



Jack Kelly Clark

DAIRY INCENTIVE PAY

4th Edition



Gregorio Billikopf

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GREGORY ENCINA BILLIKOPF, EDITOR



UNIVERSITY OF CALIFORNIA
AGRICULTURE AND NATURAL RESOURCES

DAIRY INCENTIVE PAY (4th Edition)

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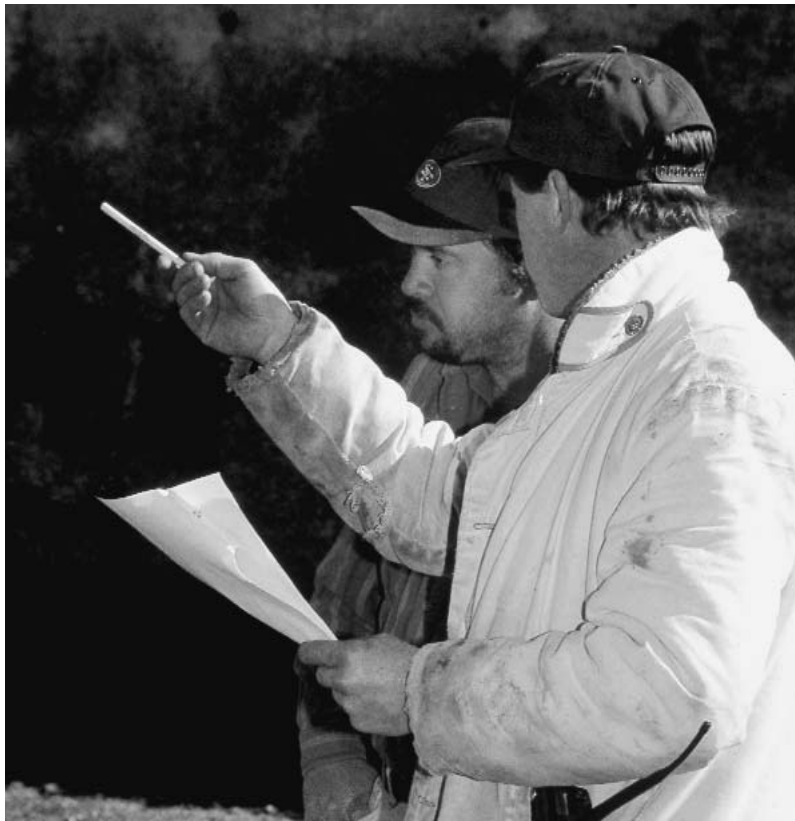
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To those who work in dairy farms

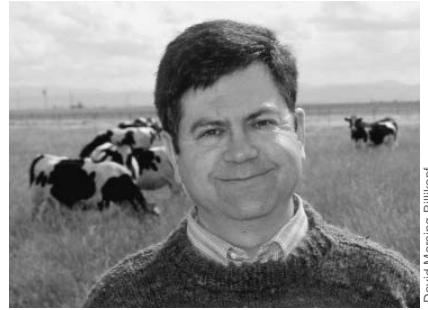


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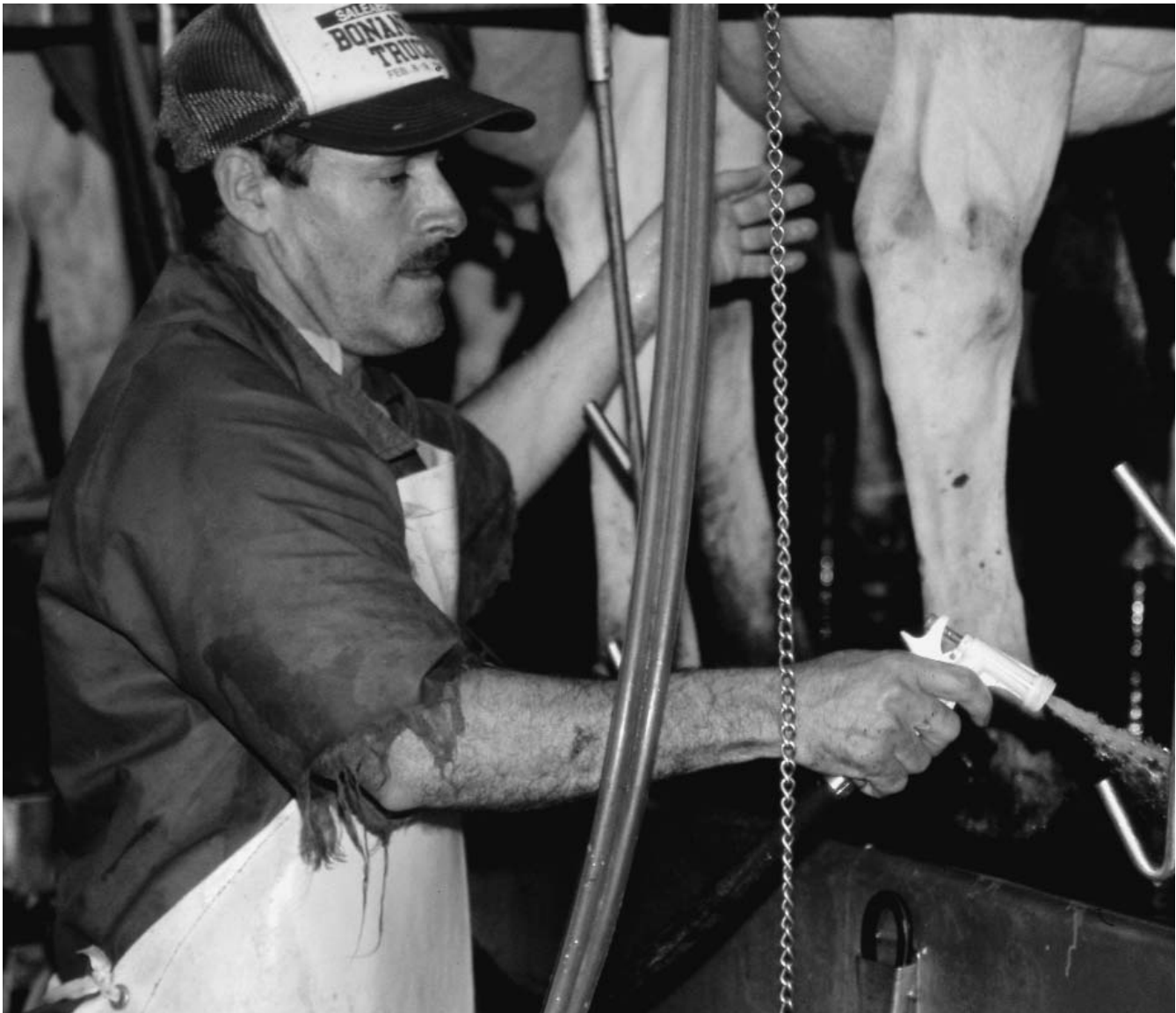
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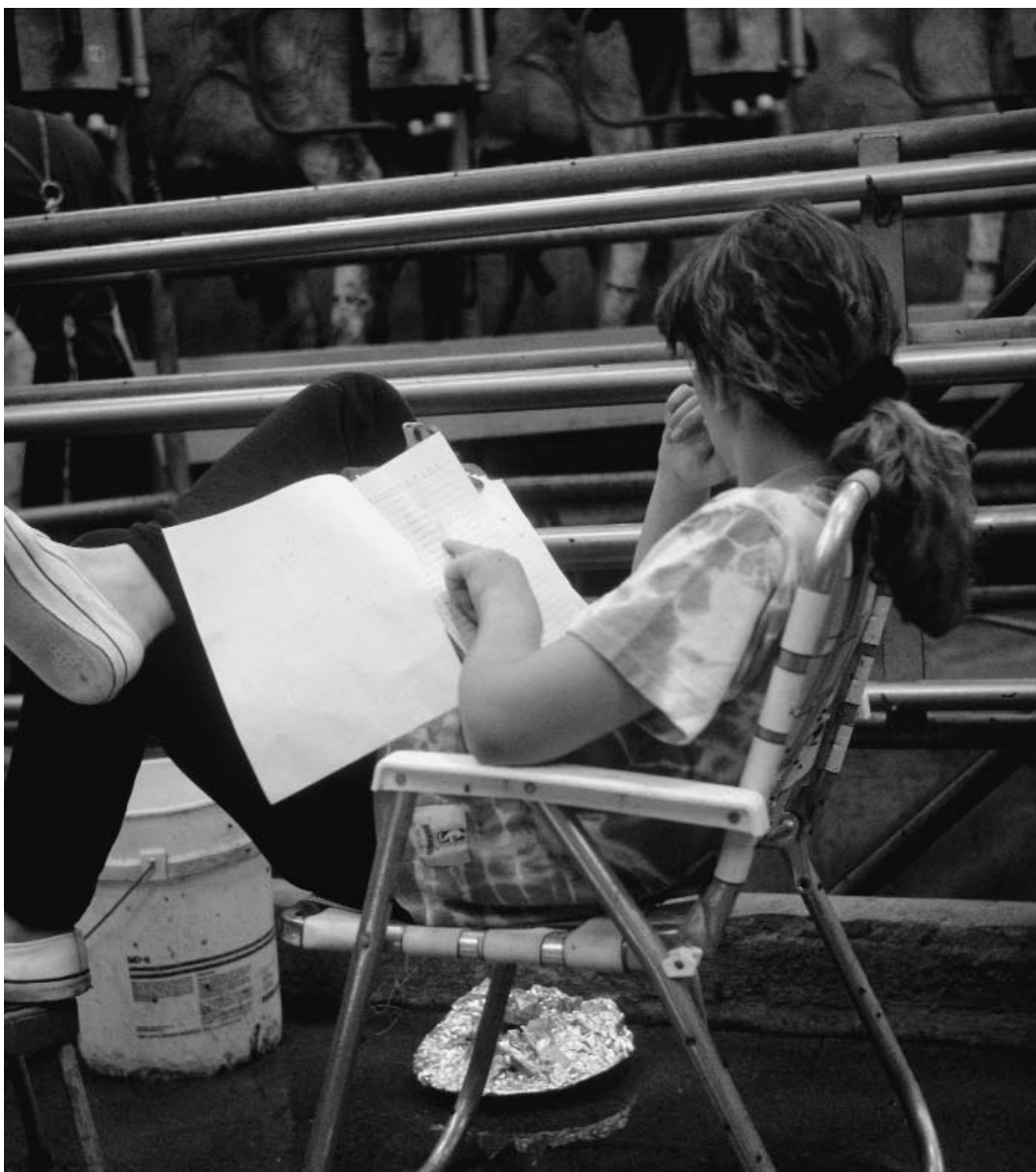


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We wish to thank those who have contributed chapters to the previous editions of this publication.



Gregorio Billikopf

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Incentive pay programs are not simple to design, but can result in great benefits to both dairy farmer and employee.

PREFACE

Jobs that call for creativity, analysis, and personal growth may provide the best motivator of all: intrinsic rewards. Such satisfaction originates from *within* the employee. An intrinsically motivated dairy worker does not obtain his motivation from external stimulation provided by the dairy farmer. An overemphasis on external rewards may be responsible for elimination of internally originated ones. There are personal and organizational objectives that simply cannot be realized through pay.

On the down side, intrinsic motivators, as wonderful as they may appear, are not equally found among all workers, nor do they always motivate the type of performance you may desire. Pay can be a powerful management tool and a compelling motivator. Employees often consider pay a measure of individual achievement and social status. The importance of pay, then, ought neither to be over or underrated.

We hope that in the pages of the fourth edition of *Dairy Incentive Pay* you will information on how to establish or troubleshoot an incentive pay program at your dairy operation. Establishing incentives is not easy and much can go wrong. Certainly there are enough war stories to go around. When properly established, however,

incentives can make a big difference in the improved management of your dairy. In effect, they help employees learn to see from a manager or owner's perspective.

Chapter 1 lays out key management principles regarding incentives. This is a critical chapter in that it outlines why some incentive pay programs succeed while others fail, and it should be read in conjunction with the other chapters on specific types of incentives (chapters 3 through 8).

Besides incentive pay or pay for performance programs, dairy farmers sometimes have questions about how to set the wages for milkers in contrast to those of calf feeders, cow feeders, or herd managers. Or, how much to pay in relation to what a neighbor may pay. Chapter 2, on internal wage structures, is included to guide you in making these types of decisions.

Chapters 3 through 8 deal with specific goals you may want to achieve, such as increasing pregnancy rate and calf health, incentives for improving milk quality, feeding management goals, and improving hoof or health care at the dairy.

Even dairy farmers who have no interest in tying employee performance to pay can greatly benefit from this publication. There is much here on managing dairy employees in terms of specific dairy science measures.

Pay for Performance¹



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Incentive pay is generally given for specific performance results rather than simply for time worked at the dairy. While incentives are *not* the answer to all personnel challenges, they can do much to increase worker performance.

In this chapter we discuss casual and structured incentives. Although each rewards specific employee behaviors, they differ substantially. In structured incentives, workers understand ahead of time the precise relationship between performance and the incentive reward.

In a casual approach, dairy workers never know when a reward will be given.

CASUAL INCENTIVES

The simplicity inherent in the *casual incentive* approach attracts many dairy farmers who would not consider a structured incentive. Casual rewards include a pat on the back, a sincere thank-you, a \$50 bill, a dinner for two at a local restaurant, or a pair of tickets to



Jack Kelly Clark



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Casual rewards include a pat on the back, a sincere thank-you, a \$50 bill, a dinner for two at a local restaurant, or a pair of tickets to the rodeo.

the rodeo (workers may have excellent suggestions along these lines). You may want to entitle dairy employees to choose from a menu of several rewards. One farm employer provides a catalogue from which employees can order items under a certain dollar value.

Accompanied by a specific commendation, "This is for reducing our total harvest-time machinery break downs," the reward is more effective than "thanks for all you do." To be of use, these casual incentives must be given at *unexpected intervals*.

A bonus given routinely soon becomes part of the expected compensation package. Casual incentives communicate to employees that you have noticed their efforts. People thrive on positive feedback.

Drawbacks. Three possible drawbacks to the casual incentive approach may include (1) *envy* among dairy employees, (2) feelings among workers that the supervisor may be acting out of *favoritism*, and (3) the use of rewards to maintain *social distance*.

While there are times when praising workers in public is appropriate, at other times it may do more harm than good. An example of the latter is when coworkers hear a direct or implied comparison between the rewarded employee and themselves.

Even though workers are likely to tell others about their rewards anyway, the force of the comparison is reduced when you give casual incentives privately. Perceptions among workers that rewards are given in a capricious or arbitrary manner, however, may still remain.

One way of overcoming both envy and favoritism challenges may be by having workers nominate others for these casual awards. The nominating procedure should be kept simple. Recognition coming from fellow employees is unlikely to cause resentment and is one of the most sincere forms of praise. This type of recognition could even be given in public. Unfortunately, chances are that workers at the dairy will be rewarded for their popularity.

Sometimes employees are reaching for a *positive stroke*: they hope that their superior performance has been noticed. While casual incentives can be very appreciated rewards, they can also be used to keep a social distance from the persons to whom they are given. This may happen, for instance, if an employee receives a monetary reward when he was reaching for psychological proximity instead. Only you can discern your employee's needs in a given situation. After all, both workers and situations vary.

Suggestion Plans. Suggestion plans may also be handled under a casual incentive system. You may want to recognize personnel for suggestions resulting in savings or increased productivity. In one instance, a farmer saved thousands of dollars after an employee suggested a more frequent adjustment to the scales.³

Employee suggestions that require small capital or labor outlays to implement, such as what was needed to keep the scale adjusted, should generally result in larger rewards. Expensive or difficult to implement suggestions may not yield any pay reward but a simple acknowledgment to the worker.

You must decide whether to reward all workers or only the authors of an accepted suggestion. There may be a balance that rewards teamwork and individual creativity.

Regardless of approach, a functional suggestion system needs management follow-through. Receipt of worker recommendations, as well as possible action to be taken, needs to be acknowledged promptly to those who make the proposals.



Not every suggestion will be accepted, yet employees should be kept informed on the status of suggestions. A structured incentive plan, discussed next, helps both workers and management improve communications.

STRUCTURED INCENTIVES

Structured incentives can help direct employee efforts. Other benefits include cost certainty and cost reductions for the

dairy farmer. Benefits to employees include higher pay and satisfaction.

Dairymen's feelings about structured incentives generally fall into four groups:

1. *Incentives work well*—they have either helped motivate or maintain high worker performance. A Stanislaus dairy farmer spends \$5,000 to \$7,000 each year to implement his incentive program and gets \$55,000 to \$57,000 back.

2. *Challenges posed by incentives* — Top concerns about incentives from a

Public praising of an employee may cause jealousy between workers.

farm survey⁴ included: (a) poor quality work (or neglect of important goals not directly rewarded by the incentive); (b) no change in worker performance; (c) difficulty in setting standards; (d) change in work methods or technology; and (e) excessive record-keeping.

3. *Incentives do not apply to present needs.*

4. *Incentives are not used because of lack of information on how to establish them.*

Workers are also divided in their feelings about incentive pay. One dairy employee said incentives are what farmers pay when they do not want to pay workers a fair wage. Another milker, in contrast, was very enthusiastic about the incentive program the dairy

farmer had instituted: it made him feel part of a team.

Workers in one study were evenly divided between those who favored hourly pay and those who liked piece-rate pay. The most common reason for preferring piece-rate pay was increased earning potential. Workers could acquire greater earnings in fewer hours of work, even though it took more effort to do so. Worker preference for hourly work fell into three general categories. Workers (1) felt that piece rate was unfair (mostly concerned about what they viewed as game playing in how piece rates were set), (2) preferred the pace of hourly paid work, or (3) associated other benefits with hourly pay.⁵ When properly designed to protect both dairyman and farm personnel, structured incentives work well.

Despite the benefits of piece-rate pay, workers often (1) feel it is unfair how piece-rates are determined; (2) prefer the pace of hourly paid work; or (3) associate other benefits with hourly pay.



Examples of structured incentives

A structured incentive (1) must be capable of *fluctuating* (variable pay) as performance changes, and (2) is based on a *specific accomplishment-reward connection understood* by both management and workers.

Examples of typical incentives:

- paid for number of cows milked or hoofs trimmed
- allowing workers to go home early, with full pay, when they finish milking
- end-of-season bonus for employees who stay to the end
- quality or production incentive
- bonus for reducing production costs or death loss
- profit sharing.

Examples of payments or benefits which are not incentives:

- most mandated benefits such as unemployment insurance, workers' compensation
- nonmandated benefits that do not fluctuate, such as housing
- wage increases, vacation, or rewards that, once earned, are seldom lost
- pay tied to time worked (except for bonuses for attendance, difficult shifts, and the like).

STEPS IN ESTABLISHING STRUCTURED INCENTIVES

This section provides seven guidelines helpful in deciding whether to establish, and how to design and troubleshoot, structured incentive programs at your dairy.

- (1) Analyze the challenge and determine if incentives are appropriate.
- (2) Link pay with performance.
- (3) Anticipate loopholes.
- (4) Establish standards and determine pay.
- (5) Protect workers from negative consequences.
- (6) Improve communications.
- (7) Periodically review the program.

Step No. 1. Analyze the challenge and determine if incentives are appropriate

The purpose of an incentive program needs to be clear and specific. Poor calf health or milk quality, slow work, and sick leave abuse are examples of specific, measurable problems.

Just because a goal can be measured in clear and specific terms, however, does not mean incentives are called for.

Incentives may not be appropriate to motivate employees who lack the resources or skills to perform. No amount of incentive will help an unskilled AI practitioner to improve his breeding record. Because establishing incentives is not simple, dairymen sometimes opt for other solutions. A dairy farmer tried several ways to improve an employee's milk quality performance. A veterinarian was called in to demonstrate proper milking techniques, but the improvement was short lived. The worker knew how to do the job but was not doing it. The producer decided not to implement an incentive pay system. Instead, in a last ditch effort, he warned the milker: improve or be fired. The milker improved so much that the dairyman gave him a raise a few months later.

One three-way classification of employee performance is (1) poor, (2) standard, and (3) superior. *Standard* performance is what can be expected from a dairy worker just because he has a job. Rewarding workers with incentives for bringing their *poor* work up to *standard* would be like paying twice for the same job: once for having the employee show up, the other for working. Instead, an incentive pay

SIDEBAR 1-1

Safety Incentives

Safety incentives reward workers with good safety records (often measured in terms of reportable accidents) or for safety suggestions management considers worth implementing. Rewards for good suggestions can be positive in the area of farm safety as well as in reducing waste, improving productivity, or other areas. However, it seems peculiar to have to pay workers not to get hurt. After all, it is the worker who has the most to lose by an injury or illness. Instead, farmers may improve their safety record through (1) a policy encouraging a safe working climate, (2) worker training, (3) hazard evaluation and correction measures, (4) safety

committees, (5) discipline for violation of safety rules, and (6) careful employee selection, including the use of post-offer, pre-employment physicals.

In some instances safety incentives that deal with reported accidents may be construed to be illegal, as workers seem to be punished for filing workers' compensation claims.

If you still want to recognize dairy employees for a long accident-free spell at the ranch, you may want to tailor a casual incentive. The reward should be given to all and be a simple, low-key, non-monetary prize such as a company hat or picnic. Along with the recognition, emphasis should be on safety and on reporting job-related injuries and illnesses, even those appearing insignificant.



Dairymen may sometimes provide an incentive for employees to finish out the season, such as a per hour or per-unit incentive to be given employees who stay to the end of the season.

program can reward workers who continue to produce *superior* work, or encourage those who already produce *good* work to excel.

Incentives designed to deal with farm safety seem inappropriate to me. Such incentives may do more to deter the filing of workers' compensation claims than to reduce accidents. Workers may hide incidents of injury or illness in order to earn a reward—or avoid the wrath of peers (see Sidebar 1-1).

A farmer who pays well, provides positive working conditions, and has a waiting list of employees who want to work for him, does not normally need to turn to incentives to improve punctuality or attendance, except for seasonal work.

Extra pay may also be provided to recognize particularly difficult conditions, such as staying through extra wet or cold months at the dairy.

Tradition is not always the best indicator of what programs will work under incentive pay.

Incentives are often needed to counteract the effect that crew dynamics has on performance.⁶ Dairy workers may work down to the speed of their slowest co-worker.

Step No. 2. Link pay with performance

Some dairy farmers offer end-of-year profit sharing plans “because we did well this year.” Lamentably, there are too many factors that affect dairy farm profits besides worker productivity. Weather and market are two external concerns, while farm accounting procedures can be an internal one. Personnel must trust that the dairy enterprise will report profits in a fair and honest way.

Dairy employees do not always see a link between their efforts and dairy profits. Another danger is a streak of ever increasing profits followed by several years of deficits simply caused by the price of milk. While many workers will be very understanding at receiving a reduced profit-sharing paycheck for a year, few will tolerate a longer drought without experiencing considerable dissatisfaction. One manager shared with me his excitement about a substantial profit-sharing bonus. As a result, he worked much harder the next year and felt defrauded when that check ended up substantially reduced when compared to the first year. He soon left that enterprise.

In another instance, a worker at an equine and cattle facility explained, “I put the same effort each month, but in some I get the added bonus of getting a profit-sharing check.” The ranch employee was explaining that he did not do anything special to try and get a higher bonus, but that some months he would get one while in others he would not. Since he was not putting any effort into obtaining the bonus, the employee felt that it was a windfall in those months when he would get something.

Instead of being a motivator, profit sharing can discourage employees. Not only are profits dependent on the efforts of the whole organization, but profits can be fickle in dairy farming.

Risk sharing is related to profit sharing. Here employees are given higher profit-sharing bonuses in good years in exchange for getting a lower base pay than normal in unprofitable years. That is, in contrast with the normal system of profit sharing, in bad years the employees not only did not earn a bonus, but also lost part of their base salary; in good years, they earned bonuses much greater to what they would have earned normally. It is not surprising that companies favor risk sharing ventures more than employees do: “[The employee] gambles along with the company... Clearly, at-risk plans shift some of the risk of doing business from the company to the employee.”⁷

Any time employees are rewarded or punished for that which they cannot control, dairy employers are asking for a cynical or disillusioned workforce. All this having been said, some dairymen may wish to have a *very small* profit-sharing bonus as a teaching tool for top and middle management. Much better than profit sharing, however, is breaking down all elements under the control of employees or management that affect dairy profits and rewarding personnel for achieving results.

A Fortune 500 executive, after explaining three of his most important goals—making an important contribution to society, developing excellent products, and making the organization a good place to work—made quite an impact as a guest speaker by pretending to momentarily forget his fourth goal: “The fourth goal . . . there must be a fourth goal. I mentioned it in a speech at [a nearby university]. Oh yes, the fourth goal is to make a profit.”⁸ Sooner or later, then, when the profit potential is there, the dairy enterprise will make money as employees improve their ability to make changes in areas they control.

Seasonal fluctuations and other factors may need to be considered when setting incentives. When attempting to control mastitis in the herd, for instance, a dairy manager has to consider variables beyond the control of her

workers. Because mastitis is caused by several factors, it is desirable to consider them all. A milker would soon be discouraged if, no matter how diligently he used any specific prevention technique, the mastitis level was sensitive to improper machinery maintenance or seasonal fluctuations caused by environmental factors.

One way to categorize incentive pay is by whether individuals, small groups, or all dairy personnel are covered. Individual incentive plans offer the clearest link between a worker’s effort and the reward.

Probably the best-known individual or small group incentive pay plan in agriculture is *piece rate*. Piece rate is not suited to much of the work that takes place at a dairy. There are other types of individual incentives, however, that can be given at the dairy.

Small group and farmwide incentives work better when it is difficult to distinguish individual contributions, or where cooperation and team work are critical. Group incentives do not automatically foster team work, however. More productive workers may resent less motivated or less talented employees.

A supervisor reported that when his crews were paid a group incentive, the fastest workers would slow down the most. This is not surprising, given that the fastest employees are four to eight times more effective than the slowest. Some of them may ask themselves, “Why rush when we will all get paid the same?” When paid on a strict hourly wage sometimes workers “sort of kick the tires, take a lot of trips to the

Instead of being a motivator, profit sharing can discourage employees. Not only are profits dependent on the efforts of the whole organization, but profits can be fickle. This is especially true in farming where there may be a rash of good years followed by bad ones.



bathroom” and slow down in other ways. “The faster workers put a lot of pressure on the slower ones,” explained one farm manager, “and we have even had those who felt so harassed they wanted to quit. The system has created tension and conflict among the workers.”

As the tie between individual work and results is diminished, so is the motivating effect of the incentive on the individual. If you use small group incentives, it helps to have workers choose and control their own teams, but this is seldom possible at most dairies. When workers who have partial control over results are not included in the incentive pay program, conflicts may arise.

Step No. 3. Anticipate loopholes

Being so specific about a single result may cause workers to achieve it at the expense of all others. Examples include the herd manager who reduced the average number of breedings per conception, but did so by culling several of the best milk cows.

Allowing workers to “go home” (with a full day’s pay) when they finish milking has the same motivating effect as most output-based incentive pay systems—and similar problems. The incentive is to get done as quickly as possible and go home.

Dairy workers rewarded for detecting cows in heat (as part of a breeding program) may find an unusual number of cows in heat. Instead, workers could be paid for detecting cows in heat who are later confirmed pregnant.



Dairy workers rewarded for detecting cows in heat may find an unusual number of cows in heat. Instead, workers could be paid for detecting cows in heat that are later confirmed pregnant.

The number one loophole for *quantity* production incentives is often *quality*. If the dairy farmer does not take any preventive measures, his milkers who are paid by the cow (or allowed to go home as soon as they are finished, yet paid for the full shift) is more motivated to finish quickly than to do a good quality job following all of the milking procedures.

Sidebar 1-2 speaks about keeping up good quality when paying people for quantity-based performance.

Step No. 4. Establish standards and determine pay

This process involves clarifying expected performance, considering agricultural variations, noting when it is fair to eliminate incentives, contemplating potential savings and gains, determining base wage versus incentive pay, anticipating effects of technological or biological change, and converting standards into pay.

Clarifying expected performance.

The first task is to establish and define standards.

- When feeding, how close should the feed be to the cows? Is the employee supposed to come back and push the feed closer?
- Will mortality calculations part of a greater calf health program include all calves—even those born dead or killed by lightning? Or, will a veterinarian conduct a calf autopsy and decide if it was a preventable loss?
- What are all the steps required in the milking procedure?

Agricultural variation. Each agricultural commodity has its own idiosyncrasies that can be used to determine work effort. In one orchard operation,¹¹ crop density is used to determine how to pay for thinning fruit load. Weather conditions at a dairy may

affect ease of work and specific bonuses based on actual temperatures or precipitation may be given.

Elimination of incentives. The specific circumstances for eliminating incentives should be clearly related to

the incentive and articulated ahead of time. Employees on a milk quality incentive could lose incentive earnings, for instance, if (1) the milk got hot because no one turned on the cooler, (2) cows with antibiotics were milked into

SIDEBAR 1-2

Approaches Toward Improved Quality while Paying Piece Rate or for Quantity of Work

Hourly base pay with piece-rate pay. The greater the proportion of pay going toward hourly pay, the less importance given to quantity of work. These farmers may not be getting their money's worth, however. Hourly paid workers are substantially slower than piece-rate ones without obtaining sizable improvements in quality.⁹

Speed limit placed on workers. It is true employees who work faster than their skill level will do so by neglecting quality. Unfortunately, limiting worker speed, to be effective, would have to take place on a worker-by-worker basis. A maximum speed standard established for all employees would likely result in expectations overly high for some and too easy for others.

Discipline. Minimum standards are set—or workers risk being disciplined. This tactic is perhaps the most commonly used and works relatively well.

Quality incentive. This method may take more time to set up but has the greatest potential. Set up *random quality-control* inspections or spot checks. Substandard scores can result in additional training or discipline. Superior scores earn a bonus. Here is an example outside the dairy industry: a cherry farmer may pay \$3 per box picked, with a potential multiplier of 1.084 for good quality or 1.25 for superior quality (about 25 or 75 cents per box, respectively). Three workers picking 24 boxes each in a day would earn \$72 (no bonus), \$78.05 for good work, and \$90 for superior work. The quality bonus has to be high enough as

to provide greater rewards to the careful employee over the one who picks more boxes.

Earn the right to work in a piece-rate paid crew. An effective management tool is to have employees work on an hourly paid basis until they can prove their complete understanding of quality considerations. Only when workers have shown a complete mastery of quality are they moved to a piece-rate paid situation. For instance, a milker would have to prove she understands milk quality procedures perfectly before being permitted to go home after finishing a shift. As a condition of working in the piece-rate situation, milkers would be expected to keep up high quality performance. This approach can be effectively combined with discipline and the quality incentive above.

When paying for quantity of work performed, quality incentives take more time to set up but have the greatest potential. Begin by identifying a range of acceptable individual performance. Then set up random quality-control inspections or spot checks. Sub-standard scores can result in additional training or discipline, while good marks earn employees an extra bonus per unit.



the bulk tank, or (3) line filter changes were neglected.

It makes little sense to eliminate a bonus for reducing calf loss for employees who commit unrelated infractions (e.g., displacing a tool, getting into a fight). Any prolonged elimination of incentives risks surrendering any motivational effect the incentive program may have had. If the breach is so serious, perhaps the dairy farmer should consider worker discipline or termination.

Potential savings and gains. A dairy farmer trying to increase calf health may ask: how much does it cost me every time a calf dies?¹² Unfortunately, many employers think more in terms of how much they expect workers to earn in an hour—rather than what the incentive program does in reducing costs (e.g., costs per acre). In a well-designed incentive pay program, a dairyman should feel that the more his employees earn, the better off he is.

There may be a point where improvements beyond a certain level require a substantially greater effort, yet yield less significant results. Efforts may be better directed elsewhere. There is a substantial milk production increase when somatic cell counts reduce from log scores of 5 to 4 or 3, but a smaller proportional increase in milk quantities for further improvements. For the worker to achieve the first improvements, also, is much easier.

Two conflicting principles must be balanced here: (1) greater worker effort should result in greater pay; and (2) greater employee earnings should result in increased profits for the ranch. You may need to create a reward structure with a ceiling beyond which no additional pay increments are obtained.

Base wage versus incentive pay. Some incentives constitute 100 percent of a worker's wages. Other incentives are combined with base wage earnings (Chapter 2). As a rule of thumb, the percentage of potential wages represented by incentives should consider the (1) amount of *control* a worker has over rewarded results, (2) *importance* of the rewarded results to the overall position, and (3) possible

loopholes not covered by the rewarded results.

For instance, work quantity incentives can constitute most of an employee's wages if she has complete control over the outcome, speed is important, and quality is taken into consideration so it is not neglected.

In contrast, a herd manager does not have full control over calf health, nor does calf health represent his only job. This same manager may also be concerned with herd feed intake, improving milk quality and pregnancy rate, and supervision of milkers. A pay system for such a manager should reflect the wide spectrum of what is expected of her.

Anticipate effects of technological or biological change. If new machinery, technology, biological stock or methods are being contemplated, dairymen would do well to postpone introduction of new incentive programs until after such changes have been made and their effectiveness evaluated. Otherwise, the dairy farmer will not be sure whether it was the technological change or the incentive pay that brought about results. Workers may either be blamed or paid for something over which they had little control. For example, thousands of dollars can be spent on new equipment that would automatically improve workers' performance. If the incentive was established before the equipment was purchased, it would mean paying twice for the equipment: the direct cost of the equipment plus the cost of the higher remuneration to the workers. Any changes in technology or measurement have the potential for a change in standard and can lead to distrust if not handled properly.

Converting standards into pay. If no historical performance data exists for making sound pay decisions, you may want to do the work yourself—or ask others you trust to do it. In no case should the people who will eventually do the work, or someone who has a vested interest in the results (e.g., a herd manager with relatives in the crew), perform the trial.

When dairymen ask employees to work first on an hourly basis until the

standard is set, workers may perform at a reduced level (while sometimes making it look as if they are struggling or working very hard). Employees realize high performance during the trial will result in lower wages once the bonus is fixed.

Once standards are set, a dairy farmer may lower the requirements but *never* make them harder. A farmer underestimated worker performance. When the workers earned much more than the farmer expected, he lowered the piece rate. The farmer lost credibility, worker morale fell sharply, and many left for other jobs.

Step No. 5. Protect workers from negative consequences

Employees have a number of reservations related to the use of incentives. These include such things as fear of job loss, unfair pay, and rate reductions. In the section on loopholes we considered how to protect the dairy farmer when incentives are used. To also protect employees we need to:

- Provide a fair wage.
- Tell employees how much they are earning.
- Maintain fair standards.
- Hire fewer workers for longer periods.
- Protect senior workers.
- Provide timely performance feedback.
- Be sensitive to physical demands.
- Encourage workers to take rest breaks.
- Provide a safe environment.
- Avoid chance incentives.

Provide a fair wage. Workers are more likely to feel incentives are an excuse for low wages when they do not receive a fair base wage to begin with. (That is, in those cases where there is a base wage plus an incentive, which would be the case in most dairy jobs in contrast to say, a fruit picker.) Employees may see incentives as either requiring unachievable goals in order to make a competitive wage, or only partially under their control. In contrast, when added to a generous base wage, incentives may be quite small and still

be well received. Workers may look at them more as *casual incentives*; they provide positive feedback and a feeling of belonging to a team. If incentives are not proportional to the amount of work involved, however, they are unlikely to provide the intended long term motivation.

Tell employees how much they are earning. Pickers at one California farm did not find out what the piece rate was until the end of each day when they got paid—which was strictly on a per bucket basis. A worker thinning peaches did not know how much he was earning per tree. In a third example, workers in Voronezh, Russia, who were putting boxes together for packing fruit, did not know how much they would get paid per box until the end of the month. In each of these cases, the farmer, the farm labor contractor, and the enterprise manager respectively explained, “Our workers trust us.” It became obvious, however, that the more buckets picked by the cucumber crew, the more trees thinned, or boxes built, the less they were going to get paid per unit. One of the workers in the thinning crew expressed frustration at not knowing what the piece rate was and pointing to the end of the long row said, “If I knew how much I was getting paid per tree, I would have already finished the row and would be on my way back.” These same principles can be applied to the dairy operation.

Maintain fair standards. Even after an incentive standard is fixed, workers may be hesitant to show the dairy farmer their full performance potential. I will give some examples from outside the dairy industry, but similar principles can be understood at the dairy. A grape grower called to express a fear that his employees were *earning too much*. “I have been thinking of reducing what I pay per grapevine from 32 cents per vine to 28,” he explained. I explained to the grower that the piece rate should not be diminished, that half his crew was apt to leave—the better half—and the other half would never trust him again. “I was just putting you to the test,” the grower retorted. “I reduced the piece rate last week, and half the crew already left ...”

Crew members sometimes exert pressure on overly productive coworkers to have them slow down. They fear standards will be increased (i.e., they will have to put in more effort to make the same amount) either now or in future years. A worker described how on a previous job he had been offered \$1 per box of apricots picked. When he picked 100 boxes for the day within a few hours the rate was suddenly changed to 50 cents per box. Another worker explained, “If we are making too much on piece rate we are told to also weed, and that reduces our earnings.”¹⁴

At a large orchard operation, top management was mistakenly focusing on average earnings per hour (by translating piece rate costs into hourly wages). Instead, they needed to focus on *cost per acre* or *cost per job*. When piece-rate paid workers made what to top management seemed like overly high wages, their pay rate was reduced with disastrous results: the best employees left, and trust was destroyed for those who remained.

In order to counteract management’s tendency to lower the piece rate, a clever production manager formed crews where high earning workers were balanced out with slow ones. This kept top management satisfied (because the average cost per hour was not too high) and yet allowed fast workers to earn more with less fear of having their

wages cut.¹⁵ This practice, of course, does not solve the real problem, nor does it entirely overcome the disincentive to faster, more effective work. For instance, this production manager may not want to use a practical test to improve the number of superior crew workers because of the wrongful dependence on costs per hour as a productivity gauge. It just wouldn’t look good to his supervisors if workers started earning more.

The changes in standard may not be blatant. For instance, when hourly paid workers get a cost-of-living raise, dairymen may reason that those being paid a quantity or quality based bonus do not need a raise as they are already earning much more. Without the raise, the premium for *effort* given to incentive paid workers is thus reduced. Yet those working under a well designed pay for performance system exert considerably more effort.

The design of the incentive may be poor, also. For instance, dairyman may give employees an incentive for achieving a percentage of improved productivity over previous performance, such as improving milk grade. Once certain goals are achieved the dairy farmer needs to be pleased with the improvement rather than requiring a percentage improvement each year. There comes a point where the better we are at something, the harder we need to

SIDEBAR 1-3

Do Piece-Rate Paid Crew Workers Leave after Making a Wage Goal?

Some farmers resist increasing incentive pay levels when compensating seasonal crew workers. They have hypothesized that workers have a certain earnings goal for each day and that once this goal is achieved, workers will go home. Economists would explain this phenomenon as the *income effect*: increases in income allow those in the work force to take more time for leisure activities.

But economists also speak of the *substitution effect*: the greater the

wages, the more a worker forfeits by engaging in leisure time. A study in numerous crops showed that fewer than three percent of crew workers out of more than 440 left work after reaching a wage goal for the day. About 11 percent of the respondents had at some time left earlier in the day, but the reasons given were (1) getting overly hot or tired or (2) not making a sufficient wage (i.e., low wages or not enough to pick). In either case, these workers were generally willing to stay longer if the earning opportunities were greater. Workers need to maximize earning opportunities when they can be fully employed. Leisure could come later, during “down time.”¹³

work to make the next level of improvement. An “S” shaped curve can be used to illustrate the phenomena. Improvement at first may be slow, then very fast, and then slow again. In some cases, of course, there may be another “S” shaped curve waiting for us even when we thought we had improved all we could.

In one farm operation employees “reached an expected threshold and there was no further change” after that. The more workers improved, the harder it was to surpass previous performance levels and gain an incentive reward. This employer dropped his incentive program. I wonder if performance reverted to a lower level, too.

To conclude this set of examples with a more positive one, a prominent California vineyard operator called in frustration: “We have an employee who is earning \$45 per hour by the piece! We must be doing something wrong!” Like the other farmer, they wanted to cut piece rates, but fortunately these growers called before making the change. I was able to explain that \$45 per hour for the best employee was not out of line to what the research indicated. The best farm worker in a crew was capable of four to eight times the performance of the worst. I *congratulated* this farm enterprise, they had achieved trust from the workers!

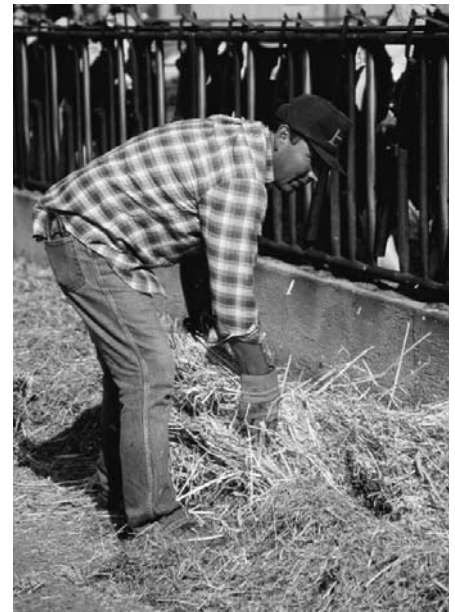
Sometimes dairymen get paid less

for their milk or have to pay more for the commodities they purchase in order to feed the cattle. When dairy farmers are forced to cut incentive wages in order to stay in business, they are likely to lose workers’ trust. Part of an effective labor management policy is to carry over dairy income to protect workers’ future earnings. This will help balance out some of the rough spots so inherent in agriculture.

Some jobs require extra *effort* while others mean extra *time* (e.g., time spent improving quality). Incentives should compensate employees for the extra amount of time required to accomplish a job. For instance, if employees spend about half an hour more per milking shift to improve milk quality, the incentive should pay more than the half hour per shift the dairy farmer would have had to pay on an hourly basis.

Hire fewer workers for longer periods. Workers are less likely to slow down when they realize there is plenty of work to do. When time frames are not critical, it is often preferable to hire fewer, better-qualified people to do the job. You can manage to save money while providing a longer season and higher pay rates for employees. While most of the work in the dairy parlor and around the animals is pretty constant, this principle needs to be taken into consideration when hiring people who work in crops.

Dairymen will not derive the full benefits of quantity based pay until workers are confident that high earnings today will not translate into reduced rates in the future.



Rather than just firing long term employees who do not do as well under an incentive pay program, or in order to have fewer employees, dairy farmers will want to have a policy of reducing their work force by attrition rather than by terminations.

Protect senior workers. Dairy farmers may, through a careful selection process, avoid hiring employees who cannot perform the job. Those who employ workers without first testing them may want to introduce incentives to encourage the most productive workers to stay and produce. Dairymen who have poor performers in their staff may wish to deal with this issue before introducing an incentive pay program.

Sooner or later dairy farmers need to deal with long time employees who are no longer in their prime. Many dairy farmers rightfully feel a sense of responsibility for these workers and often find less strenuous tasks for them. For instance, some dairymen may employ older workers to do tasks that are strictly paid by the hour and leave more strenuous jobs for others. It is not uncommon for senior workers to outdo younger ones, of course, and assumptions about worker capabilities based on age are often unfounded.

Provide timely performance feedback. Effective performance appraisal and communication is critical. Supervisors need to provide effective training and appraise worker performance in a timely fashion. Dairy farmers who have workers earn the right to work on a quantity-based bonus (see Sidebar 1-2) by showing complete understanding of quality issues ahead of time, are likely to end up with fewer miscommunications with their employees.

The simple act of making a list of criteria that are important to you and sharing those with workers will go a long way towards improved quality. Taking the next step, of sharing with employees how well they are doing, can cement good habits. It also helps to provide samples of what is considered good quality work.

Be sensitive to physical demands. The physical demands of speed or

quantity based performance are such that workers need to work fewer hours than when paid by the hour,¹⁶ or risk health problems. This is especially so with more physically demanding jobs in the summer heat. Generally, the maximum workers can perform when paid by the piece is seven to eight hours. It is important to provide plenty of cold water and have it sufficiently close to the work being performed so workers will drink it. It may be necessary to provide worker training on the importance of drinking sufficient water. Encouraging workers to drink early (before they become thirsty) and at frequent intervals may reduce body fatigue.¹⁷

Encourage workers to take rest breaks. One disadvantage of quantity based pay incentives is that employees may want to forego their breaks.¹⁸ Making sure employees take their breaks is likely to reduce injuries and mistakes as well as increase worker preference hourly paid work. While those who perform hourly paid tasks take breaks on the dairyman's time, those on productivity incentives would have to do so on their own time. One way to encourage employees to take breaks when paid by the piece is to bring warm bread or cold sodas out to the crews. Even more effective, is to insist that workers take a rest and pay them for the break time, either on an hourly basis or as a proportion to the incentive they would have earned.

Provide a safe environment. The hard pace of some incentive pay work may increase back or other work-related injuries.¹⁹ Farmers should consider ergonomic measures that facilitate, to the greatest extent possible, a work environment free of injury and illness. Some suggest worker pace should be limited to protect workers from injury. Unfortunately, as we said when discussing this issue as it related to quality, limiting the total performance of workers would only be effective on a worker-by-worker basis, as optimum pace varies among employees.

Dairy farmers may want to go to an occupational medicine facility to design appropriate warmup or stretching

exercise programs for workers. Effective employee selection, training, and supervision can also do much to reduce injuries.

Avoid chance incentives. Chance incentives use luck (e.g., a chance at winning a TV or trip) to reward specific worker behaviors or results. Often those who are poor are especially attracted to gambling, hoping for things they are unlikely to achieve unless they get lucky. Employers who use chance incentives are gambling for the employee.

In the *short run*, some chance incentive programs may produce the specific behaviors or results dairymen are looking for. But how appropriate—or to use a stronger word, how ethical—is the use of such chance incentives?

Key questions dairy farmers might ask themselves before implementing a chance incentive are: Is it fair to each worker? Who benefits from the incentive? Is the incentive being offered because paying each worker would cost too much? Or because what each worker would get would seem too little? Are all workers rewarded for their work efforts? Is this incentive sustainable in the long run producing good results for both the owner-operator as well as the employees?

Step No. 6. Improve communications

To improve communication with and between employees:

- Build positive interpersonal relations.
- Explain the program.
- Prepare a bargaining style.
- Provide feedback.
- Be open for suggestions.

Build positive interpersonal relations. Positive interpersonal relations between management and employees, as well as among employees, are a must before installing a successful incentive pay program. Incentives often add some tension and stress, especially at first, before results showing success are clear. Added demands for positive two-way communication, feedback, and teamwork will increase. If interpersonal

conflicts already exist, they should be worked out first, rather than hoping they will dissipate after the incentive program is established.

Explain the program. A simple program will help build trust. At minimum, all workers need to know what is expected of them and how their performance will translate into pay. It helps when the incentive plan is presented to workers for review and comments before implementation. Workers might spot not so obvious shortcomings or obstacles, and they are more likely to accept the performance challenge when they are involved. Better yet, is to involve workers in the design of the incentive pay program from the outset.

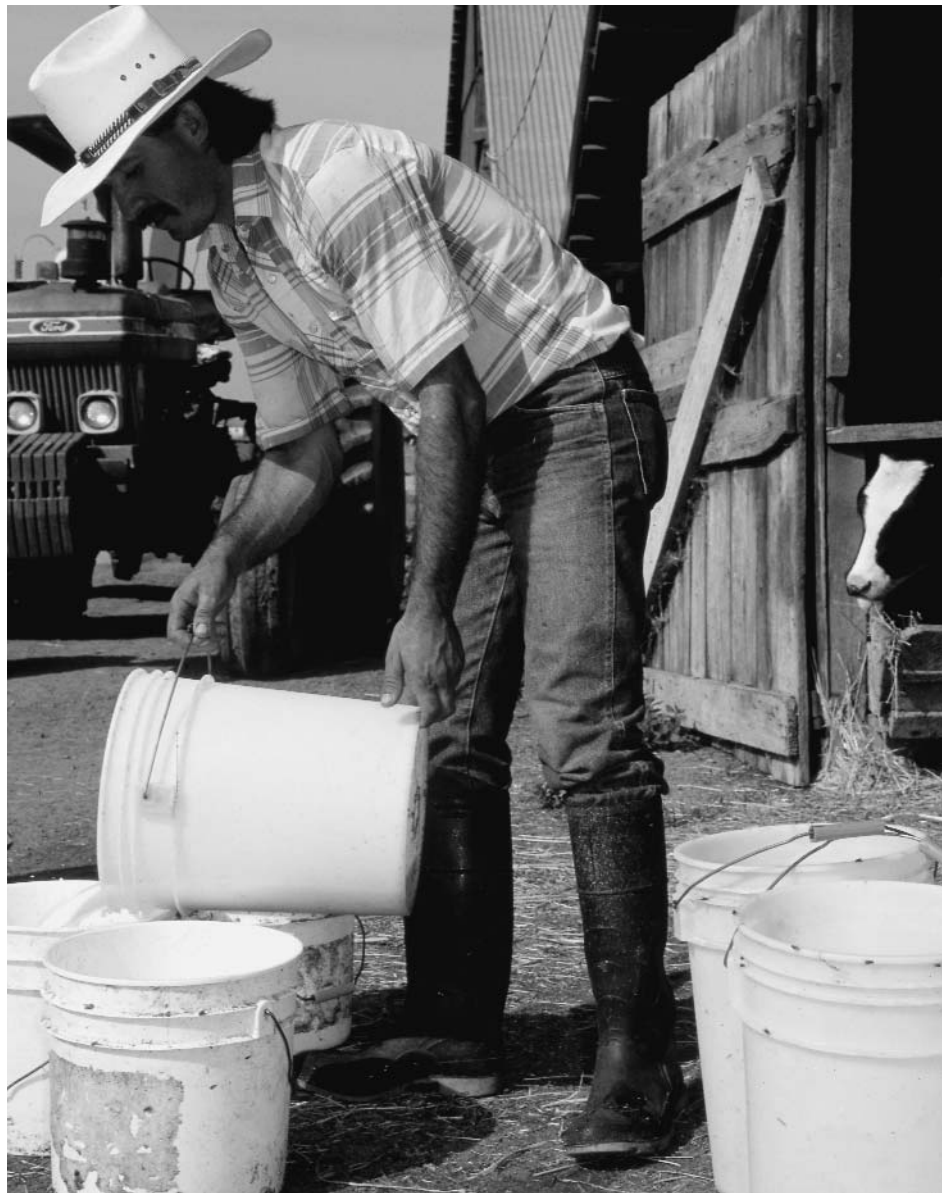
If an expectation is set that employees can very easily make the top incentive goal (e.g., for improving quality), the incentive may act as a demotivator. Instead, dairy farmers should encourage employees to try their best and begin by shooting for the lowest level. If the accomplishment exceeds the workers' expectations, all the better.

Prepare a bargaining style. Some negotiation on pay rates may be traditional. Know how much you pay compared to others, and consider all factors in terms of how your dairy compared to other dairies and other employers workers may want to compare themselves against (more about this in Chapter 2).

One farmer encountered stiff resistance from employees regarding wages. They pointed out the neighbor's higher wages. The farmer aggressively told workers they could look for work elsewhere if they did not like the rates. This situation ended up in a labor dispute, as workers felt they had been *constructively discharged* (i.e., forced to quit) in order to save face.

Instead, this farmer could have calmly explained how he arrived at the pay level and told employees he hoped they would be able to work for him at this wage. Perhaps the neighbor pays more but keeps employees for a shorter season or does not provide as many benefits.

If an expectation is set that employees can easily make the top incentive goal (e.g., for improving quality), the incentive may act as a demotivator. A herd manager, for instance, may start each month assuming he will earn the full possible award for reducing calf mortality. This herdsman will be discouraged when he sees his bonus vanishing as each month comes to an end. Dairy farmers can encourage employees to try their best but set up more realistic expectations of what can be achieved.



By posting wages where they can be readily seen by all applicants, the dairyman avoids (1) surprising workers, (2) haggling, or (3) taking a chance on a confrontation that may get ugly and out of hand.

Provide feedback. Dairymen need to provide frequent feedback to employees, regardless of the usual pay interval. For instance, milkers may be paid on a bi-weekly basis but receive more frequent performance feedback. Feedback may be given in person or posted to safeguard worker anonymity.

An effective method of providing meaningful feedback is through a separate paycheck, or “*adder*,”²⁰ for the

incentive. For greatest effectiveness, adders should be given at a different date than the usual payday, or at the very least, in a separate check. This reminds the recipient that the extra compensation is for a specific purpose (e.g., such as a wet winter or harvest months involving long hours) and will last only as long as the condition merits.

Be open for suggestions. After the incentive is in place, workers may not be pleased with it. A dairy farmer who employed five workers was approached by two of them. They asked for a raise and the elimination of the incentive pay program set up a year earlier.

The producer, rather than ask the

other workers if they also wanted to eliminate the incentive, asked everyone, “What can we do to improve the incentive pay system?” In the end, he ended up with a successful program, with workers earning \$300 a month in incentives.²¹

Step No. 7. Periodically review the program

Record keeping and statistical analysis are critical to determine the success of the incentive pay program. Good controls are crucial so incentive pay results can be isolated and correctly attributed to the pay system. If a dairy farmer introduces other changes simultaneously, she may never know the impact of the incentive program. There are a number of statistical tools that may be used to analyze results. Your computer spreadsheet may already allow you easy access to these tools. You may want to consult with a statistician, labor specialist, farm advisor or county agent on what statistical tools to use.

Results may indicate directions for change or improvement. Once the program is in use, changes must involve workers in order to maintain the trust that is so essential to the success of an incentive pay program.

Dairy farmers can benefit from keeping records even if they are not providing incentives. These records can help establish base lines essential for establishing standards for future performance.

In some cases, incentive programs are dropped too soon, without giving the systems sufficient time to work. Several dairy farmers who have established successful incentive programs have mentioned the need for patience—sometimes having to wait several months for the program to function well.

SUMMARY

Incentive pay has the potential to increase worker productivity if properly designed and maintained.

Even though employees know that attention to detail, increased

productivity, or suggestions may bring about rewards, casual incentives are characterized by the inexact or unexpected timing and amount of the reward.

Dairy farmers’ structured incentives are most likely to succeed if they have (1) accurately established standards; (2) clearly linked superior performance with pay or a valued reward; and (3) carefully considered what type of performance the incentive stimulates. Effective incentives are designed so the more an employee earns, the more the farmer benefits.

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Unless otherwise indicated, photos in this chapter were taken by the chapter author.

Internal Wage Structure



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To be effective, pay must be tied to performance. While incentives (Chapter 1) can yield the clearest link between performance and pay, they are not suitable to all jobs at the dairy. In this chapter we will look at wage structures, or time-based pay. Even though its relationship to performance may not be as salient as incentive pay, time-based pay can also motivate increased worker performance.

Pay issues covered in this chapter include (1) pay fairness; (2) what is

behind pay differences; (3) job evaluations and market considerations; (4) elements of a wage structure; and (5) maintaining a pay structure.

PAY FAIRNESS (PAY EQUITY)

In a casual survey I conducted, workers said that they expected wages to: (1) cover basic living expenses, (2) keep up with inflation, (3) leave some money for savings or recreation, and (4) increase over time.

Workers also become concerned later in their careers about supporting themselves during their retirement years. Personnel who have lived in dairy-provided housing will find it especially difficult to afford payments on a new home after they retire.¹ Although beyond the scope of this work, dairy farmers may want to look into retirement and tax deferred plans to cover some of these future needs.

Even if a dairyman devises a wage structure to satisfy these expectations, worker dissatisfaction may arise if either *internal* or *external* equity principles are violated. Simply put, internal equity refers to the relative fairness of wages received by other employees in the same organization. External equity is fairness relative to wages outside the organization. Depending on the type of work and location, tests of external equity may involve comparisons with other dairies, other types of agriculture, or even nonfarm corporations.

Employees will act to restore equity if they perceive an imbalance. In evaluating the fairness of their pay, employees balance *inputs* (e.g., work effort, skills) against *outcomes* (e.g., pay, privileges). Workers may experience guilt or anger if they feel over or undercompensated. The greater the perceived disparity, the greater the

tension.² Employees may seek balance in the following six ways:

(1) modify input or output (e.g., if underpaid, a person may reduce his effort *or* try to obtain a raise; if overpaid, a person may increase efforts or work longer hours without additional compensation);

(2) adjust the notion of what is fair (e.g., if underpaid, a worker may think himself the recipient of other benefits—such as doing interesting work; if overpaid, an employee may come to believe he deserves it);

(3) change source of equity comparison (e.g., an employee who has compared himself with a promoted co-worker may begin to compare himself with another worker);

(4) attempt to change the input or output of others (e.g., asking others not to work so hard or to work harder);

(5) withdraw (e.g., through increased absenteeism, mental withdrawal or quitting);

(6) forcing others to withdraw (e.g., trying to obtain a transfer for a co-worker or force him to quit).³

The issue of fairness is critical to compensation administration and most every phase of labor management. Generally, workers and managers agree, in principle, that wages should take into account a job's (1) required preparation, responsibility, and even unpleasantness,⁴ and (2) performance differences and/or seniority. Less agreement exists about the relative importance of each of these factors. Challenges in applying differential payment stem from subjectivity in the evaluations of both jobs and workers.⁵

Equity considerations influence the satisfaction of the workforce. Within a broader view, the stability of a nation may be affected when the contributions of any segment of society are either greatly exaggerated or undervalued.

WHAT IS BEHIND PAY DIFFERENCES?⁶

Dairy farmers sometimes ask if they should pay workers the same. Philosophical differences affect

Workers expect wages to:

(1) cover basic living expenses, (2) keep up with inflation, (3) leave some money for savings or recreation, and (4) increase over time.



judgments employers make about their wage structures. Some think all members of a society should receive enough income to meet their necessities. Such employers may base pay more on the needs than on the contributions of the individual dairy employee. To some, all jobs contribute equally to the dairy's productivity and, therefore, all employees should be compensated equally. By this standard, pay differences are based on *how well* a job is performed rather than *what* job is performed. In a contrasting system the nature of the job—besides the quality of performance—is an important part of how pay differences are set at the dairy.

In making pay decisions at the dairy farm, you have much flexibility within the constraints of the law, labor market, and local norms. The choices you make will affect employee recruitment, retention, satisfaction and performance.

Alan, a former Farm Bureau president, was asked by his workers why irrigators were paid less than equipment operators. After considering the question, Alan concluded these wage differences among his workers were rather arbitrary. He decided to start paying everybody the same hourly rate. A dairy farmer, Cecilia, increases wage rates as employees move up the job ladder from milker to herd manager.

What do Alan and Cecilia gain or lose from their respective approaches? The single rate Alan has settled on is fairly high. He has raised lower wage jobs to the level of better paying positions, rather than the reverse. His total wage bill is probably higher than it need be, but it is buying him a relatively content work force. Simplicity is one advantage of this approach. Alan does not have to adjust rates for employees when they work outside of their usual assignments—which is often.

Most dairy farmers require flexibility in employee assignments. Individuals are called on to wear several hats and use a variety of tools in their jobs. On such a dairy, the worker who is digging fence post holes and fixing corrals today, might be planting alfalfa tomorrow, pouring cement the next day, and entering herd data into a computer



next winter.

Despite the practical advantages of paying everyone identical rates, more skilled workers may resent being paid the same as others. Cecilia forgoes the simplicity of Alan's method in hopes of using pay as a tool to attract, retain, and motivate qualified employees.

Paying different wages for different jobs, however, tends to make people more sensitive to job boundaries. Workers may resist taking on tasks outside their normal routine. On her ranch, Cecilia handles this by paying her workers their regular rates when they perform lower paid jobs. When employees perform more highly classified tasks—which is not often—she pays them extra.

When several positions receive a similar assessment, they can be combined to create a pay grade. To simplify, we will mostly speak of pay grades, but it is understood that pay grades may sometimes consist of a single position.

Of course, pay is not the only factor that affects dairy workers' resistance to taking on tasks outside their normal duties. Employees quickly sense when lower paying jobs are not as valued by management. An occasional chance for a manager to milk the cows may underscore the importance of the job, and also serves as a good reminder of what a milker does.

Employees compare what they earn to what others within the dairy (internal equity) and outside (external equity) make. External equity may involve comparisons with other farms or even non-farm corporations.

SIDEBAR 2-1

Illegal Pay Differences

It is illegal to base pay differences on such protected personal characteristics as sex, race, color and marital status. The term “protected” is used because employees are safeguarded by law against discriminatory practices based on these personal characteristics. Federal law, established in the Equal Pay Act of 1963, explicitly requires men and women performing the same work to be paid the same—with four key exceptions:

. . . where payment is made pursuant to (i) a seniority system; (ii) a merit system; (iii) a system which measures earnings by quantity or quality of production; or (iv) a differential based on any other factor other than sex. . .⁷

Blatant cases of sex-based discrimination include instances where men and women hold the same jobs yet are paid differently with none of the defensible reasons applying. Somewhat veiled, but no less illegal, are cases where sex-segregated jobs are equal, except for their titles, and yet are paid differently.⁸

Once you decide whether persons holding *different* jobs should be paid different rates, the next question is whether pay rates should vary for workers performing the *same* job (e.g., calf feeder). If so, what factors could determine pay differences within a job?

Since abilities and actual performance vary remarkably among individuals, even in the same type of job, individual differences can be acknowledged if each job has a *rate range* (as in Figure 2-1). Higher rates or “upper steps” in the range could be given to employees with longer seniority, merit (i.e., better performance evaluations), or a combination of the two.

Establishing rate ranges requires careful consideration. The relationships between grades and ranges have symbolic and practical consequences. A person at a top step within a pay grade, for example, may earn more than a

person in a higher pay grade, but at a lower step (Figure 2-1). Whether and how much overlap to build into a pay structure is discussed later in this chapter.

While not recognizing differences in the importance of positions, Alan could also establish rate ranges within his flat *wage line* (not pictured here). Like Cecilia, he would need to consider the basis for pay differences with a given job.

JOB EVALUATIONS AND MARKET CONSIDERATIONS

You can arrive at appropriate wages for positions on your dairy on the basis of two main management tools: (1) *job evaluations* (based on compensable factors such as education, skill, experience, and responsibility), and (2) the going rate (or *market value*) of a job.

Job evaluation

A farmer such as Cecilia who pays different rates for different jobs usually first classifies the jobs on her dairy operation. Through a *job evaluation* she rates the jobs on the dairy according to their relative “importance.” Each job might be given its own rate, or jobs of comparable importance may be grouped or banded into a single wage classification, or *pay grade*.⁹

Job evaluations compare positions in a dairy with respect to such factors as

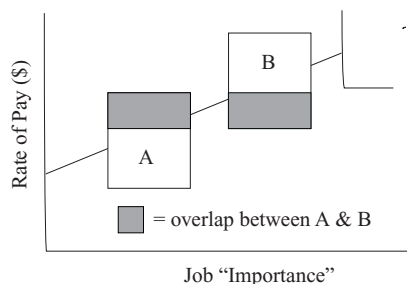


FIGURE 2-1

Pay grades can have rate ranges. Each pay grade is represented by a rectangle; rate ranges by the height of the rectangle.

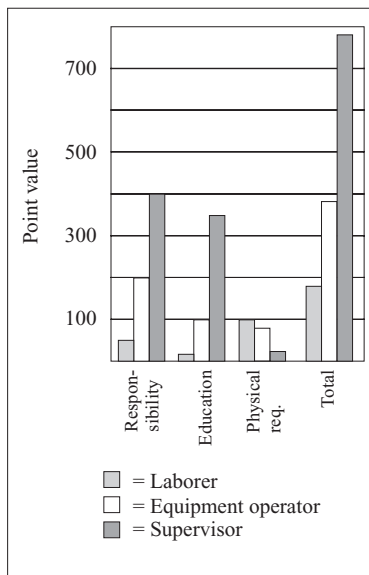


FIGURE 2-2
Compensable factors.

education, responsibility, experience and physical effort. Figure 2-2 shows a sample job evaluation. In it, for instance, much more value is given to responsibility and education than to physical requirements. The supervisor in this example would earn about twice what an equipment operator would.

Figure 2-2 uses education as a compensable factor. You may prefer to think in terms of what combination of experience and education would qualify a person for the job. This is an important step for determining the value of the position to be filled. However, when it comes time to hire someone, you may not care what combination of education or experience an applicant has as long as she can do the job.

If education is used as a compensable factor, a bachelor's degree might be worth 200 points, a junior college degree 150, a high school diploma 100, and an elementary diploma 50 points. Some of the jobs at the dairy might require a high school diploma, thus earning 100 points in this category, while others might have no education requirement (0 points allotted)—regardless of the educational qualifications of the person who may actually apply. Similar ratings of jobs would be made for responsibility and other factors worth compensating.

You decide how much weight to allot various compensable factors and how to distribute points within each job. For the job evaluation to be useful, a detailed list of compensable factors needs to be articulated. (The *job analysis* created during the selection process can help. Or, for a sample dairy job analysis, contact the author.) You can test the job evaluation by comparing a few jobs you value differently. Does the tentative evaluation match your expectations? If not, are there any job factors missing or given too much or too little value?

Workers may also participate in the process of evaluating jobs and can add valuable insight into the essential job attributes for various positions.¹⁰ Personnel involved in evaluating their own jobs, nevertheless, are likely to experience conflict of interest.

Although supervisors will normally make more than those they supervise, this is not always the case. A very skillful welder or veterinarian will probably make more than his farm supervisor.

Job evaluations, then, reflect the relative value or contribution of different jobs to a dairy. Once a job evaluation has been completed, market comparisons for a few key jobs need to be used as *anchors for market reality*. In theory, other jobs in the job evaluation can be adjusted correspondingly.

A very skillful welder or veterinarian will probably make more than his farm supervisor. Piece-rate paid workers often make more than the crew leaders supervising them, as well.





Those who pay at or below the market may have difficulty attracting workers, and may find themselves frequently training people who leave for higher paid positions.

Market considerations

In practice, results of job evaluations are often compromised—or even overshadowed—by market considerations. Labor market supply and demand forces are strong influences in the setting of wages. No matter what your job evaluation results may indicate, it is unlikely you will be able to pay wages drastically lower or higher than

the going rate.

Supply and demand factors often control wages. When there are many more milkers than available jobs, for instance, the going wage decreases. If few good livestock nutrition specialists are available for hire, they become more expensive in a free market. The market may also influence the migratory patterns of dairy workers, for example, whether a worker stays in Mexico or travels to Texas, Florida, Oregon, or even into Canada.

Of course, the market is not totally free. Legal constraints affect wages (e.g., equal pay, minimum wage). Labor groups, in the form of unions, can combine forces to protect their earnings. They may prevent employers from taking advantage of a large supply of workers. At times wages are driven so high that corporations cannot compete in a broader international market. Some professional groups can also impact the market. By limiting acceptance to universities, a limited supply of available professionals is set.

To establish external equity, employers need information about what other employers pay in the same labor market. While some employers are content to lean over the fence and simply ask their neighbors what they pay, others conduct systematic wage and salary surveys.¹¹

Wage surveys need to describe jobs accurately as positions may vary widely even for jobs with the same title. A typical example is the huge difference in responsibilities among herd managers. Surveys should seek information about benefits given employees (e.g., farm products, housing). Of course, there are other “intangible benefits such as stability, the prestige of the position or the institution [and] the possibility of professional development.”¹² Surveys need to consider the number of workers per farm in a given classification. Wages on a farm employing many employees affect the going rate more than one with few.

Yet another viable possibility is for the person conducting the study to take into consideration the number of years each subject has worked.

In some cases, farmers may compete for labor within a broader labor market. When compensating mechanics or welders, for instance, you may have to check what those in industry are paid.

An important pay decision is whether one will pay the going market rate. Those who pay at or below the market may have difficulty attracting workers. Further, they may find themselves training people who leave for higher paid positions. Merely paying more than another dairy, however, does not automatically result in higher performance and lower labor costs. Even when well paid, workers may not see the connection between wages and their performance. Dairymen who pay too much may find it difficult to remain competitive. Furthermore, there are other factors valued by dairy employees besides pay, such as working for an organization that values their ideas and allows them to grow on the job.

Reconciling market & job evaluations

In wage setting, it is usually more beneficial to reconcile market information and job evaluation results than to singly rely on either. Unique jobs at the dairy are more appropriately priced on the basis of job evaluations. You may depend more heavily on the job market for common jobs.

In most cases, dairy farmers have freedom to satisfy both job evaluation and the market. Where the market pays a job substantially less than a job evaluation does, however, you can either pay the higher wage, reconsider job evaluation factors, or pay the reduced wage. The dairyman has fewer viable options when the market would pay a higher wage than the job evaluation.

ELEMENTS OF A WAGE STRUCTURE

Wage structures, we have said, help illustrate many of the decisions you can make about pay. We have already introduced most of the elements of a wage structure (review Figure 2-1) and will revisit them here.

Wage lines reflect *wage differentials*

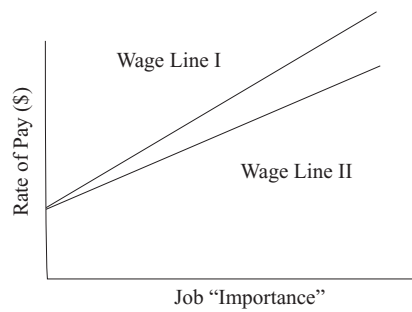


FIGURE 2-3

Wages may begin at the same level but rise steeper at one farm.

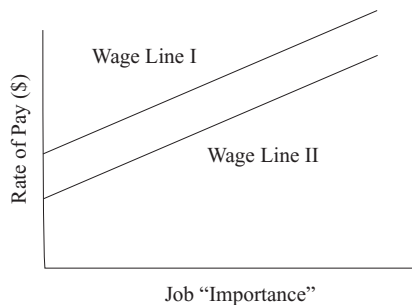


FIGURE 2-4

Pay differential maintained.

between jobs. The *steeper* the wage line *slope*, the greater the differences in pay between jobs. In Figure 2-3, two dairy enterprises pay their lowest level job the same. From this point on, wages for one farm rise at a steeper rate.

Wage lines also reflect the *overall pay level* of the organization. Figure 2-4 illustrates two dairies whose differential between the highest and lowest paid job are the same despite the differences in the total wages paid.

The number of *pay grades* (job groupings sharing the same wage levels) and the scope of *rate ranges* may vary. Rate ranges are represented by the height of a pay grade, that is, the difference between the lowest and highest pay within the grade. For example, the minimum and maximum salaries for cow feeders might be \$10 and \$15 per hour, with a potential \$5 pay range.

The more pay grades, the finer the distinctions between jobs. Alternatively, *broadbanding* is the use of fewer pay grades with larger rate ranges. Broadbanding allows dairy employees to

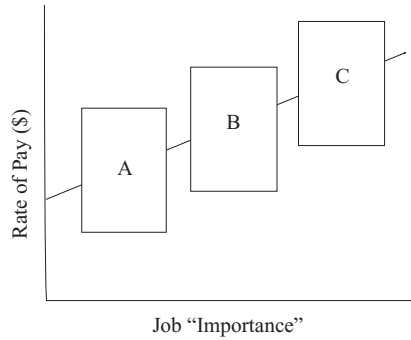


FIGURE 2-5
Few pay grades (broadbanding), with taller rate ranges.

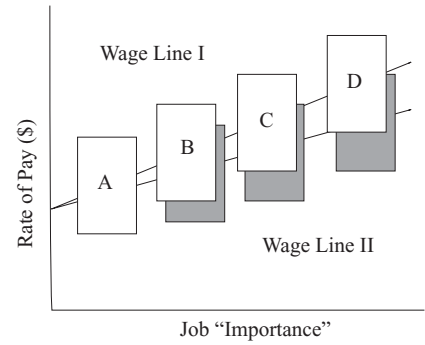


FIGURE 2-7
Flatter slopes lead to increased overlap. Note: Wage Line II is flatter than Wage Line I, and thus contains more overlap.

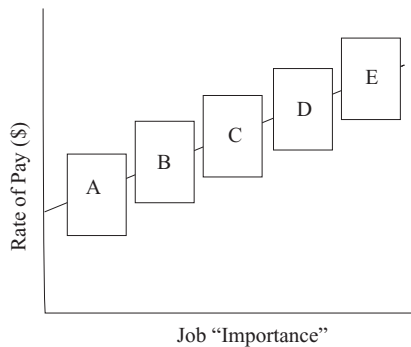


FIGURE 2-6
Many pay grades with shorter rate ranges.

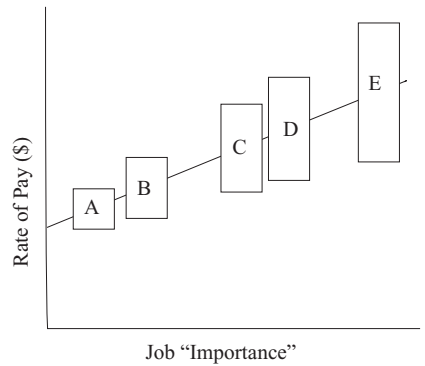


FIGURE 2-8
A fan type structure.

step out of very narrow or rigid job descriptions. Broadbanding may result in significant differences in jobs going unrecognized, and *pay equity* concerns may arise.¹³ In dairies with few pay grades, it may be that there are taller rate ranges within each grade (Figure 2-5). This allows room for pay increases within a grade. Where many grades exist (Figure 2-6) workers may also obtain an increase by moving from one pay grade to another (i.e., being promoted) as they are by getting a raise within their grade. Some farms may have few grades and short rate ranges, also.

There tends to be more overlap where a pay grade slope is flatter (Figure 2-7), or with larger rate ranges. We shall return to overlapping rate ranges once more, as we discuss pay as a function of employee promotions.

Up to here—for simplicity—we have depicted wage structures containing equal rate ranges for all pay grades (i.e., the differential between the starting and top wages within each pay grade are the

same). A fan structure is closer to reality (Figure 2-8).¹⁴ In this kind of structure the rate ranges are comparatively taller for jobs at higher pay grade classifications. To someone earning \$9 an hour, an increase of 50 cents an hour would be significant. To someone making \$40 an hour, the 50 cent raise would not be nearly as meaningful.

When asked how large pay raises should be, consistent with this principle, employees at the lower end of the pay scale often respond in terms of specific dollar amounts (for example, \$0.50 per hour), while those at middle and higher levels tend to speak in terms of percentage increases.

MAINTAINING A PAY STRUCTURE

Maintaining pay equity within a compensation structure after it has been

developed is an ongoing challenge. Here we will look at:

- seniority-based raises
- merit-based raises
- promotion pay
- out-of-line or color rates
- cost of living adjustments (COLAs)
- flat vs. percentage COLAs
- wage compression and minimum wage

Employees traditionally progress within a grade on the basis of merit and/or seniority. Decisions about pay increases should be fair, sound, and well communicated to workers.

Seniority-based raises

Systems providing periodic raises regardless of evaluated merit may be based on the *assumption that ability grows with time on the job*, which simply is not always true. Many dairies use pay increases to reward workers for “belonging” and for their length of employment with the dairy farm. As long as worker performance meets minimum standards, they continue to receive periodic raises.

Some dairy workers value the certainty of seniority-based pay, and workers’ needs for increases in pay through time are met. Seniority-based pay also promotes continuous service and may reduce turnover.

Dairy farmers who give raises on the basis of seniority value the maturity and experience of senior workers, but they are sometimes relieved when senior workers leave. In some instances, senior workers cost organizations disproportionately higher wages and benefits (e.g., longer vacations) than their contribution to the organization. This is not a reflection on the senior employee, but rather, on a system that undervalues the new employee with the promise that in due time, new personnel will be able to earn greater amounts.

In order to avoid having employees climb the pay scale too quickly, smaller but more frequent pay increases may be given early in an employee’s career. Increases later on are given at a slower pace. These increases, without being



overpaid, must be large enough to motivate employees to stay.

Merit-based raises

Merit wage increases are designed to recognize improved worker performance and contribution to the organization. In theory, in a merit system workers earn wage increments proportional to their performance. As with the seniority system, however, once someone climbs to a given wage level at the dairy his wages are rarely reduced. Pay for performance plans (Chapter 1) can solve the problem of giving “permanent” raises based on present and past performance.

Incentives, however, can have a disrupting effect on an internal wage structure. Dairymen who use incentive pay systems for some jobs and not others may find workers in some lower

A herdsman who has one cow and has earned a second one will be very pleased, while one who has many will hardly notice the addition of one more cow to the herd (Weber’s Law). When it comes to pay increases, those at the lower end of the pay scale may ask for a specific dollar amount, while those at higher levels tend to speak in terms of percentage increases.

“value” jobs earn more than those in higher level ones.¹⁵ Dairies some-times abandon their incentive programs or expand them to cover more jobs.

Where pass/fail merit reviews are conducted at specified time-service intervals—and where employees tend to pass—the process may be viewed as a “glorified seniority system.” Length of employment and wages are closely correlated within each job category. In such a system workers would experience the same positive and negative benefits of a seniority system.

Dairy managers may feel unduly constrained when given a choice between recommending a worker for a full step raise or nothing. To deserve no raise an employee must have performed quite poorly. If the choices were even slightly expanded to include half or quarter steps (e.g., half step, step and a quarter), managers may be more likely to reward workers commensurate with their performance.

Whenever performance reviews affecting raises are given at specified time intervals, merit systems automatically include a seniority factor. Alternatively, performance reviews for raises could be triggered by other events, such as specific performance accomplishments, or skill acquisition (skill-based pay).

Some workers may merit faster advances to the top of the pay scale than others. Unfortunately, employees who advance too quickly may not have any further economic increase to look forward to, and experience a feeling of stagnation. The only growth may mean trying for a promotion—or a job elsewhere.

In order to avoid having employees climb a merit scale too quickly, upper levels of the scale must be harder to achieve. Also, if the merit system incorporates seniority (i.e., performance reviews are triggered by time spent on a given pay step) reviews need to take place less frequently as people move up the pay scale.

It turns out, then, that there are fewer differences than expected between seniority and merit based pay systems. In order to fully take advantage of merit

based pay, it is critical that dairy employees understand how they will be evaluated. That is where the *negotiated approach to performance appraisal* can play a key role along with the more traditional appraisal (for more information, contact the author).

Promotion pay

How much of a pay increase should accompany a promotion at the dairy? If there is a pay structure policy, the boundaries of such a decision already exist. A tall rate range or steep wage structure may permit room for larger wage increases after raises or promotions. The wage differential will also depend on the height of rate range occupied by the employee within the present pay grade, as compared to the height in the grade promoted to. Obviously, a greater pay increase will accompany those promotions where the employee moves up more than one pay grade.

Any time there is an overlap between jobs, some workers in a lower grade may earn more than some workers on the adjacent higher grade. If workers are seldom promoted from one grade to another at the dairy, this structural characteristic rarely creates a dilemma.

When workers move from one grade to another, difficulties may arise. There might be some pay overlap between the jobs of “assistant mechanic” and “mechanic.” Consider an assistant mechanic who, because of many years of work, has reached the top of his scale and makes more than a journeyman mechanic who has been working for a couple of years. The journeyman mechanic is likely to tolerate the wage discrepancy because even though the assistant is earning more temporarily, due to seniority, in time the wages of the journeyman are likely to surpass those of the assistant, due to the higher potential earnings in the journeyman’s pay grade.

The challenge arises when this assistant mechanic, who has topped out in his grade, decides to seek a promotion to mechanic. The assistant is unlikely to want to start at the bottom

step of the mechanic scale where he would be making less than in his previous job.

One solution would be to start the assistant mechanic at a higher step level in the mechanic grade. But if the newly promoted mechanic ended up with higher pay than the more experienced journeymen, questions of internal equity may be raised. Both employees are now performing exactly the same job but the one with less experience (although more overall seniority) is earning the same as or more than the other. This pay equity situation may become even more pronounced when the accomplished mechanic has to help train the one who just obtained the promotion.

You may help employees manage career and development plans to avoid losing pay when obtaining a promotion. They will have to apply for promotions early enough in their careers as not to lose the potential economic advantage. Another possibility is to give the promoted employee a one-time lump sum, or *pay adder*, to make the transition into the temporarily lower paying job more palatable.

Another promotion pay consideration is the inherent risk of failure in the new position. The greater the risk of failure (that would call for termination) that a promoted employee faces in a new position, the larger the wage increase should be.¹⁶

Out-of-line or color rates

Sooner or later you will encounter situations where jobs are paid more or less than their actual worth in the labor market. Different “color rates” are commonly used by compensation specialists¹⁷ to indicate particular out-of-line pay relationships (Figure 2-9): *red* and *green* illustrate either over or under compensated jobs—when compared to current worth.

Although the colors imply the farmer loses money with the first and gains with the latter, both situations can be quite costly. If out-of-line rates are not corrected speedily, both internal and external equity will be disturbed.

Red rates (so called because they

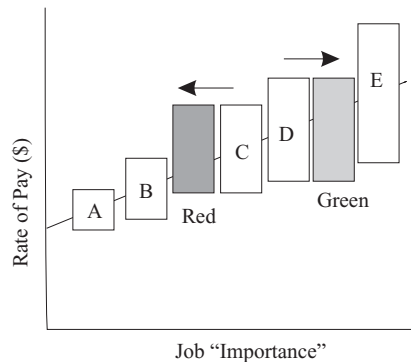


FIGURE 2-9

Red and green rates.

represent overpaid jobs). If rates are allowed to stay out of proportion to the rest of the farm jobs, other workers may feel mistreated. Also, the wage bill will likely be higher than it need be. When red-grade rates are cut abruptly, dairy workers may experience difficulty meeting their financial obligations. Smoother alternatives include combinations of freezing raises until internal equity is reached; exerting efforts to transfer workers to higher paying jobs consistent with present wages; or even adjusting rates downward immediately while giving

A grower who does not keep wages competitive may feel forced to start inexperienced new workers up near the middle of a pay grade. If this is the case, there may remain no sound basis for pay differences among workers.



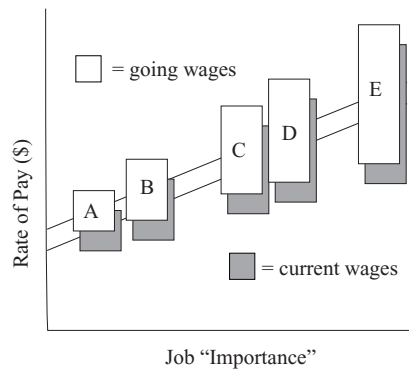


FIGURE 2-10

Current wages have failed to keep up with market reality.

workers a lump sum (or several) to offset the downward adjustment.¹⁸

Green rates (underpaid jobs). Green-grade rates can be brought up into line immediately in one or two steps.¹⁹ A dairy farmer may attempt to cut labor costs with green rates, but the benefits may be short term as it will be difficult to retain valuable workers.

Two likely green-grade indicators are (1) increases in turnover (with employees seeking better paying jobs); and (2) feeling forced to start inexperienced new workers up near the middle of a pay grade. If the latter approach is taken, no sound basis for pay differences among workers may remain.

Of course, it is possible a dairy farmer does not have a green-grade rate problem, but rather, her whole wage structure may have failed to keep up with the market (Figure 2-10).

Cost of living adjustments (COLAs)

Inflation can have especially devastating effects on a worker's ability to make ends meet. We have seen how dairy farmers whose pay structures fall below market values may have difficulty attracting and retaining personnel. Some corporations (and often union contracts) stipulate a COLA based on the Consumer Price Index (CPI).²⁰ The index is supposed to reflect cost-of-living changes. The prices of common commodities purchased by most consumers are observed and compared.

While the CPI can be a useful tool, some observers feel the list of common articles used to come up with the index is not so common. The greatest challenge posed by the CPI is that it acts independently from labor market wages. In doing so, it may exaggerate and perpetuate inflation. Instead of using the CPI, farmers may prefer to monitor changes in the labor market through periodic wage surveys. Geographical transfers—especially international ones—may involve upward or downward COLAs to reflect substantial differences in cost-of-living requirements.

Flat vs. percentage COLAs

COLAs may be given in terms of flat dollar amounts or percentage increases. Those who argue in favor of flat increases feel workers at the lower end of the earning scale need the COLA increases more than those at the higher end. Across-the-board percentage increases, they contend, have the effect of "further widening the gap in already disparate incomes" between the haves and have-nots. Some even feel it would be fair to give greater increases to those who make less.²¹

Those who favor percentage across-the-board increases allege flat increases cause wage compression. Wage compression means differentials between higher and lower paying jobs decrease. For instance, if workers making \$8 an hour and workers making \$18 an hour both get a \$2 an hour increase, the first group obtained a 25 percent increase while the second group only a 11 percent increase. If such a trend continues, proportional differentials between occupational wages can be all but eliminated. A conceivable compromise may mean alternating between giving straight and percentage increases.²²

Wage compression & minimum wage

Increases in the minimum wage can also cause pay compression in dairies paying at, or near, the legal minimum. For instance, if starting hourly wages for cow feeders and milkers are \$8.15 and

SIDEBAR 7-2

Comparable Worth Doctrine²⁴

We will first distinguish between *comparable worth* and *equal pay for equal work*, and then briefly review arguments in favor of and against comparable worth.

Some jobs at the dairy may be filled mostly by men while others mostly by women. This is slowly changing with fewer jobs being categorized as “men’s work” or “women’s work.” But it is not changing fast enough for those who feel “women’s work” is underpaid in comparison with different but comparable “men’s work.” The move to correct such pay differences is based on the “comparable worth doctrine.” While the debate has dealt mostly with jobs segregated by sex, discussion can also focus on jobs held mostly by minority groups, as is so common in farm work.

Earnings gap

Both advocates and critics of the *comparable worth doctrine* agree some jobs are dominated by women and some by men, and that women often earn less than men. Solutions and reasons offered by advocates and critics are different.

The earnings gap between men and women has been cited by comparable worth advocates as clear evidence of sex discrimination.²⁵ When men and women who do the same type of work and bring similar experience and skill to the job are compared, their present wages²⁶ and future pay outlooks²⁷ appear more even.

Many reasons have been offered to explain why men earn more than women. The results of one study suggest gender-differentiated values and preferences are a factor. Males may choose higher paying occupations more frequently while women may place greater value on more stimulating jobs.²⁸

Some believe women in the past did not invest as much time as men in

higher education, resulting in higher wages for men. This argument does not hold up today, however, when a greater percentage of women are pursuing professional occupations. Women are often enrolled in greater numbers than men in veterinary schools. Another reason given for the higher earnings of males is their longer work experience in general as well as greater seniority with a given employer.²⁹ It is more common for women to leave the labor force to raise a family or to leave a job to follow a spouse who has been transferred.³⁰

Market vs. job evaluation

Advocates of comparable worth feel market values used in wage settings perpetuate inequities: “We’re talking about fundamentally altering the marketplace because the marketplace is inherently discriminatory.”³¹ Though advocates acknowledge the subjectivity of job evaluations, they favor basing wages on job evaluations rather than on market comparisons.

Critics of comparable worth feel that as long as women have a choice of jobs, there is no need for the comparable worth doctrine. Today, women are free to choose work in male-dominated jobs and obtain higher wages.³² The law already requires that women holding the same jobs as men be paid the same wages. Assuring widespread education and opportunities to all who desire them can help reduce inequities between the sexes and races.

Instituting comparable worth would result in massive government intervention. This may mean either setting a national comparable worth policy or requiring the validation of job evaluations within organizations.³³ If government—rather than individual employers—would determine the value of compensable factors, the dairy farmer’s prerogative to manage would be substantially curtailed. Finally, in a growing world-market economy, a nation that ignores market forces would certainly be at a competitive disadvantage.

Some believe women in the past did not invest as much time as men in higher education, resulting in higher wages for men. This argument does not hold up today, however, when a greater percentage of women are pursuing professional occupations.

\$7.20, respectively, a new minimum wage of \$8.00 would bring both to essentially the same starting wage (Figure 2-11).

In order to avoid raising the complete wage structure a farmer may, without raising the top wage, make minor adjustments all along the wage structure. Although one pay grade would not take the brunt of the wage compression, this approach may create pay compression throughout the organization.²³

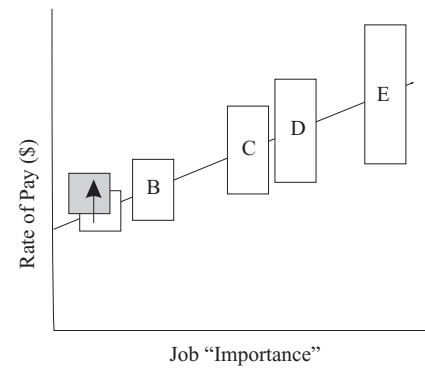


FIGURE 2-11

Sample wage compression.



Veterinarian, Dr. Diane Ferry, courtesy (c) 2002 Bovine Veterinarian Magazine

SUMMARY

This chapter focused on internal wage structures, the framework for establishing and maintaining pay relationships at a dairy. An important feature of a well-designed pay system is the provision for rewarding performance achievements with increased pay, either within the present job or through a promotion.

Pay is an important work reward for most people. Dairy workers expect their wages will: (1) cover their basic living expenses, (2) keep up with inflation, (3) leave some money for savings or recreation, and (4) increase over time.

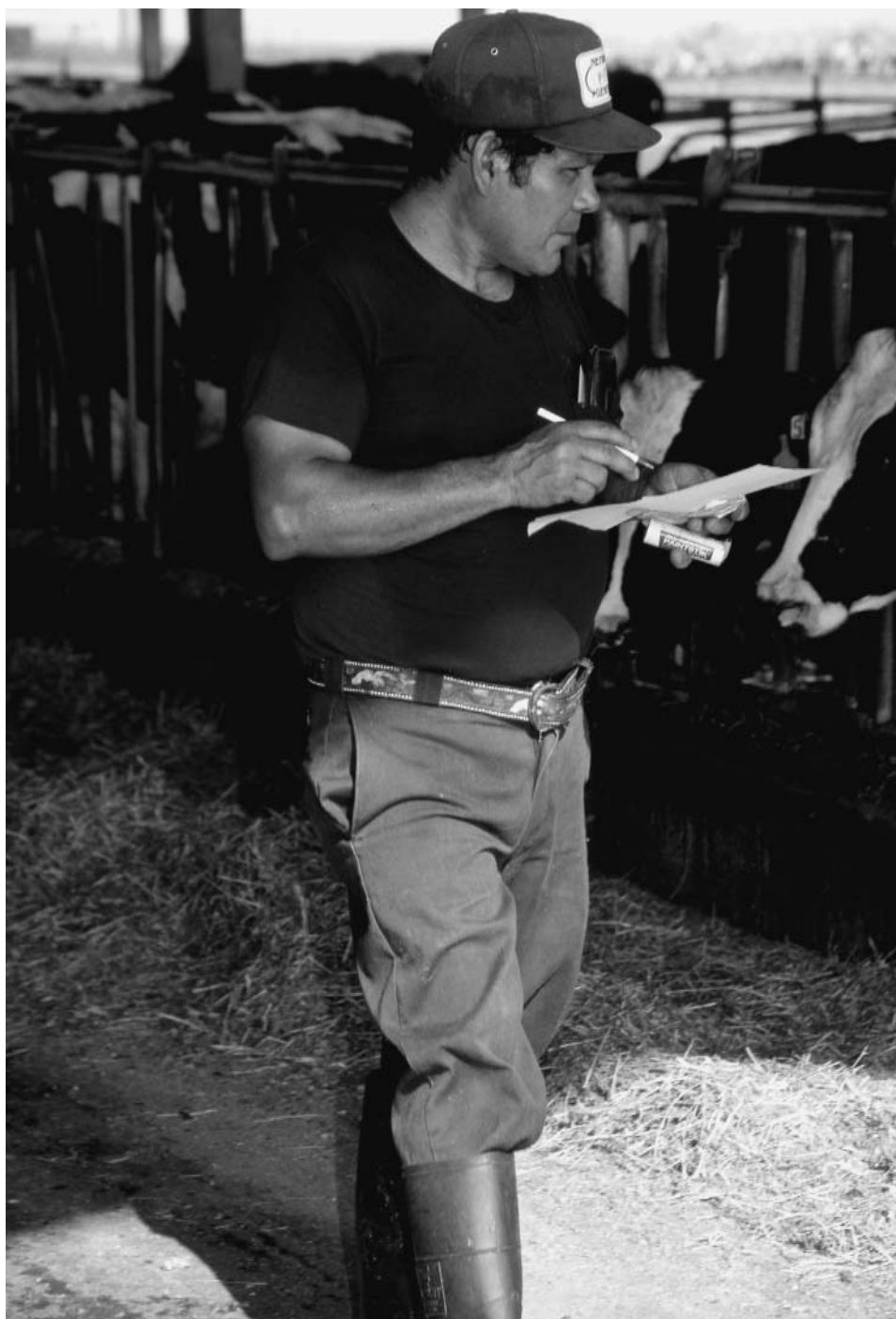
Dairymen can set wages based on (1) job evaluations, and (2) market values. In practice, results of job evaluations must often defer to market considerations. Once wages are set, pay structures must be continually evaluated to assure competitiveness in attracting, retaining, and motivating personnel.

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Unless otherwise indicated, photos in this chapter were taken by the chapter author.



There is much that dairy farmers do not have control over, and what they do control, they control through people. How these people are hired, managed and motivated makes a huge difference. Labor management is much more than forms and paperwork. It is more about finding creative new ways of increasing productivity and reducing loss.

Incentives for Increasing Pregnancy Rate



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Reproductive efficiency has major impacts on profitability of dairies, primarily through its impact on average milk/ cow/ day, but also due to its impact on culling and the number of calves born. Despite improved understanding of the financial impacts of poor reproductive management, reproductive efficiency has been on the decline within the dairy industry for the last 50 years. Consequently, producers have expressed renewed interest in

designing incentive pay programs for their employees to try to improve reproductive performance. However, effective incentive programs for reproductive management are rare and difficult to design and maintain. Before attempting an incentive program, one needs to understand the key influencers of success, the major limitations faced by breeders, and the concepts and metrics of monitoring reproduction. After a more complete understanding of



Good reproduction starts with healthy fresh cows and the cornerstone of fresh cow management is a structured monitoring and treatment program.

the complexities associated with reproductive management, producers who still desire to design and implement an incentive program should proceed cautiously and work together with their veterinary advisor.

Whether in-house or from outside companies, dairy breeders face the same obstacles with improving reproductive efficiency...locating cows in heat and successfully placing semen into these cows.

CRITICAL FACTORS NOT CONTROLLED BY BREEDER

Health problems such as lameness, prolonged anestrus, mastitis, and endometritis are usually beyond the control of the breeders, unless they are also involved with the day-to-day management of transition cows and the herd's nutrition program.

Recent studies have demonstrated that the effect of milk production on

Cycle number	Days in Milk	# of Eligible Cows (cow cycles)	# of Heats Serviced	Breeding Submission Rate	# of Pregnancies	Conception Rate (CR)	Pregnancy Rate (PR)
1	50-70	100	56	56%	20	36%	20%
2	71-91	80	63	79%	22	35%	28%
3	92-112	58	36	62%	13	36%	22%
4	113-133	45	25	56%	8	32%	18%
5	134-154	37	21	57%	6	29%	16%
6	155-175	31	17	55%	5	29%	16%
7	176-196	26	14	54%	3	21%	12%
8	197-217	23	12	52%	3	25%	13%
9	218-238	20	10	50%	3	30%	15%
10	239-259	17	9	53%	2	22%	12%
11	260-280	15	7	47%	2	29%	13%
12	281-301	17	8	47%	2	25%	12%
		469	278	59.3%	89	32%	19%

fertility within herds is minor compared to other critical factors such as calving difficulty, twins, retained fetal membranes, metritis, and ketosis.^{1:2} Excessive weight loss during the early postpartum period, often associated with one of the preceding disease problems, leads to an increased risk for metritis, endometritis, and prolonged anestrus, a condition marked by a delayed return to normal ovulation patterns. Each of these conditions leads to problems with reproduction such as poor heat detection, lower conception rates, and higher risk for early embryonic deaths.

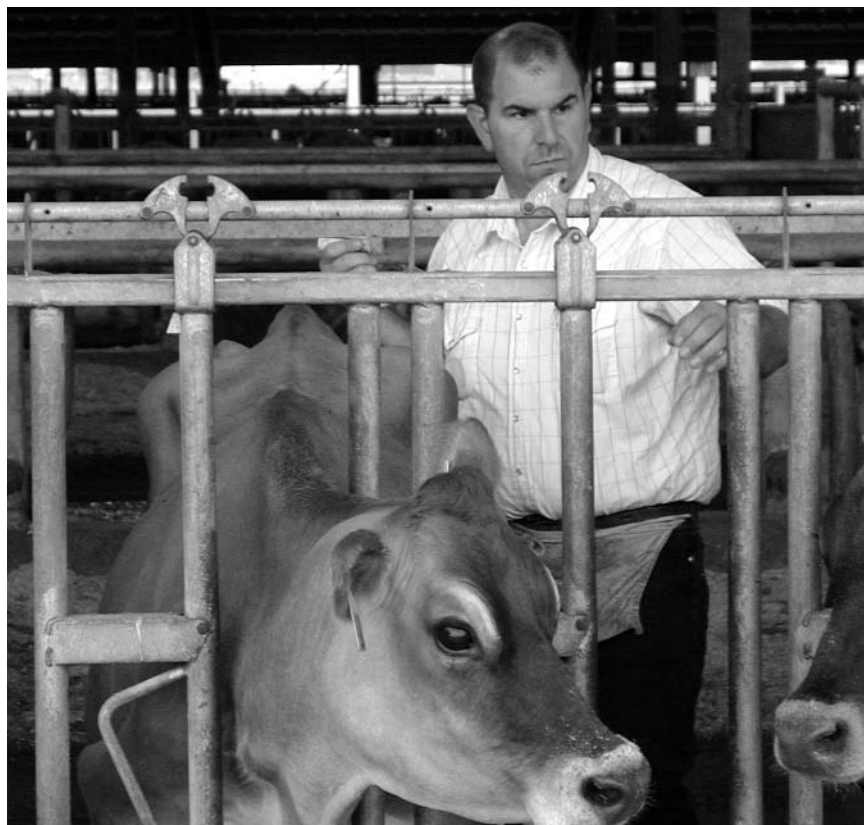
With such a wide variety of problems that may impact reproductive efficiency, there is the potential for a large disparity between the effort of the breeder and the actual success of the reproductive management program.

Disease control and prevention strategies, along with nutritional management and cow comfort, interact to impact reproductive efficiency. Unfortunately, these factors are often out of the control of breeders and no amount of financial incentives will allow even the best breeding manager to achieve the targeted goal for reproduction if cow health is the limiting constraint. The net result is mounting frustrations and an ineffective incentive program.

BIASED MEASURES

Historically, dairy managers and consultants have used calving interval (CI) or days open (DOPN) as indices of reproductive performance. Generally, most advisors agree that the optimal lactation length to maximize milk/ cow/

Sample pregnancy rate (PR) calculation for an imaginary 100 cow dairy that continues breeding cows until 301 days in milk and has a voluntary waiting period of 50 days.



American Jersey Cattle Association, Reynoldsburg, Ohio

A key component to improving pregnancy rates is accurate and intensive heat detection.

day in the herd, without regard to transition management issues or risk of culling, is something less than 11 months. Adding a 40-60 day dry period to the end of an 11-month lactation results in a calving interval of 12-13 months.

Both CI and DOPN are actually biased estimates since they only provide information for positive outcomes (pregnant cows) and exclude all remaining animals. Calving interval only measures the reproductive efficiency of cows that became pregnant, maintained the pregnancy through a normal gestation length, and calved again. It neglects cows that fail to become pregnant or that are culled while pregnant. In addition, there is considerable lag in this metric due to the time it takes a cow to become pregnant and deliver her calf. While DOPN is slightly better, it still does not consider cows that have failed to become pregnant and is very susceptible to the effects of culling.

For example, clinical experience has shown that the calculated average DOPN is almost always going to be

higher for high producing cows. However, to interpret this metric as meaning that high producing cows are more difficult to get pregnant is often incorrect. As a group, high producing cows stay on the dairy longer than low producing cows. Consequently, these high producing cows receive more opportunities for additional breedings, which results in longer average days open and higher services per conception. While the fertility may not be different per unit of time, high producers have longer average DOPN because they are retained for their milk production. On the other hand, low producing cows tend to either become pregnant or end up being culled due to their lower milk production, resulting in a shorter average DOPN.

PREGNANCY RATE (PR)

Pregnancy rate, defined as the proportion of eligible cows that become pregnant each 21 day cycle, is the preferred parameter for evaluating reproductive performance. PR is a true rate (considers risk of success or failure per unit of time) and is calculated by dividing the number of pregnancies produced within a 21-day cycle by the number of eligible cows present during that same 21-day period. PR is a less biased parameter than either DOPN or CI since it considers all eligible cows (not just successes) and contains much



less lag than CI. It is more sensitive to detecting recent changes in reproductive performance and provides useful information for most of the lactating cows.³ Based on database surveys as reported by Steve Stewart, Bruce Clark, Don Niles, and David Galligan (personal communications), PR nationwide appears to average approximately 14-16%. Yet, the ultimate goal for optimum reproductive management is a PR of 25-30%.

Since PR is a function of both heat detection efficiency (HD) and conception rate (CR), attempts to improve reproductive performance must consider both factors. Heat detection efficiency refers to the percent of cows found in heat. In reproductive management, the better term to consider is breeding submission risk (BSR) since only the cows that are found in heat and inseminated affect the ultimate goal of more pregnancies. Previous recommendations have been made to base incentive programs on heat detection and the number of cows presented for breeding. While dairies want to increase the herd's heat detection intensity, paying breeders in this manner promotes overzealous recording of heats. Inaccurate or overzealous heat detection will usually lead to a dramatic decrease in conception rate due to breeding cows that are not truly in heat. Since conception rate is influenced by both the accuracy and intensity of heat detection, as well as handling of semen and cow uterine health, overzealous heat detection may also result in more early embryonic death or abortions due to inseminating cows that are already pregnant.

Another type of reproductive incentive that has sometimes been promoted is to base breeders incentives on conception rate. This approach is also problematic. Within herds, breeders can make their conception rates improve dramatically by hand-selecting cows to inseminate. For example, if breeders only inseminated healthy, well conditioned cows that displayed very strong signs of estrus such as standing for multiple mounts and discharging



large amounts of perfectly clear, thick vaginal mucous, their conception rates would rise. However, many other cows that might become pregnant if inseminated, might be skipped. The result would be higher conception rates, but fewer pregnant cows.

While conception rate can be easily decreased by overzealous breeding, it is much more difficult to positively impact compared to heat detection. Breeding submission risk can be positively impacted with the implementation of either estrus synchronization or by using ovulation synchronization protocols. Since estrus synchronization protocols do not control the moment of ovulation, detection of estrus is required. Ovulation synchronization protocols have gained in popularity because of their ability to dramatically improve breeding submission risk or rate. Examples of these programs included Ovsynch and Cosynch. Each of these programs utilizes combinations of

A well organized breeding cart, good record keeping, and attention to semen handling details are important steps to improving conception rates.

GnRH (Cystorelin®, Fertagyl®, OvaCyst®, etc.) injections and prostaglandin (Lutalyse®, Estrumate®, Prostagmate®) injections to synchronize ovulation and allow dairymen to deliver a timed AI. These programs have been proven to work well, assuming that cows are able to respond, uterine health is good, and the injections are actually delivered at the appropriate times.

Table 1 demonstrates how PR is calculated for an imaginary dairy milking 100 cows with a voluntary waiting period of 50 days. In this simplistic example, all 100 cows calved together and remained in the herd for the entire 250+ day breeding period. Starting with the first cycle, 50-70 days in milk (DIM), 100 cows were considered eligible for breeding. During this time, 56 cows were inseminated, resulting in a heat detection rate of 56%, assuming that all cows detected were actually inseminated. Of the 56 cows inseminated, 20 pregnancies resulted, yielding a conception rate of 36% (CR is calculated by dividing the number of pregnancies, 20, by the total number of inseminated cows, 56). The pregnancy rate for the first cycle is 20% (PR is calculated by dividing the number of pregnancies, 20, by the total number of

eligible cows, 100). The second cycle is much better. During the period of 71-91 DIM, 80 cows were eligible and 63 were inseminated. With a CR of 35%, the resulting PR is 28% or 22/80. The reason that this cycle has a higher PR is because a timed AI program such as Ovsynch was used on all cows not inseminated during the first cycle, resulting in a higher breeding submission rate of 79%. To calculate the total PR after the first 2 cycles, we add the # of pregnancies (20 + 22) and divide by the total # of eligible cow cycles (100 + 80). The result is 24.4%. The goal of a successful reproductive program is to get cows pregnant as quickly as possible, once the voluntary waiting period has ended. [*Editor's note:* In thinking through an incentive pay program, breeders ought to be rewarded according to the difficulty of the task, so in this case, the incentive pay structure would be higher during periods when no synchronization protocols are used. The idea is to pay for effort involved. Otherwise, the dairy farmer will pay twice: a higher bonus obtained by using a synchronization protocol (breeders are more successful) plus the cost of purchasing the synchronization program.]

Utilizing a team approach to reviewing breeding records can help identify problem areas more quickly.





Good cow comfort can help reduce lameness and improve not only milk production, but also reproduction.

If an incentive program for reproductive management is still desired, there are several alternatives that may offer improvements over paying for heats or conception rates. The first is to pay for improvements in PR. Conservative estimates by the author for the value of 1 unit change in PR are approximately \$10-20/ cow in the milking herd. The dairyman could choose to give a breeder a bonus for improvements in whole herd PR. For example, in a 1000 cow dairy with a baseline PR of 16% (whole herd, including bulls), moving the herd to 18% could theoretically result in an economic gain for the herd of approximately \$20,000 per year. The breeders could be awarded a percent of that gain for the year for improving PR. [Editor' note: There are two somewhat opposing incentive pay principles that need to be considered simultaneously: 1) As goals are more difficult to achieve, employees should receive higher pay (so that effort is rewarded evenly); and 2) The greater the amount of incentive earned by an employee, the greater the benefit to the dairy. Because breeders will be better able to achieve increases in the baseline at the lower PR levels (10-11%), greater incentives would need to be provided for achieving the more difficult higher levels (over 20%). On the other hand, dairymen will see proportionately greater economic gains with improvements at the lower than the higher levels. Say a 10% increase at the 10% PR level (moving to 11% PR) will

yield substantially greater savings than a 10% increase at the 25% PR level (moving to 27.5% PR). There comes a point where improvements beyond a certain level require too much effort for the return. A dairy farmer needs to be clear as to where that point is.]

In order to use PR change as an incentive, the breeder must understand the concept of PR and the various forces that influence it including cow health, heat detection, conception rate, and movement of cows into bull pens. The author's research shows that keeping cows in AI pens longer results in improved PR's. Records used for evaluation and incentives should reflect the overall risk of becoming pregnant for the entire herd by evaluating the PR of both AI and bull pens. If only AI pens are considered for incentives and breeders have the ability to influence the movement of cows or the classification of breeding eligibility, problems may result due to manipulation of the system just to improve the AI numbers. Cows with fertility issues might be moved to bull pens or classified as "do not breed," thus removing them from the eligible population. To prevent this potential source of abuse, safeguards must be put in place such as using whole herd PR and not just the AI pens and monitoring of the proportion of cows recorded as "do not breed."

Another possible incentive involves paying for compliance within the breeding system. As previously mentioned, pregnancy rate is determined

by both breeding submission rate and conception rate. Paying bonuses for improved compliance within the Ovsynch program should lead to improved PR assuming cows are actually inseminated. For example, cows are started on Ovsynch by receiving an injection of GnRH. In order for the program to be successful, cows must receive all injections and be inseminated as per the protocol unless observed in heat prior to its completion. Incentives could be set up to pay for levels of compliance within the system such as 95% or 98% of cows receiving an insemination within 10 days of receiving the first GnRH.

SUMMARY

Effective incentive programs for reproductive management are very rare and can be difficult to design. Knowledgeable breeders or workers can find ways to manipulate the system to their advantage or may become frustrated over a lack of control within the dairy system. Before attempting an incentive program, dairy producers, breeders, and their veterinary advisors need to understand the key influences of success, the major limitations faced by breeders, and the concepts and metrics of monitoring reproduction. Commonly used incentive programs from the past

such as reducing days open, or paying for improved heat detection or conception rates independently, often result in failures within the system. Producers who still desire to design and implement an incentive program should proceed cautiously, work with their veterinary advisor, and consider basing incentives on pregnancy rate changes or improvements in compliance within the reproductive management system.

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Incentives for Dairy Calf Raising



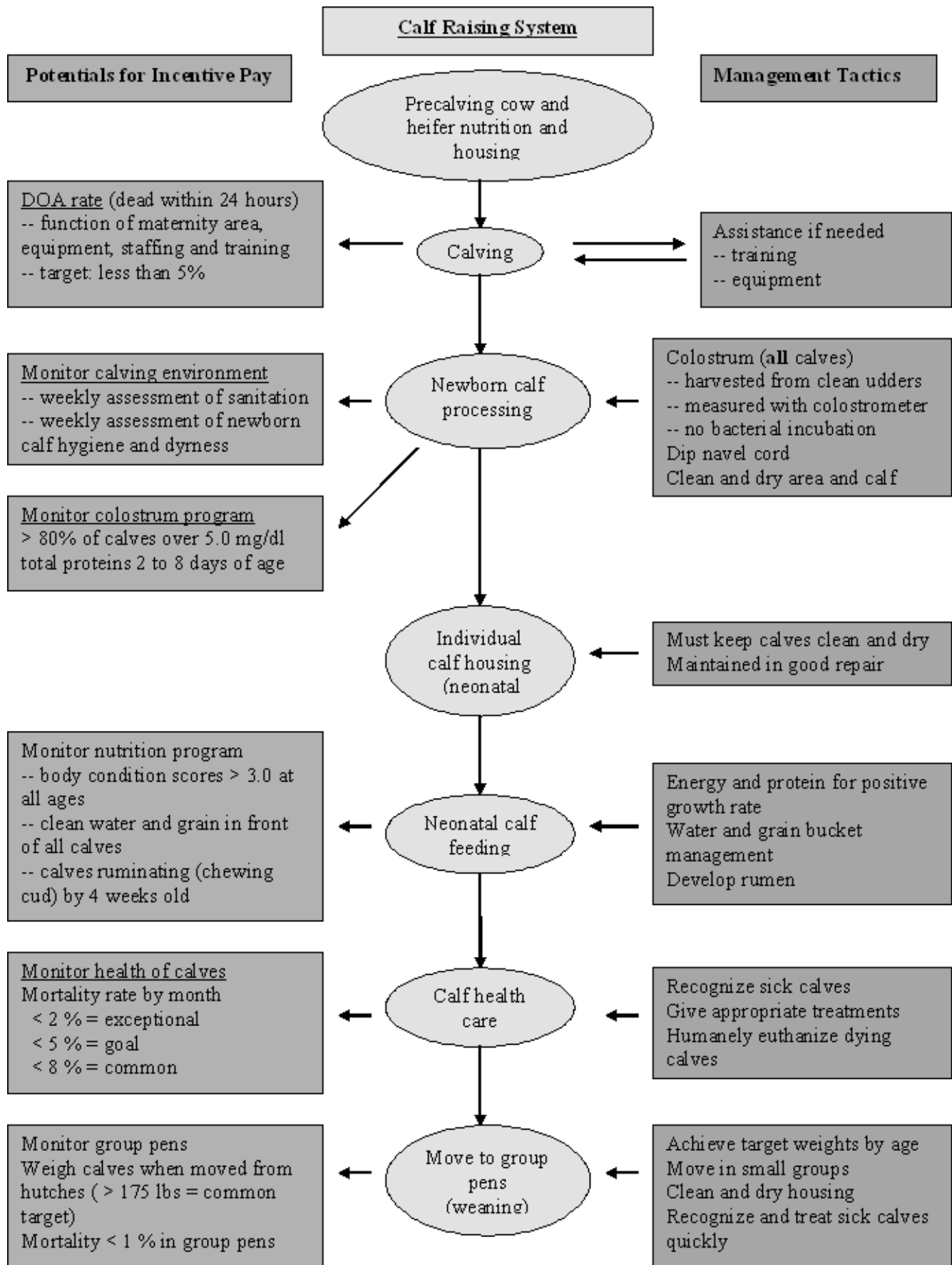
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Calf raising on dairies is very important to the profitability of a dairy. Managed properly, the calf program can supply a surplus of healthy replacement cattle to the dairy. If managed poorly, the calf program can consume money and resources, strain relationships and cause the dairy to purchase replacements. Dairy calf raising programs have many variations and can include several different management areas and systems on the farm. Successful calf raising begins with the

health, condition and sanitation of the late-gestation pregnant cows and heifers and ends when the heifer enters the milking herd. This discussion will focus on the system from birth to weaning, because this is the most labor intense period of calf raising and takes the most skill and management.

Dairies can raise their replacement heifers on site, have them custom raised at calf ranches for any part of the growing cycle, or sell them after birth.





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CALF RAISING SYSTEMS ON DAIRIES OR CALF RANCHES

Calf raising systems can be outlined as the following parts:

- 1) Calves must be born in a clean and dry area.
 - Sanitation determines the pathogen load, or exposure to bacteria and other disease agents. Calves born into dirty conditions will be exposed to pathogens.
 - Calves born into wet conditions will lose body temperature and will need to expend energy to stay warm. Holstein calves are born with about 48 hours of energy reserves.
- 2) Dystocias must be attended by trained people in appropriate facilities.
 - Well-designed maternity areas allow workers to attend a cow in labor when she needs help. This will result in more live calves, better cow reproductive health and better calf health.
- 3) Calves must be fed adequate amounts of clean colostrum within a few hours of birth.
 - Poorly designed facilities require extra labor or result in ignoring cows that need assistance. This will increase the still-born rate and the number of calves born distressed.
 - Attending dystocias is a skilled task that truly requires training so that trauma to the cow is minimized and the chance for a live calf is maximized. The herd veterinarian should be used to help train the workers involved with delivering calves.
 - Appropriate and sufficient quantities of equipment, lubricants and disinfectants must be available to the workers at the maternity area.

Healthy calves start from birth: a clean and dry calf from birth is essential. The goal for the maternity area is to provide clean bedding and appropriate care for both the dam and the calf.



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Newborn calves have an absolute requirement for colostrum. Colostrum provides more energy and protein than regular milk or milk replacer and is the only source of antibodies in the newborn calf.

- Calves have an absolute requirement for colostrum. Cattle are a species that does not transfer antibodies from the dam to the fetus during pregnancy. Therefore, the newborn calf is dependent on colostrum for passive immunity as well as initiation of maturation of the immune system.
 - Colostrum has twice the solids and considerably more energy and protein than regular milk or milk replacer.
 - Calves need colostrum for energy, protein, antibodies and to initiate the digestive enzymes and parts of the immune system.
- 4) Calves must be housed in clean and dry facilities.
 - Sanitation is one of the key determinants of the pathogen load in the calf's environment. Filth and manure expose calves to pathogens, clean housing protects calves.
 - Manure, mud and water decrease the insulating ability of hair and reduce the calf's ability to regulate body temperature. A wet calf will use up to 20% of it's' energy to stay warm in cold weather.
- Fly control is very important because flies transfer pathogens around a calf facility. Keeping the area in and around calf housing clean, dry and free of manure and water is very important.
 - Calves must be able to turn around when kept in individual hutches.
 - Calves must be provided dry bedding, shade from direct sunlight and shelter from rain or snow.
- 5) Calves must be fed adequate amounts of energy and protein for growth and health.
 - Whole milk provides more calories than most milk replacers.
 - Calves in positive growth are healthier and require less medical treatment than calves that lose body condition (fat stores) during early growth.
 - Body condition scores of calves from 7 to 28 days of age should not get below 3 (1 to 5 scale). Thin calves are the result of inadequate energy.
 - 6) Rumen development must be managed properly.
 - Calves are born with small, undeveloped rumens.
 - Rumen development occurs as a response to volatile fatty acids (VFAs) released during digestion of carbohydrates.
 - Grain intake determines VFA production. Therefore, it is imperative that calves are presented fresh, palatable grain daily so they will eat grain and make VFAs.
 - A calf can develop a rumen, become a functional ruminant and get energy from grain by about 3 weeks of life if managed properly.
 - Clean water must be provided to calves daily. Calves need water to stay hydrated and grain intake is dependent on water intake.
 - 7) Calves must be observed daily by trained personnel for attitude, body condition score, hygiene and health.
 - Workers must be trained to understand how to observe calves for the above parameters.
 - Workers must be trained to implement treatment protocols when they recognize sick calves.
 - Calf health is determined by positive growth, which can be measured by

- body condition score observations.
 - Workers must have the ability or authority to correct problems in housing maintenance, feeding, handling or treatment or be able to direct their observations to supervisors who will implement necessary actions.
 - Calves that require euthanasia must be identified and humanely euthanized.
- 8) Calves should be moved from individual housing to group pens as soon as possible.
- Individual housing and liquid feeding is more expensive than group housing and solid feeding.
 - Calves can only be removed from liquid feed after they have developed rumens and are eating and digesting over 1 pound of grain daily for at least 3 days in a row.
- Target body weights should be established for each facility that allow healthy transition from individual pens to group pens.
 - Calves can generally be smaller when moved into small groups of 5 to 10 calves. Calves should be larger when moved into groups of over 30 calves.
 - Most dairies target 175 pounds for calves before moving from individual pens to group pens.

INCENTIVE PAY PROGRAMS IN CALF RAISING PROGRAMS

Causal incentive pay programs, where the employee never knows when a reward will be given, are used on some farms. Examples of these

The goal in the hutch system is to have calves that are alert and curious. All calves must have fresh and clean water and grain available everyday so that they develop rumens quickly and maintain normal hydration.



An easy way to monitor the nutrition program in young calves is to observe body condition as they grow.

Body condition can be scored from 1 (emaciated or very thin) to 5 (fat) based on the amount of covering over the pelvis and ribs. Calves should not be less than 3 body condition score as they grow. The calf pictured is about a 3 and represents a healthy calf.

programs are when employees are given gifts, such as restaurant vouchers or cash gifts, when the owner or manager feels that work has been productive or the farm income has been good. These unstructured attempts to direct employee behavior by spontaneous rewards usually fail in the long term because the underlying reasons for the rewards, such as hard work or increased income, have not been clearly defined and are achieved only by happenstance and not management.

Successful calf raising requires clearly defined goals, objectives and tactics. Workers should be trained to their jobs and tasks and understand what the outcome goals are for their specific areas of work. Only then will structured incentive pay programs work. Incentive pay can be arranged for any work done by employees that produces more outcome or better results than they are expected to provide for their base salary.

Incentive pay can be set for any of the areas described in the calf raising system outline above. Any effective and lasting incentive pay program will require considerable interest and effort

by management. Management will have to establish targets, collect the data or information related to each target, analyze the information and report to each employee whether or not the target was met. If the employee did not meet the target(s) it is necessary to tell the employee why they will not get the incentive pay and work with them to correct the situation. Many times targets are not met for reasons that are out of the employee's control but require management or the supervisor's involvement. For example, a worker may do a very good job of feeding colostrum to the calves but the milking crew may be providing the wrong milk to the calf worker, or they may not be cooling the evening colostrum, thus allowing bacteria to incubate. If management does not correct the parts of the system that are outside the worker's control the worker may become disgruntled and the incentive program may become a disincentive program.

Actual dollar amounts to be given for each targeted incentive program are difficult to determine and will depend on the particular farm. Losses from calf deaths, less than desired weight gains and more than desired medicine costs can be calculated and the expected savings shared with employees when the targets are met.

Potential areas for incentive pay in the calf raising system could then be the following:

Rates are usually defined as number of cases/ number of eligible animals per month. The analysis can be done weekly or quarterly, depending on the size and needs of the farm. [*Editor's note: Even if the employees are not paid right away, the more frequent the feedback, the better. This is especially true when getting started on an incentive pay program*]

DOA rate (dead on arrival)

This is usually defined as calves that are born dead or die within the first 24 hours after birth. The rate varies considerably by dairy due to the facilities, worker training, staffing levels, pre-partum cow nutrition, parity



American Jersey Cattle Association, Reynoldsburg, Ohio

of the dam, housing and the owner's attitude and desires.

Calculation: number of calves DOA/number of calves born per time period.

Suggested targets: < 5% = excellent; < 10% = achievable.

Possible corrective actions when target not met: increase staffing to accommodate increases calving load, retrain employees, investigate pre-partum cow and heifer conditioning.

Colostrum feeding

Because calves require colostrum it is imperative that they receive it promptly. Colostrum feeding is commonly monitored by testing the blood of the calf for evidence of absorbed maternal antibodies. This can be done either by radial immunodiffusion, salt precipitation (sodium sulfite turbidity test) or by total serum protein determination (TP). Total proteins are determined with a hand-held refractometer and are easiest and most practical for on-farm use. Calves are born with about 4.5 mg/dl of TP. Levels over 5.0 mg/dl between 2 and 8 days of age indicate that the calf received and absorbed maternal antibody proteins. Levels can be as high as 6.5 to an occasional 7.0 mg/dl. Dehydration and age interfere with interpreting TP values.

Monitor: routinely (weekly or monthly) test a sample of calves for total serum protein. Usually 10 calves are bled for this test.

Suggested targets: >80 % of calves should be above 5.0 mg/dl TP. > 50 of calves should be > 5.5 mg/dl TP.

Possible corrective actions when target not met: verify quality of colostrum with colostrometer, verify good quality colostrum is arriving at maternity area on time,

Nutrition and growth rates in young calves

Positive growth of calves is the single most important thing associated with health in calves. If calves are growing and gaining weight they can

resist disease. If they are losing body condition or weight they will get sick. Calves are expected to grow at least 1.7 to 2.2 pounds per day from birth through the end of the liquid feeding period (usually 60 to 80 days of age). Body condition is an excellent tool to monitor the feeding program.

Monitor: body condition scores in calves in the individual hutches. Once per week determine the proportion of calves too thin (< 3 BCS) or normal (3 or > BCS).

Suggested target: > 80 % of calves less than 30 days old should be 3 or greater BCS (1-5 scale).

Possible corrective actions when target not met: Review the amount of energy available in the milk replacer and that the milk replacer is mixed properly and the correct amount fed. Calves may require increases in calories depending on ambient temperature and pathogen load. The milk replacer may need adjustment to control the body condition scores within desired limits.

Rumen development

Calf rumen development is dependent on volatile fatty acid production in the rumen from bacterial breakdown of carbohydrates. This is completely manageable and should happen as early as possible so that the calf will receive energy from grain, a cheaper feed than milk or milk replacer. Calves can be developed into functional ruminants by 25 days of age.

Monitor: calculate the proportion of calves chewing their cuds in the 25 to 35 day-old group.

Suggested target: at least 20 % of the calves in this group should be chewing cuds when observed resting.

Possible corrective actions when target not met: review bucket management. Make sure clean water is available from day 1 of age and grain is clean, fresh and palatable.

Health of calves

Measuring the mortality (MR) or morbidity rate are outcomes that are too late in the management system to be very useful for economics or welfare.

The mortality rate is commonly calculated and is useful as a clear measurement of success or failure of the calf raising system. The morbidity rate (number of sick calves in a time period) is difficult to determine accurately because the recognition and diagnosis of calf diseases can be subjective by employees and most calf ranches or dairies do not adequately record morbidity information.

Calculate: divide the number of calves that died in a time period by the number on the ranch during that time period. An easy way to estimate the denominator is to average the begging inventory and the ending inventory (add the number of calves in the system at the beginning of a month and the number at the end of the month and divide by 2). It is most useful to determine mortality rates for specific age, or management, groups such as MR

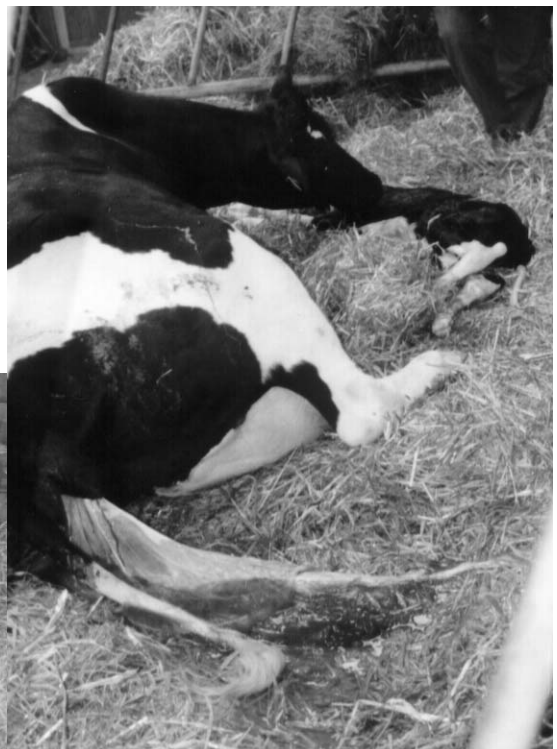
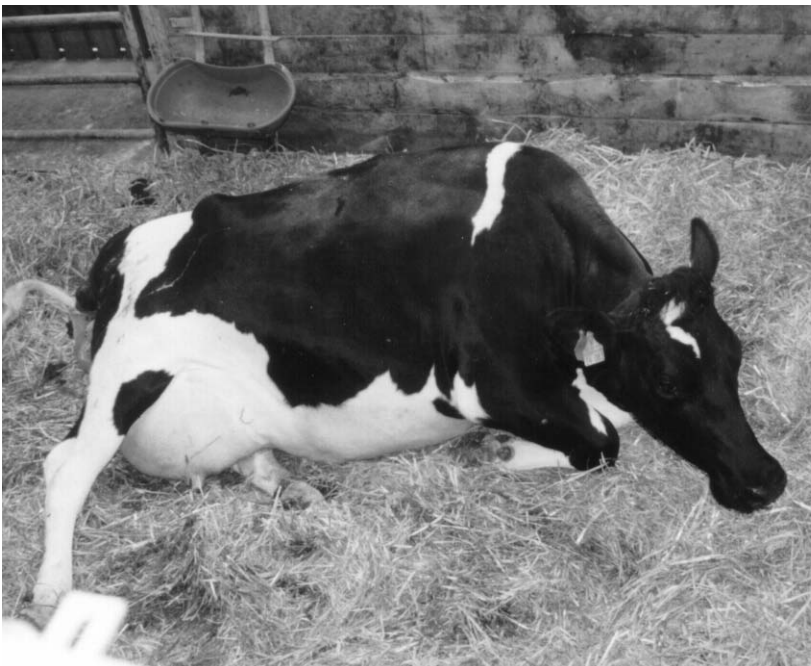
for calves less than 30 days of age and MR for calves in the group pens.

Suggested targets: overall MR for the replacement system: < 2 % per year = excellent, < 5 % per year = achievable, < 10 % per year = average dairy or calf ranch.

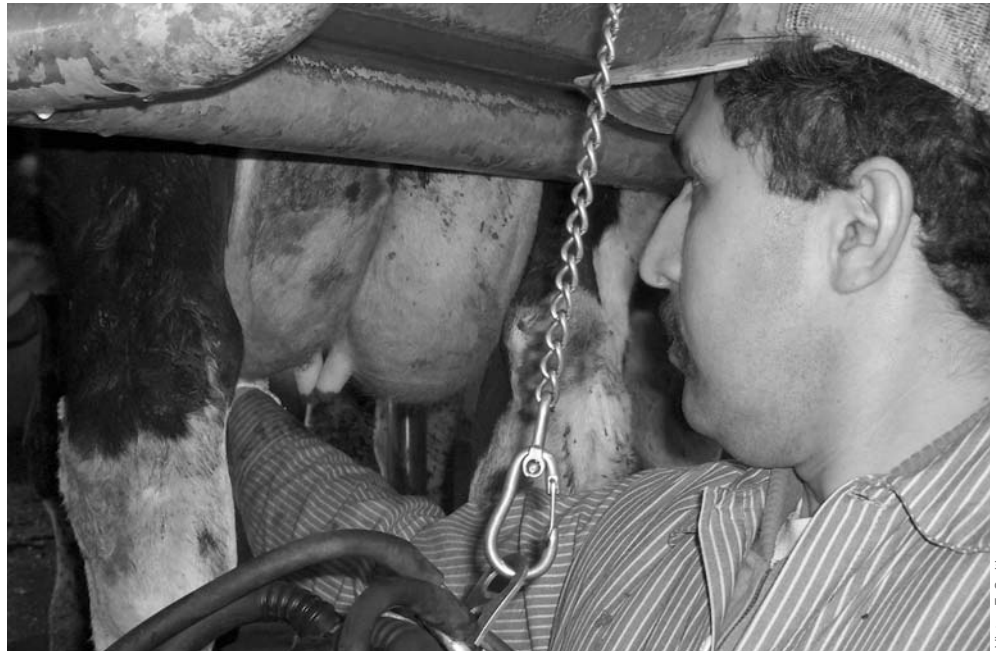
Possible corrective actions when target not met: Review all areas of the calf raising system, but focus on sanitation and nutrition.

CHAPTER 4 REFERENCES

1. This chapter builds on Carol Collar's chapter in the 3rd edition of *Dairy Incentive Pay*.



Milk Quality Incentives¹



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Consumers, processors and regulatory agencies are increasingly interested in the safety and wholesomeness of milk, which in turn has resulted in a greater emphasis on management practices that insure the production of high quality milk. Despite technical advances in milk processing, the quality of milk is still determined at the dairy farm.

Milkers have the important, yet

routine, job of harvesting the milk from the udder of the cows in a manner that maintains milk quality and protects the udder from infections. In addition, the milkers have the responsibility of washing and sanitizing the milk handling, cooling and storage system on the dairy. They handle a complex set of equipment and chemicals that affect milk quality. During milking they detect cows with clinical mastitis. Other non-

milking employees also influence milk quality. Some employees manage the bedding and housing areas where the cows live. Other employees provide antibiotic treatments for cows that are infected with mastitis and manage the cows while they are in the hospital pen. Given that these employees have a considerable influence on milk quality, there are important questions as to how to motivate them to maintain high standards of performance. The use of incentives to motivate dairy employees is often cited as the means to improve performance. The effectiveness of incentives depends on the program design and should be a part of a larger program of employee supervision and training.

MILK QUALITY MEASURES

When milkers properly clean and dry the teats before attaching the milking machine, they will harvest high quality milk.

Milk from the dairy is frequently analyzed for several milk quality parameters. Such data is generated both on the dairy and by the milk processor. There are actually so many parameters that are analyzed that employees can easily be overwhelmed by the information. It is the job of the dairy managers to select and underscore the data that is most appropriate to the specific goals sought after. The dairy manager must transform the data into

information that the employees can relate to their daily job performance. Here, we will consider some of the most critical milk quality measures.

Standard Plate Count (SPC)

The SPC is the total quantity of viable bacteria in a millimeter (ml) of raw milk expressed as CFU/ml (colony forming units per ml). The bacteria are counted but not specifically identified. The SPC is performed on milk samples collected from the bulk tank. This is usually done at least monthly by the milk processing plant. The SPC is primarily an indicator of the sanitation used by milkers as they milk the cows, the capacity of the equipment to rapidly cool the milk to less than 40 F within 2 hours after milking, and the cleaning and sanitizing of the milking equipment.

Thus, the SPC will be elevated when cows are milked with wet or soiled udders and teats, with unclean or inadequately sanitized milking equipment, or the system fails to rapidly cool the milk to less than 40 F. The SPC may also be elevated when cows with mastitis due to *Streptococcus agalactiae* or environmental *Streptococcus* species are milked into the bulk tank. Damaged or over-used inflations or liners may also influence the SPC.

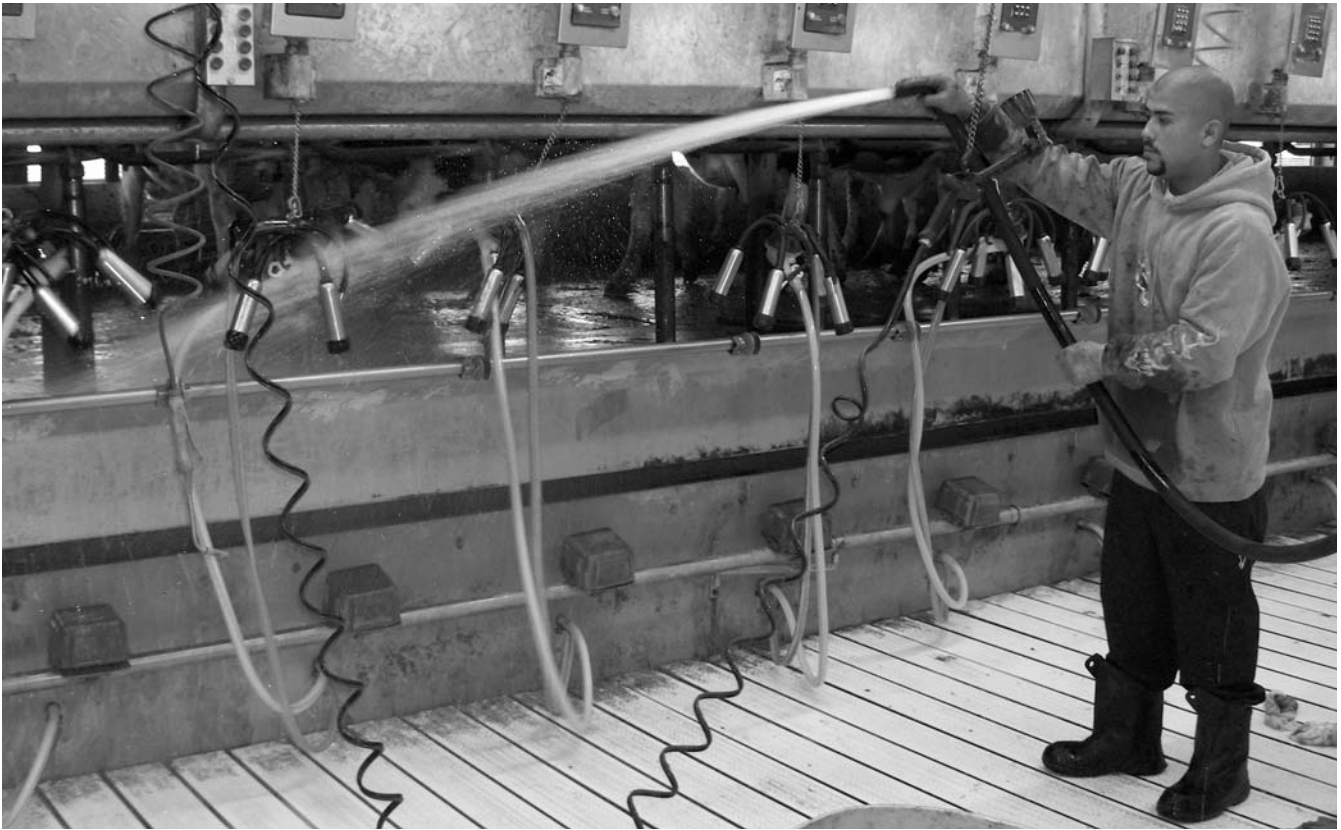
Milking employee influence on SPC:

Employees are responsible for (1) attaching the milking units only to cows with clean and dry udders and teats; (2) reporting problems with wash and dry pen equipment, or lack of towels or supplies to clean and dry the udders and teats to management; (3) following instructions for properly cleaning and sanitizing the milk system; (4) detecting cows with mastitis at each milking; and (5) ensuring that protocols for handling and treatment of cows with mastitis are followed (milk from cows with mastitis or those treated with antibiotics should not be sent to the bulk tank).

Influence by other employees on SPC: Workers responsible for properly bedding the free stalls and corrals should provide adequate bedding to keep the cows clean and dry. Failure to provide a clean, dry, comfortable place



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for the cows to rest may result in overly dirty cows arriving at the milk parlor and may make it more difficult for the milkers to properly prepare the cows prior to milking.

Management influence on SPC: The management is responsible for maintenance and function of the wash and dry pen equipment, provision of adequate supplies of towels in the milking parlor, provision of cleaning and sanitizing chemicals, function of the water heaters or adequate amounts of hot water for the cleaning equipment, maintenance of the milking equipment function and the function of the milk cooling equipment. Management is also responsible for providing clean, dry housing areas for the cows. Management is responsible to train the milkers in the proper milking techniques.

SPC guidelines: SPC counts of <5000 CFU/ml are achievable and indicate high quality milk. Realistically, SPC of <10,000 CFU/ml. can be consistently achieved on most dairies and are acceptable. SPC counts >10,000 CFU/ml. indicate a need for improvement.

Laboratory Pasteurized Count (LPC)

The LPC is the measure of bacteria that survive after pasteurization in the finished milk products. These bacteria come from the environment of the cow (*Streptococcus* sp. and the coliforms) and incubate on the milking equipment. These surviving bacteria produce off flavors and reduce the shelf-life of dairy products. The LPC is performed on bulk tank milk samples at least once per month by most milk processors. The LPC generally reflects the sanitation level during milking and the adequacy of the milking system cleanup between milking periods. Worn rubber liners or gaskets may harbor bacteria and contribute to the LPC count. The LPC and the coliforms counts may be elevated with wash-up problems.

The LPC will be elevated when the milking system is not adequately washed and sanitized allowing the contaminating bacteria to grow. Elevated LPC counts occur when the wash water is under 120 F, there is insufficient agitation of the wash water during washing, with faulty air injectors,

Milkers should insure that the milking equipment is properly cleaned and sanitized between milking periods and should maintain the cleanliness of the equipment during milking to insure high quality milk.



Vinton E. Smith

While the milkers are responsible for using the milking equipment properly to collect milk of high quality, the managers of the dairy are responsible for overall maintenance of the milking equipment and training employees.

by lack of enough or low quality soaps and chemicals, and incorrect use of soaps and chemicals. The sources of these bacteria are wet, dirty udders and teats and failure to properly prepare the cows before milking.

Milking employee influence on LPC: Milkers are responsible for milking cows with clean, dry udders and teats. They should also alert the management when worn rubber liners or gaskets are noticed. The milkers are responsible for following the wash and sanitation protocols to insure an adequately cleaned and sanitized milking system.

Influence by other employees on SPC: Workers responsible for properly bedding the free stalls and corrals should provide adequate bedding to keep the cows clean and dry. Failure to provide a clean, dry, comfortable place for the cows to rest may result in overly

dirty cows arriving at the milk parlor and may make it more difficult for the milkers to properly prepare the cows prior to milking.

Management influence on SPC: The management is responsible for maintenance and provision of cleaning and sanitizing chemicals, function of the water heaters or adequate amounts of hot water for the cleaning equipment, maintenance of the milking equipment function and the function of the milk cooling equipment. Management is responsible for training employees to properly clean and sanitize the milking system.

LPC guidelines: LPC counts <50 CFU/ml are attainable. LPC counts should be <200 CFU/ml. Counts >200 CFU/ml are considered high and should be investigated.

Coliform Count

The coliform count reflects the extent of fecal bacteria in the milk. The coliform count is performed on raw milk samples from the bulk tank. Coliform counts are usually performed at least monthly by the milk processor. The coliform count may reflect milking cows with wet, manure soiled udders and teats or growth of coliforms within the milking system. Cows with coliform mastitis rarely influence the coliform count.

The coliform counts may be elevated when milkers fail to properly clean and dry the udder and teats prior to milking. Counts may be elevated when dirty milking equipment is used to milk the cows or when the water source is contaminated.

Milking employee influence on the coliform count: Milkers are responsible for milking cows with clean, dry udders and teats. The milkers are responsible for following the wash and sanitation protocols to insure an adequately cleaned and sanitized milking system.

Influence by other employees on the coliform count: Workers responsible for properly bedding the free stalls and corrals should provide adequate bedding to keep the cows clean and dry. Failure to provide a clean, dry, comfortable place for the cows to rest may result in overly dirty cows arriving at the milk parlor and may make it more difficult for the milkers to properly prepare the cows prior to milking.

Management influence on the coliform count: The management is responsible for maintenance and provision of cleaning and sanitizing chemicals, function of the water heaters or adequate amounts of hot water for the cleaning equipment, maintenance of the milking equipment function and the function of the milk cooling equipment. Management is responsible for training employees to properly clean and sanitize the milking system.

Coliform count guidelines: Coliform counts are attainable at <50 CFU/ml. Counts of 10 CFU/ml are associated with high quality raw milk. Coliform counts > 100 CFU/ml suggest a need to investigate the source of the counts.

Preliminary incubation count (PIC)

The PIC count is a measure of bacteria that will grow at refrigerator temperatures. The PIC gives an indication of the on-farm sanitation and holding temperatures of the milk in the bulk tank. It is similar to the SPC in that it is performed on raw milk from the bulk tank; however, in the PI testing the milk is held at 55 F for 18 hours before culturing in the same method as the SPC.

The PIC may be elevated when the milking handling and cooling system is not properly cleaned and sanitized or when cows are milked with poor udder preparation. Failure to rapidly cool the milk (<40 F within 2 hours), marginal cooling or prolonged storage times may result in high PI counts. Expanding the milking cow numbers and extending the milking times without increasing the cooling capacity may result in elevated PIC.

Milking employee influence on PIC: Employees are responsible for attaching the milking units only to cows with clean and dry udders and teats. Employees are responsible for reporting problems with wash and dry pen equipment or lack of towels to clean and dry the udders and teat to the dairy management. Employees are responsible for following instructions for properly cleaning and sanitizing the milk system. Lack of supplies or faulty equipment should be reported to the management. Employees should report problems with cooling the milk to the management.

Influence by other employees on the PIC: Workers responsible for properly bedding the free stalls and corrals should provide adequate bedding to keep the cows clean and dry. Failure to provide a clean, dry, comfortable place for the cows to rest may result in overly dirty cows arriving at the milk parlor and may make it more difficult for the milkers to properly prepare the cows prior to milking.

Management influence on PIC: The management is responsible for provision of adequate supplies of towels in the milking parlor, provision of cleaning and sanitizing chemicals, function of the water heaters or adequate amounts of

hot water for the cleaning equipment, as well as the maintenance and function of the milk cooling equipment.

Management is also responsible for providing clean, dry housing areas for the cows. Management is responsible to train the milkers in the proper milking techniques and operation of the cleaning and sanitation of the milking equipment.

PIC guidelines: The PIC values are generally higher than the SPC. A PIC 3 to 4 times the SPC suggests a potential problem with cleaning and sanitation of the milking system or poor udder preparation prior to milking. High quality milk will have a PIC of <10,000 CFU/ml. Counts of <50,000 CFU/ml are acceptable. PIC >50,000 CFU/ml or >4 times the SPC should be cause for concern.

Sediment

Sediment is a measure of the cleanliness of the cows being milked. Sediment is the fine debris that is capable of moving through the milk filter into the bulk tank milk. High sediments may also be associated with high bacteria counts.

Sediment may enter the milk when extremely fine sand is used in the bedding materials of the cow housing. It may also enter the milk when the milkers are not using water to clean the udders and teats prior to milking.

Employee influence on sediment: Sediment may enter the milk when the milkers are told not to wash the udders and teats prior to milking the cows. Sediment may also be found when milkers are not properly preparing the udders and teats during wet weather.

Management influence on sediment: Sediment may increase in the milk when the management instructs the milkers not to wash the udders and teats prior to milking. Sediment may also occur when management decides to use fine sand in the bedding areas for the cows.

Sediment guidelines: Sediment should not be detected in the milk.

Added water

The milk is tested by the milk processor for added water using a

freezing point test. When water is added to the milk, the freezing point will be altered. Added water is commonly found when water is accidentally left in the milking system between milkings.

Employee influence on added water: Added water may be found when the milkers fail to properly drain the milking system between milkings.

Management influence on added water: The management should instruct the milkers to insure that the milking system is completely emptied of wash or rinse water prior to every milking period.

Added water guidelines: No added water should be detected.

Antibiotic drug residues

Antibiotics are commonly used to treat mastitis or other conditions in dairy cows. Each antibiotic has label instructions that indicate the approved reasons for using the antibiotic, the dose or amount of the antibiotic, how often the antibiotic dose should be repeated, the route of administration, and the type of cow permitted to be treated with the antibiotic. Each antibiotic preparation also has a specific withdrawal time for both milk and meat. The withdrawal time is the time from the last treatment with the antibiotic until the milk is permitted to be put in the bulk tank for shipment to the processor.

Antibiotic residues occur when employees fail to follow the specific label instructions when treating cows. They may also occur when treated cows are accidentally milked into the bulk tank before the withdrawal period is completed. Residue may also occur when employees fail to clearly identify treated cows with chalk marks, leg bands or neck chains. They may also occur when written records of treatments are not kept or are not checked prior to returning the treated cow to the milking herd. Treated cows should be housed and milked separately from main milking herd.

Milking employee influence on antibiotic residues: Residue may occur when employees milk treated cows that have been identified as treated.

Other employee influence on antibiotic residues: Non-milking employees may be charged with properly treating, identifying and separating milking cows from the main milking herd. Employees may inadvertently cause an antibiotic residue by using an antibiotic in a manner other than indicated on the drug label. Residue may also occur when employees treat cows and fail to properly identify the cows and separated from the milking herd. Employees may cause residue by removing treatment identification and returning the treated cows to the milking herd before the milk withdrawal time has been completed.

Management influence on antibiotic residues: Management is ultimately responsible to train all employees in proper antibiotic use and drug residue prevention. Management along with the dairy veterinarian should develop written protocols for use of antibiotics and records systems to properly document antibiotic use as a mean to prevent residues.

Antibiotic residue guidelines: Antibiotic residue in milk should not be permitted.

Somatic cell counts (SCC)

Low levels of somatic cells are normally found in milk (<100,000 cells/ml). The somatic cell count can be measured on bulk tank milk or milk from individual cows. When mastitis occurs in a cow, the somatic cell count (SCC) in the milk for that cow will increase in approximate proportion to the severity of the infection within the udder. Milk production is inversely related to SCC. An elevated SCC in a particular cow will also influence the somatic cell count of the bulk tank milk (BTSCC). Elevated BTSCC will reduce the quality of the milk from the herd resulting in lowered herd milk production, loss of quality milk premiums, reduced cheese yields and decreased shelf-life of the finished products.

The individual cow SCC increases when there is an infection within the udder. These infections are caused primarily by bacteria and mycoplasma.

The source of these pathogens may be infected cows or the environment. Infected cows transfer infections during the milking process on the milking machine and hands of the milkers. Environmental infections enter the udder through the teats from sources in the cow housing areas in between milking periods. Both clinical and non-clinical cases of mastitis contribute to the BTSCC. The BTSCC is reflective on a qualitative basis to the extent of individual cow SCC or mastitis infections.

Milking employee influence on SCC: The milkers play an important role in

Fore-stripping of each quarter prior to attaching the milking units allows for early detection and treatment of mastitis resulting in lower somatic cell counts.





Vinton E. Smith

All teats should be completely covered with teat dip after the milking machines are removed at the end of milking to control contagious mastitis and produce high quality milk.

the control of mastitis: particularly contagious mastitis that spreads from cow to cow during milking. Milkers should only put milking units on cows with clean, dry udders and teats. Milking units should be promptly removed from the cows when milk ceases. Every cow should be treated with a post-milking teat dip that covers at least 90% of the teat. Milkers should pre-strip all cows in order to detect clinical mastitis at the earliest time after the onset of mastitis. Milkers should follow the dairy protocol for informing the dairy management when cows with clinical mastitis are detected.

Non-milker employee influence on SCC: Bedding in the housing areas should be kept clean and dry to prevent excessive growth of bacteria that may cause mastitis from environmental sources. Employees that treat cows with

mastitis should use appropriate intramammary infusion methods to prevent the introduction of pathogens into the mammary gland and the spread of pathogens to other cows. Employees that treat cows with mastitis should not return the treated cows to the milking herd until they have clinically normal appearing milk. Employees that milk the cows in the hospital pen should be very careful not to spread mastitis from one cow to another via the milking units or their hands.

Management influence on SCC: Management should insure that milkers are properly trained in the application of mastitis prevention and control measures during the milking process. There should be a written or pictorial protocol provided to the milkers stating the procedure for handling cows detected with clinical mastitis. Workers who treat

cows with mastitis should be trained in proper intramammary infusion techniques. Management should provide adequate bedding materials and a schedule for bedding management that provides for a clean, dry place for all cows to rest. Management should use a program of total dry-cow antibiotic treatment for all cows at the end of their lactation. Management should review information on the prevalence of mastitis within the herd on a regular basis and send chronically infected cows to market.

Guidelines for SCC: On an individual cows basis, cows with SCC <250,000 cells/ml have a low risk of being infected with mastitis at any stage of lactation. Cows with SCC >250,000 cells/ml have an increased risk of being infected. Almost all cows with a SCC >500,000 cells/ml will be culture-positive for a mastitis pathogen. Repeated SCC > 250,000 cells/ml on a consecutive or intermittent basis (2 or 3 of 4 test periods) indicates a chronic infection. BTSCC <200,000 cells/ml indicate high quality milk. BTSCC >300,000 cells/ml suggest a need to review the dairy mastitis prevention and control program. In some milk cooperatives, BTSCC >400,000 cells/ml will result in a lower price for the milk. For sale off the dairy in California, the BTSCC must be <600,000 cells/ml.

Clinical mastitis

Clinical mastitis is the form of mastitis that is visibly apparent to the milkers. Clinical mastitis will result in abnormal milk (flakes, clots, watery) and possibly signs of sickness in the cow as well. Milk from cows with clinical mastitis should not be milked into the bulk tank milk for sale. Milk from cows with clinical mastitis will also have elevated SCC and be of poor quality. Cows detected with clinical mastitis should be segregated from the milking herd and handled according to the herd protocol. Early detection and treatment of clinical mastitis can be expected to reduce the incidence of chronic, non-responding cases of mastitis.

Most all forms of mastitis pathogens are capable of causing clinical mastitis. The Staphylococcal sp., Streptococcal sp. and mycoplasma generally cause mild clinical mastitis that may become chronic while the coliform bacteria often cause severe, life-threatening mastitis.

Milking employee influence on clinical mastitis: Milkers should pre-strip all cows prior to milking in order to detect clinical mastitis at the earliest time after the onset of mastitis. Milkers should follow the dairy protocol for informing the dairy management when cows with clinical mastitis are detected. The milkers play an important role in the control of mastitis particular contagious mastitis that spreads from cow to cow during milking. Milkers should only put milking units on cows with clean, dry udders and teats. Milking units should be promptly removed from the cows when milk ceases. Every cow should be treated with a post-milking teat dip that covers at least 90% of the teat.

Non-milker employee influence on clinical mastitis: Bedding in the housing areas should be kept clean and dry to prevent excessive growth of bacteria that may cause mastitis from environmental sources. Employees that treat cows with mastitis should use appropriate intramammary infusion methods to prevent the introduction of pathogens into the mammary gland and the spread of pathogens to other cows. Employees that treat cows with mastitis should not return the treated cows to the milking herd until they have clinically normal appearing milk. Employees that milk the cows in the hospital pen should be very careful not to spread mastitis from one cow to another via the milking units or their hands.

Management influence on mastitis: Management should insure that milkers are properly trained in the application of mastitis prevention and control measures during the milking process. There should be a written protocol provided to the milkers stating the procedure for handling cows detected with clinical mastitis. Workers who treat cows with mastitis should be trained in proper intramammary infusion techniques.

Management should provide adequate bedding materials and a schedule for bedding management that provides for a clean, dry place for all cows to rest. Management should review information on the prevalence of mastitis within the herd on a regular basis and send chronically infected cows to market.

Guidelines for clinical mastitis: A reasonable goal is to limit clinical cases of mastitis to 2 cases or less per 100 cows per month. This goal for clinical mastitis might be expressed as <24% of the cows affected per year.

It should be clear at this point, that the production of high quality milk is a complex task with inputs from the milkers, other dairy workers and the dairy management. Each group will need to complete their tasks with a high degree of proficiency in order for the milk to be of high quality.

MILK QUALITY INCENTIVE DESIGN

Chapter one deals with the design of an incentive pay program at the dairy.

Specific issues that need further underscoring for milk quality incentives are included here. Feedback should be offered soon after the task is completed to reinforce the desired performance behavior. If weekly or monthly performance data are available--for example, bacteria counts in milk--it is desirable to issue incentives on that basis as well. When rewards come only once a year for benchmarks achieved in the distant past, the employees may fail to associate the reward with the quality of the performance. Furthermore, a quarterly or annual reward may be too distant to positively motivate today's performance.

Many of the milk quality criteria are complex, and involve conditions that cannot be perceived by the human senses. Hence, management must be able to educate and train the employee so that they can clearly see how their performance affects the desired outcomes. Similarly, the employees must perceive that the goal is within reach, and within reasonable employee performance expectations. A farm that

On dairies where milkers meet their milk quality goals, the dairy management can reward them for their efforts by using a well designed incentive program.



Brian Manning

attempts to move from poor milk quality to superior milk quality in a very short time by placing responsibility solely on the employees is sure to fail. The employees will perceive the goal as unattainable, no matter how attractive the incentives.

It is imperative that management select the appropriate performance criteria to be monitored and linked to employee incentives. Incorrect monitors will quickly reveal themselves, as employees become frustrated by efforts that do not achieve the desired results. For example, most farm managers monitor total milk shipped on a daily basis. On occasion, daily milk production is monitored as a means of assessing the extent of mastitis in a dairy herd. The linkage between udder health and milk yield has been scientifically proven. It is incorrect, however, to extend that association and assume that all milk yield variation is due to mastitis. Clearly, management factors like nutrition and feeding have a far greater influence on milk production.

The largest pitfall of most milk quality incentive programs is the lack of checks and balances. A dairy producer had a significant problem with severe acute clinical Coliform mastitis. Management believed that if these cases could be caught early enough, treatment would be more effective and less harm would come to the cow. The manager also believed that the milkers did not like to identify sick cows, as it required special handling of the cow that only slowed them down and prolonged the work day. In an attempt to deal with the problem, the manager instituted a financial incentive of five dollars for each case of clinical mastitis that was detected early. As a result, the detection rate nearly tripled and most of the cases were incorrectly diagnosed. The opposite is also true--if you pay for decreased cases of clinical mastitis you may initially find a decrease in the number of cases reported by employees, only to find elevated SCC's and more severe cases of clinical mastitis later.

SPECIAL CONSIDERATIONS

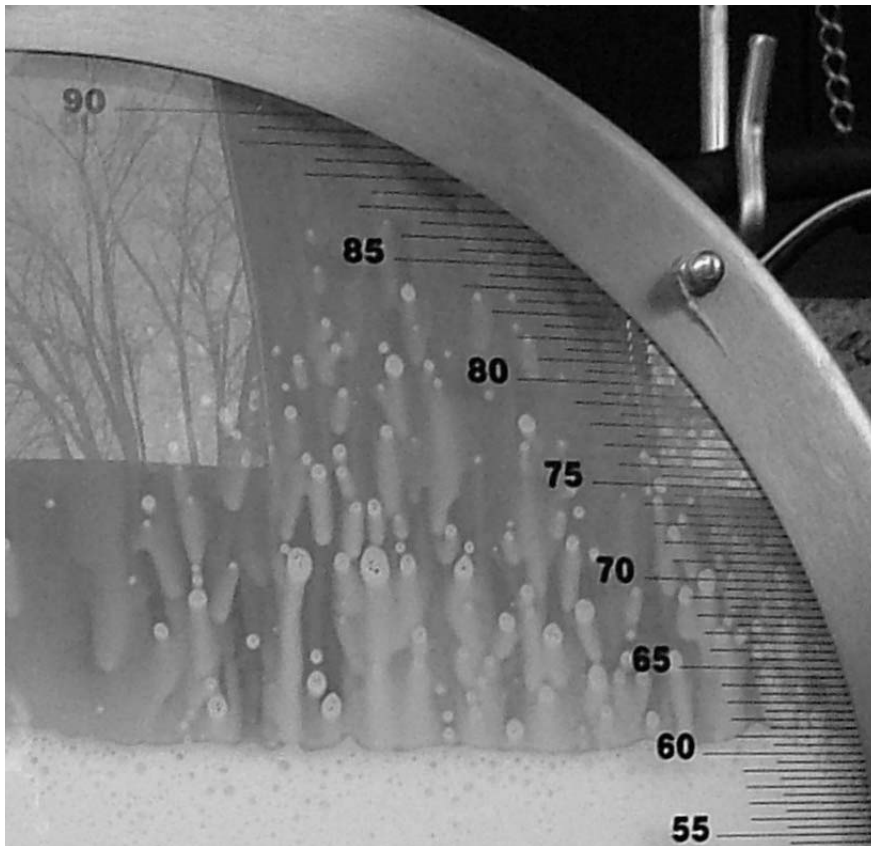
A review of the major milk quality criteria indicates that employees do not have complete control over the quality of milk produced, nor the rate of new mastitis infections. Since it is not possible to establish a perfect correlation between milker's performance, milk quality, and mastitis control, dairy management must be able and willing to adjust the criteria when the situation warrants. For example, some dairy cows are kept in the herd, even though they are subject to recurrent episodes of mastitis. Data from this type of cow is not used in the determination of the incentive award.

Milk quality data can behave in ways that are somewhat unusual; i.e., subject to extreme variations resulting from specific farm conditions and practices. Techniques such as averaging, high and low throw out, seasonal averages, trend analysis, and zero tolerance are useful tools and will assist in the equitable measurement of performance.

1. *Averaging.* For data that does not differ by orders of magnitude; i.e., 10.s, 100.s, 1000.s, etc., simple averaging is appropriate. The bulk tank somatic cell count, for example, could be averaged over many weeks and the incentive goal determined by the monthly average value. In this manner one or two higher or lower counts in a short time period would not influence attainment of the goal.

2. *High and low throw out.* Milk quality data is subject to erratic and great variations. Throwing out the highest and lowest value for the month or quarter may be appropriate when a few erratic values are evident. All of the bacteria count data, SPC, LPC, CC, and the PI can behave this way. In contrast, prolonged elevation in the bacteria counts is a very clear evidence of a problem.

3. *Seasonal Averages.* In some locations, weather and management factors may change conditions which employees cannot mitigate. In such a case, the average seasonal performance



Bijan Manning

Employee incentives can be powerful tools if used correctly and fairly by management to motivate employees to increase production of high quality milk on dairies.

can be calculated to establish the norm or goal from which incentives are determined. Employee performance expectations are adjusted for seasonal weather or management practices.

4. *Trend analysis.* Trend analysis, a sophisticated analytical tool, is useful for determining if any one or set of data points is within the normal and expected variation. Using trend analysis to set a course for improvement in performance is similar to the step-wise goal process, but instead of a series of steps, the goal is to follow a declining or inclining ramp. In step-wise analysis it is easy to tell when performance is on step. If we have a straight line goal for bulk tank SCC, for example, how can we tell if any given SCC is on the proper trend? For those that use computers and spread sheets the answer is easy. The trend is selected from the management goal; i.e., in the next 48 months, bulk tank SCC should drop from 700,000 to 150,000 cells per ml. of milk. A few months of data will determine and help predict the normal variation. The computer can then indicate which SCC

values are better or worse than those expected along the trend to lower somatic cell counts and incentives awarded accordingly.

5. *Zero Tolerance.* Some milk quality parameters may be too important to consider trend movement or step-wise movement. Zero tolerance is another form of fixed goal, except that the goal is no occurrences. Examples of the use of zero tolerance might include antimicrobial residues and added water. Both problems can subject the producer to economic losses and fines. The legal standard is zero occurrences. Effective antimicrobial residue avoidance requires that the employee have the knowledge, tools, and authority to act to keep the milk residue free. This requires knowledge of what drugs are used and which specific farm tests are needed.

CONCLUDING CONSIDERATIONS

Employee incentives are powerful tools if used correctly and fairly to improve milk quality. Management and employee must become very knowledgeable about the milk quality factor they choose to improve. They can obtain positive results by focusing on one problem at a time and by maintaining crystal clear communications.

CHAPTER 5 REFERENCES AND RECOMMENDED READING

1. This chapter is an update of Milk Quality Incentives (Dairy Incentive Pay 3rd Edition) by Richard H. Bennett. Substantial portions of that chapter where preserved here.
Peters, Tom & Waterman, R. H. *In Search of Excellence*, Harper & Row, 1991.
Guidelines for Effective Installation, Cleaning, and Sanitation of Milking Systems (NDPC2), September 1993, *Northeast Dairy Practices Council*, (315) 449-7547.

Feeding Management Incentives



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If feed quantity or quality for cows is poor, milk production will suffer. Feeding management in many cases represents the difference between 20,000 and 22,000 pounds of milk per cow per year. There are no secrets or magic formulas for achieving efficient and profitable milk production from a feeding program.

It is essential that feeding personnel realize the importance of keeping cows properly fed and managed throughout the lactation cycle. This means that

dairy farmers need to *communicate* to their feeders the consequences of poor feeding practices.

MAXIMIZE DRY MATTER INTAKE

Peak or maximum daily milk production for most cows occurs 6-8 weeks after calving with peak feed intake not occurring until 12-15 weeks into the lactation. This results in a

nutritional deficit which needs to be made up by mobilizing nutrients from the cow's body. If there is a shortage of these nutrients, then peak production will suffer.

It is important during the early lactation period to bring fresh cows to full feed as rapidly as possible. This can be achieved in several ways. First, offer dry cows 6-8 pounds of concentrate per day two to three weeks before calving. This enables the rumen microorganisms to adjust to the milking cow rations more rapidly. Second, gradually bring fresh cows to full concentrate levels. Concentrate should be limited to 6-8 pounds per meal. Third, feed at least 16-18 pounds of high quality alfalfa hay. This will minimize the chances of a cow going off feed. Fourth, avoid overcrowding of the fresh pen. Fresh cows are usually timid upon entering the fresh pen. As a result, they usually do not compete well at the feed manger if pens are overcrowded.

One objective of feeding management in order to achieve and maintain high production is to maintain a proper balance of nutrients which minimizes fluctuations in the rumen, maximizes digestion, and ensures a steady flow of nutrients to the mammary gland (Muller, 1992). Within the framework of existing housing, feeding equipment, frequency and time of milking, and available labor, dairy producers should strive to provide a nutritionally balanced diet 24 hours each day to enhance the opportunity for maximum dry matter intake and to achieve ruminal fermentation that maximizes digestion and rumen microbial production.

MONITORING OF FEED INTAKE

As mentioned previously, maximizing of dry matter intake is the goal in feeding dairy cattle. Dairy feeders need to understand the important role they play in getting fresh cows off to a good start.

Part of feed management begins by feeding cows according to their predicted feed intake level. Since cows require pounds of nutrients and not

percentages, predicting feed intake becomes important in balancing rations for the desired production level. Most dairies will employ a nutritionist who will formulate a feed ration based on the cow's average body weight, days in lactation and milk production along with the level of milk components such as milk fat and protein. Based on these parameters a requirement will be given for a minimum level of feed intake that the cows should be achieving. Various factors can affect feed intake such as heat stress, infrequent feeding, feed not available 20+ hours per day or moldy feed being fed. If cows eat more than two pounds below their predicted intake, something is depressing their feed intake. Feeders need to be keenly aware of this and be directed by management accordingly.

Cows whose dry matter intake are calculated at more than two pounds above predicted values are generally wasting feed. Cows prefer fresh moist feed and feed that is fed in excess usually dries out and is not very palatable. Excess feeding also results in mold buildup which when consumed by cows can result in abortions or low milk production. Ideally, feed bunks should be cleaned daily in order to prevent the occurrence of molds. This is especially true if considerable amounts of wet feeds are fed.

Underfeeding or overfeeding of cows is usually the result of not making adjustments when pen sizes are changed. Although it is not practical to take a daily accounting of pen numbers, a once weekly count is recommended to ensure proper utilization of feed and equipment.

FEED MANAGEMENT MONITORING

Various areas of feeding management can be monitored in order for bonuses to be considered to feeders. Areas to concentrate on are as follows:

1. Bunk management - As mentioned earlier, moldy feed can cause both reproductive and palatability problems.



J.W. Schroeder, NDSU

Feeding areas should be cleaned frequently to prevent the build-up of moldy feed. It is generally a dairy manager's responsibility to monitor the feed bunk area, but all too often dairy feeders are given this task. An explanation to feeders on why feeding areas need to be cleaned frequently should be conducted. This gives them a better understanding of feed management principles.

Incentives to feeders for maintaining a clean feed bunk area would be a worthwhile investment. It should be noted though that it is easy to underfeed

and thereby get a clean bunk.

2. Feed storage facilities - Management of feed storage facilities is the first line of defense against feed waste. Feeders should keep all feed covered when possible in order to prevent loss due to both wind and rain.

If silage bags are used, they can be prone to high losses when the opened end of the bag is not managed properly. Bags should only be exposed enough to allow gathering of feed. Any holes made in silage bags need to be patched promptly in order to prevent occurrences of mold. With silage trenches, the silage

Dairies using total mixed rations (TMR) are aware that good mixing practices are desirable.



American Jersey Cattle Association, Reynoldsburg, Ohio

Feed intake is the main factor which governs milk production.

face should be kept smooth to prevent the occurrence of mold. Excess silage should be kept at a minimum at the foot of the face. This feed can deteriorate quite rapidly in feed value.

Wet feeds such as citrus pulp, brewers grains and vegetable by-products can mold easily, therefore feeders need to be observant for deterioration of feed quality. A load of wet feed usually needs to be utilized, depending on the weather, within 10-14 days of delivery. Incentives for minimizing feed losses and mold build-up would be advantageous on many dairy operations.

3. Calculated expected feed usage versus inventories - If inventories are below expected uses, then some waste may be occurring or expected feed use needs to be reevaluated. The key to improving feed inventory control and reducing feed waste is setting up a well-understood and effective monitoring system for measuring feed disappearance charged against inventory. Many examples can be cited of a dairy that experienced a significant health challenge with fresh cows, or a dairy that lost a large amount of milk production and income over time because of errors that were made in the mixing or feeding program, yet essentially no records were available to determine specific causes to allow implementation of a better management plan (Barmore, 2001). Experiences have shown that by establishing as part of a feeder's job description the expectations for monitoring feeding and

mixing, and at the same time giving the feeder the monitoring tools, that significant reductions can be made in the variation that occurs from load-to-load or day-to-day.

Barmore, 2001, discusses ways by which feed intake can be monitored. A simple method of monitoring feeding involves recording daily amounts of ration offered and refused, and then comparing this to inventories taken on a regular basis. This requires that a feed intake log be kept for each pen or group of cows, while all feed purchases are recorded for actual scaled amounts, and when they are delivered.

Another method of monitoring feeding and inventory is to use a spreadsheet, where actual weights of the ration offered daily can be recorded by pen or group along with the feed refusals. These amounts can be automatically subtracted from the running inventories if available in the spreadsheet. Computerized software scale interfaced programs are rapidly becoming of interest due to their ability to automatically capture feeding and mixing information without requiring the feeder to hand-enter data. These programs record automatically the actual amounts loaded and fed relative to projected, capturing any deviations and errors for each ingredient and pen. An example printout from this type of software is shown in Figure 1. In this example, the feeder for this dairy had close to a 6.0% error by loading too much molasses into the feed truck. These errors can be costly most notably

for a large dairy where multiple loads are fed through out the day. Incentive programs could be developed to reward the feeder for keeping the error rate between 1.0 and 2.0%. Dairy farmers should have scales on their feeding equipment calibrated annually to make sure that it is weighing correctly.

Time of delivery and mixing times can also be monitored by day of week or feeder. Computerized feeding systems can perform inventory tracking based on what is actually loaded and unloaded. This in turn can be used for feed forecasting and purchasing.

To monitor proper mixing of a total mixed ration, samples can be taken for lab analyses of the finished product. One should be cautious in interpreting the lab results as this method can give an inaccurate picture of the feeding program.

INCENTIVE PROGRAMS FOR FEEDERS

It is not enough for a feeder to know that sufficient feed needs to be available for cows 23+ hours of the day. Feeders should know what the consequences are for not delivering sufficient feed to a group of cows.

Feeders need to know what they can do to maintain or improve feed intake. A growing number of feeders are coming to dairies with no experience. Even those with previous experiences

often need training to acclimate them to the dairy's equipment and practices.

Many factors can effect milk production so incentives tied to the feeder may need to be also associated with other employees on the dairy. Suggestions for possible incentive programs for feeders (beyond regular salary) are included below.

1. So many cents per hundredweight of milk for keeping feeding areas cleaned. This should be rewarded on a monthly basis after discussion with the feeder on what is to expected for this incentive to be realized.
2. A specified amount per 100 pounds of milk over so many pounds shipped per month (example: so many dollars per hundred weight over a million pounds monthly in a 500 cow herd).
3. A specified amount per 1,000 pounds milk produced in 365 days or less over 22,000 pounds for each complete lactation (example: so many dollars per 1,000 pounds over 22,000 pounds).
4. So much per 100 pounds of milk produced over 22,000 pounds of milk per cow annually (example: so many cents per 100 pounds over 22,000 pounds times number of cows).
5. A specified amount for keeping feed loading and unloading error rates between 1.0 to 2.0 %.

Figure 6-1. Feed loading detail with feeder deviations. (Courtesy, DHI Computing Service, Inc., Provo, Utah.)

	ingr	actual loaded	expected to load	loading dev	% error		
04:16:50	HighHay	1946	(1943)	3	0.2%		
04:18:53	PreMix#1	3176	(3159)	17	0.5%		
04:20:19	RldCorn	2811	(2806)	5	0.2%		
04:21:51	CrnSilage	5782	(5757)	25	0.4%		
04:27:11	HighWheat	1607	(1583)	24	1.5%		
04:27:49	Molasses	609	(576)	33	5.8%		
ttl loading deviation & percent error -->				107 lbs	0.7%		
	pen	pen count	actual unloaded	adjusted expected to unload	original expected to unload	unload dev	% error
04:31:32	Pen 5	285	7821	(7752)	(7665)	69	0.9%
04:34:08	Pen 4	280	8267	(8175)	(8158)	92	1.1%
ttl unloading deviation & percent error -->						161 lbs	1.0%

On many dairies, heat detection can be a problem. Feeders can aid in this since they are in contact with the milking strings at various times throughout the day. Bonuses to feeders for catching hot cows can add to a dairy's reproductive efficiency (see Chapter 3 for details). It is important though not to delegate too much added work load to feeders as this will cause less time in the feed management area.

With regards to incentive programs we usually equate a financial reward for doing a better than normal job. But, just being recognized for doing a good job may be satisfaction enough for certain employees. Individuals who do consulting work on dairies specifically in the feed management area will often meet with just the feeders on a dairy to discuss the importance of their job. In one instance, a consultant has had a pizza party for the feeders and others associated with the feeding program. The owner of the dairy will supply the employee's with time off from their work schedule or an extra hour of pay in order for the workers to attend this meeting. The consultant will talk about how important their job is, and what skills are needed to do a good job as a feeder (Bakke, personal communication).

One of the most important duties of a feeder is feed bunk management.

SUMMARY

Visual appraisal of a feeder's performance is generally the only way that dairy managers can gauge a feeders competency. Quantitative measurements such as milk yield can be used, but many other factors effect milk production. Bunk management along with feed storage supervision are important areas for which to consider incentives.

Feeders are an integral part of the dairy's work force. A carefully designed incentive pay program will help recognize their valuable contribution to the dairy.

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Hoof Care Incentives



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Lameness, mastitis, and reproduction are the three most common causes of cows leaving the herd prematurely. Many of the losses associated with lameness can be prevented by good dairy management and proper attention to hoof health (hoof trimming and prompt treatment of lame cows). Lameness can be due to infectious or non-infectious causes. Infectious causes are digital dermatitis (footwarts), footrot, interdigital dermatitis, and heel horn erosion. Non-infectious causes are

due to disruption of horn production or trauma and are commonly lumped under the category of "laminitis". Some of the factors that influence the incidence of laminitis are nutrition, feeding management, cow comfort, time standing on concrete, and husbandry.

If a dairyman wishes to establish an incentive program for good hoof health, the first thing that must be done is to determine the "normal" level of lameness in the herd. One of the tools for determining and monitoring



If a dairyman wishes to establish an incentive program for good hoof health, the first thing that must be done is to determine the “normal” level of lameness in the herd.

lameness in the dairy herd is locomotion scoring. Locomotion scoring information is available from the following website:

<http://www.availa4.com/locomotion/index.html>.

Further information on lameness can also be obtained from the author.

Locomotion scoring must be done in a location where the cows have a level walking surface and good footing. Cows must be observed standing and walking with special attention paid to the posture of the back (flat or arched). Keep in mind that older cows will tend to score higher and may need more attention than younger cows. [Editor's note: in an incentive pay program, this would

have to be considered so that dairy workers are not punished or rewarded for the average cow herd age.] The scores are as follows:

Locomotion Score 1: Normal gait. Animal stands and walks normally and with a flat back. All feet are placed with purpose.

Locomotion Score 2: Abnormal gait. Stands with a flat back and walks with an arched back. Gait is slightly abnormal.

Locomotion Score 3: Mildly lame. Stands and walks with an arched back. Takes short strides with one or more legs.

Locomotion Score 4: Moderately



Before Trimming: Here is a front foot of a cow. The outside claw (on the right) has a toe that is approximately the right length, while the inside claw (on the left) is too long and will need more extensive trimming.



During Trimming: Here the hoof trimmer is removing the excess horn using an electric grinder motor with a cutting disc. Most of the hoof trimming can be done with the electric grinder, which is easier on workers but necessitates great care since it can cut very rapidly.



After Trimming: A small amount of horn has been removed from the outside claw, leaving the heel intact. More horn was removed from the inside claw making it the proper length and is now balanced with the outside claw so that weight bearing is more even between the claws. Also, more horn has been removed from the toe area making the cows weight distribution more even from the toe to the heel.

lame. Arched back standing and walking. One or more limbs favored but at least partially weight bearing.

Locomotion Score 5: Severely lame. Arched back standing and walking. Animal refuses to bear weight on one limb. May refuse or have great difficulty rising from lying position.

Note that the above definitions are slightly different from those on the

website or on the current issue of "Locomotion Scoring of Dairy Cattle". We are currently revising the locomotion scores according to our observations of cows on confinement (freestall) dairies. Cows scoring 3, 4, or 5 are considered lame and should be examined and treated appropriately. According to research by Peter Robinson at UC Davis (see article on website above), cows scoring 3 were

Cows that have properly designed, bedded, and maintained freestalls will spend from 10-14 hours per day lying down and ruminating. This lying time is critical for optimum milk production and prevention of many lameness problems.

four times more likely to score 4 or 5 the following month than were cows scoring 1 or 2. Some older cows with chronic laminitis will exhibit a locomotion score of 3 even though there are no visible lesions and her feet are properly trimmed and balanced. Most of these cows will require more frequent examination and trimming but if they are good milk producers, more serious lameness might be prevented and the cows kept in the herd.

A herd with a very good locomotion scoring profile might have 90% of the cows scoring 1 or 2 with 10% scoring 3, 4 or 5. It should be possible with an excellent hoof health program to maintain 1% or less of the cows scoring 4 or 5 (that is 10 cows scoring 4 or 5 and 90 cows scoring 3 on a 1000 cow

dairy). While cows with a locomotion score of 3 do not appear very lame, they have already lost considerable money for the producer by decreased dry matter intake, milk yield, and reproductive performance and an increased likelihood of premature culling.

If an incentive pay system is to be implemented on a dairy, then it must be designed to reward the worker for performance that is under his control. For instance, if a worker is paid by the head for hoof trimming, then he will probably trim more cows but there will be no incentive to only trim cows that need it. Whereas, if a worker is paid an incentive to maintain or improve hoof health on a dairy and is allowed to choose the cows to trim, he might be more inclined to pick the cows that need



trimming to prevent more serious lesions.

Let's consider two scenarios for implementing a hoof health program on a dairy:

Scenario 1: An outside hoof trimmer is hired to trim cows on the dairy. The hoof trimmer is presented with lame cows and dry cows to trim on the day he is there. The cows are picked by the herdsman or manager on the dairy facility. The hoof trimmer gets paid by the cow for trimming and any treatments used for lame cows. In this case, the incentive is for the hoof trimmer to trim cows and apply treatments since he gets paid on a piece basis. The hoof trimmer could do a very good job and yet the prevalence of lameness might stay the same on the dairy because the hoof trimmer is not getting the cows he needs to decrease the lameness. If it is the herdsman's job to pick cows for the hoof trimmer then it may be possible to pay the herdsman a differential incentive based on the prevalence of lameness from month to month. In order to assess whether the lameness prevalence was decreasing it would be necessary to have another, objective person (the manager, veterinarian, or owner) assess the locomotion scores on a regular, perhaps monthly, basis. Problems with this program that are out of the herdsman's control would be the nutritional program (ration formulation, mixing, and feed bunk management), cow comfort (freestall maintenance and bedding), alley flushing, and time standing on concrete during milking. In my opinion, it would be better to establish a hoof health management team with plainly stated goals of performance for all members involved than to establish an incentive program for just one person.

Scenario 2: Some larger dairies are building special needs facilities, which include a hoof trimming chute on the dairy. Some producers are interested in having workers on the dairy trim the cows rather than hiring an independent hoof trimmer. Since the average case of lameness costs the producer approximately \$300 per case and it is very easy to make cows lame with improper trimming, I always encourage

dairy producers to make sure that workers are properly trained in functional hoof trimming. There are several schools in the US and abroad that teach the theory and practical aspects of hoof trimming. For this scenario to work well, someone with management responsibility would have to monitor the lameness prevalence and serve as a quality control supervisor for the person(s) doing the actual trimming. It would also be very helpful if the supervisor or manager had training in proper functional hoof trimming so that new personnel could be trained as turnover occurs. It should be possible to train the worker doing the hoof trimming to observe the cows and spend some time each day identifying which cows need to be trimmed or treated. In this way, the hoof trimmer has partial ownership in the program and is not trimming cows that do not need to be trimmed. If the hoof trimmer was given responsibility for picking the cows that needed to be trimmed and treated, it should be possible to design an incentive program based on monthly locomotion score prevalence. [*Editor's note:* A good way to train workers to see with skilled eyes is to have the worker score 100 cows in terms of whether or not trimming is needed. After finishing this task, this worker's opinions are compared to those of a skilled rater. They can then both look at each cow where there are differences of opinion and discuss these. Over time, as the worker's ability to discern which hoofs need trimming, this responsibility can be increasingly delegated.]

From my perspective, hoof health would benefit more from forming management teams and rewarding results with responsibility and salary rather than a specific incentive program. I think that workers would respond to developing further skills in cow care and having their opinions valued by managers and owners. One of the problems with training on-dairy workers to trim cow claws is that they may learn that they could make more money as an independent hoof trimmer and turnover could be a problem unless steps were taken to ensure loyalty and job

satisfaction. [*Editor's note:* A well trained employee may well be worth paying more in recognition for special skills. This pay may come either in terms of an added incentive (Chapter 1) or wages (Chapter 2). The employee can benefit from such appreciation, and the dairy can save money.]

CHAPTER 7 REFERENCES

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This cow has a locomotion score of 5 and will not bear weight on her left hind foot. She is losing body condition because her feed intake is lower than normal.



Herd Health Incentives



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All of the areas on the dairy are interrelated and can have effects on cow health and herd performance. It should be emphasized that every individual on the farm plays a vital role in contributing to herd health and performance. Performance can be measured in pounds of milk, milk fat and protein production per cow, reproductive performance, and heifer growth or age at first calving. Health can be measured by calculating disease

incidence. This chapter will highlight some of the more important areas in which employees can impact overall health of the herd which can affect herd performance.

Most employees on the dairy really do want to do a good job. They like the cows and want to help them. What is often missing, however, is the training to provide the knowledge of the best herd health practices and the *reasons* why those practices are the best ones to

improve the health of cows. Adequate and proper training should be the first step to the management of the health of the dairy herd.

What are the herd health areas for which the employees have direct responsibility? Employees can be responsible for implementing vaccination programs, transition cow management, maternity pen and calving management, fresh cow management, hospital pen management (including treatment), and environmental management. Each of these areas requires attention to details to be effective. A path analysis model to represent the complex of influences of

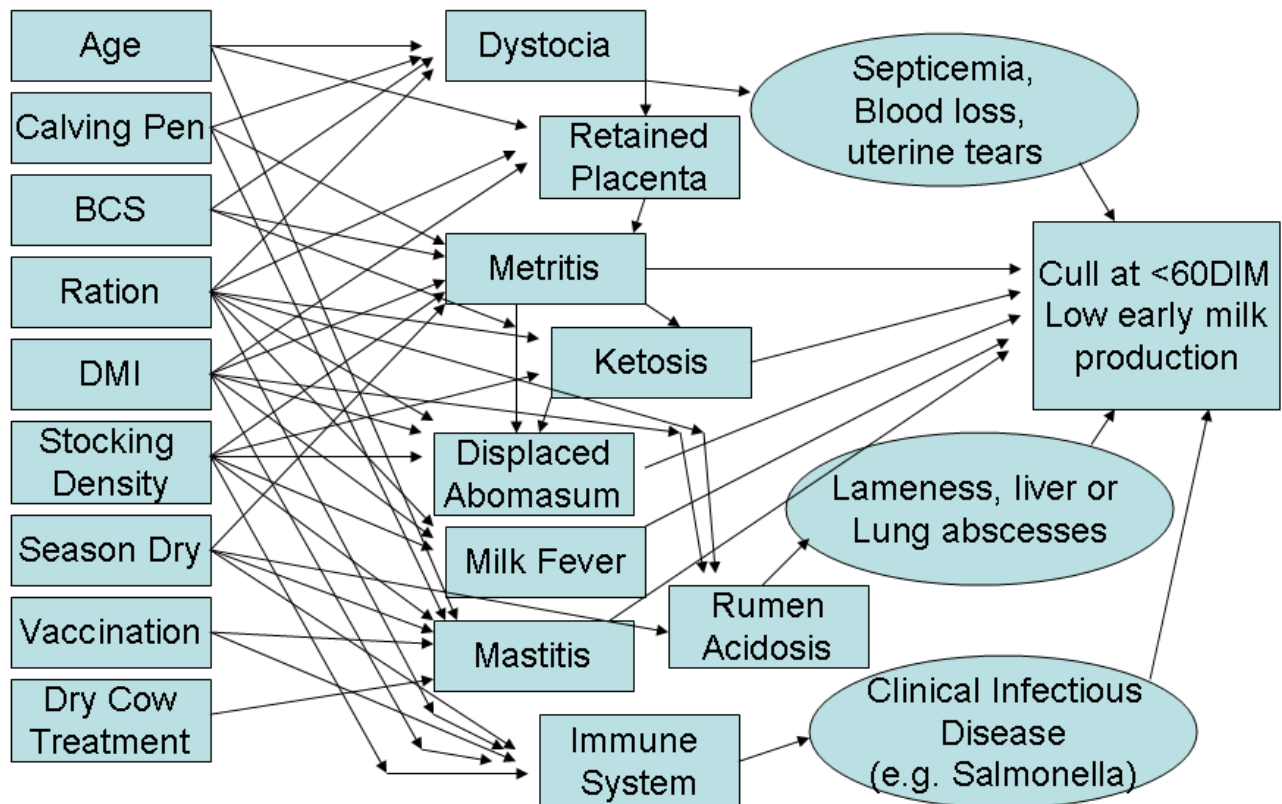
many of these areas on health and performance in early lactation is given in Figure 1.¹⁻³

VACCINATION OF HEIFERS AND COWS

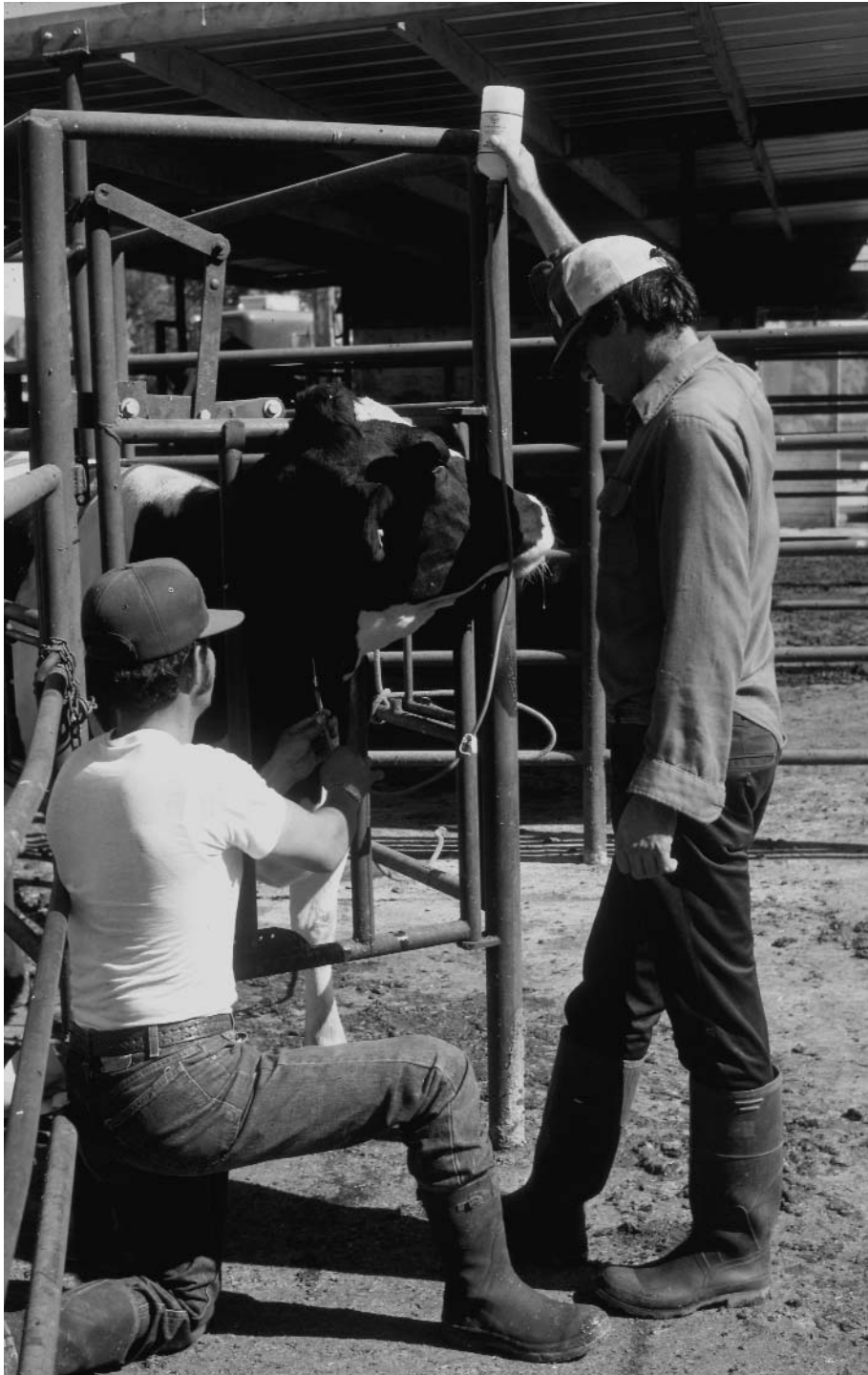
Sound herd vaccination programs are essential for the health of cows and heifers and for the prevention of a number of infectious causes of abortion. Employees are often asked to perform vaccinations of all heifers and cows but often lack knowledge of some of the details to make these tasks effective at reducing the chances of disease. Vaccination programs require the

Figure 8-1. Path analysis for dry cow management and metabolic disease effects on early lactation culling (<60 DIM) and early lactation milk production.

Close-Up Pen Factors



(Adapted from Erb et al. 1985; Curtis et al. 1985; Correa et al. 1990)



Gregorio Billikopf

What are the herd health areas for which the employees have direct responsibility? Employees can be responsible for implementing vaccination programs, transition cow management, maternity pen and calving management, fresh cow management, hospital pen management (including treatment), and environmental management. Each of these areas requires attention to details to be effective.

knowledge of who to vaccinate, when to vaccinate, where to vaccinate and how to vaccinate. The herd veterinarian can craft a comprehensive vaccination program for the herd and make recommendations about what vaccines should be used specifically for the herd. What the employee then needs is training on handling the vaccine (proper storage with no freezing, nor heating nor

leaving on the dashboard) so that it remains an effective stimulus to produce immunity; the proper dose of vaccine to provide enough of a stimulus to produce immunity; and the correct route of vaccine administration. All these aspects of vaccination are on the vaccine package inserts. Providing the training on how to read the insert or providing language-appropriate label directions is



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No one employee is solely responsible for herd health. It requires a team effort.

paramount to effective vaccination.

Incentives for getting the job of vaccinations done correctly have not been developed. If a producer paid incentives for the proportion of the herd vaccinated, it could make a difference, but monitoring this is very difficult. Counting the doses of vaccine used does not mean that they were actually given to the cows and heifers. An objective measure on which to base incentive pay is hard to find.

TRANSITION MANAGEMENT

A good transition from the dry period into early lactation can prevent numerous health and production problems later on. There are very specific areas in which employees have an influence. This section will focus on the period from dry off through the fresh pen. Areas to monitor and possible incentives will be provided at the end of the section.

Dry cow management

Dry cows are rarely “managed” other than providing dry cow treatment at dry off. Once put into the dry pen, they are left on their own. Critical areas to pay attention to, however, are corral management to provide cows with clean, dry resting areas, thereby

reducing chances of new intramammary infections; dry cow nutrition; and identification and movement of cows to the close-up pen three weeks before calving.

Close-up cows

Cows in the close-up pen are there for several reasons. First, they are moved so as to receive a transition diet that prepares their rumens for the lactating cow ration by providing substrates that elongate rumen papillae, and giving them a lead-time to adapt to new feedstuffs. Second, they are separated from other cows, and hopefully not overcrowded, so that they can eat more feed because they naturally start to decrease intakes in the two weeks before calving. And, third, many close-up cows are fed anionic salts in their diet for prevention of milk fever and subclinical hypocalcemia. Stocking density, dry matter intakes, and anionic salt feeding are areas that can be monitored.

Every week the cows are in the close-up pen, an employee can obtain urine samples from ten close-up cows that have been in the pen for at least two days. Recommendations are to have urine pH's in the 6.0-7.0 range. This information should then be provided to the feeder, nutritionist or veterinarian if changes to the diet need to be made.

In addition to pH monitoring, employees need to recognize that maximization of feed intake through estimation of dry matter intake and frequent feed push-ups is essential in the close-up pen. Employees can provide information on the weight of the feed, numbers of cows in the pen and the pounds of feed refusals so that dry matter intake can be estimated and improved. The final stage in close-up pen management is to have employees able to recognize the signs of imminent pregnancy and know when to move cows to the maternity pen.

Maternity pen and calving management

Maternity pen hygiene, allotment of the appropriate space per cow, and

comfort (bedding) are essential ingredients in effective maternity pen management. Calving management guidelines to reduce risk of injury or infection to cows or heifers can be provided to employees through “calving schools” conducted by the herd veterinarian. Training should include identification of calving problems, delivery techniques, and when to call for veterinary assistance. Employees should also be able to perform rudimentary physical examinations after calving to check for uterine or vaginal tears and assess overall cow health. An incentive that some producers have used is one based on the proportion of live calves at birth (or a reduction in stillbirths). This could have a bad consequence, however, because it could result in the employee deciding on earlier, unnecessary calving intervention that could cause more uterine and vaginal tears, infections, abscesses or downer cows. Targets for live calves between zero and 24 hours of age are <6-8% of all births, with an action level of >10%.^{4,5}

Just-fresh cows

Employees working with these cows need to understand and be able to perform sanitary colostrum harvesting. They need to be able to identify fresh cow mastitis, retained placentas, and assess cows for fevers. Once the cows are milked for 3-4 days, they are then moved to the fresh pen.

Fresh cow programs and fresh cow treatment protocols - Fresh cow monitoring programs are popular in California to detect problems early and initiate the appropriate treatment in order to reduce fresh cow health problems' effects on early lactation milk production and subsequent cow fertility. Producers should work with their veterinarian to develop detection, monitoring, and treatment protocols for specific conditions. These programs usually rely on monitoring signs of illness and rectal temperatures for the first 10 days in the pen.⁶ Employees also need training in how to identify those sick cows that may need further examination and know when to send cows to the hospital pen.

Potential ways to assess the progress of transition cow management include the proportion of cows culled in the first 60 days in milk and early lactation milk production.



In addition to fresh cow treatment programs, employees need to pay attention to fresh cow comfort, hygiene and stocking density. Cows in the fresh pen should not exceed 90% of freestall capacity (stocking density) and at least 35 inches of bunk space per head in the pen. They are still ramping up for peak dry matter intake and need fresh feed often.

Transition cow management monitoring and incentives

Few producers are actually monitoring the effectiveness of their transition program because effective monitors have been elusive. Recently, some new information has provided some hope for making decisions about interventions in transition cow programs. There are three possible areas to monitor that are relatively easy to set up and may provide bases for incentive pay for employees. One caveat, however, is that because of the interrelated nature of transition cow management, multiple employees may be involved in an incentive plan.

Potential Monitors for Transition Cow Programs⁷

1. Proportion of herd removed within 60 days in milk (DIM) - On most dairies, herd removal in early lactation (<60 DIM) is almost always due to death or forced culling because of disease or injury.⁷ The proportion of cows leaving the herd early in lactation can serve as a valuable monitor for transition cow programs. About 25% of all removals leave within 60 DIM (about 6-12% of the entire herd). This represents a tremendous direct economic impact on herd profitability. To use this monitor on which to base incentive pay, the producer must set up the monitor so that distinct cohorts of cows that calve are evaluated for which specific employees had responsibility. A benchmark goal is given as no more than 6-10% of the entire lactating herd removed within 60 DIM. In addition, improvement

in documenting the reasons for removal could improve the ability to target specific areas of transition management improvement.

2. Early lactation milk production - Milk production in early lactation is tied to how well cows went through their transition. There are three possible milk production monitors on which to base incentives: peak milk, cohort peak milk and average first test day milk.
 - a. *Peak milk* - This measure is influenced by age, season of calving, as well as genetics of the cow. Average peak milk adds a lot of momentum to the measure because of the time between calving and peak, and the experience of all the cows in the herd.
 - b. *Cohort peak milk* - This measure still has some of the disadvantages of peak milk and requires a special set-up within the farm computerized record-keeping system to extract the data. There is still a lag between what happened around calving and when peak milk occurred, but the measure is looking only a specific calving cohort of cows, e.g. those calving each month.
 - c. *First test milk production* - This measure reduces the lag time from calving, but the amount of milk produced is highly correlated to the days in milk at first test. First test-day milk production may occur anywhere from a few days in milk (guidelines suggest no less than 10 DIM) to over 30 DIM. One recommendation is to look only at a calving cohort of cows that had a first test between 15 to 25 days in milk (M. Overton, personal communication). First test milk production (15-25 DIM) may be the most sensitive and earliest measure of transition cow management.
3. Rates of metabolic disease in early lactation - Measuring monthly rates of diseases associated with transition management and rewarding employees responsible could be a

direct means to provide an incentive for overall transition management. Disease rates within the first 30 days after calving could be calculated for monthly calving cohorts of cows for which the employees had responsibility. Although this sounds straightforward, these calculations are difficult because most producers do not keep adequate health or diagnosis records for sick cows. Although large farms have computerized record-keeping systems for production and reproduction data, they may not capture health data or only record treatments and not the diagnoses. A veterinarian could help set up health event codes that can be appropriately summarized.⁷ A second consideration is that a simple, standard, agreed-upon clinical definition needs to be made for each disease. Another consideration is that the employee who might receive the incentive is not the same one who makes the diagnosis or enters it into the computer. An impartial third-party should be involved. Potential goals for post-calving diseases:

- a. Milk fever, 3-5% of cows calving within 30 days
- b. Retained placenta, 5-8% of cows calving within 30 days
- c. Displaced abomasum, 3-5% of cows calving within 30 days

What is critical is that the producer knows what these measures currently are in the herd so as to establish reasonable, attainable goals.

HOSPITAL COW MANAGEMENT

Maintaining the health of the rest of the herd means isolating and effectively treating cows that are ill or injured. Hospital cow management requires some knowledge of physical examination, recognition of common diseases and a set of treatment protocols. Employees also need to know when to call the veterinarian or producer if they are not seeing treatment success. A close working relationship with the herd veterinarian who can help hospital

pen employees better manage sick cows can result in fewer culls, fewer deaths, and a faster return of cows to the lactating pens.

ENVIRONMENTAL MANAGEMENT

Environmental management includes corral management, to minimize mud and maximize shade and cooling so that cows can utilize nutrients for fetal growth, maintenance and future milk production; water trough sanitation and maintenance; bedding and stall maintenance, to optimize cow comfort; and flush alley systems management, for the timing and frequency of flushing. Incentives for corral or freestall management could be based on observations by an objective third party. For example, the herd veterinarian or other dairy consultant could provide data on cow comfort and hygiene at their regular visits on which incentive pays can be based. This could, however, result in a potentially adversarial relationship between the staff and consultant. [*Editor's note: spot checks on cow comfort and hygiene should take place on an irregular basis, perhaps using a random number calculator to determine the day and time of the day on a rotating basis, else workers may know to increase their efforts on days when the veterinarian or consultant is scheduled.*]

CONCLUDING THOUGHTS

Because of the interrelationships of feeding, milking, reproductive management, and environmental management and the effects that nutrition, lameness, fertility, and mastitis have on immunity and milk production performance of the herd, it may be difficult for the producer to identify specific areas for incentive pay for herd health practices. The employee may not have individual, complete control over the standard measures of herd performance because of these interrelationships. For example, a hospital pen manager can become easily

Effective, meaningful employee training is critical to maintain a healthy, productive herd.



overwhelmed if the milkers have high sensitivity for pulling cows with mastitis for treatment. Or, if the fresh pen manager does not quickly detect and treat fresh cows, more cows will go into the hospital for further treatment.

What will motivate employees to perform optimally in the farm's herd health programs?

* Disease monitoring.

* Specific job goals and specific tasks to reach those goals.

* Adequate training, retraining and reinforcement of what to do and why it is important.

“Hear, see, do, say, and say while doing” will ensure proper training.

* Appropriate and effective feedback based on observations of job performance.

* Adequate animal holding facilities and equipment so that the employee can provide optimum care most efficiently.

* Recognition by management that each detail of what the employee does to maintain or improve the health of cows is important.

* Regular staff meetings to discuss how to integrate what is happening on the farm and more efficiently manage all the different areas for herd health and performance.

Attention to the details in the maternity pen can have an effect on future reproduction, milk production, and survival in the herd.



CHAPTER 8 REFERENCES

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