

# TECHNOTE

## 8

## 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 can spread to other quarters by splashes and aerosols of milk during stripping, by milkers' hands, by teat cup liners, and by cross flow of milk between teat cups. 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 infections.

### 8.1

#### *Wear gloves when milking.*

The risk of transferring contaminated milk or bacteria from cow to cow is greatly reduced if hands and the milking area under the cows are kept as free as possible from dirt and contaminated milk. Wearing of gloves during milking provides an easier surface to decontaminate after stripping cows, and protects milkers' hands from the drying effects of repeated exposure to dirt, water and manure.

Low pressure, high volume washing water should be used to sluice away manure. High pressure hoses should be avoided directly beneath or around cows, as these can form aerosols of bacteria-laden droplets that settle onto the cows.

#### *Hands*

In the 1960s, studies at the National Institute for Research in Dairying in England showed that 50% of milkers 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).

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 farm dairies especially at times of high risk.

#### Research priority – Low

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.

A study in Holland (Olde Riekerink *et al* 2008) across 27 farms found that the use of gloves reduced bacterial contamination of hands by 75% compared to using bare hands. Although disinfecting hands with a teat wipe reduced the bacterial count by 85%, gloved hands were easier to disinfect; disinfected gloved hands had a bacterial count that was 98% lower than bare hands. Other studies have noted a strong association between farmers that operate in a clean and precise manner and low bulk milk SCC levels and a lower incidence of clinical mastitis (Barkema *et al* 1999).

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 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 the improved skin condition of the operator's hands particularly in winter.

The early studies in England quoted above showed that when operators wore smooth gloves and gloved hands dipped in a 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, care should be exercised in herds where *Staph. aureus* is prevalent, to prevent the spread of this pathogen to uninfected cows and milking personnel. Also, 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'

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.

or reusable and can be purchased from agricultural merchants.

**Latex** and **vinyl** gloves do not mould to the hands but are thinner and more flexible than rubber gloves. Latex gloves appear to be more elastic than vinyl, 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. These are generally purchased from supermarkets or medical suppliers.

**Rubber** gloves e.g. washing up gloves available at supermarkets, are strong but not easy to work in for long periods. Commonly, thin cotton gloves are worn underneath for comfort, dryness and warmth.

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.

## 8.2

### **Use running water and disinfectant solution to remove infected milk.**

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 sanitiser 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 may be used to decontaminate hands and gloves in some dairies, most products registered for post-milking teat disinfection are designed for slow, prolonged release of the disinfectant and may not provide adequate, quick action on hands or gloves.

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

### **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 often not practical under New Zealand conditions.

Cluster flushing systems, whereby a small volume of water (usually containing a sanitiser) is flushed back through the liners after milking each cow, has been promoted over the years to help reduce the spread of contagious mastitis. Some commercial systems can also provide delivery of post-milking teat disinfection immediately after milking, as well as flushing of the liner with a sanitiser, before draining the cups, ready for attachment to the next cow.

Under artificial conditions, a flushing system reduced bacterial contamination of the liner by 99.9% (Hogewerf *et al* 2008). When compared against manual teat dipping, the system achieved similar coverage and

iodine residue levels in milk (Hogewerf *et al* 2008), but dramatically reduced milking times in 4 out of the 5 herds (Ohnstad *et al* 2010). It is unproven whether use of a flushing system reduces the incidence of new mastitis cases.

## 8.3

### ***Draft out clinical cases into a separate mob, and milk them last.***

Low bulk milk cell counts have been associated with herds that milk clinical mastitis cases last (Hutton *et al* 1991). Since many infections are spread during milking in the dairy, uninfected cows should be milked prior to, and independently of, all cows suspected to have mastitis. The milking machine should then be thoroughly cleaned, with a full hot water wash, and allowed to dry prior to the next milking. This principle can be extended to include cows with chronic infections i.e. those with multiple high individual cow cell counts (see section 8.4).

Cows with newly detected clinical mastitis should be drafted out and milked last, after the milking herd has been milked. Cows under treatment with antibiotics should also be milked last, in a separate mastitis herd, once the milkline has been disconnected from the vat. The whole milking machine should then be washed with a full hot water wash to remove any residues of milk contaminated with bacteria or antibiotics.

If it is not possible to run a separate herd, treated cows should be well marked and drafted out before being milked, then held back until the end of milking, and milked once the delivery line has been removed from the vat. Running them in the milking herd and milking them on test buckets is now considered a major hazard by most dairy companies.

## 8.4

### ***Reduce the risk of spreading infection by identifying infected cows and milking them last.***

Wilson *et al* 1995 found that for herds with a high prevalence of *Staph. aureus* infection, segregating bacteriologically-positive cows, either by milking them last or by milking them with separate milking units, reduced the prevalence of infection with this pathogen from 29.5% to 16% of cows, over a 6 to 24 month interval, and observed almost a 50% reduction in bulk milk SCC. Herds that did not segregate such cows maintained a similar prevalence of infection and had a bulk milk SCC that remained higher than herds that segregated infected cows.

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.

Technote 4.6 discusses MRS T and the importance of separating out infected cows before commencing treatment for mastitis.

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