



Needle-free Injection of Clostridial Vaccines
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Occasionally injection site swelling will occur when cattle have been injected with clostridial vaccines through a needle-free injection system. There are several factors that can contribute to injection site swelling and there are ways to minimize the reaction.

Factors Impacting Clostridial Injection Site Reactions

- Mature cattle which have been previously injected with clostridials or other adjuvanted vaccines are more reactive at the injection site than calves that have not been so injected.
- Squeeze chutes that do not allow good 90-degree contact with the Pulse nozzle in front of the shoulder in the very posterior of the BQA Triangle are more apt to result in injection site reactions (e.g. knots) with clostridial vaccines (or other adjuvanted vaccines). It has been observed that injection site swelling occurs more often when the cattle are too far forward in the chute and the injection administrator is forced to inject in front of the head gate over tense muscle.
- A clogged nozzle or an injection at too low pressure may also increase the incidence of injection site reactions. Any factor that results in shallow injection depths can cause injection site reactions with these types of products. Shallow injection depths often show a circular “donut” shape at the injection site immediately after the injection is given. Suggested injection pressures for injecting clostridial vaccines or other adjuvanted vaccines with the Pulse are:
 - **300-500lb cattle 70-75 PSI**
 - **500-800lb cattle 80-85 PSI**
 - **800lb and up 90 PSI**
- On the front of the shoulder these pressures will yield deep subcutaneous injections.
- Some consulting veterinarians have recommend injecting clostridial vaccines (or other adjuvanted vaccines) behind the shoulder where the skin is loose, for both needle-free and needle/syringe injection methods. This is outside the BQA Triangle, but is generally successful in mitigating injection site reactions. (Even if injection site reactions occur, they are not visible in this location and the carcass

should not be affected.) This approach would certainly be plausible in dairy or beef cow herds.

General Observations

- If reaction sites occur, they generally resolve in 10 days to 2 weeks
- Reaction sites have never been linked to carcass issues
- Many producers inject clostridial vaccines or other adjuvanted vaccines through the Pulse daily and have had no issues. A variety of issues impact the occurrence of injection site reactions, and not all of these issues are known.
- Some producers that have observed injection site reactions indicate that needle/syringe injections of the same vaccines produce the same effect. These producers also note that the injection site reactions dissipate faster with the Pulse system than with needle/syringe injections.
- Pulse recommends that the veterinarian or producer first increase injection pressure (by 5-10 PSI) to ensure subcutaneous delivery, before evaluating other options.

What Do Injection Site Reactions Mean?

- The vaccine has created a localized immune response to the adjuvant in the vaccine. The injection site reactions are a sign that the adjuvant within the vaccine is working.
- Injection site reactions do not impact the carcass. Pulse has tracked hundreds of cattle to slaughter and the injection site reactions always come off with the hide at slaughter.
- A knot is not an abscess. When an injection site reaction knot is lanced, there is no purulent discharge.