

Salmonella Dublin

Bulk milk testing: Frequently Asked Questions

Version 1.0 - August 2022

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.



With respect to biosecurity protocols, a [risk scoring tool](#)¹ was developed to assist farmers and veterinarians to identify transmission routes and plan control strategies. This tool can be completed with the herd veterinarian and used to identify risks for introduction or presence of *Salmonella* Dublin. Proper calving management and hygiene of the calving area are essential to any *Salmonella* Dublin control program. Specific recommendations include:

- 1) minimize contact between newborn calf and dam;
 - 2) reduce number of cows in the calving pen;
 - 3) use proper bedding management in the calving area;
 - 4) implement practices to avoid colostrum contamination.
- 5) Additionally, animals with clinical signs must be separated from the herd.

Currently there is no approved vaccine against *Salmonella* Dublin in Canada. Buying animals from multiple sources, particularly from countries or areas where *Salmonella* Dublin is endemic, is a significant risk factor for introducing *Salmonella* Dublin in disease-free herds. *Salmonella* Dublin can be spread to uninfected farms on the clothing, footwear and tools of visiting personnel. Therefore, it is important to maintain strong biosecurity protocols in order to prevent the introduction of *Salmonella* Dublin.

Where do I obtain more information about *Salmonella* Dublin?

There is a wealth of information available about *Salmonella* Dublin in dairy cattle. Calfcare.ca has a suite of resources, including a summary of how *Salmonella* Dublin is spreading in Ontario and can be accessed [here](#)³. The Michigan State University has recently prepared a detailed online document about *Salmonella* Dublin that can be accessed [here](#)⁴. In addition, a risk assessment tool is [available](#)¹ to identify areas of higher risk for the transmission of *Salmonella* Dublin based on farm management practices.

Producers and veterinarians can also [contact](#)⁵ the Dairy at Guelph team to participate in ongoing studies, as well as request further information on bulk tank milk testing.

Disclaimer

The content of this FAQ sheet was current at the time of preparation (Feb. 2, 2022) and is believed to represent the best information about the presence of Salmonella Dublin in dairy herds. Neither Dairy Farmers of Ontario or the University of Guelph nor any of their funding partners or content providers shall be held liable for any improper or incorrect use of information described and/or contained herein, and assumes no responsibility for any direct, indirect incidental, special, exemplary, or consequential damages that anyone incurs from use of this information.

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

¹Danish Risk Scoring Tool – *Salmonella* Dublin (https://ahdc.vet.cornell.edu/programs/NYSCHAP/docs/NYS_modified_Risk_scores_Salmonella_Dublin.xls)

²OMAFRA's List of Frequently Asked Questions (<http://www.omafra.gov.on.ca/english/food/inspection/ahw/aha-regs-faq.htm>)

³*Salmonella* Dublin – CalfCare.ca (<https://calfcare.ca/salmonella-dublin/>)

⁴*Salmonella* Dublin in dairy calves – Michigan State University (<https://www.canr.msu.edu/news/salmonella-dublin-in-dairy-calves>)

⁵Dairy at Guelph (<https://dairyatguelph.ca/contact/>)

References

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Your test results are strictly confidential and will be provided to you via DFO correspondence. DFO takes the privacy of producer information seriously. For this reason, only aggregate test results will be made public. That said, you should be aware that, under the Animal Health Act, *Salmonella* Dublin is "immediately notifiable" to the Office of the Chief Veterinarian for Ontario (OCVO). That means that the laboratory will share an annual report containing all bulk milk test results with OMAFRA veterinarians, who will assess the report and may contact your veterinarian to discuss the case in confidence. Ministry veterinarians may be able to provide advice on how to prevent further spread of the hazard among your animals and between premises and work with your veterinarian on next steps if needed. More information about this can be found [here](#)².

