

INTERNATIONAL ANIMAL HEALTH NEWS



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Contributors: Dr. Earle Goodman, Editor. Dr. Leroy Dorminy, Co-Editor.

Dear Reader,

This year we celebrate the 10 year anniversary of this newsletter! We are grateful for the skilled professionals who have contributed research and articles to International Animal Health News (IAHN). We hope in the years or months that you have received this publication that it has been helpful to you in your work.

Starting in January 2008 we will feature IAHN in a different format. The U.S. Postal Service has significantly raised the rates to mail items like this newsletter. Because of the increased cost and the large number of people on our distribution list, we will be changing to an electronic format. IAHN will still be available to you for free by e-mail. We will also post every new issue on our website. We are in the process of making available articles from past issues on our website as well. Just go to www.cvmusa.org and click on the link to Education. You will see a full list of the books we sell and on the right you will find a link for IAHN.

The December 2007 issue will be our last paper newsletter. If you would like to continue to receive IAHN after that, please write to us and let us know an e-mail address to which we can continue to send it to you. Many internet companies offer e-mail addresses for free (www.yahoo.com). If we do *not* hear

from you, your name will be removed from the list, and you will no longer receive the IAHN.

We enjoy receiving letters and e-mails from you, so please continue to write to us and let us know how you are involved with animal healthcare or how you are using the information provided in these newsletters. Also, if there is a subject that you would like us to address in an article, please let us know. We welcome suggestions for how to improve the IAHN to make it more relevant for your use.

You may make copies of this newsletter and share it with others, as long as you are giving it away for free. We encourage you to tell your friends about IAHN and share with them how they can sign up to receive this information for free.

Sincerely,

Leroy Dorminy, DVM
Founder of CVM



INTERNATIONAL ANIMAL HEALTH NEWS

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AN OVERVIEW OF VACCINATION IN FARM ANIMALS

Part II - The Practical Side

Introduction to Part II

by Earle Goodman, DVM

Vaccination of farm animals is one of the most important aspects of animal health. In fact in many cases it is the only thing that can prevent major losses from death and chronic stunting. Yet, because of many errors, mistakes and lack of understanding of the practical aspects of vaccination, the money, time, and labor are often all but wasted. In this second part series on the subject we have developed information from many sources and authors in the hope that we can offer help to greatly lessen those mistakes and improve the results of our efforts. If we have mentioned certain points several times, that is not an oversight, rather it is something that we and the authors felt was important enough to emphasize strongly.

Vaccine Use in the Real World

by Dr. Jim Brett

The use of vaccines to prevent the diseases we face is an essential practice in livestock management. But, no vaccine protocol or vaccine is 100% fool proof in the real world. Producers may still experience disease problems even after vaccinating stock, or they may experience adverse reactions post-vaccination. We must review the overall effectiveness of a program before placing fault or ceasing protocol. When applied in a scientific and rational manner, vaccinations are still a vital part of any herd's disease prevention plan.

First, let's look at why we have "vaccine failure." There are multiple reasons why vaccinated animals may develop a disease after vaccination and all must be reviewed to determine if there is a product or a protocol problem. Remember the first rule: vaccination does not always mean immunization.

Storage and temperature are always of concern. Did the product arrive cool and did you keep it at a reasonable temperature while in use? The vaccine labels I reviewed all include the instructions "store at 35 to 45 degrees F – do not allow to freeze" on their labels. Freezing or allowing vaccines to get warm can "kill" virus

particles and other antigens or damage the carriers or adjuvants in vaccines. Always check the products when you receive them to be sure they are cool and keep them in a cooler on ice while using to maintain the proper temperature.

If a vaccine requires mixing, mix vials as you need them and never mix 2 different vaccines in the same vial to be given as a single dose.

Was it given properly? I've found producers giving vaccines incorrectly from the wrong dose (giving 2 ml instead of 5 ml) or the incorrect route (an intranasal vaccine given IM is not likely to work and it can cause severe swellings). Always check the label and use the correct syringe and needle size (a 1 ½ inch needle is better for IM injections than the ¾ inch needles I use for subcutaneous injections).

Did you use the wrong vaccine? Maybe this should be, "did you use the wrong serotype or vaccine strain?" Not all strains in our commercial vaccine will cross protect against all naturally occurring diseases. Some do a better job than others. Most of the Bovine Viral Diarrhea (BVD) vaccines now contain the Type 2 BVD virus, even though some manufacturers claimed cross protection using their Type 1 vaccine. Was this done to market pressure or was there failure of cross protection or a delay in this response to protect?

How many vaccines did you give at one time? Many farms do "whole herd" vaccinations, giving 2 to 4 vaccines containing 10 to 20 different diseases or strains. Is it possible for animals to respond to such a sudden challenge? Although the immune system in cattle is much more adaptive to multiple antigens or vaccines than most other species, the practice of giving everything at one time can have disadvantages. Some vaccines may "react" with others and cause an adverse reaction – depression, lethargy, decreased milk production, swellings or nodules, anaphylactic reactions or even death. Given at the wrong stage of the animal's production, the immunity may not endure until the challenge or adverse event can occur. Two rules I always follow when vaccinating dairy animals: 1) Never give more than 2 gram negative vaccines at the same time. 2) Do not give combination leptospirosis and vibriosis vaccines to Holsteins. The immunologist who taught me years ago in veterinary school said 2 things that have always



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stayed with me: “The more things in a vaccine, the less efficacious it is when compared to multiple injections with vaccines with one or two antigens,” and “Never give multiple vaccine injections whenever possible. When possible, give your vaccines at different stages of life so the body doesn’t have to work so hard at one time.” A simple look at a complex process, but it makes sense as a practitioner.

Even if you followed this guideline, problems can still occur. Then we should look at the animal and disease for our answers. Were the animals healthy and able to respond to a vaccine? We all know there are factors that will immunocompromise cattle and diminish their response to vaccines. Stress and its effects on the immune system is well documented in our stocker and feedlot calves. We also know that other problems such as chronic acidosis, diseases such as Bovine Leukemia Virus (BLV) or Bovine Immunodeficiency-like Virus (BIV), parasites and mycotoxins in our feedstuffs can suppress an animal’s immunity. If the immune system isn’t working properly, then it cannot respond to a vaccine and build an adequate immunity.

Were boosters given as directed and was the vaccine given at the right time? Most vaccines require a 2 shot initial dosing and then again at some interval, determined by your risk and degree of exposure. Duration of immunity to diseases varies with the disease, the vaccine, and the individual, so regular boosters are needed. Giving a booster vaccination the right amount of time before the expected exposure or risk is vital to improve the animal’s protective level.

The timing of the vaccinations are an important part of any protocol I develop. Diseases we incur post-freshening need to be vaccinated for just prior to calving. Our vaccines for pregnant cows to prevent calf scours (Rota or Coronavirus) or those we see in fresh cows such as E. coli mastitis, and clostridial diseases should be given 3 to 6 weeks before calving to maximize the cow’s immunity and that immunity passed in the colostrum. Diseases for abortion and reproductive efficiency (viral diseases and Leptospirosis) should be given 4 to 6 weeks before breeding. These vaccines may also be given during pregnancy to booster the immunity and hopefully prevent

abortions. Other vaccines to protect the cow, such as those for E. coli mastitis, must be given again later in lactation, since the duration of immunity will not last the entire lactation period.

Did you have immunity but the disease was stronger than your protection? You have to look at a disease process and the immunity you have against that disease as a war. If you have more and better soldiers (antibodies and cell-mediated immunity factors) than the disease then you win with little or no evidence of that disease. If the disease pathogen has overwhelming numbers or if the immunity is not adequate, the disease begins to win. The stronger the disease is over your immunity, the sicker the animals is and more severe the response with death a possibility. Timing and animal health are the keys here.

Even with all the unknowns we face, properly used vaccines can provide a vital link in herd health. It is the practitioner’s responsibility to review the current data on products and efficacy. Producers should consult with their veterinarian or animal health technician.

Dr. Jim Brett is a native of Mississippi, U.S.A. and a graduate of the Veterinary School at Mississippi State University. He practices veterinary medicine in Montezuma Georgia and specializes in Bovine and Swine. He does consulting work across the Southeastern U.S.A. and writes articles for Bovine Herd Management.

Vaccines – Handling to Maintain Potency Under Adverse Conditions

The author of this very practical and helpful article is Dr. Sam Galphin of Raleigh North Carolina USA. He is a well known bovine practitioner who does consulting working in Southeastern USA as well as foreign countries and volunteer work for Christian Veterinary Missions in third world developing countries. He has written many articles. Dr. Galphin is a native of South Carolina USA and a graduate of the Veterinary College at the University of Georgia USA.

Vaccines and other biological agents are used to produce immunity to livestock diseases. The use of vaccines is one of the more important things that we can do to improve the health of animals. However, if these products are not properly handled, little or no immunity will result from their use. The cost of purchasing and transporting vaccines to the field, the preservation of vaccines at the field site, the labor to confine animals, and the cost of administration can all be lost if the potency of the



vaccine is not maintained at each step throughout the process.

Biological products or vaccines are produced in several different forms for specific types of immune responses. If the product is manufactured by a reputable company, the label should clearly state which type of immunizing agent is contained in the bottle. The products that are at least risk during handling are those which contain killed or inactivated agents. Examples of these low-risk products are killed bacterins (blackleg), killed and inactivated viruses (Bovine Virus Diarrhea – BVD), and inactivated toxoids (tetanus). Products which are very sensitive to how they are handled include live virus (Contagious Ecthyma or sore mouth in sheep), live bacterial suspensions (Brucellosis), and modified live virus vaccines (Infectious Rhinotracheitis – IBR). Many of the live products now are produced in a freeze-dried form which is fairly stable until mixed with the liquid diluent supplied with them. Nevertheless, it is very important to safeguard these products until they are injected into the animal. The following general recommendations should be applied to the handling and use of all vaccines, especially the high-risk vaccines to protect their potency.

1. All biologicals/vaccines should be shipped in a cool and well-insulated container. They should be stored in a refrigerator until taken to the field. The vaccines should never be frozen regardless of the type of vaccine. However I have found that when space is limited in the cooling container one can freeze the diluent (which is separate from vaccines). Repackage the frozen diluent product in Ziplock or other heavy plastic sandwich bags with cool vaccine and wrap the entire package in several layers of clothing for transport. The package of diluent will stay cool for 24-30 hours in this condition. Immediately upon arrival the vaccine and diluent needs to be transferred to a refrigerator. The diluent needs to be completely thawed and allowed to reach normal refrigerator temperature before being used to reconstitute the vaccine.
2. Freeze-dried products should not be mixed until ready to be used. These products come

in two containers, one containing a small dry powder, the other a liquid (diluent). DO not mix more than what will be used in a one hour time at the maximum. All of these products lose their immunizing properties a few hours after mixing.

3. Always observe the expiration date printed on the bottle with directions. Never assume that vaccines will be good for a slightly longer time than the expiration date.
4. Never allow biologicals/vaccines to sit in the sun before or after being reconstituted-mixed. Sunlight will destroy and heat the product. Maintain your biologicals/vaccines in a cooler chest with frozen water filled bottles or frozen ‘Freezer Packs’ that are commercially available. Often these come free with vaccines and can be reused. Relative to lessening exposure of vaccines to heat and sunlight where vaccination is being done. Try to work in a naturally shady area or provide some type of artificial protection such as sheds over the working area or a temporary canvas like cover.
5. If using a multiple dose container, never enter the container with a needle that isn’t sterile (already used on an animal or otherwise contaminated). You may leave a sterile needle in the container for refilling syringes.
6. Never use syringes and needles that have been sterilized in chemical disinfectants. Sterilize all syringes and needles used for vaccines by boiling in distilled water for 20 minutes. Chemical disinfectants will destroy modified live and live products. Do not increase or decrease the manufacturer’s recommended dose. Do not mix products unless specifically recommended by the manufacturer. Always read the instructions.
7. Always burn or otherwise destroy the vaccine bottles. Do not leave them around as a hazard to people and animals.
8. Be as clean as possible with the inoculation procedure. Keep an adequate supply of clean, sterilized needles and change when one becomes contaminated or dull. It is a good idea to change needles about every



five to ten animals if Anaplasmosis-like diseases are a problem in the area.

9. Always give vaccines according to the manufacturer's directions. Intramuscular means in the muscle and should be given under the skin with a 3/8 inch to 1/2 inch needle. A 16 or 18 gauge needle will not bend as easily and will last longer for both routes of administration.
10. Lastly, the use of immunizing agents is an aid in the prevention of disease. If animals are in a poor state of health due to anemia, malnutrition, or disease, one may not get the expected results from vaccination. Severely debilitated animals should not be vaccinated until they have been nursed back to health at which time they can then be vaccinated with the expectation of getting protection from the vaccine. Vaccination of debilitated animals may not protect it and may even cause the animal to break with a disease if using a live vaccine. Don't waste time and effort vaccinating non-responsive at-risk animals, and vaccinate only for diseases of concern in the area. Consult a local practicing veterinarian on what diseases are important.

- The agent might change back into a disease-causing form

Indications

- Routine vaccination
- Vaccination in the midst of an outbreak

Killed Vaccine (Inactivated Vaccine)

Advantages

- The agent cannot return to disease causing form
- More stable in storage

Disadvantages

- Minimum of 2 doses for best protection
- More risk of allergic reaction
- Shorter immunity
- More microorganisms needed
- Adjuvant is commonly added to insure adequate stimulation to the animal's immune system

Indications

- Pregnant animals
- Debilitated animals
- Neonates who did not receive colostrum

Subunit Vaccine

Advantages

- Minimal foreign protein therefore fewer allergic reactions
- Can be highly potent

Disadvantage

- Expensive to develop and manufacture

Indications

- Pregnant animals
- Debilitated animals

Live Vaccine (controlled numbers of disease producing microorganisms). Live vaccines are made with the disease organisms to stimulate a good immune response but not enough to cause disease. As one might imagine, this balance can be a problem to achieve.

General Guidelines for Vaccine Administration

The withdrawal period is usually 21 days, but some require 60 days. **CHECK THE LABEL.** (The withdrawal guidelines are set up to cover slaughter only. There are no residue issues to be concerned about when considering milk. There are basically

TYPES OF VACCINES

Modified Live Vaccine (Attenuated Vaccine)

Advantages

- Rapid Protection
- Long protection
- Fewer microorganisms needed
- Reproduction of the microorganism simulates the natural infection process which stimulates multiple protective immune pathways

Disadvantages

- Risk of contamination with other infectious agents
- Must be stored and handled correctly to prevent damage to vaccine
- Requires more testing to insure safety and potency prior to release for sale
- Requires viral reproduction in animal to be effective



two slaughter times that are set for vaccines. One covers all modified live virus (MLV) and killed viral and bacterial vaccines that contain an aluminum-OH adjuvant. These are given a 21 day slaughter withdrawal. The other group is usually killed vaccines that have an oil as an adjuvant. The withdrawal is not primarily a human health problem. It is more concerned with the time involved in resolving any injection site blemishes.)

- DO NOT chemically disinfect syringes and needles used to administer vaccines. Chemical residue could render the vaccine ineffective.
- Vaccinate pregnant animals 2-4 weeks prior to expected birthing.
- Do not give antisera and vaccines at the same time. The antisera may block the vaccine from working.
- Vaccinate only healthy animals.
- READ THE LABEL INSTRUCTIONS COMPLETELY PRIOR TO USE.

*Excerpted from **Drugs and Their Usage** by Dr. Will Grimley, Dr. Beth Myhre Blevins, Dr. Randy Lynn, Dr. Beth Robinson. A publication of CVM. pp. 171-173. Available from CVM's website www.cvmusa.org – Education.*

VACCINATION - Goats

Injection Sites

The following abbreviations are for corresponding type of injection and the site on the goat as described.

Intramuscular (IM) – injected deep within a major muscle mass, such as that in the hind leg or on the shoulder. It should be given with a 20, 19 or 18 gauge, 2.5 to 4 cm (1 to 1.5 inch) needle, pointed straight into the muscle. Before injecting the drug, always withdraw on the syringe plunger to make sure you have not hit a blood vessel. If you have, blood will flow into the syringe. To correct, simply replace the needle in the muscle in a different site, and repeat procedure.

Subcutaneous (SC or SQ) – injected under the skin, usually in the neck or behind the shoulder. Usually a 1 to 2.5 cm (3/4 to 1 inch) needle is inserted at an angle through the skin. So that you do not stick yourself, pick up the skin with your

fingers and insert the needle through the skin while it is pointed away from your fingers.

Techniques

1. Vaccine should be sterile and “in date” (not expired). Every time the needle punctures the rubber top of vaccine vial, bacteria are introduced into the vial.
2. Keep vaccine cold (refrigerated but not frozen) to reduce bacterial growth.
3. Best to use sterile needle for each animal. Or, at least, clean the needle by wiping with alcohol before each use. Some diseases can be transmitted by “dirty” needles, e.g. anaplasmosis.
4. Give manufacturer's recommended dosage.
5. Restrain animal. A moving, struggling goat can cause tissue damage from a flaying needle.
6. Where to vaccinate. Vaccinations usually cause permanent swellings on goats, no matter where they are placed.
 - a. Back (dorsal/posterior) to scapula (shoulder blade). SC = subcutaneous (under the skin). Flatten out the swelling and rub in well to disperse the vaccine. May still form a swelling.
 - b. Be careful about vaccinating goats in the rump or rear leg region as you might strike a nerve or blood vessel, especially with very thin animals and kids.
7. Skin should be cleaned with Alcohol or Betadine and allowed to air dry before giving the injection.
8. Do not inject an obviously contaminated site.

*Excerpted from **Raising Healthy Goats** by Dr. Robert A. Vanderhoof. A Publication of CVM. pp. 135-137. Available from CVM's website www.cvmusa.org – Education.*

HOW TO IMPROVE RESISTANCE

All protective mechanisms are supported by good nutrition and freedom from stress. Consumption of colostrum is the young animal's first line of defense against infectious agents. Resistance can be increased by vaccination. Vaccinations work best



in animals that are in good health and have adequate diet of protein and minerals.

The type of vaccine needed will vary with the conditions present in the immediate locality. If the disease does not exist in the area or is not a problem do not spend the money to vaccinate. The timing for giving vaccinations will depend on the disease and the time of the year the disease is most prevalent. When vaccinating, make certain to read the instructions and follow them. Use clean equipment and a sanitary procedure. Always use a sharp needle as dull needles will often carry wool and dirt into the injection site causing an abscess.

antimicrobial monographs, ranging from aminoglycosides to tetracyclines.

Each monograph features information on the various aspects of drug use, such as dosing, regulatory considerations, chemistry information, comprehensive pharmacologic and pharmacokinetic data, drug interactions, medical considerations and contraindications, adverse effects, overdosing, brand names, and withdrawal times. Careful attention is paid to differentiating species-specific information.

Adapted from JAVMA Vol 226, No. 9, May 2005

Three AVMA Backgrounders Updated

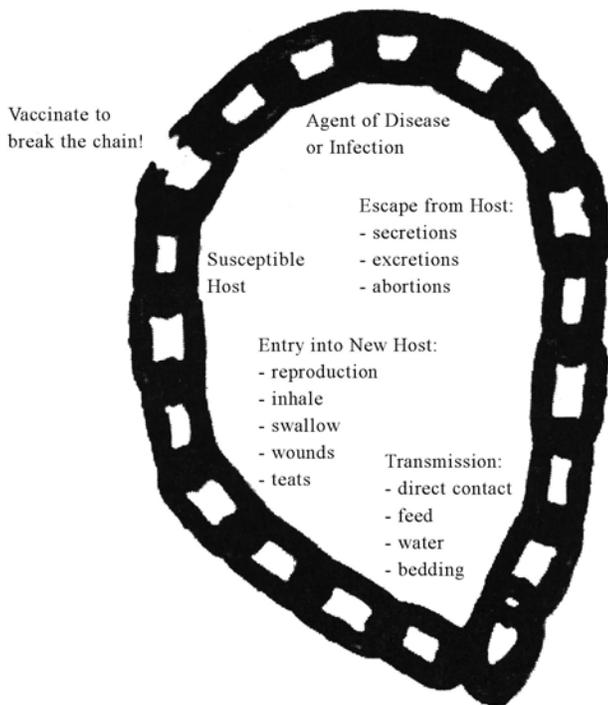
Updated AVMA backgrounders on canine influenza, brucellosis, and foot-and-mouth disease are now available by visiting the AVMA Web Site, www.avma.org, and clicking the Reference bar under the "Scientific" section.

The canine influenza backgrounder provides updated information on areas of the country in which the virus has become endemic. The designated status of certain states was updated in the brucellosis backgrounder. And the FMD backgrounder now includes information provided by the World Organization for Animal Health (OIE) on the status of the disease in certain countries. Each backgrounder provides information on causative agent, natural distribution, clinical signs, diagnosis, treatment, prevention, and control.

Adapted from AVMA News Bulletin, February 20, 2007

For Information on Any of Our Publications:

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(206) 546-7441 or vetbooks@cvmusa.org



This drawing shows the links in the chain of the infectious process and how important vaccination can be.

From **Raising Healthy Sheep** by Dr. Cleon V. Kimberling, Dr. MaryGessert, and Deborah Marsh, MS, A Publication of CVM. pp. 101-102. Available from CVM's website www.cvmusa.org – Education.

USP Web Site Offers Free Monographs

The United States Pharmacopeia's website, <http://www.usp.org/audiences/veterinary/>, now offers free monographs on anti-inflammatory and antimicrobial drugs for use in animals. The website boasts 10 anti-inflammatory monographs, ranging from aspirin to tepoxalin, and 22



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