

# Pre-shipment Processing to Enhance the Health of Calves

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## INTRODUCTION

A properly implemented pre-shipment processing program of calves at or near weaning can and does economically benefit both the cow/calf producer and the feeder stocker operation receiving the cattle.

I propose that by understanding some basic concepts about immunology, vaccination strategies and economics, you'll come closer to believing that you can't afford not to implement a pre-shipment processing program.

Florida ranks tenth in the United States in numbers of Beef Cows. Eighty percent of the cattle are fed in 10 states. Florida, like Missouri, is not included in that top ten list. I would guess that the majority, if not all the calves that are raised in Florida eventually leave Florida to be grown and fed in a distant state.

The reputation of calves originating from Florida is directly related to management decisions with respect to processing. Sound management decisions can only be made after gathering, evaluating and understanding the options, implications and benefits.

Today I will discuss with you some basic concepts of immunology and vaccinations. We will discuss the importance of timing of vaccinations and how it relates to the level and duration of protection. We will also discuss the types of vaccines available and how they should be used. Finally we will discuss the economics of not vaccinating and the costs of sickness.

The following is an outline of the concepts that will be discussed:

## Clinical Immunology:

Immunity: An Animal's long term response mounted against invasion from a Bacteria, Virus, Toxin etc.. Is not absolute!!

Antigen: Any foreign substance capable of stimulating an animal's immune response.

Disease Resistance: Based on a combination of non-specific native defense and specific acquired defense mechanisms.

Active Acquired Immunity: Animal develops this following either recovery from disease or an effective vaccination. It requires time to develop, is long lived and is disease specific.

Vaccination: Can be accomplished following the administration of a toxoid, a killed organism or a modified live (either replicating or non-replicating) organism. Modified live vaccines are generally viral in nature.

Primary Immune Response: Occurs following the initial administration of a vaccine. Takes 7-10 days to generate a moderate response which is short lived if not boosted. Is thought of as a priming dose.

Secondary Immune Response: Follows a second exposure to a vaccine. Measured response occurs in 1-2 days with higher titers. These higher titers remain in the system for a longer period of time due to memory cells. It is

essential to stimulate

this secondary response in order to provide the animal with PROTECTION.

### **Vaccination:**

#### **Replicating-Modified Live Vaccines (MLV):**

Viral replication takes place within the animal stimulating a more complete Immune Response to antigens produced throughout the cycle of infection. The protection is broader and more closely duplicates the level of protection following an infection in Nature, which for the most part is superior.

**Non-Replicating-Modified Live:** These are modified live vaccines that do not replicate systemically in the animal. There may be some local replication at the injection site. These vaccines are labeled as safe for use in pregnant cattle and calves nursing pregnant cattle. These vaccines generally stimulate a broader range of protection against disease than Non-replicating killed vaccines. This broader range of protection occurs because a cell-mediated response is elicited.

**Killed Vaccines-Non-Replicating:** The specificity of Protection is narrower. The immune cells are only exposed to the viral antigens that are harvested on day 5, rather than to antigens that are produced throughout the life cycle of the virus. Theoretically the immune response stimulated following the administration of a killed vaccine is not as effective or as long lived as that experienced following the administration of a modified live vaccine. Killed Non-Replicating vaccines are safe for use in pregnant cattle and in calves nursing pregnant cattle.

**Replicating and Non-Replicating-Modified Live Vaccine Precautions:** Vaccines need to be

refrigerated, should not be exposed to direct sunlight and should be used shortly after reconstitution. MLV should not be used with syringes that are contaminated with cleaning and disinfectant residues!! Replicating modified live vaccines are not labeled to be used in pregnant cattle or in calves nursing pregnant cattle.

**Intranasal Vaccines:** Intranasal vaccines are modified live replicating. They replicate locally on the mucosal surface and have the ability to stimulate the production of both local and circulating antibodies. They are safe to use in pregnant cattle and in calves nursing pregnant cattle. They have the ability to stimulate local protection against disease even in the face of circulating maternal antibodies.

**What Happens Following Vaccination? :** An animal may either respond to a vaccination or not. In reality, a non-response rarely happens. A response following vaccination can be described as one of three events.

1. Priming 2. Immunization 3. Booster.

**Vaccinate:** The Act of Administering a Vaccine to an Animal. Does not Mean that the Animal was IMMUNIZED!!

**Immunization:** Occurs following Vaccination when a measurable immunologic response occurs. Doesn't imply that the animal is PROTECTED!!

**Protection:** Occurs when a properly Immunized Animal is PROTECTED against a specific disease following vaccination.

**Vaccination Interference:** Can occur because of 1. Maternal antibody interference 2. Age of the animal 3. Inadequate nutrition 4. Improper Vaccine Handling 5. Pregnancy??

## **Vaccinations to Consider when Developing a pre-shipment health program:**

Virals: IBR, BVD, PI3, BRSV.

When developing and implementing a viral vaccination program a manager must understand the differences between killed non-replicating vaccines and replicating and non-replicating modified live vaccines. Understanding what vaccine to use, when to administer the vaccine and how many doses to administer is essential in order to stimulate an effective and optimal response.

Whenever choosing the viral vaccine to use in your herds, it is important to read and understand the label!!

Bacterials: Pasteurella, Haemophilus, Clostridials, 5-way Lepto. ???

The cow/calf producer must understand what diseases are perceived by the buyers as essential to vaccinate against when developing a pre-conditioning program. Vaccinating against the clostridial diseases is a foundation for any pre-shipment program. 5-way Lepto vaccines are a necessity for cattle going to certain feeding regions and should be considered.

Some controversy exists over whether or not to vaccinate against Haemophilus and Pasteurella and what vaccines to use. I feel that if an animal is properly vaccinated against (Immunized and Protected) these diseases, the feeder/stocker will benefit many times over.

**Protection (Resistance) vs. Challenge:** It is important to understand the relationship between protection following vaccination and disease challenge the vaccinated animal may subsequently experience. Vaccination procedures must be timed far enough in advance of disease challenge in order to stimulate the level of protection necessary to prevent clinical disease. If boosters are required, then they too must be given far enough in advance.

## **Economics of Developing a pre-shipment processing program:**

Marketing: Tell The Buyers what you have to offer !! Value added concept.

Partial Budgeting Model: A tool used by economists to determine whether or not an addition or change to a vaccination program is a paying proposition.

Partial Budgeting Template for Pre-Shipment Processing:

POSITIVE IMPACTS	NEGATIVE IMPACTS
Increased Revenues	Decreased Revenues
Decreased Costs	Increased Costs

Total Positive  
Impacts \_\_\_\_\_

Total Negative  
Impacts \_\_\_\_\_

Net Impact = Positive Impacts - Negative Impacts