

Salmonella Dublin Herd Testing Options

The Role of Serological Testing

Serological testing within a herd involves analyzing blood or milk from individual animals for the presence of antibodies against *Salmonella* Dublin. Serology does not detect the actual bacteria in blood or milk, but rather measures the presence of antibodies against S. Dublin. This means that animals that are positive on S. Dublin serological testing have been exposed to the bacterium but may or may not be actively infected. For this reason, using serology as a herd screening tool can be tricky, but with a thoughtful approach, it can help identify chronic carriers, determine if biosecurity procedures are effective at reducing cow to cow transmission, and ultimately improve management and mitigation on farm.

On-Farm-Biosecurity Report Card

Biosecurity measures are most often discussed as means to prevent diseases from entering a farm. However, biosecurity is also critical for reducing and preventing pathogens from circulating within a herd (proAction® had a number of excellent biosecurity [resources](#), including Biosecurity for Canadian Dairy Farms: National Standard is. Serological testing for S. Dublin can be a good tool to assess the efficacy of on-farm biosecurity measures.

Four- to six-month-old calves are most susceptible to S. Dublin infection. Robust on farm biosecurity practices —such as strong calving pen hygiene and colostrum management, refraining from feeding raw milk, and ensuring optimal calf housing — will help to prevent calves from being exposed to S. Dublin. Therefore, testing four- to six-month-old calves can serve as a ‘report card’ for your on-farm biosecurity program. Non-exposed calves will test negative for S. Dublin antibodies, indicating biosecurity is working well. The presence of S. Dublin antibodies in four- to six-month-old calves, regardless of clinical signs of disease, indicates that there are biosecurity gaps allowing ongoing circulation of S. Dublin within the farm.

Identification of Chronic Carriers

After infection with S. Dublin, cattle may either perish, clear the infection, or become chronic carriers. A chronic carrier is an individual that sheds the bacteria, either continuously or intermittently, and often without clinical signs. Because these animals are constantly infected, they will maintain high antibody levels. Shedding by chronic carriers

causes ongoing infections of naïve cattle and is the reason S. Dublin is difficult to eliminate from the herd.

The goal of testing and culling is to remove chronic carriers from the herd to break the cycle of infection. There has been some success with 'test and cull' protocols for the elimination of chronic carriers. However, it is important to note that these protocols are NOT a replacement for improved biosecurity, which is essential to prevent introducing S. Dublin into a herd from external sources and for limiting spread within the farm environment (including during a test and cull program). If there are cattle moving on and off farm frequently (i.e., buying and selling, cattle shows, outsourced heifer rearing, etc.) the risk introducing or re-introducing S. Dublin is increased (compared to closed herds). This may reduce the success of test and cull programs. We highly recommend only pursuing these options if you are confident that on-farm biosecurity is optimal.

There are several approaches to selecting which animals to include in a test and cull program. Which approach is best for the farm will be influenced by that farm's past S. Dublin bulk tank milk (BTM) results, as well as its management goals:

Step 1: Determine whether the herd is newly infected or chronically infected.

- A newly infected herd is one that has been consistently negative on bulk tank surveillance for four consecutive bulk tank tests before subsequently having a positive test.
- A chronically infected farm is one that has been positive on two or more bulk tank tests.

Step 2: Determine a goal, and from that, a herd testing plan.

For **newly infected herds** you must decide whether your goal is S. Dublin **CONTROL** (i.e., reducing the impact of S. Dublin on the farm) vs S. Dublin **ERADICATION** (getting rid of all infected animals).

- If you are interested in **control**, then **targeted testing** may be a reasonable choice. Targeted testing involves testing all **heifers that are between 1 year of age and 1st calving** at the time of the first BTM positive, these animals are most likely to become chronic carriers if they are infected with S. Dublin.
- If your goal is **eradication**, then it is better to **test all individuals**, as this is the best way to catch all possible chronic carriers, even in less susceptible age groups.

For **chronically infected herds** targeted testing is not effective as it is more likely that there are chronic carriers amongst multiple age cohorts. Because of this we recommend **testing all individuals** in the herd, **regardless of whether the goal is control or eradication**.

Step 3: Determine which samples to collect and submit for testing.

- **Milk is recommended for all milking individuals that are ≥ 5 days in milk.** This is the more sensitive test (i.e., fewer false negatives). *Do not use milk from individuals that are producing colostrum or transitional milk, as active secretion of antibodies by the mammary gland can interfere with test results.*
- Serum from **blood** samples is recommended for all non-milking individuals.
- Blood and milk samples can be submitted to the [Animal Health Centre](#) for testing.

Step 4: Develop a strategy to act on testing results.

Up to three tests may be needed to determine which animals are likely chronic carriers and good candidates for culling.

- **First test:** In general, culling is not performed after the first test; however, if possible, we recommend isolating positive individuals until those individuals test negative or are culled (see [Biosecurity for Canadian Dairy Farms: National Standard](#) for tips). An individual animal that has other reasons to cull, and is S. Dublin positive, may be selected for culling after one positive test.
- **Second test (4 months after the first test):** Individuals with **two positives** may be considered for culling OR, for a more conservative approach, you may elect to wait for a third positive.
- **Third test (4 months after second test): Any recurring positives** at this time should be culled.

Note that this testing process may be repeated as many times as needed until no further positive animals are detected.

Step 5: Reduce the risk of S. Dublin being reintroduced to the herd.

Minimize cattle movements on and off farm, including the introduction of new cattle into the herd, especially from sources where the S. Dublin status is not proven to be NEGATIVE.

The risk of S. Dublin introduction can be further mitigated by **testing animals prior to introducing them into the herd and isolating new animals.**

Step 6: Monitor the success of your program.

Repeat the test and cull program until you have **two rounds of testing, 4 months apart where all animals are negative on both rounds.** Subsequently, it is prudent to **monitor the BTM serology quarterly.** We recommend watching for any increases in your percent positivity greater than 9%. If you note this degree of increase further testing can be considered.

Please note that there is no guarantee that a test and cull program will be successful. Even the best test and cull program may miss chronic carriers and/or experience reintroduction of infection from outside sources.

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