

operation that deals with in-patients loads like this, you need ample driving and parking space so that semi trucks can manipulate to load and unload. Heifers are unloaded into the clinic corrals. These heifers are 12 to 14 months old and have been wintered in a feed lot situation for moderate gain so they can be turned out on summer range for grazing. They have been held off feed and water for 24 hours prior to surgery and will go from the clinic back on to another semi for a 20 mile trip to where they will be turned out for summer grazing and really not seen again, except for an occasional rider, until fall. They will then be sold to go to fatlots in the midwest.

The corrals are not elaborate but can hold 350 yearling heifers. The two squeeze chutes are placed end to end, the first one for preping the heifer, the second one for doing the surgery. Two chutes are an absolute necessity when you are doing a large number of animals in a day's time. The instruments needed are: sunbeam clipper with a regular shearing head, an electric 'S' brand to identify the heifers as spayed, surgical soap diluted 50-50 with water and placed in a color-coded squeeze bottle for easy identification and a triple sulfa solution diluted 50-50 in another color-coded squeeze bottle and a disinfectant placed in a bucket of water for cleansing the hands and instruments. This water should be kept clean and replaced with clean water often. 5cc's penicillin are given to each heifer. I feel a growth stimulating implant is very important for spayed heifers to achieve maximum gains. The scalpel, 9 inch curved spaying scissors for removing the ovaries and #1 pig rings on a card available from \*Seymour Mfg., or \*Nasco Supply, for using in the automatic hog ringer or wound closing device. Several clips can be applied rapidly without reloading the device thus saving valuable time. I have found the retention of the clips to be less than one percent and of no objection to the owner or buyer come fall.

The heifers are moved into the crowding pens. Two men are usually quite sufficient to move the heifers up the alley and into the chutes. Because these heifers have been off feed and water for 24 hours and because it is spring time and our weather can be unstable I feel it's important to be sure you are fairly certain that you will have good weather for the day scheduled for spaying as well as for the next 3 or 4 days. This gives the heifers time to get back on feed and feeling good again. Spaying heifers is one of the hardest things we do to an animal in the way of elective surgery, but if rapidly and

properly done they rebound amazingly and are back on feed within a day or two.

The heifer is placed in the first chute where the paralumbar fossa is clipped. The important thing here is to see that all the loose hair clipped off the animal is removed and not carried into the second chute where the surgery will take place. The heifer is also branded in the first chute so she can be identified as a spayed heifer. After clipping and branding, the heifer is moved into the second chute where surgery will take place. As the surgeon is scrubbing the surgery site, the heifer receives an implant by the man that's running the head gate. At the same time the heifer is placed in the chute a bar is placed behind her so she won't be moving back and forth and the penicillin is given. By this time the incision has been made. The surgeon rapidly makes an incision through the skin, external oblique and internal oblique then forces his hand through the transversus and peritoneum. The scissors enter the peritoneal cavity and are pressed against the wound edge, gapping it open to allow air to enter, thus allows the viscera to drop forward. The left ovary is located and removed, the right ovary is located and removed, tri-sulfa G is applied into the peritoneal cavity and around the wound edge. The wound is closed. Because it is late in the season and there is a fly problem the wound is sprayed with a little fly spray and out she goes. I believe its important to keep your hand near the incision at all times to prevent the animal from eviscerating her rumen when she struggles. The wound is closed, sprayed, and the animal released. If you are timing this it takes approximately 60 seconds for the actual surgical procedure from the time the heifer enters the chute until she is gone.

The man running the surgeon's squeeze chute is really your key man. As soon as the heifer hits the chute he must apply maximum squeeze until you have made your incision and forced your way into the peritoneal cavity. He must then release the squeeze to allow the viscera to drop forward so you can rapidly locate and remove the ovaries. If the heifer struggles at all he must immediately apply squeeze to control her and then instantly release it so you can continue your surgery. As soon as you're done he must re-apply the squeeze while you close the wound. This man must be alert and in concert with you at all times so you don't have to tell him 400 times a day to apply or release the squeeze. We expect to routinely get 35 to 40 some heifers a hour with this technique. In an eight to ten hour day, we can easily do 400 heifers.

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### Research Summary of Factors Affecting Conception To First Service in Dairy Cows. Part III

*Clinical Factors—Cystic Ovaries, Retained Placenta, Uterine Infections and Milk Fever:*

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**The objective of this analysis is to evaluate the effects of various health disorders on the reproductive and productive performance of dairy cattle.**

### Data and Methods

Data used in this analysis came from three of the four herds involved in the study described in the previous two papers. These three herds utilized a reproductive herd health program from one veterinary clinic and had a permanent record system for the herd health information.

The three herds were: herd 1 CP, herd 3 SB, and herd 4 DM. Herd 1 was examined reproductively once a month for pregnancy and post-partum examinations. Herd 3 was checked twice monthly and herd 4 was checked every two weeks for both pregnancy and post-partum.

TABLE 1. Incidence (%) of Health Disorders in the 3 Herds

Health Disorder	Herd 1	Herd 2	Herd 3
Retained Placenta	2.6	12.2	8.0
Mild Uterine Infection	15.7	32.1	38.7
Severe Uterine Infection	15.7	19.3	35.0
Cystic Ovaries	7.9	7.5	9.8
Milk Fever	2.8	9.9	10.5
Number of Cows	1054	704	715

Cows examined on routine reproductive programs were as follows:

- (1) Cows fresh 15 days and longer.
- (2) Cows bred 30 days and longer.
- (3) Rechecks of pregs.
- (4) Rechecks of post-partum cows.
- (5) Cows fresh 60 days and no heats.
- (6) Cows bred four or more times and not palpated since post-partum exams.

Reproduction and milk production information used in this analysis have been previously described. Reproduction parameters studies included conception rate of first service and interval from calving to first breeding. Milk production

TABLE 2. Effect of Milk Production (Above & Below Average) on Incidence

Herd #:	Herd 1		Herd 2		Herd 3	
	Below	Above	Below	Above	Below	Above
Average:						
Mild Uterine Infection	15%	17%	30%	34%	37%	40%
Severe Uterine Infection	16%	15%	18%	22%	48%	33%
Retained Placenta	2%	4%	9%	15%	15%	10%
Cystic Ovaries	7%	9%	6%	9%	9%	12%
Milk Fever	2%	4%	5%	14%	14%	16%

was the average daily milk production from calving to the DHIA test following breeding (this determined by once a month weigh days on DHIA).

**Health disorders were diagnosed by either the consulting veterinarian or the herd management. The health disorders considered in this study were uterine infection, retained placenta, milk fever and cystic ovaries.**

Retained placenta and milk fever were for the most part diagnosed and treated by the herdsman. The parameters of "retained placenta" was a cow that held fetal membranes 24 hours or longer. These cows were packed with antibiotics (furacin and tetracyclines) and sulfa urea uterine boluses every 48 hours until the membranes dropped. "Milk fever" was defined as any cow with post parturient paresis and in some cases may not have been recumbent yet when treated. Milk fever cows were given a commercial milk fever treatment containing calcium, phosphorus, magnesium and dextrose. The same preparation was not used on all farms.

Uterine infections were diagnosed by the consulting veterinarian and were categorized by a coding system used by Pilchuck Veterinary Hospital and recorded on permanent records. For the simplicity of evaluation in this study, the cervical and uterine pathology is grouped into "mild" and "severe".

A mild uterine infection is defined as a reproductive tract that is enlarged (in a cervix and/or uterus) with or without a pus discharge, but no palpable volume of pus in the uterine horns. The usual therapy would be 60 cc. Liquamycin (Pfizer 50 mg / cc.). The cow may, or may not be retreated in ten days by the herdsman depending on the severity of the condition.

**Severe uterine infection group is defined as those cows that had a palpable volume of pus in the uterine horn or horns, regardless of whether the cervix was open or closed. The severe uterine infections were treated by infusing 60 cc. Liquamycin or injecting Lutalyse (dinoprost trimethamine, Upjohn Company). In both cases the cow would be retreated in 10-15 days with Liquamycin intra-uterine.**

Cystic ovaries were diagnosed by the consulting veterinarian with no attempt to distinguish luteal and follicular cysts. Most of the cystic cows were anesterus though there was no attempt to separate these for this study. Standard treatment of cystic ovaries by the attending veterinarian was 5,000 I.U. of chorionic gonadotropin given in the tail vein. The second line of therapy for the problem cows would be 2cc. Cystorelin (Gonadorelin, Abbott). No attempt to separate these was made in this study. The cow was bred on first heat following treatment for cystic ovaries if compatible with calving date.

In table 2 we looked at the incidence of various health disorders in each herd of those below herd average and those above herd average. The trend of increased health problem in higher producing cows was constant for all herds and all conditions except severe uterine infections. This may be explained by loss of production of those cows with severe uterine infections.

The incidence of health disorders (table 3) in cows in first and second lactation (cow age 2 and 3) were similar and were lower than the incidence of health disorders in older cows (cow age 4 and 4 plus). Generally, the incidence of health disorders in the third lactation (cow age 4) was similar to that of older cows except for milk fever. The frequency of milk fever continues to increase at least until lactation 4 (cow age 5 to 6).

TABLE 3. Incidence (%) of Health Disorders in Cows of Different Ages

Health Disorder	Cow's Age:			
	2	3	4	4+
Retained Placenta	2.7	6.1	10.4	11.6
Mild Uterine Infection	24.1	23.7	31.3	32.6
Severe Uterine Infection	19.8	17.5	25.8	30.0
Cystic Ovaries	5.4	6.9	10.0	13.6
Milk Fever	0.5	2.4	10.4	21.2
Number of Cows	815	708	450	500

The occurrence of retained placenta did not affect subsequent milk production but did significantly increase the interval to first breeding (table 4). The conception rate of cows having a retained placenta was reduced by twelve percent. This reduction in conception rate was reduced even with palpation and diagnosing these cows 'okay to breed'.

TABLE 4. Effect of Retained Placenta on Various Traits

Retained Placenta	Conception	Milk Production	Interval to Breeding
None	.53 <sup>a</sup>	71.0 <sup>a</sup>	75.2 <sup>a</sup>
Present	.41 <sup>b</sup>	69.7 <sup>a</sup>	78.8 <sup>b</sup>

To further look at conception rates of cows having retained placentas (table 5) the three herds were separated. We see that the trend of reduced conception holds about the same in each herd. Table 6 has the influence of retained placenta on incidence of metritis. Those cows with retained placentas had 21 percent no uterine infection, 34 percent mild, and 45 percent severe. The cows without retained placentas had 53 percent, 26 percent, and 21 percent respectively.

Uterine infection effects on the various traits are in table 7. There was no difference between the "none's" and "milds".

TABLE 5. Effect of Retained Placenta on Conception Rate in 3 Herds

Herd #:	Herd 1	Herd 2	Herd 3
With Retained Placenta	.33	.49	.44
Without Retained Placenta	.48	.63	.56

TABLE 6. Influence of Retained Placenta on Incidence of Metritis

Severity of Metritis:	None	Mild	Severe
With Retained Placenta	21%	34%	45%
Without Retained Placenta	53%	26%	26%

TABLE 7. Effect of Uterine Infection on Various Traits

Uterine Infection	Conception	Milk Production	Interval to Breeding
None	.54 <sup>a</sup>	71.4 <sup>a</sup>	74.0 <sup>a</sup>
Mild	.54 <sup>a</sup>	70.9 <sup>a</sup>	76.1 <sup>a, b</sup>
Severe	.46 <sup>b</sup>	69.9 <sup>b</sup>	77.3 <sup>b</sup>

Severe uterine infections resulted in significantly poorer production and reproduction.

The occurrence of cystic ovaries resulted in significantly higher milk production (table 8). Reproduction efficiency was, however, drastically reduced. Even though the interval to first breeding was increased an average of 20 days by a cystic ovary, conception rate was reduced by 8 percent. These results occurred in spite of the treatment of these herds. The increase in days to first breeding would reflect the lack of normal cycling activity in cystic cows. The occurrence of milk fever in these three herds had no statistical effect on conception, milk production, or on interval to first breeding as seen in table 9.

Table 10 compares the cows in all three herds with some clinical disorder versus those with no clinical disorder. The conception rate and milk production was not statistically different. But the interval to first breeding was statistically different, 72 versus 78 days.

To further look at the various health disorder of those cows with some clinical disorder and those without, table 11 shows the difference between the three herds and the cow

TABLE 8. Effect of Cystic Ovaries on Various Traits

Cystic Ovaries	Milk		Interval
	Conception	Production to Breeding	
None	.53 <sup>a</sup>	70.7 <sup>a</sup>	73.7 <sup>a</sup>
Present	.45 <sup>b</sup>	72.4 <sup>b</sup>	93.0 <sup>b</sup>

TABLE 9. Effect of Milk Fever on Various Traits

Milk Fever	Milk		Interval
	Conception	Production to Breeding	
None	.51 <sup>a</sup>	70.7 <sup>a</sup>	75.5 <sup>a</sup>
Present	.56 <sup>a</sup>	72.2 <sup>a</sup>	75.5 <sup>a</sup>

TABLE 10. Effect of No Health Disorders on Various Traits

Health Disorder	Milk		Interval
	Conception	Production to Breeding	
No Disorder	.54 <sup>a</sup>	.71 <sup>a</sup>	.72
Some Disorder	.50 <sup>a</sup>	.71 <sup>a</sup>	.78 <sup>b</sup>

TABLE 11. Conception Rate of Cows with No Clinical Disorders

Herd:	Herd 1	Herd 3	Herd 4
No Disorder	.45 (641)	.65 (260)	.54 (170)
Some Disorder	.46 (413)	.54 (409)	.54 (544)

numbers in each group. Table 12 has the milk production and table 13 has the interval to first breeding. Herd 1 and 4 will breed some cows at 50 days fresh, while herd 3 breeds

after 60 days fresh. But in all cases the interval is lengthened by the clinical disorder.

TABLE 12. Milk Production of Cows with No Clinical Disorders

Herd:	Herd 1	Herd 3	Herd 4
No Disorder	66.4	71.7	76.1
Some Disorder	65.8	71.7	75.3

TABLE 13. Interval to First Breeding of Cows with No Clinical Disorders

Herd:	Herd 1	Herd 3	Herd 4
No Disorder	72.9	79.5	66.0
Some Disorder	79.2	84.9	71.3

### Discussion

This was an evaluation of the reproductive herd health data available with an opportunity to have the data in the computer along with the other parameters being evaluated by Dr. Sanger and Dr. Hillers. The three herds had a total of 2,473 cows. This provided an opportunity to have the clinical disorder evaluated and corrected for difference in technicians and bulls.

**Severe uterine infection, retained placenta and cystic ovaries reduced reproductive performance in this study. The occurrence and duration of these disorders must be minimized in order to have optimum reproductive performance in dairy herds.**

In summary of the three papers on this study, the following is a list in decreasing effect and reproduction in these 2,473 cows evaluated. The effect of the different clinical disorders on reproduction performance was with treatment. There were no controls.

The factors affecting reproductive performance are:

- (1) Inseminators, 22 percent
- (2) Bulls, 15 percent.
- (3) Cystic ovaries reduce conception 8 percent; increase interval to first breeding 20 days.
- (4) Retained placenta reduced conception 12 percent.
- (5) Age of cow.
- (6) Severe uterine infection reduces conception 8 percent.