# Lactation

## After calving until last 2 - 3 months lactation



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| 11 | Monitor bulk tank SCC |
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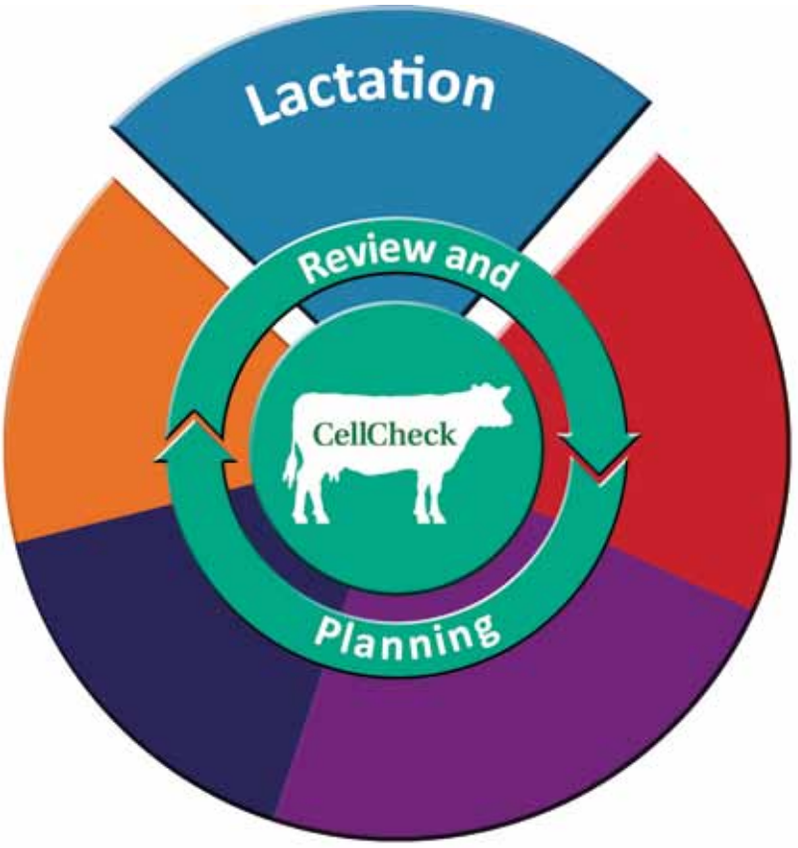



## After calving until last 2 - 3 months of lactation

During lactation, cows can become infected with both contagious and environmental mastitis organisms:

**Contagious mastitis** is caused by bacteria such as *Staph. aureus* and *Strep. agalactiae* that are transmitted between cows during milking.

Although *Strep. uberis* is classified as an environmental pathogen, it sometimes behaves like other contagious mastitis pathogens - that is, it can be transmitted between cows during milking. Milk from one infected quarter is spread to the teat skin of other quarters and cows by milkers' hands, liners and cross flow of milk between clusters.

Damaged teat ends are particularly susceptible. Malfunction or poor use of the milking machine can contribute to transmission of infection.

*Prevention of contagious mastitis* involves disinfection of teat skin after milking, wearing clean gloves during milking, careful use of machines that are operating well, and keeping cows calm and teat ends healthy.

**Environmental mastitis** is caused by bacteria such as *E. coli* and *Strep. uberis*. The primary source is faeces and mud. The infection pressure from these bacteria increases when there are wet and dirty environmental conditions.

High traffic areas such as water troughs, gateways, collecting yards and housing areas must be kept clean to minimise infection. Cubicles and calving boxes must be managed to ensure a high level of cleanliness.

Prevention of environmental mastitis involves minimising the build-up of mud and manure in the cows' environment ensuring clusters go on clean, dry teats.

GUIDELINE

# 05 Use good milking technique and a consistent routine

- Calm cows
- Good stockmanship
- Foremilk stripping
- Clean, dry teats
- Cluster attachment
- Weight on cluster
- Cluster removal
- Undermilking
- Overmilking

## 5.1 Ensure that cows enter the milking parlour willingly by use of good stockmanship.

Calm cows manure less frequently, they kick the clusters off less often and have better milk let-down.

**Refer to Guideline 8:**
Practice good hygiene during milking.

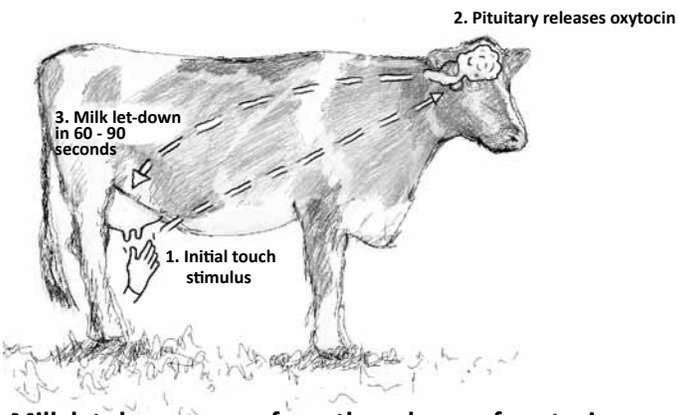
## 5.2 Forestrip all cows, for early detection of clinical mastitis.

The benefits of foremilk stripping include:

- early identification of clinical cases
- avoidance of overmilking at the beginning of milking
- faster milking (natural Oxytocin let-down).

Foremilk stripping is the single most effective way to detect clinical cases. Pay special attention when foremilk stripping cows in their first month of lactation i.e. in periods of high risk.

Cows quickly become accustomed to having their teats touched. Routine foremilk stripping of cows also helps to provide an effective 'signal' for milk let-down. It simulates the action of the calf suckling, and activates a similar response.




**Milk let-down comes from the release of oxytocin.**

**Avoid getting milk on gloves when foremilk stripping.**

If done poorly, foremilk stripping contributes to the spread of bacteria from teat to teat via milkers' gloves. Good milkers will take care to avoid ever getting milk on their gloves while foremilk stripping.

## 5.3 Put clusters on clean, dry teats - only wash dirty teats.

Ideally, clusters should only be attached to clean and dry teats. Milking wet teats is unacceptable, both for the risk of mastitis and milk quality issues. Mastitis risk is a 'numbers game' - the risk of infection is reduced by keeping bacterial numbers low on or near the teat-end.

When cleaning dirty teats, always use clean, low pressure water. Avoid wetting the udder, as it is almost impossible to dry before attaching the cluster. Just wet the teats if they need to be washed.

Great care is needed if pre-milking teat disinfection (using teat dip or spray) is used, because of the risk of residues in milk. Only use a product that is licensed for pre-milking teat disinfection, and follow manufacturers guidelines. Of particular concern is drainage of excess teat dip, when used prior to milking, into the milking unit.

Teats are rarely dry when clusters are attached if they are simply left to 'drip' dry. Effective drying is achieved with single use paper towels or suitable woven cloths (such as J-cloths). Each J-cloth must only be used for one cow per milking. J-cloths should then be placed in disinfectant solution, washed and wrung out before the next milking.

**NEVER** use rags or communal cloths.

Minimise contamination by trimming cows' tails. Completely remove the long hair on the end. Repeat three times a year if necessary.

If necessary, take steps to remove hair from udders in order to keep them clean - by trimming or using a cool flame. Consult your vet re. udder flaming.

**Pre-milking teat disinfection.**

Discuss pre-milking teat disinfection with your CellCheck advisor to determine if this is a practice that will target the mastitis challenges to your herd.

**Refer to Guideline 27:**
Fix areas that make udders muddy.

**Wash teats if dirty.**

**Dry thoroughly using single use paper towels.**

**Clusters should only go on to clean dry teats.**

## 5.4 Put clusters on when teats become plump with milk.

Putting clusters on too soon, usually results in the clusters creeping up to the base of the udder during the first minute of milking. When clusters creep early in milking, milk harvesting is less complete and less efficient near the end of milking.

The optimum time to apply clusters is 60 - 90 seconds after the cow's teats and udder are first touched by the milker, or the sights and sounds of milking and the predictability of a calm, consistent milking routine have stimulated good milk let-down. Choose a set of procedures that allows or (preferably) requires each milker to be absolutely consistent at every milking.


**Beware of applying clusters before milk let-down.**

As a simple check, watch the claw bowls during the first minute of milking. When clusters are applied too soon, milk flow into the claw bowl typically slows or stops after about 15 - 20 seconds of initial flow, and then full flow does not start (or restart) until about one minute after putting the clusters on.

## 5.5 Allow minimum air to enter when attaching clusters.

The milk carrying capacity of the milkline is reduced by the air admitted when clusters are attached or removed. To minimise air leakage through clusters:

- ensure that clusters match claws correctly (so liners hang over claw inlets properly)
- during milking, align the cluster carefully and ensure good alignment throughout the milking.

## 5.6 Never apply extra weight to a cluster.

Extra weights on clusters affect their balance and increase liner slippage, which increases the risk of mastitis.

It is bad practice to lean on the cluster with your hand to attempt to speed up milking out.

**Breaking the vacuum by kinking the long milk tube.**

**Maximum milking-out time per cow.**

If your milking system is functioning correctly, the following figures will apply to about 80% of cows in typical Irish herds:

- 10 L/milking will be milked in 6.3 minutes
- 12 L/milking will be milked in 7.2 minutes
- 14 L/milking will be milked in 8.0 minutes
- 16 L/milking will be milked in 8.8 minutes
- 18 L/milking will be milked in 9.5 minutes
- 20 L/milking will be milked in 10.2 minutes.

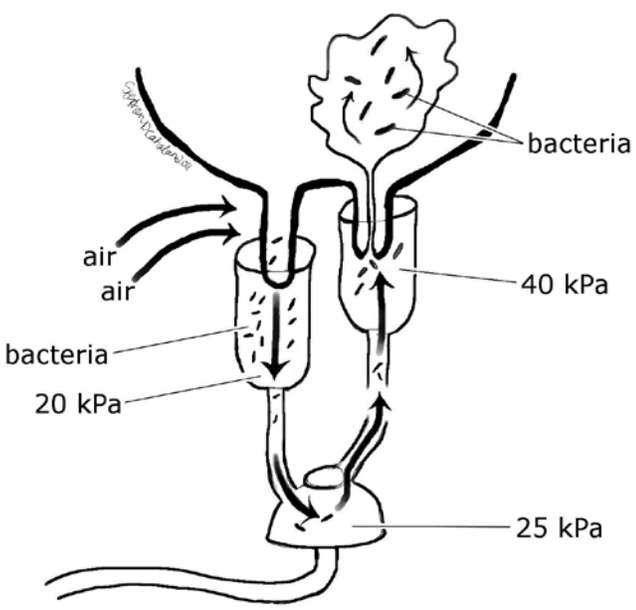
These figures are based on ICBF data on milk yields and milking duration from Irish milk recorded herds.

Do not leave the parlour while clusters are on to do other 'quick jobs' - this increases the chances that you will overmilk cows.

## 5.7 When removing clusters, they should slip free from the teats after the vacuum has been cut. Do not break the vacuum at the mouthpiece lip of the liner.

Air entering at the cluster mouth, because of liner slip or rough cluster removal, causes vacuum fluctuation in the cluster. Milk droplets may be thrown back against the teat ends. These impacts carry bacteria into the teat canal where they are beyond the reach of a teat disinfectant. Bacteria that gain entry to the teat canal at or near the time of cluster removal pose a greater risk of infection leading to both clinical and subclinical cases because there is much less chance they will be flushed from the teat canal or teat orifice by milk flowing from the teat.

Machine buttons should be working correctly. Repair/ replace if these are not.




## 5.8 Avoid under and overmilking.

The aim of milking is to milk all cows as completely and evenly as possible. Uneven milk out contributes to residual milk being left in the udder, which may increase the risk of mastitis.

Overmilking cows that have finished milking, or milking slow milkers for a long period of time will increase the risk of teat end damage. This will make them more prone to mastitis.

GUIDELINE

# 06 Maintain and monitor milking machine function

- Daily checks
- Air admission holes
- Vacuum gauge
- Pulsators
- Receiver jar
- Weekly checks
- Liner condition
- Regulators
- Monthly checks
- Effective reserve
- Cluster slips
- Milking machine technician
- Changing liners

Milking machine equipment has been designed to harvest milk efficiently and maintain healthy teats. Teats are attached to milking machines for 50 - 100 hours per lactation.

Machines that are not functioning correctly can contribute to new mastitis infections in three main ways:

1. as a bacterial carrier
2. damaging teats and teat ends and reducing the natural defence mechanisms of the teat canal
3. causing impact of bacterial-laden droplets of milk into the teat canal.

The most common reason for milking machine problems is inadequate routine maintenance of mechanical components and rubberware. A series of regular, systematic checks provides a simple method of finding problems and guiding preventative maintenance.

If more than one person milks in your parlour, it is important to assign these checking tasks to particular people, and ensure that the right person is alerted to any problems that are found or suspected. Daily and weekly checks should be conducted by milking staff as part of their regular list of responsibilities. The monthly checks should be done by the herd owner or manager or other skilled observer.

Recording the results of monthly checks enables subtle changes due to wear and age to be detected more easily.

**Typical vacuum levels.**

Typical vacuum level recommendations are:
High line 48 - 50 kPa
Mid line 46 - 48 kPa
Low line 42 - 45 kPa

## 6.1 Use daily, weekly and monthly guides to check machine function.

# Daily checks

- Check the air admission holes (air vents). If the air vent is blocked, the claw bowl fills with milk and leads to more clusters falling off, slow or incomplete milking, and difficulty removing clusters even after the vacuum is cut off. Remove any debris with the probe designed for the task - avoid using drill bits or other tools that may enlarge the holes.
- Read the vacuum gauge. Check to see that the needle reads the same at every milking, i.e. that it aligns with the red pointer during milking and reads zero when the machine is off. If the reading is different to normal, tap on the face of the gauge to ensure that the needle isn't sticking.
- Listen to pulsators. The sound of air entering the external airport should be both regular and intermittent. It should be the same sound for all pulsators.
- Watch milk entering the receiver jar. Flow should be even, without flooding or slugging.
- Check cows' teats as clusters come off for any changes e.g. in colour, texture etc.
- Observe cows during milking - unsettled cows may be an indicator of a problem in the environment, or with the machine.

| Daily checks | ✔ |
|---|---|
| **Check air admission holes (air vents)** | |
| **Read the vacuum gauge** | |
| **Listen to pulsators** | |
| **Watch milk entering the receiver jar** | |
| **Check teats as clusters come off** | |
| **Check cow behaviour** | |

# Weekly checks

- Check for twisted liners. Align marks/arrows on mouthpiece and short milk tube, or place your thumb in each liner.
- Check liner condition, particularly for distortion of the mouth piece lip or holes in the short milk tube. Split liners lead to fluid between the liner and the shell.
- Check filter(s) on pulsator airlines, especially in parlours where the filters are close to the feeders.
- Check drain valves on pulsation airline.
- Listen to the regulator(s). It is normal to hear air being admitted at the regulator. If air is not being admitted it may indicate that the machine is leaking air or air is getting in due to careless cluster attachment or cluster fall off.
- Check filters on the vacuum regulator and clean if necessary.
- Check vacuum pump oil level, check oil drop rate.

**Jetter washing systems.**

Preferably use jetters which wash both the inside and outside of the mouthpiece and can be left connected so that after washing the system is sealed. This reduces contamination by milk, muck, dust or flies.

| Weekly checks | ✔ |
|---|---|
| **Check for twisted liners** | |
| **Check for liner condition** | |
| **Check filters on pulsator airlines** | |
| **Check drain valves on pulsator airlines** | |
| **Listen to the regulator** | |
| **Check regulator filters** | |
| **Check vacuum pump oil level** | |
| **Check oil drop rate** | |


**Undermilking.**

Undermilking is best assessed visually or by hand-stripping at least 25% of cows immediately after cluster removal and measuring the volume of milk from each quarter (strip yields).

- Undermilking is a problem if more than 20% of the quarters have strip yields of > 100mL.


**Maximum milking-out time per cow.**

If your milking system is functioning correctly, the following figures will apply to about 80% of cows in typical Irish herds:

- 10 L/milking will be milked in 6.3 minutes
- 12 L/milking will be milked in 7.2 minutes
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These figures are based on ICBF data on milk yields and milking duration from Irish milk recorded herds.

# Monthly checks

- Check 'effective reserve' and regulator function.

  Effective reserve is an airflow measurement of the spare or reserve pump capacity actually available to maintain the receiver vacuum stable when extra air enters the system during milking.

  All milking systems should have sufficient effective reserve to cover the possibility that at least 1 milking unit might fall off during milking. Larger systems (more than 32 units) should have sufficient reserve to cope with 2 simultaneous falls.

  A simple test to try when the machine is running: open 1 set of clusters (or if more than 32 units, open 2 sets). If the vacuum drops more than 2 kPa, then effective reserve is not adequate. (Note: This is not an accurate test if there are less than 14 units). If this suggests a problem, contact your technician.

  During this test, check that the regulator closes or almost closes. The hiss of air entering the regulator should be greatly reduced when the clusters are opened. If this does not happen, check the regulator filter and clean if necessary. If cleaning does not improve the regulator response, call your milking machine technician.
- Measure completeness of milking i.e. undermilking, and milking times.
  If clusters are applied before milk let-down, these average milking times will be extended by approximately one minute.
- Count liner squawks, and slips requiring correction by milker:
  - preferred machine function: no more than five slips per 100 cows
  - machine requires service: more than 10 slips per 100 cows.

| Monthly checks | ✔ |
|---|---|
| **Check effective reserve and regulator function** | |
| **Measure completeness of milking and milking times** | |
| **Count cluster squawks, and slips** | |

## 6.2 Call a milking machine technician if you observe any abnormalities in the parlour during your daily, weekly or monthly checks.

Arrange a visit by a technician with a current Irish Milk Quality Co-operative Society (IMQCS) qualification to investigate the problem you have observed and:

- to ensure vacuum levels and airflows are appropriate for machine
- to check pulsation
- to service faulty pulsators
- to correct all faults promptly.

Milk flow simulation trials using artificial teats are the most repeatable way of carrying out assessments. These are specialist tests and should be carried out by trained individuals.

A list of IMQCS qualified technicians is available at **www.milkquality.ie**. You should receive a full written report on a current IMQCS form from your milking machine technician. CellCheck recommends that milking installations are serviced twice per year.

**Refer to Management Note H:** IMQCS milking machine test reports.


**Stray Voltage**

Stray voltage is often blamed for uneasy cows and high SCC - however having a well bonded machine should rule this out.

## 6.3 Change liners at regular intervals (2,000 milkings or every 6 months).

Cluster liners are designed to flex and squeeze the teat during each pulsation cycle. This is essential to massage the teat and maintain its blood supply. When fitted into a correctly matched cluster, the liner should be stretched 5 - 15% more than its original length.

As soon as they start work, liners begin to lose tension, absorb fat and hold bacteria. Once they have been used for too many milkings, the deterioration is sufficient to reduce the speed and completeness of milking, increase teat end damage, and increase the spread of mastitis bacteria.

The effective life of liners is influenced by:

- the characteristics of the materials they are made from
- the conditions of storage, cleaning and use they experience
- their exposure to sun, heat, chemicals and ozone.


## Liner Life

Manufacturer's maximum life for rubber liners is 2,000 cow milkings or six months whichever is first, after which time they should be changed.

When liners are changed, estimate when the next 2,000 cow milkings (or manufacturer's recommendation) will have occurred, and mark the date to replace liners on your calendar.

### Guide to estimating number of days for 2,000 cow milkings

**Number of days =**

$$\frac{\text{2,000} \quad \text{x} \quad \text{number of milking units}}{\text{herd size} \quad \text{x} \quad \text{number of milkings per day}}$$

*For example: A herd of 100 cows [herd size] milking twice per day [number of milkings per day] in a 12 unit swing-over parlour [number of milking units] would take 120 days to reach 2,000 cow milkings.*

**Number of days =**

$$\frac{\text{2,000} \quad \text{x} \quad \text{12}}{\text{100 x 2}} = \frac{\text{24,000}}{\text{200}}$$

**= 120 days**

GUIDELINE

# 07 Use post-milking teat disinfection

- Disinfectants
- Water quality
- Mixing directions
- Emollients
- Operator technique
- Assess coverage
- Dip cup cleaning

Bacteria in milk from infected quarters may contaminate the skin of many other teats during milking. For example, after a liner has milked an infected quarter, bacteria may be transferred to the next 5 - 6 cows milked with that cluster.

After milking, bacteria multiply on the teat skin and may extend into the teat canal. If the whole surface of each teat is disinfected immediately after milking, this spread can be minimised. Teat disinfection also helps to keep teat skin supple and healthy.

Teat disinfection after milking reduces new infections due to contagious mastitis (e.g. infection with bacteria such as *Staph. aureus*) by 50% and is also important in reducing *Strep. uberis* infections. It is one of the most effective SCC and mastitis control measures available, but it only works if it is done thoroughly.

Failure to cover the **whole teat of every cow at every milking throughout the year** is the most common error in teat disinfection.

Teat disinfectants making a medicinal claim (e.g. aid in the prevention of mastitis) are classed as veterinary medicinal products and as such are subject to registration and regulation by the Irish Medicines Board **(www.imb.ie)**. If no medicinal claim is made, teat disinfectants may be classed as biocides, and these are subject to registration and regulation by the Department of Agriculture, Food and the Marine.

**www.pcs.agriculture.gov.ie/biocides/BiocidalProductRegisterApril2011.pdf**

**Refer to Guideline 26:**
Service teat spray units and review teat disinfectant to be used.


**Beware of unregistered products.**

Farmers using unregistered products risk applying ineffective treatments, having chemical residues in milk or meat, and causing harm to the environment, human health or animal health. **www.imb.ie** or **www.pcs.agriculture.gov.ie/biocides/BiocidalProductRegisterApril2011.pdf.**

**Refer to Management Note I:**
The correct way to mix and store teat disinfectant.


**Use at least 15 mL per cow per milking (when using a spray).**

Do a quick calculation for your herd to see if enough product is being used. *For example, a 100 cow herd should be using at least 1.5 litres of prepared teat disinfectant each milking* ***(15 mL x 100 cows = 1500 mL or 1.5 litres).***

## 7.1 Use a recommended teat disinfectant.

Select a product based on duration of activity, speed of bacterial kill and ability to function in the presence of organic matter. For mixing purposes, farm water must be of very high quality.

## 7.2 Use a ready to use (RTU) product or mix a fresh batch every day.

RTU products are recommended as best practice, particularly for farms experiencing difficulties sourcing water of adequate quality or mixing solutions consistently.

## 7.3 Use water of very high quality.

Cooled water from the hot water source is ideal.

Water with high organic matter content (for example, from tanks or rivers) is unacceptable because of the inactivation of the disinfectant, and the risk of contamination with bacteria such as *Pseudomonas*. *Pseudomonas spp*. can cause very severe mastitis which is virtually impossible to treat.

Water very high in minerals is also unacceptable.

## 7.4 Mix all products according to the label directions. For Iodophor products ensure the dilution gives at least 0.5% iodine.

## 7.5 Maintain teat skin condition by using product containing an emollient such as glycerine.

Ready mixed products containing emollient are the recommended option as incorrect mixing of teat disinfectant, water and emollient can lead to the end product being totally unsuitable for controlling mastitis. Good emollients include glycerine, lanolin, glycan, sorbitol and lanolinated esters.

Never use bloat oil (or any white oil) in chlorhexidine disinfectants.

Do not exceed 10% glycerine for regular use. Higher levels may interfere with killing power of the disinfectant. If teat condition is particularly bad or irritation of teat skin has occurred with a change in chemical use, glycerine concentration may be increased to 20% but for no more than two weeks.

## 7.6 Spray or dip the whole surface of all teats after every milking throughout lactation.

Ensure the whole teat surface is covered with disinfectant. The entire teat surface touched by the cluster liner must be covered. A drop of teat disinfectant seen at the end of the teat does not indicate adequate coverage.

Spray upwards from beneath teats, not from the side.

**Do not** spray cows as they walk past.

Dipping is more reliable than spraying for getting complete coverage.

## 7.7 Check operator technique.

Check that at least 15 mL of prepared teat disinfectant is being used per cow per milking if spraying (10 mL per cow per milking if dipping). Adequate volume alone, however, does not ensure teats are being covered.

Check the 'far sides' of teats of at least some cows after spraying or dipping every day to ensure they are being covered.

Check the spray pattern of spray units. Hold a sheet of white paper 10 cm from spray and spray it like you would a teat. Hollow ring spray patterns miss the teat. If required, change or service nozzles.

## 7.8 When dipping, clean out dip cup as teat dip gets low - don't just top up the dip.

Minimise the amount of milk or other organic material that accumulates in the dip cup. Clean out immediately if there is dirt or manure dropped into the cup.

Wash out the dip cup every day.

TIP

**Use clean, dry paper towel test to check coverage.**

To assess if all sides of the teat are being covered, wrap a piece of paper towel around the barrel of the teat, then carefully remove and examine the wet or stained area.

**Use paper towel to assess teat coverage.**

**A "solid" pattern indicates good coverage of the teat barrel.**

**A "patchy" pattern indicates incomplete teat coverage.**

GUIDELINE

# 08 Practise good hygiene during milking

- Gloves
- Disinfectant use
- Separate cluster
- Separating infected cows

**Clean gloves are much cleaner than 'clean' hands.**

**Milking in a clean parlour is essential.**

## 8.1 Always wear gloves when milking.

Gloves should always be used, especially when searching for or dealing with clinical cases of mastitis. A bare hand is more difficult to clean and disinfect during milking, than a gloved hand.

Gloves should be clean - keep clean all through milking. Change during milking, if they get torn. Replace gloves after each milking.

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

Rinsing with running water for about 30 seconds provides a physical wash. Then dipping in a disinfecting solution provides a sanitising effect.

Disinfectants take time to kill bacteria, so ensure sufficient contact time (as per manufacturer's recommendations).

For the same reason, avoid touching any other unit or cow for at least 20 seconds. Drying hands on a paper towel after this will also help reduce the bacteria that remain.

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

If you can't separate out the mastitis cows from the herd and milk last or in a separate group - you must use a separate cluster to avoid passing infection to clean cows.

Mark the cluster with some red tape to remind all people milking that it is only to be used for mastitis cows.

Rinse and then sanitise the cluster after milking each mastitis cow.

**Refer to Guideline 4:** Rapidly find, treat and record clinical cases in freshly calved cows.

**Refer to Management Note M:** Dealing with high SCC cows.

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

It may be more feasible and more time efficient to run a separate herd for clinical cases and high SCC cows.


**Drafting out infected cows.**

Electronic identification systems may allow automatic drafting so that the cows can be managed as a single herd yet still milked separately.

GUIDELINE

# 09 Manage teat sores and cracks

- Teat skin
- Teat sores
- Teat end condition
- Mud problems
- Washing teats
- Teat disinfectant
- Machine check
- Teat ointments
- Veterinary advice

Mastitis is a numbers game. The risk is decreased if teats and teat ends are healthy, especially during periods of challenge such as muddy wet conditions. The risk of infection is increased if there are greater numbers of bacteria near the teat end or if the teat end is damaged.

Teat skin health is affected by exposure to mud and water, and milking machine factors.

Water and mud increase the likelihood of cracks developing on teats (and also on milkers' hands). Healthy teat skin is easier to keep clean, minimising preparation before milking.

Teat sores (especially at the ends of teats) provide sites where bacteria can multiply. Teat sores are painful and lead to poor cow behaviour during milking, with increased kicking and poor milk let-down.

**Normal teat end and colour.**

## 9.1 Assess teat skin and teat ends after milking.

Maintenance of healthy teat skin and teat ends is a key requirement for effective mastitis control.

Factors or organisms that affect the teats of dairy cows fall into one of three broad categories:

- milking induced (i.e. faulty machines or milking management)
- environmental (e.g. water, mud, windy cold conditions, sunburn)
- infectious (i.e. viral or bacterial infections).

These factors can produce short, medium or longer term changes in teat condition.

Regular systematic scoring and recording of teat condition in your own herds is recommended.

Whole herd examination (or at least 80 randomly selected cows, in herds larger than 80 cows) is needed to provide an accurate assessment of the herd situation.

**Short term changes** are seen immediately after a single milking and can include:

- colour changes such as teats becoming red or blue
- teats become swollen (e.g. rings at base of teats) or firm
- teats remaining open
- teats or udder becoming sensitive to touch.

**Medium term changes** usually take a few days to become obvious. They include:

- Petechiations
- Chaps
- Cracks
- Photosensitisation
- Hyperkeratosis (rough teat ends).

**Refer to Guideline 7:** Use post-milking teat disinfection.

### Skin colour

**Red teats.**

**Blue teats.**

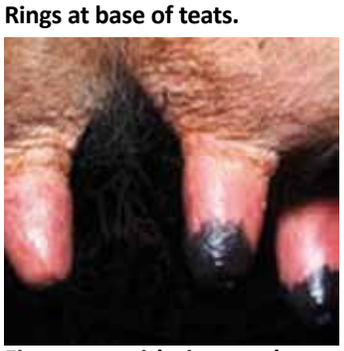
### Degree of openness of the teat orifice/ sensitivity to touch

**An open orifice directly after milking.**

**Udder and teats may be sensitive to touch after milking.**

### Firmness and swelling

**Rings at base of teats.**



**Firm teats with rings at the base.**

### Petechiations, chaps and cracks

**Tiny blood blisters ('petechiations' or 'haemorrhages'), especially around the lower parts of a teat.**

**Chaps and cracks, especially around the upper parts of a teat.**

**Photosensitisation.**

**Skin roughness or cracking around the teat orifice ('teat end hyperkeratosis')**

No ring.

Smooth or slightly rough ring.

Rough ring.

Very rough ring.

**Major risk factors affecting teat end hyperkeratosis:**

| Risk Factor | Reason for increased likelihood of teat end hyperkeratosis |
|---|---|
| Pointed teats | The load applied by the closing liner is on a smaller area of teat surface |
| Increasing age | The 'wrinkle factor' in all species |
| Higher production | Clusters are on for longer |
| Peak lactation | Clusters are on for longer |
| Udder washing | Water and chemicals reduce skin moisture and elasticity |
| Clusters on before let-down | Longer period of milk flow < 1 litre/min |
| Low thresholds for Automatic Cluster Removers (ACRs) | Longer period of milk flow < 1 litre/min |
| Overmilking | Longer period of milk flow < 1 litre/min |
| High vacuum | Greater stress on teat tissues - more stretched in the open liner and squeezed in the closed liner |
| Tight liner mouthpiece | The lip acts like a tourniquet which slows or restricts outflow of blood from the teat wall when the liner is collapsed |
| Liners mounted at high tension | The region of greatest local pressure is applied just above rather than at the teat end<br>This restricts outflow of blood from the teat tip (acts like squeezing a grape until the skin splits) |

**A scoring system for teat end hyperkeratosis** *(Mein et al 2011)*:

| Score | Score | Score |
|---|---|---|
| **N** | **No ring**<br>The teat end is smooth with a small, even orifice.<br>This is a typical status for many teats soon after the start of lactation. |  |
| **S** | **Smooth or Slightly rough ring**<br>A raised ring encircles the orifice. The surface of the ring is smooth or it may feel slightly rough, but no fronds of old keratin are evident. |  |
| **R** | **Rough ring**<br>A raised, roughened ring with isolated fronds or mounds of old keratin extending 1 - 3mm from the orifice. |  |
| **V** | **Very rough ring**<br>A raised ring with rough fronds or mounds of old keratin extending 4mm or more from the orifice.<br>The rim of the ring is rough and cracked, often giving the teat end a 'flowered' appearance. |  |

**Teat warts.**

**Bovine herpes mammillitis.**

**Blackspot.**

Infections causing common teat lesions from viruses and bacteria include:

- Pseudocowpox
- Teat warts
- Bovine herpes mammillitis
- Blackspot.

## 9.2 Minimise the build up of mud on teats.

**Refer to Guideline 27:**
Fix areas that make udders muddy.

## 9.3 Minimise use of water on cows in the parlour.

Ideally, clusters should only go on to clean and dry teats.

Avoid wetting the udder - just wet the teats if they need to be washed.

Always use clean, low pressure water to wash dirty teats and dry them afterwards.

## 9.4 Check teat disinfectant mix, particularly emollient concentrations.

**Refer to Management Note I:**
The correct way to mix and store teat disinfectant.

The use of teat disinfectants with emollient is recommended.

## 9.5 Check important machine factors:

- check vacuum level
- check pulsators
- check liner suitability.

**Refer to Guideline 6:**
Monitor and maintain milking machine function.

## 9.6 Take care with the use of teat ointments, especially those that come in tubs or jars.

Teat ointments which are dispensed by repeated dipping into a jar become easily contaminated with bacteria and may spread infection. Keep containers covered in the parlour.

## 9.7 Seek advice from your vet if problems persist.

## 9.8 Teat sores are attractive to flies which can be a vector for spreading mastitis-causing bacteria between cows, particularly in the warmer months.

**Flies can spread mastitis-causing bacteria.**

GUIDELINE

# 10 Rapidly find, treat and record clinical cases

- Abnormal milk
- Checking suspect cows
- Clots on milk filter
- Foremilk stripping
- Increased bulk tank SCC
- Milk samples for culture
- Swollen quarter

Throughout lactation, milking staff must keep a close watch for mastitis cases. Finding cases can sometimes be a challenge, especially in large herds, but the effort is worth it. If clinical mastitis cases are missed, they pour millions of cells into the milk tank and can significantly increase bulk tank SCC. Rapid detection and treatment of cases means fewer chronic infections develop, and there is less chance of infection being passed to other cows.

A case of clinical mastitis which requires treatment occurs when there is heat, swelling or pain in the udder, or there are changes in the milk (wateriness or clots) that persist for more than three squirts of milk. You need records of clinical cases and treatments to assess individual cows for culling and to monitor herd mastitis.

Your herd has a significant problem if there are more than 5 clinical cases per 100 cows calved in the first month of lactation, or 2 clinical cases per 100 cows in subsequent months of lactation. Milk cultures are recommended to identify which bacteria are involved if a herd problem emerges. A sterile sample must be taken before treatment is started for each case.

**Refer to Guideline 5.2:**
Forestrip all cows, for early detection of clinical mastitis.

## 10.1 Forestrip all cows before attaching clusters.

Foremilk stripping is the single most effective way to detect clinical cases.

## 10.2 Monitor every test result for bulk tank SCC.

A sudden increase may indicate one or more missed clinical cases. The effect a clinical case will have on the bulk tank will be more apparent in smaller herds.

Many milk processors now offer daily text services - sign up for this to ensure you get your results as soon as possible after each test.

## 10.3 Check for swollen quarters and quarters that don't milk out.

Milkers should be looking for swollen quarters at every milking. When taking off clusters be alert for 'strings' of mastitis hanging from teat ends.

## 10.4 Watch for clots on the milk filter.

Check the filter after every milking, before washing the plant.

If there is a separate mastitis/high SCC herd, check the filter before these cows are milked.

Learning to assess the nature of the material on milk filter (reading the filter) can be very useful.

**Checking the milk filter.**

## 10.5 If you notice clots on the filter, pay close attention when forestripping 'suspect cows' at the next milking.

Suspect cows include:

- cows which have not milked out
- cows which have recently had a case of mastitis (check clinical records for last month)
- cows known to have had a high individual SCC (check last milk recording sheet).

Look for clots, watery or discoloured milk that persists for more than three squirts.

Quarters with a few small flecks only in the first three squirts may be left untreated and checked again at the next milking. If these flecks continue at every milking, consider taking a milk sample for culture and check the individual cow SCC history.

For cows that are not sick, treatment during lactation should only be used when there are visible changes present in the milk (or if *Strep. agalactiae* is the infecting bacteria, in which case you should consult with your vet). The decision to treat should be based on factors such as the bacteria identified, parity, stage of lactation and mastitis history.

**Refer to guideline 5.2:**
Forestrip all cows, for early detection of clinical mastitis.

**Refer to Management Note A:** Milk cultures.

**Milk cultures.**

Milk cultures should be done if you have:

- more than 2 cases per 100 cows per month during lactation
- more than 5 cases per 100 cows during the first month after calving.

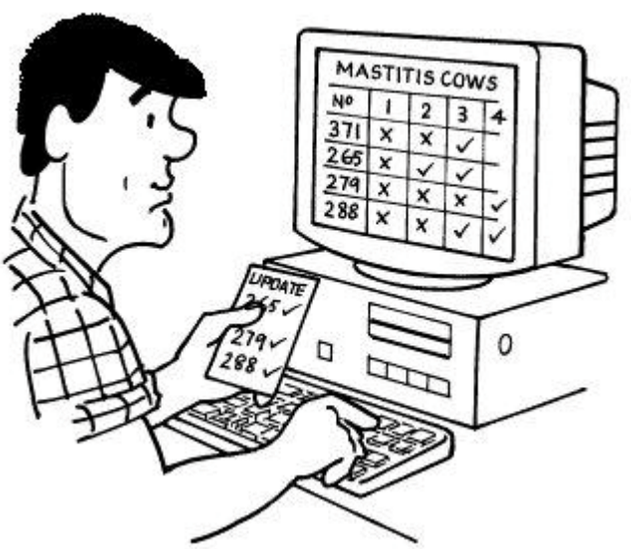
**Refer to Management Note G:** Records to keep on clinical cases of mastitis.

## 10.6 Send milk samples for culture to establish the organisms involved in the herd, if concerned by the number of cases.

If you have had more than 2 cases per 100 cows per month in the past two months, or are concerned about the type of clinical cases of mastitis occurring, it is worthwhile checking the organism involved.

Samples for mastitis culture can be frozen and stored, so taking samples from all cases and freezing them allows you to send them for laboratory examination later, if necessary. Samples can be stored for up to 4 months without any negative effect on most major mastitis pathogens.

## 10.7 Treat and record clinical cases as recommended by the guidelines in this CellCheck publication.



GUIDELINE

# 11 Monitor bulk tank SCC

- Checking trends
- Seeking advice
- Clinical cases

The bulk tank SCC is an indirect way of estimating the level of subclinical mastitis in the herd. Bulk tank SCC is a function of the percentage of quarters infected by major pathogens in a dairy herd. Each 100,000 cells/mL indicates approximately 10% of cows are infected.

A series of bulk tank SCCs should be assessed to see both the level and the trend for a herd.

In herds with bulk tank SCCs below 200,000 cells/mL, a sudden increase (of 10% or more) may indicate that a clinical case has been missed. The impact will be more pronounced in smaller herds. Herds with higher bulk tank SCCs have much more fluctuation of bulk tank SCCs on a day-to-day basis because there are so many infected quarters.

## 11.1 Check bulk tank SCC whenever they arrive, to see if they have risen.

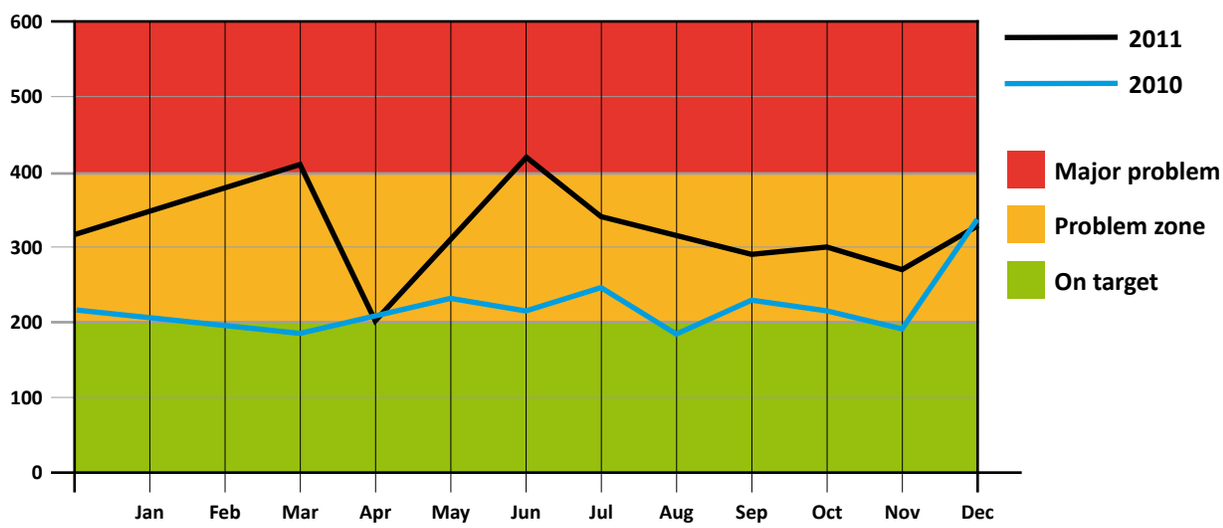
Ensure you are receiving your bulk tank SCC as soon as possible after they are tested. Discuss with your milk processor representative the reporting methods that are available to you.

Use a graph to help identify trend changes and consult with your CellCheck Advisor and vet - see example below.

TIP

Best mastitis control is achieved through regular monitoring of bulk tank SCC and regular milk recording to monitor individual cow SCC levels.

**Sample graph showing monthly bulk tank SCC pattern**



**Sample of Milk Processor supplier information website.**



**Many milk processors now send milk test results by sms.**

## 11.2 Consult with your CellCheck advisory team if close to, or in receipt of, bulk tank SCC results which would downgrade your milk, or exceeds your farm targets.

## 11.3 Check for clinical cases - undetected clinical cases can cause bulk tank SCC to rise.

Regular monitoring of bulk tank SCC is essential to identify new clinical cases. If your bulk tank SCC level is usually less than 200,000/mL, a 10% increase may indicate a missed clinical case and further monitoring for clinical cases is necessary. The impact will be more pronounced in smaller herds.

GUIDELINE

# 12 Use individual cow SCC for management decisions

- Seeking advice
- Chronically infected cows
- Infection spread
- Milk recording

Regular individual cow SCC enable you to monitor the udder health of each cow over each lactation. They also give you an option for dry cow treatment (DCT) decisions, and allow you to assess the contribution of individual cows to bulk tank SCC problems if they arise. Scientific evidence shows that it is not always economically justifiable to treat high cell count cows with antibiotics during lactation. Thus, it is important that management decisions are made that reduce the infection risk posed by these animals.

## 12.1 Consult your CellCheck Advisor for advice on management of cows contributing high numbers of cells to the bulk tank, if bulk tank payment premiums are being lost or you are approaching penalty levels.

Management options may include:

- withholding certain cows from bulk tank - this is a short term solution only
- drying-off cows or quarters
- strategic culling.

Milk recording provides individual cow SCCs. CellCheck recommends monthly milk recording as this provides the most regular and useful information.

## 12.2 Consider milking chronically infected cows last to avoid contaminating other cows.

This can be achieved by managing the mastitis cows as a separate herd (depending on the farm system) or drafting out mastitis cows before each milking and milking them last.

Some newer cluster systems include automatic cluster disinfection which sanitises clusters effectively after each cow. These methods reduce the risk of spreading infection from cow to cow via the cluster.


**Use the CellCheck Farm reports for your herd.**

The CellCheck Farm reports (Summary and Analysis) use your milk recording results, and clinical case records to give an accurate overview of udder health in your herd. They help you identify problem areas and potential risks as well as tracking progress after any management changes are made.

Contact ICBF or your CellCheck Advisor for more information, or visit **www.icbf.com**.

## 12.3 Watch for evidence of spread of infection in the herd by checking the percentage of cows and heifers with increased cell counts each month.

Somatic cell counts are a guide to infection status of individual animals, and will only give a guide to infection spread. Where contagious mastitis bacteria are concerned (especially *Staph. aureus*) fluctuations in individual cow SCC occur in infected animals, and a peak individual cow SCC over the season should be used. A reduction in individual cow SCC in tests later in lactation does not necessarily mean that the infection has cleared up.

**Refer to Management Note M:**
Dealing with high SCC cows.


**New/recent infection.**

The new/recent infection rates give you an indication of how quickly and when infection is spreading to clean cows. This is usually not obvious as most mastitis infections are subclinical. New/recent infection rates can only be measured in herds that participate in milk recording.

GUIDELINE

# 13 Seek professional advice if problems persist

- Acting on warning levels
- Recording problems
- Preventative action

Assistance in investigating and solving mastitis and milk quality problems is available throughout Ireland.

A team approach is often required because solutions require the expertise of a number of professionals.

CellCheck is providing training in these skills for vets, milking machine technicians, milk quality advisors, and farm advisors throughout Ireland.

## 13.1 Seek professional advice e.g. your CellCheck Advisor, your vet, IMQCS milking machine technician if mastitis indices are above warning levels (see table below).

Seek advice and put into action the advice you are given.

Review the table below to see if you need to act because your herd figures exceed the suggested warning levels.

| Factor | Your figures | Warning level, seek help if: |
|---|---|---|
| **Bulk tank SCC** | | **Average for month above 200,000 cells/mL threshold** |
| **Clinical case rate** | | **> 5% of cows in the first month of lactation OR > 2% of cows in subsequent months of lactation** |
| **Individual cow SCC** | | **The new/recent infection rate on your milk recording is > 5% of cows at the last recording** |
| **Teat condition** | | **Is unacceptable and does not improve three weeks after changes are made to machines or disinfectant mix** |

**Use the CellCheck Farm reports for your herd.**

The CellCheck Farm reports (Summary and Analysis) use your milk recording results, and clinical case records to give an accurate overview of udder health in your herd. They help you identify problem areas and potential risks as well as tracking progress after any management changes are made.

Contact ICBF or your CellCheck Advisor for more information, or visit **www.cellcheck.ie** or **www.icbf.com**

## 13.2 Record problems and actions taken.

If you write and record you won't forget when the problem has happened.

It's also easier to draw up an appropriate action plan if you have good records for your CellCheck Advisor to go through.