

Reproduction Program: Cost Analysis
New York State
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The reproductive or breeding program, on dairy farms is a critical management function that is important to the overall success of the dairy farm. Much emphasis has been put on developing performance measures to track the success of the breeding program, and many different management approaches, technologies, services, and supplies are utilized within the program across dairy farms. While much effort has been targeted at improving reproductive performance, the costs associated with the reproductive program have not always been known as very few farms track reproduction costs within their accounting system.

PRO-DAIRY, in partnership with Farm Credit East, ACA consultants and Cornell Cooperative Extension embarked on a reproduction cost analysis study, as part of ongoing studies of different dairy production activities and as part of a grant funded by New York State Farm Viability Institute. The purpose of the study was to provide a descriptive study of the costs associated with getting cows and heifers pregnant on farms of various sizes and with different reproduction management programs.

Study Methodology

When analyzing the costs associated with the reproductive program, it has been difficult to utilize on-farm accounting systems as most farms don't utilize activity based accounting programs, and costs associated with the reproductive program have not been tracked or recorded. The focus of the study is to utilize on-farm data to determine the costs associated per breeding and per animal check pregnant for both mature cows and dairy replacements.

For this study, surveys were utilized to collect data associated with the reproductive program on participating farms for the months of May through July, 2010, looking at both the mature animals and the dairy replacements. May through July was picked to capture at least 3 months of data and also capture some of the variability in reproductive performance during the year.

Participating farms completed the survey utilizing a combination of approaches, including tracking activities for the time frame, going through records to determine number of treatments, and utilizing invoices to determine costs. 30 farms were identified and volunteered to do the work necessary to develop the information to complete the survey. In October 2010, the farms reported on the success of the reproductive program, reporting the number of animals that were confirmed pregnant from breeding services during the 3 months tracked.

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With the intent to determine the total cost of the reproductive program, producers provided detail on the following areas:

Hormone Costs	Semen Costs
Outside Breeding Services	Veterinarian Services
Other Supplies	Labor and Management Hours and Wages
Natural Service Costs	Technology Costs

This data set is not designed to represent the average costs per breeding or per animal check pregnant across dairy farms in New York, but is a descriptive study of what costs are for the 30 participating farms.

Total Cost Per Cow Checked Pregnant

Table 1 is a summary of the total costs associated with getting a cow checked pregnant for the 30 farms in New York for the period of May-July, 2010. The average total cost per animal check pregnant was \$135.75 with a range from the 10th the 90th percentile of farms of \$69.83 to \$245.34. 80 percent of the farms fall within this range.

Costs were broken down into the following categories: Labor, supplies & services, natural bull service and technology costs. Labor costs average \$46.73 per cow checked pregnant with a range from \$12.87 to \$98.21. Head detection contributed to 43% of labor costs. Supplies and Services were on average \$83.92 per cow pregnant with a range of \$35.60 to \$133.59. Semen costs and hormone costs together accounted for 66% of the total costs. Natural Service Bull and Technology added the least to the total costs at an average of \$0.55 and \$4.55 respectively.

The average herd size of the study was 649 cows with 80% of the farms ranging from 195 cows to 1,139 cows. The average number of services, or cow breedings was 406, with an 80% range of 113 to 792. Number of cows pregnant from these services averaged 135 with a range from 36 to 222.

Percent pregnant for this study simply represents the percentage of animals pregnant from the number of services during the study period. It is not a true reflection of the farm's pregnancy or conception rate. Percent pregnant averaged 34% with values ranging from 25% to 42%. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those services.

Total Cost to get a cow pregnant per cwt. of milk was \$0.41 with a range of \$0.25 to \$0.55.

Table 1

Reproductive Program Costs				
Per Cow Checked Pregnant				
30 Farms, New York State, May-July 2010				
	Average	Percent	10th Percentile	90th Percentile¹
Labor Costs				
Heat Detection	\$20.28	43%	\$0.00	\$28.18
Sorting	\$5.21	11%	\$0.00	\$9.92
Breeding	\$7.91	17%	\$0.00	\$16.99
Treatments	\$5.34	11%	\$1.29	\$10.06
Management	\$8.00	17%	\$1.72	\$16.74
TOTAL	\$46.73	100%	\$12.87	\$98.21
Supplies & Services				
Hormones	\$20.88	25%	\$10.41	\$35.62
Semen	\$34.81	41%	\$15.92	\$50.65
Breeding	\$10.58	13%	\$0.00	\$25.73
Vet	\$17.65	21%	\$0.00	\$34.78
TOTAL	\$83.92	100%	\$35.60	\$133.59
Natural Service Bull	\$0.55	100%	\$0.00	\$1.19
Technology	\$4.55	100%	\$0.00	\$14.48
Total Cost Per Cow Checked Pregnant	\$135.75		\$69.83	\$245.34
Cost per cwt of Milked Shipped	\$ 0.41		\$0.25	\$0.55
		Average	10th Percentile	90th Percentile
Average Herd Size		649	195	1139
Number of Cow Breedings		406	113	792
Number of Cows Pregnant		135	36	222
Percent Pregnant ²		34.0%	25.0%	42.0%
¹ This shows the range from the 10th to the 90th percentile in the study. The range represents 80% of the farms in the study and eliminates any outliers.				
² Percent Pregnant in this study does not reflect true pregnancy rate or conception rate. It is only referring to the cows or heifers that were checked pregnant from those that were bred during the study. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those breedings.				

Table 2

Reproductive Program Costs				
Per Cow Breeding				
30 Farms, New York State, May-July 2010				
	Average	Percent	10th Percentile	90th Percentile¹
Labor Costs				
Heat Detection	\$6.53	43%	\$0.00	\$9.95
Sorting	\$1.67	11%	\$0.00	\$3.24
Breeding	\$2.55	17%	\$0.00	\$5.86
Treatments	\$1.75	11%	\$0.49	\$3.83
Management	\$2.75	18%	\$0.58	\$5.77
TOTAL	\$15.25	100%	\$3.74	\$28.05
Supplies & Services				
Hormones	\$6.80	25%	\$3.24	\$12.29
Semen	\$11.37	42%	\$5.10	\$16.91
Breeding	\$3.52	13%	\$0.00	\$8.04
Vet	\$5.69	21%	\$0.00	\$11.23
TOTAL	\$27.39	100%	\$13.87	\$38.63
Natural Service Bull	\$0.18	100%	\$0.00	\$0.34
Technology	\$1.55	100%	\$0.00	\$5.19
Total Cost Per Cow Breeding	\$43.76		\$25.31	\$73.16
Cost per cwt of Milked Shipped	\$ 0.41		\$0.25	\$0.55
		Average	10th Percentile	90th Percentile
Average Herd Size		649	195	1139
Number of Cow Breedings		406	113	792
Number of Cows Pregnant		135	36	222
Percent Pregnant ²		34.0%	25.0%	42.0%
¹ This shows the range from the 10th to the 90th percentile in the study. The range represents 80% of the farms in the study and eliminates any outliers.				
² Percent Pregnant in this study does not reflect true pregnancy rate or conception rate. It is only referring to the cows or heifers that were checked pregnant from those that were bred during the study. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those breedings.				

To contrast Table 1, Table 2 shows the costs per cow breeding, or service, during the study. The average total cost per cow bred was \$43.76 with a range between the 10th and 90th percentiles of \$25.31 to \$73.16.

Supplies & Services represented the highest percent of the total cost. The average cost of this category was \$27.39 per cow breeding with semen and hormones accounting for 67% of the total category cost. The range of values was from \$13.87 to \$38.63. Labor costs were the second highest contributor with an average of \$15.25 per cow pregnant and range of \$3.74 to \$28.05. Technology and Natural Service Bull were again a small amount of the total cost at \$1.55 and \$0.18 per cow bred.

Using Technology in the Cow Reproductive Program

On-farm technology is one area that is being utilized by producers within their breeding program. There were 7 farms that used technology and 23 that did not. For this study, technology refers to activity monitoring systems, with farms using different systems to monitor the activity. Table 3 highlights the costs of each group of farms, based on whether or not they utilized technology. The average size of the farms that used technology was 784 cows and farms that did not was 608 cows. Percent pregnant of the animals bred during the period were nearly the same for both groups with 32.9% pregnant for technology using farms and 33.3% pregnant for non-technology farms.

Total cost per cow checked pregnant averaged \$126.70 for farms that used technology. Supplies and services represent 53.53% of total costs at \$67.82 per cow pregnant. Labor costs were 31.04% of the total at \$39.33 per cow pregnant. Cost of technology (including ownership and maintenance costs) was 15% of the total at \$19.19 per cow pregnant and natural bull service contributed very little to total costs.

For farms that do not use technology the average cost to get a cow pregnant was \$138.51 with supplies contributing the most to total costs. Supplies and Services costs averaged \$88.82 per cow pregnant and were 64% of total costs. Labor represented 35.37% of total costs at an average of \$48.99 per cow pregnant. The remainder of total costs was the cost of natural bull service.

For farms that use technology the cost savings was seen in the following areas: labor spent on heat detection, the cost of semen and breeding service. These farms however, did have to invest in the technology for the reproductive program. The average cost of the on-farm technology was \$19.49 per cow checked pregnant. Costs of using technology versus not using technology are very dependent on the management intent of the farm. Some farms are successful using technology while others may be more successful if they choose a different approach.

Table 3

Reproductive Program Costs		
30 Farms, New York State, May-July, 2010		
Technology Cost Comparison		
	Use Technology	No Technology
Number of Farms	7	23
Average Cows	784	608
Percent Pregnant, Cows ¹	32.93%	33.28%
	Average	Average
Labor	39.33	48.99
Supplies & Services	67.82	88.82
Bull	0.07	0.70
Technology	19.49	0
Total Cost Per Cow Check Pregnant	126.70	138.51
¹ Percent Pregnant in this study does not reflect true pregnancy rate or conception rate. It is only referring to the cows or heifers that were checked pregnant from those that were bred during the study. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those breedings.		

Using a Breeding Service & On-Farm Service

Of the 30 farms in the study, 13 farms bred their own animals and 17 farms used a breeding service. Table 4 reports the costs of these two groups of farms. The farms that bred their own animals averaged 688 cows in size and those that used a breeding service averaged 612 cows.

The average total cost of getting a cow pregnant for farms that bred their own cow was \$114.68 per cow checked pregnant. Labor and Supplies and Services were most of the cost of getting a cow pregnant for these farms at \$53.44 and \$56.57 per cow pregnant respectively. Natural bull service and technology average \$4.67 per cow pregnant. These farms averaged 34.4% cows pregnant from services during the study.

Farms using a breeding service averaged \$150.80 per cow pregnant for total costs. Supplies and services was the major contributor to total cost at \$105.13 per cow pregnant or 70% of the total. Labor averaged \$42.63 per cow pregnant while technology and bull service were \$3.05 per cow pregnant. These farms averaged 32.1% cows pregnant from those bred during the study.

Farms using a breeding service spent more on the actual service and supplies in the categories of semen, breeding and vet costs however labor costs were lower than farms that bred their own animals. Due to size of data set and the different costs associated with choices made on the farm, separate from the choice to use a service or not, it is not possible to compare or draw any conclusions between these two areas.

Table 4

Reproductive Program Costs		
30 Farms, New York State, May-July, 2010		
By Breeding Service Cost		
	Use Service	No Service
Number of Farms	17	13
Average Cows	612	688
Percent Pregnant ¹	32.10%	34.41%
Totals per Cow Checked Pregnant		
Labor	42.63	53.44
Supplies & Services	105.13	56.57
Other (Bull & Technology)	3.05	4.67
Total	150.80	114.68
¹ Percent Pregnant in this study does not reflect true pregnancy rate or conception rate. It is only referring to the cows or heifers that were checked pregnant from those that were bred during the study. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those breedings.		

Hormone Usage as Part of the Reproductive Program

Most farms use some level of hormones as part of their reproductive program with the intent to improve the success of their breeding program. In this study the farms were sorted into thirds- those with low hormone use, those with mid-level hormone use and those with high hormone use, with the results summarized in Table 5. Usage was determined by the dollars spent on hormones during the study period. Farms with low hormone use spent on average \$11.09 per cow pregnant on hormones. Mid-level

hormone farms spent \$15.96 per cow pregnant and high hormone use farms spent \$35.60 per cow pregnant.

Low hormone use farms average cost per cow pregnant was \$84.43 with supplies and services contributing \$51.32 or 60.8% to the total costs. Labor was 32.3% of total cost at \$27.30 per cow pregnant and other costs make up 6.9% of the total. 32.7% of the services resulted in a pregnant animal.

Mid-level hormone use farms average cost to get a cow pregnant is \$147.53. Supplies and services again is the major contributor at \$91.83 or 62.2% of total costs. Labor costs were \$54.45 per cow pregnant or 36.9% of the total. 35.5% of services resulted in a pregnant animals for this group.

High hormone use farms averaged \$175.30 for total cost to get a cow pregnant. Service and supply costs were 62% of total costs at \$108.61 per cow pregnant. Labor costs were next in line at 33.3% of the total or \$58.45 per cow pregnant. 33.5% of services resulted in a pregnant animal for this group.

Farms that used more hormones as part of their reproductive program had the higher total cost per cow pregnant in this study. However, due to size of data set and costs associated with management decision on the individual farms, separate from using different levels of hormones in the reproductive programs, it is not possible to compare or draw any conclusions in between the hormone use levels.

Table 5

Reproductive Program Costs			
30 Farms, New York State, May-July, 2010			
Hormone Usage Comparison			
	Low Hormone Use	Mid Level Horm. Use	High Horm Use
Average Cows	624	507	817
Percent Pregnant ¹	32.7%	35.5%	33.5%
Cost per Cow Checked Pregnant			
Labor	\$ 27.30	\$ 54.45	\$ 58.45
Supplies & Services	\$ 51.32	\$ 91.83	\$ 108.61
Bull	\$ 0.34	\$ 1.25	\$ 0.07
Total	\$ 78.96	\$ 147.53	\$ 167.13

¹ Percent Pregnant in this study does not reflect true pregnancy rate or conception rate. It is only referring to the cows or heifers that were checked pregnant from those that were bred during the study. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those breedings.

Heifer Reproductive Program

In this study, farms also tracked the costs associated with the dairy replacements. 28 of the 30 farms in the study raised their own heifers and thus averages are based on those 28 farms. The average number of breedings (services) for the farms in the study was 96 with a range from 21 to 186. Number of pregnancies averaged 54 for an average percent pregnant of 57% with 80% of the herds falling in the range of 41% to 84%.

Tables 6 and 7 show the heifer reproductive costs. The 10th and 90th percentile range is shown which again represents 80% of the farms that raise their own heifers in the study.

The average cost of get a heifer pregnant on this study was \$85.06 with the 80% range being from \$37.90 to \$164.36, indicating there is a good amount of variability among the farms in the study. Services and Supplies contributed the most to the total cost at an average of \$53.23 per heifer pregnant with a range from \$23.72 to \$84.25. Within Services and Supplies semen costs were 56% of the total indicating it took more semen to get the heifers pregnant than the cows. Labor costs averaged \$31.42 per heifer pregnant with the 10th percentile being \$0.00 and the 90th percentile being \$83.48 per heifer pregnant. None of the farms used technology for breeding heifers and Natural Bull Service averaged \$0.42 per heifer checked pregnant.

In table 7 you will find the cost per heifer breeding. The average cost per services was \$49.06 with a range from \$25.31 to \$81.02. Supplies and Services were 62.6% of total costs at an average of \$30.72 per heifer bred with semen costs being the biggest cost in that category. Labor costs averaged \$18.01 per heifer bred with a range from \$0.00 to \$43.21. The farms with \$0.00 for labor costs were using a breeding service for their heifers. Natural Service Bull costs were minimal at \$.33 per heifer bred.

Table 6

Reproductive Program Costs				
Per Heifer Checked Pregnant				
28 Farms, New York State, May-July 2010				
	Average	Percent	10th Percentile	90th Percentile¹
Labor Costs				
Heat Detection	\$13.75	44%	\$0.00	\$41.04
Sorting	\$3.44	11%	\$0.00	\$12.00
Breeding	\$6.74	21%	\$0.00	\$21.90
Treatments	\$2.25	7%	\$0.00	\$6.71
Management	\$5.24	17%	\$0.00	\$15.54
TOTAL	\$31.42	100%	\$0.00	\$83.48
Supplies & Services				
Hormones	\$7.23	14%	\$0.00	\$14.23
Semen	\$29.98	56%	\$10.17	\$48.60
Breeding	\$8.52	16%	\$0.00	\$15.56
Vet	\$7.50	14%	\$0.00	\$15.29
TOTAL	\$53.23	100%	\$23.72	\$84.25
Natural Service Bull	\$0.42		\$0.00	\$2.87
Technology	\$0.00		\$0.00	\$0.00
Total Cost Per Heifer Checked Pregnant	\$85.06		\$37.90	\$164.36
Cost per cwt of Milked Shipped	\$ 0.13		\$0.06	\$0.21
		Average	10th Percentile	90th Percentile
Average Herd Size (Cows)		649	195	1139
Number of Heifer Breedings		96	21	186
Number of Heifers Pregnant		54	16	99
Percent Pregnant ²		57.0%	41.0%	84.0%
¹ This shows the range from the 10th to the 90th percentile in the study. The range represents 80% of the farms in the study and eliminates any outliers. ² Percent Pregnant in this study does not reflect true pregnancy rate or conception rate. It is only referring to the cows or heifers that were checked pregnant from those that were bred during the study. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those breedings.				

Table 7

Reproductive Program Costs				
Per Heifer Breeding				
28 Farms, New York State, May-July 2010				
	Average	Percent	10th Percentile	90th Percentile¹
Labor Costs				
Heat Detection	\$8.20	46%	\$0.00	\$20.37
Sorting	\$2.02	11%	\$0.00	\$6.68
Breeding	\$3.51	20%	\$0.00	\$12.48
Treatments	\$1.27	7%	\$0.00	\$4.00
Management	\$3.01	17%	\$0.00	\$8.82
TOTAL	\$18.01	100%	\$0.00	\$43.21
Supplies & Services				
Hormones	\$4.39	14%	\$0.00	\$7.00
Semen	\$17.16	56%	\$7.19	\$27.46
Breeding	\$4.65	15%	\$0.00	\$9.99
Vet	\$4.53	15%	\$0.00	\$9.16
TOTAL	\$30.72	100%	\$17.29	\$53.47
Natural Service Bull	\$0.33		\$0.00	\$1.80
Technology	\$0.00		\$0.00	\$0.00
Total Cost Per Heifer Breeding	\$49.06		\$25.31	\$81.02
Cost per cwt of Milked Shipped	\$ 0.13		\$0.06	\$0.21
		Average	10th Percentile	90th Percentile
Average Herd Size (Cows)		649	195	1139
Number of Heifer Breedings		96	21	186
Number of Heifers Pregnant		54	16	99
Percent Pregnant ²		57.0%	41.0%	84.0%
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² Percent Pregnant in this study does not reflect true pregnancy rate or conception rate. It is only referring to the cows or heifers that were checked pregnant from those that were bred during the study. This number was calculated by dividing the total number of breedings, or services, during the 3 months by the total number of animals that were checked pregnant from those breedings.				

Summary

The reproductive program is an important focus of management for successful dairy farms. With margins on dairy farms continuing to tighten, farms can no longer only focus on achieving the best performance within a specific area of the dairy farm. The costs associated with each area needs to be known and tracked. While this study doesn't address the value that may be associated with the difference in performance of the breeding programs, the range in costs associated with getting cows pregnant, ranging from 25 cents per cwt to 55 cents per cwt of milk shipped, is significant. For a 100 cow dairy shipping 22,000 pounds of milk per cow, the cost difference represents a change of \$6,600, or \$66 dollars per cow. In addition, while this study provides a snapshot of the costs associated with the breeding program on these 30 farms and highlight the areas where the differences in costs are. It is not a representative study that can be used to draw any conclusions on what may or may not be the best reproductive program choices to achieve the highest results at the lowest possible costs.

Explanation of Expenses Calculated

All costs were calculated for cows and heifers individually

Labor

Labor expense is the cost of labor that is used in the reproductive program over the time of the study. The cost is based on the number of hours per day spend on different tasks associated with the reproductive program (both cow and heifer) and the hourly wage rate, including benefits. Daily, weekly, and monthly labor requirements by employee and task were determined to develop the number of hours of labor utilized within the reproductive program. Hourly wage rate is the gross wages plus all benefits, workman's compensation, and other costs associated with the hired labor. If the owner was providing labor, a cost was assigned to the owner.

Natural Service Bull

Cost of a natural service bull was determined by including the cost of purchasing the bull, cost of maintenance (feed, bedding, vaccinations and other health costs), and the salvage value (sale price) of the bull. Costs were determined for all bulls being utilized for the number of months the bull was servicing heifers or cows.

Outside Services

Cost of outside services includes the cost of using a breeding service and/or vet service, including costs associated with breeding cows, checking cows pregnant, etc. Breeding service costs ranged from just arm service cost to the total of heat detection, mating, and arm service.

Supplies

Supplies cost is the cost of hormones and semen used as part of the reproductive program, along with other supplies, such as tail paint, syringes, etc.

Technology

Cost of technology includes ownership and operation costs associated with the equipment. Operation costs include utilities and repairs. Ownership costs are the fixed costs associated with owning the equipment. These costs include depreciation and opportunity interest. The costs were determined from estimated amount of investment and useful life of the technology based on usage.