply with the regulations, which will be key to improving the position in the international dairy chain, which is increasingly demanding from the consumer.

JAPAN

BIOSECURITY AND INFECTIOUS DISEASE CONTROL IN JAPAN'S DAIRY INDUSTRY

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A UNIFIED NATIONAL APPROACH TO BIOSECURITY

Japan, an island nation with high livestock densities, faces constant risks of infectious disease in its dairy sector. To address this, the Standards of Rearing Hygiene Management (SRHM) under the Act on the Prevention of Infectious Diseases in Livestock provide a uniform national biosecurity framework. This is bolstered by a nationwide network of livestock hygiene service centers, prioritizing surveillance, diagnostics, and farmer education. Daily animal health care is delivered by clinical veterinarians, including those from NOSAI. Together, these roles enable early detection and coordinated responses, safeguarding herd health and ensuring the integrity of Japan's milk supply.

INTEGRATING LAW, VETERINARY SERVICES, AND FARMER CONFIDENCE FOR DISEASE PREVENTION

This initiative integrates legal standards, public veterinary services, and clinical veterinarians to prevent and control infectious diseases in dairy cattle. It ensures animal welfare, milk safety, and production stability, while fostering farmer confidence through transparent, science-based, and standardized biosecurity practices nationwide.

IMPLEMENTING BIOSECURITY THROUGH COLLABORATION

The Standards of Rearing Hygiene Management (SRHM), stipulated under the Act on the Prevention of Infectious Diseases in Livestock, mandate strict measures for farm access, hygiene, and record-keeping, with compliance overseen by local governments. Livestock hygiene service centers, staffed by veterinarians and technicians, conduct on-farm surveillance, sampling, diagnostics, and farmer education, coordinating through national data-sharing platforms. Clinical veterinarians, including those from NOSAI, provide daily herd health care, diagnosis, and treatment, collaborating with the centers on infectious disease monitoring. The National Institute of Animal Health (NIAH) under the National Agriculture and Food Research Organization (NARO) provides scientific support, develops diagnostics, and conducts joint research to enhance response capacity.

> "Strong coordination between national and prefectural authorities, livestock hygiene service centers, and clinical veterinarians is the cornerstone of Japan's infectious disease control in the dairy sector."
>
> Yoshio Kiku

BUILDING RESILIENCE IN DAIRY DISEASE CONTROL

Japan's dairy sector has fortified its disease control system through lessons from past outbreaks, including the 2010 foot-and-mouth disease and earlier bovine brucellosis cases, which led to stronger national biosecurity and eradication programs. Livestock hygiene service centers conduct regular farm visits to monitor for diseases such as enzootic bovine leukosis (BLV) and Johne's disease. Clinical veterinarians, including those from NOSAI, provide daily herd health care. Mastitis control has advanced through improved milking practices and farm management. The Standards of Rearing Hygiene Management have reinforced hygiene, traffic control, and record-keeping, supporting animal welfare, milk safety, and public confidence in Japan's dairy industry.

COORDINATED ACTION FOR HERD HEALTH: BENEFITING FARMERS AND CONSUMERS

The SRHM and livestock hygiene service center framework exemplifies coordinated disease control between national and prefectural governments. The national government manages international biosecurity and provides scientific and technical support, while prefectural centers implement on-farm surveillance, diagnostics, and farmer education. Clinical veterinarians, including those from NOSAI, deliver daily herd health care and collaborate with centers on disease monitoring. This structure enables rapid identification of infectious diseases and swift countermeasures, strengthening preparedness and response. It aligns with One Health principles and supports antimicrobial resistance (AMR) strategies through improved disease control. Farmers gain accessible guidance, and consumers benefit from safer milk and reduced zoonotic risk.

EMBRACING DIGITAL INNOVATION AND ONE HEALTH FOR THE FUTURE OF DAIRY BIOSECURITY

Japan is advancing the integration of digital biosecurity measures within its coordinated national–prefectural

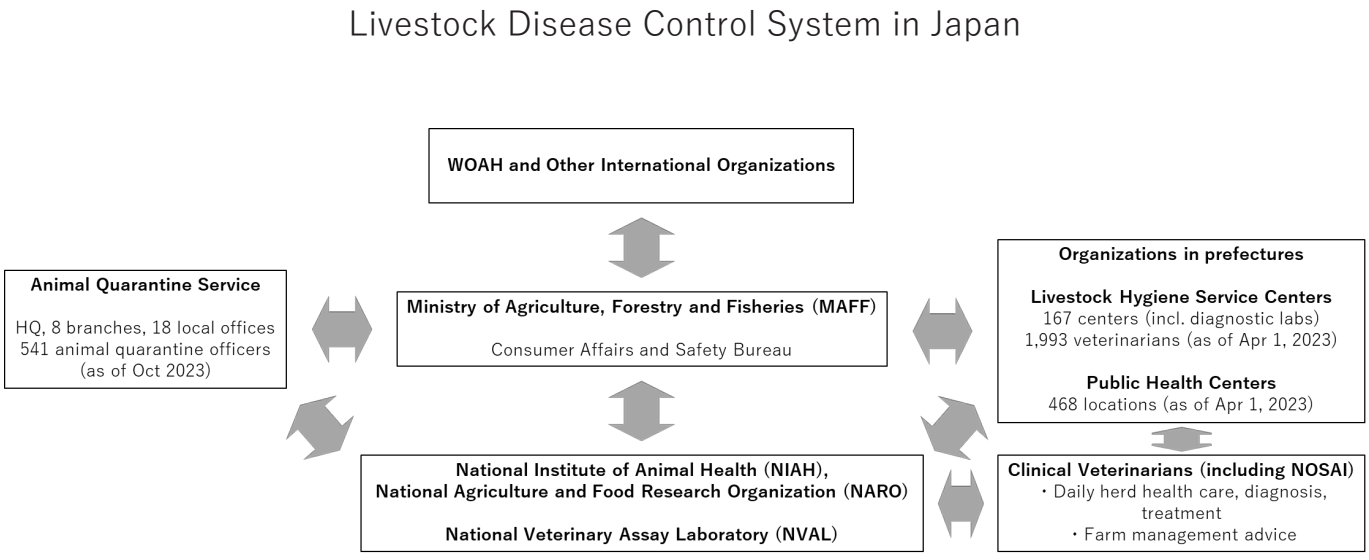

Figure: Structure of Japan's livestock disease control system, integrating the Ministry of Agriculture, Forestry and Fisheries (MAFF), prefectural livestock hygiene service centers, clinical veterinarians (including those from NOSAI), and the National Institute of Animal Health (NIAH), NARO, with linkages to international collaboration (e.g., WOAH).

system. Recent initiatives include mobile technologies for real-time disease monitoring and reporting, developed with research institutions and pilot farms. Geographic information systems (GIS) visualize outbreaks, and centralized platforms enhance surveillance data management. Future plans aim to embed One Health principles and expand international collaboration. The Ministry of Agriculture, Forestry and Fisheries (MAFF) and the National Agriculture and Food Research Organization (NARO) promote smart livestock management by integrating health, environmental, and productivity data. Strengthening agricultural education, expanding livestock hygiene service center functions, and enhancing collaboration with clinical veterinarians are priorities for addressing antimicrobial resistance and climate-related vector-borne diseases, offering potential lessons for other countries.

FOR FURTHER INFORMATION

please refer to the Ministry of Agriculture, Forestry and Fisheries (MAFF) website (https://www.maff.go.jp/e/index.html), the National Institute of Animal Health (https://www.naro.go.jp/english/laboratory/niah/index.html), and Japan's AMR Action Plan (https://www.mhlw.go.jp/content/10900000/001096228.pdf). The Standards of Rearing Hygiene Management and the Act on the Prevention of Infectious Diseases in Livestock provide the legal framework for Japan's disease control system. These resources provide detailed insight into Japan's national strategies for livestock health, biosecurity, and disease control.

UNITED STATES

SECURING THE SUPPLY: STRENGTHENING DAIRY HERD HEALTH THROUGH STRATEGIC PLANNING

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SAFEGUARDING DAIRY FARMS AGAINST FMD

In the event of a foot-and-mouth disease (FMD) outbreak, the United States will implement movement restrictions, enhanced biosecurity measures, surveillance, depopulation, and vaccination (USDA 2020). Although FMD was eradicated from the U.S. in 1929, its reintroduction could severely impact dairy farmers and the broader economy—making preparedness essential. The Secure Milk Supply (SMS) Plan for Continuity of Business offers strategic guidance for dairy farms under movement restrictions, provided their cattle show no signs of infection (SMS n.d.). Importantly, FMD is not a public health or food safety concern.

EXPANDING BIOSECURITY RESOURCES AND RAPID RESPONSE CAPABILITIES

This initiative expanded the FARM Biosecurity Program (FARM n.d.) to include resources about on-farm biosecurity practices and integrate aspects of the Secure Milk Supply Plan into easily accessible training and certification. A database was developed to collect and share data with state and federal animal health officials if an FMD outbreak occurs.

BUILDING A CULTURE OF CONTINUOUS IMPROVEMENT THROUGH COLLABORATIVE BIOSECURITY PLANNING

Supported through funding from the U.S. Department of Agriculture National Animal Disease Preparedness and Response Program (USDA 2021), a biosecurity task force composed of dairy farmers, veterinarians, cooperative staff, and state animal health officials was formed to guide FARM Biosecurity Program development. The task force determined that the program must foster a culture of continuous improvement and evolve to incorporate the latest research into biosecurity best management practices.

> ”FARM Biosecurity equips dairy farmers with the tools to protect their herds—and the industry—against foot-and-mouth disease before it strikes.”
>
> **Dr. Jamie Jonker**

MEASURABLE PROGRESS IN DAIRY BIOSECURITY NATIONWIDE

The FARM Biosecurity Program established a platform for everyday and enhanced biosecurity for dairy farms across the United States. The program created free producer resources, including the FARM Everyday Biosecurity Reference Manual (FARM 2022a) and producer everyday biosecurity plan template (FARM 2022b). The FARM Program database was expanded to be able to securely host individual dairy farm Secure Milk Supply plans (SMS 2017) with data sharing capabilities. In December 2022, National Milk Producers Federation and Kansas Department of Agriculture completed an FMD exercise, testing the database’s data sharing capabilities; an after-action report identified areas for further data sharing opportunities and improvement. Since its launch, 151 people have taken the online enhanced biosecurity training and 40 have been trained in person. Participants were surveyed with an overwhelming positive response, many noting the training was the ideal length and they felt ready to help put together enhanced biosecurity plans.

CONNECTING PRODUCERS AND AUTHORITIES FOR PROACTIVE OUTBREAK RESPONSE

This multi-year initiative established a coordinated framework that links dairy producers with state and federal animal health authorities, ensuring all stakeholders operate with a unified understanding of biosecurity protocols. The FARM Biosecurity Program equips producers with tools to proactively prepare for a potential FMD outbreak, including awareness of response protocols and regulatory requirements. Its integrated training modules and secure data-sharing infrastructure also support animal health officials by streamlining communication and facilitating rapid access to enhanced biosecurity plans, thereby improving outbreak response efficiency.

NEW TRAINING, BROADER DISEASE COVERAGE, AND ENHANCED DATA SHARING

As the FARM Biosecurity Program continues to evolve, a second in-person training will be offered to FARM Evaluators and state animal health officials to guide them in developing SMS plans for dairy producers. To further support implementation, the FARM Program is

Biosecurity signage. (National Milk Producers Federation/National Dairy FARM Program)

Biosecurity plan preparation and review with a dairy farm owner. (National Milk Producers Federation/National Dairy FARM Program)

In-person biosecurity training (National Milk Producers Federation/National Dairy FARM Program)

creating additional optional modules focused on specific areas of biosecurity planning. A stakeholder working group has been convened to review and expand the SMS plan, broadening its scope beyond foot-and-mouth disease to include other high-risk cattle diseases. Concurrently, enhancements are underway to improve the FARM Biosecurity database, which securely stores Enhanced Biosecurity Plans and facilitates voluntary sharing with state officials to expedite movement permits during disease outbreaks.

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EUFMD

FMD IN EUROPE IN 2025: A TIMELY REMINDER THAT BIOSECURITY IS EVERYONE'S BUSINESS

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RECENT FMD OUTBREAKS HIGHLIGHT THE URGENT NEED FOR ENHANCED BIOSECURITY

Recent outbreaks of foot-and-mouth disease (FMD) in Europe have predominantly affected dairy cattle herds. While the countries that have had FMD implemented all the measures prescribed in relevant legislation for prevention and control of the disease, additional measures to improve on-farm biosecurity practices were identified and implemented.

This recent experience indicates the need for enhanced biosecurity to reduce the risk of introduction and spread of infectious diseases. This is especially important for dairy enterprises, where frequent movements of personnel, animals and materials on and off farm (e.g. milk collections), frequent interactions between people and animals, and intensive production are all factors that increase vulnerability to FMD and other transboundary animal diseases (TADs).

RAISING AWARENESS AND TAILORING BIOSECURITY PRACTICES ACROSS EUROPE

The aim was to enhance the prevention and control of FMD and other TADs across Europe by raising awareness of the need for improvements in on-farm biosecurity practices. Emphasis was placed on the need to tailor biosecurity measures to different settings. In addition, behavioural sciences can provide insights to encourage behavioural change.

ENGAGING STAKEHOLDERS THROUGH WEBINARS AND TARGETED COMMUNICATION

The European Commission for the Control of Foot-and-Mouth Disease (EuFMD) organized two webinars focused on improving on-farm biosecurity. Although the target audience was official veterinarians from EuFMD member nations, the ultimate objective was to support national veterinary services in engaging with the farming community and other livestock industry stakeholders. Each webinar included presentations, followed by a panel discussion and a question-and-answer (Q&A) session. The Q&A sessions emphasized the need for effective communication that is tailored to diverse stakeholder groups. Other topics included FMD transmission pathways and risk-based mitigation strategies. By using insights from behavioural sciences, participants were advised on how to more effectively target messaging, foster collaboration, and promote compliance with biosecurity protocols.

> ”Biosecurity is the most important risk mitigation measure for the prevention and control of transboundary animal diseases such as FMD. Rather than striving for perfection, a pragmatic approach involving behavioural change can reduce risk to an acceptable level in a very cost-effective manner.”
>
> **Tsviatko Alexandrov**

IMPACT AND ENGAGEMENT HIGHLIGHTS

The two webinars attracted a combined audience of over 900 participants from across Europe. The audiences were very engaged and asked challenging questions, indicating their interest in on-farm biosecurity. Presentations on FMD outbreaks in 2025 (in Hungary) and 2011 (in Bulgaria) were a very effective way of highlighting specific biosecurity challenges and practical solutions for same. At the conclusion of the webinars, many participants expressed an interest in receiving additional resource materials on the subject, that have been developed by EuFMD.

LESSONS LEARNED FROM RECENT OUTBREAKS

Panel discussions highlighted the critical importance of effective on-farm biosecurity measures in reducing the risk of introduction and spread of FMD and other TADs. Apart from practical biosecurity challenges that arose during on-farm activities (disease investigation, stamping out, cleaning and disinfection, and disposal), the recent FMD outbreaks highlighted a lack of awareness about the importance of biosecurity. Other lessons learned related to the complexity of transmission pathways, and the multiplicity of movements on- and off-farm and of contacts between farms. Active engagement of all stakeholders is key to ensuring context-specific and practical solutions to biosecurity issues. EuFMD resources and tools can be leveraged to raise awareness and to engage stakeholders.

Figure 1. EuFMD also provides real-time training to translate theory into practice.

DEVELOPING NEW RESOURCES FOR ON-FARM BIOSECURITY

Panel discussions and the questions asked during the webinars will inform the development of additional resource materials about on-farm biosecurity and the updating of those resources that are already available through EuFMD's open access online tools – the Emergency Toolbox and the Get Prepared Wall.

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SECTOR COLLABORATION AND POLICY TOOLS


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SPAIN/SWEDEN

BIOSECURITY PLANNING - A SYSTEMS APPROACH

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BIOSECURITY: THE FOUNDATION FOR DAIRY SECTOR RESILIENCE AND PUBLIC TRUST

Biosecurity in dairy relies on two complementary strategies—elimination and mitigation—and on coordination across the system, group and individual levels. Clear roles and aligned priorities help these layers work together effectively.

Why is it important?

- To protect public health
- To protect the agricultural production and food supply chains
- To ensure public trust

What is it?

- Preventing the entry of the pathogen
- Preventing the spread of the pathogen
- Preventing the exposure of the pathogen

Level of Focus

System level

- National: The entire country
- Farm: One dairy farm

Group level

- National: Regional zones
- Farm: Calves, milking cows, dry cows

Individual level

- National: One single farm
- Farm: One single animal

Very simply, biosecurity is important for life.

Potential benefits associated with a cross-sectoral systems approach to biosecurity:

Source: FAO 2007, Part 1 Biosecurity principles and components (Original updated in Sora AI 24/9/25).

From the environmental perspective, biosecurity plays a crucial role in reducing greenhouse gas emissions by improving animal health and minimizing livestock disease losses. According to the Animal Health and Sustainability report by Health for Animals, a 10 percentage point reduction in global livestock disease correlates with a decrease of 800 million tonnes of greenhouse gas emissions annually. This demonstrates that effective biosecurity measures not only boost productivity by preventing disease but also significantly mitigate environmental impact, linking animal health directly to the fight against climate change and enhancing food security globally. We the authors highly recommend reading this report to understand more. It is a treasure trove of insightful information.

Biosecurity is fundamental to protecting livelihoods in the dairy sector because it helps prevent the introduction and spread of infectious diseases among cattle, which can have devasting impacts. Outbreaks of diseases such as Mastitis, Foot-and-Mouth disease (FMD), or Bovine Tuberculosis can lead to severe drops in milk production, increased veterinary costs, and even the loss of entire herds. These impacts directly threaten the income and food security of dairy farmers and their families, their lives, and livelihoods. Research indicates that, in agricultural communities where livestock represent a major source of income, the death of livestock can lead families into financial crises (Mechlowitz et al., 2023) (Saimon et al., 2021). To highlight how crucial it is to address biosecurity - from a systemic perspective, we the authors want to underline that the problem does not stop with financial crises. These crises situations have been known to follow with tragic social consequences such as disrupted families, and negative education impacts, and even suicides, and child marriage. Systemic problems need systemic solutions.

Effective biosecurity practices—such as controlling farm access (preventing the entry of the pathogen), maintaining strict hygiene practices (preventing the spread of the pathogen) monitoring animal health, and maintaining animal groups,

Source: Health For Animals 2023

and quarantine protocols (preventing) the exposure to the pathogen), help ensure stable milk yields, reduce economic losses, and maintain access to local and international markets. In this way, strong biosecurity measures are essential for sustaining the livelihoods of those who depend on dairy farming.

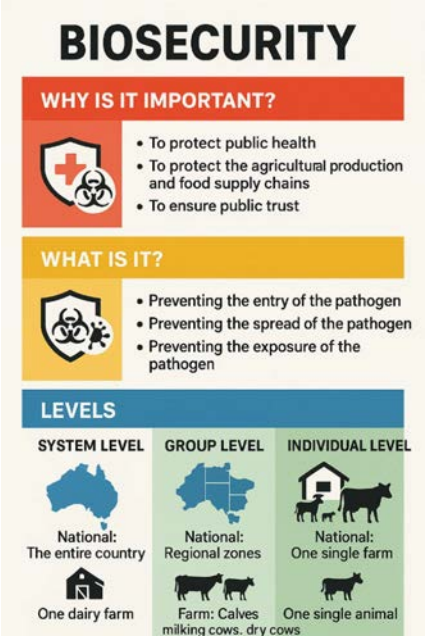

Illustration generated by Sora 24/9/2025

These principles must be applied consistently across all levels: A system could be just one farm, but we can also think of a nation as a system. Or a region of nations. Change your level of thinking to suit the situation, as we see in the illustration above.

Why This Framework Matters

By maintaining focus on these three principles at every level, we:

- Strengthen national and farm-level biosecurity systems
- Protect the dairy sector from disease outbreaks
- Reduce risks for individual families and communities
- Protect local and global trade

Who Can Use This Framework

- **Farmers:** To guide daily practices
- **Farm Advisors:** To support decision-making and farm systems guidance
- **Policy Makers:** To shape effective biosecurity policy, from a systems approach.

SAFEGUARDING HEALTH, FOOD CHAINS, AND PUBLIC CONFIDENCE

- To protect public health
- To protect the agricultural production and food supply chains
- To ensure public trust

In dairy farming, two key biosecurity strategies are commonly used: Elimination and Mitigation. Elimination involves a strict zero-tolerance approach to pathogens, which is often the strategy dairy farms rely on. This means preventing the entry of any disease-causing agents into the farm system entirely. Mitigation, by contrast, focuses on managing and reducing the spread and impact if pathogens are introduced.

Preventing pathogen entry, spread, and exposure can be addressed at three levels in dairy farming: system level, group level, and individual animal level.

With the Elimination strategy, the dairy farm operates as a closed system, where no animals, vehicles, or visitors bring pathogens onto the property. Strict protocols such as quarantine for incoming animals (e.g., isolating purchased cattle for 14 days), thorough testing, culling, disinfection procedures, and controlled access are essential. Vaccinations are also important tools at the system level to prevent disease spread within the herd.

Mitigation involves managing the risk rather than fully closing the system. Entry of animals and equipment is allowed but closely monitored with testing, quarantine, and sanitation efforts to limit pathogen dissemination.

Biosecurity Strategy			
Testing, tracing and recording is key to measure the impacts and to understand the situation		**Elimination** **Goal:** Eliminate the infectious agent	**Mitigation** **Goal:** Manage the infectious agent
Analysis level	**System Level** *Prevent the entry and the spread through the system!*	•Close the system – no entry (or quarantine at entry), only exit •If there is entry – strict testing and quarantine •Vaccination	•Testing at entry •Quarantine at entry •Vaccination
	Group Level *Prevent the entry, the spread, and the exposure – especially of vulnerable groups!*	•Stable groups – minimize movement between groups •Isolate and quarantine when sick •Protect vulnerable groups •Best practice hygiene processes •Widespread testing •Contact tracing to understand the transmission source •Antibody testing	•Stable groups – minimize movement between groups •Isolate and quarantine when sick •Protect vulnerable groups •Best practice hygiene processes •Widespread testing •Contact tracing to understand the transmission source •Antibody testing
	Individual Level *Prevent the entry the spread, and the exposure!*	•Sanitation •Hygiene of equipment •Personal hygiene! (washing hands, clothing etc) •Isolation & quarantine at movement or illness	•Sanitation •Hygiene of equipment •Personal hygiene! (washing hands, clothing etc) •Isolation & quarantine at movement or illness

Alvarado & McDonald, created for training material for Tetra Pak Food for Development 2020.

”Systemic problems need systemic solutions.”

Lynda & Rómulo

Testing and tracing are fundamental to both strategies to track potential pathogen presence and understand disease dynamics in the herd.

Group-level biosecurity means minimizing movement and contact between groups of animals, such as different paddocks or housing units. Proper hygiene, cleaning of shared equipment, and isolating sick or vulnerable groups (such as newborn calves and recently calved cows) help prevent cross-contamination and protect susceptible groups from exposure.

At the individual animal level, rigorous hygiene and isolation practices are applied to prevent disease transmission. This involves maintaining cleanliness of animal housing, using dedicated equipment when possible, and promptly separating sick animals to minimize spread throughout the farm.

Overall, successful dairy farm biosecurity integrates these layered protections to prevent disease introduction, reduce the spread of the disease, and protect animal health and welfare — which supports productivity, sustainability, and long-term farm profitability.

© Lynda McDonald

There is often a gap in coordination and communication between farmers, advisors, veterinarians and regulators, which limits consistent biosecurity implementation and shared outcomes. This gap increases vulnerability to disease spread within local dairy sectors.

We the authors therefore believe it is imperative that in order to improve this, a systems approach to biosecurity is needed.

APPLYING GLOBAL BIOSECURITY KNOWLEDGE TO DRIVE DEVELOPMENT

This work is using existing biosecurity knowledge and frameworks, but we apply them at a global development level.

ONGOING IMPACT: ADVANCING BIOSECURITY ON FARMS AND AMONG POLICYMAKERS

This is ongoing work, both on farm and educating policy makers.

ADVOCATING FOR POLICY AWARENESS

We want policy makers to be more aware of the impact of not implementing biosecurity policies and measures.

NORWAY

BIOSECURITY IN NORWEGIAN DAIRY FARMING; COWS AND GOATS

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ANIMAL HEALTH AND SUSTAINABILITY IN NORWEGIAN DAIRY

Unlocking our potential concerning animal health and contribution to animal welfare. The quality of our production in the big picture, sustainability commitment and climate change reduction.

Success factors:

1) Effective communication means first explaining why farmers should strengthen their biosecurity routines, before emphasising how these measures can be implemented in practice.

2) Cooperation is needed at many levels: from the local community and regional livestock farming, to national, Nordic, and European collaboration, and ultimately at a global scale.

BRINGING THE RIGHT PEOPLE TOGETHER FOR COORDINATED BIOSECURITY

The promise lies in planning that brings the right people together at the right time, for example veterinarians, advisors, farmers and regulators, to support coordinated implementation of biosecurity plans.

THE NORWEGIAN STRATEGY: PREVENTION, KNOWLEDGE, AND CONTINUOUS IMPROVEMENT

«The Norwegian strategy» - Farmers Associations working together with the national authorities

- To handle infectious diseases by prevention and hence using minimal amounts of antibiotics.
- Believing it is possible to eradicate and control infectious diseases. We aim to eliminate the infections instead of introducing large scale vaccination programs in milk producing animals.

> "To get better rutines in everyday biosecuity always explain the farmers thoroughly why they should strengthen their biosecurity routines before telling them how to do it"
>
> **Dag Lindheim**

- Building farmers' knowledge in «everyday» biosecurity and advice restricted trading with animals.
- Continuously improving the Health Certificates and the biosecurity routines used in live animal trade
- Continuous attention concerning animal welfare. Annual control program at the Dairy Farms by veterinarians. *The level from the past is not accepted today. And the level in the future must be even higher.*

ERADICATION OF DISEASES THROUGH NATIONAL EFFORTS

BVDV: Was eliminated from the Norwegian cattle population through a national control effort 1993-2007, the last infected animal was detected in 2006.

Ringworm in Cattle: Has been almost eliminated through vaccination and sanitation. Programs started in the 1990-ties. A few new outbreaks occasionally, but due to intense follow-up "the bubble has not burst", as in neighboring countries.

CAE, CLA and paratuberculosis in Goats: All herds that deliver milk to dairy were included in a sanitation program, The Healthier Goat program during the period 2001–2014. The program led to eradication of paratuberculosis in the goat population.

ECONOMIC AND REPUTATIONAL GAINS FROM DISEASE CONTROL

In the elimination of BVDV, for example, approximately €7 million was invested. Some years later, it was calculated that the net present value had exceeded this figure, demonstrating the long-term economic benefit of coordinated disease control programmes.

The fact that such successful programs give confidence in general among decisionmakers, will give us finance and make it possible to start new programs like the Healthier Goats program. The main beneficiaries from the BVDV elimination are the cattle owners, though recipients of meat and milk also benefit due to better reputation.

FUTURE OPPORTUNITIES IN COORDINATED DISEASE PREVENTION

Coordinated disease prevention strategies have the potential to reduce disease burden, limit the need for antimicrobial use, and improve long-term herd resilience. Norway's national laboratory system and data-sharing infrastructure provide strong foundations for continued progress in this area.

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© Dag Lindheim - A project team together with the farmer, planning sanitation of his goat farms, as there were 3 different localities in use during the year.

AUSTRALIA

THE AUSTRALIAN DAIRY INDUSTRY EMERGENCY ANIMAL DISEASE ACTION GUIDE

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DEFINING ROLES AND RESPONSIBILITIES IN EMERGENCY ANIMAL DISEASE RESPONSE FOR THE DAIRY SECTOR

In the event of an Emergency Animal Disease (EAD), Australia's EAD Response Agreement (EADRA) outlines cost-sharing agreements between industry and government for EAD responses. Signatories to the deed include industry representative bodies who are not experts in EAD's or in EADRA. The **Dairy Industry Emergency Animal Disease Action Guide (the Guide)** describes the industry's roles and responsibilities during a cost-shared emergency animal disease (EAD) response. It also outlines the activities dairy industry leaders and staff will undertake during an EAD response.

GUIDING THE DAIRY INDUSTRY'S ACTIONS DURING COST-SHARED EAD EVENTS

The purpose of the Guide is to provide detail on the different tasks that the dairy industry needs to perform in the event of an EAD with cost-sharing.

COLLABORATIVE DEVELOPMENT AND REAL-WORLD TESTING: THE JOURNEY OF THE ACTION GUIDE

A project team coordinated by Dairy Australia and facilitated by a subject matter expert was convened and consisted of representatives from all dairy industry groups. A draft guide was developed by the project team, to be tested by a simulation exercise dubbed *Exercise Laneway*.

Exercise Laneway was held to test the *Dairy Industry Emergency Animal Disease Action Guide (draft)*, using a facilitated discussion exercise with a range of dairy industry, government and other relevant stakeholders, based on a hypothetical outbreak of the emergency animal disease (EAD), foot-and-mouth disease (FMD). Modifications to the guide were made based on feedback from the exercise, and the guide was then finalised.

IMPROVING PREPAREDNESS AND COORDINATION IN LIVESTOCK INDUSTRIES

The Guide is the first of its kind in Australian livestock industries to describe roles and responsibilities for industry personnel in an EAD response. While its ultimate effectiveness will be demonstrated during an actual response, the development and exercising of the guide has already improved preparedness and coordination.

Figure 1: The purpose of the guide

"When an EAD outbreak occurs, the situation can get out of hand rapidly, and we realised that the industry needed to have a single source-of-truth document where the right people could find the right information quickly so that industry can effectively support response agencies'"

Andy Hancock

ENHANCING COLLABORATION BETWEEN INDUSTRY AND GOVERNMENT

The process of developing and then exercising the guide was of value to both industry and government stakeholders, as it placed key industry and government personnel together and allowed them to discuss and understand each other's perspectives and how they could work most effectively together during a response. Other livestock industries may also incorporate some of the aspects of the dairy guide into their own industry plans.

PRIORITIZING FUTURE INVESTMENTS TO STRENGTHEN BIOSECURITY AND PREPAREDNESS

The development of the guide and Exercise Laneway provided a list of 'out of scope' items which are needed to be addressed to help improve the industry's preparedness and biosecurity activities. This list will be utilised to prioritise investments in activities going forwards.

SWEDEN

CLEAR AND UNIFIED VISITOR GUIDELINES TO SUPPORT BIOSECURITY ON SWEDISH FARMS

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WELCOMING VISITORS SAFELY TO SWEDISH DAIRY FARMS

Farm visits play an important role in increasing public understanding of dairy production and agriculture more broadly. They offer a unique opportunity to share knowledge, build trust, and demonstrate the care and professionalism behind food production. At the same time, rising risks of disease transmission highlight the need for clear biosecurity practices. Ensuring that visitors are welcomed safely is essential for maintaining transparency while protecting animal and human health. For the dairy sector, this balance is key to sustaining openness and resilience in a changing biosecurity landscape.

FIVE ORGANISATIONS PRESENT CLEAR GUIDELINES FOR SAFE FARM VISITS

Five organisations have jointly presented clear and accessible biosecurity guidelines for farm visits. These basic rules aim to support safe and transparent animal production by helping farmers and visitors understand how to reduce infection risks while maintaining openness.

COLLABORATIVE ACTION IN RESPONSE TO RISING DISEASE RISKS

This initiative was launched by the Federation of Swedish Farmers in collaboration with the District veterinarians, the veterinary organisation Lundens Djurhälsa and two advisory services Gård & Djurhälsan and Växa Sverige. It was developed in response to the growing need for clear visitor guidelines during a time of increasing disease transmission, both nationally and internationally. The organisations jointly presented basic biosecurity rules to support safe and responsible farm visits. The aim was to balance the importance of infection prevention with the need for transparency in animal production, ensuring that visitors can be welcomed under secure conditions.

FROM FRAGMENTED RULES TO PRACTICAL GUIDELINES: ACHIEVING CLARITY AND BROAD REACH

The project consolidated a fragmented set of biosecurity rules into clear, accessible, and visually appealing guidelines. These were published on the websites of participating organisations and shared through the national Knowledge Hub for Animal Production, ensuring broad reach. By harmonising and simplifying the information, the initiative promotes better understanding and practical application of biosecurity measures during farm visits.

The guidelines provide straightforward instructions for visitors, helping both farmers and visitors reduce the risk of disease transmission. Designed to be user-friendly and freely available, they support safe and transparent farm visits. Ultimately, the project offers a practical tool for everyone involved in animal production visits, fostering responsible behaviour and protecting both animal and human health.

FUTURE STEPS FOR BIOSECURITY AWARENESS AND BEHAVIOUR

Dissemination of the guidelines will be prioritised by the collaborating organisations, ensuring a unified message reaches farmers, advisors, and visitors. This joint approach is expected to encourage widespread adoption and deliver improvements in biosecurity awareness and behaviour across the sector.

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ON-FARM PRACTICE & ENGAGEMENT

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DENMARK

BEHIND THE WHEEL: INSIGHTS ON BIOSECURITY FROM TRUCK DRIVERS COLLECTING LIVESTOCK

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EVOLVING DANISH DAIRY FARMS: WHY BIOSECURITY MATTERS MORE THAN EVER

The structure of Danish cattle farming is evolving, with herd sizes steadily increasing and more farms operating across multiple sites. The average Danish dairy herd now has around 250 cows. While not large by international standards, this represents a significant shift within Denmark. As herd sizes grow, animal movements become more frequent, including transport for slaughter, sale, or export.

This increases the importance of strong biosecurity. Yet many farmers find it difficult to recognize the specific risk factors on their farms or to know how best to address them. This underlines the need for practical and accessible solutions to support on-farm biosecurity

UNDERSTANDING BIOSECURITY PRACTICES THROUGH THE EYES OF TRUCK DRIVERS

The aim of our study was to gain insights into the practices of biosecurity on Danish dairy farms during the collection of livestock for slaughter, sale or export. Additionally, we wanted to understand the truck drivers' knowledge and motivation regarding biosecurity. We spent a working day with 10 different truck drivers as they collected cattle.

OBSERVING AND INTERVIEWING TRUCK DRIVERS ACROSS DANISH FARMS

We contacted eleven different transport companies that collect cattle for slaughter or export and asked if we could join them for a day and interview the truck drivers. Ten companies agreed to let us accompany one of their drivers during a workday. Of these, seven companies collected cattle for slaughter, while three collected calves (2-4 weeks old) for sale or export.

> "I'd hate to get a reputation for being the one who brings in infection"
>
> **Frank Olesen, Danish truck driver**

On each farm we visited, we noted the type of farm (dairy, beef cattle, or veal calves) and the biosecurity measures in place regarding the transfer of animals. Throughout the day, we interviewed the truck drivers about their knowledge of biosecurity, the measures they were aware of and what worked for them. We also explored their attitudes towards biosecurity.

REVEALING BIOSECURITY GAPS

We visited 49 different farms. At 11 farms (22%), the truck entered the barn, often with cattle from other farms on board. At 14 farms (29%), the truck stayed just outside the barn, but the driver entered to help load the cattle. Only one farm provided designated boots for the driver; at the other farms, the driver entered with potentially contaminated footwear. Generally, there were few places where it was possible to clean boots near the loading area.

Most of the drivers were aware of the risk they posed. Several mentioned this when entering the barn with the truck. They did not like being seen as a risk factor but followed the farmers' instructions. They were willing to adhere to the biosecurity measures provided by the farmers.

TRUCK DRIVERS' ROLE IN FARM BIOSECURITY AND DISEASE PREVENTION

There is potential for improvement. The current practices on many Danish cattle

	Cattle trailer	Truck outside door or gate to the barn. Driver do not enter barn	Truck outside door or gate. Driver entering barn.	Truck and driver entered barn or calf hutch area
Dairy cattle	6	5	5	5
Veal calves for slaughter		2	3	
Beef cattle	2		3	
Young calves for sale	6	3	3	6

Figure 1: Position of truck and driver during cattle collection on Danish farms

farms when collecting animals for export, sale or slaughter may increase the risk of disease introduction to the herd. This study helped raise awareness of this important issue in biosecurity.

The findings indicated that truck drivers were generally aware of biosecurity risks and expressed willingness to follow measures provided by the farm. Some also raised concerns about being a potential source of disease transmission. This highlights the importance of both farm-level facilities and the overall biosecurity culture, which together are essential for enabling effective biosecurity while also facilitating cattle handling, ensuring truck driver safety, and supporting cow welfare.

THE FUTURE OF SAFE CATTLE LOADING

To enhance biosecurity when loading cattle for slaughter, practical solutions need to be implemented on farms. The next step in this project is to design and describe various options for loading facilities that improve biosecurity, ensure safe handling of the animals, and maintain high welfare standards for the cattle.

It is not feasible to find a one-size-fits-all solution. Therefore, it is crucial to provide different options to accommodate the diverse needs of farms.

View from inside the truck while positioned inside the barn during cattle collection for slaughter. This scenario illustrates one of the highest biosecurity risk situations observed in the study, as both the truck and driver enter the barn, increasing the potential for cross-contamination between farms.

CANADA

BIOSECURITY ISN'T CONSIDERED A PROBLEM, UNTIL IT'S A PROBLEM

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SALMONELLA DUBLIN: AN URGENT THREAT TO DAIRY HERDS

International dairy industries consider *Salmonella* Dublin (*S.* Dublin) a bacterial pathogen of concern. Herds infected with the bacteria incur economic costs related to illness, death, abortion, and reduction in milk production. *S.* Dublin is especially impactful on young calves and causes high rates of respiratory disease and death. Unfortunately, cows and calves that recover from *S.* Dublin may serve as a reservoir of endemic infection in herds because they periodically shed the bacteria. Increased detection of antibiotic-resistant strains and its ability to infect humans creates an urgency to address the global spread of *S.* Dublin.

UNDERSTANDING FARMERS' PERSPECTIVES ON BIOSECURITY BEST PRACTICES

Our research team spoke with dairy farmers in Ontario, Canada, about established biosecurity best management practices (BBMP) for the control of *S.* Dublin. We aimed to understand how familiar they were with BBMP, what they thought of BBMP, and what barriers they faced to implement BBMP.

ENGAGING ONTARIO'S DAIRY COMMUNITY: FOCUS GROUPS AND THEMATIC ANALYSIS

The Dairy Farmers of Ontario emailed an invitation to take part in the study to all dairy farms in Ontario. Farmers who responded to the invitation were asked to recruit additional farmers in their area. Once a suitable number of participants were enlisted, a focus group was organized at a local community centre or library. Five focus groups were held during March and April 2023, in Ontario. There was a total of 28 farmers across the 5 focus groups that ranged from 4 to 8 people. All discussions were recorded, transcribed, and analyzed with Applied Thematic Analysi*S.*

> "Unfortunately [it's] human nature. When things are going well you kind of become a little bit complacent [with biosecurity practices]."
>
> **Anonymous**

BARRIERS TO BIOSECURITY ADOPTION

Most of the farmers in our study were aware of *S.* Dublin, said they were currently not prepared to handle an outbreak but were not concerned about their farm becoming infected. Farmers felt that producer organizations, and national or provincial governments could improve disease surveillance and called for academia to create new farm-level BBMP to mitigate *S.* Dublin transmission. Farmers said biosecurity is not a daily priority, the risk of *S.* Dublin infecting their farms is low, and barriers (e.g., money, labor, practicality) were challenges to change current on farm biosecurity practice*S.*

NEED FOR SUPPORT AND PERCEIVED RISK IN BIOSECURITY

The farmers that participated in our study expected producer organizations, government, and academia to develop strategies and provide additional support to mitigate the spread of *S.* Dublin. The farmers who had not experienced an outbreak of this disease did not believe it was an important risk to their farm. In conclusion, until the perceived risk of *S.* Dublin increases, the willingness to overcome barriers to adopt biosecurity best management practices to control this pathogen will likely remain low.

CHARTING A PATH FORWARD: SURVEILLANCE, DIALOGUE, AND MANDATED CONTROL

Biosecurity remains a low priority on most dairy farms in Ontario, Canada despite efforts to raise awareness of its importance. A path forward might include a more comprehensive surveillance program, engaging in 2-way discussions about the impact of infectious diseases like *S.* Dublin and perhaps the implementation of a mandated control program.

MORE INFORMATION

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UNITED STATES

THE ROLE OF MANUFACTURERS IN SUPPORTING FARM BIOSECURITY

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THE MANUFACTURERS' ROLE IN BIOSECURITY

As partners to the dairy industry, equipment manufacturers must keep customers' needs and the pressures they face in mind. Biosecurity is one of those pressures, recently heightened by H5N1, Bluetongue and other emerging diseases. Equipment manufacturers are frequent visitors to dairies as they provide installation, repair, advisory and sales activities and services. As such, they directly interact with the people and animals that are responsible for producers' livelihoods. Preserving the health of dairy workers and of dairy herds is essential to the financial stability of each farm. It is our responsibility not to disrupt that balance.

MINIMIZING BIOSECURITY RISKS DURING FARM VISITS

Equipment technicians and salespeople are common farm visitors whose presence goes unnoticed. Given their high technical expertise, it can be incorrectly assumed that they have high biosecurity awareness. Their work is expected to be limited to equipment. However, their proximity to animals and movement throughout different areas of the farm presents a biosecurity risk. Implementing biosecurity guidelines for equipment manufacturers aids in conducting safe and productive visits to farms minimizing biosecurity risks.

DEVELOPING A BIOSECURITY POLICY

Upon the emergence of HPAI in the US, DeLaval formed an internal multidisciplinary biosecurity working team with expertise across veterinary medicine, animal science, microbiology, and farm management. The team monitored disease progression through government alerts, scientific updates, and academic consultation, providing weekly guidance to management on disease progress (Fig. 1).

> "We found that the farmers ended up trusting us more than other sources…they saw us as partners who understand their unique challenges and are invested in their success. This trust has been invaluable for effectively implementing the guidelines on farms. It's truly a gift—an honour—that we shouldn't take lightly."
>
> **Kristy Campbell, Dairy Advisory Manager DeLaval**

This process informed the development of a biosecurity policy supported by structured communication pathways and a tiered farm-visit risk protocol (Fig. 2). The policy complemented the company's wider biosecurity manual and became mandatory training for field-facing staff.

SUCCESS THROUGH COMMUNICATION

Clear, timely and consistent internal communication allowed employees to feel informed and confident, improving their interactions with customers and minimizing the transmission risk during farm visits. The structured approach enabled the company to share the program externally through farm forums and extension channels, reinforcing

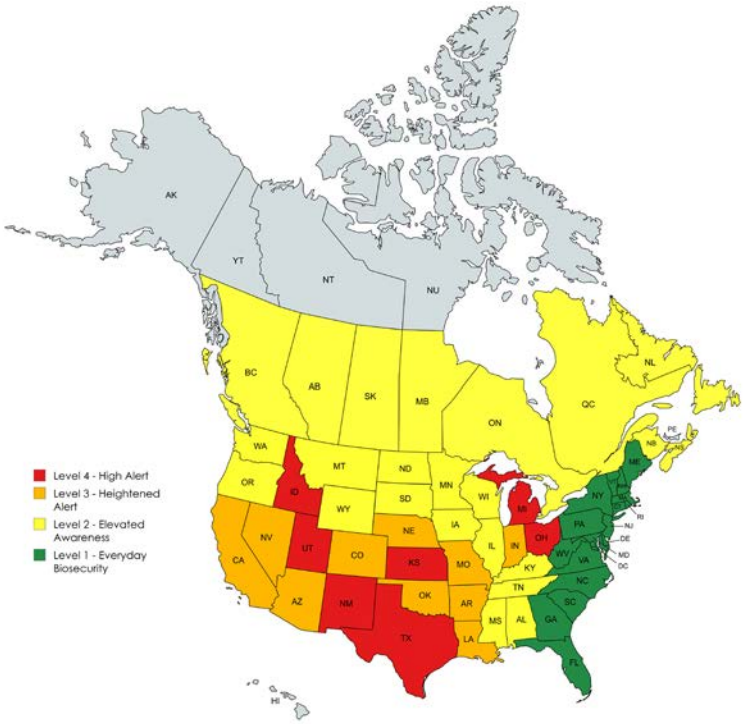

Fig. 1. DeLaval Biosecurity Awareness Level Map – April 4, 2024 denoting the following biosecurity classifications from "Everyday biosecurity" (Level 1) to "Foreign Animal Disease Outbreak" (level 5) based on the formal declaration of an outbreak by authorities, the nature of the outbreak (zoonotic or not), the duration, and the effectiveness of known diagnostic and control measures.

General Recommended PPE Guidelines

See Description for More Detail

✓ Required ✗ Not required ⊘ No farm visits

DeLaval

	Clean/laundered clothing	Disposable boots or Disinfected rubber boots	Disposable or laundered coveralls	Hand washing	Gloves	N95 mask	Safety glasses or goggles	Disinfect tires	Clean vehicle
Level 1 – No Animal area exposure	✓	✓	✗	✓	✗	✗	✗	✗	✗
Level 1 – Animal area exposure	✓	✓	✗	✓	✓	✗	✗	✗	✗
Level 2 – No animal area exposure	✓	✓	✗	✓	✗	✗	✗	✗	✗
Level 2 – Animal area exposure	✓	✓	✓	✓	✓	✗	✗	✓	✓
Level 3 – No animal area exposure	✓	✓	✗	✓	✗	✗	✗	✓	✓
Level 3 – Animal area exposure	✓	✓	✓	✓	✓	✗	✗	✓	✓
Level 4 – No animal area exposure	✓	✓	✗	✓	✓	✗	✗	✓	✓
Level 4 – Animal area exposure	✓	✓	✓	✓	✓	✓ *Animal Contact Only	✓ *Animal Contact Only	✓	✓
Level 5	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘

Fig. 2a. Summary tables with recommended personal protective equipment (PPE) and behavioural guidelines for each biosecurity level.

Samantha Swanke, DeLaval employee showing the organization in the back of her truck to comply with biosecurity requirements

Kristy Campbell, DeLaval NA Dairy Advisor Manager, leading an educational session.

General Recommended Behavior Guidelines
See Description for More Detail

Required · Not required · No farm visits · DeLaval

	Business Activity Restrictions	Animal Area Contact	Multiple Farm Contacts within Same Day	Tours/Visitors/ Trainings Within Country of Origin	Tours/Visitors/ Trainings from Outside Country of Origin	2 week log of all on-farm activities
Level 1 – No Animal area exposure	None	Minimize	Minimize + PPE	PPE required	PPE required	✓
Level 1 – Animal area exposure	None	Minimize	Minimize + PPE	Minimize + PPE	Minimize + PPE	✓
Level 2 – No animal area exposure	None	Minimize	Minimize + PPE	PPE required	PPE required	✓
Level 2 – Animal area exposure	None	Minimize	Minimize + PPE	Minimize + PPE	Minimize + PPE	✓
Level 3 – No animal area exposure	Reduced Nonessential	Limit	Limit + PPE	Restrict + PPE	⊘	✓
Level 3 – Animal area exposure	Essential Only	Limit	Limit + PPE	Restrict + PPE	⊘	✓
Level 4 – No animal area exposure	Essential Only	Restrict	Restrict + PPE *Restriction after Level 4 visits*	⊘	⊘	✓
Level 4 – Animal area exposure	Essential Only	Restrict	Restrict + PPE *Restriction after Level 4 visits*	⊘	⊘	✓
Level 5	No Activities Permitted	No Animal Area Contact Allowed	No Farm Contacts Allowed	⊘	⊘	⊘

Fig. 2b. Summary tables with recommended personal protective equipment (PPE) and behavioural guidelines for each biosecurity level.

biosecurity messaging industry-wide and becoming a positive educational agent at a critical time for the industry.

A structured and timely internal response to emerging disease risks helped maintain continuity of farm support while minimizing disruptions or aggravating an already precarious situation. This approach illustrates how manufacturer-led biosecurity protocols can complement farm-level efforts during high disease pressure.

A LASTING COMMITMENT TO BIOSECURITY

We foresee the biosecurity task force to stay in place as part of our global crisis task force within the company. We are now better equipped to address the next biosecurity emergency not only by having systems in place, but also through a stronger biosecurity culture within the company.

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NIGERIA

ANIMAL HEALTH: THE IMPORTANCE OF TAKING THE RIGHT STEPS

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When running a dairy farm in Africa, like Arla Foods is doing at the Arla-Dano dairy farm in Nigeria, several things need to be done differently compared to a similar-sized farm in many other places in the world, mainly in terms of preventive healthcare and biosecurity. This is due to the fact that many cattle diseases, such as FMD (Foot and Mouth Disease) and LSDV (Lumpy Skin Disease Virus), are still prevalent in Africa but have been more or less eradicated or are under good control in Europe. Additionally, during the dry season, the migration or movement of nomadic herds, with tens if not hundreds of thousands of animals in search of feed, contributes significantly to disease spreading. Despite the obvious differences between the environment for farm operation in Africa versus other places many things regarding animal health are the same.

To operate effectively alongside these challenging diseases, each dairy farm needs to take several steps:

FARM DESIGN WITH FOCUS

One of the criteria in the design of the Arla-Dano farm was a strong focus on biosecurity, as it was well-understood that the farm would be at risk of exposure to severe cattle diseases. To address this, a series of protective mechanisms were integrated into the design and operational routines:

1. Biosecurity

The first step is to do everything possible to protect the herd from contagious diseases. For this reason, strong biosecurity rules are even more important on dairy farms in Africa than elsewhere. Restrictions on vehicles, people, and other animals near the herd are essential; where contact is unavoidable, hygienic procedures and disinfection are critical.

Visitors and employees use a designated entry house where shoes are disinfected, and visitors are provided with single-use PPE. Employees also shower and change into farm-only clothing before entering. These measures are in place to reduce the risk of disease transmission to the animals.

2. Vaccination Programs

In parts of Africa, limited surveillance and incomplete characterization of some tropical diseases mean vaccination may not always be available or sufficient on its own. At the Arla-Dano farm, the vaccination program includes systematic vaccines for diseases such as FMD, LSDV, CBPP, BQ, BV, Anthrax, and BHV, with ongoing monitoring of regional disease status to guide adjustments.

3. Quick Reaction

Thirdly, a rapid and well-coordinated response is needed when disease is suspected. Employees are trained to recognise signs early, enabling quick action. The farm is fully fenced to prevent contact with nomadic cattle herds, and facilities allow for isolation of suspect groups. Airflow systems can also be redirected to help minimise the risk of internal airborne spread.

CONCLUSION

The Arla-Dano farm demonstrates how biosecurity, systematic vaccination, and rapid response capacity can be integrated into farm design to safeguard animal health. By combining modern infrastructure with local expertise, the farm provides a model of how high-yielding dairy cattle can thrive in a tropical environment while minimising disease risks. In doing so, it serves not only as a productive dairy unit, but also as a reference point for resilient and biosecure dairy development in the region.

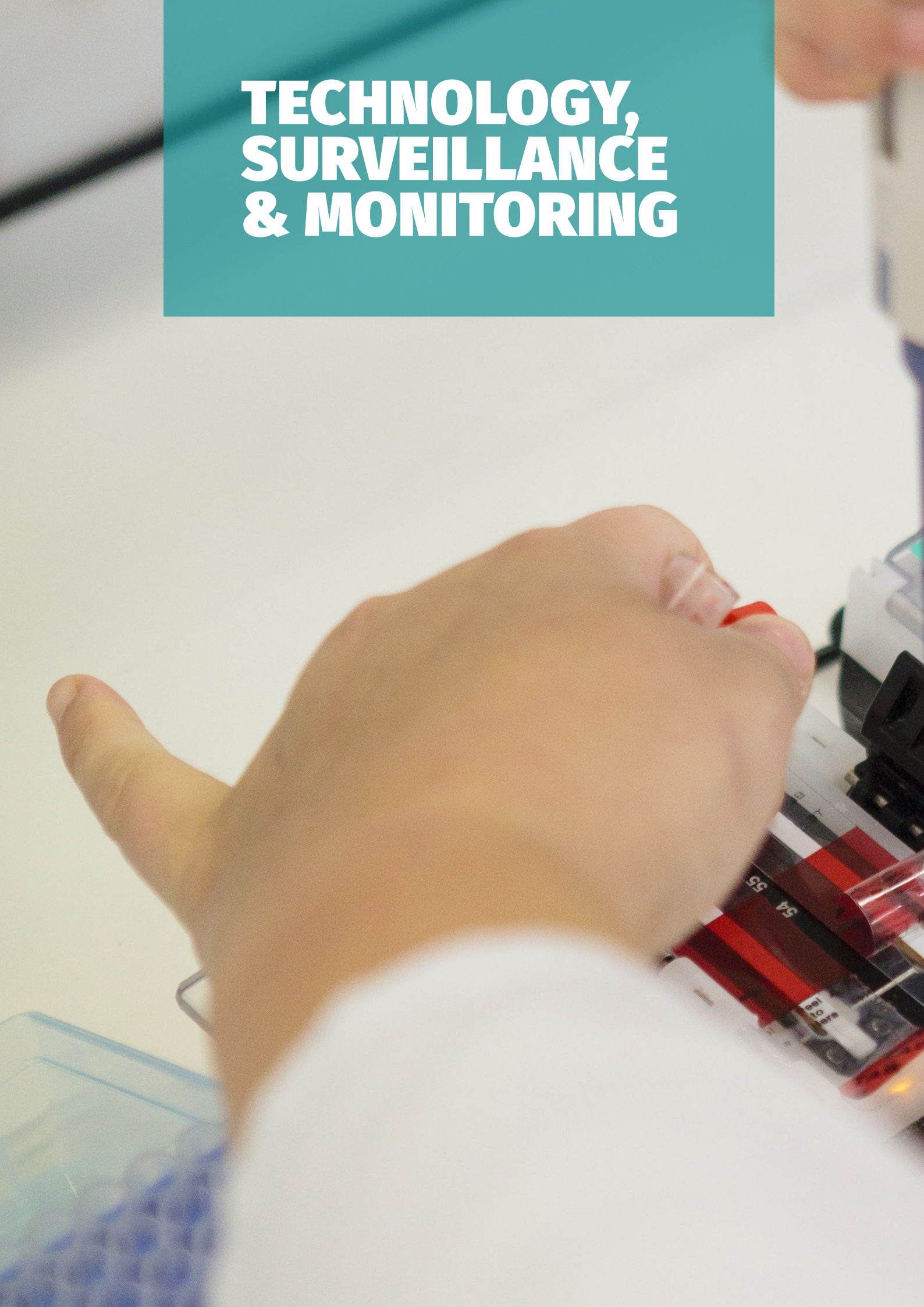
Vehicle bath and disinfection

All vehicles entering the Arla-Dano farm pose a biosecurity threat so they all have to drive through a tire bath with disinfection. Any vehicle that is considered a threat is also sprayed with disinfection.

Guests in single use clothes

All employees use special farm work clothes and all guests need to wear single use protective gear to reduce the risk of spreading diseases.

TECHNOLOGY, SURVEILLANCE & MONITORING

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AUSTRALIA

NAMP: AUSTRALIA'S NATIONAL ARBOVIRUS SURVEILLANCE PROGRAM

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SAFEGUARDING AUSTRALIA'S DAIRY SECTOR: WHY ARBOVIRUS SURVEILLANCE MATTERS

NAMP objectives are:

1) Market access - To facilitate the export of live cattle, sheep, goats and camelids, and their reproductive material, to countries that apply import conditions to mitigate the risk of introduction of bluetongue, Akabane and bovine ephemeral fever (BEF) viruses.
2) Bluetongue early warning - To detect incursions of exotic strains of bluetongue virus (BTV) and vectors (Culicoides species biting midges) that have the potential to adversely affect livestock production in Australia and trade by surveillance of the northern BTV-endemic area.
3) Risk management - To detect changes in the seasonal distribution in Australia of endemic bluetongue, Akabane and BEF viruses and their vectors, to inform livestock producers and support trade.

DELIVERING MARKET CONFIDENCE THROUGH PROACTIVE DISEASE MONITORING

By monitoring arboviruses in Australia, we can help maintain access to arbovirus sensitive markets while providing credible disease risk management data.

HOW NAMP TRACKS ARBOVIRUSES

NAMP monitors the distribution of economically important arboviruses of livestock (cattle, sheep, goats and camelids) and their associated insect vectors within Australia. Arboviruses are viruses transmitted by arthropods such as mosquitoes, ticks, sandflies and midges.

> "With significant arbovirus outbreaks impacting dairy herds across Europe in the past two years, I felt it was important to share how NAMP helps the Australian dairy industry stay ahead of these risks - because proactive surveillance is the foundation of resilient dairy systems worldwide."
>
> **Stephanie Bullen, Dairy Australia**

Arboviruses monitored by NAMP include bluetongue, Akabane and BEF viruses. Clinical bluetongue disease is an uncommon occurrence in Australian sheep and has never been reported in any other susceptible animal species in Australia.

NAMP data are gathered throughout Australia by serological monitoring of cattle in sentinel herds, strategic serological surveys of other cattle herds (serosurveys), and trapping of insect vectors.

NAMP is jointly funded by the cattle, sheep and goat industries, the livestock export industry, and the state, territory and Australian governments.

EXPANDING SURVEILLANCE AND ENSURING DISEASE-FREE ZONES

During the 2023-24 period, 105 sentinel herds, 23 serosurvey sites, and 98 insect traps operated nationally. No new BTV serotypes were found; circulating BTV-1, 4, 5, 7, 16, 20, 21. South Australia, Tasmania, Victoria remained BTV transmission-free; transmission expanded in New South Wales and at buffer sites in the Northern Territory, prompting zone updates. A reproducing Culicoides nudipalpis population was confirmed on Croker Island. Akabane was endemic in the north and seasonally widespread in Queensland and New South Wales. It was absent in the southern states. BEF was widespread in the north, sporadic in South Australia, absent in Australia's major dairying states Victoria and Tasmania.

THE TRIPLE VALUE OF TIMELY ARBOVIRUS INTELLIGENCE

NAMP's value is threefold:

1. Trade assurance: a WOAH-aligned zoning picture that trading partners can use in certification and risk assessment.
2. Practical clarity: producers and processors gain early warning when transmission edges approach key milk regions;
3. Efficient compliance: clear, current mapping reduces delays and disputes in BTV-sensitive transactions.

Crucially, WOAH recognises milk and milk products as "safe commodities" irrespective of BTV status, but breeding stock and germplasm require status-aware certification - NAMP provides the underpinning evidence.

INNOVATING FOR THE FUTURE: REAL-TIME ANALYTICS AND SMARTER SURVEILLANCE

Looking ahead, opportunities include near-real-time vector analytics combining automated light traps with weather feeds; geospatial nowcasts (rainfall, wind trajectories, soil moisture) to anticipate vector expansion; environmental metagenomics on trap catches to detect arbovirus signals sooner; and producer/exporter dashboards that translate zone shifts into actionable movement/certification guidance. These innovations would further align national surveillance with WOAH's emphasis on risk-based monitoring and zoning and help international buyers interpret seasonal risk without disrupting dairy trade.

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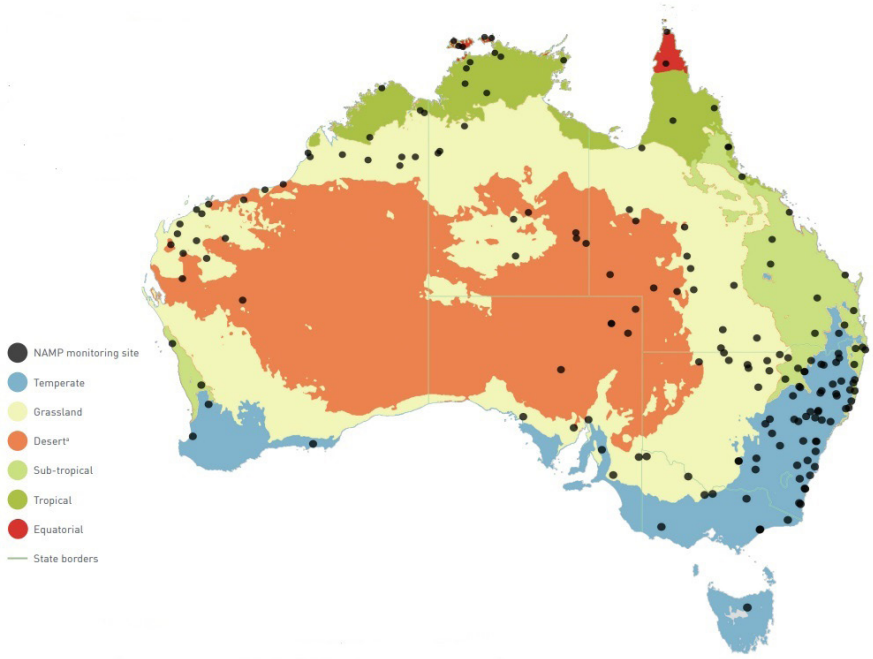

Fig. 1. Location of NAMP monitoring sites (virology and entomology) between September 2023 and August 2024. © Animal Health Australia

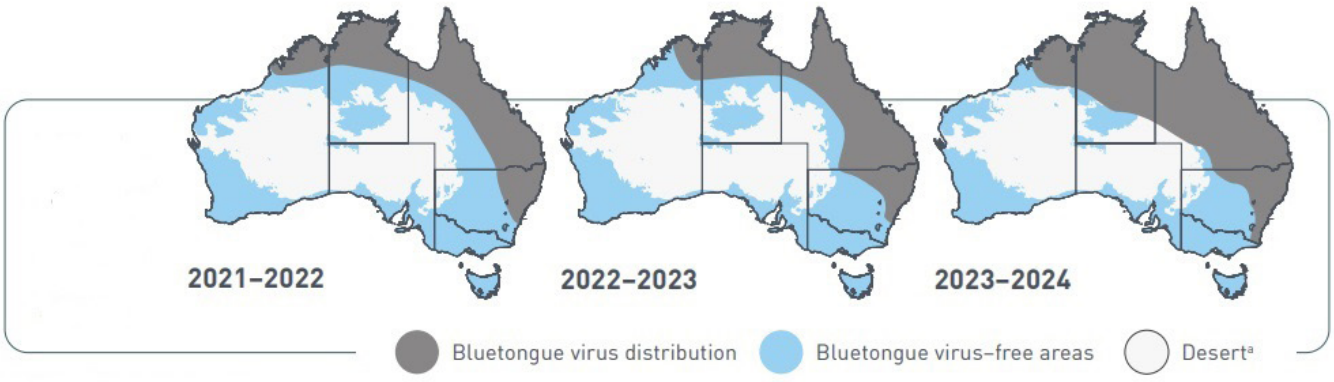

Fig. 2. Distribution of bluetongue virus in Australia (September 2021-August 2024).
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SWEDEN

STRENGTHENING BIOSECURITY ON SWEDISH DAIRY FARMS

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STRENGTHENING DISEASE SURVEILLANCE AND BIOSECURITY IN SWEDISH DAIRY HERDS

The voluntary FriskKo® programme seeks to strengthen disease surveillance and biosecurity in Swedish dairy herds by giving farmers quarterly updates on pathogen status, such as *Mycoplasma bovis* (*M. bovis*) through testing of bulk tank milk (BTM). *M. bovis* is slowly spreading in Sweden and the infection may cause serious health issues and significant economic losses, with no effective treatment available. Growing concerns about infection pressure in large herds, antibiotic use and antimicrobial resistance further emphasises the need for preventive measures, making it essential to monitor disease status, prevent spread to new herds, and support infected herds in managing disease.

AUTOMATED PATHOGEN DETECTION FOR SUSTAINABLE DAIRY PRODUCTION

FriskKo® is an automated sampling and testing programme, enabling efficient detection of important pathogens in dairy herds. Limiting disease spread between herds is crucial for sustainable dairy production and contributes to national efforts to prudent use of antibiotics and to combat antimicrobial resistance.

ROUTINE DISEASE MONITORING IN DAIRY HERDS

BTM samples are collected quarterly from dairy herds subscribed to FriskKo® and tested for *M. bovis*, *Salmonella* spp., and *Streptococcus agalactiae* (SrA). For herds in *Kokontrollen*® (the Swedish Official Milk Recording Scheme), pooled milk samples from first-parity cows are also analysed for bovine respiratory syncytial virus (RS virus), bovine coronavirus and *M. bovis*.

> ”Bulk milk sampling – a useful tool to protect dairy herds from new infections”
>
> **Sara Kjellsdotter, Lena Stengärde**

Furthermore, to control *M. bovis* spread, BTM samples are also collected from all herds in the voluntary biosecurity programme, Smittsäkrad besättning, and tested twice a year for antibodies.

IMPACT ACROSS SWEDISH HERDS

In July 2025, 401 herds subscribed to FriskKo®, with 313 qualifying for the Green List. In 2024, 1,514 herds (out of 2,462 nationally) were tested for *M. bovis* antibodies through FriskKo® and Smittsäkrad besättning, with 147 (9.7%) testing positive. Hurry et al. 2022 identified herd size as a risk factor for infection. While sampled herds were larger than the national average, the programs primarily attract larger production systems, thus the true national prevalence of *M. bovis* may be lower. As illustrated in Figure 2, *M. bovis* is primarily found in southern Sweden. Lower subscription among northern herds may also impact data representativeness.

When a herd tests positive for the first time, test results are promptly communicated to the affected farmer and herd veterinarian, who receive support with interpretation, investigation, and guidance on controlling the infection.

EMPOWERING FARMERS AND PROMOTING SAFER ANIMAL TRADE THROUGH BIOSECURITY

With *M. bovis* spreading in Sweden, early detection is crucial to limit further transmission. FriskKo® enables regular monitoring and information of the current disease status, enhancing farmers' awareness of infectious diseases and biosecurity. Herds with infection-free status listed on the Green List, promote safer animal trade. Växa, the largest cattle farmers' association in Sweden, emphasises the importance of minimising infection risk by advising farmers on biosecurity and especially

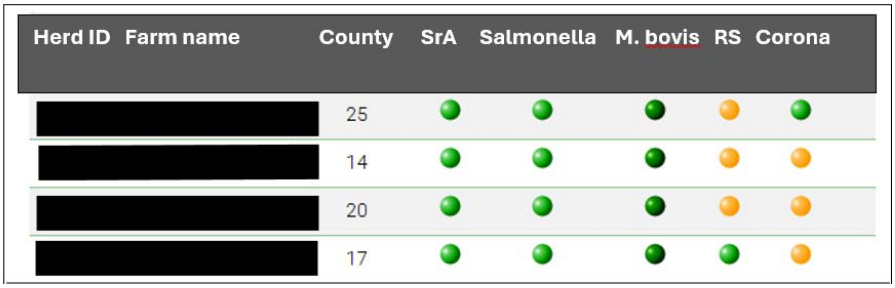

Fig. 1. The Green List comprises herds with approved testing in FriskKo® and serves as a tool for both purchasing and selling herds for safer animal trade. Herds qualify once four consecutive BTM samples test negative for infection.

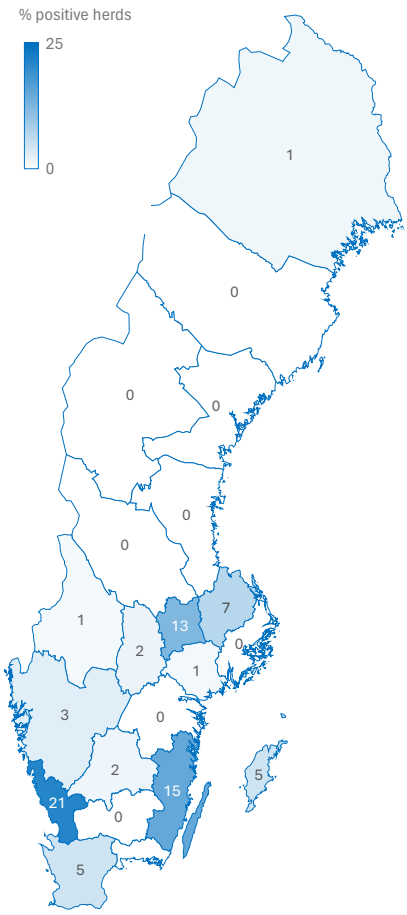

Fig. 2. Regional distribution of Swedish dairy herds that tested positive for *Mycoplasma bovis* antibodies in BTM samples collected through the Smittsäkrad besättning and/or FriskKo® programmes (Växa, 2024). The number displayed in each region represents number of positive herds.

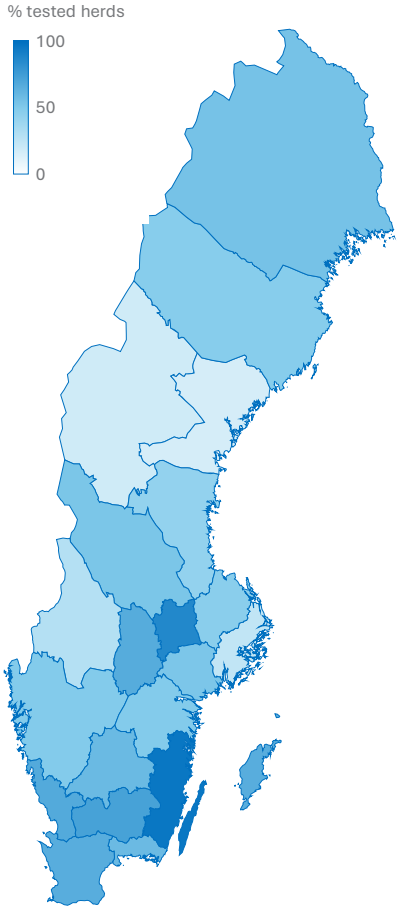

Fig. 3. Regional distribution of proportion of Swedish dairy herds tested for *Mycoplasma bovis* antibodies in BTM samples collected through the Smittsäkrad besättning and/or FriskKo® programmes (Växa, 2024).

to avoid purchasing untested livestock. Participation in FriskKo® is supported by tailored advice to help farmers interpret results and implement effective biosecurity measures. As part of a national initiative, FriskKo® offers a cost-effective tool to protect herd health and animal welfare, minimise production losses, and lowering the need for antibiotics.

EXPANDING SURVEILLANCE AND ADVANCING HERD HEALTH FOR THE FUTURE

FriskKo® has the potential to evolve into a broader surveillance platform by including additional pathogens, more dairy herds and possibly individual sampling. Future development could incorporate monitoring digital dermatitis and claw health (Växa, 2025). Including beef herds and enabling individual animal testing would provide a more comprehensive view of herd health across production systems. Strengthened infection control measures would also benefit non-replacement calves by reducing early pathogen exposure, ultimately improving calf health and animal welfare. Future prospects position FriskKo® as a key tool in promoting sustainable, healthy livestock production in Sweden.

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SWEDEN

CONTROLLING MYCOPLASMA BOVIS IN SWEDEN: IDENTIFYING EFFECTIVE AND FEASIBLE BIOSECURITY MEASURES

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MYCOPLASMA BOVIS: AN EMERGING THREAT TO SWEDISH DAIRY HERDS

M. bovis is a bacterium that can cause severe disease in cattle, thus in turn, animal welfare issues and costs due to e.g. reduced productivity. Treatment is difficult due to antibiotic resistance and *M. bovis* ability to evade the immune system. Currently, there is no highly effective vaccine available for widespread use. The current dominating strain of *M. bovis* was first detected in Sweden in 2011, and in 2019 4.8% of the dairy herds had antibodies in bulk tank milk. Recurrent sampling suggests that the antibody prevalence has increased over time. Livestock movements is likely an important route for the spread, but a better understanding of effective measures to stop the spread is still needed.

STOP THE SPREAD

The project aims to increase the epidemiological knowledge about *M. bovis* and to propose and assess control strategies to stop the spread and protect free herds.

THE PIECES OF THE PUZZLE

We are developing a data-driven model of *Mycoplasma bovis* transmission in Swedish dairy herds, parameterized using bulk tank milk sample data.

In addition to geographical data and herd-level variables, records of cattle movements between holdings were incorporated into the model. These movements were first analysed separately using network analysis.

> ”Understanding the impact of cattle movements and biosecurity actions is important when advising farmers.”
>
> **Ivana R. Ewerlöf**

In the final model, biosecurity measures can be applied within the simulations to assess how different interventions might influence herd-level prevalence and the spread of *Mycoplasma bovis*. Furthermore, a questionnaire study was conducted to investigate farmers’ willingness to adopt such measures.

FARMERS ARE OPEN TO BIOSECURITY BUT SEEK MORE KNOWLEDGE

While cattle movements have increased substantially over the past decades, the potential size of an epidemic may have decreased, due to changes in network characteristics. Going forward, the disease spread model will help us better understand how these movements affect the spread of *Mycoplasma bovis*, which is crucial when suggesting control measures.

According to preliminary results, farmers appear willing to adopt biosecurity measures when purchasing animals, such as individual or herd-level testing and cleaning of transport vehicles. However, they expressed a need for more knowledge about effective measures. Furthermore, farmers with greater perceived awareness of *M. bovis* seemed more willing to implement certain biosecurity practices.

IDENTIFYING EFFECTIVE MEASURES AND INFORMING THE FARMERS

The preliminary results are promising, particularly as increased perceived knowledge may enhance farmers’ willingness to implement biosecurity measures. The current focus of the project is therefore on developing the disease spread model, an important step in identifying effective control measures and improving epidemiological understanding of *Mycoplasma bovis*.

It is also essential to communicate the results to farmers, veterinarians, and other decision makers. Preventing the spread of *M. bovis* benefits both farmers and animal welfare, and may also help reduce the unnecessary use of antibiotic treatments.

A NEW CONTROL PROGRAM?

This project is still ongoing. Once the results have been summarised and conclusions can be drawn, the findings may serve as a foundation for developing a Swedish control programme for *Mycoplasma bovis*.

As the project is a collaboration between the Swedish Veterinary Agency, the Swedish University of Agricultural Sciences, and Växa – a national cattle farmers’ association – there are strong prospects for translating the results into practical application. The outcomes may also contribute to *M. bovis* control efforts in other countries.

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MORE INFORMATION AND OUTCOMES FROM THE PROJECT:

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FUNDING:

This project is supported by the Swedish Research Council FORMAS and co-funded by the European Union's Horizon Europe Project EUPAHW.

CALVES AND BIOSECURITY

SWITZERLAND

PERFORMANCE AND ANTIBIOTIC TREATMENTS OF PRECONDITIONED VERSUS CONVENTIONAL VEAL CALVES IN SWITZERLAND

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REDUCING ANTIMICROBIAL USE IN VEAL CALVES

In the veal industry, antimicrobial use remains high, mainly because respiratory diseases are common during the first weeks after arrival from dairy farms. One promising approach to reduce antimicrobial use is preconditioning, which involves improving calf constitution before transport. Adequate colostrum supply, high milk feeding, vaccination against respiratory disease, and trace element supplementation are key to strengthening calf resilience.

EVALUATING PRECONDITIONING EFFECTS

This prospective field study aimed to evaluate the effects of preconditioning dairy calves on-farm by comparing preconditioned and conventionally reared groups with respect to production outcomes and antimicrobial use during the veal fattening period.

COMPARING CALF REARING APPROACHES

Between April 2019 and December 2020, the Swiss Calf Health Service conducted a pilot field study comparing preconditioned calves (N = 1,104) to conventionally reared controls (N = 1,265) from 200 dairy farms.

Preconditioning criteria included adequate colostrum supply, achieving >70 kg within 50 days, and vaccination with an attenuated live vaccine against respiratory pathogens.

Farmers meeting criteria received CHF 50 per calf. Data were analysed using a mixed linear model with relevant fixed and random effects.

> ”Optimization of calf rearing on the dairy farm represents a promising strategy to improve calf health on veal farms.”
>
> **Martin Kaske**

BETTER GROWTH, NO DROP IN ANTIBIOTIC USE

Preconditioned calves arrived with better constitution, higher live weights, and faster growth, making preconditioning economically beneficial for veal farms.

However, no significant reductions in antimicrobial treatments were observed. This may reflect post-arrival stressors and a low risk tolerance among farmers, who often treat early to prevent losses from respiratory disease.

KEY FACTORS FOR CALF ROBUSTNESS

The results demonstrate the importance of colostrum, feeding intensity, and vaccination for calf robustness. However, meaningful reductions in antimicrobial use require broader change in on-farm decision-making and confidence in alternative treatment strategies. Continued support for farmers is essential to achieving sustained improvements.

TOWARDS BROADER ADOPTION OF PRECONDITIONING

Preconditioning is a promising strategy for improving calf health, but broad implementation requires communication and cooperation across the production chain. Producers also need greater awareness of the benefits of reducing antimicrobial use. Attention to barn climate, group size, and transport stress remains important even in preconditioned calves.

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Performance parameter	N_{Tot} = 2'368 Preconditioned calves N_{KGD} = 1'104 Mean ± SEM	Conventional calves N_{nT} = 1'265 Mean ± SEM	Δ	p
Age at arrival (days)	40.3 ± 0.6	43.4 ± 0.5	-3.1	<.0001
Weight at arrival (kg)	78.4 ± 0.3	74.4 ± 0.2	4.0	<.0001
Fattening duration (days)	97.2 ± 1.3	99.7 ± 1.3	-2.5	<.0001
Carcass weight (kg)	120.4 ± 0.9	117.6 ± 0.8	2.8	<.0001
Daily weight gain (g/day)	1'376 ± 25	1'324 ± 24	52	<.0001

Fig. 1. Performance results of preconditioned vs conditioned calves

OUTBREAKS, LESSONS AND DISEASE RISK PREPAREDNESS

INDIA

A FIVE-YEAR SURVEILLANCE STUDY ON BOVINE MASTITIS PATHOGENS AND ITS ANTIMICROBIAL RESISTANCE (AMR) PATTERNS

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BIOSECURITY CHALLENGES AND THE IMPORTANCE OF MASTITIS SURVEILLANCE IN INDIA'S DAIRY SECTOR

Mastitis remains a major barrier to sustainable dairy farming, particularly in India's smallholder-dominated system where numerous small herds operate in close proximity. This landscape poses distinct biosecurity challenges, as rapid pathogen transmission can occur between neighbouring but independently managed herds. Identifying mastitis-causing organisms is therefore essential, both for targeted treatment and for tailoring biosecurity strategies to specific transmission routes.

Contagious pathogens highlight the need for strict milking hygiene and equipment disinfection, while environmental pathogens point to the importance of clean housing and effluent management. The emergence of antimicrobial resistance (AMR) among mastitis-causing bacteria adds a further layer of complexity.

A five-year passive surveillance initiative across Milk Producer Organisations (MPOs), including Milk Unions and Milk Producer Companies, has provided evidence-based insights into pathogen distribution, resistance trends, and multidrug resistance (MDR). This supports improved treatment decisions, informs targeted biosecurity planning, and enhances the long-term sustainability of India's dairy sector.

A DATA-DRIVEN APPROACH TO TACKLING MASTITIS AND ANTIMICROBIAL RESISTANCE

This initiative aimed to analyse the incidence of major mastitis pathogens, profile their resistance to various antimicrobial classes and assess MDR status over a five-year period. This data-driven approach was aimed to bridge the gap between disease management and comprehensive biosecurity planning by highlighting regional patterns, thereby fostering a more resilient and secure dairy sector against evolving microbial threats.

> "Our five-year surveillance underscores the critical need for adaptive biosecurity strategies to combat evolving mastitis pathogens and AMR, ensuring healthier humans and animals."
>
> **Meenesh Shah**

SURVEILLANCE DESIGN: SAMPLING, LABORATORY ANALYSIS, AND RESISTANCE SCORING

This study analyzed microbiological and Antibiotic Susceptibility Testing (AST) data from 527 clinical mastitis cases collected over five years under the NDDB Mastitis Control Project. Milk Producer Organisations (MPOs) identified clinical cases, collected milk samples, and sent them to the NDDB R&D Laboratory under a maintained cold chain. Data from 14 MPOs across eight Indian states were analyzed for pathogen identification, antimicrobial resistance (AMR) patterns, and multidrug resistance (MDR). A Cumulative Resistance Score (CRS) was developed to compare AMR levels across MPOs and support evidence-based prioritization of interventions and policy decisions.

KEY FINDINGS: PATHOGEN PREVALENCE AND RESISTANCE TRENDS OVER FIVE YEARS

Over five years, mastitis samples from 14 MPOs revealed pathogens in over 70% of cases, predominantly Staphylococcus aureus, non-aureus staphylococci, and Streptococcus spp. Antimicrobial susceptibility testing showed high resistance to beta-lactams (32–59%) and moderate resistance to aminoglycosides and tetracyclines (20–25%), while fluoroquinolones and macrolides remained largely effective. Multidrug resistance (MDR) was observed in 19% of isolates, varying among species and MPOs (Table). The Cumulative Resistance Score (CRS) enabled benchmarking of antimicrobial resistance and highlighted regional differences (Illustration). This surveillance provided practical, region-specific AMR insights to support targeted interventions and strengthen biosecurity within India's dairy sector (Table).

ADVANCING HERD HEALTH AND ANTIMICROBIAL STEWARDSHIP

This five-year surveillance study provides invaluable insights into the evolving landscape of bovine mastitis pathogens and their antimicrobial resistance patterns in various MPOs in India. By identifying predominant pathogens and their resistance profiles, the study offers critical data for guiding targeted treatment strategies, thereby improving herd health and milk quality. The findings underscore the urgent need for judicious antibiotic stewardship to preserve the efficacy of existing antimicrobials. The primary beneficiaries are veterinary services section of MPOs, who can make more informed treatment decisions, leading to reduced economic losses from mastitis

MPO	Major Pathogens	Highest Resistance Class	MDR %	CRS (%)	AMU	Probable Biosecurity Risk Inference*
MPO 1	Streptococcus spp. (35.5%),	Penicillins	Low	High	Beta-lactam, Fluoroquinolones	Hygiene/environmental sanitation lapses; biofilm-related persistence suspected
MPO 2	NAS (32.3%)	Tetracyclines	Very Low	Low	Beta-lactam, Aminoglycosides	Milking hygiene risk; possible person-equipment-animal transmission
MPO 3	NAS (33.3%),	Penicillins	Moderate	Moderate	Beta-lactam,	Hygiene and sanitation concerns; mixed-type infection risk
MPO 4	S. aureus (33.3%)	Macrolides	Moderate	Very High	Beta-lactam,	Poor environmental biosecurity; high AMR suggests chronic or repeated exposure
MPO 5	NAS (41.4%),	Penicillins	Moderate	Very High	Beta-lactam, Fluoroquinolones	Likely cluster hygiene gaps and high AMU pressure
MPO 6	S. aureus, Streptococcus spp. (24%)	Penicillins	High	Very High	Fluoroquinolones	Biosecurity breakdown in both milking and housing management
MPO 7	Streptococcus spp. (52.6%), NAS (21.1%)	Beta-lactams	Moderate	High	Beta-lactam, Macrolides	Combined risk: disinfection, bedding, and personnel hygiene lapses
MPO 8	NAS (41.3%), Streptococcus spp. (23.9%)	Cephalosporins	Moderate	High	Tetracyclines, Fluoroquinolones	Poor hygiene and AMU mismanagement;
MPO 9	NAS (37.9%), Streptococcus spp. (20.7%)	Tetracyclines	Very Low	Moderate	Beta-lactam	Low MDR but mixed flora suggests hygiene challenges in milking and housing
MPO10	Streptococcus spp. (27.8%), NAS (25.0%)	Penicillins	Low	Low	Low AMU	Better-controlled hygiene; possible good disinfection protocols
MPO11	NAS (58.6%), Streptococcus spp. (13.8%)	Cephalosporins	High	Very High	High beta-lactam residues	High AMR burden; urgent need to audit milking hygiene and residue control
MPO12	NAS (43.5%), Streptococcus spp. (39.1%)	Penicillins	Moderate	Very High	Fluoroquinolones, Macrolides	Poor udder health management; inadequate antimicrobial stewardship
MPO13	NAS (34.5%),	Macrolides	Low	Moderate	Low AMU	Contagious mastitis dominance; review needed of cluster hygiene and farmers awareness
MPO14	S. aureus (34.5%)	Penicillins & Macrolides	Moderate	Moderate	Beta-lactam, Fluoroquinolones	Mixed pathogen profile; moderate AMR; gaps in milking-time biosecurity anticipated

Table 1. The distribution of mastitis pathogens and their associated antimicrobial resistance patterns observed across regions

and more sustainable dairy production. The veterinarians and policymakers also benefit from this data, as it guides strategic allocation of resources, acts as an early warning system for emerging resistance, and supports the broader One Health goal of antimicrobial stewardship and finally as a road map to extensive AMR surveillance programmes.

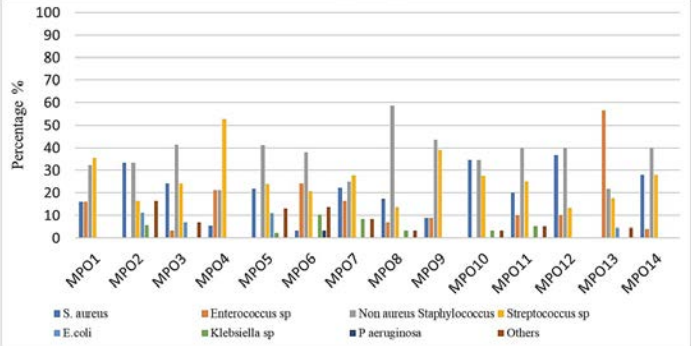
EXPANDING SURVEILLANCE AND INTEGRATING ADVANCED DETECTION

Building upon this foundational five-year study, the next steps will focus on strengthening the surveillance framework. This includes increasing sample sizes, expanding geographical coverage to better represent diverse farming systems, and incorporating data on factors such as herd size, milking practices, and antibiotic usage to identify specific risk factors. Furthermore, the study will explore the use of molecular tools for advanced AMR detection and resistome analysis, alongside integrating antibiotic residue monitoring in bulk milk tanks. There is a significant opportunity to establish a comprehensive, multi-faceted AMR surveillance system that provides a holistic understanding of selection pressures and guides policy decisions for improved antimicrobial stewardship and reduced spread of resistant bacteria in dairy production systems. The bi-annual testing of milk in the same study area will provide valuable insights into resistance shifts.

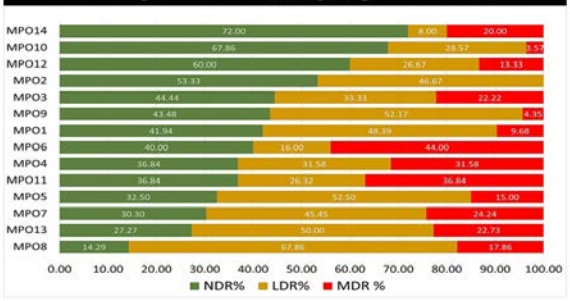
MORE INFORMATION

Further data and detailed project outline, activities undertaken, methodologies used are available upon request from the Animal Health, National Dairy Development Board, India. Email: avhk@nddb.ccop

1. Profile of mastitis pathogens in MPOs

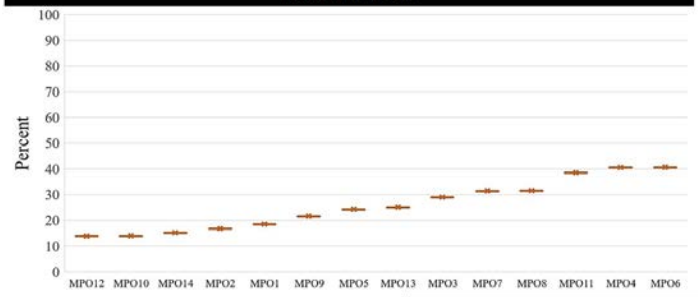


2. Multi-drug resistance in mastitis pathogen of various MPOs

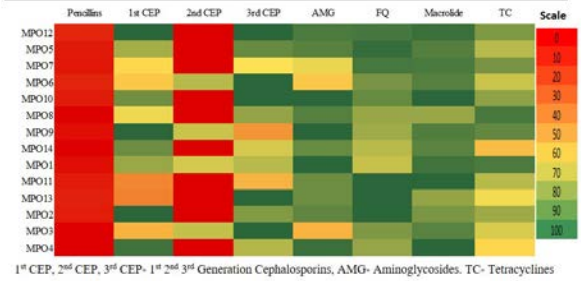


NDR : Susceptible to all test antimicrobial classes
LDR : Exhibited resistance to < 2 antibiotic classes
MDR : Exhibited resistance to ≥ 3 antibiotic classes (at least 1 member per class)

3. CRS of MPOs

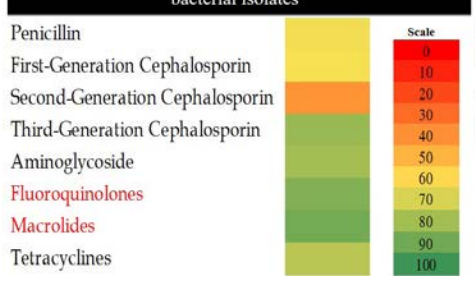


4. Drug susceptibility profile of mastitis pathogen



1st CEP, 2nd CEP, 3rd CEP- 1st 2nd 3rd Generation Cephalosporins, AMG- Aminoglycosides. TC- Tetracyclines

5. Drug preference chart-based on the overall AST of bacterial isolates*



*The selection of a particular drug depends on factors such as its intended use as indicated on its label, the range of conditions it is effective against (spectrum), and whether it has received official approval for treating the specific ailment in question.

This landscape of various analysis of mastitis pathogens from clinical mastitis cases gives comprehensive data for further mitigation and action strategies.

SOUTH AFRICA

THE HORRORS OF FOOT-AND-MOUTH DISEASE ON A DAIRY FARM – LESSONS LEARNED

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FMD IN SOUTH AFRICA'S DAIRY HEARTLAND

South Africa has been battling with an outbreak of foot-and-mouth disease (FMD) since 2019. During 2024 the disease spread to the Tsitsikamma region of the Eastern Cape province (Fig. 1), the densest dairy producing area of the country, and caused severe devastation in dairy herds. It was the first time that dairy farms were affected and the spread and effect in dairy herds was unexpected and unprecedented. The herds were not culled but "vaccinated to live" and milk production allowed to continue. Dairy farmers were affected on 3 fronts:

A) Reduced milk production due to FMD causing lameness (Fig. 2), painful mouth lesions (Fig. 3) and severe mastitis and udder/teat damage (Fig. 4) in individual animals, leading to an increased culling of cows on welfare and production grounds.

B) Loss of income from calf sales and meat of culled animals since quarantined animals had to be euthanised and buried on the farms.

C) Loss of export markets for dairy products due to restrictive processing and export requirements for milk from affected areas.

SEEKING SOLUTIONS FOR DAIRY FARM SURVIVAL

The primary aim was to stem the spread of the disease and ultimately eradication. In addition, we were trying to find solutions to decrease the effects of the state-imposed control measures by testing alternative methods to neutralise the virus in milk. The welfare on dairy farms became a major issue since calves could not be sold and cull animals could not be sent for slaughter due to quarantine restrictions.

> "Producing milk in the face of a FMD outbreak is extremely challenging. If the disease does not bankrupt you, the disease control measures probably will."
>
> **Mark Chimes BVSc**

BUILDING A UNITED FRONT AGAINST FMD

A Joint Operations Committee was formed involving the state veterinarians, private veterinarians, livestock farmers, agricultural societies, municipalities and law enforcement. This ensured good communication and collaboration between all the involved parties to find solutions and control the disease through surveillance, vaccination and movement control (Fig. 5). A Disease Management Area (DMA) was declared using natural obstacles, such as rivers, highways and mountains as borders. Animals and their products could not be moved within or out of the DMA without a Red Cross Permit from the state veterinarian. The infected farms were quarantined and vaccinated. A buffer zone of uninfected farms was vaccinated around the quarantined farms.

A POLICY SHIFT THAT TURNED THE TIDE

Convincing the state veterinarian to allow voluntary vaccination of uninfected farms as a buffer zone within the DMA was a massive policy shift for the government and the most successful in stopping the spread of FMD.

The power of collaboration and weekly meetings of state veterinarians, dairy farmers and private industry had proven to be the most effective method of control. Within 3 months there were no new outbreaks of FMD in the Tsitsikamma district without culling any herds. This was the quickest that an outbreak of FMD had been brought under control since the outbreaks started in 2019.

LESSONS LEARNED AND LINGERING CHALLENGES IN FMD MANAGEMENT

The main benefit was allowing vaccination of uninfected herds as a buffer zone.

Areas that still need addressing are:

a. Vaccine availability – a large-scale vaccination campaign is the only way to control the spread of the disease if you are not culling infected herds.

b. DIVA vaccine – being able to differentiate infected and vaccinated herds will reduce the control burden on uninfected farms.

c. FMD designated abattoirs & availability – Abattoirs need to be pre-approved to allow the slaughter of animals from infected farms for trade and animal welfare reasons. Affected animals were branded with an F on the right-hand side of the neck and could only be moved to an abattoir approved to slaughter FMD-positive animals (Fig 6).

d. Onerous milk processing requirements for FMD quarantined farms hampers trade at a time that dairy farms are struggling to survive the effects of the disease. More research is required on methods to make milk and meat safe to trade and export from infected farms. Milk that originates from a FMD infected farm may only be exported if the milk is UHT treated, in accordance with international WOAH standards for safe trade from FMD-affected areas.

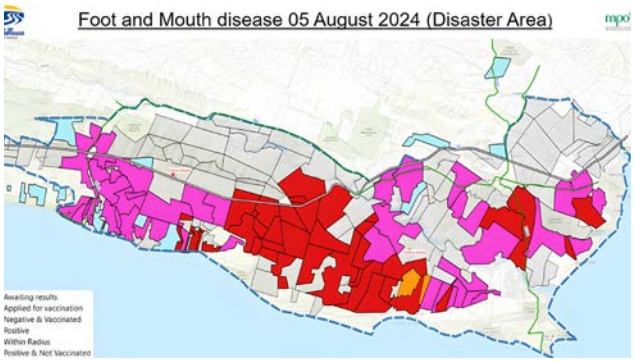

Fig. 1 – Disease management area in the Tsitsikamma region, demarcated by the green broken outline, indicating the uninfected (grey), FMD infected (red) and FMD vaccinated (pink) dairy farms. – Courtesy State Vet - Gqeberha

Fig. 2 – FMD leads to severe lameness in several dairy cows causing the cows to be unable to walk to and from pastures from the milking parlour. As a result they had to be fed close to the milk parlour. – M Chimes

Fig. 3 – Lesions in the mouth led to severe reduction in feed intake contributing to the reduction in milk production. – Courtesy A Davis

Fig. 4 – Sores on the teats and udders made milking painful. - Courtesy A Davis

Fig. 5 – All vehicles entering and leaving the disease management area had to disinfected at roadblocks. This also helped to control the illegal movement of animals. – M Chimes

Fig. 6 – All infected and vaccinated animals were F-branded on the right hand side of the neck. - M Chimes

PAVING THE WAY FOR FUTURE FMD SOLUTIONS

We are collecting milk samples, swabs and serum samples from infected farms and storing it to be used for:

1. Validating a PCR test for foot-and-mouth disease virus (FMDV) in milk to be used to prove that a herd's milk is free from virus. This will allow lifting of the control restrictions on milk from uninfected dairy herds that were vaccinated as a precaution to create a buffer zone.
2. Researching pasteurisation at various temperatures and times to find an alternative to double pasteurisation.
3. Test the effectiveness and safety of adding lactoperoxidase in milk to kill FMDV. Lactoperoxidase is a natural antimicrobial substance present in milk with antibacterial, antifungal and antiviral effects.
4. Developing vaccines based on newer technologies such as vector-vaccines and mRNA-vaccines that can be adapted to new strains of FMDV in a shorter space of time.

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UNITED STATES

STRENGTHENING DIAGNOSTICS, SURVEILLANCE, AND BIOSECURITY: HOW THE ONE HEALTH APPROACH IS TACKLING HPAI H5N1 IN U.S. DAIRY CATTLE.

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HPAI H5N1'S IMPACT ON US DAIRY CATTLE AND THE URGENT NEED FOR ONE HEALTH SOLUTIONS

On March 25, 2024, HPAI H5N1 was detected in U.S. dairy cattle for the first time globally, marking a major shift in avian influenza dynamics (USDA 2024a). Over 1080 herds across 18 states have been affected (Figure 1; USDA 2025a). The virus spreads via direct contact, aerosolization, contaminated milk, equipment, and farm-to-farm movement (Figure 2; USDA 2024b). Infected cows show reduced milk yield and mastitis, leading to significant economic losses. Human cases remained mild but concerning (CDC n.d.). While pasteurization ensures milk safety (Spackman et al., 2024), the outbreak has required advances in diagnostics, surveillance, and biosecurity. A coordinated One Health federal, state, and industry response is successfully containing the virus and protecting public health and dairy operations.

UNITING FEDERAL, STATE, AND INDUSTRY EFFORTS TO SAFEGUARD DAIRY HEALTH

The coordinated One Health federal, state, and industry response aimed to contain H5N1 spread in dairy cattle, protect public health, ensure milk safety, and support affected farms. Through enhanced testing, biosecurity, surveillance, and financial aid, the strategy fostered resilience, minimizes economic losses, and strengthens preparedness across the dairy sector.

HOW THE ONE HEALTH RESPONSE WAS IMPLEMENTED

The coordinated One Health response to H5N1 in dairy cattle united federal, state, and industry efforts. USDA mandated pre-movement testing, bulk milk surveillance, and genomic tracking (USDA 2024c). FARM Biosecurity protocols were adapted for H5N1, emphasizing disinfection, cattle isolation, and personal protective equipment (NMPF n.d). NMPF led a multistakeholder group to develop a State Status framework, classifying states by infection status and guiding targeted virus elimination. A USDA-NMPF subgroup refined this process, culminating in the December 2024 launch of the National Milk Testing Strategy (NMTS), integrating surveillance and eradication efforts nationwide (USDA 2024d). Financial aid and interagency collaboration supported rapid implementation to protect public health and the dairy supply chain.

> "The coordinated One Health response to HPAI H5N1 in U.S. dairy cattle has successfully contained the virus, protected public health, and ensured the resilience of the dairy sector by enhancing diagnostics, surveillance, and biosecurity measures."
>
> **Jamie Jonker**

DECLINING INFECTIONS AND EXPANDING SURVEILLANCE ACROSS STATES

The coordinated One Health response led to a measurable decline in newly infected dairy farms (Figure 3; USDA 2025a). The NMTS has expanded to 46 states, with 34 states now free from H5N1 infected cattle including several that previously experienced outbreaks (Figure 4; USDA 2025b). The NMTS also led to early detection of a new genotype (D1.1) affecting dairy cattle in Nevada and Arizona (USDA 2025c), enabling rapid containment. Improved biosecurity, surveillance, and interagency coordination stabilized milk safety and reduced transmission. These outcomes demonstrate the effectiveness of a One Health approach in protecting public health and the dairy supply chain.

THE BROAD BENEFITS OF A ONE HEALTH APPROACH

The coordinated One Health response to H5N1 in dairy cattle safeguarded public and animal health, protected milk supply chains, and ensured livelihoods of affected dairy farms. Dairy producers benefited from financial aid, testing programs, and biosecurity support, while consumers retained access to safe, pasteurized milk. Federal and state agencies gained critical surveillance data to guide containment strategies. Farm workers received protective resources and monitoring, reducing occupational risk. The One Health approach ensured collaboration across veterinary, public health, and environmental sectors, enhancing outbreak preparedness. Ultimately, the response helped mitigate economic losses, maintain market access, and maintain resilience across the U.S. dairy industry.

EXPANDING STRATEGIES AND INNOVATIONS FOR A RESILIENT DAIRY SECTOR

A One Health approach remains central to addressing H5N1 in dairy cattle. Future efforts focus on expanding the National Milk Testing Strategy to all continental states and continued enhancement of biosecurity across dairy farms. USDA is fast-tracking H5N1 vaccine development (USDA 2024e), with multiple candidates in trials, while continuing financial support for affected producers. Insights gained from the H5N1 outbreak are being integrated into the National Dairy FARM Enhanced Biosecurity (FARM n.d.) and Secure Milk Supply (SMS n.d.) platforms for foreign animal disease preparedness. These steps aim to eliminate H5N1 from the national herd, safeguard public health, and maintain long-term resilience in the dairy sector.

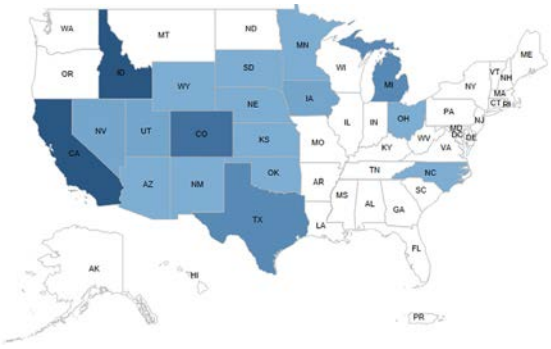
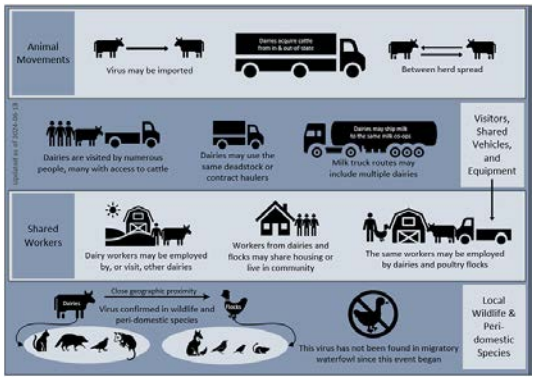


Figure 1 – Total H5N1 Affected Dairy Farms (n=1078) by State Through 8 December 2025



(Source: USDA 2024)

Figure 2 – H5N1 Transmission Pathways Within and Among Dairy Farms.

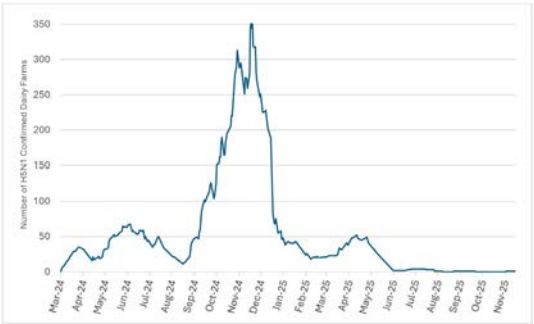


Figure 3 – H5N1 Affected Dairy Farms (30-Day Rolling Total) Through 8 December 2025

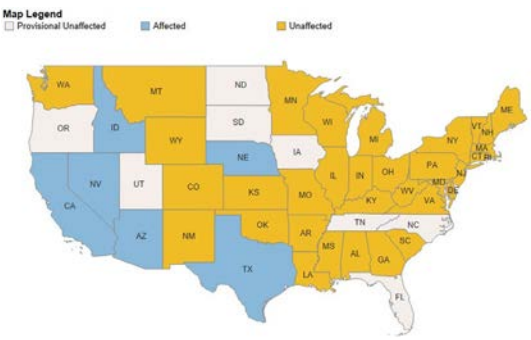


Figure 4 – H5N1 National Milk Testing Strategy Showing State Status Through 8 December 2025

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AUSTRALIA

FIRE, FLOOD, DROUGHT: BIOSECURITY WHEN RELOCATING ("PARKING") COWS IN TIMES OF EMERGENCY

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NATURAL DISASTERS AND THE NEED FOR COW PARKING IN AUSTRALIAN DAIRY FARMING

While Australia is a fantastic country to live in, it does come with a cost and dairy farmers are often faced with natural disasters. In a flood or bushfire crisis, cow parking – the relocation of milking cows from their farm of origin to an alternative host farm – may be the only viable short-term option to get cows milked, while in times of drought, cow parking may involve a formal, longer-term business arrangement. However, cow parking increases the risk for diseases into either the parked or host herd: with the potential to cause significant losses.

DELIVERING PRACTICAL GUIDANCE TO MITIGATE COW PARKING RISKS

To create an up-to-date factsheet, that outlines 1) the risks associated with cow parking, including infectious, vector borne, and nutritional diseases, and 2) the key steps to mitigate these risks – such as environmental acclimatisation, vaccination, and diagnostic testing.

"A good biosecurity tip when parking cows is to compare the vaccination schedules of the two herds. One farm may not see clinical disease because they vaccinate, but animals may still shed pathogens. Animals from the other herd may then become sick because they don't have the protection that vaccination can provide."

Zoe Vogels

REVIEWING RISKS AND RESOURCES: BUILDING A COMPREHENSIVE FACTSHEET

The update involved reviewing the current cow parking resources and ascertaining the key animal health risk when moving dairy cattle. This movement was not only between farms, but also between the dairying regions of Australia as many diseases (such as Theileria) have varying prevalence: disease is seen when naïve animals enter infected zones, and vice versa.

The factsheet was then divided into key areas:

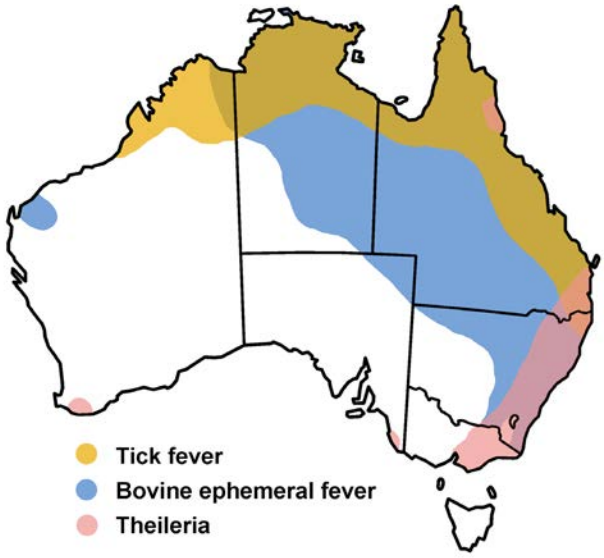
1) Infectious diseases
2) Vector borne diseases
3) Diagnostic testing of bulk milk
4) Quarantine
5) Specific milking and milk quality considerations
6) Vaccination schedules
7) Nutrition considerations

SUPPORTING FARMERS THROUGH TIMELY RESOURCES DURING FLOODS AND DROUGHTS

The renewed factsheet has been placed as a resource on Dairy Australia's Issues and Emergencies page[1], which provides information and resources for dairy farmers preparing for and/or managing the impacts of wet conditions and floods on dairy farms. The factsheet has been included in information packs delivered to NSW dairy farmers impacted by recent severe flooding[2] and circulated to veterinarians and other service providers advising Victorian dairy farmers currently experiencing severe drought conditions[3].

EMPOWERING DAIRY FARMERS WITH BIOSECURITY AWARENESS AND ACTION

Cow parking increases the risk for introducing infectious bacterial and viral diseases into either the parked or host herd. These diseases have the potential to cause substantial disease and economic



BEF tick fever Theileria map for cow parking – Dairy Australia


© DA IDF flood – Dairy Australia

loss: pathogens such as Strep ag and Mycoplasma impact milk quality, while tick-borne Theileria significantly impacts animal (and farmer) health and welfare. Awareness of these risks is the first step of good biosecurity, which aims firstly to prevent entry of disease into either herd or secondly to minimise disease if it does occur. The beneficiaries of this factsheet are dairy farmers and ultimately dairy cattle. The factsheet provides a structured reference point to support farmers, veterinarians and service providers in identifying and evaluating disease and management risks during cow relocation. This shared framework can help improve consistency of advice and coordination during both planned and emergency cow movement scenarios.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HELPING NOURISH THE WORLD WITH SAFE AND SUSTAINABLE DAIRY

The IDF is the leading source of scientific and technical expertise for all stakeholders of the dairy chain. Since 1903, IDF has provided a mechanism for the dairy sector to reach global consensus on how to help feed the world with safe and sustainable dairy products.

A recognized international authority in the development of science-based standards for the dairy sector, IDF has an important role to play in ensuring the right policies, standards, practices and regulations are in place to ensure the world's dairy products are safe and sustainable.

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