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Precautions for Vaccination

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Abstract:

Vaccination is one of the most effective and economical methods for preventing infectious diseases in livestock, poultry, and companion animals. However, the success of a vaccination program depends on careful adherence to recommended precautions before, during, and after vaccine administration. Prior to vaccination, animals should be clinically healthy, free from fever or severe stress, and maintained under good nutritional and hygienic conditions. Vaccines must be purchased from authorized sources, stored and transported according to the recommended cold chain (usually 2–8°C), and checked for expiry date, batch number, and physical integrity before use. During vaccination, sterile equipment, correct dosage, recommended route of administration, and proper animal restraint should be ensured to prevent contamination, injury, and vaccine failure. Vaccines should be prepared and administered according to the manufacturer's instructions, avoiding exposure to direct sunlight or excessive heat. Following vaccination, animals should be monitored for any adverse reactions, protected from unnecessary stress, and provided with adequate feed, water, and rest. Proper disposal of used needles, syringes, and vaccine containers, along with accurate vaccination records, contributes to biosafety and effective disease management. Adherence to these precautions enhances vaccine efficacy, minimizes adverse effects, improves animal welfare, and strengthens disease prevention and control programs in both livestock and poultry production systems.

Keywords: Vaccination precautions, Vaccine administration, pre-vaccination assessment, Livestock vaccination, Vaccine safety, Vaccine efficacy, Cold chain management, Vaccine storage, Vaccine

Introduction:

Vaccination has been an essential tool over the years for preventing, controlling and eradicating infectious diseases, for improving animal health and welfare and reducing the need for treatment, as well as contributing to food safety and public health. Animals have been both the receiver and the source of vaccines. Through laboratory testing, the first animal vaccine created was for chicken cholera in 1879 by Louis Pasteur.

The main issues in relation to the vaccination of animals are access and availability. The logistics of distributing vaccines to marginalized populations is still a challenge. Not all animal vaccines are identical. The veterinarian has the scientific background to advise the animal owner, and to prescribe the right product for each species, category of animals, risk or disease condition, based on the directions provided in the products' leaflet. The veterinarian will assess the health status of the animals or herd/flock before vaccination, by observation of clinical signs and/or use of diagnostic tools, ensuring a proper administration and advice on booster doses to reach a level of immunity that will successfully protect the animals.

Before Vaccination:

- a. Become familiar with vaccine labels before scheduling vaccinations to avoid errors in timing and the number of packs required.
- b. Maintain cold chain unless otherwise stated, livestock vaccines must be stored at 2-8°C. Vaccine components may degrade prematurely if stored inappropriately. Freezing can reduce efficacy due to separation of the adjuvant from the antigen, and it can cause adverse drug events due to release of endotoxin from Gram negative cell walls. In the case of live vaccines, deviation from the recommended temperature directly affects the viability of the organism.

The most common causes of cold chain failure are:

- Vaccines left outside the refrigerator on delivery.
- Power cuts.
- Refrigerator failure (especially in hot weather).
- Accidental alteration of the thermostat setting.
- Door seal failure (the refrigerator works harder and the resulting temperature gradient within the refrigerator creates warm vaccine

- near the door and frozen vaccine at the back).
- Overloading the refrigerator with vaccine packs stored too close together (inadequate cool air circulation).
 - Cooling large masses of warm objects in the same space (e.g. colostrum).
- c. Protect vaccines from light, as ultraviolet light accelerates vaccine degradation.
- d. Coordinate all life stages and livestock classes with a herd health program leaving some ages or classes unvaccinated may fail to achieve herd immunity and result in an apparent vaccine breakdown. Vaccination events should be planned to avoid administering several products simultaneously, e.g. vaccines, anthelmintics and mineral injections, especially to sick or stressed animals and during hot weather. Check equipment and vaccine sometimes as a label condition. Use of incorrect or poorly calibrated equipment may result in overdosing (resulting in not enough vaccine on hand and potential toxicity with mineralised vaccines) or underdosing (meaning the entire group should be re-vaccinated).

Dispose of needles in sharps containers:

- Veterinarians and farmers should dispose of needles in designated and appropriately labelled sharps containers. These containers should be collected by medical waste service providers.

Dispose of vaccine packs and unused vaccine responsibly

Some products are harmful to the environment.

- Dispose of empty containers by wrapping with paper and putting in garbage or in approved medical waste containers.
- Vaccine packs containing unused vaccine should be disposed of at veterinary clinics in approved medical waste containers.

Store part-used packs according to label instructions

Check the recommended in-use storage life of opened vaccine packs.

- Do not inject unused vaccine in the gun or draw-off tube back into the vaccine pack. This could contaminate the entire vaccine pack.
- Clearly record the date the pack was opened on the packaging. Many vaccines have a space provided on the carton.

- Unscrew the delivery tube from the vaccine pack.
- Disinfect the stopper with a suitable antiseptic, e.g. methylated spirits.
- Unless otherwise stated, place the vaccine pack in the original outer packaging and store upright in the refrigerator at 2-8°C, protected from sunlight.
- Use a new draw-off tube with each new vaccine pack. Some draw-off tubes can be boiled to sterilize them and then reused. Frequent attachment of the connecting tube may cause the stopper to leak. Therefore, the tube should not be attached more than twice.

Post-vaccination reactions

Ensure owners are aware of the possibility of post-vaccination reactions, such as local tissue lumps and abscesses. Local reactions are more likely with some vaccines. Adherence to aseptic technique will minimize the risk of post-vaccination reactions. Suspected adverse events should be reported.

Conclusion:

Vaccination is one of the most reliable and cost-effective measures for protecting animals against infectious diseases. However, administering a vaccine alone does not guarantee protection. Its

success depends on careful planning, proper storage and handling, correct administration, and appropriate monitoring after vaccination. Even a high-quality vaccine may fail to provide adequate immunity if recommended guidelines are not followed.

Veterinarians play a central role in ensuring the success of vaccination programmes by selecting suitable vaccines, evaluating the health status of animals, following recommended vaccination schedules, and educating livestock owners about good vaccination practices. Maintaining the cold chain, using sterile equipment, handling vaccines correctly, and monitoring animals for any adverse reactions are all essential steps in achieving the desired immune response.

Ultimately, effective vaccination is a shared responsibility between veterinarians and animal owners. When vaccines are used correctly and responsibly, they not only protect individual animals but also strengthen herd immunity, reduce the spread of infectious diseases, improve livestock productivity and welfare, and contribute significantly to food security and public health.

References:

Please contact the corresponding author.