A Form to Develop Goals for Dairy Production Medicine Programs (modified for Version 6: 4/8/92)

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Introduction

A production medicine program is a continual search to identify the current limitations of herd production and develop solutions to those problems. The conceptual basis of a production medicine program is dynamic.

Yet the day to day practice of production medicine tends to become static. Dairymen are creatures of habit. Veterinarians are creatures of habit. A production medicine program may begin in some herd by identifying nutrition as the primary production limiting problem. The problems are defined and a program is designed to solve them. A year later, the nutrition issues may be resolved and the next production opportunity might come from improved udder health. Yet the program may have developed its own routine. There is no search for the next opportunity. The process of problem identification and solution that was so dynamic in the beginning has become static. In fact, the program is no longer a production medicine program. It has undergone a regression back to a traditional nutrition program.

Practitioners try to remain active in problem identification by monitoring production records such as DHI reports on a routine basis. Some veterinarians develop formal written or computerized monitor services by combining data from DHI records with other records which the dairyman keeps. Herd performance indices are evaluated relative to two points: a target or goal level and alarm level. By monitoring herd performance on this basis, progress towards goals can be measured and emerging problems can be identified early.

While these principles of monitoring are sound, the process of monitoring is a pointless exercise if the client is not committed to solving problems. A client with a low commitment to problem identification will soon become bored with the monitor efforts. This paper describes a form that can be used to identify dairy herd problems and establish production goals for the dairy manager. Completion of the form can increase client commitment to problem solving. Clearly focused goals and carefully selected monitors are essential to production medicine programs.

Desirable Characteristics of Production Medicine Program Goals

Mutuality of goals

Effective production medicine programs begin with a mutual commitment by the dairyman and the veterinarian to common goals. As veterinarians, we frequently assume that the goals we desire for our herd programs are the same goals our client has for his dairy. This assumption is a mistake. When we set a somatic cell count goal of 100,000 without the consensus of our client and then proceed to comment on his failure to achieve it, we risk being viewed as an irritating nag. The goals of dairy management and the production medicine clinician must be understood and mutual.

Economic expression of goals

Veterinarians tend to define production indices in biological terms. We talk about the impact of somatic cells and days open as if they were as clear a threat as hailstones. Yet our clients have not shared our indoctrinations and may not fully understand our language. We can probably create more compelling goals if we define them in economic rather than biological terms.

Prioritized and limited number of goals

Production medicine is an attempt to coordinate and integrate all of the production and health services to a herd. As professionals, we seek thoroughness. However, thoroughness does not require that all problems are addressed at once. In my opinion, we risk attaining nothing when we seek to solve all problems simultaneously. It is the responsibility of a production medicine veterinarian to help prioritize problems, set a few appropriate goals, and develop programs to realize them one at a time. The person with one or two goals will usually achieve them, while the person with 100 goals frequently reaches none.

With new clients, it is often wise to give high priority to solvable problems that can produce a prompt and positive financial impact. With established clients, the most important long-term problems should receive priority.

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Monitors with short interval responses

When a goal is established, a monitor must be designed to track progress toward that goal. Monitors should be defined to respond to changes in a short time frame. For example, we may be working with a client to reduce the age at which his replacement heifers calve. The goal may be an average age to first calving of 24 months, but "Average Age at First Calving" would not be a good monitor for that goal. There is too much lag time between the implementation of management improvements and changes in that index. If heifer nutrition and parasite control programs are implemented today, followed by earlier breeding, it will be a full year before these improvements are reflected in a reduced calving age. A more satisfying index would be "Average Age at First Breeding", "Average Age at Conception", or "Projected Age at Calving" of heifers confirmed pregnant. These monitors would provide positive feedback within a couple months after beginning the program.

Task-responsive monitors

Goals should be stated to directly reflect a very specific task. For example, a herd with reproductive problems due to ineffective heat detection should not use calving interval as a performance monitor. Calving interval will also be affected by voluntary waiting period and conception rates, as well as heat detection. Instead, an appropriate monitor might be to list the cows eligible to be bred in the next 30 days and track the percentage of this group inseminated.

Opportunity Identification Form

In the summer of 1988, I developed a form to help identify production opportunities and set goals. It was designed to:

1. Be *completed in a discussion with a client.*
2. Utilize the *client's records and their estimates of costs* wherever possible.
3. Provide a *limited economic assessment* of different production problems.
4. Provide a format to *mutually agree on production goals* for the herd.
5. Set the stage to *develop a plan* to accomplish these goals.

This form requires four pieces of information: the number of heifers on the farm that have not calved, the girth and height of recently calved heifers, current milk plant pricing policy, and the DHI herd summary sheet. It is useful to have a calculator. The form is divided into sections on replacements and culling, udder health, genetics, reproduction and nutrition. Several sections have been redesigned from the first version to more clearly define opportunities. These sections are followed by spaces to summarize areas for attention, list the goals and describe a working plan. A sample form follows this article.

The form can be criticized as being oversimplified as an analytic tool. As I have developed it I have wrestled with the conflicting issue of analytic precision and practicality. A less than precise tool that can be completed in a practical world will be more effective than a precise analysis that is rarely done. To be "workable", I believed that it had to depend upon data that was available to most dairymen, the process had to take less than two hours to complete, and the form should not be longer than two pages. I could not product it in two pages, but have contained it to three.

Replacements and Culling

Replacement issues include appropriate inventory of replacements, their age at first calving, and their size. The inventory of heifers and the age at which they begin milk production are more related to efficiency, whereas size at calving directly relates to production.

a. Inventory

The form begins by calculating the number of replacements required by a dairy, based upon herd size, cow culling rates, heifer mortality and culling, and age at first calving.[1] Inadequate numbers of replacements can result from high cow cull rates, extended calving intervals and therefore fewer calves, calf death problems, unusual runs of bull calves, and sales or culls of growing heifers.

Many dairy farms maintain a much larger replacement herd than necessary. If they can sell "springing" heifers at a profit, this may be desirable. However, many dairyman do not know what costs they have in the replacement enterprise and do not know if they make or lose income through this work. Production medicine veterinarians can offer a service of quantifying the replacement heifers rearing costs for each client. The University of Wisconsin Extension Bulletin A2731 - Wisconsin Farm Enterprise Budgets: Dairy Cows and Replacements, provides a manual format for this analysis. A computerized Lotus spreadsheet[2] to estimate the cost of raising dairy replacements is available from the Food Animal Production Medicine section in the School of Veterinary Medicine at the University of Wisconsin.

b. Calving age of replacements

The form next requests average age at first calving. This index is found on most DHI summary sheets. The dairyman is asked to put a price per day to maintain two-year old heifers. If the dairyman is reluctant to estimate a cost, asking what he would charge to board his neighbor's heifers will generate a prompt estimate. The cost for maintenance beyond 24 months is estimated. This is a gross opportunity estimate. No effort is made to estimate the alternative costs of growing the heifers at greater growth rates. A partial budgeting approach to look at these alternatives would be appropriate if a new heifer nutrition program becomes part of the action plan.

c. Size of replacements at calving

The next section asks for heart girth and height of recently calved heifers. A chart[3] translating inches to estimated weight follows, along with an estimate of the production impact of additional weight on first lactation yield. The economic consequences are calculated relative to a 1200-1250 pound standard post-calving heifer and are multiplied by the number of heifers calving per year. The section ends with a place for comments about anestrus problems with first lactation heifers, calving paralysis, and the like.

d. Culling rate and cull cost burden

The act of culling a cow and replacing her with a replacement heifer is usually an expensive transaction. An average cost of the transaction is calculated by subtracting the average price received for cull cows from the current price for springing heifers.

The cost of this transaction is part of the "overhead" costs of maintaining the herd. This cost can be spread over the entire productive life of the average cow. A reasonable estimate of the average productive life of cows in a herd can be found by calculating the reciprocal of the annual herd cull or turnover rate. For example, if 33% of the herd is culled per year, the average herd life would be approximately 3 years.

The cost of the average culling transaction is divided by the estimated average productive herd life to calculate the annual cost of culling. This value is then compared to the costs of culling at a goal annual rate of 25%.[4]

Udder Health

The next section focuses on economic losses to mastitis. Mastitis losses are divided into three areas: subclinical production losses, subclinical milk price premium losses and clinical case losses.

a. Production losses due to subclinical mastitis

Production losses due to subclinical mastitis are calculated from herd average somatic cell count (SCC) linear score.[5] For each increased unit of linear score, a first lactation cow is assigned a loss of 222 lbs for the lactation. Mature cow losses are estimated at 444 lbs per unit of linear score.

b. Milk price premiums lost due to high somatic cell counts

Opportunities to generate milk price premiums for lower somatic cell counts are calculated based upon current premiums received versus the maximum offered by the dairy plant.

c. Losses due to clinical mastitis

The next section asks the dairyman to estimate the number of clinical cases of mastitis per year. These cases would include the full range of clinical cases ranging from a simple tube treatment in one quarter to a coliform death. It was unusual for my clients to record this number and it seems easier to get them to estimate a typical number per month. An annual estimate is made, and the number is multiplied by $105 per case.[6]

Genetics

Many veterinarians dismiss genetics, as long as the sires are in artificial insemination. Yet this is a profound mistake for a production medicine advisor. In 1992, it is not difficult to pick two groups of bulls out of the available AI offerings that differ in predicted transmitting ability of dollar value (PTA$) by $150. This means that the daughters of one group of bulls can be expected to produce $150 more milk product per lactation than daughters of the other group. The financial impact of semen selection policy can exceed the impact of most of our health programs and should not be overlooked.

The chart in the form shows the average PTA$ value of sires of different age groups of animals at different production levels in Minnesota.[7] The values have been modified from the published values dates 8/31/91. PTA$ values are recalculated with each new ranking of bulls. Because commercial milk prices for the year 1991 were significantly lower than 1990, the PTA$ value of all bulls dropped with the new calculations in January 1992. The formulas used to compute 1991 and 1992 PTA$[8] are as follows:

$$1991\ PTA\$_{MFP}=\$0.04386(PTA_{Milk})+\$1.18(PTA_{Fat})+\$1.37(PTA_{Protein})$$

$$1992\ PTA\$_{MFP}=\$0.03664(PTA_{Milk})+\$1.04(PTA_{Fat})+\$1.28(PTA_{Protein})$$

The values in the chart reflect subtractions of $28 from service sires, $24 from sires of 1st lactation bulls and $20 from sires of mature cows from the 1992 Minnesota DHI data base.

This chart is dynamic and the data needs to be updated annually. Each year, new proven higher production bulls are added to the studs, resulting in an typical increase of about 20 PTA$ per year for the population of bulls in AI. Over a longer period of a decade, there will be periodic adjustments of the "base", where the increasing PTA$ indexes are returned to zero.

a. Production losses in cows from lower value AI sires

Potential losses of production are calculated relative to the genetic values being achieved by other high production dairy farms.[7] The availability of computerized sire selection programs such as BullSearch[9] and MaxBull[10] has made it possible for veterinarians to aid in identifying high performance sires for their clients.

b. Production losses in cows sired by unproven herd bulls.

The section on genetic losses from unidentified sires assumes that the sire is an unproven herd bull. Cassell estimates that an average daughter of an average AI bull will produce $134 more product per lactation than an average daughter of an unproven bull.[11] This calculation can stimulate interest in replacement synchronization and the AI programs.

Reproduction

The section on losses due to reproduction has gone through several changes, and now is based upon a 12-month rolling average of the "average days in milk" (ADIM) *of the lactating cows only*. A rolling 12 month average is needed because seasonally calving herds produce wide swings in ADIM. Western Region Extension Publication 0067- "Evaluating Dairy Herd Reproductive Status Using DHI Records" indicates that herd milk production is reduced 0.17 lbs per cow per day of the year for each day the herd averages over 150 ADIM.[12] The goal-form uses 155 ADIM as a goal.

Reproduction losses are calculated from ADIM rather than the more traditional "calving interval" or "average days open" because dairy clients seem to understand the financial impact more clearly.

Nutrition

Average peak milk serves as an indicator of nutrition management. While they are certainly influenced by periparturient health, average peaks serve as excellent monitors of both nutrient adequacy of rations as well as feedbunk management. Other indicators such as "income over feed cost" would be useful, but take considerable time to calculate accurately in most situations, and tends to focus the discussion too closely on input costs and not on overall nutrition management.

Average peak milk production is an excellent monitor of fresh cow management and nutrition. The traditional thumb-rule is that each additional pound at peak will increase lactation yield by about 220 lbs. A table[13] relating average peak milk to rolling herd average is presented in the form. The client's average peak milk figures are written onto the table. At that time, the discussion must focus on how much improvement in fresh cow nutrition the dairyman and veterinarian think is possible. A goal is selected and the projected rewards are calculated.

Areas for Attention

The last page of the goal form begins with space for notes. It is a place to jot down the largest loss items and specific comments relative to herd problems. This can be a complete listing of problem areas from which a few goals will be produced.

Goals

Space is provided to list agreed upon goals. As discussed earlier in this article, they should be few, they should be reflective of specific tasks, and they should be achievable in a modest amount of time.

Plans/Next Step

This space is provided to outline a plan to achieve the goals. This is a superb time to outline in broad terms the approach to the identified problems and their solutions. It can stand as a written agreement to implement a production medicine program.

Use of the Form

Because completion of the form takes professional time, the time should be ignored. Because the logical outcome of completion of the form is new or expanded services, part of the time spent is in "service sales" and clients will object to being charged for listening to a "salesman". While the approach to fees for a goal setting exercise will be handled differently by each practitioner, the following comment may be helpful. Because there are benefits to both parties from the exercise, I found it acceptable with clients to track the time spent in the exercise and bill for half.

The exercise can be repeated whenever a new overview is justified. However, I believe that an interval of about a year is appropriate.

Summary

Clearly defined goals facilitate the delivery of production medicine programs. Carefully defined monitors that reflect specific tasks and respond in timely fashion can help motivate people to accomplish goals. Time spent with a carefully constructed form to overview major health and production areas can serve as an effective motivator and as a written agreement to address production problems

References

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DAIRY PRODUCTION MEDICINE GOAL FORM - HOLSTEIN Version 6:4/8/92 — Page 1

CLIENT: ____________ Date: ____________

____________ Vet: ____________

REPLACEMENTS

INVENTORY: Number of heifers on farm: ________

# cows in herd		Cow culling rate factor		Heifer mortality & culling rates factor		Age at 1st Calf Factor		Required size of replacement herd
______	x	0.______	x	1 / (1-0.______)(1-0.______) (mortality rate, hfr. cull rate)	x	(1 + (avg age, mo. / 24))	=	______

Univ.Wis.Ext.Pub A2731

Shortage or excess of replacement herd: ____________

ECONOMIC IMPACT OF OVERAGE HEIFERS

(______ - 24) x 30 x ______ x ______ = ______
Age 1st Calving, Mo. — days/mo — $/day — No. Hfrs/yr — Gross opportunity $ from reducing 1st calving age

PRODUCTION IMPACT OF UNDERSIZE HOLSTEIN HEIFERS

SIZE of recent 1st lactation cows: ____________ (Avg. Heart Girth) ____________ (Avg. Withers Height)

Heart Girth Inches	Body Wt at Calving (lbs)	1st Lactation Production Differential from 1200 lb Target Wt, Lbs. milk	
70	951-1000	-1079	
71.5	1001-1050	-842	
73	1051-1100	-583	
74	1101-1150	-427	<-J.F.
75.5	1151-1200	-211	Keown.
77	1201-1250	0	DHMgt.
78	1251-1300	41	Aug.86
79	1301-1350	172	
80	1351-1400	212	
81	1401-1450	222	
>82	>1450	168	

(______ x ______) x ______ = ______
No. Heifers entering herd per year — Lb milk lost — Milk price per lb — Annual Production loss to undersized heifers at calving

CULLING

Culling Transaction: $______ - $______ = ______
Replacement Hfr — Cull Price — Avg.Cost per Cull

Replacement Overhead:

Annual Cull Rate ______ % — Target Overhead with 25% Cull Rate

$______ Avg.Cost / (1 / .____ Annual Cull Rate) = $______ — $______ Avg.Cost / (1 / .25) = $______

($______ Cull Overhead - $______ Target Overhead) x ______ No. Cows in herd = ______ Annual Cull Losses over Goal

DAIRY PRODUCTION MEDICINE GOAL FORM - HOLSTEIN Version 5:9/28/91 — Page 2

UDDER HEALTH

PRODUCTION LOSSES DUE TO SUBCLINICAL MASTITIS

Lactation Group	No. Head		Avg LLSCC	Goal	Production Loss/Unit LS		Lbs milk lost per Group
1st Lactation	______	x	(______	- 2.0)	x 222 lb	=	______
Other Cows	______	x	(______	- 2.0)	x 444 lb	=	______
					Total Lbs Lost	=	______

______ x ______ = ______
Total Lbs Lost — Milk price per lb — Production $ lost to subclinical masitis

ECONOMIC OPPORTUNITY FROM MILK QUALITY PREMIUMS

Maximum low SCC premium Offered by your milk plant: $ 0.____ per cwt

Quality premium currently received: $ 0.____ per cwt

Potential premium difference: $ 0. per cwt

______ x ______ ÷ 100 x ______ = ______
Rolling Herd Avg — No. Cows — Potential Prem. Difference — Premium Opportunity for low SCC milk

LOSS FROM ACUTE MASTITIS:

The average mastitis flareup will cost $107, as a combination of $12 in medication, $90 in discarded and decreased milk, $2 in veterinary cost, and $3 in labor. Hoblet, NMC 1991

______ - ______ x $107 = ______
Estimated # of mastitis cases/year — Target # of mastitis cases/year — $ loss to clinical cases/year

GENETICS

Average PTA$ of Sires at Increasing Levels of Herd Production (Minn. DHI, 8/31/1991) *Adjusted

Avg. PTA$,	13,000	16,000	19,000	>22,000	Yours
Service Sires	171	172	177	184	______
1st Lact. Cows	104	114	127	131	______
Other Cows	35	60	76	85	______

PTA$ LOSSES RELATIVE TO TOP PRODUCTION HERDS

Lactation Group	>22,000 PTA$		Yours		PTA$ Diff.		No. Identified Head		
First Lact. Cows	155	-	(____)	=	(____)	x	(____)	=	______
Later Lact. Cows	105	-	(____)	=	(____)	x	(____)	=	______
							Total	=	$______

PTA$ LOSSES IN HERD MEMBERS FROM UNIDENTIFIED SIRES

Lactation Group	Total Number		No. Identified		No. not Identified		Genetic Loss (Cassell, 1990)		
First Lact. Cows	(______)	-	(______)	=	(______)	x	$134	=	______
Later Lact. Cows	(______)	-	(______)	=	(______)	x	$134	=	______
							Total	=	$______

Type traits statistically associated with longevity of dairy cows ranked in order of importance: Udder depth, Teat Placement, Fore Udder Attachment, and Foot Angle.

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DAIRY PRODUCTION MEDICINE PROGRAM GOAL FORM - HOLSTEIN Version 5:9/28/91 Page 3

REPRODUCTION: Average Days in Milk (Lactating Cows ONLY)

Reproduction problems result in cows having extended lactations. The herd average days in milk is very reflective of long term reproductive status of the herd.

Because average days in milk is highly variable in seasonally calving herds, the Average Days in Milk should itself be averaged over the previous 12 month period.

1__________
2__________
3__________
4__________
5__________
6__________
7__________
8__________
9__________
10__________
11__________
12__________

Sum above and divide by 12 = __________ Rolling ADIM

MILK SALES LOST DUE TO HERD MILKING LATE AND LOWER IN LACTATION CURVE

(__________ Rolling ADIM - 155 days) x __________ Total Cows x .17 lb/day* ÷ 100 x $____/cwt x 365 days = __________ $ in milk sales lost per year

* Western Regional Ext. Pub. 0067

CALVING INTERVAL IS DETERMINED BY FOUR FACTORS:

1. Average Days to First Breeding: __________
2. Heat Detection Rate: __________
3. Conception Rate: __________
4. Minimal Abortion and Early Embryonic Deaths: __________

NUTRITION: PEAK MILK

ECONOMIC IMPACT OF PEAK MILK

1 lb. increased peak = approximately 220 lbs. during lactation

Herd Lactation Avg, Lbs	Peak, 1st Lactation	Peak, Other Cows	Your 1st Lactation Cows	Your Other Cows
23,034	78	103	____	____
21,453	74	98	____	____
20,434	71	93	____	____
19,490	69	90	____	____
18,480	66	86	____	____
17,501	63	82	____	____
16,550	61	79	____	____
15,512	58	74	____	____
14,543	55	71	____	____
13,555	53	68	____	____
12,561	49	64	____	____

________ Increase in Peak Goal, lb x ________ No. Cows x 220 lb x ________ Milk price/lb = ________ Gross income from increased peak milk

FACTORS THAT INFLUENCE PEAKS

Animal: Size, Body Condition, Rumen Adaptation, Calving-time Problems and Diseases, Mastitis, Parasitism

Ration: Palatability, Energy, Protein, Balance

Management: Lead Feeding, Transition Ration, Rate and Degree of Challenge

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FOOD ANIMAL PRODUCTION MEDICINE SECTION
DAIRY PRODUCTION MEDICINE PROGRAM GOAL FORM Page 4

AREAS FOR ATTENTION

____
____
____
____
____
____

MANAGEMENT GOALS

1. ____________________
2. ____________________
3. ____________________
4. ____________________

PLANS / NEXT STEP

____
____
____
____
____
____

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