



Recommended Vaccination Schedules for a Comprehensive Dairy Herd Health Program

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always read and follow the instructions carefully. Table 1 lists advantages and disadvantages of both vaccine types.

Feeding practices, management styles, health care programs, and facilities vary greatly among dairy operations. Because of this, the degrees of stress, the patterns of disease resistance, and pathogen exposure are variable and unique to each operation. Consequently, there is no "one size fits all" vaccination program, but each program must be "tailor-made" to fit the individual needs of each dairy.

Immunization is a necessary aid to limit or prevent disease in cattle due to common agents, such as Infectious Bovine Rhinotracheitis (IBR) virus, Parainfluenza-3 (PI₃) virus, Bovine Viral Diarrhea (BVD) virus, Bovine Respiratory Syncytial Virus (BRSV), clostridial infections, and leptospirosis. The design of a vaccination program must take into account a variety of factors including infectious disease problems in the immediate area or region. It is strongly recommended that producers contact a qualified veterinarian before proceeding with any herd health vaccination program.

Killed (inactivated) vaccines (KV) vs Modified-live vaccines (MLV)

The most common vaccines on the market are either killed or modified-live. Most killed vaccines are provided in a liquid form that is ready for immediate use. Modified-live vaccines usually come as a dry powder that must be reconstituted prior to use. They should be used within a few hours after reconstitution, and they are particularly sensitive to harsh environmental conditions and should be protected from extreme temperatures or exposure to direct sunlight. Modified-live vaccines contain the disease organism that has been altered so that it may reproduce after it is injected into the host (animal); it is designed to develop immunity against the agent without making the animal sick. Modified-live vaccines are generally not recommended for pregnant animals. (See Table 1.) It takes approximately two to four weeks after the initial vaccination for the animal's body to develop sufficient protection against a challenge from the infectious agent included in the vaccine. Yearly boosters are usually recommended for both modified-live and killed vaccines. However, there are many new products on the market that are exceptions with regard to frequency of administration and handling as compared to older, conventional vaccines. It is important that all vaccines are handled and stored properly to maintain their potency, and

Heifers (birth to 6 months of age)

Colostrum management is of primary importance for the health of the newborn calf. Calves should be fed 3 quarts of colostrum within an hour of birth and should receive a total of 6 quarts of colostrum within the first 24 hours of life.

Table 2 outlines the recommended vaccination schedule for dairy heifers from birth to six months of age. Young pre-weaned calves usually require little in the way of vaccines. In fact, a period of suppression or refractoriness to immunization may exist for two to three weeks after birth in calves that have received adequate transfer of antibodies from colostrum. However, an intra-nasal dose of IBR-PI₃ vaccine during this time can be justified as a preventative measure against respiratory disease related to those viral agents.

At weaning and two weeks prior to group penning or housing, calves should be vaccinated with a modified-live IBR, BVD, PI₃, BRSV vaccine and a 7-way clostridial bacterin-toxoid. *Pasteurella spp. (multocida and haemolytica)* bacterin-toxoid and *Leptospira spp.* bacterin may be administered at this time.

At 6 to 10 months of age, heifers should be revaccinated with modified live IBR, PI₃, BVD, BRSV virus vaccine, a minimum 2-way clostridial vaccine (up to 7-way), brucellosis vaccine, and leptospirosis bacterin (up to 5-way, pomona minimum). If a history of leptospirosis or clostridial disease exists on the property in calves at a younger age, then appropriate earlier vaccination should be done.

Heifers (pre-breeding to calving)

Table 3 *bovis* bacterins within five days of mastitis vaccines. Animals should be vaccinated for Vibriosis (*Campylobacter fetus*) if using natural service.

Adult cows

Table 4 outlines the recommended vaccination schedule for adult dairy cows. Animals must not receive any other gram negative vaccines including: *Pasteurella spp.*, *Salmonella spp.*, *Campylobacter sp.*, *Haemophilis somnus*, *E. coli* or *Moraxella bovis* bacterins within five days of mastitis vaccines. Annual vaccination for Vibriosis is recommended for non-AI herd. If

* *Pasteurella haemolytica* has been renamed *Mannheimia haemo-*

a problem exists with scours, annual vaccination for Rota and Corona virus, *E coli*, and *Clostridium perfringens* (type C and D) may be considered to support other improved preventative management practices.

Bulls

Table 5 outlines the recommended vaccination program for dairy herd bulls. It is suggested that producers purchase only virgin bulls from reliable sources with known vaccination histories, and these bulls should have negative test results for persistent BVD virus infection, brucellosis, and tuberculosis (depending on local and state requirements). All herd additions should also undergo a minimum isolation period of 30 days and preferably 60 days. All bulls should have been designated as satisfactory potential breeders, utilizing the standard breeding soundness examination, prior to exposure to breeding females.

Summary

It is important that the owner and veterinarian develop a vaccination program tailored to fit the needs of the herd, and that it is implemented within current or proposed management practices. Pregnancy status of breeding females and herd/animal immune status are also important factors to be considered in any herd health program.

Vaccines, vaccine selection, and proper vaccine and equipment handling are only one component of a well-structured herd health program. If there is an absence of proper biosecurity (inter-herd) and biocontainment (intra-herd) practices, proper nutrition, and proper management of environmental conditions and other stress factors, any well-planned vaccination program may be ineffective. Always include a veterinarian in preventative herd health decisions, and always read and adhere to product instructions and precautions.

Table 1. Comparison of advantages and disadvantages of modified-live and killed (inactivated) vaccines.

Modified-live vaccines	Killed (inactivated) vaccines
◆ Provide longer duration and more complete immunity	◆ Provide short-lived systemic immunity
◆ May produce better cellular and secretory immunity	◆ May provide limited cellular and secretory immunity
◆ Do not require multiple vaccinations for immunologic memory	◆ Often require revaccination to ensure immunologic memory
◆ Often do not require revaccinating or require fewer revaccinations during the life of an animal	◆ Require multiple vaccinations to maintain active immunity
◆ Rarely causes hypersensitivities, but may be virulent to certain individual animals or may cause animals to produce clinical signs of disease	◆ Can cause hypersensitivity reactions
◆ When used on pregnant animals some abortions may occur (depending on the particular viral agent)	◆ Cannot cause disease even in immunologically compromised animals

Table 2. Recommended vaccination schedule for dairy heifers from birth to 6 months of age.

Age or time of administration	Disease	Type of vaccine or therapy
0-6 hours		Colostrum
6 weeks	IBR-PI ₃ -BVD-BRSV Clostridial spp.	Modified live vaccine 7-way bacterin/toxoid
4-6 months	Brucellosis ^a	RB51
6 months	IBR-PI ₃ -BVD-BRSV Clostridial spp. Leptospirosis	Modified live vaccine 7-way bacterin/toxoid 5-way bacterin

^aFollow state and federal regulations: replacement heifers should receive immunization between 4 to 10 months at the owner's discretion depending on marketing strategies.

Table 3. Recommended vaccination schedule for heifers pre-breeding to calving.

Age or time of administration	Disease	Type of vaccine or therapy
Pre-breeding (10-12 months)	IBR-PI ₃ -BVD-BRSV	Killed or modified live vaccine
	Leptospirosis	5-way bacterin
	<i>Clostridial spp.</i>	7-way bacterin/toxoid
	Vibriosis (optional)	Bacterin
40-60 days prior to calving	IBR-PI ₃ -BVD-BRSV	Killed vaccine
	Leptospirosis	5-way bacterin
	Calf scours: Rota and Corona virus	Killed vaccine
	<i>E. coli</i> + <i>Clostridium perfringens</i> , type C & D	Bacterin/toxoid
3 weeks prior to calving	Calf scours: Rota and Corona virus	Killed vaccine
	<i>E. coli</i> + <i>Clostridium perfringens</i> , type C & D	Bacterin/toxoid
	Coliform mastitis	Bacterin

Table 4. Recommended vaccination schedule for adult dairy cattle.

Age or time of administration	Disease	Type of vaccine or therapy
40-60 days prior to calving	IBR-PI ₃ -BVD-BRSV ^a	Killed vaccine
	Leptospirosis ^b	5-way bacterin
	Vibriosis (optional)	Bacterin
	Calf scours: Rota and Corona virus	Killed vaccine
	<i>E. coli</i> + <i>Clostridium perfringens</i> , type C & D	Bacterin/toxiod
3 weeks prior to calving	Calf scours: Rota and Corona virus	Killed vaccine
	<i>E. coli</i> + <i>Clostridium perfringens</i> , type C & D	Bacterin/toxiod
	Coliform mastitis	Bacterin

^aAnnual booster is necessary^bVaccination is recommended every six months in some areas.**Table 5.** Recommended vaccination schedule for dairy herd bulls.

Age or time of administration	Disease	Type of vaccine or therapy
Breeding soundness examination	IBR-PI ₃ -BVD ^a	Killed vaccine
	Leptospirosis ^a	5-way bacterin
	Vibriosis ^a	Bacterin

^aAnnual booster is necessary

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