were entered at the mean value for sample observations with ScVS. The new calculated values were days open 102.49, CMT 1.54, and milk 47.72. Despite improvements of plausible magnitudes in days open and CMT, and greater expenditures on veterinary services, milk output was calculated to be lower under ScVS. If confidence interval estimates were calculated for projected milk, they undoubtedly would overlap, and that would bring into doubt the decline in milk in the point estimates, but less technical qualifications are at least as important.

A change to ScVS is likely to be undertaken as much for the changes it produces in the qualities of other inputs and in the opportunities to use them effectively as for the more direct benefits represented in the calculations above. Probably the most important such change is an improvement in management of the dairy. Under ScVS a veterinarian can much more fully exploit the role of educator and consultant to management. The difference between the average management scores for EVS dairies and ScVs dairies was 174.84 (Table 2). If only half of this difference is attributed to the change in veterinary services and that addition is entered into the equations, milk output returns to 49.30. Realistically the improvement in management may be greater and other inputs, like feed would be adjusted as well. When these, less easily measureable, effects of a change in services can be included, the case for ScVS services is likely to be much stronger than the first calculations would indicate.

In this study the emphasis was given to precise, valid data on a few dairies in order to isolate the relatively small and certainly complex influence of veterinary services. This sample selection may have been responsible for each policy of veterinary services having similar effects on days open. On one hand, it was believed that by concentrating on a small sample of high quality data that more credible although less generalizable results could be obtained. On the other hand, the sample may have been biased because it was predominately drawn from one practice. Thus, this sample may not have represented various practice policies in the area as there would be less policy variation within the same practice as opposed to sampling many practices. Also, the sample may not have represented the full spectrum of managers as most in this sample were accustomed to veterinary services which may have caused policy differences to be subtle. For instance, a future sample may want to include both DHIA and non-DHIA dairies or dairies receiving services less frequently than once a month. Another factor is that practice methods are in transition and it may be difficult to code and thus the policy categories used may have been somewhat artificial.

**The next step in research is to replicate the study on a larger, more diverse and more representative sample of dairies with the quality of the data assured by prospective study design and data collection.**

TABLE 2 Means and Standard Deviations of Variables Used by Veterinary Expenditure Classifications.

| | Overall | Emergency | Scheduled |
|---|---|---|---|
| | Mean (St. Dev.) | Mean (St. Dev.) | Mean (St. Dev.) |
| Days Open | 111.13 (10.3) | 106.33 (10.5) | 133.3 (6.4) |
| CMT | 1.686 (.30) | 1.693 (.32) | 1.548 (.24) |
| Milk | 50.33 (4.7) | 49.45 (5.5) | 52.77 (3.1) |
| Feed | 2167.34 (306.9) | 2186.4 (294.9) | 2106.3 (203.8) |
| Management | 709.33 (88.1) | 656.40 (49.8) | 831.24 (62.4) |
| Cow Capital | .926 (.03) | .919 (.03) | .929 (.03) |
| Capital Equipment | .276 (.09) | .266 (.09) | .287 (.13) |
| Herd Size | 523.76 (327.9) | 484.18 (237.7) | 728.00 (498.0) |
| Rain | .84 (1.2) | .77 (1.2) | .88 (1.2) |
| Temperature | 63.68 (12.3) | 63.84 (12.3) | 63.77 (12.3) |

# Use of Lutalyse® Sterile Solution in Lactating Dairy Cows with Silent Estrus

**J. W. Lauderdale**
**J. F. McAllister**
*The Upjohn Company*
*Kalamazoo, Michigan*

Prostaglandin F2$\alpha$ (PGF2$\alpha$) has been reported to be luteolytic in the bovine. As a result of the luteolytic activity, PGF2$\alpha$ has been reported in both scientific and clinical journals to be effective in cattle for treatment of unobserved estrus, abortion, parturition, pyometra, termination of pathological gestation and cystic ovaries. Thus, new data in

these areas may be redundant. However, the effectiveness for estrus synchronization of beef cattle and dairy heifers suggests use of PGF2$\alpha$ in dairy cows. Lactating dairy cows that had not been detected in estrus between 61 and 257 days postpartum, but had a corpus luteum detected by palpation of the ovaries *per rectum* (unobserved or silent estrus), were assigned randomly in replicates to control and Lutalyse® sterile solution experimental groups within each of 20 herds distributed among six investigators located in Colorado, North Carolina, Florida, Michigan and Kansas. Cows assigned to the control group were artificially inseminated (AI) at each estrus detected after assignment on study. Cows assigned to the Lutalyse (PGF2$\alpha$) group were injected with 25 mg PGF2$\alpha$ (5 ml Lutalyse) intramuscularly. The PGF2$\alpha$ cows were AI at each estrus detected after injection and if a cow had not been detected in estrus by 75 to 80 hr post injection, she was AI at that time and at each estrus subsequent to that AI. The uterus of each cow was palpated *per rectum* at 35 to 70 days after AI to measure pregnancy status.

Data were analyzed statistically by means of least squares analyses of variance with the herd x experimental group interaction used as the error term for testing significance of experimental group differences. Average intervals between calving and assignment on study were 119.6 and 128.5 days for control and PGF2$\alpha$ cows. Average body weights were 1,302 and 1,334 lbs for cows of control and PGF2$\alpha$ groups. Pregnancy rates (no. pregnant x 100 ÷ no. per group) between cows of the control and PGF2$\alpha$ groups where 0 and 24.2% ($P<.0003$) by 80 hr., 2.6 and 28.4% ($P<.0001$) by 5 days, 27.1 and 32.7% ($P<.45$) by 24 days, 46.5 and 52.9% ($P<.46$) by 60 days, and 55.0 and 57.6% ($P<.71$) for duration of breeding after assignment on study. Thus, PGF2$\alpha$ cows were pregnant in a 5 day interval at a rate comparable to controls in 24 days (28.4% vs 27.1% for control). The pregnancy rate of controls in 24 days of 27.1% indicated assignment to study increased their pregnancy rate since they had not been detected in estrus during the previous average interval of 120 days. Pregnancy rate during the first 5 days after PGF2a was a result in part of inseminating 84% of cows assigned to the PGF2$\alpha$ group at about 80 hr. Because of timed AI, services per conception were greater for cows of the PGF2$\alpha$ versus control groups (1.8 vs 1.4, $P<.03$). First and second insemination conception rate (no. pregnant x 100 ÷ no. AI) averages varied between 27% and 40%, but did not differ between cows of the control and PGF2$\alpha$ groups. The "low" conception rates (National average approximates 49%) of cows on this study reinforces the conclusion that these cows represent a sample of problem breeders.

These data support a conclusion that Lutalyse sterile solution was effective for the treatment of unobserved (silent) estrus as measured by pregnancy rates within five (5) days after treatment. The data also reinforce clinical observations that increased awareness by herd managers of unobserved estrus cows can lead to detection of estrus and AI leading to pregnancy. This latter observation leads to the suggestion that PGF2$\alpha$ would be effective for treatment of cows with a CL at about 60 days post-partum rather than waiting for a longer postpartum interval in hopes that estrus would be detected.



# The Divided Milking Machine—A New Design

**Robert B. Corbett,** *D.V.M.*
*Dairy Health Consultation Service*
*Rt. 3, Box 454*
*Blackfoot, Idaho 83221*

The idea of the divided milking machine or 4-way system as it is now called, was first conceived quite some time ago, but the first prototypes have only been milking in field trial dairies for approximately the last two years.

The primary purpose of the 4-way milk system is to prevent cross-infection from one quarter to another on the same cow. This cross-infection may be induced in a conventional claw system through liner slippage, fall off of a teat cup, manual removal of a teat cup from a quarter that is milked out, slow attachment of milkers at the beginning of the milking process, removal of the milking cluster without shutting off the vacuum, etc. Since each individual quarter has a separate milk tube all the way to the pipeline, automatic take-off sensor or weigh jar, there is no possible way that bacteria shed from one quarter will be transmitted to a clean quarter on the same cow by the milk system itself.

When liner slippage occurs there is little vacuum fluctuation at the teat ends of the other 3 teats. If one teat cup is removed and allowed to suck air, a Detco recording only shows a drop in vacuum of ½ to 1½ inches Hg depending on pipeline size, reserve air capacity and sensitivity of the vacuum controller. A conventional claw milking system often shows a drop in vacuum of 4 to 7 inches Hg depending upon the same parameters previously mentioned. This increased vacuum stability at the teat end when air is allowed into the system at one teat cup has other benefits besides decreasing cross-infection and teat end impacts. When placing a claw milker on the cow there is often a large influx