

THE ECONOMIC IMPACT OF ADULT VACCINATION
UPON FLORIDA DAIRY HERDS

by Paul Nicoletti DVM MS
Epidemiologist, U.S.D.A.
Gainesville, Florida

The dairy and beef cattle industries in Florida have special problems with brucellosis. The herd infection rate is the highest in the nation (approx. 40/1000). Over 25% of the dairies are infected and these contain about 50% of the cows (100,000). On the average, less than 20% of the cows are vaccinated as calves which has resulted in highly susceptible populations. Large numbers of replacement cattle are imported which are mostly unvaccinated and sometimes incubating the disease. The variable incubation period of brucellosis and cows which may calve prematurely or normally and react positively to blood tests later cause infections which are very difficult to prevent. Regulations, which will become effective in mid-1979, to require imported cattle to be calf vaccinates may do little to prevent introductions of new infections. Fraudulent tattoos may become common. It is my opinion that herd vaccination and vaccination of replacements upon arrival are the only practical methods to prevent serious outbreaks.

History of the Adult Vaccination Program

In 1973, many concerned dairymen and animal health officials petitioned for herd vaccinations to reduce the growing difficulties of the test and slaughter methods. This petition was denied by the Brucellosis Committee of the U.S. Animal Health Association (USAHA). In late 1974, this group requested USDA to conduct special studies in Florida. These began in May 1975. Five experimental herds were eventually included in the studies. Different doses and methods of administration of Strain 19 were evaluated by extensive serologic (blood test) and bacteriologic studies. In late 1976 the results were presented to the USAHA and adult cattle vaccination (AV) was adopted as part of the national program, with certain restrictions.

The AV program began approximately 1 year ago in Florida and certain appraisals can now be made:

Profile of 17 Dairy Herds

<u>Prevaccination</u>		<u>Postvaccination</u> (4-5 months)	
Number of Cows	13,429		13,836
Ave. Cows per Herd	790		813
Card test reactors		Card Test Pos.	1,778 (12.8%)
Previous Year Total	2,447	Probably Infected	671 (4.8%)
Average per Month	204	False Positive	1,107 (8.0%)
At Vaccination	593 (4.4%)		
		Rivanol Test Pos.	968 (7.0%)
		Probably Infected	671 (4.8%)
		False Positive	297 (2.2%)
		Complement-Fixation	
		Test Positive	671 (4.8%)

In these 17 herds, the rivanol test positives were reduced from 968 to 349 (2.5%) on the second herd retest. The number of probable infected cows (complement-fixation test positive) reduced from 671 to 217 (1.6%) or more than 63% from the initial test. Extensive bacteriologic studies have shown that the CF test is superior to others in a correct diagnosis.

In Florida there are 89 dairy and 45 beef herds which have been adult vaccinated. Data can be presented on 51 dairy herds which have had 1 or more retests during the past calendar year. The 51 herds contain 34,625 cows (679 ave/herd) and had 1529 reactors (4.4%) on the tests at time of vaccination. On the first postvaccinal test there were 1399 CF test positive cattle. These mostly represent cows which were incubating the disease when inoculated. Not all 51 herds have been retested the second time but the percentage of CF test positive cows has been reduced as in the 17 herds previously mentioned.

Economic Studies

In the early part of the experimental studies we began an economics study in 4 herds in cooperation with the Department of Agricultural Economics. A graduate student, Walter Prevatt, compiled data under the guidance of Prof. Ed Finlayson. The results were published in Hoards Dairyman in the February 25, 1978 issue. The evaluations included the effects of vaccinal methods (milk production and feed consumption), reduction of disease (comparisons of reactors sold prior to and after vaccination - including salvage and replacement values considering depreciation based upon 3 lactations), cost of labor to owners and governments, effects of abortions, equipment depreciation, indemnities, losses of milk production due to testing and costs of laboratory personnel.

In the 4 herds, the prevaccination costs averaged \$40,000/year/herd. During the first year after vaccination, these were reduced to \$16,000 or a 50% reduction. During the second year, these costs were further reduced to an estimated \$8000 or 80% reduction of prevaccination costs. Complete studies were not performed in the 5th experimental herd due to the methods of vaccination and other herd studies. It seems quite sure that without vaccination, none of these herds could have survived test and slaughter methods.

Calculations of some Economic Effects of Adult Vaccination

1. In 51 dairy herds:

Estimated reactors 1 year prior to vaccination	6240
Reactors removed during past year	<u>1745</u>
Estimated reduction in number of cattle sold	4495 (72%)

Values of \$100 indemnities and \$300 difference in replacement and salvage values:

4495 x \$400 x 1 year \$1,798,000

2. In 4 experimental herds:

Prevaccination costs of \$40,000/year x 4 herds x 2 years	\$320,000
Reduction first year = \$24,000 x 4 herds	96,000
Reduction second year = \$32,000 x 4 herds	<u>128,000</u>
Estimated Savings	\$224,000

3. In 1 Large Experimental Herd:	
Prevaccination reactor percentage (25%) = 1800 x \$400	
2 years	1,440,000
Reductions - First year, est. 5% = 360 x \$400 =	144,000
- Second year, est. 2% = 144 x \$500 =	<u>57,600</u>
	\$201,600
Savings estimated for 2 years	\$1,238,400
Total estimated savings	\$3,260,400

These figures do not include savings in labor costs (fewer tests) to owners and governments in the 51 herds or in 1 large experimental herd. They also do not include inestimable cost of certain bankruptcy of several dairies if adult vaccination had not been introduced.

Summary

Florida dairies will continue to become infected with brucellosis as long as other states have the disease. The impact can be minimized by keeping the herd resistance high by adult vaccination. The adult vaccination program has resulted in dramatic reductions in the economic impact of brucellosis and the brucellosis program in many dairy herds in Florida. It is certain that it has prevented the bankruptcy of several owners.

The reduced Strain 19 dosage combined with proper diagnostic tests and interpretations offer a practical program for the control of brucellosis in large susceptible cattle populations.