



Costs and Benefits Associated with Preconditioning Calves

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Research for this Extension Fact Sheet was a cooperative effort between the Samuel Roberts Noble Foundation and Oklahoma State University. To learn more about the Noble Foundation and its programs, see <http://www.noble.org/Index.html>.

Preconditioning is the process of preparing calves to enter the stocker phase of the beef industry or to be directly placed in the feedlot. This process typically includes ranch management activities such as weaning, supplemental nutrition, dehorning, castration, and implementation of an animal health program including both deworming and vaccinations. Cow-calf operators can influence the market value of their livestock through these industry-accepted management practices.

While preconditioning is of interest to many producers today, the associated set of management practices is not a new concept to the beef industry. Preconditioning has been shown to improve both animal health and performance (Lalman and Smith, 2005). As a result, buyers frequently pay a premium for preconditioned cattle that are perceived to be of higher quality. However, there remains a question for many cow-calf producers. Are the additional vaccination and feed costs and time spent associated with preconditioning economically feasible for a cow-calf producer?

A cooperative effort between the Noble Foundation (NF) and the department of agricultural economics at Oklahoma State University (OSU) was formed to determine the cost versus benefit of preconditioning as part of an integrated beef production system (Donnell, 2007). The NF assists cooperators within a 100-mile radius of Ardmore to meet their individual production, marketing, and quality-of-life goals through multi-disciplinary consultation. Specifically, producers are consulted in areas such as forages and rangeland management, animal production, economics and marketing, and wildlife conservation. For producers in the integrated beef production program, the intent is to provide guaranteed source, process, and performance verified feeder cattle to the marketplace. This fact sheet specifically addresses costs and returns associated with the integrated beef production program.

Preconditioning Costs

Preconditioning cost data obtained from 11 and 29 NF co-operators in 2004 and 2005, respectively, show the average total

cost of preconditioning both steers and heifers approximates \$49/hd (Table 1), a little more than \$1/hd/day for a 45-day preconditioning program. Note that not all labor costs were available and costs associated with marketing and shrink are excluded in the total reported here. The largest preconditioning cost item was for animal nutrition during the 45-day period. Feed/mineral and hay costs averaged \$33/hd. Vaccination cost, a critical component of a preconditioning program, was not as large as some producers might think, averaging about \$8.25/hd. Producers' data also showed the average net margin for preconditioning was nearly \$62/hd for steers in 2004-05; and \$50/hd for heifers.

Findings from our analysis indicated that number of days preconditioned, average daily gain, and the cost of nutrition (feed/mineral and hay) have a significant impact on the economic returns from preconditioning. Statistical analysis indicated:

- Each additional day in a preconditioning program increased net margins by about \$1/hd.
- Increasing average daily gain by 0.2 lbs/day increased net margins by \$4.25/hd.

Table 1. Summary for Key Preconditioning Variables by Sex, 2004-2005.

Variable	Sex	Mean	Std. Dev.
Days Preconditioned	Steers	52.4	10.4
	Heifers	52.4	10.3
Average Daily Gain	Steers	1.44	0.60
	Heifers	1.32	0.54
Feed and Mineral Costs	Steers	23.00	6.24
	Heifers	23.00	6.24
Hay Costs	Steers	10.03	5.91
	Heifers	10.03	5.91
Vaccination Costs	Steers	8.23	3.97
	Heifers	8.23	3.97
Additional Labor Costs	Steers	2.00	1.03
	Heifers	2.00	1.03
Total Preconditioning Costs	Steers	49.24	9.06
	Heifers	49.29	9.02

- Each \$1 increase in feed/mineral costs reduced net margins \$1.47/hd while the negative effect from feeding \$1 more hay was \$2.31/hd.

Preconditioning Benefits

Benefits from preconditioning stem from a combination of three factors. First is additional weight gain during the preconditioning phase, thereby enabling producers to sell more pounds (heavier calves) after preconditioning than at weaning. Second is capitalizing on the typical seasonal price increase from when calves are frequently weaned and sold in mid-October to marketing preconditioned calves in early December. Third is a potential price premium associated with preconditioning management practices implemented at the ranch.

Additional Weight Gain

One benefit from preconditioning is selling additional pounds after the preconditioning phase (typically 45 days or more). Table 2 demonstrates the value of additional weight from marketing preconditioned calves in December compared with weaned calves in mid-October. The example assumes a 45-day preconditioning program and an average daily gain of 1.33 lbs/day. The 2005 average market price for 500- to 550-pound steers sold in mid-October at Oklahoma City was used and adjusted for a price slide of \$5/cwt between 500- to 550-pound and 550- to 600-pound calves. This price slide accounts for the fact prices for heavier calves are typically lower than for lighter calves. The average price slide obtained from historical market report data over the years 1992-2006 was \$3.06/cwt, slightly less than what is used in our example. The value of additional pounds sold was \$47.82/hd in this example. Recognize that a lower average daily gain and a larger price slide for heavier calves will lower the value for additional pounds sold.

Seasonal Price Increase

Using historical market report data from 1992-2006 at Oklahoma City, we found the seasonal price increase for steers weighing 500 to 550 pounds and sold in the first week of December rather than in mid-October averaged \$5.74/cwt. However, producers should not expect this seasonal price change every year. A seasonal price increase was found in 12 of 15 years for 500- to 550-pound calves at Oklahoma City between mid-October and early December. An average price of \$4.61/cwt was found when omitting the two largest, atypical seasonal price increases. Even the more conservative price change translates to \$23.05/hd for 500-pound calves.

Management Premium

OSU and other university research has shown that management practices such as weaning, dehorning, supplemental nutrition, castration, deworming, and vaccinations are not only

beneficial to animal health and performance, but also return more dollars when sold at market. Previous research indicates producers have the opportunity to realize an additional premium of \$3 to 5/cwt depending on how many of the above mentioned practices are implemented at the ranch. Importantly, the premium is also dependent on the reputation of the rancher, the preconditioning program, the reputation of the livestock market and its manager, and how the livestock sale is conducted. The premium amounts to an added \$15 to \$30/hd of revenue for 500-pound calves.

Summary of Benefits

Readers must be cautioned that the benefit examples given here are neither guaranteed nor necessarily additive. Still, preconditioning offers the opportunity to increase revenue from three sources to offset the added costs associated with preconditioning calves.

Price Premium Specific to the NF Program

Previous research on estimating the price premium buyers pay for preconditioning varies. Most estimates are in the \$3 to \$5/cwt range but a price premium as high as \$8/cwt has been reported. Four sales in which preconditioned calves were marketed by NF cooperators were analyzed. Two approaches were taken, both accounting for many factors that affect calf prices (such as lot size, animal weight, breed type, muscling, frame size, condition, health, etc.). The focus was on producer management practices, especially related to weaning, vaccination, castration, and dehorning.

Results for the two largest sales each year found a price premium for preconditioned, source, and age-verified calves from NF cooperators of \$3.02/cwt when compared to all other management practices and other producers (Donnell, 2007). When compared to calves for which buyers have little information about the timing of weaning and vaccinations, the price premium buyers paid was \$4.28/cwt. For calves weighing 500 pounds, these premiums amount to \$15.30/hd and \$21.40/hd, respectively.

All models estimated showed that larger sale lots command a higher price. Figure 1 shows that as lot size increased in the two largest sales, prices paid by buyers increased also. The extent of these higher prices varied sharply for the two sales. For example, the premium for a 25-head sale lot was about \$2.50/cwt in December 2005 and about \$5.50/cwt in October 2006. Highest prices were paid for sale lots of 60 to 65 head, approaching a truckload of calves. However, many producers are not large enough to market a uniform sale lot of steers or heifers in a truckload size lot. In that case, it is important to note that a price premium of about \$1 to \$3/cwt was paid even for increasing sale lots from 1 head to 10 head.

Another model considered the combined effect of marketing preconditioned, source and age-verified calves in lot sizes of 20 head or more. The combined effect resulted in a price premium for NF producers of \$5.41/cwt or \$27.05/hd for a 500-pound calf.

Partial Budgeting Comparison

Evaluating preconditioning typically involves partial budgeting. This economic tool allows the producer to evaluate the costs versus benefits of a traditional cow-calf operation (sell at weaning) compared to alternative management practices (sell after preconditioning). In essence, what producers need

Table 2. Additional value of preconditioning weight gain.

	Weight (lbs)	Market Price (\$/cwt)	Total Revenue (\$/hd)
Sold at weaning	500	126.36	631.80
Sold after preconditioning	560	121.36	679.62
Difference in Total Revenue			47.82

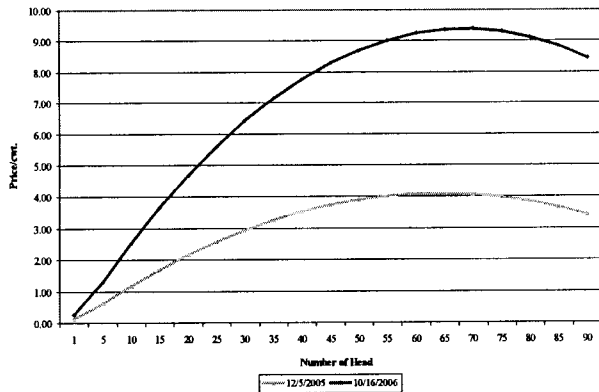


Figure 1. Lot Size and Price Relationship Comparing NF Calves to All Others Sold at Two Sales

to determine is whether the added costs from preconditioning will be offset by the added revenue for preconditioned calves. Recall the added revenue comes from the three benefit components discussed above.

Table 3 is a partial budget comparison between multiple preconditioning programs. The column labeled "Noble Foundation" shows the costs and returns for the two-year experience, 2004-05 – with some modifications. Actual selling price is entered. Decomposing it into its components (Price change from weaning to marketing, Price slide for heavier weight, Price discount for increased flesh, and Management premium) were estimated from the 2005-2006 sale models and related data.

The column labeled "Oklahoma Quality Beef Network" is a proposed budget developed by economists and animal scientists at OSU. It is similar to a budget in the Beef Cattle Handbook (Lalman and Doye, 2005). The column labeled "Kansas State University" is a budget prepared by economists and animal scientists at Kansas State University (KSU) (Dhuyvetter, Bryant, and Blasi, 2005).

Lastly, the column labeled "OSU Revised" is a proposed budget which includes current prices at the time this fact sheet was written, along with production, price, and cost values from the Noble Foundation experience, recent research (Donnell, 2007), and the previously prepared OSU and KSU budgets.

The Oklahoma Quality Beef Network (OQBN) and KSU budgets are relatively conservative. Added revenue from marketing preconditioned calves exceeds added costs by \$2.40 to \$13.71/hd. Actual net returns by NF producers were considerably higher (\$57.31/hd) though the NF results do not account for all added costs as was noted earlier.

The "OSU Revised" budget is an attempt to develop a realistic partial budget for preconditioning. As indicated, it includes a combination of actual experiences from NF producers, plus a combination of production, price, and cost assumptions from previous budgets and market data. Net returns are well-above the conservative returns in the OQBN and KSU budgets but well-below those from two years' experience by NF producers. Yet, the OSU Revised budget projects a net return of more than \$30/hd for preconditioning calves. Thus, the added revenue more than compensates for the added cost associated with preconditioning calves. Another way to state the bottom line is that preconditioning is expected to return \$30/hd or more in net returns for cow-calf producers *under the assumptions in the OSU Revised budget*.

Note that net returns are influenced by several factors. Among them are price level, the price change from weaning

calves to marketing preconditioned calves, the price premium for preconditioning, length of the preconditioning period, average daily gain, various cost items, etc. Net returns also are influenced by the extent information on preconditioning practices is exchanged between seller and buyers and the reputation of the livestock market where calves are sold. A partial budget like Table 3 enables a producer to plug in various values they believe represent previous or expected experiences. By using such a spreadsheet, producers can assess how sensitive returns are to key budget items. The OSU Revised budget in Table 3 is available in a Microsoft Excel spreadsheet available at <http://agecon.okstate.edu/marketing/publications.asp>.

Sensitivity of the OSU Revised budget in Table 3 is illustrated here. Below are several budget item changes in production, costs, or market conditions and how they affect net returns. Note in each case, only one budget was changed at a time, then net returns were compared to those in the OSU Revised budget of Table 3.

- A \$2/cwt increase (decrease) in price level results in a \$1.45/hd increase (decrease) in net returns.
- A \$2/cwt increase (decrease) in the seasonal price change from October to December results in an \$11.89/hd increase (decrease) in net returns.
- Similarly, a \$2/cwt increase (decrease) in the price premium also results in an \$11.89/hd increase (decrease) in net returns. Taking the price premium to zero, which is possible depending on when and where calves are marketed, still results in a net return of \$5.16/hd for preconditioned calves in the OSU Revised budget.
- A 0.1/lb increase (decrease) in average daily gain results in a \$4.85/hd increase (decrease) in net returns.
- Increasing death loss to 1.5 percent results in a \$6.65/hd reduction in net returns.
- Increasing feed/mineral and hay costs \$5/hd results in a \$5/hd reduction in net returns.
- Increasing vaccination and animal health costs \$2/hd results in a \$2/hd reduction in net returns.

Summary and Conclusions

The Noble Foundation's integrated beef production program enabled studying actual costs and returns from marketing preconditioned, source and age verified calves. Potential preconditioning benefits consist of three components. One is marketing heavier calves after preconditioning than at weaning. Second is usually marketing calves at a higher seasonal price after preconditioning than at weaning. A third is oftentimes receiving a price premium from buyers for healthier and better performing preconditioned calves. Important also are the costs associated with preconditioning calves.

Data from Noble Foundation producers enabled estimating the price premium buyers paid for preconditioned calves. In addition, the research confirmed again that marketing calves in larger sale lots commands an added premium from buyers. Actual costs and estimated premiums enabled developing what the authors believe to be a more accurate budget which producers can use to determine how expected added costs and added returns affect net returns from preconditioning calves.

References

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Table 3. Partial Budget Comparison.

	<i>Noble Foundation</i>	<i>Oklahoma Quality Beef Network</i>	<i>Kansas State University</i>	<i>OSU Revised</i>
Traditional management				
Weaning weight (lbs)	560	500	550	550
Shrink (%)	8.5	4.0	4.0	6.0
Sale weight (lbs.)	512	480	528	517
Price (\$/cwt.)	118.97	95.00	94.07	110.00
Gross revenue (\$/head)	609.60	456.00	496.69	568.70
Preconditioning management revenue				
Weaning weight (lbs.)	560	500	550	550
Days from weaning to marketing	52	45	45	45
ADG (lbs./day)	1.4	1.5	1.3	1.4
Ranch (marketing) weight (lbs.)	633	568	610	613
Shrink (%)	2.5	2.0	2.5	2.5
Sale weight (lbs.)	617	556	595	598
Weaning day price from traditional management (\$/cwt.)	118.97	95.00	94.07	110.00
Price change from weaning to marketing (\$/cwt.)	2.00	1.00	2.41	4.00
Price slide for heavier weight (\$/cwt.)	-8.00	-6.00	-4.95	-6.00
Price discount for increased flesh (\$/cwt.)	-0.99	0.00	0.00	-1.00
Management premium (\$/cwt.)	4.28	3.50	4.50	4.25
Final price (\$/cwt.)	116.05	93.50	96.03	111.25
Gross revenue (\$/head)	716.01	520.00	571.00	664.91
Preconditioning management costs				
Interest rate (%)	7.0	8.0	6.5	7.0
Cattle interest (\$/head)	6.09	5.00	4.42	5.45
Health supplies and medicine (\$/head)	8.25	8.00	10.00	9.00
Death loss (%)	0.00	0.50	0.25	0.50
Death loss (\$/head)	0.00	2.60	1.43	3.32
Labor and equipment (\$/head)	2.00	6.00	6.75	8.00
Feed, hay, and pasture (\$/head)	33.00	35.00	35.00	35.00
Additional marketing costs (tags, commission, etc.) (\$/head)	22.50	5.00	3.00	5.00
Total cost (\$/head)	49.09	61.60	60.60	65.78
Traditional vs Preconditioning Summary (\$/head)				
Traditional gross revenue	609.60	456.00	496.69	568.70
Preconditioning gross revenue	716.01	520.00	571.00	664.91
Increased revenue	106.40	64.00	74.31	96.21
Less preconditioning costs	49.09	61.60	60.60	65.78
Net return from preconditioning management	57.31	2.40	13.71	30.44

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