# Fact Sheet: Bovine Norovirus

## P2f Infectious Diseases

August 2025

## Bovine Norovirus (BoNoV)

Bovine noroviruses (BoNoVs) are found worldwide and mainly affect newborn and pre-weaned calves. Infections are uncommon in calves older than six months and disease is rarely seen in adult cattle. It was found on all farms sampled in our study.

## Transmission

Bovine noroviruses spread mainly through the faecal-oral route, meaning calves become infected by ingesting the virus from contaminated manure or surfaces. Healthy-looking calves can carry and shed the virus, so infection can occur even without obvious sick animals in the group.

## Treatment and control

There is no specific antiviral treatment for bovine norovirus. Management focuses on supportive care, including oral rehydration and good nutrition. Preventive measures rely on hygiene—keeping calving pens clean, minimizing faecal contamination, and isolating sick calves.

Vaccines are not yet available, but research is exploring virus-like particle (VLP) vaccines for future use.

## Genetics

Bovine caliciviruses are part of the *Caliciviridae* family. Different strains can vary in how sick they make calves, with some causing worse symptoms than others. BoNoV belongs to genogroup GIII, which has four genotypes. The most important two are:

- **GIII.1 (Jena virus):** can cause more severe diarrhoea in calves under experimental conditions.
- **GIII.2 (Newbury virus):** most common in the field, usually linked to mild or moderate diarrhoea.

### Key points

- Bovine noroviruses (BoNoVs) mainly affect newborn and pre-weaned calves.
- Clinical signs range from mild to severe watery diarrhoea, depending on the strain (GIII.1 more severe, GIII.2 more common but milder).
- Transmission is faecal-oral, and healthy calves can shed the virus without showing symptoms.
- No specific treatment or vaccine exists; control relies on hygiene and supportive care.
- Research is limited due to difficulties growing the virus in cell culture, slowing vaccine development.

### Microbial surveillance in dairy cattle

This series of fact sheets has been prepared for cattle vets. It covers a range of microbes that were identified by Dairy UP team in samples collected from cattle on NSW dairy farms in 2023 and 2024. As many of these viruses are new, and knowledge about them is still emerging, we have collated current knowledge as a handy reference.

### About Dairy UP

Dairy UP is a research and development program to help NSW farmers unlock the potential of their dairy businesses. Led by the University of Sydney's Dairy Research Foundation, Dairy UP is delivered through NSW DPIRD, Scibus, Dairy Australia, and the University of Sydney.

## Clinical signs and pathogenesis

The severity depends on the strain. GIII.1 (Jena virus) can trigger sudden, severe watery diarrhoea within 14–16 hours, lasting about three days.

GIII.2 (Newbury virus) is more common in the field and usually causes milder signs like soft stools, reduced appetite, and tiredness.

The virus mainly targets the small intestine,

especially the jejunum and ileum. It causes villus atrophy (loss of absorptive structures) and crypt hyperplasia (increased cell growth in intestinal glands), which reduce nutrient absorption and lead to diarrhoea and poor growth in calves.

## Laboratory detection

Bovine norovirus is most reliably detected using RT-PCR or qRT-PCR. ELISA tests for antigens or antibodies can be used for research or herd-level screening but are less sensitive than PCR.

## Research challenges

Because they don't grow well in standard lab cell cultures, studying their role in disease has been challenging.

Historically, detection relied on electron microscopy or infecting animals. While recent advances have enabled human norovirus growth in special cell systems, these methods don't work for bovine strains yet. This limitation slows progress in understanding the virus and developing vaccines.

## References

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## More info

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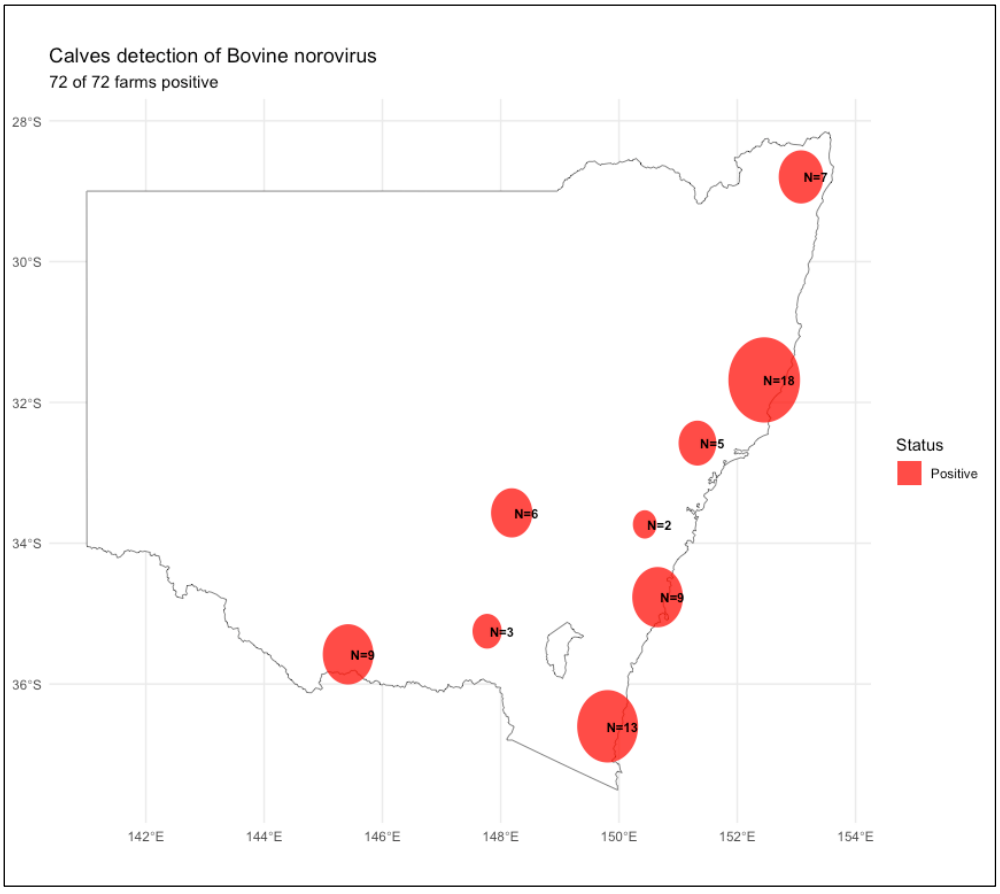

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The University of Sydney – Dairy Research Foundation

NSW Department of Primary Industries

Scibus

Dairy Australia

**Partner organisations**

NSW Farmers – Growing the best

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Dairy NSW | Dairy Australia

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Leppington Pastoral Company Pty Ltd

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**Additional program supporters, collaborations or partnerships**

Charles Sturt University | DairyBio | DataGene | Eagle Direct | Entegra
Macquarie University | NSW EPA | smaXtec | UC Davis | University of Technology Sydney

Thank you to the following organisations for specific funding for this project

McGarvie Smith Institute

Australian Government – Australian Research Council

UTS

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