Proper handling and administration of vaccines play a fundamental role in any antibiotic stewardship program. When handled and administered properly, vaccines can reduce the use of antibiotics by preventing or reducing the occurrence of diseases that may require treatment with antimicrobials. Vaccines are a component of Best Management Practices (BMP) on any livestock or backyard production unit. In order for vaccines to work, it is important to consider that:

- Proper handling and administration of vaccines is fundamental
- Vaccination failure is mostly related to vaccine mishandling and improper usage
- Vaccines work together with other BMP to ensure healthy and productive animals

Vaccination steps as components of the Best Management Practices:

**PLANNING**
- Establish or review vaccination protocols & gather supplies for carrying out on-farm

**TRANSPORTATION**
- Maintain appropriate temperature

**STORAGE**
- Maintain vaccine sterility & appropriate storage temperature

**PREPARATION & ADMINISTRATION**
- Implement or review protocols to safeguard vaccine efficacy

**FOLLOW-UP, MONITORING & RECORDS**
- Evaluate outcomes & maintain accurate records
Set Goals & Protocols With Your Vet
Consider what has worked well for your farm in past years, and areas to improve upon.
Pay special attention to your herd health records from previous years to help identify needs.
Discuss upcoming potential health challenges due to disease status in your area, weather, geography, and production goals.

Training & Troubleshooting
Educate employees on their role in ensuring proper vaccination, including the following:
• Emphasize the value of utilizing prevention methods for keeping the herd healthy
• Demonstrate proper technique including injection location and needle size
• Explain protocols to ensure appropriate injection
• Discuss proper disposal for empty bottles and residual vaccine
• Monitor for adverse reactions

Create and maintain a Material Safety Data Sheet (MSDS) book for all the chemicals and drugs (including vaccines and antibiotics) that are stored on the farm.

Talk to your veterinarian about how to fix common problems. What will you do if:
• A vaccine was left at room temperature
• A bottle was mixed with the wrong diluent

Assign Specific Duties
- Order supplies
- Create vaccination protocols with veterinarian
- Educate workers
- Receive vaccine shipments
- Ensure proper vaccine storage
  - Check temperatures
  - Expiration dates
- Administer vaccines
- Keep records
- Read and save manufactured vaccine guides or directions for use

Acquire Tools & Materials
Purchase and gather necessary materials to ensure appropriate record-keeping, such as:
- Clipboards and whiteboards
- Record-keeping software, paper forms, or designated notebooks
- Pens, permanent marker
  - Securing the pen to the refrigerator door or clipboard may prevent losing them; have backup pens in office
- Refrigerator to store vaccines
- Standalone or wireless thermometer
- Needles & syringes
  - Account for adequate number of needles, including extras for those broken or dropped
  - Consider appropriate gauge and size of needles according to the type of animal and route of injection
  - Use a new needle to draw vaccine into single or multiple dose syringe or gun. Follow your quality assurance plan recommendations for number of animals per needle.
- Sharps disposal containers
- Vaccine vials
  - Ensure your vaccine provider follows appropriate precautions regarding storage, transportation, and records. Inquire if policy is not publicly stated.
  - Write out estimated vaccine dose needs including current head counts and potential buy-ins or births
  - Where possible, purchase smaller bottles of vaccine for smaller groups of animals to reduce wasted product or accidental vaccination with product that may be expired, less effective, inactivated or contaminated
  - Dispose of vials soon after use
  - Staff teaching materials such as videos, visuals, or flowcharts
Packaging Guidelines

- Use properly insulated containers such as commercially available coolers; maintain them properly and discard if broken or if it loses its insulating properties
- Place insulating barrier between frozen packs and vaccines (such as bubble wrap, paper, Styrofoam peanuts or similar material) when transporting to prevent direct contact
- Clearly identify the contents as fragile and perishable on the outside of package
- Pack refrigerated vaccines first before frozen vaccines
- Properly layer contents in shipping container
- Ship or transport vaccines in original packaging
- Note the packing time on outside of package
- Include enough ice packs to maintain a safe temperature while shipping
- Minimize the number of times a vaccine is transported and the container is opened

Temperature Guidelines

- Maintain appropriate temperature range (per the packaging) at all stages of vaccine transportation, to ensure the cold chain is maintained. Most vaccines are stored at 2 to 7°C (35 to 45°F)
- Delay opening refrigerator or freezer until ready to administer vaccine to maintain appropriate temperature
- Do not freeze and then thaw vaccines
- Monitor and record the temperature – commercially available single-use cold chain monitors can be a useful tool to identify if the vaccine has experienced dangerous temperature variations
- Thermometer or other cold chain device should be placed next to vaccines and checked to confirm the packaging is at the correct temperature
- Guarantee that delivery person does not leave vaccine package outside your farm or office, exposed to the elements (heat or freezing)
- If travelling by car, stow the packed vaccines in the passenger compartment, not in the trunk to maintain consistent temperature
- Immediately open package on arrival and move vaccines to refrigerator

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When vaccines arrive, immediately remove shipping packaging and move to the refrigerator.

Record vaccine arrivals in log. Keep invoice and record lot numbers to refer to in case of vaccine adverse reactions. Record expiration dates to prevent economic losses or use of expired vaccines. Photographing the bottle label may be useful backup in case they are lost or accidentally disposed of.

Refer to manufacturer’s recommendations for storage and verify vaccine insurance policy in case of accidental loss due to temperature variations.

Always maintain appropriate storage temperature for vaccines. Most vaccines are stored at 2 to 7°C (35 to 45°F).

Monitor and record refrigerator temperatures daily by physical inspection or automated sensors that alert when the temperature is out of its set range. Bluetooth thermometers allow monitoring without opening the refrigerator door.

Establish standard operating procedures to use if the refrigerator goes outside the target temperature range or loses power.

Store vaccines in the middle of the refrigerator.

Store multi-dose bottles completely sealed, ensuring removal of any needles from vials prior to storage to reduce airflow and contamination of the bottle.

Perform regular maintenance of the refrigerator (temperature control, connectivity, door seal, locks in place, etc.) and record in log.

Keep a functional thermometer inside the refrigerator to monitor temperature daily.

Label shelves to clearly indicate where each vaccine is stored; store similarly named vaccines on different shelves to avoid confusion.

Rotate vaccine supply so the bottle or lot with the shortest expiration date is in front.

Do not store in the door, refrigerator drawers, near the cold air vent or against walls of the refrigerator as these will provide inconsistent temperature.

Placing water bottles in doors and drawers may help maintain a consistent temperature.

Do not store food in a vaccine fridge.

Do not freeze vaccines unless permitted by label. Freezing may reduce the effectiveness of the vaccine by changing the chemical structure.
Review your veterinarian’s recommendations for vaccination
Consider animal age, immune status, maternal antibodies, nutritional status, etc.
Plan a date for booster vaccines
Check the label and follow any extended withdrawal periods recommended by your veterinarian
  • Discuss appropriate ways to track the animal to ensure residue does not enter food supply
Determine proper vaccination sites and administration routes based on species

Use portable coolers to maintain vaccine cold-chain (35°-45°F)
  • Pre-cool coolers for at least one hour
  • Take enough vaccine for the morning or afternoon shift, but not both
  • Keep in a shaded area away from direct sunlight

Avoid exposure to disinfectants when handling modified live vaccines to prevent accidental inactivation

For multidose bottles, record the date of reconstitution and always draw up individual doses just before administration

If severe vaccine reactions are observed (such as hives, collapse, seizures, or other unusual responses) call your veterinarian immediately

Combine only approved vaccines and diluents – always check vaccine labels before handling and administering vaccines
Reconstitute with diluent specific to the vaccine (match diluent and vaccine lot numbers)
Check expiration dates
Use sterile technique and equipment to draw and mix vaccines – ask your veterinarian for demonstration
Reconstitute immediately before use

Consider environmental conditions when vaccinating – heat and humidity can alter the vaccine’s effect on the immune system
Vaccines should be mixed by gently rotating the vial a few times immediately before use to ensure a uniform suspension

Use appropriate gauge and length needle according to label or species
  • Use appropriate delivery site
  • Change needles every time you fill a syringe or vaccine gun to avoid contaminating the vaccine bottle
  • Change needles that become bent, dull or damaged

Vaccines should be mixed by gently rotating the vial a few times immediately before use to ensure a uniform suspension

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**Follow-up and Monitoring**

Contact your veterinarian immediately in the event of an adverse reaction, such as:
- Swelling at injection site
- Facial swelling
- Rapid breathing
- Drooling
- Muscle tremors
- Collapse

Store purchasing receipts and label information
- Stick the label onto the paper record
- Store receipts in a binder

Provide additional training employees might need, such as:
- Sterile technique to fill syringe
- Appropriate injection site, route, and needle size
- Vaccines that can and cannot be used together
- Sanitation of vaccine syringes if reusable

Discuss withdrawal times for groups that are at high risk of culling
- Culling an animal before the end of the withdrawal period can lead to a residue

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**Important Information for Records**

### Vaccine supply:
- Name of vaccine
- Date of purchase or receipt
- Temperature at time of receipt
- Quantity
- Expiration date
- Lot/serial #
- Storage location
- Daily refrigerator temperatures

### Vaccine administration:
- Animal or herd ID
- Date
- Name of vaccine
- Lot/serial # *(can place sticker)*
- Expiration date
- Dosage
- Route and location of administration
- Withdrawal time *(in days)*
- Earliest date the animal could clear withdrawal time
- Name of person who administered
- Follow-up notes *(record adverse reactions)*