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
(about 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 popula-
tions. 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 dif-
ficult 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. Fradulent 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 peti-
tioned 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

<table>
<thead>
<tr>
<th>Prevaccination</th>
<th>Postvaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(4-5 months)</td>
</tr>
<tr>
<td>Number of Cows</td>
<td>13,429</td>
</tr>
<tr>
<td>Ave. Cows per Herd</td>
<td>790</td>
</tr>
<tr>
<td></td>
<td>13,836</td>
</tr>
<tr>
<td></td>
<td>813</td>
</tr>
<tr>
<td>Card test reactors</td>
<td></td>
</tr>
<tr>
<td>Previous Year Total</td>
<td>2,447</td>
</tr>
<tr>
<td>Average per Month</td>
<td>204</td>
</tr>
<tr>
<td>At Vaccination</td>
<td>593 (4.4%)</td>
</tr>
<tr>
<td>Card Test Pos.</td>
<td>1,778 (12.8%)</td>
</tr>
<tr>
<td>Probably Infected</td>
<td>671 (4.8%)</td>
</tr>
<tr>
<td>False Positive</td>
<td>1,107 (8.0%)</td>
</tr>
<tr>
<td>Rivanol Test Pos.</td>
<td>968 (7.0%)</td>
</tr>
<tr>
<td>Probably Infected</td>
<td>671 (4.8%)</td>
</tr>
<tr>
<td>False Positive</td>
<td>297 (2.2%)</td>
</tr>
<tr>
<td>Complement-Fixation</td>
<td></td>
</tr>
<tr>
<td>Test Positive</td>
<td>671 (4.8%)</td>
</tr>
</tbody>
</table>
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 1745
   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 128,000
   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 = 57,600

   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 brucel-
losis in large susceptible cattle populations.