

---

# Sponsors

---

## University of Minnesota

College of Veterinary Medicine

College of Agricultural, Food and Environmental Sciences

Extension Service

Swine Center

## Editors

W. Christopher Scruton

Stephen Claas

## Layout

David Brown

## Logo Design

Ruth Cronje, and Jan Swanson;

based on the original design by Dr. Robert Dunlop

## Cover Design

Sarah Summerbell

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, or sexual orientation.

# Biosecurity: The protocols in place are appropriate

Jerome O. Geiger DVM, MS

PIC, Franklin KY

In addressing the broad question of biosecurity appropriateness (past, present, or future), this discussion considers:

- definitions of biosecurity;
- biosecurity as a blend of science and emotion;
- biosecurity as it is utilized today; and,
- biosecurity as it may be utilized in the future.

## Definitions of biosecurity

On the front lines of battle, defending herds against pathogen invasion, swine practitioners and consultants generally define biosecurity in terms of physical barriers, written protocols, and tables dictating downtimes.

In a more abstract sense, biosecurity is defined in terms of plans and programs. The Dictionary of Veterinary Epidemiology defines biosecurity as a “health plan or measures designed to protect a population from transmissible infectious diseases”<sup>1</sup>. The New Zealand Ministries of Agriculture and Forestry website states, “Biosecurity means protection from the risks posed by organisms to the economy, environment, and people’s health, through exclusion, eradication, and control”<sup>2</sup>.

Going one step further into the theoretical, in order for biosecurity to be effective, it must be more than tangible structures or written protocols. It must embrace not only the letter of the law, but the intent as well. For the sake of this exercise, this broader vision should be the working definition.

Biosecurity is a mindset or philosophy, an approach to animal husbandry with a focus on maintaining or improving health status and preventing the introduction of new pathogens. That mindset ultimately manifests itself as tangible measures (e.g., locks, gates, showers, policies, protocols, and tables of downtimes).

## Biosecurity as a blend of science and emotion

Biosecurity protocols have historically been based on science’s worst-case scenarios. Consider the Foot and Mouth Disease (FMD) example.

Thirty years ago, it was shown that FMD virus can survive in the human respiratory tract at least 28 hours, but

less than 48 hours<sup>3</sup>. Later, it was shown that humans could transfer the virus from infected to non-infected stock<sup>4</sup>. Based on that knowledge, and to protect the nation’s live-stock industries, the wisdom of Plum Island established a 5-day quarantine for people actually or potentially exposed to FMD. Certainly, a liberal cushion was built into the downtime, but considering the potential impact, and the virulence and pathogenicity of the virus, it all seemed appropriate.

This cushion illustrates the non-science component of biosecurity. Biosecurity has an emotional component in the form of fear—fear that comes with knowledge of the consequences.

When establishing downtimes to protect genetic nucleus swine herds in times and locations where international travel makes risks high, conservative managers adapt similar guidelines. With the available facts, why should it be anything less? If it is good enough for Plum Island, it’s good enough for a nucleus herd. Consider what is at stake—especially if you are a shareholder (or report to the shareholders).

In a time when production managers push key resources to the limit, and financial officers cut every corner, health practitioners and consultants (as guardians of long-term health and financial success) have knowledge of what disasters can befall a herd. It is the *fear* of those disasters that causes one to utilize and refine available biosecurity tools and reduce risk to an acceptable level.

No doubt, not every farm represents the entire industry, nor does it carry the weight of the national economy. Not every producer is exposed to the risks of Plum Island or even a genetic nucleus. The risks and potential disasters change with herd size, location, number and type of visitors, and other factors. In the real world, biosecurity measures can, should, and do vary accordingly. Generally speaking, FMD is not the primary concern. Nonetheless, the basic foundation and framework of all biosecurity plans start with the largest financial risk and the greatest possible disaster. Decisionmakers (veterinarians included) work down from there.

Biosecurity is a tool by which one manages potential health-related disasters, reducing the risk or the downside to an acceptable level.

## How is biosecurity utilized today?

Answer. By applying science (what is currently known) against potential risks to eliminate or minimize negative outcomes.

In the swine industry today, there are disease risk factors that are known.

- It is known that unwashed trucks expose naïve healthy pigs to the pathogens of a previous load.
- It is known that people spread pathogens on boots and clothing.
- It is known that birds, pets, vermin, and rodents carry disease from farm to farm, directly or indirectly.
- It is understood that in the application of any program, protocol, or procedure, human nature contains an inherent temptation to cut corners.

Utilizing biosecurity wisely is applying what is known to the facilities and situations at hand, to reduce risk to an acceptable level. In the real world, production managers and financial officers (for lack of knowledge or some other motivation) are tempted to dismiss the risks or minimize the potential outcomes. It is easier to work with the assumption that those risks or outcomes are small. The role of the veterinarian is to ask one more question at that point: “what if we’re wrong?”

It is assumed that informed production personnel would not knowingly or willfully bring a new pathogen to a farm:

- That they would thoroughly wash and disinfect the truck after hauling to the slaughter plant.
- That they would change their clothes and boots after a trip through the local sale barn and before they entered a healthy swine herd.
- That they would recognize the dangers of allowing birds, vermin, stray pets, or rodents inside the production unit.

In a perfect world, that assumption may hold true. Biosecurity rules are established (and ultimately, manifest in the form of physical barriers) to reduce risk or impact if/when those assumptions are wrong.

Biosecurity is a tool used to address the question, “what if I’m wrong?”

## How will biosecurity be utilized in the future?

Answer: by applying science (what is known) against potential risks to eliminate or minimize negative outcomes.

No doubt each day, science increases what is known. Technology applies the science, providing tools to prevent

negative outcomes. Both sides of the equation change as a matter of progress, with respect to diseases and disasters that are known. But new risk enters when one assumes that existing diseases or syndromes are the only enemy. Again, one must ask, “what if I’m wrong?”

Biosecurity must also protect against the unknown, the emerging diseases. Currently, the swine industry faces Post-weaning Multisystemic Wasting Syndrome (PMWS) and Porcine Dermatitis and Nephropathy Syndrome (PDNS) with less than perfect knowledge. This is the same industry that has literally waged war against Porcine Reproductive and Respiratory Syndrome (PRRS) for over a decade, with mixed success at best. This industry must never assume we have all the answers, because there will be new questions tomorrow.

With the energy and fortitude of insightful people like Drs. Amass and Dee, the swine industry will add to its knowledge and technology, allowing for cautious and strategic modification of its biosecurity. Such modifications will be easily effected because modification does not necessarily involve constructing or destroying concrete walls or building new loading facilities. Modifying biosecurity involves changing a mindset.

## Closing

It is hoped this review provides insight and perspective on biosecurity (past and present) to facilitate critical discussion. In the final analysis, appropriateness or application of biosecurity condenses to a basic question. With all that is currently known about health, immunity, pathogens, epidemiology, treatment, production, animal husbandry, nutrition, facility design, economics and human nature, how much risk are you and your client willing to accept?

## References

1. Toma et al., *Dictionary of Veterinary Epidemiology*, Ames, IA: Iowa State University press; 1999-24.
2. New Zealand Ministries of Agriculture and Forestry website, [http://www.maf.govt.nz/biocouncil/publications/strategy\\_tor.htm#top](http://www.maf.govt.nz/biocouncil/publications/strategy_tor.htm#top)
3. Sellers RF, Donaldson AI, Herniman KAJ., Inhalation, persistence and dispersal of foot-and-mouth disease virus by man. *J. Hyg. Camb.* 1970; 68: 565-73.
4. Sellers RF, Herniman KAJ, Mann JA., Transfer of foot-and-mouth disease virus in the nose of man from infected to non-infected animals. *Veterinary Record.* 1971; 89: 447-449.

