

Salmonella Dublin: It Pays to Be Proactive

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In 2013 *Salmonella enterica* serotype Dublin (S. Dublin) was cultured in BC for the first time. There are many different serotypes of Salmonella, but the discovery of S. Dublin in BC herds is significant because it is adapted to cattle. This means S. Dublin is more likely to cause subclinical infections and create carrier animals that show no abnormal signs allowing it to hide in the herd. However, S. Dublin can also cause significant, hard to treat disease resulting in significant economic loss. Unfortunately, S. Dublin has become widespread throughout BC and is the most common serotype of Salmonella cultured from cattle. This is also the case in other provinces. Ongoing concern from dairy veterinarians and the province's Animal Health Centre (AHC) in Abbotsford led to the creation of the BC Salmonella Dublin Investigation and Management Program (SDIMP) in 2021. The SDIMP team is led by Dr. Chelsea Himsworth and funded by BC Dairy, the Canadian Agricultural Partnership, WestGen and the BC Ministry of Agriculture.

How many dairies in BC have S. Dublin?

Detection of antibodies to S. Dublin in bulk tank milk samples indicate lactating cows have been exposed or are infected with the serotype. The BC SDIMP program took quarterly samples in 2022 on all BC dairy farms and found that 30% of BC dairies were positive on at least one sample over the year. This is much higher than was expected and is likely an

underestimate! If you are wondering if you have S. Dublin on your farm, the 2022 bulk tank results are available. If you don't know your study ID number contact the SDIMP team at sdublin@gov.bc.ca. To get a current result, take a bulk tank milk sample and submit to the AHC in Abbotsford for \$10. Greater than 35% positivity reflects S. Dublin infection in a herd. Personally, I consider positivity rates that are consistently above 15% to be of concern.

Clinical signs

Most farms with positive bulk tanks have not diagnosed sick animals with S. Dublin. Typically, Salmonella bacteria enter the body through the mouth. Salmonella has a nasty ability to get out of the gastrointestinal tract into the rest of the body causing severe disease. Infected animals can shed bacteria in all secretions, such as manure, nasal discharge, saliva and milk. S. Dublin usually presents as respiratory disease with a high fever and typically without the telltale diarrhea we associate with other Salmonella serotypes. Unfortunately, infected animals typically do not respond well to pneumonia treatments, have persistent fevers and lose body condition. It is difficult to tell the difference between pneumonia and S. Dublin cases, but increased mortality or poor response to treatment is an indication it may be S. Dublin. Calves that are lame with joint infections are also a red flag. Cattle can be infected at any age and

young calves are more likely to have severe infections that get into their bloodstream and result in mortality. A common time to see affected calves is before weaning or after weaning in group pens. If you have sick calves with similar clinical signs, get your veterinarian to examine sick calves, especially if they don't respond to treatment. To get an accurate diagnosis, I recommend euthanasia and postmortem examination of chronic poor doing calves, any calves that die, and abortions. Culture for S. Dublin from postmortem cases is much more effective than from fecal samples of live calves.

Another way to use serology is to take blood samples from individual animals to determine if they have been exposed. Most animals that are exposed will clear the infection and become seronegative over time. Chronic carriers are identified by three positive serology results over 8-12 months. To determine if calves have been exposed, take blood samples from 15-20 heifers > 4 months age. This is something we do on infected farms to determine if calf biosecurity procedures are preventing exposure to S. Dublin. We **CAN** prevent exposure of calves on infected farms and have seen farms go from more than 90% exposed to less than 5% after making on farm biosecurity changes.

What should you do?

Because of its insidious nature, biosecurity or preventing spread of the bacteria **between** farms and **within** farms is key to controlling S. Dublin. Risk factors for introduction into the herd include purchasing cattle, custom heifer raising, and people and equipment moving between farms. However, don't think that just because you haven't bought animals for a while, you don't have it. I have seen several herds with clinical S. Dublin outbreaks that haven't introduced new animals in the previous five years. S. Dublin survives in manure and the environment for months, so can easily be spread from one farm to another. If you don't think you have it on your farm, improve between herd biosecurity to try to keep it out.

Prevention of new infections

If you have S. Dublin on your farm, it's important to prevent new infections by blocking fecal oral transmission. It's critical to focus on the calf right from birth. Even if you don't have S. Dublin on your farm, reducing fecal oral transmission to calves will reduce other calf diseases such as diarrhea.



Practical measures to reduce fecal oral transmission include:

Calving pen sanitation

- Keep calving pen as clean as possible. Minimize the number of animals in the pen. Do NOT use the maternity pen to house sick cattle if possible.
- Remove calves from calving pen ASAP to a clean, disinfected hutch or pen.

Calves: Liquid feed sanitation

- Cleanliness is critical. Soap, scrub, disinfect and dry ALL feeding and treating equipment.
- Colostrum can be a source of infection. Collect cleanly and feed with clean equipment. For some farms, heat treatment of colostrum is critical in breaking transmission to calves.
- Unpasteurized milk fed to calves is a potential source of infection.

General cleanliness

- Don't contaminate feed with manure. This can be as simple as not walking in feeding area with boots contaminated with manure. Hoses at pen exits can make this easy.
- Make sure you don't expose calves to manure from older cattle. Scrub your boots and make sure your hands and clothing are clean before handling calves.

It is important to remember that Salmonella bacteria have the potential to infect people and cause severe illness. Consumption of raw milk is high risk, especially from herds with suspected or confirmed infection.

Be proactive and discuss S. Dublin with your herd veterinarian. Your veterinarian will be able to advise you on the most important practical changes for your farm. A risk assessment spreadsheet is available online at sdublinbc.ca. The SDIMP currently has a survey to further improve and refine the risk assessment tool. If you are interested in participating it can be found at sdublinbc.ca/survey. **Improving your biosecurity before you have S. Dublin is a lot better than having to improve it after S. Dublin.** Salmonella Dublin is a difficult disease to manage but you **CAN** prevent transmission on farm.

S. Dublin Herd Status	Not infected or very low prevalence	Likely low prevalence	Moderate to high prevalence
Infection History	Bulk tank consistently negative	Recently positive herd. Previous bulk tank results negative.	Persistently positive bulk tank or highly variable bulk tank results. May have diagnosed clinical disease
Recommended Testing	Quarterly bulk tank serologies	Targeted blood serology of heifers > 4 months. Quarterly bulk tank serology. IF goal is eradication consider serology on all individuals to identify chronic carriers	Targeted blood serology of heifers > 4 months. Quarterly bulk tank serology
Recommended Actions	Closed herd practices. Improve biosecurity between age groups on farm. Postmortem of chronics, dead calves or abortions.	Improve biosecurity between age groups on farm. Closed herd practices. Postmortem of chronics, dead calves or abortions.	Improve biosecurity between age groups on farm. Postmortem of chronics, dead calves or abortions.
Likely outcome	Prevention of S. Dublin entering the farm	Reduction of infection, losses and creation of chronic carriers. Prevent additional S. Dublin entering the farm. Possible eradication of S. Dublin - difficult	Reduction of infection, losses and creation of chronic carriers. Reduce S. Dublin prevalence on farm.