

Effective Use of Standard Operating Procedures on Dairies to Improve Herd Health

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Formal management programs to help maintain process and quality control have been widely adopted by many industries; the Total Quality Management (TQM) and HACCP (Hazard Analysis Critical Control Points) programs are examples. **Standard operating procedures (SOPs)** are the common component of these programs; they **help reduce the variation that occurs when different individuals perform the same task in different ways**. Dairies are a perfect place for adoption of SOPs because multiple employees often share responsibility for a single task, and because variation in these tasks (milking, feeding, bedding, health and reproductive management) can have detrimental consequences for herd performance (Stup et al, 2006). It does not matter if a dairy producer has the best milking parlor, feeding system and housing in the world; if employees do not perform their tasks consistently the dairy will be unlikely to succeed. Most dairies should aim to have a set of written SOPs that explain how all the different jobs on the dairy are to be performed, i.e. a document that defines how the dairy is operated. In these proceedings the basics of SOPs will be reviewed, followed by examples of herd health SOPs.

What is an SOP?

A Standard Operating Procedure (SOP) is simply a written step-by-step set of instructions on how to complete a task. It is just like a cookbook recipe, and gives an employee a detailed description of how to handle a specific task within their job.

Why Use SOPs?

- Dairy cattle are creatures of habit! They thrive on consistency. If tasks are performed correctly and consistently, cow performance will be optimized.
- Except for very small farms, dairies typically have multiple employees on whom they rely to milk and care for cows. For example, in a study of 101 Wisconsin farms with an average herd size of 377 cows, there was an average of 6.4 different people (range 2 to 16) milking cows each month (Rodriguez et al, 2005). There is plenty of opportunity therefore, for individual variation to occur in the way tasks are performed.
- SOPs help workers to do their job correctly. They provide guidance for an employee who is faced with a situation that requires action. They help eliminate confusion and indecision. A written protocol puts all employees on the same page and helps foster a team approach to getting tasks done correctly and consistently.
- When employees are involved in developing the SOPs for the farm they feel more invested in their job and are more likely to perform to their full potential.
- A well-written SOP makes job training easier. It also helps when someone has to do a job that they don't usually perform. Even small farms with a single owner/worker can benefit from

having written protocols so that if someone has to step into that person's shoes in an emergency there are guidelines to follow.

- SOPs can be prepared in English and Spanish and can help reduce misunderstandings when there are language barriers.
- Data entry can be easier when SOPs are used. Protocols can be incorporated into almost all computerized dairy records systems, helping to reduce mistakes in data entry and records. For example, an SOP for treatment of moderate ketosis might be administration of IV dextrose and oral propylene glycol, followed by rechecking ketones the following day. The person entering cow treatments in the computer can just select the protocol for moderate ketosis and the treatments will be automatically entered and the cow number automatically populated to a list of cows to be checked the following day.
- Well-written SOPs for the treatment of health disorders help employees to follow prudent drug use guidelines and reduce the chances of a drug residue violation.
- The preparation of SOPs provides an excellent opportunity for the producer to work closely with their employees and with experts such as the herd veterinarian and nutritionist so that everyone understands the goals of each procedure and how that procedure will be performed.
- Having written procedures for key tasks such as administering injections, milking parlor protocol and handling of down cows can be important for compliance with animal husbandry audits and certification in some dairy quality programs. For example, one of the major components of the National Dairy Farm Animal Care Program is having SOPs, training and record keeping in place on your dairy.

What Parts of the Dairy Should Have SOPs?

Every discipline on the dairy (milking, feeding, bedding, herd health and reproduction, maternity management, replacement herd health, etc.) should have a written protocol that clearly describes what is to be done, how it is to be done and why it is important that it be done that way (Sumrall, 2011). However, when starting out, the preparation of an SOP for every area of the dairy can be daunting. Focusing on the areas that are likely to benefit the most from use of SOPs is a good place to start. For example, if consistency in feed mixing and delivery is an area that could use improvement on a particular dairy this would be a good place to start with SOPs. Milking procedures is another area that is always likely to benefit from the use of written protocols. All dairies should have written protocols for drug use and residue avoidance.

How to write SOPs

In preparing an SOP the manager should identify the best person to lead the writing effort and involve any relevant experts (veterinarian, nutritionist, extension agents, agribusiness reps etc.). The SOP should be written with the ultimate goal of the procedure in mind – e.g. the goal of a milking procedure SOP is not to make sure everyone milks in the same way, it is to quickly and efficiently harvest high-quality milk while eliminating the spread of mastitis organisms (Stup, 2001). Stating the goal upfront helps guide the development of an effective SOP.

Treatment and residue avoidance protocols should be developed by the herd veterinarian in close collaboration with the manager and employees. The veterinarian should also provide ongoing active evaluation of the protocol. Herd health SOPs should detail how to recognize and handle all of the common health problems and/or practices on the dairy.


Each SOP must be farm-specific; there are few one-size-fits-all ways of doing things on a dairy. However, there are several sets of sample SOPs for dairies available on the internet that can provide a helpful starting point. Example SOPs for the UF IFAS DU (with farm-specific treatment protocol information removed) are available at: <http://animal.ifas.ufl.edu/facilities/dru/>. Other sites include the New York State Cattle Health Assurance Program SOP templates available at: <http://nyschap.vet.cornell.edu/module/welfare/section3/welfare3.asp>

There are a variety of ways to format an SOP; the format chosen should be that which makes the SOP easiest to understand and follow. Routine procedures that are short and require few decisions can be written in **simple steps**. If there are >10 steps, with few decisions, SOPs should generally be written in a **hierarchical step** format or in a **graphic** format. If the SOP requires many decisions, a **flow chart** is often the best way to present it. Sometimes **annotated pictures** are the best way to get a message across (Stup, 2001).

Once an SOP draft is prepared, it should be distributed to employees involved in that aspect of the dairy as well as other stakeholders for review. Involvement of employees in this process demonstrates to them that management values their opinion, and their recommendations should be given due consideration. Employees are much more likely to use and follow SOPs if they have been involved in their design and feel a sense of ownership towards them.

Generally, each step of an SOP should start with a verb (Strip, Hang, Wipe, Examine, etc.) and should be written in as briefly as possible to get the correct message across.

Example of the components of a simple SOP for identification and treatment of health disorders:

<ul style="list-style-type: none"> • Clear and descriptive title • Name of farm • Effective date • Name of main author • # the SOP to help with filing and keeping track of revisions 	<p>Identification and treatment of footrot Dun Milking Dairy: Health Disorders SOP # 10 Effective Date: March 21st, 2012 Developed By: Dr. Blackfoot</p>
<ul style="list-style-type: none"> • Straightforward description • Pictures can be very helpful 	<p>Condition Infected, swollen break in the interdigital skin. May have a reddened, inflamed, swollen foot with foul-smelling interdigital discharge</p> 
<ul style="list-style-type: none"> • Simple protocol (just a few steps) does not require a flow chart or numbering of steps 	<p>Treatment</p> <ul style="list-style-type: none"> • Minor case: No swelling above hoof or around heels <ul style="list-style-type: none"> ○ Clean interdigital area, apply topical KoperTox™ SID for 3 days • Major case: Swelling above hoof or around heels <ul style="list-style-type: none"> ○ Clean and apply KoperTox as above ○ Excenel 1-2ml/100lb SQ SID for 3-5 days¹ <u>OR</u> ○ Procaine Penicillin G 5ml/100 lb IM SID for 4-7 days², apply pink leg bands and move to hospital
<ul style="list-style-type: none"> • Refers to other SOPs for drug use guidelines, as the same antibiotics may be referred to in many different SOPs 	<p>Drug use cautions</p> <p>¹ Label use – see Health Disorders SOP #1 for use of antibiotics ² Caution: Extralabel drug use – see Health Disorders SOP #1 for use of antibiotics for established milk and meat withholding periods</p>

Further SOP formatting examples, including examples of graphic and flow chart formats, can be found in the reference Stup, 2001.

Example of the components of a **hierarchical step** SOP format where some of the main steps have substeps: (This SOP could also be presented effectively as a series of annotated pictures).

Sample Basic Milking Procedure

Dun Milking Dairy: Parlor SOP # 1

Effective Date: March 21st, 2012

Developed By: Parlor staff

1. Wear gloves at all times when working in the parlor, for hygiene and mastitis control
 2. Strip and dip the first 4 cows
 - a. Strip 3-4 squirts of milk out of each teat to check for abnormal milk/mastitis. If abnormal milk is found refer to parlor SOP #5, "Dealing with cows with abnormal milk"
 - b. Dip the skin of every teat with the teat dip cup
 - c. Teats from blind or dead quarters as indicated by a leg band do not need to be stripped
 3. Return to the first cow to wipe teats
 - a. Wipe each teat completely and carefully with a clean towel to remove all teat dip
 - b. Teats should be clean and dry after wiping; use more than one towel if needed
 4. Hang the milking unit on the first cow
 - a. Press the on button on the control panel to turn on the unit
 - b. Attach the milking unit to the teats
 - c. Adjust unit and hoses so that the unit hangs level from front to back
 5. Repeat steps 3 and 4 for the remaining 3 cows
 6. Repeat procedures for the next group of 4 cows on that side of the parlor (cows 5-8), and so on, until all 12 units on the side are attached
 7. When this line is all milking, start on the other side, repeating previous steps
 - a. Your goal should be to have a constant rhythm from one side to the other throughout the milking, rather than having both sides waiting to be milked at the same time
 8. When all units on a side have detached, postdip all the skin on every teat with the teat dip cup and release cows
 9. Liner slips/squawks should be corrected as soon as possible by adjusting the machine
 10. Rinse gloves frequently and avoid milk contact on gloves. Change gloves if they are visibly dirty, milk contaminated, or after stripping a cow with mastitis.
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Implementing SOPs

The best-prepared document in the world is useless if it sits on a shelf. The SOPs for each discipline of the dairy should be provided to all employees who work in that area of the dairy. Laminated copies can be posted where they can be easily referred to when needed. For example, the SOP describing how to pasteurize hospital milk can be posted next to the pasteurizer.

Each discipline on the farm should have a formal **training program**; this is critical for maintaining a high level of performance and consistency. Training provides the employee with a solid understanding of their role on the dairy and is an opportunity to discuss in detail **why** things need to be done a certain way. SOPs are an adjunct to proper training and re-training and afterwards employees can continue to refer back to them. Refresher training helps employees to stay focused and interested and provides an opportunity to remind them of the goals behind each SOP. Having regular training sessions also sends a message that management takes the persons job seriously.

SOPs are not set in stone once they are written: they are dynamic documents that will need constant revision as things change on the dairy. Regular training sessions offer an opportunity to review and revise SOPs.

Although there is a great deal of discussion in the lay literature on the benefits of SOPs in helping to ensure that consistent and appropriate health care is provided on dairies, there are actually very few scientific papers published that have critically evaluated them. Most published papers that have demonstrated a benefit of written standardized protocols are in the area of milking parlor protocol and udder health; this is being discussed elsewhere in these proceedings. The following are some other examples where SOPs may be of most benefit on the dairy:

SOPS and Obstetrical Procedures

The development and use of SOPs in conjunction with an employee training program can help reduce complications associated with management of the cow at calving. For example, the use of SOPs in a farm-specific employee training program to manage cows at calving was evaluated in a herd that had a high incidence of intra-pelvic calving trauma and postpartum uterine infection. Proper training and provision of revised SOPs to employees resulted in improved outcomes after calving and improved calving ease scores in primiparous cows (Kristula and Smith, 2011).

SOPS and Drug use on the Dairy

Although cull dairy cattle account for a small proportion (9% in 2009; USDA-FSIS Residue 2009 "Red Book") of the total cattle slaughtered in the U.S., they are responsible for the majority (82% in 2009) of violative drug residues in inspector-generated samples. When a dairy does have a violative residue one of the first things FDA wants to know is whether the producer has a written protocol in place to prevent contaminated meat or milk from being shipped, and they will want to review the drug treatment protocol with the producer at the farm.

Developing and using science-based treatment protocols is one component of a drug residue avoidance plan; your prescribing veterinarians needs to be in charge of writing these protocols but they should be developed using a team approach with the veterinarian, manager and the employees who will be treating the cows. Developing and following SOPs for treatment of health disorders can help avoid employee error in drug administration and misunderstandings on the appropriate treatment for a particular illness.

The use of written SOPs for the treatment of health disorders on the dairy also helps fulfill one component of the valid veterinary-client-patient relationship that is required for prescription of drugs. They are an agreement in writing between the dairy and the veterinarian and should encompass (1) the diseases to be treated (2) what treatment(s) are allowed (3) what are the withdrawals that will be followed, (4) how treated cows and withdrawal times are tracked. The veterinarian then has an agreement from you in writing on which drugs you are allowed to have under their script and exactly how you will use those drugs. It's important to train employees to recognize situations when standard withdrawal times may not be appropriate, such as in cows with liver disease, very sick or debilitated cows, or cows that have been treated with multiple drugs over a prolonged period for a chronic problem. Extended withdrawal periods for these individuals should be developed under the guidance of the veterinarian.

SOPs and Cow Health: Monitoring Postpartum Health

The application of a farm-specific, standardized fresh cow monitoring program is an excellent example of the application of an SOP in the herd health program. Diseases that are prevalent in the postpartum period such as metritis and ketosis can have long-term detrimental effects on cow health and reproductive performance (Gilbert et al, 2005; Hammon et al, 2006). Fresh cow monitoring programs are designed to detect postpartum problems and treat cows early in an attempt to minimize the impact of these disorders. Fresh cow programs need to be farm specific, but they typically involve the monitoring of a few parameters (some combination of rectal temperature, attitude, milk production, uterine discharge, urine milk or blood ketones) of all cows during the first 10-14 days of the postpartum period by trained farm personnel (Guterbock, 2004). Cows with abnormal findings are selected for further physical examination to make a diagnosis, and then treated appropriately. Early intervention can help prevent further disease and improve production outcomes; for example, a fresh cow monitoring program designed to detect and treat cows with mildly elevated ketones resulted in improved milk yield in early lactation and helped prevent development of clinical ketosis (McArt et al, 2011). The application and benefits we have seen from implementation of a fresh cow monitoring program at the IFAS Dairy Unit will be presented.

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