Nobivac®

Essential protection for essential bonds

Protecting what matters most

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Veterinary Supply, Inc.
Phone: 800.233.0210
www.pennvet.com

Nobivac®— high-quality vaccines for every lifestyle

MERCK Animal Health

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GLOBAL VACCINE LEADERSHIP

Nobivac®— leading the way in vaccine excellence

Our name represents our commitment to

- Delivering high-quality vaccines to protect pets from infectious diseases
- Protecting strong bonds between healthy pets and their families
- Enhancing bonds with your clients by providing meaningful support material to you
- Meeting evolving needs
  - – Disease-centered teams continually monitor disease outbreaks
  - – Quick-to-market products meet areas of emerging clinical need

A History of Innovation

FIRST...

1998	2003	2005	2006	2008
…to develop a feline *Bordetella* vaccine	…to introduce the Advanced Delivery Technology (ADT) for intra-nasal canine cough vaccines to avoid accidental injections	…to offer a canine DAP vaccine with a USDA-approved 3-year DOI	…to offer a feline HCP vaccine with a USDA-approved 3-year DOI	…to publish data proving protection against the parvovirus 2c strain[1]
2009	**2009**	**2010**	**2011**	**2016**
…to develop a canine influenza vaccine against a newly emerged virus, H3N8	…to develop a Lyme disease vaccine that induces borreliacidal antibodies to outer surface protein C[2]	…to provide a feline leukemia virus vaccine with a 2-year DOI	…to develop a leptospirosis vaccine that protects against mortality and urinary shedding caused by all 4 major serovars	…to develop a bivalent canine influenza vaccine against CIV H3N2 and CIV H3N8

MULTIPLE STUDIES
in peer-reviewed journals
SUPPORT THE EFFICACY
of Merck Animal Health vaccines

The core canine vaccines your dog needs, plus the lifestyle vaccines you want

Core vaccines

1 Year

NOBIVAC® CANINE 1-DAPPv
- Demonstrates the ability to override maternal antibodies to canine parvovirus (CPV)[1]
- Shown to protect against all known canine parvovirus strains, including CPV-2c[3]

NOBIVAC® CANINE 1-Pv
- First parvovirus vaccine to use the CPV-2b strain[1]

NOBIVAC® 1-RABIES
- Protects against rabies in dogs and cats for at least 1 year

NOBIVAC® PUPPY-DPv
- High titer for maximum protection of puppies against canine distemper virus (CDV) and CPV[1]

3 Year

NOBIVAC® CANINE 3-DAPv
- Licensed to protect against CDV, adenovirus type 1 and type 2, and CPV for 3 years
- High titer for maximum protection
- Shown to protect against all known canine parvovirus strains, including CPV-2c[3]

NOBIVAC® 3-RABIES
- Protects against rabies in dogs and cats for at least 3 years
- Safe vaccine

Lifestyle vaccines

Active dogs

NOBIVAC® LEPTO$_4$/NOBIVAC® CANINE 1-DAPPv+L$_4$
- THE ONLY vaccines to prevent or aid in the prevention of urinary shedding of all 4 *Leptospira* serovars and to prevent mortality
- VacciPure filtration reduces total proteins for a more purified vaccine[1]

NOBIVAC® LYME
- ONLY NOBIVAC® LYME is proven to trigger borreliacidal antibodies against Osp A and Osp C[4]
- Aids in the prevention of subclinical arthritis and other signs of Lyme disease[5]

Multi-dog environments

NOBIVAC® CANINE Flu Bivalent
- THE FIRST CANINE FLU VACCINE against CIV H3N2 and H3N8 on the market
- Best protection possible for dogs at risk with this 2-in-1 vaccine[6,7]
- Highly effective in reducing the clinical signs of CIV infection and in protecting the lungs[6,7]
- Monovalent CIV H3N8 and H3N2 are available

NOBIVAC® INTRA-TRAC®$_3$
- Intranasal vaccine to aid in the prevention of disease associated with *Bordetella*, CPiV and canine adenovirus type 2
- Shown to reduce infection, disease, and shedding[8]
- Low-volume (0.5 mL), one-nostril administration
- ADT (Advanced Delivery Technology) to eliminate the possibility of accidental injection

NOBIVAC® INTRA-TRAC® KC
- Intranasal vaccine to prevent canine cough caused by parainfluenza virus (CPiV) and *Bordetella*
- THE ONLY canine cough vaccine licensed to be administered to pregnant dogs[1]
- Low-volume (0.4 mL), one-nostril administration

NOBIVAC® INTRA-TRAC® Oral Bb
- Aids in the prevention of canine infectious tracheobronchitis caused by *Bordetella bronchiseptica*
- The convenient oral solution
- Free syringes with green plungers marked "For Oral Use Only" to help preventing accidental injections

Other

NOBIVAC® CANINE 1-DAPPvL$_2$
- Broad protection for dogs against distemper, adenovirus types 1 and 2, parainfluenza, parvovirus, and leptospirosis due to *Leptospira canicola* or *L. icterohaemorrhagiae*

NOBIVAC® CANINE 1-DAPPv+Cv
- Combination vaccine that offers broad protection for dogs against distemper, adenovirus types 1 and 2, parainfluenza, parvovirus, and coronavirus

NOBIVAC® CANINE 1-DAPPvL$_2$+Cv
- Broad protection for dogs against distemper, adenovirus types 1 and 2, parainfluenza, parvovirus, leptospirosis due to *L. canicola* or *L. icterohaemorrhagiae*, and coronavirus

NOBIVAC® CANINE 1-Cv
- Offers protection against canine coronavirus

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CORE PROTECTION

Nobivac® Canine 1-DAPPv—a proven foundation for vaccine protocols[1]

D– Canine distemper virus (CDV)
- Onderstepoort-type strain in Nobivac® vaccines provides a high level of safety

A– Canine adenovirus type 2 (CAV-2)
- Systemic administration stimulates a strong IgG response to protect against infectious hepatitis

P– Canine parainfluenza virus (CPiV)
- Systemic administration stimulates an IgG response for protection in the lower respiratory tract

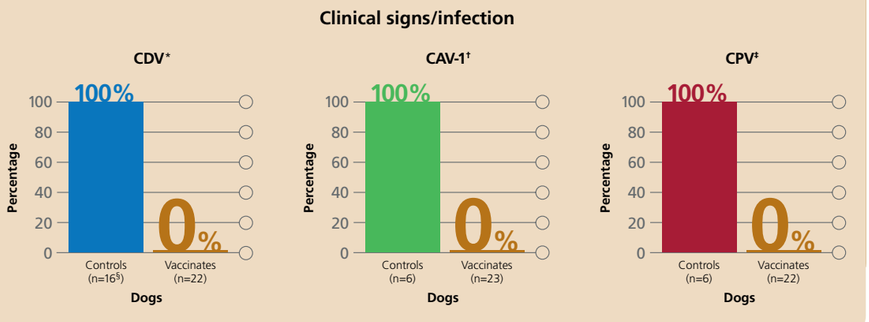
Pv– Cross-protection against canine parvovirus 2c (CPV-2c)

Nobivac® Canine 3-DAPv core vaccine

- USDA-approved label for 3-year protection against core infectious diseases based on real-time challenge studies[2]
- AAHA 2011 guidelines support 3-year interval for revaccination of adult dogs with viral core vaccines[9]

100% Protection in Challenge Studies

Proven 3-year DOI against canine distemper virus (CDV), canine adenovirus type 1 (CAV-1), and canine parvovirus (CPV)[2]

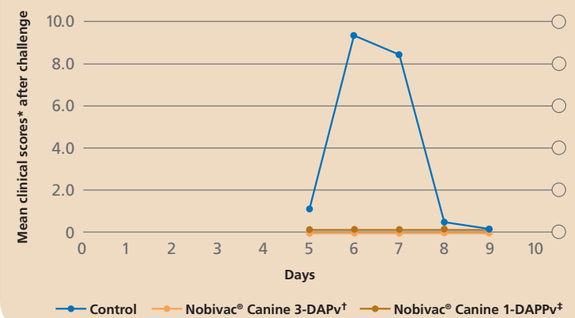


*Signs included depression, dehydration, salivation, apprehension, diarrhea, anorexia, inability to rise, pyrexia, tremor, and vomiting.
†Signs included depression, diarrhea, increased water consumption, anorexia, corneal opacity, and vomiting.
‡Signs included depression, diarrhea, dehydration, anorexia, vomiting, and pyrexia.
§CDV controls: 6 age-matched controls and 10 seronegative, 10- to 12-week-old puppies included to verify challenge severity.

Nobivac® parvovirus vaccines protect against all known strains of CPV, including CPV-2c[3]

No clinical signs of disease were seen in Nobivac®-vaccinated puppies after challenge with mixed CPV-2b and CPV-2c strains

Eliminated clinical signs of infection[3]



INDEPENDENT STUDY
by Laurie J. Larson and Ronald D. Schultz, School of Veterinary Medicine University of Wisconsin-Madison[3]

- All puppies were challenged with a combination of virulent CPV-2b and CPV-2c 5 weeks after vaccination
- All vaccinated puppies were protected from disease
- All control puppies developed disease and 50% died or were euthanized

*Clinical scores were recorded daily as 0 (no signs) or the sum of the following: 1 (lethargy), 1 (vomiting), 1 (diarrhea), 3 (dehydration), 5 (bloody diarrhea), 1 (first day of anorexia), 6 (second day of anorexia), 12 (third day of anorexia), 12 (moribund).[3]
† Formerly known as Continuum® DAP.
‡ Formerly known as Galaxy® DA2PPv.

Comparative CPV-2c protection in different studies

	Merck Animal Health Nobivac®[3]	Zoetis VANGUARD® Plus[10]	Elanco DURAMUNE® Max[11]	Boehringer Ingelheim Animal Health RECOMBITEK®
Published 2c Data	Yes	Yes	Yes	No
External Study	Yes (U WI)	No	No	
# doses of vaccine	1*	2	2	
Age at last dose	12 wks	9-10 wks	10 wks	
Challenge strains	2b & 2c	2c	2c	
Age at challenge	17 wks	14-15 wks	18 wks	
Clinical signs in vaccinates†	No	Yes (25%)	Yes (50%)	

*Per label, Nobivac® parvovirus vaccines require 2 doses.
†Clinical signs such as abnormal stool, fever, diarrhea, vomiting, mucus in feces, leukopenia/lymphopenia.

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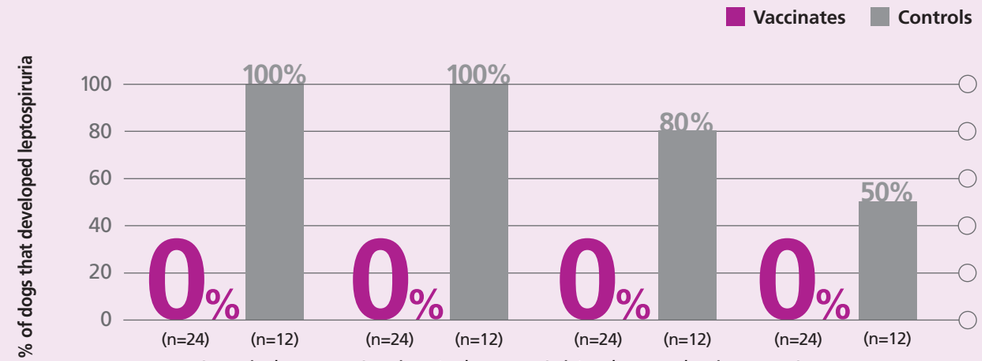
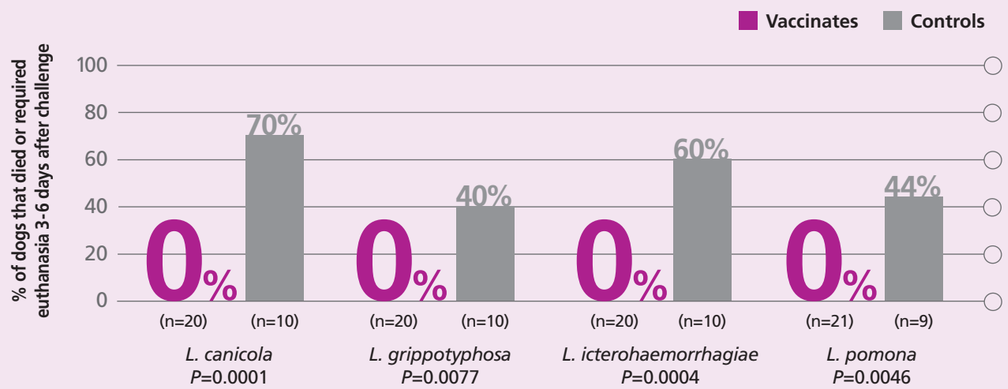
LIFESTYLE PROTECTION

Nobivac® Lepto$_4$ and Nobivac® Canine 1-DAPPv+L$_4$—the **ONLY** leptospirosis vaccines indicated to prevent and aid in the prevention of urinary shedding and mortality[1]

Prevented urinary shedding in all vaccinates[1]



Prevented mortality caused by 4 virulent *Leptospira* serovars[1]

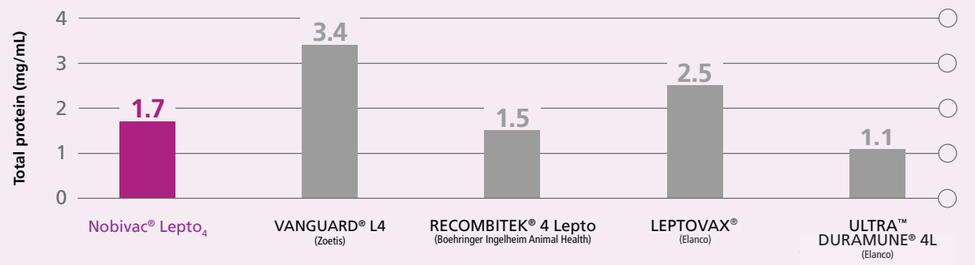


A strategic advance: VacciPure™ filtration technology[1]

VacciPure™ Filtration

- A porous filtration membrane selectively removes extraneous proteins, salts, solvents, and water
- The outcome—fewer total proteins and a more purified final product, which may reduce unwanted immune system response, such as vaccine reactions

Comparison of total protein (per mL) in leptospirosis vaccines[1,12-14]



Nobivac® Lepto$_4$ is the clear choice when compared with other 4-way leptospirosis vaccines[1,12-14]

		Nobivac® Lepto$_4$	VANGUARD® L$_4$	RECOMBITEK® 4 Lepto	LEPTOVAX® 4	ULTRA™ Duramune® 4L
Prevents or aids in the prevention of leptospirosis		✔	✔	✔	✔	✔
Prevents leptospiruria caused by...	*Leptospira canicola*	✔		✔		
	L. grippotyphosa	✔		✔		
	L. icterohaemorrhagiae	✔		✔		
Aids in the prevention of leptospiruria caused by...	*L. pomona*	✔		✔		
Aids in the prevention of mortality caused by...	*Leptospira* serovars	✔				

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LIFESTYLE PROTECTION

Nobivac® Lyme—THE Lyme disease vaccine that aids in the prevention of subclinical arthritis in addition to clinical disease[5]

UNIQUE dual action makes Nobivac® Lyme highly effective

1 Targets OspA in the tick's midgut

When an unfed *Borrelia*-infected tick attaches to a dog, high levels of OspA are expressed by the *Borrelia* residing in the tick's midgut.[5,15]

2 Targets OspC in the tick's salivary glands and in the dog

Soon after the tick begins its bloodmeal, OspA expression decreases and OspC expression increases, becoming the dominant Osp. Infection occurs when the *Borrelia*, which are now expressing only OspC, pass from the tick's midgut to its salivary glands and then into the dog.[5]

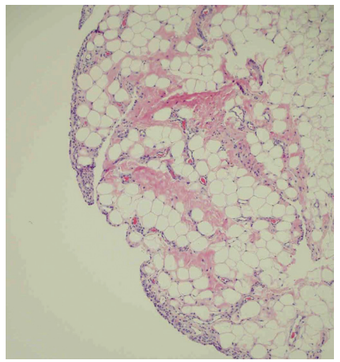
Osp=outer surface protein.

Powerful comparative benefits and proven safety[1,12-14]

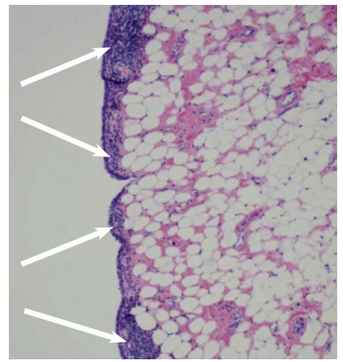
	Nobivac® Lyme	LYMEVAX® (Zoetis)	RECOMBITEK® Lyme (Boehringer Ingelheim Animal Health)	Duramune Lyme® (Elanco)	Vanguard® crLyme (Zoetis)
Induces **OspA** borreliacidal antibodies	✔	✔	✔	✔	✔
Induces **OspC** borreliacidal antibodies	✔[4]				
Aids in the **prevention of clinical disease** caused by *Borrelia burgdorferi*	✔	✔	✔	✔	✔
Aids in the **prevention of subclinical arthritis** associated with *B. burgdorferi*	✔				✔
Subcutaneous administration	✔	✔	✔	✔	✔
Initial vaccination	8 weeks	9 weeks	9 weeks	9 weeks	8 weeks
Second dose	2-4 weeks	2-3 weeks	2-3 weeks	2-3 weeks	3 weeks
Annual vaccination recommended	1 year	1 year	1 year	1 year	1 year

Products are registered trademarks of their respective manufacturers.

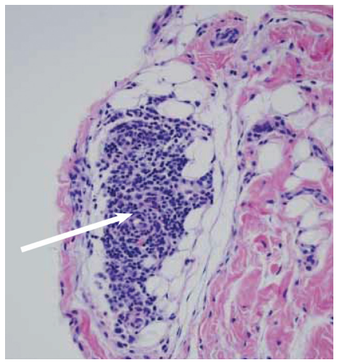
Comparison of joints after *B. burgdorferi* challenge in dogs vaccinated with Nobivac® Lyme and control dogs[5]



Healthy joint in a dog vaccinated with Nobivac® Lyme



Arthritis characterized by the infiltration of white blood cells (lymphocytes) in the knee joint tissue in an unvaccinated control dog

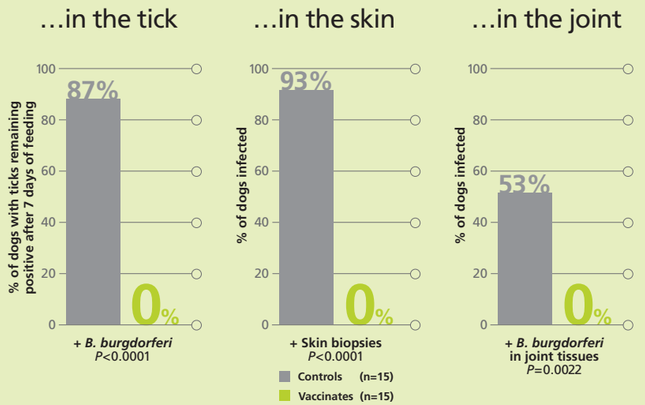


Arthritis characterized by the accumulation of plasma cells in the connective tissue of the front limb (carpus) in an unvaccinated control dog

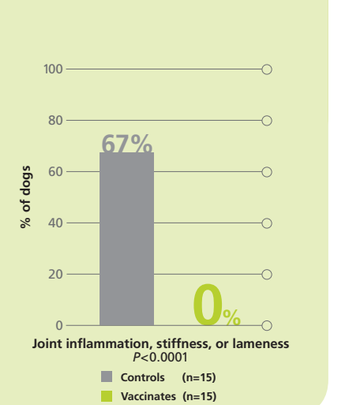
The borreliacidal antibodies in Nobivac® Lyme were shown to be highly effective in killing *B. burgdorferi* and preventing infection[5]

Tick challenge study

Following Nobivac® Lyme vaccination, no *B. burgdorferi* were found…



No signs of Lyme disease-associated joint abnormalities



The tick challenge study was a placebo-controlled trial involving thirty 8-week-old puppies. Dogs were challenged 44 days following first vaccination.

Nobivac® Lyme is proven to aid in the prevention of subclinical arthritis in addition to clinical disease

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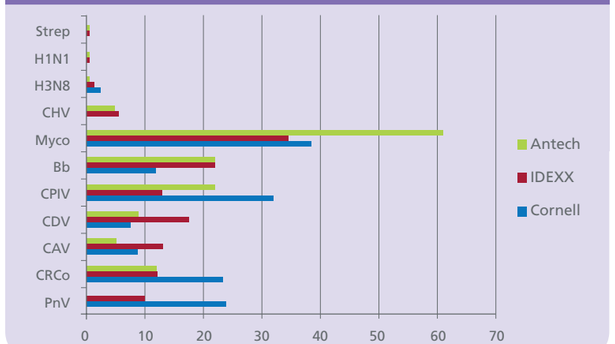
ESSENTIAL PROTECTION

Nobivac® Intra-Trac®$_3$ ADT— protects against *Bordetella*, canine parainfluenza virus (CPiV), and adenovirus-2[16]

Prevalence for potential canine respiratory pathogens from clinical diagnostic samples[16]



Prevalence is defined as positive percentage of all samples tested. Data include samples submitted to Cornell Diagnostic Laboratory from October 1, 2011 to October 1, 2012 (blue), IDEXX Laboratories Inc., IDEXX Canine Respiratory Disease (CRD) RealPCR™ Panel during 2012 (red), and Antech Diagnostics from January 2011 through March 2013 (green).

The number of samples tested for each pathogen is as follows, where NST means not specifically tested: canine pneumovirus (PnV; Cornell n=499; IDEXX n=200, and Antech n=NST); canine respiratory coronavirus (CRCo; Cornell n=503, IDEXX n=4062, Antech n=2229); canine adenovirus (CAV; Cornell n=497, IDEXX n=4062, Antech n=4820); canine distemper virus (CDV; Cornell n=500, IDEXX n=4062, Antech n=4816); canine parainfluenza virus (CPIV; Cornell n=359, IDEXX n=4062, Antech n=4821); *Bordetella bronchiseptica* (Bb; Cornell n=205 via PCR and n=401 cultures, IDEXX n=4062, Antech n=4780); *Mycoplasma* (Myco; Cornell n=299, IDEXX n=4062, Antech n=4760); canine herpesvirus (CHV; Cornell =NST, IDEXX n=4062, Antech n=4795); canine influenza virus H3N8 (H3N8; Cornell n=471, IDEXX n=4062, Antech n=2506); H1N1 influenza virus (H1N1; Cornell n=NST, IDEXX n=4062, Antech n=4715); *Streptococcus equi* subsp. *zooepidemicus* (Strep; Cornell n=NST, IDEXX n=4062, Antech n=4828). Although the large majority of results are based on PCR assays, Cornell Diagnostic Laboratory routinely performed viral isolation, and both Cornell and Antech commonly performed bacterial culture on submitted materials.

Dogs parenterally vaccinated against CPiV:

- Have been shown to develop respiratory disease caused by CPiV infection[17]
- Have been shown to spread the virus to other dogs with no direct contact[17]
- May be vulnerable to other pathogens, which can cause more severe respiratory disease and occasionally death[18,19]

AAHA RECOMMENDS INTRANASAL OVER PARENTERAL[9]

Intranasal administration allows you to provide a broader range of protection over parenteral CPiV vaccination[8,9]

PREVENTS SHEDDING

REDUCES INFECTION

PREVENTS DISEASE

Nobivac® Intra-Trac®$_3$ ADT

UNIQUE ADVANCED DELIVERY TECHNOLOGY (ADT) eliminates the possibility of accidental injection.

- Single nostril administration
- Needleless applicator
- Small volume (0.5 mL)

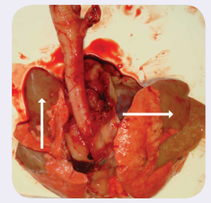
Protection you can rely on[1,12-14]

	Nobivac® Intra-Trac® ADT intranasal	Nobivac® Intra-Trac® Oral Bb	BRONCHI-SHIELD® Oral (Elanco)	BRONCHI-SHIELD® 3 (Elanco)	BRONCHICINE® CAe injectable (Zoetis)	VANGUARD® Rapid Resp 3 (Zoetis)
***Bordetella* protection**	X	X	X	X	X	X
CPiV protection	X			X		X
CAV2 protection	X			X		X
Onset of protection	As quickly as 48 hours	No published data	No published data	No published data	Up to 42 days for initial protection (2 doses)	No published data
Duration of immunity against Bb	1 year with challenge	No published data	No published data	No published data	No published data	1 year with challenge
Ease of administration	One nostril, 0.5 mL	1 mL administered orally in the buccal cavity	1 mL administered orally in the buccal cavity	2 nostrils, 0.5 mL each	1-mL subcutaneous injection	One nostril, 0.5 mL
Risk of accidental injection	Needleless administration with ADT	Possible risk	Possible risk	Possible risk	Not an issue	Needleless administration available

Nobivac® Canine Flu Bivalent—The First 2-in-1 vaccine to aid in the prevention of canine influenza caused by H3N2 and H3N8 strains

- Demonstrated to significantly protect dogs against lung consolidation and the development of suppurative pneumonia due to CIV H3N2 and H3N8 infection[6,7]
- Proven safe in a field safety trial[1]
- Recommended in multi-dog environments: boarding facilities, doggie day care, groomers, dog parks, puppy classes, dog shows, dog sporting events, dogs in high-rise buildings, and dogs of clinic staff
- Nobivac® Canine Flu H3N8 proven to reduce the severity and spread of disease[20]
  - Reduces the duration and severity of coughing
  - Significantly reduces the days and degree of viral shedding ($P<0.0001$)

Healthy lung



CIV-diseased lung

Without vaccination, the lungs of infected dogs may develop lesions.

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The core canine vaccines you need plus the lifestyle vaccines you want[1]

Canine VACCINES

Dog

	Distemper (MLV*)	Adenovirus Type 2 (MLV)	Parainfluenza (MLV)	Parvovirus (MLV)	Leptospira (Killed)	Coronavirus (Killed)	Lyme (Killed)	Canine Influenza Virus (Killed)	Bordetella (AL†)	Rabies (Killed)	Non-adjuvanted
1-year vaccines											
Nobivac® Canine 1-DAPPv	●	●	●	●							●
Nobivac® Canine 1-DAPPv+Cv	●	●	●	●		●					
Nobivac® Canine 1-DAPPvL_2	●	●	●	●	●						●
Nobivac® Canine 1-DAPPvL_2+Cv	●	●	●	●	●	●					
Nobivac® Lepto$_4$					●						
Nobivac® Canine 1-DAPPv+L_4	●	●	●	●	●						
Nobivac® Canine 1-Cv						●					
Nobivac® Canine 1-Pv				●							●
Nobivac® Puppy-DPv	●			●							●
Nobivac® Lyme							●				
Nobivac® 1-Rabies									●		
3-year vaccines											
Nobivac® Canine 3-DAPv	●	●		●							●
Nobivac® 3-Rabies									●		
Nobivac® 3-Rabies CA									●		
CIRD Complex vaccines											
Nobivac® Intra-Trac® KC			●					●			●
Nobivac® Intra-Trac®$_3$		●	●					●			●
Nobivac® Intra-Trac®$_3$ ADT		●	●					●			●
Nobivac® Intra-Trac® Oral Bb								●			●
Nobivac® Canine Flu Bivalent							●				
Nobivac® Canine Flu H3N2							●				
Nobivac® Canine Flu H3N8							●				

Colored dot(s) next to product names indicate cap color(s).

*Modified live virus. †Avirulent live.

To learn more, contact your Merck Animal Health sales representative, your distributor representative, visit **www.merck-animal-health-usa.com**, or give us a call.

Customer Service 1-800-521-5767
(Monday–Friday, 9:00 AM–6:00 PM EST)

Technical Services 1-800-224-5318
(Monday–Friday, 8:30 AM–5:00 PM EST)

Vaccine Protocol Help Line 1-866-437-7955
(Monday–Friday, 8:00 AM–5:00 PM EST)

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