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Department of Dairy Science
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Can mastitis during pregnancy affect the next generation?

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I had the privilege of listening to Dr. Turner Swartz speak at the National Mastitis Council Annual Meeting held in San Diego last month. Dr. Swartz received his Ph.D. from Virginia Tech in 2018 and is currently working on a postdoc at Michigan State University under the guidance of Dr. Barry Bradford. Since leaving here, Dr. Swartz has focused much of his work on improving immunity in transition dairy cows and pre-weaned calves. At this NMC meeting he discussed the harmful exposures that occur during developmental periods (such as *in utero*) and the increased risk for disease and mortality later in life. This has been shown many times over in both humans and rodents. Interestingly, multiple studies have found an increased risk for cardiovascular disease, hospitalization, and mortality in adults who were exposed to influenza *in utero* during the 1918 epidemic. Similarly, in rodents, prenatal maternal inflammation reduced the ability of the pups to respond to lipopolysaccharide which is a potent antigen. Despite these findings in humans and rodents, little work has examined the impact of inflammation during pregnancy on the calf. Just one study has shown that daughters born to dams who were diseased during pregnancy showed fewer digestive disorders during the preweaning period, which would suggest a possible protective effect, but these daughters were also more likely to be sold prior to first calving. But this begs the question about the impact of mastitis on the next generation of dairy cattle.

We know mastitis has a profound impact on milk yield, fertility, animal well-being and survival in the herd. However, Dr. Swartz assessed the association of maternal mammary gland health on daughter performance in a recently published study. In this study, dam and daughter records were linked based on farm identification as well as breeding date of the dam and birthdate of the daughter. A total of 15,992 daughter records were analyzed for age at first calving, 15,119 records for first lactation performance and 3,570 for second lactation performance. The results showed a positive association between dam somatic cell score (SCS) and daughter's age at first calving (as dam SCS increased, daughter's age at first calving also increased). Additionally, as the dam's SCS increased, the daughter's first and second lactation milk fat yields decreased. Interestingly, no association was found for milk or protein yields in the daughter's first or second lactation.

The concept of fetal programming has been more widely established in humans. Far fewer studies have looked at this association in dairy cattle. This was the first study to show an association between the mammary gland health of the dam and the performance of the daughter which supports the theory of developmental programming in bovine. We have touted for decades the importance of mammary gland health and the relationship with milk yield, quality and fertility, but now knowing the impact on the next generation makes this even more important.

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Biosecurity on your dairy farm—Revisited

Authored by Jeremy Daubert, Extension Agent — ANR, Dairy, Rockingham County, Virginia Cooperative Extension, jdaubert@vt.edu

A successful replacement heifer program is rooted in biosecurity on a dairy farm and should be a priority every day. It affects the health and safety of the animals and employees and can quickly affect the profitability of the farm. Unfortunately, too often we forget about biosecurity until a disaster happens — whether on our farm or that of someone we know. Biosecurity encompasses the procedures you have in place to protect humans, animals, and plants from disease. There are many things that you do not have control over; don't spend time worrying about what you cannot control and work on what you can control.

There are three main steps to a biosecurity risk analysis on your dairy. Remember the end goal at each step — keeping everyone safe and healthy.

1. Do a Risk Assessment. This assessment can be done by the farm owner, safety manager, or a third party, like a consultant or extension agent. Sometimes it is good to have someone who is less familiar with the day-to-day operation to help with the assessment. They can see risks that might not be noticed by someone who is there every day. Analyze each part of the farm. Look at calves, dry cows, heifers, milking cows and other enterprises. How do visitors enter or leave the farm? Where can contamination happen? Assess the vulnerability of each part of the farm, newborn calves are more susceptible to disease than a bred heifer would be. What would be the specific risk to each part of the farm? What diseases could present risks and how can they be introduced to the farm? It is important to not only know what diseases could be present, but also how they can be spread, by inhalation or direct contact? How long do they live in the environment, how long do the incubate in the animal, etc.? Can they be prevented by vaccines or do they need to be eliminated from the environment?

2. The second step is to develop a Risk Management Plan based on the risk assessment. This will be unique to every farm and will take the most time in developing and implementing. The risk management steps should be specific and include steps to manage risks. The risk management plan should be written down and can be updated as needed on the farm. A visitor log should be held on each farm to help track diseases. Many farms implement camera systems to monitor animals, these systems can also be used to monitor farm visitors and can help to deter unwanted guests. How are you managing sick animals to prevent disease transmission? Can you separate them from healthy animals? Do employees wash hands and boots after working with sick animals? Do visitors sanitize boots before and after they enter the farm. Are trucks entering the farm free from contaminated materials from other farms? What wild animals might have access to the farm? How can contamination from deer, raccoons and birds be prevented?

3. The third part of a biosecurity plan is communication. Communication is key to making the plan a success. Everyone who works on the farm should know about the biosecurity plan and how it affects them and others on the farm. Explain the reason for it

and what the goals are. The plan should be communicated to anyone that enters the farm. Is it expected that the nutritionist sanitizes their boots before and after a farm visit? Make sure they understand the expectation and the reason for it. Biosecurity signs should be placed strategically for visitors to clearly see around the farm and at farm entrances.

Another important part of the biosecurity plan is to have an emergency action plan and a contingency plan. Contacts for local fire and rescue and sheriff's office should be in every building. Also include contacts for poison control, your veterinarian and any of the first calls to make in case of emergency. What will the farm do if the neighboring farm has a disease outbreak? How will you prevent it from being transmitted to your farm? If there is flood or a fire, a chemical spill or an injury, what will happen if any of these occur?

Each farm should make the biosecurity plan specific to their needs and situation. It should be known by all employees, owners and visitors. It must also be evaluated regularly and updated as needed.

Upcoming Events

Private Pesticide Applicator Prep Class with Test
April 11, 2022

Interpreting Forage Analyses - VCE Ag Today
Zoom 9:00 a.m.
April 23, 2022

Pittsylvania Youth Dairy Show
April 23, 2022

Dairy Skill-a-thon
April 29, 2022

Little All-American Show & Banquet
April 30, 2022

Virginia Spring Holstein Show (Youth)
April 30, 2022

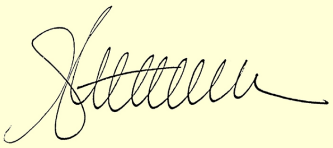
Hokie Cow Classic
May 16, 2022

Franklin Co. Youth Livestock Show with Dairy
June 18, 2022

Franklin County DHIA
June 23, 2022

If you are a person with a disability and require any auxiliary aids, services or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.

For more information on Dairy Extension or to learn about current programs, visit us at VTDairy—Home of the Dairy Extension Program online at www.vtdairy.dasc.vt.edu.



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