Salmonella Dublin

Bulk milk testing: Frequently Asked Questions
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What is Salmonella Dublin?
Salmonellosis in humans is a common bacterial disease that involves the intestinal tract. Salmonella Dublin; however, are cattle-adapted bacteria that usually present as a respiratory illness in infected animals, particularly in young stock (less than five months of age), although animals of any age can be affected. Other clinical signs include abortions, sudden death, septicemia and death. Salmonella Dublin is commonly multi-drug resistant, limiting the ability to treat infections with antibiotics. Once infected, animals may carry the bacteria and maintain the infection in a herd by periodically shedding the bacteria, even without showing clinical signs. Animals may remain lifetime carriers of Salmonella Dublin. In addition, the bacteria may survive for several years in the environment. Salmonella Dublin may infect people and can cause illness with high risk of hospitalization. The multi-drug nature of Salmonella Dublin is a concern for treating the disease in humans as well. People get infected mostly by consuming unpasteurized milk from infected animals, although transmission may also occur by direct contact with faeces of infected cows or calves.

How does the PrioCHECK® Salmonella Dublin Antibody ELISA work?
Once infected, animals will develop antibodies against Salmonella Dublin. Typically, diagnosis of Salmonella Dublin is based on detecting antibodies in an infected animal's milk or blood, or in the bulk tank milk using enzyme-linked immunosorbent assays (ELISA). For more than 20 years, bulk tank milk testing has been used for detecting Salmonella Dublin-infected herds. The PrioCHECK® Salmonella Dublin Antibody ELISA detects antibodies against Salmonella Dublin in milk, including bulk tank milk. The test compares the concentration of antibodies in the test milk sample with the same antibodies in a positive control (i.e. samples known to have antibodies against Salmonella Dublin).

How will my results appear?
Each herd will be provided with two pieces of information: the percent positivity (%PP) and risk status. The %PP is a comparison between the concentration of antibodies in your bulk tank milk versus the concentration of antibodies in the positive control. If the %PP is higher than 15%, herds will be classified as high-risk. If lower than 15%, herds will be classified as low-risk.

What do my results mean?
As the concentration of antibodies against Salmonella Dublin in bulk tank milk samples increases, so does the probability Salmonella Dublin infected cows are in the milking herd. However, the test is not perfect and may fail to correctly classify some herds. There are several reasons for this. There is an ‘antibody-lag’ period, where herds have been exposed to Salmonella Dublin but antibodies in bulk tank milk are not yet sufficient to trigger a positive bulk tank milk test (average of 60 days). Also, in herds where the disease is present exclusively in young stock, testing of bulk tank milk will likely fail to detect diseased animals. These would produce FALSE-NEGATIVE results. There is the ‘antibody-fall’ period, where herds no longer have infectious animals but antibodies are still being produced by cows and detected in bulk milk samples (average of six months). Thus, herds with past infections, which have been eliminated, can test positive even without any diseased animals present in the herd. Finally, there is a small chance herds test positive in bulk tank milk due to presence of Salmonella species other than Salmonella Dublin (i.e. Salmonella Typhimurium). These would be FALSE-POSITIVE results.

Since test results are best interpreted with farm specific history and information, and there are imperfections with respect to the testing, herds will be classified as either low-risk or high-risk herds. Overall, based on data from Quebec, nearly 96% of herds that test negative (low-risk herds) will be free of Salmonella Dublin. In contrast, there is a greater risk of a false positive result; only 25% of herds that test positive (high-risk herds) will have at least one animal infected with Salmonella Dublin. Therefore, we recommend working with your herd veterinarian to further investigate high-risk herds, particularly those with %PP greater than 50, or any high-risk herd with recent history of respiratory disease in young stock that was not responsive to antibiotic treatment.

What do I do now?
Low-risk herds should resume their normal activities. Although low-risk herds may still have Salmonella Dublin-positive cattle, given how infrequent the disease is in Ontario right now, it is much more likely low-risk herds are indeed disease-free.

All herds, regardless of risk status, should implement biosecurity protocols in order to prevent Salmonella Dublin, including monitoring replacement heifers for clinical signs consistent with Salmonella Dublin infection.

Farmers with high-risk herds, particularly those with recent history of respiratory disease in young stock, should consult their herd veterinarian and confirm herd disease status. A positive bulk milk test should be followed by testing for Salmonella Dublin in young stock or any suspected animals. Farmers must also avoid consuming raw milk from their dairy herd.

Remember…
To consult your herd veterinarian and review test results in the context of your herd biosecurity protocols and disease control strategies.
Take home messages

- *Salmonella* Dublin causes disease in dairy cattle, primarily in young animals. It can also cause severe illness in humans.
- The PrioCHECK® assay detects antibodies against *Salmonella* Dublin in bulk tank milk, but it is not a perfect test; it may fail in some specific circumstances.
- Risk status should be interpreted alongside herd clinical history, as well as the per cent positivity value. Once results are available, share with herd veterinarian.
- Low-risk herds should resume normal activities while focusing on adopting biosecurity protocols to prevent introduction of *Salmonella* Dublin.
- High-risk herds should confirm herd-disease status by follow up testing for *Salmonella* Dublin in calves or cows as directed by herd veterinarian.

Weblinks

3. *Salmonella* Dublin – CalfCare.ca (https://calfcare.ca/salmonella-dublin/)
5. Dairy at Guelph (https://dairyatguelph.ca/contact/)

References


