

BOVILIS
Protect the future



Bovilis[®] Guardian[®]
The first line of defense against scours

 **MERCK**
Animal Health



Appropriate vaccination and good calving practices can reduce the incidence and impact of scours

- **Vaccinate pregnant cows and heifers before calving. See label for more information.***
 - Pre-calving vaccination at the right time **increases serum and colostrum antibody titers**, leading to increased titers in calves¹
- **Prepare calving areas carefully**
 - To reduce scours exposure, calving and post-calving areas should be clean and dry and heifers should calve in a separate area from older cows^{2,3}
- **Give calves antibody-rich colostrum immediately**
 - For adequate transmission of passive immunity, calves must receive **high-quality colostrum as soon as possible**⁴

Criteria for an **OPTIMAL PRE-CALVING VACCINE** against neonatal diarrhea

To be both effective and practical, a scours vaccine should:

- Be properly timed to optimize antibody concentrations in the colostrum
- Provide broad-spectrum protection against the most prevalent and relevant scours pathogens
- Provide a flexible dosing schedule that aligns with cattle management activities



Bovilis® Guardian®
delivers on these
criteria...



and goes
BEYOND
THEM.

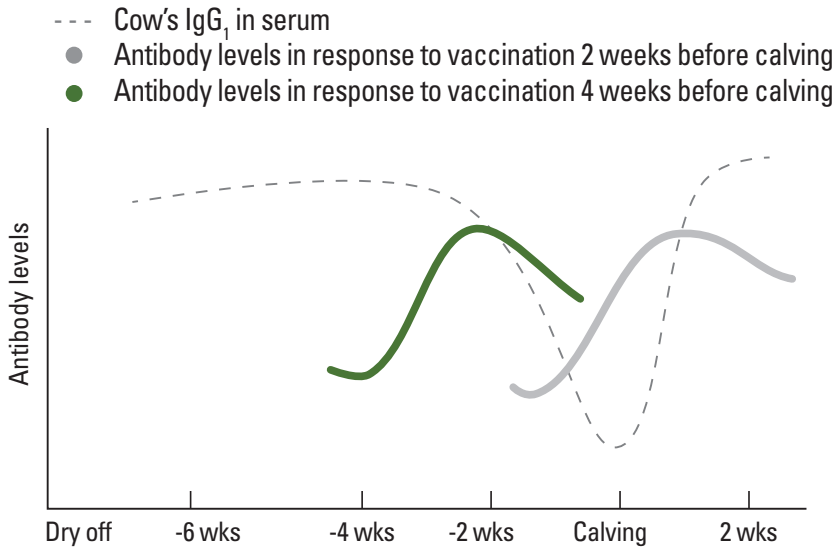
Bovilis[®] Guardian[®]: A vaccination protocol timed for optimal colostrum fortification



| | | |
|--|---|---|
| It takes about 2 weeks for an animal to respond to vaccination with full antibody development . ⁵ | Antibodies start to transfer from serum to colostrum around 5 weeks before parturition . ⁶ | Vaccinating early helps ensure high levels of antibody are available to concentrate in colostrum. |
| 2 weeks | + 5 weeks (prior to calving) | = 7 weeks (prior to calving) |

Bovilis[®] Guardian[®] vaccination can be completed 6-9 weeks before parturition for heifers and 5-7 weeks for cows.*

AN ILLUSTRATION OF THE IMPACT OF VACCINATION TIMING AND SERUM IgG LEVEL DURING COLOSTROGENESIS⁵



- A cow's **serum IgG₁ level drops** as antibodies are transferred from the blood to the colostrum⁵
- Vaccine administration **at least 5-7 weeks prior to calving*** helps ensure high serum levels are available for deposit into the colostrum⁵
 - In addition, earlier vaccination helps provide coverage in the event of early calving or uncertain breeding/calving date
- With later vaccine administration (e.g., 2 weeks before calving), antibodies from the vaccine will only peak in serum shortly before calving and may not be available for optimal transfer to the colostrum and the calf⁵

*To be injected in healthy pregnant cattle 3 months prior to calving. Repeat in 3-6 weeks following initial vaccination. For subsequent calvings, revaccinate 5-7 weeks before calving.

Bovilis® Guardian®:
Unique broad-spectrum coverage
against the most prevalent and relevant
scours pathogens



Bovilis® Guardian® stimulates a strong immune response against the most prevalent and clinically relevant pathogens which includes *E. coli*, Corona virus, Rota virus and *C. perfringens*.

| Scours Pathogens | Clinical Relevance | Bovilis® Guardian® | |
|--------------------------------|---|---|---|
| | | Antigens | Unique Benefits |
| Rotavirus | In numerous surveys, rotavirus is the most common or second most common enteric pathogen found in the feces of diarrheic calves ^{7,8} - Type G6 and G10 are reported to be the most prevalent types of rotaviruses in cattle ⁹ | Type G6 Type G10 | Rotavirus coverage consistent with other vaccines on the market. |
| Coronavirus | The second most frequently found pathogen in calf necropsies ¹⁰ - Coronavirus infections involve the small and large intestines so clinical disease is more severe than Rotavirus infections with higher mortality rates ¹¹ | Two BCoV subtypes ¹² | Guardian is the ONLY scours vaccine to include two coronavirus subtypes. ¹² |
| <i>E. coli</i> | The most important bacterial cause of diarrhea in calves during the first week of life ¹³ - Strains in calves most commonly possess K99 fimbrial antigens ¹³ | Cell-free extract of K99 pilus type of <i>E. coli</i> | The ONLY scours vaccine to use subunit technology to create a strong immune response against <i>E. coli</i> pilus type K99. (Find out more on page 6.) |
| <i>Clostridium perfringens</i> | Clostridial infections , often called “sudden death” diseases can be treated, but can kill before scours even begins ¹⁴ - Type C may be responsible for more fatal infections than any other type of <i>C. perfringens</i> ¹⁵ - Type D can cause sudden death in calves on feed ¹⁴ | Type C Type D | The ONLY scours vaccine to include coverage against <i>C. perfringens</i> type C and D. |

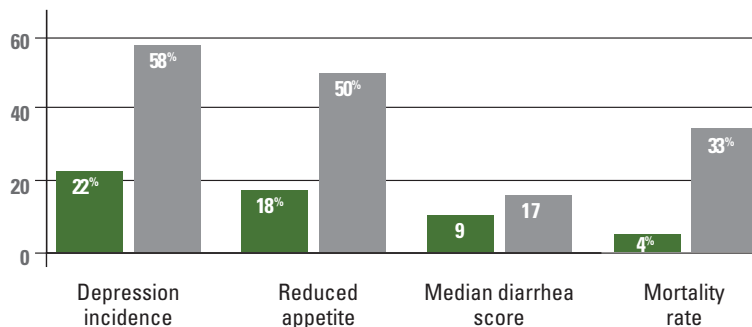
**Proven efficacy
against
coronavirus AND
rotavirus infections**



• **Bovilis® Guardian® helped protect calves against CORONAVIRUS**

CORONAVIRUS CHALLENGE AFTER COLOSTRUM FEEDING¹⁶

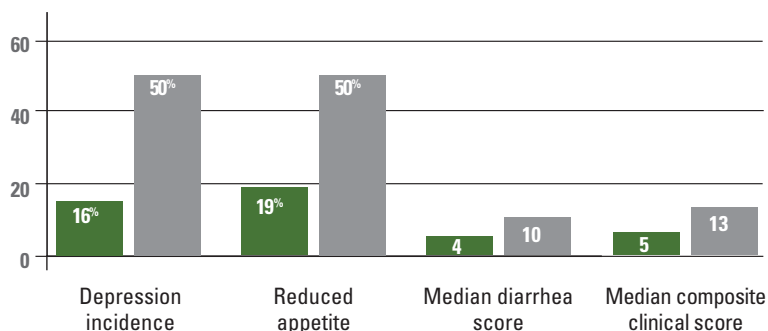
- Calves fed colostrum from **Bovilis® Guardian®**-vaccinated heifers
- Calves fed colostrum from non-vaccinated heifers



• **Bovilis® Guardian® helped protect calves against ROTAVIRUS**

ROTAVIRUS CHALLENGE AFTER COLOSTRUM FEEDING¹⁷

- Calves fed colostrum from **Bovilis® Guardian®**-vaccinated heifers
- Calves fed colostrum from non-vaccinated heifers

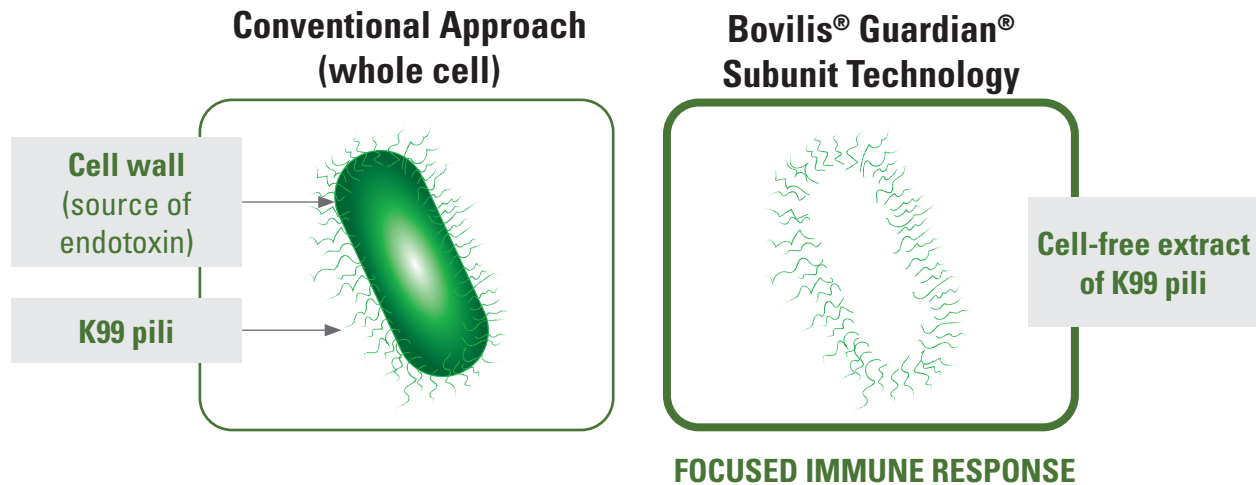


In coronavirus and rotavirus challenge studies, calves fed colostrum from Bovilis® Guardian®-vaccinated heifers showed markedly less clinical signs than controls

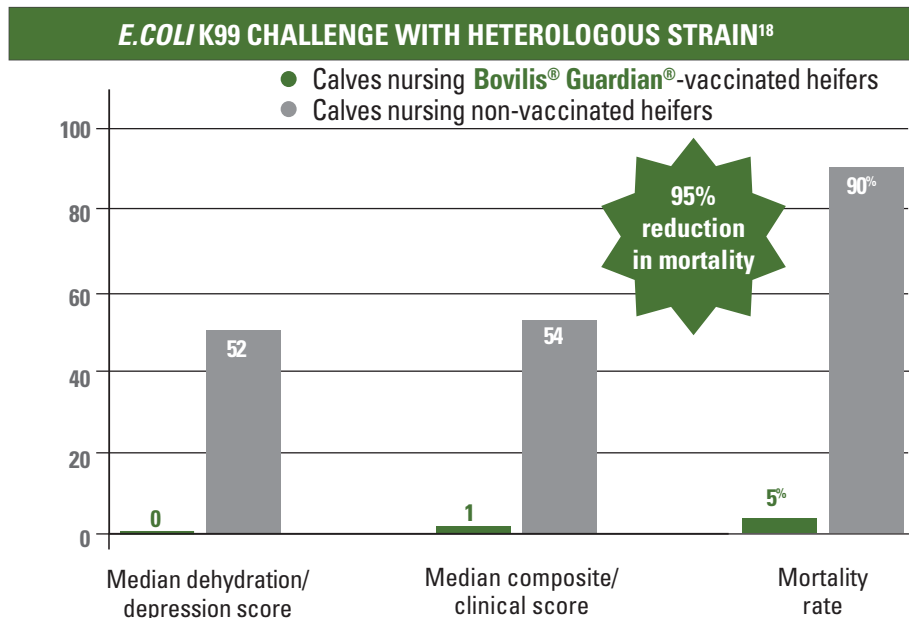


Proven efficacy against *E. coli* – backed by the unique Bovilis® Guardian® subunit technology

- **Bovilis® Guardian®** uses pili instead of whole *E. coli* cells or cell walls, which could be potential sources of endotoxin. This means:
 - Production of clean, concentrated *E. coli* pilus antigens that **generate a strong, targeted immune response against *E. coli* K99¹⁸**
 - Of the Leading Scours Vaccines only Bovilis® Guardian® is Labeled for Subcutaneous Administration and Complies with Dairy/Beef Quality Assurance Guidelines



- **Bovilis® Guardian®** helped protect calves against *E. COLI* K99





Bovilis® Guardian® pre-calving vaccine: Giving calves extensive scours protection right from the start

- **Broad-spectrum coverage against clinically relevant scours pathogens** – shown effective for the vaccination of healthy pregnant cattle against:
 - Neonatal calf diarrhea caused by enterotoxigenic *E. coli* pilus type K99
 - Neonatal calf diarrhea caused by bovine coronavirus
 - Neonatal calf diarrhea caused by bovine group A serotype G6 rotaviruses
 - Enterotoxemia caused by *C. perfringens* types C & D
- **Vaccination protocol timed for optimal colostrum fortification†**

The ONLY subcutaneous scours vaccine for use in pregnant cows/heifers to help reduce neonatal diarrhea in calves that features:

- Subunit technology to create a **strong immune response** against *E. coli* pilus type K99
- Two coronavirus subtypes
- Includes *C. perfringens* type D in addition to *C. perfringens* type C

**Prevention begins with protection.
Protection begins with Bovilis® Guardian®.**

**Available in 2 presentations:
10 doses (20 mL)
50 doses (100 mL)**



†See label for details.

Merck Animal Health offers both pre-calving and neonatal vaccines which are shown effective against enteric disease.



BOVILIS® GUARDIAN®

For pregnant cows/heifers

The only pre-calving subcutaneous vaccine with multiple antigens to help control and prevent neonatal calf diarrhea.



BOVILIS® CORONAVIRUS

For calves

The first and only intranasal vaccine indicated to help reduce enteric disease caused by bovine coronavirus in neonatal calves.



To find out more about the BOVILIS® line of vaccines, or for technical support, please contact your Merck Animal Health representative at MAHCattle.com.

Always read and follow the label instructions to ensure this product is suitable for the animal to be vaccinated.

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