

**AGRI-PRACTICE —
IMMUNOLOGY/PRACTICE MANAGEMENT**

The United States Department of Agriculture (USDA) in cooperation with state Cooperative Extension Services (CES) conducted a management survey of beef cattle vaccination practices in the southeastern United States. Producers from seven states indicated that they vaccinated calves against the following diseases: blackleg — 87.6%, pasteurellosis — 27.6%, leptospirosis — 42%, hemophilus infection — 10.3%, Bovine Viral Diarrhea (BVD) — 18.6%, Infectious Bovine Rhinotracheitis (IBR) — 15.5%, Parainfluenza (PI-3) — 14.6%. The percentage of older (age) producers vaccinating calves was less compared to the percentage of younger producers. A higher percentage of producers with large herds vaccinated their calves than those with smaller herds. Live Pasteurella vaccine was used by 12.5% of the producers. Almost 67% of the producers indicated that they rarely if ever use the services of a veterinarian. Comparative results are presented in tabular and graphic format.

SURVEY RESULTS

Feeder Calf Vaccination Management in Seven Southeastern States

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Introduction

The monetary loss to the United States beef cattle industry due to Bovine Respiratory Disease (BRD) is estimated at between 75 and 750 million dollars per year.^{1,4} *Pasteurella hemolytica* serotype 1 is considered to be one of the most important bacteria involved in BRD deaths and chronic pneumonias in the feedyards.⁵ It is believed that much of the loss could be eliminated by changing current management practices in-

volving vaccinations, weaning, nutrition and marketing.⁶⁻¹⁰ Little is known, however, about management practices on the farm and in the market system which affect calf morbidity and mortality in the feedyards, data which are of paramount importance in determining necessary management changes and establishing research priorities.¹¹

The beef cattle feeding industry is highly complex and involves cow-calf producers, auction markets,

order buyers and the feedyards as well as other industry components. Few correlations have been established between specific practices within the industry and the incidence of BRD. Many practices are not easily studied because only approximately 20% of the calves entering the feedyards can be traced back to their origin.²

This report is a summary of survey data collected in 1985 from cow-calf producers in the southeastern

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United States on vaccination and related management practices. Data were collected on the use of the following vaccines:

- *Clostridium chauvoei* (blackleg),
- *Pasteurella* sp. — both live and killed vaccine — (pneumonia),
- *Leptospira* sp. (leptospirosis),
- *Bacillus anthracis* (anthrax),
- *Hemophilus somnus* (hemophilus infection),
- Bovine Viral Diarrhea (BVD),
- Infectious Bovine Rhinotracheitis (IBR) and
- Parainfluenza (PI-3).

Materials and Methods

Seven states in the southeastern United States (Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina and South Carolina) were surveyed in 1984 and 1985 with the assistance of veterinarians, Cooperative Extension Service (CES) personnel and beef industry representatives. The survey instrument was an eight-page mailed questionnaire developed specifically for producers. In each state except Louisiana, the CES coordinators selected the counties to be surveyed, based on their assessment of which counties had the most producers. In Louisiana, where the CES did not wish to participate in the study, the counties were selected by the Executive Secretary of the Cattlemen's Association. CES coordinators were also responsible for publicity. The USDA, Agricultural Research Service (ARS), Bovine Respiratory Disease Unit, Bushland, Texas, mailed the questionnaire with an introductory letter, co-signed by ARS and CES personnel, explaining the purpose of the survey.

In each state, 250 or more questionnaires were mailed to selected producers, except in Mississippi where only 233 were mailed. The number of counties varied from two in Alabama and Mississippi to 47 in Arkansas. The response varied from 15% in Louisiana to 39% in Arkansas. There was no follow-up, either

TABLE 1
Farm Feeder Calf Survey

State	Number of Counties	Number of Questionnaires Mailed	Number of Questionnaires Returned	% of Answered Questionnaires Returned
Alabama	2	276	93	34
Mississippi	2	233	49	21
Georgia	4	317	80	25
South Carolina	6	357	132	37
Louisiana	4	425	62	15
Arkansas	47	334	131	39
North Carolina	6	578	141	24
Total	71	2,520	688	27*

* Average percentage of forms returned for seven states

by mail or direct contact by CES agents, due to the costs.

It is recognized that the results of the survey may be biased since they include only those producers willing to cooperate. Response is a function of both those selected to be in the sample and publicity. Therefore, differences in response percentages may reflect emphasis in the different states.

Chi-square tests were used to compare responses concerning use of vaccines by state, herd size, and age of respondents. A significance level of $P < 0.05$ was used. Comparisons between the states may be

confounded with differences in sampling by states. The other comparisons should not be confounded with these sampling differences.

Results

The number of counties surveyed, number of forms sent, and number and percentage of forms returned in each state are presented in Table 1. The size of farm managed by respondents ranged from 40 to ≥ 640 acres; 31% of the respondents managed farms of 40 to 159 acres. The respondents raise a total of 43,983 beef calves annually. The mean number of calves raised per respon-

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TABLE 2
Calf and Cow Vaccination Practices in Seven Southeastern States

Vaccine	Number (%) of Respondents That Vaccinate	
	Calf	Cow
Blackleg	603 (87.6)	250 (36.3)
Pasteurellosis	190 (27.6)	75 (10.9)
Pasteurella — live vaccine	86 (12.5)	42 (6.1)
Leptospirosis	289 (42.0)	256 (37.2)
Anthrax	55 (7.9)	40 (5.8)
Hemophilus infection	71 (10.3)	44 (6.4)
Bovine Viral Diarrhea (BVD) — IM	128 (18.6)	81 (11.7)
Infectious Bovine Rhinotracheitis (IBR) — IM	107 (15.5)	72 (10.4)
Parainfluenza (PI-3) — IM	101 (14.6)	59 (8.5)

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dent was 68; the mean number of cows maintained was 74. The ages of those responding ranged from 18 to over 61 years old; 35% were 46 to 60 years old.

Forty-seven percent (47%) of the 688 respondents vaccinate adult cattle annually. The calf and cow vaccination practices of producers are presented in Table 2. Blackleg vaccine was the most frequently used product; 87.6% of producers vaccinated calves against this disease. The use of common vaccines is compared between states in Figures 1 (bacterial) and 2 (viral). The greatest variation in vaccination between states occurred with *Leptospira* vaccines. The lowest use of this vaccine was in Georgia and North Carolina, and the highest use was in Arkansas, Louisiana and Mississippi. Vaccination practices by size of herd are compared in Figures 3 (bacterial) and 4 (viral) and by age of producers in Figures 5 (bacterial) and 6 (viral). Producers with larger herds vaccinated more calves with virtually all vaccines than those with smaller herds except for the youngest producer group (18 to 23 years). Significant differences by age of respondents were found in calf vaccination practices with bacterial and viral vaccines (Figs. 5 & 6). Two exceptions were vaccination against blackleg ($P < 0.058$) and anthrax ($P < 0.229$) (Fig. 5). Significant differences by state were found in calf vaccination practices with bacterial and viral vaccines (Figs. 1 & 2). One exception was the use of live *Pasteurella* vaccine ($P < 0.194$) (Fig. 1). Significant differences by herd size were found in calf vaccination practices with blackleg ($P < 0.001$), leptospirosis ($P < 0.001$), *Hemophilus* infection ($P < 0.003$) and BVD ($P < 0.048$) vaccines (Figs. 3 & 4).

Respondents indicated that professional veterinary services were used as follows: frequently (33.3%), rarely (60.3%), never (6.4%) and no response to the question (3.1%). The producers obtained their vaccines

from the following outlets: retail (32.1%), veterinarian (20.3%), wholesale distributor (15.4%) and various combinations of the above alternatives (22.9%).

Discussion

The type and efficacy of vaccines used in farm feeder calves should have an effect on the frequency of BRD and other diseases in calves which eventually reach distant feed-

yards. Approximately 40% of beef calves raised in the southeastern United States are fattened in feedyards in Texas, Oklahoma, Kansas, Colorado and New Mexico.¹² The information reported here establishes the types and frequency of vaccines used by the survey respondents and probably is indicative of the pattern throughout the southeastern United States.

The highest rate of response to

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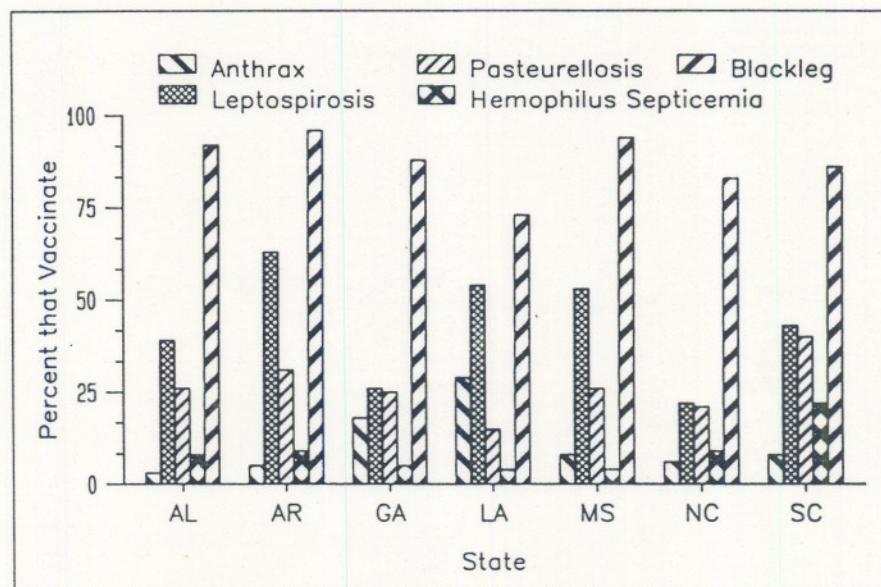


Fig. 1 — Calf vaccination by state — bacterial diseases.

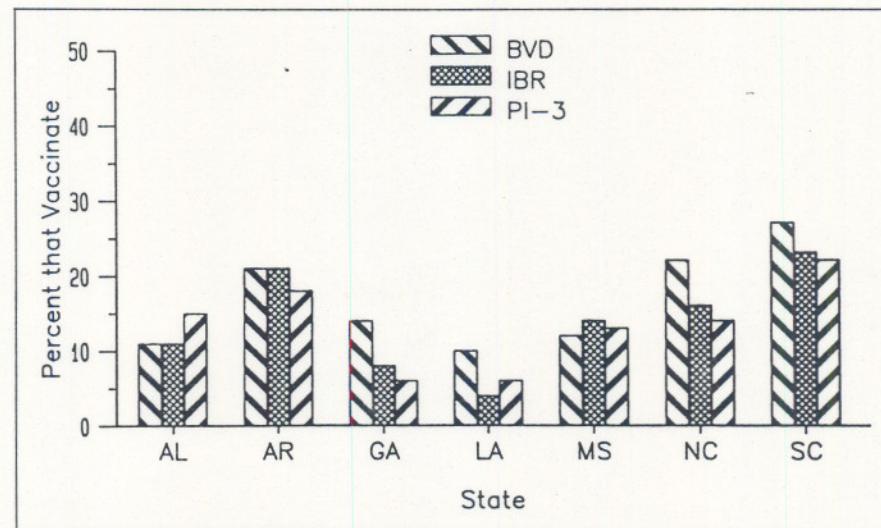


Fig. 2 — Calf vaccination by state — viral diseases.

the survey was in those states where more news announcements were made concerning the survey and its purpose.

The three most commonly used bacterins in adult cows were *Leptospira*, 37.2%; *Clostridium*, 36.3%; and *Pasteurella*, 10.9%. In calves, the frequency of the use of these bacterins was *Leptospira*, 42%;

Clostridium, 87.6%; and *Pasteurella*, 27.6%. The frequency of use of viral vaccines in cows was BVD, 11.7%; IBR, 10.4%; and PI-3, 8.5%. The frequency of use of these same viral vaccines in calves was BVD, 18.6%; IBR 15.5%; and PI-3, 14.6%. The respondents who managed larger calf herds (more than 200 calves) reported vaccinating more often with bac-

terial and viral vaccines except BVD, *Pasteurella*, and *B.anthraxis*. The amount of live *Pasteurella* vaccine used in cows (6.1%) and calves (12.5%) indicates that producers are becoming aware of this relatively new product. The use of *Pasteurella* bacterin compared to live *Pasteurella* vaccine was quite consistent in the different states. Based on the number of significant differences, the amount of vaccination was influenced more by the age of the respondents than by state or herd size. Producers in Louisiana appeared to vaccinate least for IBR compared to respondents in the other six states. The respondents of Arkansas, Louisiana and Mississippi appeared to vaccinate more against leptospirosis than those in the other southeastern states surveyed.

The high prevalence of vaccination for blackleg was unexpected in view of the large number of bull calves sold through the auction market system since it had been erroneously inferred that the large number of bull calves marketed was an indication that the calves had not been vaccinated or processed on the farms. However, the results of this study indicate that calves are being vaccinated against blackleg disease. This is important since calves could also be vaccinated against pasteurellosis at the same time they are vaccinated against blackleg disease.

BRD has been a very significant feeder calf disease in the past, and it remains so today. The problem does not usually manifest itself on the farm; the disease is contracted while the calves are in the marketing system, and morbidity and mortality are seen in the feedyards. *Pasteurella hemolytica* is the most important bacterial organism associated with feedyard calf mortality and chronic pneumonic disease. Numerous *Pasteurella* vaccines have been marketed in the past, and a number of these vaccines are marketed today. However, the disease has not been diminished. Therefore, the use, timing

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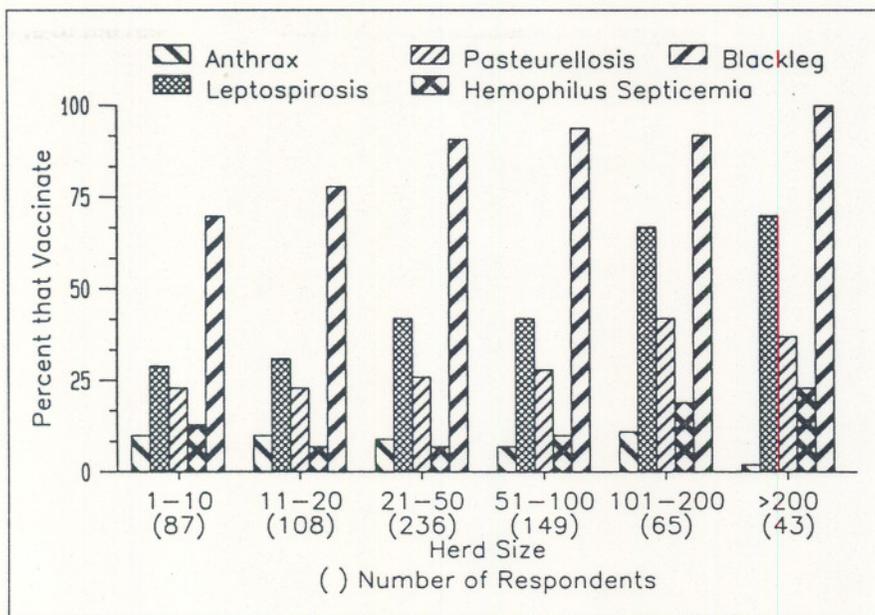


Fig. 3 — Calf vaccination by herd size — bacterial disease.

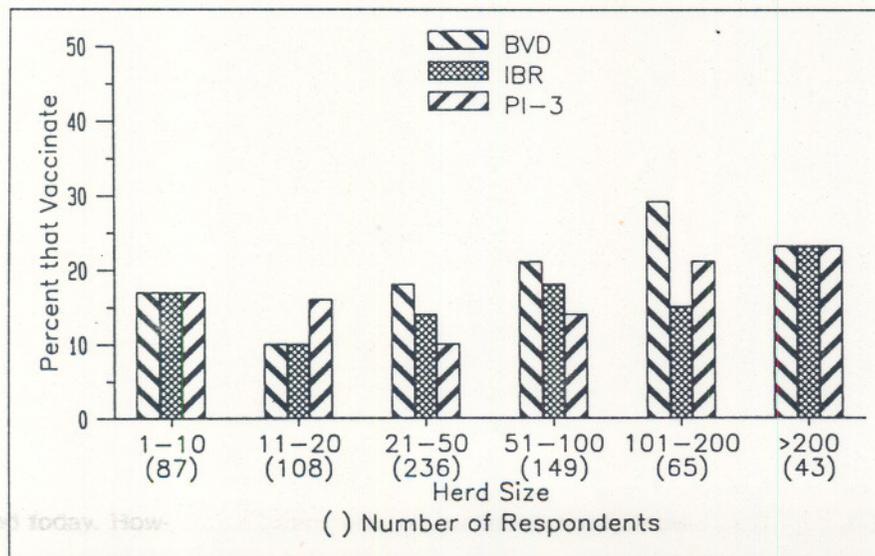


Fig. 4 — Calf vaccination by herd size — viral diseases.

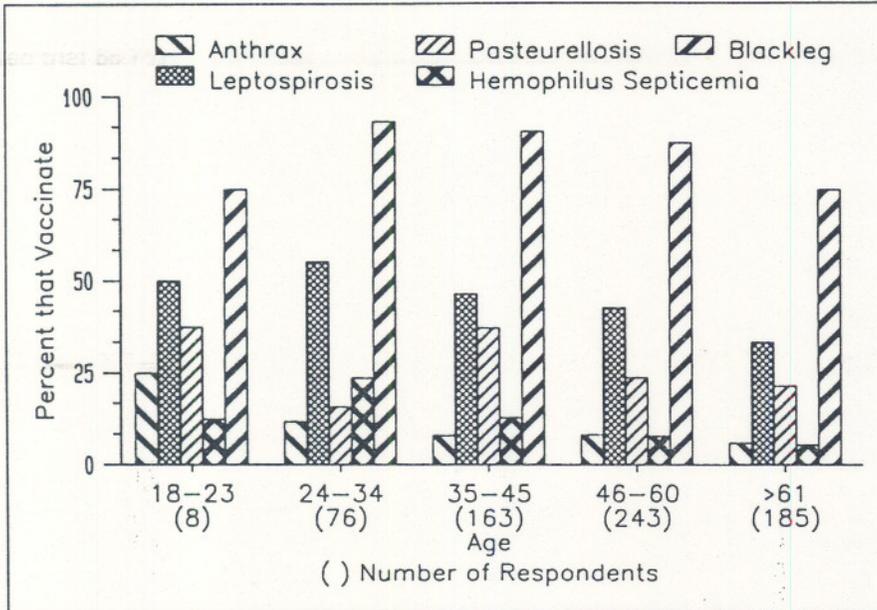


Fig. 5 — Calf vaccination by age of producer — bacterial diseases.

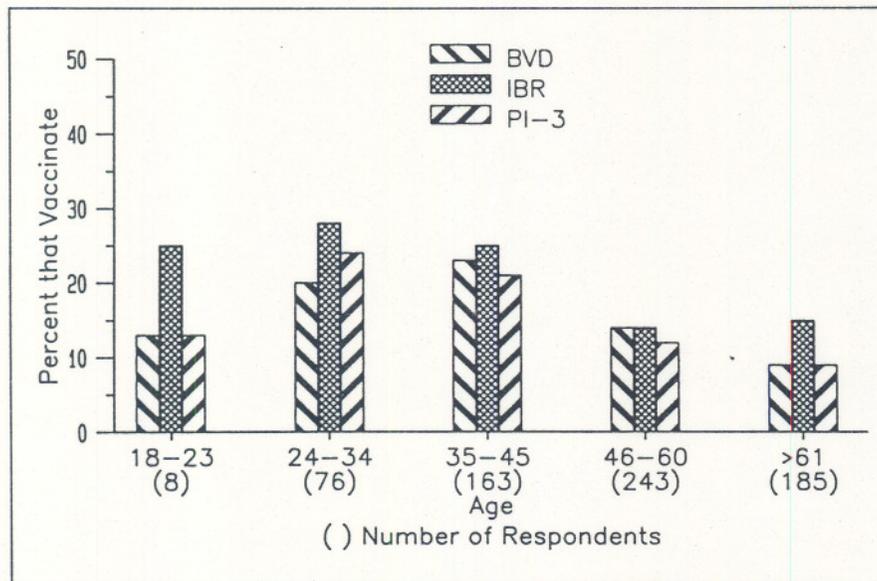


Fig. 6 — Calf vaccination by age of producer — viral diseases.

and efficacy of these vaccines must be questioned. It is doubtful that 27.6% of the producers in the southeastern states who use *Pasteurella* vaccine would discernibly affect the number of BRD cases observed in the feedyards. Presently, there is little incentive for cow-calf producers to vaccinate against *P. he-*

molytica. One solution would be the certification of calves vaccinated against pasteurellosis, expecting that higher market prices would remunerate cattlemen for the cost of the vaccination. The value of this system depends on the availability of a *Pasteurella* vaccine of proven efficacy.

The survey of southeastern cow-calf producers indicated that 66.7% rarely or never use the services of a veterinarian and only 20.3% buy vaccine from veterinarians. This indicates a serious deficiency in the delivery of veterinary services to the beef cattle industry. Undoubtedly, economics play an important role in this, but perhaps part of the problem is related to how the profession packages and markets services to the producer. AP

REFERENCES

1. Abinanti FR: Future Requirements for Prevention and Control of Bovine Respiratory Disease in the United States. *J Am Vet Med Assoc* 152:934-937, 1968.
2. Herrick JB: Preconditioning, Its National Status. *J Am Vet Med Assoc* 154:1163-1165, 1969.
3. Jensen RUE: Scope of the Problem of Bovine Respiratory Disease in Beef Cattle. *J Am Vet Med Assoc* 152:720-723, 1968.
4. Judy JW: Influence of Management Practices on Needs for Biologicals. *J Am Vet Med Assoc* 163:828-830, 1973.
5. Markham RJF, Wilkie BN: Interaction Between *Pasteurella hemolytica* and Bovine Alveolar Macrophages: Cytotoxic Effect on Macrophages and Impaired Phagocytosis. *Am J Vet Res* 41:18-22, 1980.
6. MacLean G: Comments on Feedlot Operations. *J Am Vet Med Assoc* 152:724-725, 1968.
7. Herrick FB: Comments on Preconditioning Management Practices, and Biologicals. *J Am Vet Med Assoc* 163:830-831, 1973.
8. Hoerlein AB: Preconditioning of Beef Cattle. *J Am Vet Med Assoc* 163:825-827, 1973.
9. Pate FM, Crockett JR: Value of Preconditioning Beef Calves. In: *Agricultural Experimentation Stations, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, Bulletin 799*, pp 1-14, Nov 1978.
10. Recommendation for Control of Bovine Respiratory Disease in the Beef Cow-Calf Herd. Published by National Cattlemen's Association (NCA) and American Association of Bovine Practitioners (AABP), August 1980.
11. Report of the Panel for the Symposium on Immunity to the Bovine Respiratory Disease Complex. *J Am Vet Med Assoc* 152:713-719, 1968.
12. Uvacek EJ: The Economics of the Cattle Industry. In: *A Symposium: Bovine Respiratory Disease*, ed by RW Loan. College Station, Texas A&M University Press, pp 7-15, 1984.

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