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Market Valuation of Preconditioning Feeder Calves

R. Keith Avent, Clement E. Ward, and David L. Lalman

Preconditioning calf programs, while not new, are becoming more prevalent. They provide benefits to cow-calf producers while adding value for feeder cattle buyers. However, questions remain regarding the economic costs and returns of such programs. A model was estimated with data from three consecutive-day sales, to determine the value that buyers place on preconditioning programs and related feeder cattle traits. Our results indicate that price premiums, although evident, appear to be insufficient by themselves to cover the marginal costs of preconditioning.

Key Words: Animal health, feeder cattle, hedonic model, marketing, preconditioning, prices, value-added

JEL Classifications: Q13, Q12, Q11, C23

Preconditioning programs involve a series of management practices on the ranch to improve the health and nutrition of calves. Preconditioning adds value to calves for buyers, thereby also benefiting cow-calf producers. Preconditioning is not new but has received considerable attention in recent years, with interest in value-added programs for cow-calf producers, beef quality assurance programs, and strategic alliances in the beef industry.

There are several preconditioning programs with varying names and management requirements. Some follow strict certification requirements, and some are not strictly policed. Some were developed by university researchers, some by animal pharmaceutical companies, and some by breed associations or other cattle organizations. One common program, referred to as VAC-45, requires a 45-d postweaning phase with a proper nutritional program, specified animal health program, dehorning, castration of bull calves, and bunk feeding.[1] Its purpose is to reduce stress from shipping calves at weaning, improve calves' immune system, and boost performance during postweaning production phases (stocker production and cattle feeding) and carcass performance—that is, higher grading carcasses with fewer defects.

Common preconditioning programs cost cow-calf owners approximately $60/head, depending on the nutrition ration, health of calves, and length of the preconditioning program. This added cost is considerably more than that of selling calves at weaning. Therefore, an issue related to preconditioning is whether or not feeder-cattle buyers pay a sufficient premium for preconditioned calves to cover the marginal cost of preconditioning.

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[1] VAC is an abbreviation for value-added calf, and 45 refers to management practices that occur when calves are 4–5 mo. of age.

Limited evidence to date has suggested that buyers pay a price premium, but one that is insufficient to cover preconditioning costs. The purpose of the present article is to report the results of estimating the market valuation of preconditioning. Detailed transaction-level data from three consecutive-day feeder cattle sales, two preconditioned calf sales, and one public feeder cattle sale enabled us to estimate the premiums paid for preconditioning.[2]

Previous Research

Relevant prior research has included studies on price differentials for feeder-cattle traits, production differences for healthy and preconditioned calves, and research on market effects from preconditioning programs.

Feeder Cattle Price Differences

Considerable research has estimated the market value for various traits of feeder cattle (Buccola; Faminow and Gum; Lambert et al.; Marsh; Schroeder et al. 1988; Smith et al.; Troxel et al.; Turner, Dykes, and McKissick). Although these studies were conducted over a two-decade period under varying market conditions with different data, considerable consistency was found across the results. Preconditioning affects feeder-calf traits such as weight, condition, horns, sex, and health but does not directly affect other traits such as breed, frame size, and muscle thickness. Those traits that are affected by preconditioning are discussed.

Weight.—Research has consistently indicated that feeder cattle prices decline as feeder-cattle weight increases, although the magnitude differs with market conditions (Buccola; Faminow and Gum; Lambert et al.; Marsh; Schroeder et al. 1988; Smith et al.; Turner, Dykes, and McKissick). Preconditioning calves results in marketing heavier animals compared with calves markete at weaning. Thus, cow-calf producers can expect lower prices for preconditioned calves because of heavier weights *ceteris paribus*. Some of this lower expected price may be offset by the seasonal price component associated with preconditioning programs geared toward spring calving and fall weaning programs. Therefore, instead of selling calves at weaning—for example, in mid-October—calves would be marketed 30–45 d later and into the typical seasonal increase in feeder-calf prices (Peel and Meyer). Thus, preconditioning may enable cow-calf producers to capitalize on the normal seasonal price pattern for feeder calves.

Sex.—Previous research has consistently shown significant feeder-calf price differences among steers, heifers, and bulls (Faminow and Gum; Lambert et al.; Smith et al.; Troxel et al.; Turner, Dykes, and McKissick). Therefore, to the extent that cow-calf producers sell bull calves at weaning versus steers after preconditioning, they can expect higher prices for the castration requirement in preconditioning programs.

Horns.—Polled feeder calves normally receive a price premium, compared with horned calves and often compared with dehorned calves (Schroeder et al. 1988; Smith et al.; Troxel et al.). Therefore, to the extent that cow-calf producers market preconditioned dehorned calves versus marketing horned calves at weaning, they can expect higher prices from the dehorning requirement in preconditioning programs.

Condition.—The condition of feeder cattle can significantly affect feeder cattle prices, but the price effect varies by time of study and market conditions (Schroeder et al. 1988; Smith et al.; Troxel et al.). One argument is that thin cattle may be discounted, especially if there is evidence of thinness being related to poor health or muscling. However, if it is associated with poor nutrition, thin cattle may receive a price premium, because buyers expect compensatory gains after improving the nutritional level. Fleshy cattle are usually discounted—that is, a recognition by buyers that no compensatory gains are likely—but may be preferred as long as the degree of fleshiness is slight or moderate and is associated with

[2] The terms "feeder cattle" and "feeder calves" are used interchangeably, although specific reference to calves assumes younger animals, typically 5–7 mo. of age for the purposes of this article.

health or thriftiness of the animals. Because preconditioned calves typically have a higher degree of nutrition and may appear to be fleshy, they may be discounted. Alternatively, however, some buyers may associate the increased fleshiness with higher nutrition and health and then pay a price premium for preconditioned calves.

Health.—Of all feeder cattle characteristics, health-related attributes often have the most profound effect on price. Unhealthy traits generally translate into severe price discounts (Schroeder et al. 1988; Smith et al.; Troxel et al.). Preconditioned calves are expected to be healthier, less stressed, and have stronger immune systems than calves sold at weaning. Therefore, cow-calf producers should expect a price premium for preconditioned calves simply because of the improved health of the animals.

Lot Size and Uniformity.—Two other factors that commonly affect feeder-cattle prices are lot size and uniformity of calves in the sale lot. Stocker producers and cattle feedlots want truckload-sized lots for more efficient shipping and to fill preestablished pasture and pen sizes. Increasing the uniformity of sale lots through sorting and pooling often accompanies efforts to the increase sale lot size. Increased production and feeding efficiency result from uniform lots of cattle, so some sorting and pooling with the intent to create larger, more uniform sale lots is common. Research has found that buyers pay premiums both for larger and more uniform sale lots (Faminow and Gum; Schroeder et al. 1988; Smith et al.; Turner, Dykes, and McKissick; Yeboha and Lawrence). For preconditioning programs that include sorting and pooling as part of their protocol, cow-calf producers can expect a price premium for larger, more uniform sale lots of calves.

Health Effects on Feedlot and Carcass Performance and Feedlot Profits

There is increasing evidence of the importance health contributes to stocker, feedlot, and carcass performance and, thus, to profitability. Gardner et al. found significant feedlot and carcass performance benefits and lower medicine costs from preconditioning. Preconditioning reduced feedlot morbidity and mortality rates compared with non-preconditioned calves while increasing average daily gains, improving feed conversion, and decreasing costs and costs of gain (Cravey). One key finding from the Texas A&M Ranch to Rail program has been the effect that health has on the ability of cattle to express their genetic potential, in both feedlot and carcass performance (McNeill). Stovall et al. found that heifers treated once during the receiving phase for bovine respiratory disease had 6.8% fewer Choice grade carcasses compared with cattle that were never treated, whereas those treated more than once had 25.1% fewer Choice grade carcasses than cattle that were never treated.

Table 1. Perceived Performance Differences by Texas Cattle Feeders Association Feedlot Managers[a]

Performance Variable	Preconditioned Calves	Nonpreconditioned Calves
% Sick	9.2	36.4
% Death Loss	1.5	4.3
ADG (lbs/day)	2.9	2.6
Conversion (lbs/gain)	6.3	6.9
% Choice Carcasses	50.4	35.8
% Outs	2.5	6.9

[a] There were 17 responses.

Managers of Texas Cattle Feeders Association's (TCFA) member feedlots concur with this prior research. TCFA feedlot managers were asked to estimate performance differences between preconditioned and non-preconditioned calves (Avent). All comparisons between performance estimates for preconditioned versus non-preconditioned calves were statistically significantly different (Table 1). Managers' estimated advantages in several performance categories from preconditioning—reduced morbidity, reduced mortality, increased average daily gains, improved feed conversion, higher percentage of Choice grade carcasses, and fewer nonconforming or severely discounted carcasses, frequently referred to as "outs."

Several studies have investigated the fac-

tors that affect cattle feeding profitability (Langemeier, Schroeder, and Mintert; Lawrence, Wang, and Loy; McDonald and Schroeder; Schroeder et al. 1993). A few consistent factors include feeder and fed cattle prices, cattle performance, and carcass characteristics. Because preconditioning programs improve the health and thriftiness of calves, cow-calf producers can expect a price premium because of the improved health of preconditioned calves marketed.

Preconditioning Price Effects

Relatively few studies have estimated the price effects related to preconditioned calf programs. King annually estimated the price effects from specific preconditioning programs for calves marketed through Superior Livestock Auction for 1994–2001. Premiums have increased over time but differ by the degree of management practices required. For example, the highest annual average premium was $4.06/cwt. in 2001 for the most stringent management program (i.e., a VAC-45 protocol) and averaged $3.04/cwt. for the VAC-45 program over the 8-yr. period. Only a small premium was found for calves that had been vaccinated only.

There are several preconditioning programs and sponsoring organizations, some of which have arguably misled producers into expecting larger price premiums than have been experienced for their preconditioned calves. Some producers enrolling in these programs have experienced lower-than-expected price premiums, especially for the first few years, as the program develops a positive reputation (Stough; Turner, McKissick, and Dykes). Reputation building takes time. Buyers of feeder calves pay premiums for what they feel is the quality of the cattle, given the confidence they have that producers have treated the animals according to the specified program (Yeboha and Lawrence).

TCFA feed yard managers have indicated that preconditioned calves are worth $5.25/cwt. more on average than non-preconditioned calves. Note that their expressed difference was higher than the observed premiums reported by King. One reason for the difference may be reputation and integrity questions surrounding existing preconditioning programs. Cattle feeders might pay up to the expected performance difference if there was higher perceived assurance and confidence that cow-calf producers followed the preconditioning protocol, thus resulting in actual expected performance differences. Without that assurance, cattle feeders will bear a portion of the risk by bidding less than the "true" or estimated value difference.

Data and Models Estimated

The objective of the present study was to estimate the market price premium for preconditioned calves using a similar hedonic type model as that used frequently to estimate feeder cattle characteristics. The hedonic model specified assumes that the price of a given lot is dependent on attributes of the calves and sale lot characteristics (Chvosta, Rucker, and Watts).

Data were collected from two preconditioned calf sales and one regular feeder cattle sale on three consecutive days in December 2000 at the Joplin Regional Stockyards in Joplin, Missouri. Data were recorded by a trained evaluator on several feeder cattle traits, using methods from previous research (Schroeder et al. 1988; Smith et al.). Data for each of 1,249 sale lots consisted of sale type, number of head, sex, breed, presence of horns, frame score, muscle thickness, fill, condition, uniformity, health, weight, and price. Feeder cattle weights were confined to 300–699 lbs. Each observation is one sale lot. A summary of the data can be found in Table 2.

The model estimated was

$$(1)\quad P_{it} = \alpha + B_1 Head_{it} + B_2 Head_{it}^2 + B_3 AvgWt_{it} + B_4 AvgWt_{it}^2 + \sum_{j=1}^{3} B_{5j} Sale_{ijt} + \sum_{j=1}^{3} B_{6j} Sex_{ijt} + \sum_{j=1}^{9} B_{7j} Breed_{ijt} + \sum_{j=1}^{4} B_{8j} Horns_{ijt} + \sum_{j=1}^{3} B_{9j} Frame_{ijt}$$

Table 2. Selected Summary Statistics

Variable	Mean	Standard Deviation
Head	9.1	13.4
Weight	520	96.5
Price	94.36	12.26
	Minimum	Maximum
Head	1	158
Weight	300	699
Price	2.00	139.00
	Frequency	Percent
Sale Type		
Public	586	46.92
Precon 1	307	24.58
Precon 2	356	28.50
Sex		
Steer	675	54.04
Heifer	535	42.83
Bull	39	3.12
Breed		
White Face	67	5.36
Hereford	15	1.20
Angus	273	21.86
Black Exotic	48	3.84
Other Exotic	537	42.99
Brahman	121	9.69
Dairy	28	2.24
Longhorn	10	0.80
Mixed Breed	150	12.01
Horns		
Polled	1,182	94.64
Horns	57	4.56
Dehorned	5	0.40
Mixed Horns	5	0.40
Frame		
Large	763	61.09
Upper Medium	431	34.51
Lower Medium/Small	55	4.40
Muscle		
Heavy	964	77.18
Medium	253	20.26
Light	32	2.56
Fill		
Shrunk	118	9.45
Average Fill	858	68.69
Full	27	21.86
Condition		
Thin	121	9.69
Average	831	66.53
Fleshy	293	23.46
Fat	4	0.32
Uniformity		
Uniform	1,213	97.12
Nonuniform	36	2.88
Health		
Healthy	1,231	98.56
Unhealthy[a]	18	1.44

[a] Includes calves that were sick or lame and those with dead hair and mud, bad eyes, and lumps.

$$+ \sum_{j=1}^{3} B_{10j} Muscle_{ijt} + \sum_{j=1}^{3} B_{11j} Fill_{ijt}$$

$$+ \sum_{j=1}^{4} B_{12j} Cond + \sum_{j=1}^{2} B_{13j} Health_{ijt}$$

$$+ \sum_{j=1}^{2} B_{14j} Uniform_{it} + e_{it},$$

where $i = 1, \ldots, N$ denotes each sale lot transaction, and $t = 1, \ldots, T_i$ denotes the days on which the sale took place. A complete description of the variables can be found in Table 3. P is the feeder cattle price, *Head* is the number of head in the sale lot, *AvgWt* is the average weight of the lot, *Sale* is the sale type, *Sex* is the sex of the cattle, *Breed* is the dominant or identifiable breed of the cattle, *Horns* is the status of horns, *Frame* is the frame score, *Muscle* is muscle thickness, *Fill* is the gut fill, *Cond* is the degree of flesh, *Health* is the health condition, and *Uniform* is the uniformity of cattle in the sale lot. The variables chosen were common to those of similar models estimated in the previous research cited above. The model was estimated using the REG procedure in SAS (SAS Institute). One variable from each set of dummy variables (sale, sex, breed, horns, frame, muscle, fill, condition, health, and uniformity) was dropped, to properly estimate the model. The variables dropped will be de-

Table 3. Hedonic Model Variable Definitions and Expected Signs

Dependent Variable	Variable Definition	
P_{it}	ith transaction price ($/cwt) for a lot of calves in sale t	
Independent Variable	Variable Definition	Expected Sign
$Head_{it}$	Total number of head in a lot	+
$Head_{it}^2$	Quadratic term for number of head	−
$AvgWt_{it}$	Average weight of a lot of cattle	−
$AvgWt_{it}^2$	Quadratic term for average weight	+
$Sale_{ijt}$	Zero-one dummy variable for a sale type, j classes = Public, Precon 1, Precon 2; Base = Public	+
Sex_{ijt}	Zero-one dummy variable for sex of cattle, j classes = Steer, Bull, Heifer; Base = Steer	−
$Breed_{ijt}$	Zero-one dummy variable for breed of a lot of cattle, j classes = Hereford, Angus, Whiteface, Black Exotic, Other Exotic, Brahman, Dairy, Longhorn, Mixed Breed; Base = Angus	−
$Horns_{ijt}$	Zero-one dummy variable for the presence of horns in a lot of cattle, j classes = Polled, Horns, Dehorned, Mixed Horns; Base = Polled	−
$Frame_{ijt}$	Zero-one dummy variable for frame size of cattle, j classes = Large, Upper Medium, Lower Medium/Small; Base = Large	−
$Muscle_{ijt}$	Zero-one dummy variable for muscle thickness, j classes = Heavy, Medium, Light; Base = Heavy	−
$Fill_{ijt}$	Zero-one dummy variable for fill of cattle, j classes = Shrunk, Average Fill, Full; Base = Average	+/−
$Condition_{ijt}$	Zero-one dummy variable for condition of cattle; j classes = Thin, Average Condition, Fleshy, Fat; Base = Average Condition	+/−
$Health_{ijt}$	Zero-one dummy variable for health of cattle, j classes = Healthy, Unhealthy; Base = Healthy	−
$Uniform_{ijt}$	Zero-one dummy variable for uniformity of a lot, j classes = Uniform, Nonuniform; Base = Uniform	−

noted subsequently as the base variable for comparison.

The group of three dummy variables for sale type was used to determine the price difference between preconditioned and non-preconditioned calves. Two variables represented two different preconditioning programs. The first preconditioned calf sale (Precon1) was expected to generate higher premiums because of its having a single, stringent preconditioning protocol for the program. The second preconditioning calf sale (Precon2) offers several alternative protocols.

Results and Implications

The model, estimated for data from three consecutive-day sales, gave an adjusted R^2 of 0.720 (Table 4). The Breusch-Pagan test rejected the null hypothesis of homoskedasticity. Harvey's procedure was used to produce weights for the Feasible Generalized Least Squares estimates (Greene). Coefficients for most feeder cattle traits were consistent with those of previous research.

Price was significantly affected by the quadratic terms for the average weight of calves,

Table 4. Regression Estimates

Independent Variable	Parameter Estimate
Intercept	185.878*** (40.50)[a]
Lot Size	
Head	0.160*** (9.11)
Head^2	−0.0013*** (5.63)
Lot Weight	
Weight	−0.280*** (16.55)
Weight^2	0.00020*** (12.85)
Sale Type	
Public	Base
Precon 1	3.304*** (11.19)
Precon 2	1.940*** (6.22)
Lot Gender	
Steer	Base
Heifer	−6.970*** (29.47)
Bull	−4.494*** (4.86)
Breed	
Angus	Base
Hereford	−2.955** (2.06)
White Face	−0.684 (1.03)
Black Exotic	0.470 (0.69)
Other Exotic	−0.455 (1.50)
Brahman	−4.736*** (7.99)
Dairy	−7.242*** (3.99)
Longhorn	−8.016*** (3.55)
Mixed Breed	−1.776*** (4.69)
Horns	
Polled	Base
Horns	−1.221* (1.88)
Dehorned	1.374 (0.50)
Mixed Horns	−5.893* (1.95)
Frame	
Upper Medium	Base
Large	1.426*** (4.60)
Lower Medium/Small	−4.401*** (2.93)
Muscle	
Medium	Base
Light	−10.220*** (4.20)
Heavy	1.636*** (3.78)
Fill	
Average Fill	Base
Shrunk	−0.306 (0.57)
Full	−0.151 (0.52)
Condition	
Average Condition	Base
Thin	−0.524 (0.82)
Fleshy	−0.598** (2.10)
Fat	−4.640 (0.99)
Lot Uniformity	
Uniform	Base
Nonuniform	−0.872 (1.55)
Health	
Healthy	Base
Unhealthy	−23.680*** (3.68)
Adjusted R^2	0.720
RMSE	1.938
Observations	1,249

[a] Numbers in parentheses are absolute values of calculated *t*-statistics. Significance levels are *** = 0.01, ** = 0.05, and * = 0.10.

in accordance with expected results. Marketing heavier preconditioned calves means receiving a lower absolute price but marketing more pounds of calves.

Bull calves were discounted $4.49/cwt. relative to steers, indicating a benefit from preconditioning programs that require the castration of steer calves.

Horned and mixed lots of horned and dehorned calves were significantly discounted, $1.22 and $5.89/cwt., respectively, but dehorned calves were on a par with polled calves. Thus, there is an economic incentive to dehorn horned calves or to raise polled calves.

Buyers significantly discounted fleshy calves, but the amount was relatively small: $0.60/cwt. Unlike results found in some studies, we found that buyers did not pay a premium for thin calves. Because preconditioning programs attempt to ensure a high level of nutrition, there is a tradeoff when added weight is in the form of added fleshiness.

As expected, several types of unhealthy calves were collectively discounted severely compared with healthy calves. Sick, lame, and other categories of unhealthy calves were discounted $23.68/cwt., consistent with the results of previous research. Preconditioning enhances the health and thriftiness of calves and should reduce the probability of calves being severely discounted for health reasons.

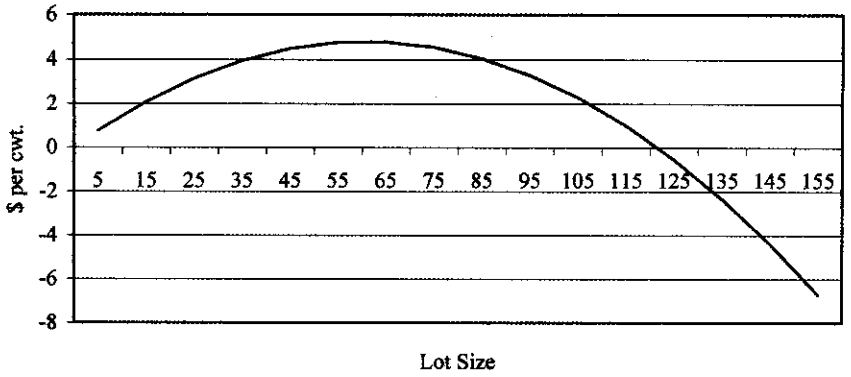

Figure 1. Effect of Lot Size on Price per cwt.

The quadratic lot size variable behaved as previous research suggested. Thus, as Figure 1 indicates, sorting and pooling calves in lots that approach truckload size increased the prices received. To the extent that preconditioning programs include sorting and pooling, there is a benefit from that component of the preconditioning program.

Uniform sale lots did not receive a premium relative to lots of nonuniform calves. This was somewhat surprising but may be related to attempting to account for uniformity when evaluating a sale lot after already accounting for feeder calf and sale lot characteristics that affect sale lot uniformity.

The primary focus of our study was the sale-type variable. The premium price for the preconditioning program with a single protocol (Precon 1), much like the VAC-45 program, was $3.30/cwt., compared with the regular weekly auction. The second program (Precon 2) generated a smaller premium, $1.94/cwt., compared with the regular weekly auction. The lower premium for the second program could be attributed to having several different vaccination and weaning guidelines. Both results are consistent with those of previous results by King: $3.04/cwt. average over 8 yr. for the VAC-45 management category to $0.86/cwt. for the vaccination-only category.

Table 5 is a partial budgeting comparison of preconditioning versus marketing calves at weaning. This was developed with a number of assumptions that were believed to typify Oklahoma cow-calf producers in 2002 (Avent). The base example column indicates that, with the price premium found in the present study, the premium alone is not sufficient to offset the marginal costs of preconditioning under the assumptions incorporated in this partial budget. Other columns indicate that, apart from the price premium, altering selected production assumptions can significantly affect the final outcome. Thus, under some production scenarios, the price premium found here enables cow-calf producers to profit from preconditioning, whereas, in other cases, it does not.

Summary and Conclusions

Preconditioning programs are not new, but interest in them has increased sharply during recent years. Preconditioned calves are healthier, with a stronger immune system, and so are more valuable to feeder cattle buyers than are non-preconditioned calves. The question is, how much more valuable?

Feedlot managers have indicated a significant perceived performance difference favoring preconditioned cattle. Significant benefits were expected for death loss percentage, the percentage of sick cattle, average daily gain, feed efficiency, and carcass traits—that is, the percentage grading Choice and the percentage of severely discounted carcasses. Those differences, in turn, increased the perceived value of preconditioned calves for feedlot managers by $5.25/cwt.

Market data were used to estimate the premium price paid by buyers for calves sold under two preconditioned programs. Data from

Table 5. Preconditioning Partial Budgeting Comparison

Traditional marketing alternative[a]	Base Example	Gain		Morbidity		Medical	
		Lower	Higher	Lower	Higher	Lower	Higher
Gross revenue ($/head)	456.00	456.00	456.00	456.00	456.00	456.00	456.00
Preconditioning revenue[b]							
ADG (lbs./day)	1.5	1.2	1.8	1.5	1.5	1.5	1.5
Ranch (marketing) weight (lbs.)	567.5	554	581	567.5	567.5	567.5	567.5
Sale weight (lbs.)	556.15	542.92	569.38	556.15	556.15	556.15	556.15
Gross revenue ($/head)	509.99	497.86	522.12	509.99	509.99	509.99	509.99
Preconditioning costs ($/head)							
Health supplies and medicine	8.00	8.00	8.00	8.00	8.00	4.00	12.00
Death loss	2.55	2.49	2.61	1.02	4.08	2.55	2.55
Total cost	60.92	60.86	60.98	59.39	62.45	56.92	64.92
Cost and returns comparison ($/head)							
Traditional gross revenue	456.00	456.00	456.00	456.00	456.00	456.00	456.00
Preconditioning gross revenue	509.99	497.86	522.12	509.99	509.99	509.99	509.99
Increased revenue	53.99	41.86	66.12	53.99	53.99	53.99	53.99
Less preconditioning costs	60.92	60.86	60.98	59.39	62.45	56.92	64.92
Net return from preconditioning	−6.93	−19.00	5.14	−5.40	−8.46	−2.93	−10.93

[a] Assumes 500 lb. marketing weight, 4% shrink, and a sale price of $95.00/cwt.

[b] Assumes 500 lb. weaning weight, 45-day preconditioning period, 2% shrink at marketing, a weaning day price of $95.00/cwt., $1/cwt. seasonal price increase, $7/cwt. price slide for heavier weight, $0.60/cwt. discount for fleshiness, $3.30/cwt. price premium for preconditioning, and a final sale price of $91.70/cwt.

[c] Assumes 7% interest rate, $6/head labor and equipment expense, $35/head feed, hay, and pasture expense, and $5/head additional marketing costs for eartags, commissions, etc.

three consecutive-day sales, two special sales and the regular public sale, were used to estimate the premium for preconditioned calves. The model found a price premium of $3.30/cwt. for one of the two preconditioning program and $1.94/cwt. for the other, both of which were compared with the regular weekly public sale. These premiums are consistent with previous research.

Preconditioning programs can be profitable or unprofitable for cow-calf producers. Results depend not just on the price premium that buyers have been found to pay for preconditioned calves. Several production factors contribute to either enhanced returns from preconditioning or costs exceeding the added revenue from selling added weight, marketing into a seasonally upward trending market, marketing steers rather than bulls, dehorned rather than horned calves, larger and more uniform lots, and healthier calves. Producers need to recognize that added weight means lower prices, *ceteris paribus,* and may increase fleshiness which was found in this study to be discounted.

It appears feedlot buyers pay what it takes to purchase preconditioned calves. That premium, from the present and previous research, appears to be less than the perceived, expected value of preconditioned calves as based on feedlot managers' experience. Therefore, for cow-calf producers to receive premium prices closer to the perceived added value for preconditioning programs, efforts must be put into building a positive reputation for integrity by sellers.

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