Preconditioning Beef Calves: An Economic Analysis

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Introduction

Preconditioning simply refers to the practice of preparing or "conditioning" calves to enter a grazing or backgrounding program or go directly into a feedlot for finishing. While the specific aspects of different preconditioning programs might vary, they all basically include a health protocol consisting of various vaccinations and other management practices (e.g., weaning, dehorning, castration, implanting, etc.). Without going into details, the basic concept behind preconditioning programs is to implement management practices around the time of weaning so as to improve the calf's health status before it is exposed to future stressors and pathogens. This concept has been around for a long time in the beef industry – Oklahoma State University hosted a national conference to discuss preconditioning in 1967 and Iowa had their first preconditioned calf sale in 1965 (Tindall).

Given that the concept of preconditioning has been around for roughly 40 years, one has to wonder why we are still talking about it today. That is, it seems that the practice would either "work" and become an industry standard or it would "fail" and quickly leave the scene as other technologies have over the years. Lalman and Smith point out that industry-wide adoption of preconditioning has been slow and that controversy surrounding the topic is prevalent. Likely this slow adoption and controversy are due to both the fact that research is often contradictory (Cole) and also because of the tremendous variability that exists in the beef industry with regards to cow-calf operations (e.g., breeds, weaning weights, size of herd, facilities, etc.). However, numerous developments in the U.S. beef industry will likely increase the interest in preconditioning. Value-based marketing, food safety concerns, source verification, individual animal identification, and consolidation (at the cow-calf level) are all issues that are somewhat "compatible" with management practices such as preconditioning. How fast these developments will occur remains to be seen, but the reality is that many of the current industry trends are consistent with more interest in preconditioning programs in the future as opposed to less.

While there might be trends in the beef industry that point to increased emphasis on preconditioning programs in the future, if they are not economical (i.e., more profitable than current practices) producers will not rapidly adopt them. Thus, the question is the same today as it always has been – is preconditioning profitable? As already pointed out, it is relatively easy to agree on the broad concept of what preconditioning is, but to agree on what is the appropriate specific preconditioning program is likely next to impossible. Thus, this paper will focus on the

broader concept without going into details of specific programs currently in existence in the industry. The objectives of the paper are to (1) identify the economic factors producers need to consider when evaluating preconditioning, (2) discuss previous literature with regards to factors affecting the profitability of preconditioning programs, and (3) provide an example of how a producer might evaluate the profitability of preconditioning for their operation.

Estimating the Profitability of Preconditioning

In order to estimate the profitability of preconditioning, producers need to do develop projected budgets that fit their particular situation. The first step a producer needs to do is identify what it is he wants to compare preconditioning to, as this will dictate how to proceed with the economic analysis. For example, if a producer plans to precondition weaned calves for a short time period (i.e., 45 days) and then sell them, the relevant comparison is likely preconditioning versus selling direct off the cow. On the other hand, if a cattle feeder is buying calves, then the relevant comparison is the expected cattle feeding returns with and without preconditioning. The process of developing budgets is similar regardless of which strategy a producer considers, the difference is that the cattle feeding strategy requires a few more projections. The basic information needed when developing budgets is (1) purchase price, (2) production (i.e., ADG and death loss), (3) costs, and (4) selling price. Once these items have been identified, a producer can calculate the "expected returns" associated with preconditioning and compare it to the returns of not preconditioning. The following sections discuss these factors for a cow-calf producer considering preconditioning his calves and then selling them (Scenario A) and for a cattle feeder considering buying preconditioned calves (Scenario B).

Cow-Calf Producer Selling Preconditioned Calves (Scenario A)

A partial budget can be used to compare the additional returns and costs associated with preconditioning to simply selling calves at weaning. That is, the costs of producing the calf can be ignored as they are presumably the same whether the calves are preconditioned or not. Table 1 shows a projected baseline budget for preconditioning steer calves 45 days and then selling them. The returns from this preconditioning program are compared to simply selling the calves at weaning (i.e., 45 days earlier). In addition to a baseline scenario (i.e., the expected value of preconditioning), there are four alternative scenarios that have been included as a sensitivity analysis to examine how various factors affect the projected returns.

The following is a line by line discussion of the baseline budget. Section A simply shows the expected revenue under the traditional management (i.e., no preconditioning). It is assumed the weaning weight is 550 pounds and there will be 4% shrink giving 528 pounds to sell at the assumed price of $96/cwt for a gross revenue of $507 per head.

Section B shows the production (i.e., days, ADG, death loss) and the expected income when preconditioning. The length of the preconditioning program in this example is assumed to be 45 days. According to McCollum and Gill, preconditioning programs have routinely been 14-45 days, with a standard of 21-30, but the benefits of a 45-day program are increasingly being documented. The average daily gain (ADG) is 1.33 lbs/day, based on an average of 1.0 ADG for the first 30 days and 2.0 ADG for the last 15 days (Bailey and Stenquist). Given the 45 days and 1.33 lbs/day gain, the ending weight (pre-shrink) is 610 pounds, or 60 pounds heavier than the weaned calf. Shrink with preconditioned calves can be less than that of fresh weaned calves (Progressive Farmer, Coffey and Skiles) and thus a slightly lower shrink of 2.5% was assumed for the preconditioned calves. A death loss of 0.25% was included in the budget because the cow-calf owner maintains ownership in the calves an extra 45 days so it is possible there will be some death loss. However, death loss is expected to be low given that the calves remain on the farm and are not commingled with calves from other herds. After accounting for shrink, the sale weight of the preconditioned calves is 595 lbs, almost 70 pounds heavier than the weaned calves.

When estimating the price for the preconditioned calves there are numerous factors that need to be taken into account. First of all, the calves will be marketed at a different time of the year and thus prices need to be adjusted for seasonal patterns. Historically, prices increase slightly from mid-October (assumed time frame for weaned calves) until the first of December, i.e., 45 days post weaning (Figure 1). Based on the $96/cwt price of weaned calves in October, we would expect prices to increase slightly over $1.50/cwt by December. However, the fact that the calves will be 67 pounds heavier also has to be taken into account. Figure 2 shows an expected price slide for feeder calves based on a fed cattle price of $75/cwt and a corn price of $2.20/bu (Dhuyvetter, Schroeder, and Prevatt). Based on the selling weight of 595 versus 528 pounds, the preconditioned calves are expected to be discounted a little more than $5/cwt due to weight. Another price factor producers need to consider is whether or not the calves will get “fleshy” and receive a discount for that. There have been numerous studies over time examining the factors affecting feeder cattle prices (e.g., Lambert et al., Mintert et al., Sartwelle et al.) and many of these have shown that fleshy cattle are discounted at times. However, the impact of fleshiness depends on weight of the cattle, season of the year, and the degree of fleshiness. Because the

ADG assumed in the budget is only 1.33 lbs, it is assumed that fleshiness will not be a problem and thus there is no price adjustment for fleshiness (i.e., Line 13c = 0).

The last price factor to consider is how much of a premium is expected for the preconditioned calves when they are marketed. Figures 3 and 4 show the premium associated with preconditioned calves from two different sales over multiple years. Figure 3 represents premiums associated with the VAC-45 program of calves sold through the Superior Livestock Video Auctions as reported by King et al. Over the last eight years the premium has averaged slightly over $3/cwt. However, the premium has consistently been over $3/cwt in the last six years and even exceeded $4/cwt in 2001 (the last year reported). Figure 4 represents data from the Holton Sale Barn in Northeast Kansas and the premium is for calves sold in their "Special Calf Sale" versus the "Regular Auction Sale" of the same week (Dhuyvetter, Holthaus, and Hallauer). These data suggest that a premium of about $4/cwt might be expected on average and possibly higher yet for preconditioned calves sold in the fall (i.e., $4.61/cwt). While these are the only two studies shown with any detail, others have reported similar values. McKinnon and Greiner report 5-year average premiums for calves in the Virginia Quality Assured (VQA) program ranging from $1.85/cwt to $4.25/cwt depending on the sex and weight of the calf. Avent, Ward, and Lalman report premiums ranging from $1.96/cwt to $3.36/cwt for calves sold in preconditioned vs. regular sales in Joplin, Missouri. Lalman and Smith concluded that premiums of $3-$8/cwt may be justified for cattle that have undergone management protocols as they discussed in their article. They report premiums of that magnitude were received on calves sold in the Lincoln County Preconditioned Calf Sales in the mid eighties in Oklahoma, but they also point out that the sale was discontinued due to lack of interest when market prices rose significantly. Ironically, preconditioning programs should be valued the most during periods of high calf prices because there is more incentive to reduce death loss (Bailey and Stenquist). A premium of $4/cwt is assumed for the preconditioned calves in the example budget (line 13d).

When all of the price adjustments are taken into account, the selling price for the preconditioned calves is slightly higher than the price of the weaned calves ($96.38 – line 14 vs $96.00 – line 4). That is, the seasonal adjustment and the premium associated with selling a preconditioned calf more than offset the discount associated with the calves being heavier. It should be noted that producers likely will not receive the $4/cwt premium simply by selling their calves through their normal outlets – i.e., the premiums reported here were based on "Special Calf Sales" or through programs that certified the precondition program.

Section C reports the estimated costs of the preconditioning program. Keep in mind this is simply a "generic" representation and thus costs were estimated with dollar amounts to be consistent with what other reported and not to represent specific ingredients and products. Interest cost (line 16) is based on the full cost of the weaned calf for 45 days because this income could have been used to pay off debt or be invested elsewhere had the calves been sold. Additionally, interest is charged on half of the feed and vaccination costs. Labor and equipment was valued at 10¢ per head per day. This cost will vary tremendously between operations due to the investment in facilities and equipment as well as the number of head being preconditioned. The total cost for the 45-day period is estimated to be almost $56/head.

Lalman and Smith suggest that costs for a 45-day program will likely fall in the $35-$60 per head range. Bailey and Stenquist show a cost of $56/head in their 45-day preconditioning budget. Lane reports a cost of $38 per head based on a University of Tennessee research trial. Preconditioning demonstrations in Tennessee had 45-day per head costs ranging from $48 to $62 (Rawls). Pate suggests it will cost $30 to $35 per head to precondition a calf for four weeks after weaning in Florida. St. Louis et al. report costs ranging from $28 to $45 per head, depending on the feeding program, for a 30-day preconditioning program in Mississippi. Given these various studies, the costs reported in Table 1 seem realistic and possibly a little conservative – i.e., efficient producers could likely shave $5-$10 off the reported values. Based on the cost of $55.80 per head, this works out to a cost per day of $1.24 and a cost of gain of $83.59/cwt. Once again, these costs estimates are a little conservative as they tend to be slightly higher than what is typically reported. Because costs will vary considerably between producers due to numerous factors, it is important for producers to estimate their own costs of preconditioning calves.

Once the information in Sections A, B, and C has been identified, then it can be determined whether or not preconditioning is expected to be profitable. Based on the assumptions used in this example, the net return to preconditioning is estimated to be $10.52/head (line 29). Line 30 shows net returns to preconditioning as a percent of the dollars spent for preconditioning. In this example, the $10.52 return per head represents an 18.9% return on the dollars invested. Keep in mind this is the return over the 45-day preconditioning program – on an annualized basis it would be 153.3% (keep in mind this "magnifying effect" works the same way with negative returns). The breakeven price needed for the preconditioned calves is $94.60/cwt (line 31) which is less than the weaned calf price due to the added weight. The breakeven premium needed for preconditioning, all else equal, is $2.23/cwt. That is, the $4/cwt premium assumed (line 13d) could drop by $1.77/cwt and preconditioning would still breakeven with selling the calves right of the cow at weaning.

Cow-Calf Producer Selling Preconditioned Calves (Scenario A) – Sensitivity Analysis

Because many of the values in Table 1 represent projections, it is useful to conduct a sensitivity analysis around the primary variables impacting profit. This type of analysis can provide some insight as to the economic risk associated with preconditioning calves. However, to more fully assess the risk of preconditioning calves, a more complex analysis involving probabilities of various outcomes should be conducted. The different scenarios considered, in the order as they appear in Table 1, are the following:

– Lower average daily gain [ADG (-)],
– Higher average daily gain [ADG (+)],
– Higher death loss [D.L. (+)], and
– Higher cost [Cost (+)].

With the exception of ADG (+), all of the scenarios considered represent negative changes relative to the baseline. This is not to say that producers only have downside risk because things could improve relative to the baseline budget just as well. Rather, it was simply done to see if preconditioning is still profitable given poorer conditions than the baseline expectations. Changes in ADG of 0.33 lbs/day in either direction impacted net returns a little over $7/head. Given the assumptions used in this budget, net returns drop to zero if ADG drops below about 0.9 lb/day. As pointed out earlier, if ADG increases to the point where calves become fleshy, then a price discount (line 13c) would possibly need to be included. If death loss increased from 0.25% to 1.0% (line 11), net returns drop by about $4 per head but they are still positive. At death loss levels in excess of 2%, net returns become negative (all else equal). The last scenario, Cost (+), represents costs increasing roughly 20 percent compared to the baseline budget via increased feed and medicine costs. Net returns are approximately equal to zero indicating that preconditioning is essentially a breakeven proposition under these assumptions. The cost per head per day is $1.48 compared to $1.24 in the baseline budget. Based on the previous discussion of costs, as a rule-of-thumb, producers should expect per-head-per-day costs to be in the range of 90¢ to $1.30. As costs increase above this upper limit, it will become more difficult to show that preconditioning is profitable for a cow-calf producer selling calves.

Because the impact of preconditioning on shrink is not well documented (Cole), a final sensitivity analysis scenario considered was to increase shrink on the preconditioned calves to the 4% level assumed for the weaned calves. At this higher shrink, the net return to preconditioning dropped from $10.52 to $5.88 per head, but this still represented a 10.5% return on the costs over the 45-day period (data not shown).

Table 1. Economic Analysis of Cow-Calf Producer Preconditioning Calves

			Alternative scenarios			
A. Traditional Management Income		Baseline	ADG (-)	ADG (+)	D.L. (+)	Cost (+)
1	Weaning weight, lbs	550	550	550	550	550
2	Shrink, %	4.0%	4.0%	4.0%	4.0%	4.0%
3	Sale weight, lbs	528.0	528.0	528.0	528.0	528.0
4	Weaning price, $/cwt	$96.00	$96.00	$96.00	$96.00	$96.00
5	Gross revenue, $/head	$506.88	$506.88	$506.88	$506.88	$506.88
B. Preconditioning Management Income						
6	Beginning (weaning) weight, lbs	550	550	550	550	550
7	Days from weaning to marketing	45	45	45	45	45
8	ADG, lbs/day	1.33	1.00	1.67	1.33	1.33
9	Ending weight, lbs	610.0	595.0	625.2	610.0	610.0
10	Shrink, %	2.5%	2.5%	2.5%	2.5%	2.5%
11	Death loss	0.25%	0.25%	0.25%	1.00%	0.25%
12	Sale weight, lbs	594.8	580.1	609.5	594.8	594.8
13	Weaning price, $/cwt	$96.00	$96.00	$96.00	$96.00	$96.00
13a	Price adjustment for seasonality, $/cwt	1.57	1.57	1.57	1.57	1.57
13b	Price adjustment for weight, $/cwt	-5.19	-4.06	-6.34	-5.19	-5.19
13c	Price adjustment for fleshiness, $/cwt	0.00	0.00	0.00	0.00	0.00
13d	Preconditioning premium, $/cwt	4.00	4.00	4.00	4.00	4.00
14	Final price ($/cwt.)	$96.38	$97.51	$95.23	$96.38	$96.38
15	Gross revenue ($/head)	$573.20	$565.71	$580.43	$573.20	$573.20
C. Preconditioning costs, $/head						
16	Interest (cattle, feed, supplies) @ 6.0%	$3.91	$3.91	$3.91	$3.91	$3.94
17	Health supplies and medicine	8.00	8.00	8.00	8.00	12.00
18	Death loss	1.39	1.37	1.41	5.56	1.38
19	Labor and equipment	4.50	4.50	4.50	4.50	4.50
20	Feed, hay, and pasture	35.00	35.00	35.00	35.00	40.00
21	Marketing costs (tags, comm, etc.)	3.00	3.00	3.00	3.00	5.00
22	Total cost	$55.80	$55.78	$55.82	$59.97	$66.82
23	Cost per day	$1.24	$1.24	$1.24	$1.33	$1.48
24	Cost of gain, $/cwt	$83.59	$107.01	$68.47	$89.84	$100.11
D. Comparison: Traditional vs Preconditioning						
25	Traditional gross revenue, $/head	$506.88	$506.88	$506.88	$506.88	$506.88
26	Preconditioning gross revenue, $/head	$573.20	$565.71	$580.43	$573.20	$573.20
27	Increased revenue, $/head	$66.32	$58.83	$73.55	$66.32	$66.32
28	Less preconditioning costs, $/head	$55.80	$55.78	$55.82	$59.97	$66.82
29	**Net return from preconditioning, $/head**	**$10.52**	**$3.05**	**$17.73**	**$6.35**	**($0.51)**
30	**Return on costs (line 29 / line 22)**	**18.9%**	**5.5%**	**31.8%**	**10.6%**	**-0.8%**
31	Breakeven price, $/cwt	$94.60	$96.99	$92.31	$95.30	$96.46
32	Breakeven premium, $/cwt	$2.23	$3.47	$1.08	$2.92	$4.09

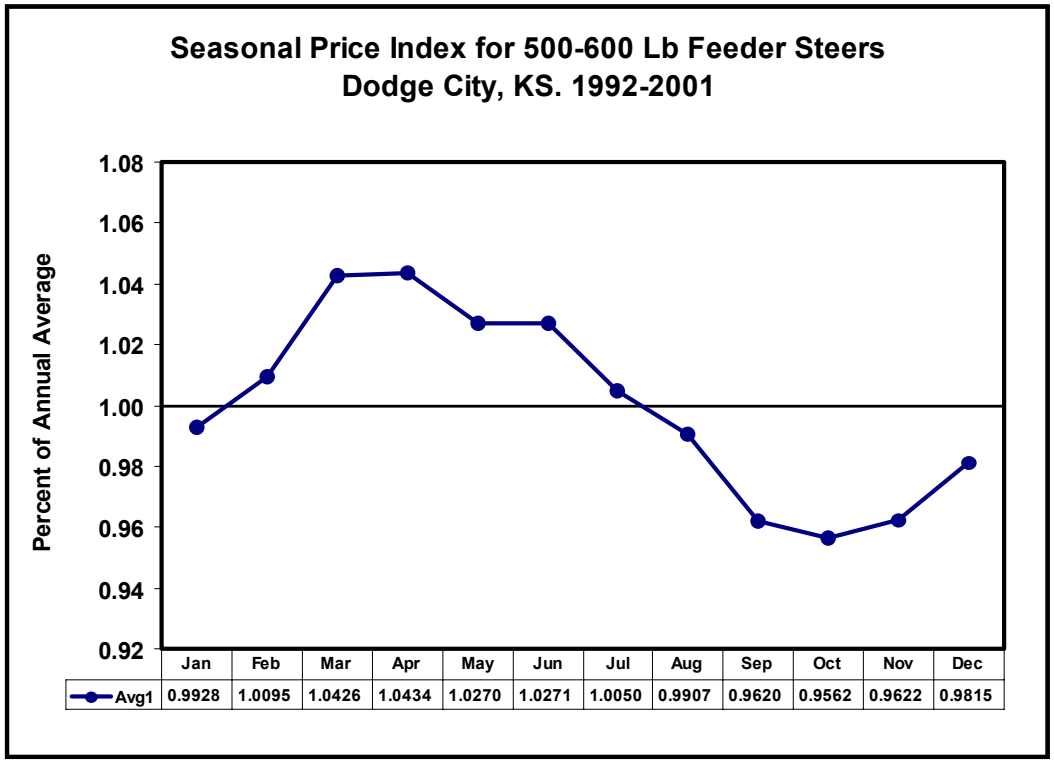

Figure 1

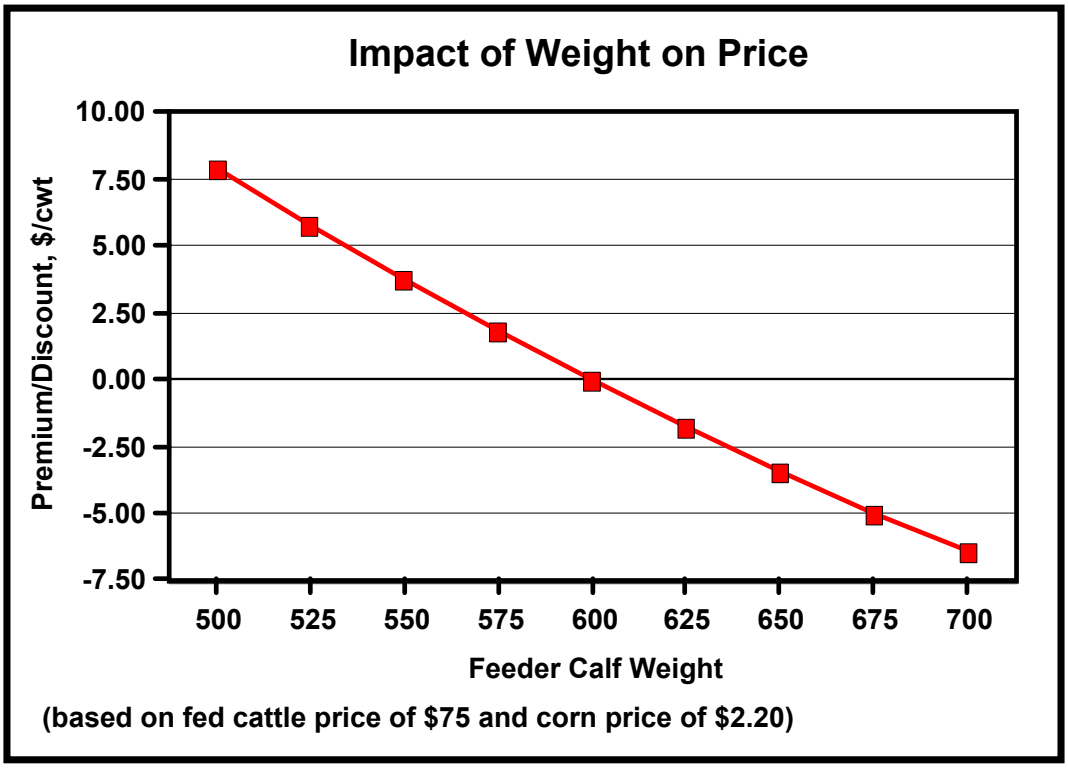

Figure 2

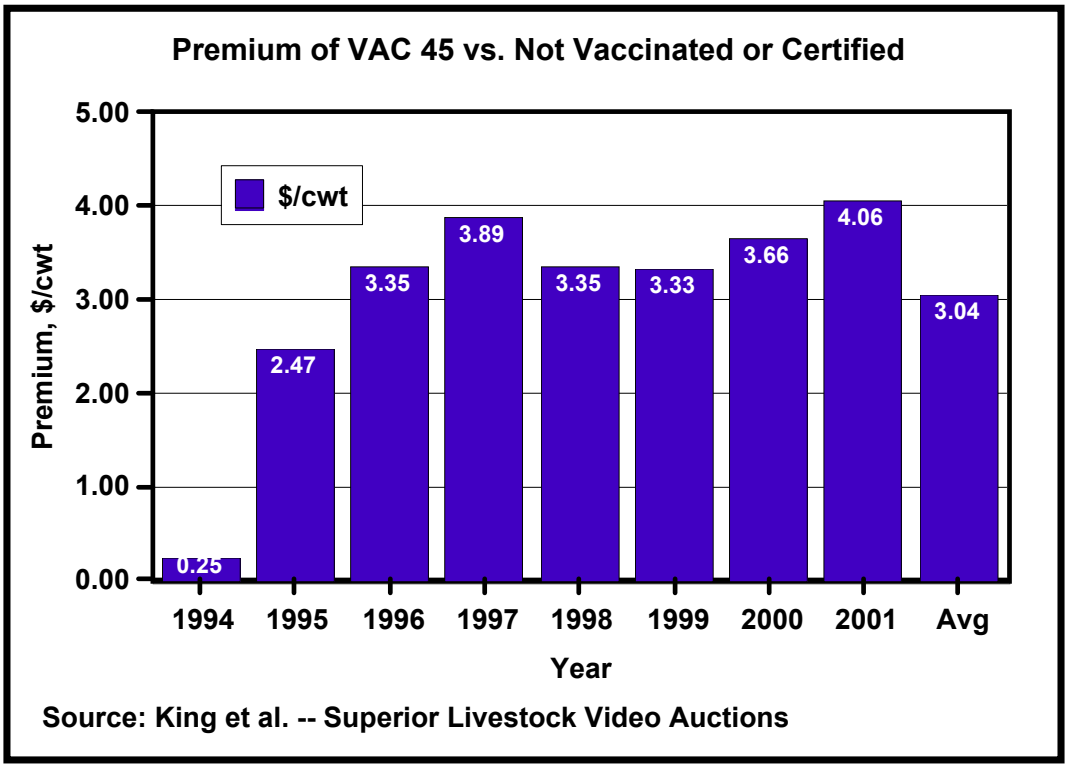

Figure 3

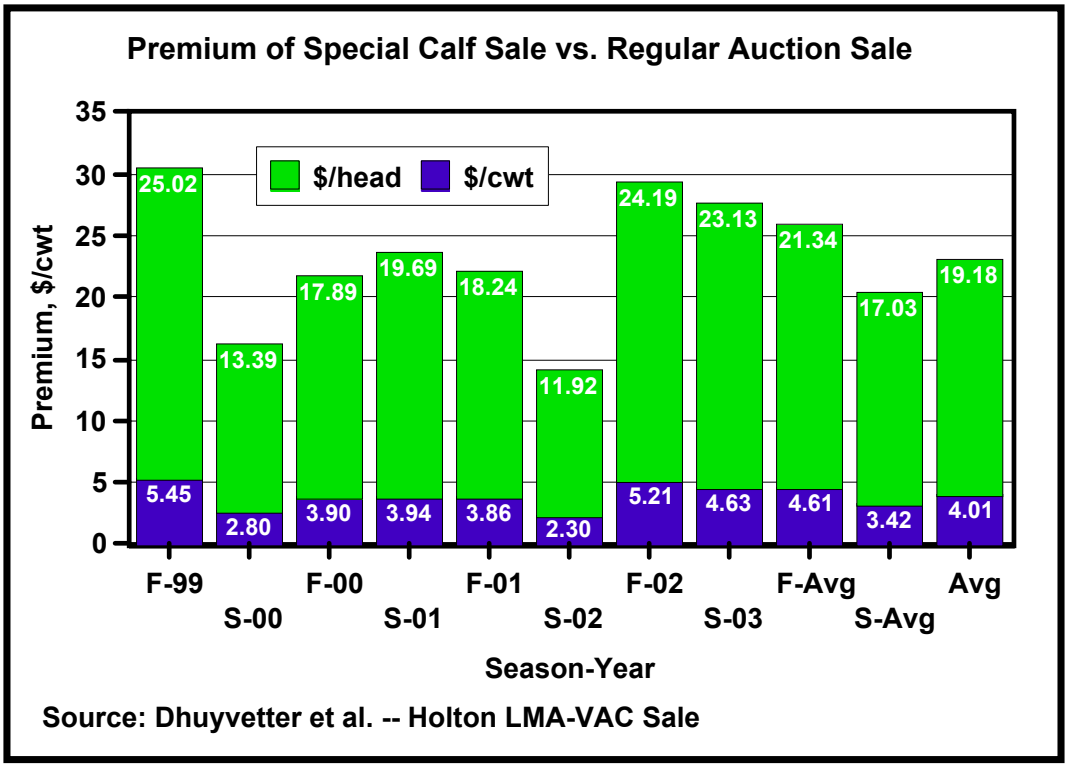

Figure 4

Cattle Feeder Considering Buying Preconditioned Calves (Scenario B)

The values reported in Table 1 indicate that cow-calf producers can increase their expected returns by preconditioning calves if they can sell them for a premium of $4/cwt. The next issue that needs to be addressed is whether or not paying a premium of this magnitude is economical for cattle feeders buying preconditioned calves. If preconditioned calves experience less health problems in the feedlot and gain weight more efficiently than non-preconditioned calves, then a premium of some amount is justified. Furthermore, given the beef industry's trend towards more value based marketing, premiums could be paid for preconditioned calves if their end value (i.e., carcass) is worth more. Numerous studies have found that preconditioning and the health status of calves significantly improves feedlot performance, due to lower morbidity and mortality, and in some cases also improves carcass quality (e.g., Cravey; Gardner et al., 1996, 1999; McNeill; Nyamusika et al.; Roeber and Umberger). The improved performance (i.e., ADG, feed conversion, death loss) results in lower medical costs and costs of gain. The improved carcass quality will result in higher revenue if cattle are marketed on a value-based system.

Thus, it stands to reason that preconditioned calves should bring a premium, but how much should this premium be? The premiums shown in figures 3 and 4, along with other findings previously discussed, indicate that cattle feeders have generally been willing to pay somewhere in the range of $2-$5/cwt for preconditioned calves. Is this the "full value" of preconditioning, or do cattle feeders pay less than the full value such that they retain some of the value themselves (as opposed to passing it on back to the cow-calf producer)? From a theoretical standpoint, we would expect that the premium paid by cattle buyers would be less than the full value because of the risk involved. That is, because uncertainty with regards to cattle health and performance exists, even with preconditioned calves, cattle buyers will factor that into the price they pay and thus premiums likely will be less than the full value of preconditioning.

In his 1984 article summarizing preconditioning trials conducted in the 70's and early 80's, Cole concluded that "Although theoretically sound, the practice of preconditioning will not, in general, reduce sickness sufficiently to repay the cost of the program." (p. 21). He also pointed out that the results of controlled experiments and surveys were often contradictory. Producers should attempt to rely on controlled experiments when possible, as opposed to testimonials, because they likely represent "repeatable results" more so than testimonials and anecdotes. However, in the absence of well-designed research trial data, producers still need to make decisions and thus they often need to rely upon whatever information they can identify. Thus, it could be argued that Cole's condemnation of survey data may be somewhat misplaced. Furthermore, the

economics of preconditioning programs might be considerably different today than 20 years ago due to changes in management styles, vaccines, etc. Therefore, it is important to look at more current studies to determine if buying preconditioned cattle is economical for cattle feeders.

In a Colorado State University study, Roeber and Umberger compared the net returns to feeding (NRTF) for two groups of preconditioned calves from value-added calf (VAC) programs in Kentucky with calves purchased through auction markets in the same region. The NRTF of the calves that had been preconditioned before being shipped to Colorado were $46.83 and $49.54 per head higher than the calves with unknown health and processing history (auction market calves). Based on a 550 pound beginning weight, these increased returns represent increased values of $8.53/cwt and $9.00/cwt, respectively. In a simulation of the economic impacts of bovine respiratory disease complex (BRDC), Nyamusika et al. found returns to vaccination combined with treatment of $44 per head for a feedlot in the midwest. Based on a 600 pound beginning weight, this increase equates to an added value of the feeder calf of $7.33/cwt. Furthermore, there was considerably less variability (i.e., risk) in net returns with this health program. The authors concluded that "preconditioning health programs for newly weaned calves would improve efficiency of the feeder cattle marketing system." (p 52).

Cravey compared the economic returns of 380 preconditioned heifer calves versus 1,600 weaned and shipped calves and concluded that the returns to preconditioning were $60.72 per head ($11.04/cwt). In a second study, Cravey compared the net returns of 15 lots of preconditioned calves to 15 lots of similar non-preconditioned calves. In this study, the value of preconditioning in the feedlot phase was estimated to be $55.93 per head ($9.67/cwt). In both of these studies, the finished cattle were marketed on a live-weight basis and thus if preconditioning improves carcass quality, these increased returns are conservative estimates as to the total increased value of preconditioning calves that are marketed on a value-based system.

Based on this limited data, it would appear that the value of preconditioned calves is somewhere between $40 to $60 per head in the feedlot which equates to price premiums that could be paid for the calves of $7-$11/cwt. Avent, Ward, and Lalman surveyed feedyard managers from the Texas Cattle Feeders Association as to what they felt preconditioned calves were worth to them in the feedlot sector. The average value reported by the 19 managers responding to their survey was that preconditioned calves were worth $5.25/cwt more than non-preconditioned calves. This lower value may reflect the fact that feedlot managers recognize the risk that still exists with preconditioned calves and thus they are not willing to pass the full added value to the cow-calf owner. Or, this lower value might reflect their experiences working with much larger numbers of

cattle over multiple years, compared to the studies reported above. That is, it may be that over many pens of cattle and many years the "true value" of preconditioning is expected to be something less than $40 to $60 per head – i.e., more on the order of $25 to $35.

Data from the Texas A&M University (TAMU) Ranch-to-Rail program are presented in Table 2. These data represent nine years and over 17,000 head of cattle. In the annual summary report of the program, net returns are reported for both the healthy calves and the sick calves – sick calves are defined as those receiving at least one vaccination for bovine respiratory disease (BRD). This comparison makes it easy to see how costly sickness in feedlot cattle can be. The difference in net income between healthy calves and sick calves averaged $91.77 per head and ranged from a low of $49.55 to a high of $151.18. Dividing this net income difference by the in-weight of the cattle indicates how much sick cattle need to be discounted (or how much of a premium can be paid for healthy cattle). The average price difference over the nine years was $15.09/cwt.

The difference in net income is partially due to production/performance differences – ADG over the nine years has been 0.30 lbs/day higher for healthy calves and death loss has been 3.9% lower. However, in addition to the improved production factors, the carcass quality of the healthy calves has been better, on average, compared to the sick calves (Figure 5). As we move towards more value-based marketing systems, this is an important consideration of preconditioning programs.

While the difference in net income between healthy calves and sick calves of $91.77 per head clearly points to the importance of keeping calves healthy, it does not necessarily reflect the profitability associated with preconditioning. That is, 100% of preconditioned calves will not necessarily be healthy nor will 100% of non-preconditioned calves be expected to get sick. Thus, to estimate how preconditioning might impact net income in a feedlot we need to consider what impact it will have on the percent of cattle being sick. Figure 6 shows the linear extrapolation of the average net income data reported in table 2 for various "levels of sickness." For example, if 100% of the calves are sick, the net income is -$10.83 per head (value reported in table). Likewise, if 0% of the calves are sick, i.e., they are all healthy, the net income is $80.94 per head (value reported in table). The rest of the points in figure 2 simply reflect linear combinations of the net returns of sick and healthy calves. The slope of this line is 0.92 which indicates that net income is expected to change 92¢ per head for every 1% change in the level of sickness. Thus, a 10% change in the level of sickness would equate to a $9.20 per head change in net income. The question now becomes, how does preconditioning impact sickness (morbidity) levels?

In his review of 1970's and early 80's studies, Cole concluded that preconditioning would decrease morbidity about six percentage points (from 26.5% to 20.4% in seven preconditioning studies reviewed). With this level of improvement in morbidity levels we would only expect a $5.61 per head improvement in net income (0.92 x 6.1) which hardly makes preconditioning economical. In the CSU study (Roeber and Umberger), morbidity decreased from 77.3% for auction market calves with unknown health history to 35.7% for preconditioned calves (average of two programs). An improvement of this magnitude would equate to $38.27 per head [(77.3-35.7) x 0.92] which is actually quite close to the values of preconditioning they estimated. In their survey of Texas feedlot managers, Avent, Ward, and Lalman, asked managers what impact preconditioning would have on morbidity and mortality levels. The average response was that they expected morbidity to decrease from 36.4% (non-preconditioned calves) to 9.2% for preconditioned calves. Likewise, they expected mortality rates to decrease from 4.3% to 1.5%. Based on the feedlot managers estimate as to the improvement in sickness level, the expected impact on net income would be $25.02 per head [(36.4 - 9.2) x 0.92].

Lalman and Smith point out that preconditioning appears to result in a substantial reduction in sickness, death loss, and medicine costs. However, they do not quantify what this reduction in sickness level is. Likely, the reason they do not give "a number" is because the impact preconditioning will have on morbidity levels will vary considerably from year to year and operation to operation due to many factors. It is difficult to discern exactly what the appropriate value to use is for a "general" economic analysis. Thus, cattle buyers are encouraged to do a similar analysis to determine what size of a premium they can economically justify when buying preconditioned calves given their expectations of sickness levels and their particular operations.

Twenty years ago Cole concluded that preconditioning programs were not profitable for cattle feeders. However, he supported the concept as being theoretically sound and suggested research should take place to make the preconditioning economically feasible. While there still appears to be a lack of well-designed research trials to evaluate the economics of preconditioning, it does appear to be more economically attractive today than in the past. Based on the data presented here, it would appear the economic value of preconditioning is in the range of $40 to $60 per head when finishing cattle. This is in slight contrast to Lalman and Smith who conclude that "Conservatively, preconditioning may capture $50 to $75 per head of additional value from weaning through the packing phase compared to a production system where weaning, vaccination, and other management practices associated with preconditioning occur after shipment from the ranch of origin." (p. 5).

Table 2. Comparison of Healthy and Sick Calves, TAMU Ranch-to-Rail Program /1

Production Comparisons

	Average Daily Gain			Death Loss			Percent
Year	Healthy	Sick	Diff.	Healthy	Sick	Diff.	Sick /2
92-93	2.88	2.68	0.20	0.50%	2.90%	-2.40%	21.9%
93-94	2.92	2.69	0.23	0.01%	2.20%	-2.19%	34.1%
94-95	3.02	2.99	0.03	0.50%	1.70%	-1.20%	23.2%
95-96	3.01	2.91	0.10	0.30%	3.50%	-3.20%	29.8%
96-97	2.96	2.40	0.56	0.60%	7.70%	-7.10%	14.4%
97-98	2.84	2.54	0.30	0.60%	4.00%	-3.40%	26.7%
98-99	3.07	2.64	0.43	1.80%	5.70%	-3.90%	14.0%
99-00	3.08	2.65	0.43	0.70%	5.50%	-4.80%	16.8%
00-01	2.85	2.45	0.40	0.01%	6.90%	-6.89%	22.6%
Avg	2.96	2.66	0.30	0.56%	4.46%	-3.90%	22.6%

Carcass Quality Grade Comparisons

	Choice Carcasses, %			Select Carcasses, %			Standard Carcasses, %		
Year	Healthy	Sick	Diff.	Healthy	Sick	Diff.	Healthy	Sick	Diff.
92-93	41%	28%	13%	55%	70%	-15%	4%	2%	2%
93-94	26%	19%	7%	67%	73%	-6%	7%	8%	-1%
94-95	39%	33%	6%	59%	63%	-4%	2%	4%	-2%
95-96	38%	32%	6%	54%	56%	-2%	8%	12%	-4%
96-97	40%	26%	14%	55%	60%	-5%	5%	14%	-9%
97-98	42%	23%	19%	51%	60%	-9%	7%	17%	-10%
98-99	41%	24%	17%	54%	65%	-11%	5%	11%	-6%
99-00	54%	37%	17%	43%	53%	-10%	3%	10%	-7%
00-01	56%	41%	15%	41%	54%	-13%	3%	5%	-2%
Avg	42%	29%	13%	53%	62%	-8%	5%	9%	-4%

Economic Comparisons

	Net Income			Medicine	Lost	Average	Price
Year	Healthy	Sick	Diff.	Cost	Value /3	In-Wt	Disc. /4
92-93	$176.38	$85.15	$91.23	$27.36	$63.87	593	$15.38
93-94	$2.17	($86.38)	$88.55	$37.90	$50.65	591	$14.98
94-95	$75.69	$26.14	$49.55	$20.76	$28.79	601	$8.24
95-96	($3.40)	($63.02)	$59.62	$34.05	$25.57	605	$9.85
96-97	$112.19	($5.23)	$117.42	$23.36	$94.06	614	$19.12
97-98	($36.18)	($101.57)	$65.39	$22.73	$42.66	630	$10.38
98-99	$80.82	$0.70	$80.12	$21.39	$58.73	609	$13.16
99-00	$146.17	$23.31	$122.86	$26.78	$96.08	619	$19.85
00-01	$174.61	$23.43	$151.18	$44.55	$106.63	609	$24.82
Avg	$80.94	($10.83)	$91.77	$28.76	$63.00	608	$15.09

/1 Source: McNeill, McCollum, and Paxschal. (http://animalscience.tamu.edu/ansc/publications/rrpubs/rr_all.html)

/2 Percent of "sick" calves, where sick is defined as animals treated one or more times for BRD.

/3 Lost value is the difference in net income between healthy and sick calves less medicine cost.

/4 Approximate purchase price discount required on sick calves in order for them to breakeven with healthy calves.

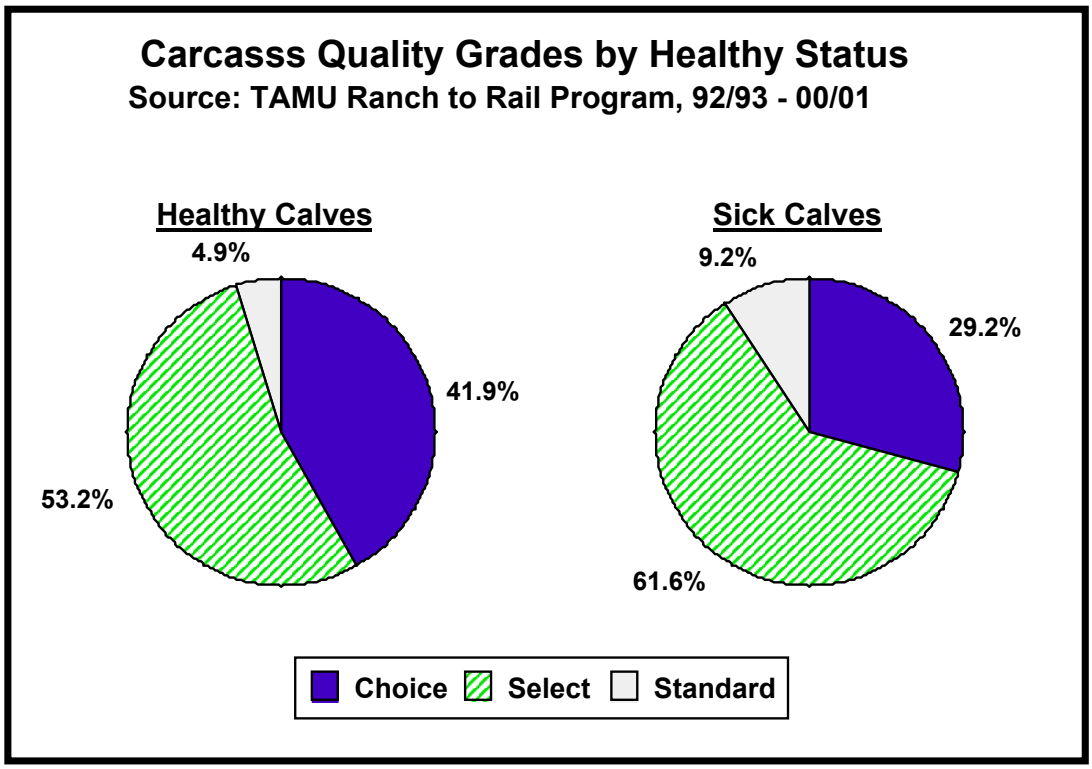

Figure 5.

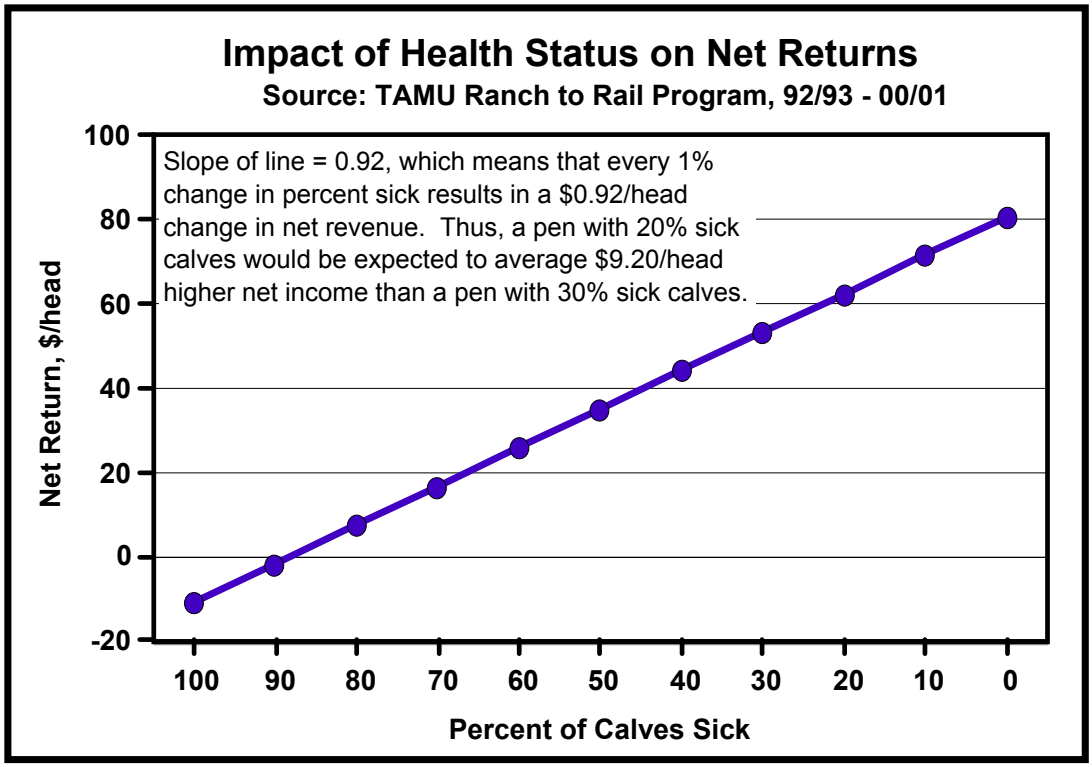

Figure 6.

Preconditioning Programs are a Continuum

While no specific preconditioning "program" has been discussed/analyzed here, the analysis has generally referred to a 45-day program. This was because it would be impossible to discuss every possible program in the industry and also because there has been a move towards the 45-day program becoming more common (McCollum and Gill). However, it is important for producers to recognize that preconditioning calves is a "continuum" and where they fit along that continuum will depend on their particular operation. Figure 7 shows the premiums of the various health programs from the Superior Livestock Auction analysis (King et al.). While premiums associated with the VAC-45 program have been the largest, premiums also exist for the VAC-34 program and even for vaccinations without certification. Different preconditioning "programs" will fit better (worse) for different producers due to their constraints (e.g., facilities, labor, feedstuffs, etc.). Furthermore, producers need to recognize what is all included in a preconditioning program when analyzing or interpreting data. For example, castrating bulls and dehorning calves will typically be required of a preconditioning program. However, it could also be argued that these practices are simply good management strategies and not necessarily have anything to do with preconditioning. The bottom line – when evaluating preconditioning programs and talking about premiums, etc. make sure you are comparing apples to apples.

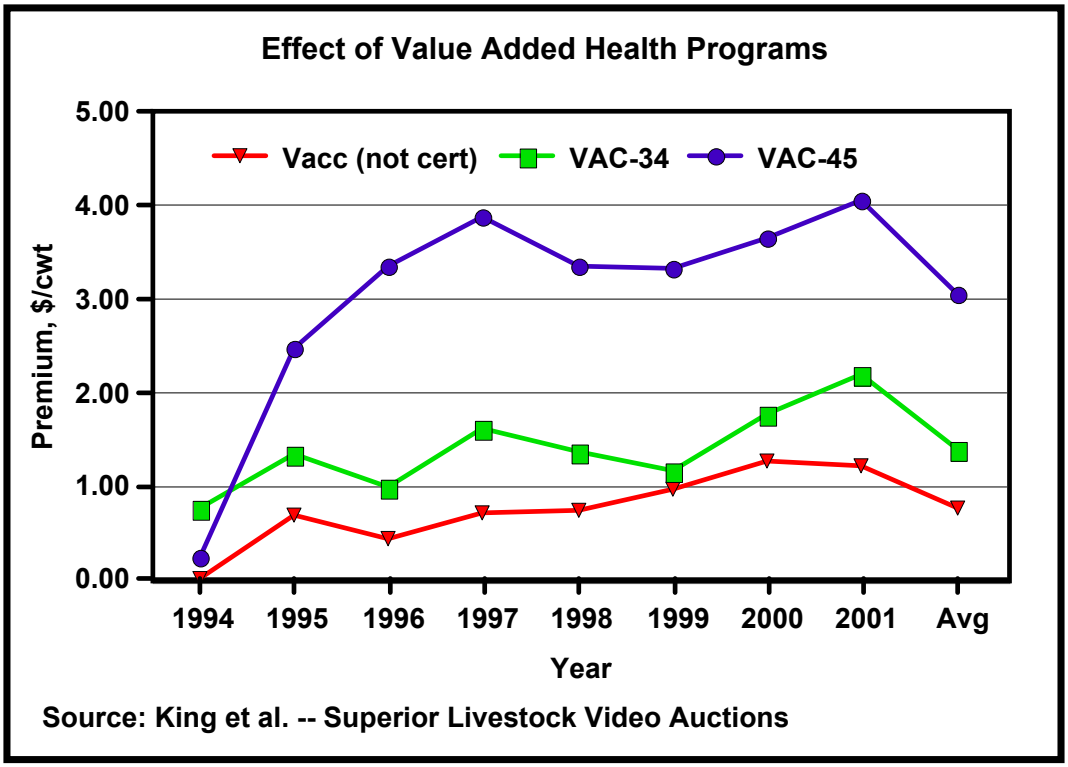

Figure 7

Summary

This paper has examined the profitability that might be expected from preconditioning calves. From the perspective of a cow-calf producer preconditioning calves and then selling them, it appears that preconditioning is a management strategy worth considering as it can add value to the calf compared to simply selling calves at weaning. However, this added value is dependent on receiving a price premium on the calves and thus producers may need to change the way they have marketed their calves if they choose to precondition them. Fortunately, most research indicates that buyers have been willing to pay premiums of the magnitude needed when calves are marketed through either "Special Calf Sales" or by certifying that the required protocols of specific preconditioning programs have been met.

The premiums being paid for preconditioned cattle also appear to be economically justified by those finishing the cattle in feedlots. Actually, the limited data available tends to suggest that cattle buyers could pay slightly higher prices for preconditioned cattle than currently done. However, the reason premiums have likely been below "the full value" has to do with risk. As the reputation and integrity of preconditioning programs increases, the premiums paid for these calves would be expected to increase and approach the full value of preconditioning. If cow-calf producers feel the premiums they receive do not reflect the full value of the preconditioning program, they should consider retaining ownership through the finishing phase as this would be a method to capture that value.

Finally, producers need to recognize that there are many different ways to define preconditioning programs. Rather than worry about conforming to a specific one (unless required to participate in a particular sale), they need to identify what best fits within their management and resource constraints. If preconditioning calves can help improve the overall health status of calves as well as improve the quality of the end product, these are positive things for the overall beef industry. To ensure that management strategies that benefit the beef industry as well as consumers are implemented, it is important that the proper economic signals (i.e., premiums and discounts) are in place.

References

Avent, R.K., C.E. Ward, and D.L. Lalman. "Asymmetric Value of Preconditioning Programs for Feeder Cattle." Selected paper presented at Western Agricultural Economics Association Annual Meeting, Long Beach, CA. July 29, 2002.

Bailey, D. And N.J. Stenquist. 1996. "Preconditioning Calves for Feedlots." *Managing for Today's Cattle Market and Beyond*, Livestock Marketing Information Center (LMIC). Available at http://ag.arizona.edu/arec/wemc/TodaysCattlePub.html. Accessed August 7, 2003.

Coffey, C., and M.A. Skiles. 1996. "Preconditioning Calves on Grass." The Samuel Roberts Noble Foundation, Ardmore, OK.

Cole, N.A. 1984. "A Critical Evaluation of Preconditioning." In: Proc. North American Symposium on Bovine Respiratory Disease Conference, Amarillo, TX. p. 21-49.

Cravey, M.D. 1996. "Preconditioning Effect on Feedlot Performance." In: Proc. Southwest Nutrition and Management Conference, Phoenix, AZ.

Dhuyvetter, K.C., J. Holthaus, and D. Hallauer. (unpublished data).

Dhuyvetter, K.C., T. Schroeder, and W. Prevatt. 2001. "The Impact of Corn and Fed Cattle Price Slides on Feeder Cattle Price Slides." Kansas State Univ. Coop. Ext. Serv. Bull. MF-2504.

Gardner, B.A., H.G. Dolezal, L.K. Bryant, F.N. Owens, and R.A. Smith. "Health of Finishing Steers: Effects on Performance, Carcass Traits, and Meat Tenderness." *Journal of Animal Science*, 77(1999):3168-3175.

Gardner, B.A., S.L. Northcutt, H.G. Dolezal, D.R. Gill, F.K. Ray, J.B. Morgan, and C.W. Shearhart. 1996. "Factors Influencing Profitability of Feedlot Steers." Oklahoma State Univ. Anim. Sci. Res. Rep. P-951:164.

King, et al., CSU Beef Program Report, 1994-1998; Pfizer Animal Health Final Reports, 1999-2001 (as reported in Lalman and Smith).

Lalman, D., and R. Smith. "Effects of Preconditioning on Health, Performance and Prices of Weaned Calves." Oklahoma State Univ. Coop. Ext. Serv. Bull. F-3529. Available at http://www.ansi.okstate.edu/exten/beef/ Accessed August 7, 2003.

Lambert, C.D., M.S. McNulty, O.C. Grunewald, and L.R. Corah. "An Analysis of Feeder Cattle Price Differentials." *Agribusiness*, 5(1989):9-23.

Lane, C. Jr. "Capturing the Value of Preconditioned Calves." Univ. of Tennessee Coop. Ext. Serv. Info Series: AS-B 259.

McCollum, T. III and R. Gill. 2000. "Preconditioning Pointers." *Beef*. Available online at http://beef-mag.com/ar/beef_preconditioning_pointers/. Accessed August 6, 2003.

McKinnon, B.R., and S. Greiner. 2002. "Beef Quality Corner VQA Feeder Cattle Program Update." Virginia Coop. Ext. Serv. Available at http://www.ext.vt.edu/news/periodicals/livestock/aps-02_07/aps-117.html. Accessed August 7, 2003.

McNeill, J.W. "Value Added Calf (VAC) Vaccination Management Program." Texas A&M Univ. Coop. Ext. Serv. Bull. ASWeb-076. Available at http://catlserver.tamu.edu/ansc/ranchtorail.html. Accessed August 7, 2003.

McNeill, J., T. McCollum, and J. Paschal. "Ranch to Rail Summary Report" (various years), Texas A&M Univ. Coop. Ext. Serv. Available at http://animalscience.tamu.edu/ansc/publications/rrpubs/rr_all.html. Accessed August 7, 2003.

Mintert, J.R., F.K. Brazle, T.C. Schroeder, and O. Grunewald. 1988. "Factors Affecting Auction Prices of Feeder Cattle." Kansas State Univ. Coop. Ext. Serv. Bull. C-697.

Nyamusika, N., T.H. Spreen, O. Rae., and C. Moss. "The Bioeconomic Analysis of Bovine Respiratory Disease Complex." *Review of Agricultural Economics.* 16(1994):39-53.

Pate, F. 2001. "Will Premiums Pay for Preconditioning Calves with Feed After Weaning?" Univ. of Florida Ona Reports. Available at http://rcrec-ona.ifas.ufl.edu/or6-01.html. Accessed August 6, 2003.

Progressive Farmer. "Does Preconditioning Pay? September, 2001.

Rawls, E. 2002. "Can You Afford to Wean and Feed Your Calves?" Tennessee Beef Cattle Initiative. Available at http://www.tnbeefcattleinitiative.org/production.htm. Accessed August 7, 2003.

Roeber, D. and W. Umberger. "The Value of Preconditioning Programs in Beef Production Systems." Selected paper presented at Western Agricultural Economics Association Annual Meeting, Long Beach, CA. July 29, 2002.

Sartwelle, J.D., III, J.R. Mintert, F.K. Brazle, T.C. Schroeder, R.P. Bolze, Jr. and M.R. Langemeier. 1996. "Improving the Value of Your Calf Crop – The Impact of Selected Characteristics on Calf Prices." Kansas State Univ. Coop. Ext. Serv. Bull. MF-2142.

Sartwelle, J.D., III, F.K. Brazle, J.R. Mintert, T.C. Schroeder, and M.R. Langemeier. 1996. "Buying and Selling Feeder Cattle – The Impact of Selected Characteristics on Feeder Cattle Prices." Kansas State Univ. Coop. Ext. Serv. Bull. MF-2162.

St. Louis, D.G., Engelken, T.J., Little, R.D., and Edwards, N.C. 2002. "Systems to Reduce the Cost of Preconditioning Purchased Calves." Mississippi State Univ. Res. Rep. Vol. 23, No. 3.

Texas A&M University. Ranch to Rail Annual Summary Reports. Available at http://catlserver.tamu.edu/ansc/ranchtorail.html. Accessed August 6, 2003.

Tindall, B. "Preconditioning Programs." *Animal Nutrition and Health*, July-August, 1983, p. 38-42.