Milking Procedures on U.S. Dairy Operations

The National Animal Health Monitoring System's (NAHMS) Dairy 2002 study surveyed dairy operations in 21 States*. These States represented 82.8 percent of U.S. dairy operations and 85.5 percent of U.S. dairy cows.

Results of the Dairy 2002 study suggest that continued education regarding how to improve milking procedures could help reduce the incidence of mastitis on U.S. dairies.

Mastitis Pathogens and Their Control

Contagious mastitis pathogens such as *Staphylococcus aureus, Streptococcus agalactiae* and *Mycoplasma* spp. can be transferred from cow to cow during milking. Milking procedures known to reduce the spread of contagious pathogens include the use of gloves by milkers, predipping and postdipping with a proven germicidal teat dip, drying teats with single-service paper towels or cloths, and disinfection of milking units after each cow with a backflush system.[1,3]

Environmental pathogens that cause mastitis, such as coliforms and environmental streptococci, can be transferred during and immediately after milking while the teat canal is still open and therefore susceptible to bacterial invasion. These environmental pathogens also are commonly acquired during the dry period. The use of gloves, premilking disinfection of teats with teat dips, and the use of single-service paper towels or cloths are recommended milking procedures to reduce new environmental infections. [1,3]

*States/Regions
West: California, Colorado, Idaho, New Mexico, Texas, Washington
Midwest: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin
Northeast: New York, Pennsylvania, Vermont
Southeast: Florida, Kentucky, Tennessee, Virginia

Use of Gloves by Milkers

Milkers can transfer mastitis-causing pathogens from their hands to the teats of non-infected cows. To help prevent pathogen transfer, it is recommended that milkers wear latex or nitrile gloves during milking. These gloves should be cleaned regularly.[2] Only 32.9 percent of operations represented by the Dairy 2002 study reported that milkers wore gloves to milk all cows.

Forestripping

Removing a small amount of milk from the udder prior to milking (forestripping) helps identify new intramammary infections and improve milk quality. By forestripping, abnormal milk can be identified before a cow is milked and before the milk is put into the bulk tank. Ideally, forestripping should be done on clean teats prior to predip removal.[3] Overall, 86.9 percent of operations forestripped all or some cows prior to milking, while 13.1 percent did not forestrip any cows before milking.

Waterless Teat Preparation

Proper teat preparation prior to milking is crucial for preventing new intramammary infections. Pre-milking teat preparation not only reduces environmental bacteria on the teat surface but also reduces bacteria counts in milk. Established protocols recommend covering most of the teat surface with an approved and proven disinfectant (predip). This method of teat preparation decreases intramammary infections and is more effective in reducing bacterial counts in milk when compared to either water and/or wet towels or no teat preparation at all.[4]

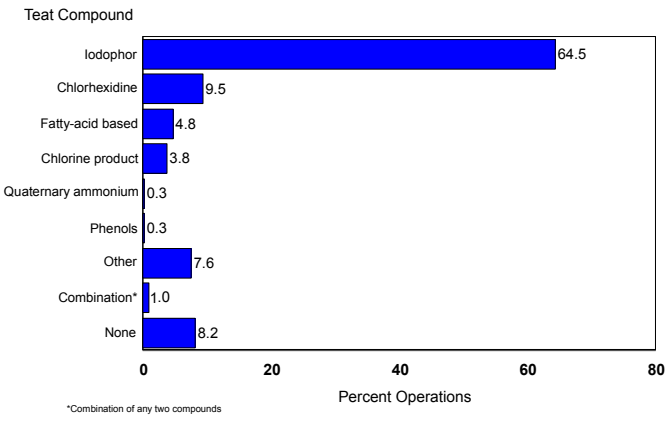
Overall, 65.0 percent of dairy operations used a waterless teat preparation method (WTPM) in both summer and winter. Operations in this category include those that predipped teats prior to milking and those that performed no premilking teat preparation. The percentage of operations that used a WTPM did not vary significantly between summer (66.4 percent of operations) and winter (66.6 percent of operations). Small (less than 100 head) and medium (100 to 499 head) operations

were more likely to use a WTPM (64.2 and 71.9 percent, respectively) than large (500 or more head) operations (39.6 percent).

In the Northeast region*, 82.6 percent of operations used a WTPM compared to 61.9 percent in the Southeast region, 61.3 percent in the Midwest region, and 38.3 percent in the West region.

There are many groups of teat disinfectant compounds approved for use on U.S. dairies. The National Mastitis Council publishes annually a table that lists all peer reviewed studies on teat disinfectants, by compound and by the study results.[5] This information helps establish recommendations for specific products proven effective on dairy operations. Of all operations that reported using a WTPM, 64.5 percent used a predip containing iodophor as a premilking teat disinfectant in both summer and winter. Compounds containing chlorhexidine were used as a predip on 9.5 percent of operations. Overall, 8.2 percent of operations using a WTPM did not use a predip (Figure 1), suggesting that no premilking teat preparation was preformed on these operations prior to milking.

Figure 1. For Operations that Used a WTPM, Percent of Operations by Predip Teat Compounds Used During Both Summer and Winter

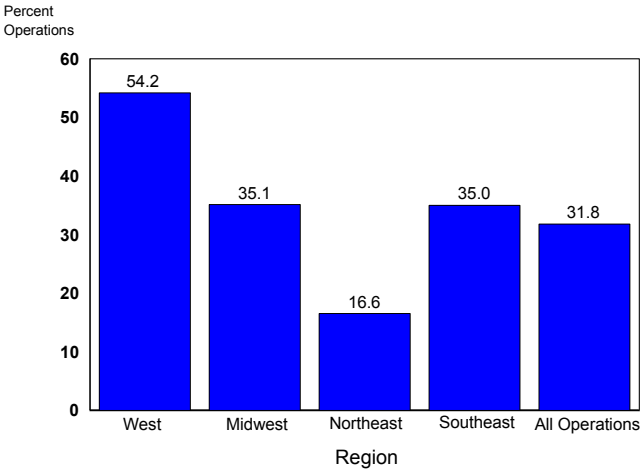


Teat Wash Method

Overall, 31.8 percent of operations used a teat wash method with water in both summer and winter to clean cow udders and teats prior to milking. Large operations (58.1 percent) were more likely to use a teat wash method than small operations (32.8 percent) and medium operations (24.2 percent.

The West region had the highest percentage (54.2 percent) of operations using a teat wash method with water in both summer and winter. The Northeast region had the lowest percentage (16.6 percent) of operations using a teat wash method with water (Figure 2).

Figure 2. Percent of Operations that Used a Teat Wash Method with Water Prior to Milking During Both Summer and Winter, by Region



Teat wash methods of teat preparation include wash pens, hose in the parlor, and single- or multiple-use wet cloth or paper towel. For large operations that used a teat wash method, wash pen was the most common teat wash method (91.5 percent of operations). On medium operations, hose in the parlor or single-use wet paper towel or cloth were the most common teat washing methods used. Single-use wet cloth or paper towel were the most common teat wash methods on small operations.

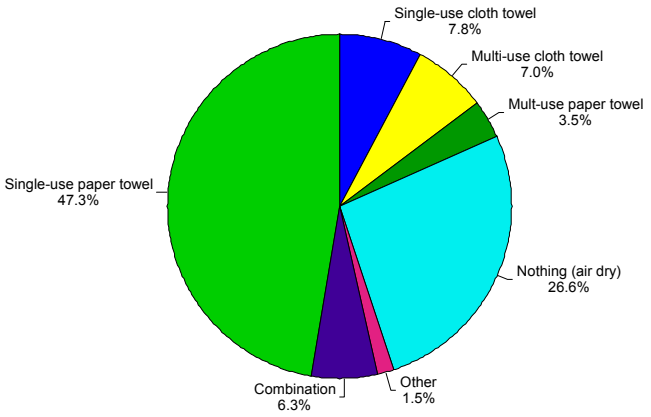
Single-use wet cloth or paper towel was the most common wash method used in all regions, except the West, where wash pens were used most commonly (74.2 percent of operations). Use of a hose in the parlor was more common in the West and Southeast regions (48.1 and 41.0 percent of operations, respectively) compared to the other regions.

Drying Method

To decrease the spread of bacteria from one cow to another, single-use cloths or paper towels are recommended for drying teats of individual cows.[6] In both seasons, single-use paper towel was the drying method reported most frequently (47.3 percent of operations) on operations that used a teat wash method.

Air drying was the next most common drying method (26.6 percent of operations) followed by single-use cloths or multiple-use cloths (Figure 3). The method of teat drying did not vary significantly between summer and winter. The Dairy 2002 study questionnaire did not address how operations routinely removed predips.

Figure 3. For Operations Using Teat Wash Methods, Percent of Operations by Drying Method Used in Both Summer and Winter



Removal of Milking Machines

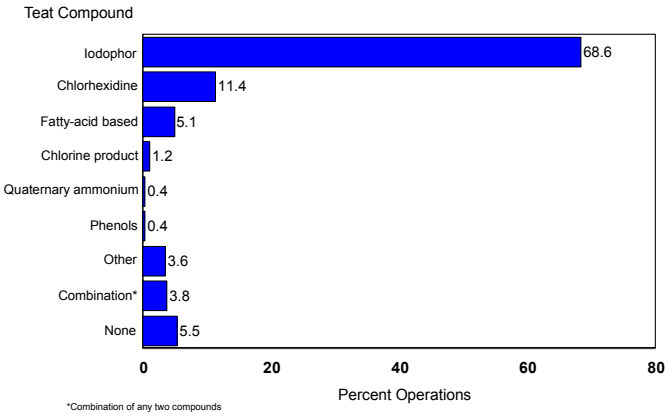
Removing milking machines from teats is done either manually or mechanically. Manual removal can lead to over milking, which can cause teat-end damage and decreased resistance to pathogen invasion. Although automatic takeoffs, or automatic cluster removers (ACRs), can also lead to over milking if not properly set and maintained, the probability of over milking is reduced.[7] More than 9 out of 10 (93.3 percent) large operations used automatic takeoffs, compared to 71.0 percent of medium operations and 21.3 percent of small operations. This coincides with results showing that large farms more commonly have parlor facilities equipped with automatic takeoffs compared to smaller stanchion operations.[8] The West region had the highest percentage of operations (78.7 percent) that used automatic takeoffs compared to 36.0 percent of all operations.

Postmilking Teat Disinfection

Postmilking teat disinfection kills bacteria transferred to the teat by milkers or milking equipment. Postmilking teat disinfection is targeted at decreasing transfer of contagious mastitis pathogens.[9] Compounds containing iodophor, followed by compounds with chlorhexidine, were the most common postmilking teat disinfectants used, as shown in Figure 4.

The percentage of operations using postdip compounds did not vary by season. Only 5.5 percent of operations did not use any postmilking teat disinfectant in both seasons.

Figure 4. Percent of Operations by Postdip Teat Compounds Used



Backflush Systems

Milking units that incorporate backflush systems are designed to remove pathogens from milking units immediately after each cow is milked. Backflush systems are used to prevent contagious pathogens from spreading from cow to cow via milking equipment.[10] Backflush systems were used on 6.7 percent of all operations. Nearly 1 in 5 (20.7 percent) of large operations used the system, while smaller operations used it less frequently (9.8 percent of medium operations and 4.9 percent of small operations). The West region had the highest percentage of operations (22.3 percent) using a backflush system.

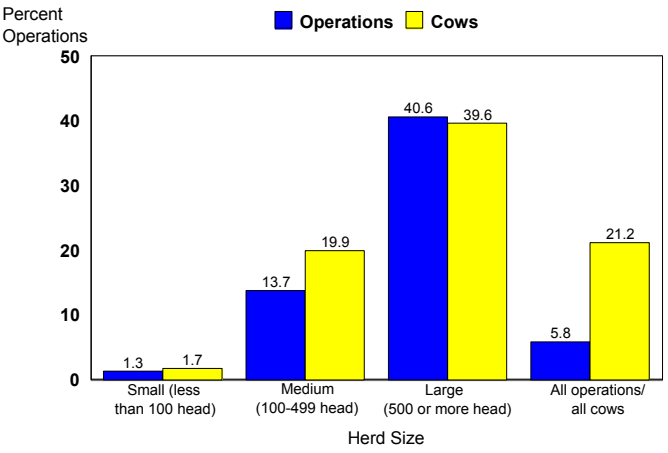
Milking Frequency

Milking frequency affects milk production and udder health. Increasing milking frequency from twice daily to three times daily improves production by 10 to 18 percent. Increasing frequency from

three to four times daily boosts milk production another 8 to 12 percent. [11,12,13]

Udder health, as measured by somatic cell counts, improves as the milking frequency is increased to four times daily.[13] This is most likely because the streak canals, where mastitis pathogens first colonize the udder, are flushed-out more frequently. Overall, 93.6 percent of operations (representing 78.6 percent of cows) milked twice daily, while 5.8 percent of operations (representing 21.2 percent of cows) milked three times a day (Figure 5). Milking frequency increased as herd size increased. Only a small percentage of operations milked less than twice daily or more than three times daily.

Figure 5. Percent of Operations (and Percent of Cows on These Operations) that Milked Three Times a Day, by Herd Size.



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[9] A Practical Look at Contagious Mastitis. National Mastitis Council Website. Accessed October 2002. http://www.nmconline.org/contmast.htm

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