

## Practise good hygiene during milking

The routine used to milk cows with clinical mastitis provides important clues about how well farmers or milkers understand and follow hygienic principles and procedures.

Bacteria in milk from infected quarters spread to other quarters by splashes and aerosols of milk during stripping, by milkers' hands, by teatcup liners, and by cross flow of milk between teatcups. The risk of infection spreading through a herd is markedly reduced if cows with mastitis are milked last. This includes clinical cases and cows that have subclinical mastitis infection.

### 8.1 Avoid splashes or sprays of milk aerosol. Never get milk on your hands.

&

### 8.2 Use running water and disinfectant solution to remove infected milk from gloves, liners and other equipment.

#### *Hands*

In the 1960s, studies at the National Institute for Research in Dairying in England showed that 50% of operators' hands were contaminated with bacteria (mastitis pathogens) before milking, and 100% of hands were contaminated after milking (Dodd et al 1966). Washing hands with disinfectants reduced contamination (but there were still 30% positive swabs) whereas washing without disinfectant left 90% of hands contaminated (Neave et al 1962).

It is difficult to make recommendations on how to effectively decontaminate hands. It is probably most pertinent to alert farmers to the near impossibility of success in this area. Consequently, rather than try to improve bare-handed milking, it is best to recommend gloves and excellence in milking technique to minimise contamination of the operator.

#### *Gloves*

Gloves should always be used when searching for, or dealing with, clinical cases of mastitis. In fact, there are good reasons for operators to wear gloves for all milking activities.

Wearing gloves begins with an attitudinal change to milk harvesting. If milking is seen from the perspective of harvesting a fresh, pure food, it is just as important for the operators' hands to be clean as it is for the cows' teats to be clean. In a practical sense, given the typical range of tasks attempted by a dairy farmer in

Technote 5 describes contagious mastitis and good milking technique.

---

#### Confidence – Moderate

The basic principles of hygiene are well established and highly appropriate. It is likely that use of gloves would improve hygiene in many sheds especially at times of high risk.

---

#### Research priority – Low

Given the benefit to operators' hands and to raw milk quality, the routine use of gloves at all times while milking is worthwhile, not just during mastitis investigations and treatment.

It is also practical to put on gloves while hands are dry prior to milking, rather than try to pull gloves on over wet hands when a problem presents itself.

the course of a normal day, it is difficult to achieve very clean hands. But it is not difficult to improve the quality of the contact surface on the operator's hands by wearing disposable or reusable rubber or latex gloves. An additional bonus is improved skin condition of the operator's hands particularly in winter.

The studies at the National Institute of Research in Dairying quoted above showed that when operators wore smooth gloves and dipped gloved hands in suitable disinfectant, manual transfer of pathogens from cow-to-cow was reduced.

Hands of health care workers are often cited as the most important vehicle for transmission of micro-organisms in human hospitals. In human medicine, infection prevention practices based on 'body substance isolation' include a requirement that gloves are worn for anticipated contact with all 'moist body substances' from patients. Gloves have been found to be superior to most handwashing attempts, and in all cases, gloves are superior to no handwashing (Lynch et al 1987).

In dairying, special care must be exercised where *Strep agalactiae* is prevalent or if a *Strep agalactiae*-free herd uses milking staff who also work in other dairies. Eberhart et al (1987) showed that *Strep agalactiae* could be isolated from milkers' hands for as long as 10 days after their last contact with infected cows.

#### Types of gloves available

In order of preference (highest to lowest) for usability, comfort and tactility:

Nitrile gloves are the most comfortable, moulding to the shape of each milker's hands in less than 10 minutes and becoming MORE comfortable the longer they are worn. Nitrile is more durable, more elastic and stronger than other thin comfortable glove materials. They are available as 'one use only' or reusable.

Latex and vinyl gloves do not mould to the hands but are thinner and more flexible than rubber gloves. Latex appears to be more elastic than vinyl and are more flexible and seem to tear less easily. A very small number of people experience adverse skin reactions (allergies) when wearing latex gloves, although this seems to be more associated with the powder often used on the inside of the gloves. Powder-free and hypoallergenic (low protein) types are available.

Rubber gloves are strong but not easy to work in for long periods. Commonly, thin cotton gloves are worn underneath for comfort, dryness and warmth. If warmed teat-washing water is used, the cotton under-glove is less necessary.

With all gloves it is worthwhile wearing elasticised cuffed plastic sleeves to prevent water draining from the arms into the gloves during milking. In this way it is easy to keep clean during milking and still maintain operator comfort.

#### Some typical prices for gloves

Type of glove	Quality	Cost per pair (\$)
Nitrile	Disposable	0.60
	Reusable	0.72
Latex	Disposable medical quality	0.30
	Supermarket quality	0.17
Vinyl	Supermarket/food quality	0.22
Rubber	Cheapest reusable glove at supermarket	0.70
	Most expensive reusable at supermarket	2.00

To clean gloves, rinsing with running water for about 30 seconds provides a physical wash but this is only as good as the microbiological quality of the water. Dipping in a disinfectant solution, such as 1% iodophor or 0.02% available chlorine, provides a sanitising effect.

Teat disinfectant is inappropriate as a disinfectant for hands and equipment. Although teat disinfectant from a teat sprayer is used to decontaminate hands and gloves in some Australian dairies, most products registered for post-milking teat disinfection are designed for slow, prolonged release of sanitiser and may not provide adequate, quick action on hands or gloves.

### **Clusters**

The liner is a common source of pathogens for dairy cows. One infected cow (clinical case or subclinical case with high bacterial numbers) has the potential to infect the next 5-6 cows milked on that cluster (Phillips 1982). Ideally, cows that are known to be clean should not be exposed to a cluster that has milked infected cows until after the machine has been fully washed. This is not practical under Australian conditions and current levels of payment. A separate cluster should be used for clinical cases (see section 8.4).

It is not ideal to wash the cluster (either back-flushing or through-flushing) with cold water. Although cold water removes gross contamination, it solidifies milk solids and associated bacteria on the liner. Water should be at least blood temperature or preferably hotter from a bacteriological cleaning perspective (above 75°C) to ensure milk fat is melted and all residue is flushed away. Workplace safety considerations dictate a compromise for water sprayers in Australian dairy pits. Most hoses in dairy pits are high-pressure and this adds to a danger factor when using hot water. All dairies should be encouraged to have a high-volume low-pressure, warm water hose in the pit.

Hands or clusters should always be rinsed before being dipped in disinfectant to avoid a 'soup' of bacteria in the bucket.

### **8.3 Draft out clinical cases where possible, and milk them last. Run a separate mastitis herd if you can.**

Bulk milk cell counts are most likely to be low in herds that milk clinical mastitis cases last (Hutton et al 1991). Since many infections are spread during milking in the shed, uninfected cows should be milked prior to, and independently of, all cows suspected to have mastitis. Milking machine and shed equipment should then be thoroughly cleaned and allowed to dry prior to the next milking. This principle can be extended to include cows with chronic infections (with multiple individual cow cell counts above 250,000 cells/mL).

In herds with a significant mastitis problem (e.g. where 40% or more cows are infected) many people find it practical to segregate the herd. Although hygiene is the key reason to segregate cows, other benefits are fewer interruptions to the milking routine and a lower risk of antibiotic contamination of vat milk.

The viability of running a separate mastitis herd as a control option depends on the number of mastitis cases, the farm layout (laneways and paddocks etc), and the calving pattern in the herd. Electronic identification systems may allow automatic drafting so that the cows can be managed as a single herd yet still milked separately.

#### **8.4 Use a separate cluster for clinical mastitis cows milked with the herd and clean thoroughly between each cow.**

If clinical cases are not milked last, the risk of spreading mastitis can be reduced using a separate cluster for infected cows on the test bucket. After a clinical cow has been milked into a test bucket, the long milk tube should be disconnected from the bucket, the cluster hosed down and flushed through with warm, running water for 30 seconds, and then it must be sanitised together with the milker's hands. This requires a bucket of fresh sanitising solution.

Teatcups should be dunked vigorously into the sanitiser. All four cups can be dunked at the same time because the cluster is disconnected so there is less likelihood of poor coverage of internal surfaces due to an 'airlock'. The whole cluster should be immersed so that the sanitising solution contacts the surfaces of the claw bowl inside and out, and the milker's gloved hands are disinfected too.

The milker should take care to splash some sanitising solution onto the tap or hose used to rinse the cluster and should not touch any other unit or cow for at least 15-20 seconds to ensure a minimum kill time.

The cluster should be marked with red tape to remind all people milking in the shed that it is only to be used on cows with mastitis.

#### **8.5 Consider identifying high cell count cows and milking them last, preferably by running a separate herd.**

Technote 8.3 discusses segregating infected cows from the herd.

#### **Key papers**

Dodd FH, Neave FK, Kingwill RG, Theil CC, Westgarth DR. International Dairy Congress 17, Munich, 1966:333.

Eberhart RJ et al. Current Concepts of Bovine Mastitis. National Mastitis Council, Arlington Virginia, 1987.

Hutton CT, Fox LK, Hancock DD. Risk factors associated with herd-group milk somatic cell count and prevalence of coagulase-positive staphylococcal intramammary infections. *Prev Vet Med* 1991;11:25-35.

Lynch P, Jackson MM, Cummings JM, Stamm WE. Rethinking the role of isolation practices in the prevention of nosocomial infections. *Ann Intern Med* 1987;107:243-246.

Neave FK, Dodd FH, Kingwill RG. Report to the National Institute for Research in Dairying, United Kingdom, 1962.

Phillips DSM. Reduction of pathogen transfer within the milking cluster. In: Proceedings of the Conference on Dairy Production from Pasture, New Zealand and Australian Societies on Animal Production, Ruakura, New Zealand, 1982: 81-82.

