

# Beef Quality Assurance for the Cow-Calf Practitioner

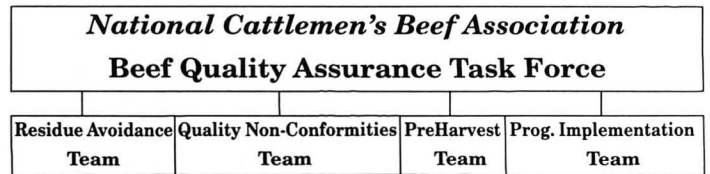
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Beef quality assurance has become an important issue in recent years because consumers demand a safe and wholesome food supply. The purposes of this paper are to define beef quality assurance, discuss the quality issues encompassed in a beef quality assurance program, and discuss the role of veterinarians in cow-calf quality assurance programs.

The first beef quality assurance program in the U.S. began in 1986. This program was developed by the National Cattlemen's Association in response to concerns about diet-health issues, hormones and potential residues.<sup>1</sup> The National Cattlemen's Association (now the National Cattlemen's Beef Association) Beef Quality Task Force in 1990 began to address concerns raised about lesions resulting from injections of animal health products.

What is beef quality? In the broadest sense, beef quality encompasses everything that contributes to consumer satisfaction with our product. The measure of beef quality in the U.S. beef cattle industry is quality grade. Quality is primarily a function of marbling and it does have some relationship with palatability, however, this relationship is not strong.<sup>2</sup> **Consumers consider tenderness to be the single most important component of meat quality.**<sup>3</sup> There is a positive relationship between the price of a cut of meat and its relative tenderness, providing evidence for a strong consumer demand for tenderness.<sup>4</sup> Currently, the debate continues over how quality should be assessed in the beef industry.

Beef Quality Assurance programs have historically used a narrower definition of beef quality. These programs have focused on the reduction or elimination of defects and residue avoidance. Figure 1 provides the structure of the NCBA Beef Quality Assurance Task Force. This group has provided much of the industry leadership for the identification of problems and the development of programs designed to reduce or eliminate these problems.



**Figure 1.** Structure of National Cattlemen's Beef Association Beef Quality Assurance Task Force (Provided by Dr. Gary Cowman, Director, Beef Quality Assurance, NCBA).

The primary problem that the NCBA Beef Quality Task Force has addressed is the problem of injection-site lesions. I will discuss that problem in some depth, but first I'd like to make a few comments on residues.

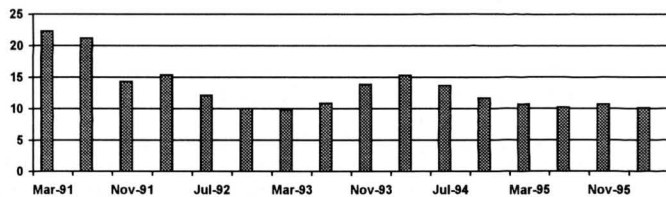
## Residue Avoidance

Do activities at the cow-calf level of the beef cattle industry contribute to violative chemical residues? Gibbons *et al.* (1996)<sup>5</sup> recently published a paper concerning violative residues in cattle carcasses. This report was a study of data from 12 states in the Food Safety Inspection Service's Residue Violation Information System (FSIS). Most of the animals found to have violative residues were bob calves and cull cows. As a percentage of total animals with a violation, dairy cows had a considerably higher rate than beef cows. Since the FSIS program does not sample each class of cattle similarly, it is not possible to establish a true incidence for each class. However, these data support the contention that within a cow-calf operation, cull cows are most likely to have violative residues. Beef Quality Assurance programs that target cow-calf producers must emphasize the importance of withdrawal times for products used in cows. My experience is that at the time of pregnancy examination, a variety of products may be used on the cows. Sometimes culling decisions are made following product application. **It is critical that we communicate to producers the importance of conformance to withdrawal times.**

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## Injection-Site Lesions

The National Beef Quality Audit-1991<sup>6</sup> identified nearly \$55 million loss per year to the beef industry from injection site lesions in the top-sirloin butt. The top-sirloin butt audits that are conducted three times per year by the meats group at Colorado State University showed some initial progress in reducing the incidence of the problem, but little progress has been made in recent years (Figure 2.) We have hovered around that 10% rate for some time.



**Figure 2.** Incidence of injection-site lesions in top-sirloin butts.

Originally, the problem was thought to be primarily due to injections given in the feedlot sector of the industry. However, research<sup>7</sup> at Colorado State University has shown that injections given to calves at branding and weaning may result in detectable lesions at slaughter. In this study, 84 steer calves of known history were used. These calves had received no injections before the beginning of the trial. The four products used in the study were a two-ml clostridial, a five-ml clostridial, vitamin AD<sub>3</sub> and a long-acting oxytetracycline. At branding, calves averaged 48 days of age and at weaning, calves averaged 199 days of age. Products were administered into the inside round muscle at branding and into the top-sirloin butt at weaning. Calves were maintained under the control of the research personnel so that no other injections could be administered in the hind quarter of these calves. Calves were slaughtered (average age=424 days) at the Excel packing plant in Fort Morgan, CO. Results are shown in Tables 1 and 2.

**Table 1.** Incidence of injection-site lesions for calves injected intramuscularly at branding and weaning.

Item	Incidence (%) Branding	Incidence (%) Weaning
2-ml clostridial	72.5 <sup>a</sup>	46.3 <sup>a</sup>
5-ml clostridial	92.7 <sup>b</sup>	79.5 <sup>b</sup>
vitamin AD <sub>3</sub>	5.3 <sup>c</sup>	10.0 <sup>c</sup>
long-acting oxytetracycline	51.2 <sup>d</sup>	92.3 <sup>d</sup>

<sup>a,b,c,d</sup>Means in a column without a common superscript differ (P<.05).

**Table 2.** Quantity of trim required to remove identified injection-site lesions for calves injected intramuscularly at branding and weaning.

Item	Trim wt./lesion (grams) Branding	Trim wt./lesion (grams) Weaning
2 ml-clostridial	48.8 <sup>a</sup>	30.3 <sup>a</sup>
5 ml-clostridial	86.0 <sup>b</sup>	69.4 <sup>b</sup>
vitamin AD <sub>3</sub>	77.4 <sup>a,b</sup>	52.9 <sup>a,b</sup>
long-acting oxytetracycline	104.1 <sup>b</sup>	88.5 <sup>b</sup>

<sup>a,b</sup>Means without a common superscript differ (P<.05).

These data showed very clearly that products injected more than a year prior to slaughter could cause injection-site damage that was detectable. The types of lesions detected in this study were similar to those detected in the top-sirloin butt audits, suggesting that much of the problem is due to injections that are given at weaning or earlier.

Further research<sup>8</sup> at Colorado State University characterized lesion sites and surrounding muscle histologically and biochemically. This research showed that injection-site lesions have greater quantities of connective tissue and fat than normal muscle. This study also demonstrated that meat tenderness is affected both at the core of the lesion and up to three inches from the center of the injection-site lesion. This research suggested that the real cost of the injection-site problem was perhaps far greater than had been previously thought. There could be a significant amount of muscle that is not noticeably damaged, however tenderness may be affected. This muscle is likely not being removed by the steak cutter, but is probably reaching the consumer.

This summer, the group from Colorado State University reported the results of another injection-site study.<sup>9</sup> In this study, 120 heifer calves were injected at weaning in the top sirloin-butt and the outside round. Products evaluated were: 1) saline-control; 2) modified-live virus vaccine; 3) killed virus-oil adjuvant vaccine; 4) 7-way clostridial; 5) Vitamin E-A+D; 6) ceftiofur antibiotic; 7) tylosin antibiotic; and 8) long-acting oxytetracycline. Heifers were slaughtered 178 days post-injection. Subprimal cuts were collected, aged for 17 days, sliced into steaks, and evaluated for presence of injection-site lesions. Additionally, cuts were examined histopathologically and for tenderness with Warner-Bratzler shear force machine. Results are shown in Table 3.

The authors reported that tenderness was affected in and around the injection-site lesions. Perhaps more importantly, tenderness was affected even when no injection-site lesion was identified. It appears that any time a product (any product) is injected into the muscle of cattle, there is a good chance that the quality of the final product may be affected. These data provide compelling evidence for the elimination of **all** injections in the top-butt and round muscles.

**Table 3.** Incidence of injection-site lesions following administration of seven products and a saline control at weaning.

Item	Top Sirloin Butt Incidence (%)	Outside Round Incidence (%)
Saline	14.3	30.8
Modified-live virus	7.7	23.1
Killed virus-oil	75.0	50.0
7-way Clostridial	92.3	100.0
Vitamin E-A+D	61.5	69.2
Ceftiofur	7.1	7.1
Tylosin	100.0	84.0
Long-acting oxytetracycline	100.0	100.0

### Summary

What can veterinarians do to assist (lead) the industry in solving beef quality problems? I will offer several recommendations.

1. *Be a good role model.* Veterinarians underestimate the impact that their actions have on producers. Producers frequently emulate their veterinarians in applying products to cattle. If a producer observes his or her veterinarian injecting a product in the top butt, the producer assumes that it is acceptable. The NAHMS data from a few years ago indicate that many veterinarians still use products in the top butt and round muscle.
2. *Be an active educator.* Veterinarians should take advantage of their frequent contact with producers to educate them. One of the best educational opportunities is when an individual cow is being treated or cattle are being processed.
3. *Become involved in state and national beef quality assurance programs.* Many veterinarians are involved in state and national beef quality assurance programs. There is some frustration that even though BQA programs have been in existence for several years, we still have an injection-site blem-

ish incidence of approximately 10%. It is critical that we do not give up on these programs.

4. *Convince animal health manufacturers to pursue product labels that do not allow the use of products intramuscularly in the top butt or round muscles.* Veterinarians are key customers of animal health manufacturers. My experience is that animal health companies are responsive to customers. When a large group of key customers conveys a clear message, action is likely.

**In summary, veterinarians are in a position to not only help, but lead the beef industry in eliminating beef quality problems.**

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