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Developing a Livestock Vaccination Program

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The livestock industry is extremely important to the economy of Arizona and includes not only commercial producers of meat and milk, but also small producers with a few animals. Producing and delivering wholesome food, and ensuring food safety is the responsibility of every livestock producer, large or small. Most commercial producers follow a quality assurance program implementing a series of good production practices to ensure safe and wholesome food production. Producers with only a few animals need to follow the same standards. Healthy animals usually grow faster and more efficiently. Healthy animals do not require treatment for health problems, this removes the risk of drug residues and removes the cost of treatment. It is cost effective to prevent disease rather than to treat sick livestock.

Livestock are susceptible to a variety of diseases. One key to keeping livestock healthy is by implementing a proper vaccination program. Having a valid veterinary-client-patient relationship is a key first step to understanding what is involved in developing a vaccination program and in getting guidance if an animal becomes ill. Veterinarians or your local extension office can provide useful advice in dealing with specific production practices.

The purpose of a vaccine is to provide exposure to a non-virulent (non-infective) form of a disease agent BEFORE the animal is

exposed to a natural infection. This vaccination causes the animal to develop antibodies and cellular resistance that protect against disease or infection. Please remember that a vaccination is not a simple process that automatically produces immunity. There are many reasons that vaccines can fail as noted below.

You can minimize the chance of vaccine failure by carefully handling and administering the product:

- Keep vaccines refrigerated (not frozen).
- Keep vaccine out of direct sunlight.
- Be sure to use vaccines before expiration date.
- Vaccinate healthy animals, avoid vaccination of stressed livestock.
- **Follow all label directions on proper routes of administration and injection site selection.**
- Follow all label directions on vaccination of pregnant animals, and age of animals at vaccination.
- In addition, it may be necessary to administer booster injections if indicated on the label directions.

Vaccines can fail for a variety of reasons.

- Failure of the animal to respond. A certain percentage of animals will not respond and build an immune response to a vaccination. This is more likely in stressed or debilitated animals.
- Insufficient resistance if the animal is faced with overwhelming exposure.
- For younger animals there are blocking maternal antibodies (from colostrums) present that interfere with the ability of the animal to build immunity. This is the result of vaccinating animals that are too young, FOLLOW ALL LABEL DIRECTIONS.
- There is a lag time of up to three to four weeks before sufficient immunity can develop in a properly vaccinated animal.
- A booster dose is not given to generate an adequate immune response. This is applicable on vaccines with label recommendations that specifically recommend a booster. FOLLOW ALL LABEL DIRECTIONS.
- Improper handling of the vaccine includes exposing to sunlight, improper storage temperature or mixing problems. **Note:** This is the most common cause of vaccine failure.

Immunizing agents are generally grouped together under the term vaccines. The most common vaccines used today are those for the protection of animals against viral diseases. There are also bacterial and toxoid vaccines available. Both types of vaccines

are biological agents that stimulate active immunity in the animal. Toxoids are specifically formulated to provide protection against the harmful effects of toxins produced by bacteria. Livestock producers may also have a choice between modified live, killed vaccines and toxoids or chemically altered products. A term that is being used more often is *replicating* for vaccines that are designed to grow and replicate (but not cause disease) in the host animal. Replicating vaccines are also called modified live vaccines. The other term is *non-replicating*, these are the killed vaccines, toxoids and chemically altered vaccines. There are some advantages and disadvantages to using either of these products. Described below are some of the factors that need to be considered in choosing a vaccine product.

Following are recommendations on particular vaccines that should be considered for beef, sheep, meat goats and swine. They are categorized by those vaccinations that are essential for a good herd health program and those that are to be considered optional, but may not be as critical as the recommended ones. Please remember that these are recommendations. Extreme caution must be taken in order to follow the label recommendations properly. There are some vaccines that can cause abortion in pregnant females. There may also be specific animal health issues in your area that need to be addressed. When animals are purchased, be sure to ask what vaccinations have already been administered and when. It is always wise to consult with a veterinarian to ensure that the vaccination program developed is appropriate for the area and species. Your veterinarian may suggest the deletion or addition of certain vaccines to better match the disease risk to your animals.

KILLED VACCINES/TOXOIDS/CHEMICALLY ALTERED (NON-REPLICATING)	
ADVANTAGES	DISADVANTAGES
Wide variety of disease protection	More likely to cause allergic reaction
No risk of reverting to "wild strain"	Boosters usually required
No risk of spread between animals	Slower onset of immunity
Little risk of abortion	May not stimulate as strong or long lasting immunity
More stable in storage	Narrower spectrum of protection
No mixing required	Blocking by maternal antibodies in young animals
Good stimulant for colostrum	Cost often higher than modified live
MODIFIED LIVE (REPLICATING)	
ADVANTAGES	DISADVANTAGES
One dose can provide protection	Possible reversion to virulent forms
More rapid protection	Disease problems in immune stressed animals
Wider spectrum of protection	Possible excessive immune response
Less likely to cause allergic reaction	Risk of abortion/infertility if directions not followed
Not as susceptible to maternal antibody block	Proper handling and mixing is very important
Cost usually less than killed	

BEEF

Vaccines recommended as essential for these common diseases.

- 1) The vaccines for **clostridial** diseases are available in various combinations from two to eight agents. These diseases are common and usually cause sudden death with little time for treatment. Because treatment success is rare, emphasis is properly placed on preventative measures. Select at least a 4 to 7 way bacterin.

Blackleg *C. chauvoei*

Malignant edema *C. septicum*

Black's disease *C. novyi*

Enterotoxemia *C. perfringens* Type C & D; *C. sordellii*

Redwater *C. haemolyticum*

Lockjaw *C. tetani*

- 2) **IBR**, Infectious Bovine Rhinotracheitis. Also known as rednose. Causes inflammation of the upper respiratory tract.
- 3) **PI3**, Parainfluenza Type 3. Upper respiratory infection, suppresses the animal's immune system, allowing other diseases to develop.
- 4) **BVD**, Bovine Virus Diarrhea. A complicated disease, it can result in a wide variety of disease problems from very mild to very severe
- 5) **Brucellosis** (heifers only). While this has been mostly eliminated from cattle in the U.S, it is still present in some wildlife. Vaccination **MUST** be provided by a USDA accredited veterinarian and the heifer must be of a specific age. Vaccination for Brucellosis is highly recommended for cattle that may be involved in interstate movement (such as shows or fairs) or animals that may be marketed interstate.

Vaccines are recommended as optional for the following diseases depending on your situation:

- 1) **Leptospirosis**. Bacterial infection that typically causes abortion in last half of gestation or still birth.
- 2) **Pasteurella**. Commonly causes pneumonia.
- 3) **Hemophilus**. Has the capacity to attack many different organs in the body interrupting blood flow.
- 4) **BRSV**, Bovine Respiratory Syncytial Virus. A stress-related infection causing respiratory disease and reduces that animal's resistance to other diseases.
- 5) **Vibriosis**. A bacterial disease transmitted through natural breeding. May result in infertility and abortion.

SHEEP AND GOATS

It is recommended as essential to vaccinate sheep and goats for two main diseases:

- 1) Tetanus (lockjaw) caused by *Clostridium tetani*.
- 2) Enterotoxemia (overeating disease) caused by *Clostridium perfringens* types C and D.

SWINE

It is recommended to vaccinate against the following swine diseases.

- 1) **Atrophic rhinitis** is a bacterial disease that causes inflammation of tissue inside the nose. Nasal passages damaged are not effective filtering the air the pig breathes, allowing more bacteria access to the lungs. (For use in young pigs if the disease is known to be present in the herd.)
- 2) **Erysipelas** is an infectious swine disease that can cause fever, sudden death, diamond shaped skin lesions, stiffness, and abortion. (A good practice in all pigs.)
- 3) **Mycoplasma pneumonia** is present in virtually all swine herds, and is transmitted from pig to pig. Piglet vaccination is most effective. Pneumonia means inflammation of the lungs. (A good practice in most young pigs.)
- 4) **Leptospirosis** is a bacterial infection that causes abortions late in gestation, stillbirths and birth of weak piglets. (Breeding animals only.)
- 5) **Parvovirus** is a reproductive disease that may result in embryonic deaths, mummified fetuses and stillborn pigs. (Breeding animals only.)

Often, even more important than the vaccination program for swine is good animal care. It is important to keep pigs either on a frequently cleaned concrete pen or new dirt pens that have not previously had pigs on them. Keeping pigs on the same dirt on a long term basis is not advised for proper care of swine.

Vaccination programs are an important part of successfully raising livestock. There are many different products available for use. Consider all factors in selecting what products to use. Consulting with a veterinarian is a good way to help establish a personalized vaccination program for the species and area.

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