








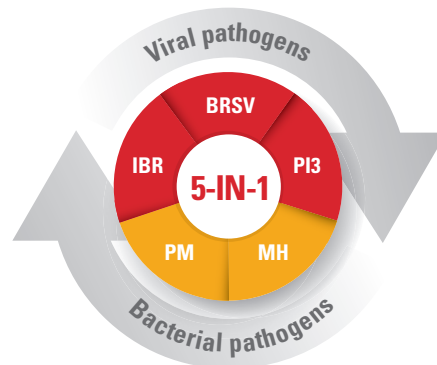
Combined viral  
and bacterial  
BRD protection  
is IN

...and supported by  
study findings

## Bovilis<sup>®</sup> Nasalgen<sup>®</sup> 3-PMH

The **ONLY** INtranasal vaccine that helps provide broad respiratory protection against five of the most common viral and bacterial causes of bovine respiratory disease (BRD) in just **ONE** convenient dose.

-  Infectious bovine rhinotracheitis virus (IBR)
-  Bovine respiratory syncytial virus (BRSV)
-  Parainfluenza 3 virus (PI3)
-  *Mannheimia haemolytica* (MH)
-  *Pasteurella multocida* (PM)



Bovilis<sup>®</sup> Nasalgen<sup>®</sup> 3-PMH is also backed by a series of studies that demonstrated the efficacy, non-interference and duration of immunity of EACH of the five antigenic fractions it contains.

## Five antigenic fractions. Ten challenge studies.

Each of the five antigenic fractions in Bovilis<sup>®</sup> Nasalgen<sup>®</sup> 3-PMH was subjected to two challenge studies aimed at

- Assessing its **efficacy against its target pathogen**, when administered in combination with the four other antigenic fractions contained in the vaccine during calves' first week of life.
- Demonstrating its **duration of immunity**.

**IN EACH OF THE STUDIES, 1- TO 7-DAY-OLD COLOSTRUM-DEPRIVED HOLSTEIN CALVES WERE RANDOMLY ASSIGNED TO BE VACCINATED INTRANASALLY WITH ONE OF THE FOLLOWING:**

One dose of Bovilis<sup>®</sup> Nasalgen<sup>®</sup> 3-PMH (BN3PMH) containing...  
the **MINIMUM** protective dose of the antigenic fraction being studied  
+  
the other **FOUR** viral and bacterial antigenic fractions in BN3PMH,  
at their licensed dose.

BN3PMH-VACCINATED CALVES

OR

One dose of a **placebo vaccine** containing...  
**FOUR** of the viral and bacterial antigenic fractions in  
BN3PMH, at their licensed dose.  
(WITHOUT the antigenic fraction being studied.)

CONTROL GROUP



## Results that speak for themselves.

Challenge studies demonstrated the protective efficacy, duration of immunity and non-interference of all five antigenic fractions in Bovilis® Nasalgen® 3-PMH

### EFFICACY STUDIES

ANTIGENIC FRACTION	BRSV	IBR	PI3	<i>Mannheimia haemolytica</i>	<i>Pasteurella multocida</i>
AGE AT VACCINATION (DAY 0)	4 to 7 days old	4 to 7 days old	6 to 7 days old	2 to 4 days old	1 to 4 days old
EXPERIMENTAL PROCEDURES	<p>Challenge on Day 30.</p> <p>Challenge was repeated on Day 31.</p> <p>Calves were observed daily for 8 days post-challenge.</p> <p>Calves were euthanized on Day 38.</p>	<p>Challenge on Day 29.</p> <p>Calves were observed daily for 14 days post-challenge.</p>	<p>Challenge on Day 39 (first shipment) or Day 32 (second shipment post-vaccination).</p> <p>Calves were observed for clinical signs of disease for 14 days post-challenge.</p>	<p>Challenge on Day 25.</p> <p>Calves were observed daily for 7 days post-challenge.</p> <p>Calves were euthanized on Day 32.</p>	<p>Challenge on Day 26.</p> <p>Calves were observed for clinical signs of disease for 7 days post-challenge.</p> <p>Calves were euthanized on Day 33.</p>
RESULTS	<p><b>Maximum shedding</b> in nasal secretions was significantly* less in the BN3PMH group.</p> <p>The <b>duration of shedding</b> was significantly* shorter for calves vaccinated with BN3PMH.</p> <p>A significantly* greater number of control calves had <b>lung lesions</b> associated with BRSV compared to BN3PMH-vaccinated calves.</p> <p><b>Lung lesion scores</b> were significantly* lower for BN3PMH-vaccinated calves compared to control calves.</p>	<p>A significantly* lower proportion of calves in the BN3PMH group developed <b>clinical IBR</b> compared to the control group.</p> <p>The <b>duration of clinical IBR</b> was significantly* shorter for calves vaccinated with BN3PMH compared to calves in the control group.</p> <p><b>Maximum titers</b> (Log<sub>10</sub>TCID<sub>50</sub>/mL) of IBR virus shed in nasal secretions was significantly* lower in calves vaccinated with BN3PMH than in calves from the control group.</p> <p>The <b>duration of nasal shedding</b> of IBR virus was significantly* shorter for BN3PMH-vaccinated calves than for calves in the control group.</p>	<p><b>PI3 virus was isolated from nasal secretions</b> of significantly* fewer BN3PMH-vaccinated calves compared to calves in the control group.</p> <p>The <b>maximum titer</b> (Log<sub>10</sub>TCID<sub>50</sub>/mL) of PI3 virus shed in nasal secretions was significantly* lower in calves vaccinated with BN3PMH than in calves in the control group.</p> <p>The <b>duration of nasal shedding</b> was significantly* shorter for BN3PMH-vaccinated calves than for calves in the control group.</p>	<p><b>Mortality due to challenge</b> was significantly* less (shipment stratified) for calves vaccinated with BN3PMH than for calves in the control group.</p> <p><b>Lung lesion scores</b> for calves vaccinated with BN3PMH were significantly* lower than for calves in the control group.</p>	<p>BN3PMH-vaccinated calves had significantly* lower <b>lung lesion scores</b> compared to calves from the control group.</p>

\* Determined by an observed *p*-value of less than 0.05.



## DURATION OF IMMUNITY STUDIES

ANTIGENIC FRACTION	BRSV	IBR	PI3	<i>Mannheimia haemolytica</i>	<i>Pasteurella multocida</i>
AGE AT VACCINATION (DAY 0)	5 to 7 days old	3 to 5 days old	3 to 5 days old	3 to 8 days old	2 to 3 days old
EXPERIMENTAL PROCEDURES	Challenge on Day 78. Challenge was repeated on Day 79. Calves were observed daily for 8 days post-challenge. Calves were euthanized on Day 86.	Challenge on Day 195. Calves were observed for 16 days post-challenge.	Challenge on Day 95. Calves were observed daily for 14 days post-challenge.	Challenge on Day 122. Calves observed daily for 7 days post-challenge. Calves were euthanized on Day 129.	Challenge on Day 125. Calves were observed daily for 7 days post-challenge. Calves were euthanized on Day 132.
RESULTS	The proportion of calves <b>infected with BRSV</b> (BRSV detected in the lung via immunohistochemistry) was lower for the vaccinated group than for the control group.  The <b>maximum titer</b> of BRSV shed in nasal secretions was significantly* lower for calves vaccinated with BN3PMH than for calves in the control group.  The <b>duration of nasal shedding</b> of BRSV was significantly* shorter for calves vaccinated with BN3PMH than for calves in the control group.  Lung lesion scores were significantly* lower in BN3PMH-vaccinated calves than in control calves.	The proportion of BN3PMH-vaccinated calves that had <b>clinical signs</b> of IBR morbidity was significantly* lower on any study day than that of calves in the control group.  The <b>duration of IBR morbidity</b> (moderate to severe clinical signs of disease and/or fever $\geq 104.0^{\circ}\text{F}$ ) post-challenge was significantly* shorter for calves vaccinated with BN3PMH than for calves in the control group.  The <b>maximum titer</b> of IBR virus shed in nasal secretions was significantly* lower for calves vaccinated with BN3PMH than for calves in the control group.  The <b>duration of nasal shedding</b> of IBR virus was also significantly* lower for calves in the BN3PMH-vaccinated group compared to the control group.	The <b>duration of nasal shedding</b> of PI3 virus was significantly* shorter for calves vaccinated with BN3PMH than for calves in the control group.	<b>Lung lesion scores</b> for calves vaccinated with BN3PMH were significantly* lower than those for calves in the control group.  Fewer calves vaccinated with BN3PMH had <b>rectal temperatures</b> $\geq 104.0^{\circ}\text{F}$ on at least one day post-challenge, compared to calves in the control group.  The <b>duration of fever</b> (rectal temperature $\geq 104.0^{\circ}\text{F}$ ) post-challenge for calves vaccinated with BN3PMH was shorter than for calves in the control group.	<b>Lung lesion scores</b> for calves vaccinated with BN3PMH were significantly* lower than those for calves in the control group.  <b>Maximum rectal temperatures</b> for calves vaccinated with BN3PMH were significantly* lower than those for calves in the control group.  The <b>duration of fever</b> for calves vaccinated with BN3PMH was significantly* shorter than that for calves in the control group.
DURATION OF IMMUNITY (DOI)	$\geq 78$ DAYS	$\geq 195$ DAYS	$\geq 95$ DAYS	$\geq 122$ DAYS	$\geq 125$ DAYS

\* Determined by an observed  $p$ -value of less than 0.05.

- **No adverse events** associated with vaccination were reported in any of these studies.
- **This series of studies demonstrated the:**
  - **PROTECTIVE EFFICACY** of the 5 antigenic fractions contained in **Bovilis® Nasalgen® 3-PMH**.
  - **NON-INTERFERENCE** between all 5 antigenic fractions contained in the vaccine.
  - **DURATION OF IMMUNITY** of each antigenic fraction.

**Results demonstrated that Bovilis® Nasalgen® 3-PMH is effective for the intranasal vaccination of calves at one week of age or older against the five viral and bacterial pathogens for which it is indicated.**

If you have any questions concerning the challenge studies mentioned in this document, would like more information about **Bovilis® Nasalgen® 3-PMH**, and/or require technical support, please contact your Merck Animal Health representative, call 1-866-683-7838, or go to [www.merck-animal-health.ca](http://www.merck-animal-health.ca).

**BOVILIS®**  
Nasalgen® 3-PMH

**Protect smart from the start.**

Always read and follow the label instructions to ensure this product is suitable for the animal to be vaccinated. Vaccination may not protect every animal that gets vaccinated.

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