



## Comparative Analysis of PCV2 Vaccines

Tim Kniffen, DVM, MS

Merck Animal Health, De Soto, KS

### Introduction

To address porcine circovirus type 2 (PCV2) effectively within a herd, it is important to consult your veterinarian and understand herd health history, labor and management requirements, and PCV2 and co-infection challenges. It's also important to understand the pathogenesis – how the disease develops within a pig. (See the Merck Animal Health Technical Services Bulletin: "Understanding PCV2 Pathogenesis.")

An important step in the development of disease in the pig is PCV2 viremia, which begins following exposure to the virus. Viremia is the presence of PCV2 virus in the blood. As it circulates in the blood, the virus spreads through the pig and infects the cells of the immune system. As the disease progresses, secondary viremia, nasal and fecal virus shedding and lymphoid depletion follow, and because PCV2 is a chronic disease, these factors can persist for months.

Consequently, when reading PCV2 vaccine label claims, it is important to understand which parts of the PCV2 disease process the vaccine is targeting. Those that target viremia prevention help break the disease cycle in the early, critical period following virus exposure. Early control is much more effective in limiting or even eliminating damage caused by the infection.

In the case of Circumvent® products, which have an "aid in the prevention of viremia" label claim, Merck Animal Health's goal is to provide maximum protection against PCV2 viremia – even in the face of multiple diseases. In that effort, all Circumvent products are tested, and licensed, with a co-infection challenge of PCV2 and porcine reproductive and respiratory syndrome virus (PRRSv).

Also important are subsequent claims on the label. Those vaccines that reduce virus shedding and reduce lymphoid infection caused by PCV2 help stem the impact of infection that occurs later in the disease progression.

### USDA licensing:

All animal-health products go through rigorous laboratory and in-field development, testing and documentation before receiving USDA license approval. Each new serial is tested for potency and safety by the manufacturer before release for sale. USDA randomly tests new serials. Some of the basic points worth noting as they relate to USDA licensing include:

- The vaccine manufacturer, in coordination with USDA, determines what documentation to submit for consideration of product approval.
- The Indications are submitted by vaccine manufacturer.
- The Indications are accepted/approved by USDA if the vaccine sponsor's trials data show statistically valid response differences between vaccinated and non-vaccinated controls.

### USDA licensing terms:

To understand the scope of USDA licensing results, it's helpful to gain perspective regarding how some of the terms on the label are actually applied. Here is some important guidance in reviewing the terminology on a vaccine label.

- The designated age of the animal is considered to be a range.
- Aid in the prevention of disease claim means that the disease was prevented in a clinically significant number of vaccinates, while a high proportion of controls had the disease.
- Aid in reduction claim means that the event occurred in vaccinates, but with significantly less severity than in controls.
- Control is the same as reduction.

## What's on the label?

It is always important to read the entire label when considering the options and selecting a vaccine. Here is a comparison of the dosage, application and timing details for most of the current USDA-approved vaccines for PCV2. All are administered through an intramuscular injection.

### Circovirus Vaccine Timing and Dosing Comparison

	Pig Age					
	3 Days	2 Weeks	≥ 3 Weeks	4 Weeks	5 Weeks	6 Weeks
Circumvent PCV G2 – Option 1			2 mL			
Circumvent PCV G2 – Option 2	1 mL		1 mL			
CircoFLEX®			1 mL			
Fosterer™ PCV – Option 1			2 mL			
Fosterer™ PCV – Option 2			1 mL			1 mL

Consult with your veterinarian to make the right product selection for your herd. On the label, the indications relay what the vaccine has been approved to accomplish. Here is a comparison of the indications of the currently available PCV2 vaccines. Precautions involving storage and disposal also are noted on the label and need to be followed accordingly to ensure product efficacy and safety.

### Circovirus Vaccine Label Claim Comparison

Label	Circumvent PCV G2	CircoFLEX®	Fosterer™ PCV
For use in pigs as early as 3 days of age (2-dose option)	■		
Aid in the prevention of PCV2 viremia	■		■
Reduction of virus shedding	■	nasal only	
Reduction of lymphoid infection	■	■	
Duration of immunity	5 months (20 weeks)	4 months	4 months

## Discussion

Before selecting any product, it is helpful to become familiar with the pathogenesis of PCV2 disease. Consider the herd health history, then consult with the herd's veterinarian to compare PCV2 vaccine labels.

Development of an effective PCV2 vaccine involves numerous steps that are critical to determine the right formulation. To test its Circumvent vaccines, Merck Animal Health is the only company that uses a PCV2/PRRSv co-infection challenge. While PCV2 is a hardy and durable virus that is commonly found within pork operations worldwide, it is not readily infectious or virulent in laboratory challenge models because PCV2 requires actively dividing, stimulated immune cells to cause infection. Merck Animal Health researchers use PRRSv, a natural promoter that mimics field situations, to stimulate the immune system to augment PCV2 infection. Other companies typically use an "artificial" chemical promoter to stimulate the immune system to augment PCV2 infection.

Also, vaccinates and controls in the Circumvent PCV G2 efficacy study were co-mingled to provide a more stringent, continuous challenge. The objectives of these steps are to mimic field conditions that pigs encounter and to ensure the data applies to a wide population and production scenarios.

The durable nature and widespread distribution of PCV2 ensures its presence in nearly all swine operations. While vaccination has been effective in most situations due to the fact that it reduces virus shedding, it does not eliminate the virus, so it will persist in the environment. Therefore, effective control requires continual vaccination.

## Merck Animal Health

Summit, New Jersey 07901

www.merck-animal-health-usa.com Technical Service: 1-800-211-3573 Customer Service: 1-800-521-5767

Copyright © 2013 Intervet Inc., doing business as Merck Animal Health, a subsidiary of Merck & Co., Inc.  
All rights reserved. SW-PCV-TB-016-1 (08-13)

