

12 BIOSECURITY TIPS TO ACHIEVE PEAK EFFICIENCY AND USE ANTIBIOTICS RESPONSIBLY

In Brief

- Biosecurity, when done correctly, can reduce the incidence of disease.
- Biosecurity is a key part of a holistic approach to the reduction or removal of antibiotics from the diet.
- Biosecurity is not someone else's responsibility: we must all take responsibility for implementing the necessary change.

Antibiotic resistance on the agenda

Widespread concern on antibiotic resistance is relatively new. The first paper showing the transfer of antibiotic resistance between humans and animals was written in November 2016. The United Nations has declared antibiotic resistance a global priority.

The United Nations predicts that, unless we act now, antibiotic resistance could claim up to 10 million victims per year by 2050. So, we have to act now.

But how do we act and implement a new business or industry model where the priority is a prudent use of antibiotics? The key to antibiotic-free production is good gut health and an efficient immune system.

Biosecurity is one logical solution

Biosecurity is recognized as one possible and logical solution for reducing the use of antibiotics. However, it may not be possible to replace antibiotics with only one strategy. Instead, a holistic approach should be considered.

Biosecurity can help directly by reducing environmental disease challenges, and some parts of biosecurity, for example water sanitation, are essential for animal production. But biosecurity also has an indirect impact on the control of antibiotic resistance by building awareness throughout the industry. Biosecurity, when thought of as a management system rather than a disease control tool, spurs the education of consumers, delivering big benefits throughout the food chain.

In order to realize these benefits, we have to broaden the traditional view of biosecurity. The new vision promotes biosecurity into a global priority to which everyone is committed. Biosecurity is our responsibility—not someone else's. We all have the tools. Motivating people to behave according to certain rules is key to ensure success.

What climate change means for farm animals

Experts predict that, if nothing is done, the average temperature of the planet will rise of approximately three degrees during this century. Higher bacterial load and water challenges are two examples how climate change will impact farm animals.

1. Higher bacterial load

Climate change will have a devastating impact on disease challenge. We will have new forms of disease. The risk of Salmonella contamination increases by 10-15% for every one-degree increase in temperature. That could mean that, at the end of this century, we will have a 50% greater Salmonella problem.

2. Water challenges

Water is an essential part of the diet of any animal. Animals drink at least three times the amount they eat. As temperatures increase, water requirements will also increase. Also as a result of increasing temperatures, there will be more soil erosion causing more and different types of pollutants getting into the aquifer, as well as new parasites and new diseases.

Territorial biosecurity

The Po Valley in Northern Italy illustrates the importance of biosecurity [8:49]. Within one square mile, there are nine individual farms all with different animals of different ages, using different production schemes, different movement of people, and different movement of vehicles. That is why we should think more in terms of territorial biosecurity and micro zoning rather than compartmentalization, which is what is happening now, especially to control the big emergencies like avian flu in poultry or foot-and-mouth.

Lombardy is considered as the leading pork-producing region in Italy and accounts for nearly 50% of Italian pig production. The density of pigs in this region is shown in a photograph [9:55]. From the photograph, you can see the proximity of the farms. In some cases, they are less than 300 yards away from each other. Biosecurity compromises are made to keep good neighborly relations. These are situations that need to be addressed when considering territorial biosecurity because disease is on the agenda every day. Officials are saying that disease can wipe up to 20% off gross production value, which is a lot of money. Only in a country like Italy, it would mean a loss of approximately 500 million lira, which if divided by the number of pigs raised or the number of cows present on farms, could escalate into a really problematic scenario.

Antibiotic use requires education and a shift in mindset

Italy cannot afford to be considered as one of the leading countries in terms of antibiotic use: a new model must be found. The Italian ministry of health decided that the use of antibiotics on farms should be curbed by at least 30% by 2020. But the problem is one of education.

We can find the answer by educating people and introducing them to new business models. There are no new antibiotics in the pipeline at the moment, and even if there were, a new active ingredient would only solve a small part of a very big problem. The answer lies in innovation. And in conjunction with this is mindset. If you do not change your mind, nothing is going to change in any aspect of your life.

Sustainable development goals

Focus should be placed on the relationship between human health, animal health, and environmental health. People and animals interact in a common area: the environment. Whether healthy animals are sustainable or sustainable animals are healthy, we know that one is the true path. However, it is certainly true to say that **healthy animals do not need antibiotics**.

The broader picture should not be forgotten. It is very easy to associate biosecurity protocols to the livestock parameter outcomes, forgetting that performance is also related to animal welfare. The environment will be dramatically changed by a 'clean and disinfect' protocol, with less dust, less endotoxins circulating, and the concept of one health comes into play. In a barn, you have the animals that are being raised, but also the people working very intensively.

Many approaches to biosecurity

Several common sets of beliefs about biosecurity still have blindspots.

1. Some people are of the mentality that biosecurity only requires a hose and some water to clean the whole farm. These people are not aware of biofilm and the implications of biofilms in creating antibiotic resistance.
2. Other people are of the mentality that they are doing all they can to control disease, perhaps even using more than the recommended dosages of antibiotics, but with little or no success. These people have forgotten the role of fomites, the non-living vectors of disease, which also need to be controlled.
3. Another set of people who will do as instructed by their veterinarian or advisor, but without really believing in the solution. In this case, economic expense will be minimized and mistakes will be made. For example, using a cheap disinfectant might not be applicable to the target application.
4. People who react dramatically to big emergencies such as Avian flu or foot-and-mouth disease. But once the threat is over, disinfection is withdrawn and there are no biosecurity measures in place at all.

With quality assurance, veterinarians realize that to control food-borne pathogens such as Salmonella, Campylobacter and Listeria, you cannot not rely on antibiotics alone: you also need to control the environment by cleaning and disinfecting in a rational way.

Biosecurity is the supporting concept around the world. Some may call it a fight against antibiotic resistance, but the underlying concept is the same. Biocompliance is the key concept and key approach used on farms that are ruled by precise disciplines. This is true for food safety, for animal welfare (biocide regulations for disinfectants and cleaners) and for environmental efficiency.

Dramatic change in the hygiene market

In recent years, the hygiene market has changed a lot. Up to the end of the last century, the approach was farm to food with a focus on putting food on supermarket shelves. Then, with the introduction of quality control and quality assurance, the concept of biosecurity in a very formal way emerged because it was a matter of customer responsiveness.

You could not sell products to supermarkets if you could not prove that you had e.g. a HACCP (hazard analysis and critical control point) program in place. There are now many similarities with the IT industry. Now that many consumers have smartphones, we can have all the intelligence we need at the right time. The same is true of biosecurity; we must be proactive.

As different intangible values arise, the scenario is developing into 'farm to foodture'. Foodture is half food, and half future.

The 'Foodture'

The more layers you build around food, the more value you create for the market, the producer, and for the whole industry. From food, we will produce i-food or intelligent food. Intelligent food will be produced in a sustainable and economic way. E-food stands for environmental food, making sure our livestock production leaves a green footprint. And finally, we have to be ready for the digital revolution even in our conservative market. We will get to a point where we have smart and connected food, with the producers and consumers sharing data directly to improve quality and production patterns.

Achieving biosecurity excellence

The important factors for biosecurity are compliance and execution: these dynamics cannot be escaped. There must be a strong focus on each step to make sure that you are putting the best biosecurity program possible in place, and this is down to the people.

For the strategy to work, you need the people involved to be properly engaged. To help with this, identify someone on the staff who embraces the biosecurity strategy and use them to emulate to the rest of the team.

Do staff really use foot dips?

The biosecurity chair of Montreal University set up some trials to monitor the use of foot dips. There were many problems to overcome in terms of measuring compliance with the foot dips on their site.

In the control group, they put a hidden camera near the foot dips and monitored use. In another group, signposts were put up to notify people of the presence of the cameras. In the third group, the people were told that they were going to be filmed using the foot dips and the camera used for the filming was not hidden.

When people knew they were being filmed, there was a much greater rate of compliance compared to those who knew nothing about the cameras [29:44]. However, after six months, the difference across the three groups was negligible which highlights the importance of reinforcing biosecurity measures regularly.

Is biosecurity worth the investment?

The big question is whether biosecurity is really worth investing in. When disinfection products were introduced to the market, they were seen as very expensive.

To prove their worth, a number of field trials were run. The data from those trials was shared, the main conclusion being that good biosecurity can decrease the risk of disease if coupled with good management practices such as 'all-in-all-out' as introduced in 1996. There were big savings made on the cost of medication.

More recently, 20 years after the original trials, scientific trials have been run by the University of Ghent who came to the same conclusions.

12 take-home messages

1. Know the farm.

Just as the Chinese General Sun Tzu said 'If you want to win the war, get to know your enemy but don't forget to know your army', you have to know your farm as completely as possible. Carry out regular audits, know all the critical control points that you have to set up. Plan ahead, measure and simulate the impact of your actions. Invest time gathering information about your farm.

2. Use detergents regularly and consistently.

Detergents offer savings on labor costs, and 80% of the costs of a biosecurity program is not product or equipment, but labor. The people on the ground have to be very clear about why their job is so important. Using detergents can also lead to savings of up to 50% in water usage, and in some cases, the effective use of detergents can allow you to afford the cost of at least one-man unit.

3. Use licensed product.

This is the only way to combine safety, security and efficacy.

4. Pay attention to your water system.

Water systems will have a growing importance in the future, and the advice is to follow the 'KISS' rule – keep it simple, stupid. The biosecurity principle is essentially the same.

First, you clean, and then you disinfect. It might be worth staying away from generic chlorine and

investigating new active ingredients such as triclosan, which can be five times more effective in the phase of addition whereby a biofilm develops and bacteria acquire antibiotic resistance.

5. Sanitize the air in continuous flow.

6. Disinfection is the first line of defense on the farm.

Take care when vehicles are entering the farm site, but also when they are leaving so as not to spread disease from one farm to another.

7. Use foot dips.

These should be strategically located around the farm. The disinfecting solution should be changed when you can see dirt accumulating.

8. Mycotoxin management.

There is no point in spending a lot of money on a sophisticated diet if you do not manage the problem of mycotoxins.

9. Don't make silly mistakes.

For example, do not move dirty sows into a farrowing unit which you have spent hours cleaning as they will re-infect it.

10. Remember animal welfare.

Endorphins are important for humans, but also for animals. We perform better or more efficiently when we feel better.

11. Structural biosecurity is important.

Avoid overcrowding and competition at the feeding trough or nipple.

12. Behavioral biosecurity is also important.

Hand sanitizer should be used every time you get close to a pig, not only to protect yourself, but also to ensure that you are not conveying any disease to the animal through touch.

Conclusion

Biosecurity has a role in a holistic approach in order to guide the market to a prudent use of antibiotics. It will allow us to efficiently produce as much as was previously possible with antibiotic inclusion. The only compromise we have to make is with ourselves. We have to not only be ready for change, but be the change itself.

Adapted from remarks given at BIOMIN Antibiotic-free Days in November 2017.