



EXTENSION

How likely are calf value-added management practices to pay off?

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Introduction

We revisit research from Williams et al. (2014) regarding the probability that value-added calf management practices are profitable. Despite research indicating price premiums from adopting health management practices, adoption rates remain low. McKinney (2009) reports that 12% of Oklahoma producers participate in formal value-added production and marketing practices such as age and source verification. Williams et al. (2013) report that 41% of Oklahoma producers are weaning calves, 35% are vaccinating calves, and 14% enroll their calves in a certified vac-45 program. To aid cow-calf producers when considering the adoption of value-added practices, we report the probability of positive returns from various combinations, i.e., bundles, of these practices using a propensity score matching estimation method (Rosenbaum and Rubin 1983).

Methods and Data

We assessed the value of a set of value-added practices, including weaning calves for at least 45 days, following an established vaccination protocol, castration, dehorning calves (or polled calves), and third-party verification of practices. A detailed description of the method used to assess the value of these practices is reported in Williams et al. (2014). For brevity, estimated dollars per head are calculated from Williams et al. (2014). Next, the impact of bundles of practices on the distribution of net returns is considered. The model from Williams et al. (2014) is reformulated to estimate the marginal impacts of simultaneously adopting two or more practices. The resulting parameter estimates and the associated standard errors for each value-added management practice/bundle represent the average price impact over all producers rather than for

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individual producers. These values are used to develop partial budgets for the various practice bundle alternatives.

Data were collected at 16 feeder cattle auctions from October through December 2010, eight of which include Oklahoma Quality Beef Network certified preconditioned cattle and two of which are comprised entirely of OQBN cattle (Williams et al. 2012). Information on price, lot size, management practices and phenotype was collected for each lot of cattle. Data on producer participation in management practices such as vaccinating, weaning, certification from a preconditioning program, and age and source verification were also collected. To account for cattle price variation over time, a basis is calculated as the difference between the sale price of each lot and the weekly average Oklahoma City price for a 750-pound steer (USDA-AMS 2010). Observations with a mean lot weight of less than 300 pounds or greater than 800 pounds, observations with missing data, and observations with recording errors were removed from the dataset. The final dataset consists of 2,762 observations, including 816 OQBN certified lots and 1,946 uncertified lots (Williams et al. 2014).

Two revenues are calculated: a baseline revenue and a management revenue. Baseline revenue is the revenue received by the non-adopters and is computed as price times the observed weight. The price used in calculating the baseline revenue is estimated as the weekly average price for a 529-pound steer in Oklahoma City (USDA-AMS, 2010) averaged over all sale dates in the dataset (\$113.95/cwt), plus the basis for that observation to adjust for the marketing date, plus an adjustment for the difference in weight between the adopter and non-adopter estimated by Williams et al. (2012). Weaned calves are assumed to gain 2 pounds per day between weaning and marketing.

In addition to the estimated revenues, the cost of implementing each value-added management practice or practice bundle is needed to create a series of partial budgets calculating the expected net return from implementation. The cost of weaning consists of labor, death loss, interest costs and feed costs. Because mortality rates peak in the first three weeks after weaning (Kelly and Janzen, 1986), a weaning death loss of \$1.80 per head was assumed (Dhuyvetter 2010). Also, following Dhuyvetter (2010), the model used feed costs of \$0.85 per day, labor costs of \$0.11 per day, and an interest rate of 7% over a 45-day

post-weaning period.

In addition to calculating individual costs for weaning, vaccinating and dehorning, the per head cost of bundles of practices were calculated including the cost of 1) weaning and vaccinating; 2) weaning, vaccinating and dehorning; and 3) a certified Vac-45 program consisting of weaning, vaccinating, dehorning, a 45-day preconditioning period and certification. The cost for weaning and vaccinating together includes cumulative costs for supplies and labor. The cost of rounding up and sorting calves is not included because calves must be corralled and sorted to be sold regardless of whether they are vaccinated. The combined cost for weaning, vaccinating and dehorning has cumulative supplies and medical cost of \$13/head from the vaccination and dehorning costs described above and a death loss of \$1.80/head reported by Dhuyvetter (2010). A labor cost of \$2.56/head includes the marginal cost of \$0.25/head for vaccinating described above plus \$0.11/head/day for post-weaning care.

Results

Table 1 displays partial budgets for each practice and bundles of practices. Both individually and in bundles, practices have positive point estimates of net return. Interestingly, some bundles have lower return than the individual practice net returns. The highest individual practice return is from weaning (\$37/head), and highest returning bundle is weaning, vaccinating, dehorning and enrolling in a certified Vac-45 program (\$68/head). Regardless, each individual practice and combination of practices shows positive returns.

Table 2 displays the estimated market price premiums from practices and bundles of practices. As is evident, all practices and combinations of practices are expected to earn price premiums at auction. Vaccination has the highest individual practice premium at \$6.79/cwt. The combination of weaned, vaccinated, dehorned and certified has the highest premium of all combinations considered at \$12.46/cwt.

Table 2 also reports the probability of positive net returns from individual practices and bundles of value-added practices. The probabilities of positive returns range from 57% for dehorning to 79% for the combination of weaning, vaccinating, dehorning and certifying. Each practice and bundle of practices has a better than even chance of earning a positive return.

Conclusions

The results in this research have important implications for cow-calf producers and Extension educators. Results suggest that producers who at least wean, vaccinate and dehorn their cattle will see positive economic returns around 68% of the time. The expected net return and the probability of positive net returns increases with the number of value-added practices adopted. By simply weaning and vaccinating their calves, producers realize an expected net return of \$27/head. They could gain an additional \$31/head over weaning and vaccinating by participating in a certified preconditioning program. Producers who currently implement none of these practices will receive an expected net return of \$23-\$68 per head by choosing to wean, vaccinate and dehorn their calves or participate in a Vac-45 preconditioning program. For a small producer selling 25 head, that translates into an extra \$1,700 in net returns by weaning, vaccinating and dehorning their calves as part of a certified vac-program.

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Table 1. Partial Budget for Value-Added Management Practices for Calves with a Sale Weight of 529 Pounds and Estimated Premiums

	Wean ^b	Vaccinate	Dehorn	Wean, Vaccinate ^a	Wean, Vac, Dehorn ^a	Wean, Vac, Dehorn, Certify ^b
Baseline Returns to Cow-Calf Expenses						
Weaning Weight (lbs)	487	529	529	487	487	439
Price (\$/cwt)	\$116.89	\$113.98	\$113.98	\$116.89	\$116.89	\$120.60
Revenue (\$/head)	\$569.27	\$602.97	\$602.97	\$569.27	\$569.27	\$529.42
Revenue with Value-Added Practice(s)						
Sale Weight (lbs)	529	529	529	529	529	529
Baseline Sale Price (\$/cwt)	\$113.98	\$113.98	\$113.98	\$113.98	\$113.98	\$113.98
Added Premium (\$/cwt)	\$5.23	\$6.79	\$5.26	\$4.86	\$8.78	\$12.46
Sale Price (\$/cwt)	\$119.21	\$120.77	\$119.24	\$118.84	\$122.76	\$126.44
Revenue (\$/head)	\$630.64	\$638.89	\$630.79	\$628.68	\$649.42	\$668.88
Value-added Expenses						
Labor (\$/head)	\$2.31	\$0.25		\$2.56	\$2.56	\$5.00
Death Loss (\$/head)	\$1.80			\$1.80	\$1.80	\$1.80
Supplies and Medical (\$/head)		\$8.00	\$5.00	\$8.00	\$13.00	\$18.00
Interest (\$/head)	\$2.34			\$2.35	\$2.36	\$4.85
Feed (\$/head)	\$17.89			\$17.89	\$17.89	\$38.34
Certification Costs (\$/head)						\$3.00
Total Costs (\$/head)	\$24.34	\$8.25	\$5.00	\$32.61	\$37.62	\$70.99
Returns to Cow-Calf Expenses with Value-Added Practice(s)	\$606.30	\$630.64	\$625.79	\$596.07	\$611.80	\$597.89
Net Returns from Value-Added Practice(s) (\$/head)	\$37.02	\$27.67	\$22.83	\$26.80	\$42.53	\$68.47

^a Assumes a 21-day weaning period and a weight gain of 2lbs/day.

^b Assumes a 45-day weaning period and a weight gain of 2lbs/day.

Table 2. Average price effect of management practices and bundles of practices and probabilities of positive net returns

Practice Adopted	Average Price Effect (\$/cwt)	Net Return (\$/head)	Probability of Positive Net Return
Weaned	\$5.23	\$31.14	0.622
Vaccinated	\$6.79	\$23.59	0.595
Dehorned	\$5.26	\$16.86	0.566
Weaned and vaccinated	\$4.86	\$28.44	0.596
Weaned, vaccinated, and dehorned	\$8.78	\$49.18	0.682
Weaned, vaccinated, dehorned, and certified	\$12.46	\$58.73	0.787

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