



LIVESTOCK VACCINE HANDLING GUIDE



WHY

VACCINE HANDLING IS IMPORTANT

The risk of a disease occurring and its severity are a trade-off between challenge and immunity. Comprehensive preventative animal health programs aim to not only boost the immunity side of the balance, but also reduce the challenge.

Vaccination programs should look beyond the scheduling of vaccination events and ensure that the animals are immunised and not merely vaccinated. No vaccine is 100% effective but the aim is to achieve herd immunity, not 100% individual immunity. The purpose of this guide is to summarise how veterinarians and farmers can maximise the chances of immunising livestock through careful handling of vaccines.

Inadequate vaccine handling can not only reduce vaccine efficacy, but also cause direct harm to animals or people, create wasted vaccine and impact the environment through inappropriate disposal of vaccine and packaging.

This is a general guide that defines Zoetis' recommendations for handling livestock vaccines, including cattle, sheep, deer and swine.

It does not describe wider animal health programs or indicate when vaccination is recommended, nor does it provide complete information on specific vaccines and diseases. Veterinarians should ensure that both sides of the challenge/immunity balance are addressed and that farmers understand their animal health program and have realistic expectations of vaccine performance.

This guide approaches vaccine handling in three parts:

1. BEFORE VACCINATION

2. DURING VACCINATION

3. AFTER VACCINATION

THE MAIN POINTS OF THIS GUIDE ARE:

1. Read and follow vaccine label directions.
2. Regularly check vaccine handling procedures.
3. Keep vaccines at 2-8°C unless otherwise stated.
4. Maintain hygienic vaccination equipment and vaccine packs.
5. Plan vaccinations in advance to avoid vaccine expiring, missing animal life stages/classes and clashes with other activities (e.g. more than two Gram negative vaccines concurrently).
6. Avoid vaccinating stressed or unwell animals.
7. Dispose of needles and vaccine packaging responsibly.
8. Prepare for suspected adverse drug events.

1. BEFORE VACCINATION

a. Read and follow the vaccine label

Become familiar with vaccine labels **before booking vaccinations** to avoid errors in timing, number of packs required and special requirements such as unique vaccination guns. Product labels can change over time. Some products have very specific and critical vaccination intervals (e.g. Bopriva®) or usage conditions (e.g. Bopriva is not to be handled by women of child bearing age) or contraindications (e.g. Eweguard® should not be used in sheep previously vaccinated for footrot).

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).

ZOETIS RECOMMENDATIONS FOR MAINTAINING CORRECT STORAGE TEMPERATURES:

- Unless otherwise stated, vaccines must be kept at 2-8°C.
- Ensure vaccine shipments are planned
 - So that delivery occurs during work hours and a staff member can unpack and refrigerate the vaccine on arrival.
 - This is especially important near weekends and during holiday periods.
- Place a digital thermometer inside the refrigerator and monitor the temperature regularly.
- Store refrigerated goods so there is space between them to allow the air to circulate and better maintain target temperature.
- Secure the thermostat so it is not accidentally adjusted.

c. **Protect vaccines from light**

Ultraviolet light accelerates the degradation of vaccines.

ZOETIS RECOMMENDATION:

- Keep livestock vaccines in the original carton when not in use.

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. Avoid administering more than two Gram negative vaccines at any one time, especially in hot weather, as this can increase the risk of post-vaccination adverse drug events. Mineralised vaccines (e.g. Ultravac® 5 in 1 with Selenium) should only be used after considering the risk of overdose.

ZOETIS RECOMMENDATIONS:

- Each farm should have a herd health program that ensures all animals are immunised and avoid application of excessive numbers of veterinary medicines concurrently.
- Avoid administering more than two Gram negative vaccines at any one time, especially in hot weather.
- Use mineralised vaccines only after considering the risk of overdose.

e. Check equipment and vaccine

Some vaccines use specific guns (e.g. the *Ezi-Grip* applicator for Scabigard®, the *Sekurus* gun for Bopriva), sometimes as a label condition. Specialist guns usually require practice. 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).

ZOETIS RECOMMENDATIONS:

- Use the correct gun and practice using it.
- Read the vaccine leaflet or label for information on vaccinator gun handling.
- Calibrate vaccination guns before use with a measuring flask or syringe.
- Inspect equipment for hygiene (see “After vaccination” for cleaning advice).
- Check the vaccine is within its expiry date and its in-use life (if opened). Vaccines that are expired or have exceeded their in-use life should be discarded (see “After Vaccination”).

f. Suspected adverse drug events (SADEs)

Veterinarians should be prepared for SADEs after the use of veterinary medicines, including vaccines (e.g. anaphylaxis, injection site reactions) and owners should be aware of such risks.

Suspected adverse drug events should be reported to either the registrant or Ministry for Primary Industries (MPI).



2. DURING VACCINATION

a. Maintain cold chain

Unless otherwise stated, keep vaccines at 2-8°C during transit. Take steps to minimise the time vaccine packs are warmed to ambient temperature and exposed to light during use. This is especially important if some of the vaccine packs will be put back into refrigerated storage and used later.

ZOETIS RECOMMENDATIONS:

- Use insulated bags passively cooled with ice packs.
- Ice packs should be chilled in the freezer at least 24 hours before use and placed on their side and evenly spread through coolers.
- Be careful not to freeze vaccines in coolers with ice packs.
- Regularly place a thermometer in vaccine packs to monitor the cold chain effectiveness.



b. Maintain hygiene

The risk of a hygiene breakdown resulting in an adverse event is a function of the type and extent of contamination and time. If the vaccine or instrument is stored in a contaminated state, the flora will multiply. The risk of contamination is much higher in wet conditions.

Do not sterilise needles with chemicals during use as this can destroy vaccines. It is not recommended to attempt to disinfect skin before vaccination with live vaccines as the disinfectant may also destroy the vaccine. Vaccines should be handled aseptically with clean hands and contact with unsterile surfaces must be avoided.

See “After Vaccination” for information on cleaning vaccination guns.

ZOETIS RECOMMENDATIONS:

- Avoid vaccination when animals are wet.
- Do not administer vaccine through visibly contaminated skin.
- Change needle, draw-off tube and gun if they become contaminated.
- Do not contaminate vaccine pack stoppers before perforating them (e.g. dirty hands).
- Disinfect stoppers with an appropriate disinfectant before perforation, e.g. methylated spirits.
- Use a new draw-off tube with each new vaccine pack. Some draw off tubes can be boiled to sterilise 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.
- Do not perforate vaccine pack stoppers with used needles, including the needle on the vaccination gun.
- *Do not inject unused vaccine in the gun or draw-tube back into the vaccine pack. This could contaminate the vaccine pack, especially if it will be stored before next use.*
- DO NOT attempt to sterilise needles with chemicals (e.g. methylated spirit) during use.

c. Connect vaccination guns correctly

Take care when connecting draw-off tubes to avoid contaminating or damaging vaccine packs and apparatus. Used draw-off tubes may contain flora that could contaminate the vaccine pack, which is especially problematic if the pack will be stored for days between uses. That pack could then contaminate other packs via the draw-off tube, creating a perpetual cycle of contamination. Blunt styluses increase the risk of leakage or pushing the stopper into the vaccine pack.

ZOETIS RECOMMENDATIONS:

- Ensure the stylus on the draw-off tube is sharp before connecting.
- Use a new draw off tube for each pack.

Follow the same instructions when withdrawing single doses into a disposable syringe. Zoetis has no data on the stability of Zoetis vaccines when removed from the original vaccine pack.

d. Select the appropriate needle size and replace regularly

The table below provides **suggested** needle sizes for cattle and sheep. However, the most suitable needle size will vary depending on the species and age of the animals being vaccinated and the injection site.

	Cattle and deer	Sheep	Pigs
Subcutaneous	3/8" – 1/2" 16-18G	1/4" (lambs) – 3/8" (adults) 18-20G	1/2" (piglets) – 1" (adults) 14-18G
Intramuscular	1-1 1/2 " 16-18G	1/2" (lambs/light animals) – 1" (large ewes/rams) 18-20G	5/8" (piglets) – 1 1/2" (adults) 14-18G

ZOETIS RECOMMENDATIONS:

- Carefully select needle size based on site of injection, age and condition of animal and viscosity of product.
- Use a new needle at the start of each vaccination event.
- Never straighten or reuse a damaged needle.
- Change needle every 10-20 animals, or sooner if it is contaminated, bent, burred or blunted.
- For subcutaneous vaccines, use the shortest needle possible.

e. Administer the correct dose to the correct site

Avoid administering vaccines into or over valuable parts of the carcass (e.g. rump) as it can result in carcass trimming and downgrading if abscesses or lumps are found. When administering multiple vaccines concurrently, ideally choose injection sites that enable each vaccine to be processed by a different draining lymph node. E.g. when two vaccines are used, administer each vaccine on different sides of the neck. Space injection sites so the vaccines do not mix (minimum of 10 cm apart). Follow a consistent pattern and record the site of each vaccine so that, in the event of injection site lesions, it is evident which vaccine is responsible.

ZOETIS RECOMMENDATIONS:

- Administer vaccines to the anterior third of the neck unless otherwise stated.
- When multiple vaccines are used:
 - Choose sites with different draining lymph nodes.
 - Space injections so the vaccines do not mix in the animal (e.g. 10cm between injections).
 - Never combine vaccines unless specifically stated on the vaccine label.
 - Keep the injection sites consistent for each vaccine and document which vaccine was injected where in case of subsequent injection site lesions.
- Ensure animals are adequately restrained to facilitate correct placement of injections.

f. Shake vaccine packs regularly and gently

Vaccine components can settle and separate. Excessive shaking can create foam.

ZOETIS RECOMMENDATIONS:

- Agitate vaccine packs regularly (e.g. every row of animals).
- Use a gentle swirling motion or gently invert the pack several times.

g. Avoid vaccinating stressed or compromised animals

Late pregnancy, heat stress and poor health can reduce the immune response to vaccination and increase the risk of adverse events. Professional nutritional advice may be needed to ensure proper energy, protein, vitamin, and mineral requirements are being met in these animals.

ZOETIS RECOMMENDATIONS:

- Avoid vaccinating pregnant livestock within 10 days of parturition.
- Avoid working cattle if temperature is over 30°C with over 40% humidity, or at lower temperatures with higher humidity.
- Sick, malnourished or stressed animals should not be expected to develop the same immunity as healthy animals.



h. Accidental exposure or self-injection

Accidental human injection may have negative outcomes due to:

- Local trauma or infection from the needle.
- Local or systemic effects from the vaccine, if injected.

Injection of a vaccine may cause an allergic or inflammatory reaction. Some vaccines, such as live scabby mouth vaccines and endocrine vaccines may also be active in humans. Consult the specific vaccine instructions and safety data sheets (SDS) in the case of human exposure. Special precautions should be taken with some vaccines, including Scabigard (live vaccine) and Bopriva.

IN THE CASE OF HUMAN EXPOSURE OR INJECTION:

- Seek medical attention if you are concerned or if vaccine is injected and show the package leaflet or the label to the Medical Practitioner.
- SDSs are available from www.zoetis.co.nz/sds/index.aspx or **0800 ZOETIS** (0800 963 847).
- If poisoning occurs, contact a doctor or Poisons Information Centre. Phone **0800 POISON** (0800 764 766).
- If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. If splashed in eyes, wash out immediately with water.
- Prompt medical attention must be sought in the case of self-injection with oil-based vaccines (e.g. Gudair®, Respisure® One), even in the absence of clinical signs.
- Human exposure to any livestock vaccine should be reported to either the registrant or MPI as an adverse drug event.

ZOETIS RECOMMENDATIONS:

- Use specialised vaccination guns according to vaccine label instructions.
- Read and follow label instructions on vaccine handling.
- Take care when changing needles – this is a common cause of needle stick injury.
- Wear gloves and eye protection when administering scabby mouth vaccines. Other people handling animals immediately after they have been vaccinated against scabby mouth should wear gloves if they will be in direct contact with the vaccination area.
- Wear gloves when cleaning equipment that has contained scabby mouth vaccines or Gudair.
- Absorb spills with inert material and dispose of it in medical waste containers. Wash the area and absorb and dispose of the material. Surfaces or materials contaminated by live vaccines should be cleaned and disinfected with suitable disinfectants or boiling for 10 minutes.

3. AFTER VACCINATION

a. Clean vaccination guns

Vaccine residue is a food source for microbes. Storage of equipment and packs containing vaccine may enable a microbial colony to establish. Furthermore, the residue of one vaccine can interfere with a different vaccine. E.g. components of inactivated vaccines can destroy live vaccines.

Operators should wear gloves when dismantling and cleaning scabby mouth vaccine applicators to prevent self-infection. Scrubbing brushes should be avoided as they can scratch the skin and inoculate live virus.

ZOETIS RECOMMENDATIONS:

- Follow vaccine gun manufacturer instructions on gun cleaning and maintenance.
- Vaccination guns should be thoroughly dismantled, rinsed and cleaned with clean water as soon as possible after use.
- Use mild dishwashing liquid to clean equipment, especially after using oily vaccines like Gudair, and rinse thoroughly as detergent residues may interfere with vaccines.
- Some applicators can be boiled for 10 minutes to sterilise them (e.g. Scabigard *Ezi-Grip* applicator) – check the manufacturer's instructions first.
- Discard the draw-off tube and use a new draw-off tube with each new vaccine pack. Some vaccines state that draw-off tubes can be boiled to sterilise them and then be reused.
- Boiled applicators and tubes must be allowed to cool to room temperature before use.
- Lubricate as required according to the gun manufacturer's instructions.
- Some applicators should be discarded at the end of each season's use, to minimise the risk of contamination (e.g. Scabigard *Ezi-Grip* applicator).

b. Dispose of needles in sharps containers

ZOETIS RECOMMENDATION:

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

c. Dispose of vaccine packs and unused vaccine responsibly

Some products are harmful to the environment.

ZOETIS RECOMMENDATION:

- 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.

d. Store part used packs according to label instructions

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

ZOETIS RECOMMENDATION:

- *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 broached 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 sterilise 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.

e. 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 minimise the risk of post-vaccination reaction.

Suspected adverse drug events should be reported to the registrant or MPI.

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