

Dry cow management

A practical guide to effective mastitis control



Contents

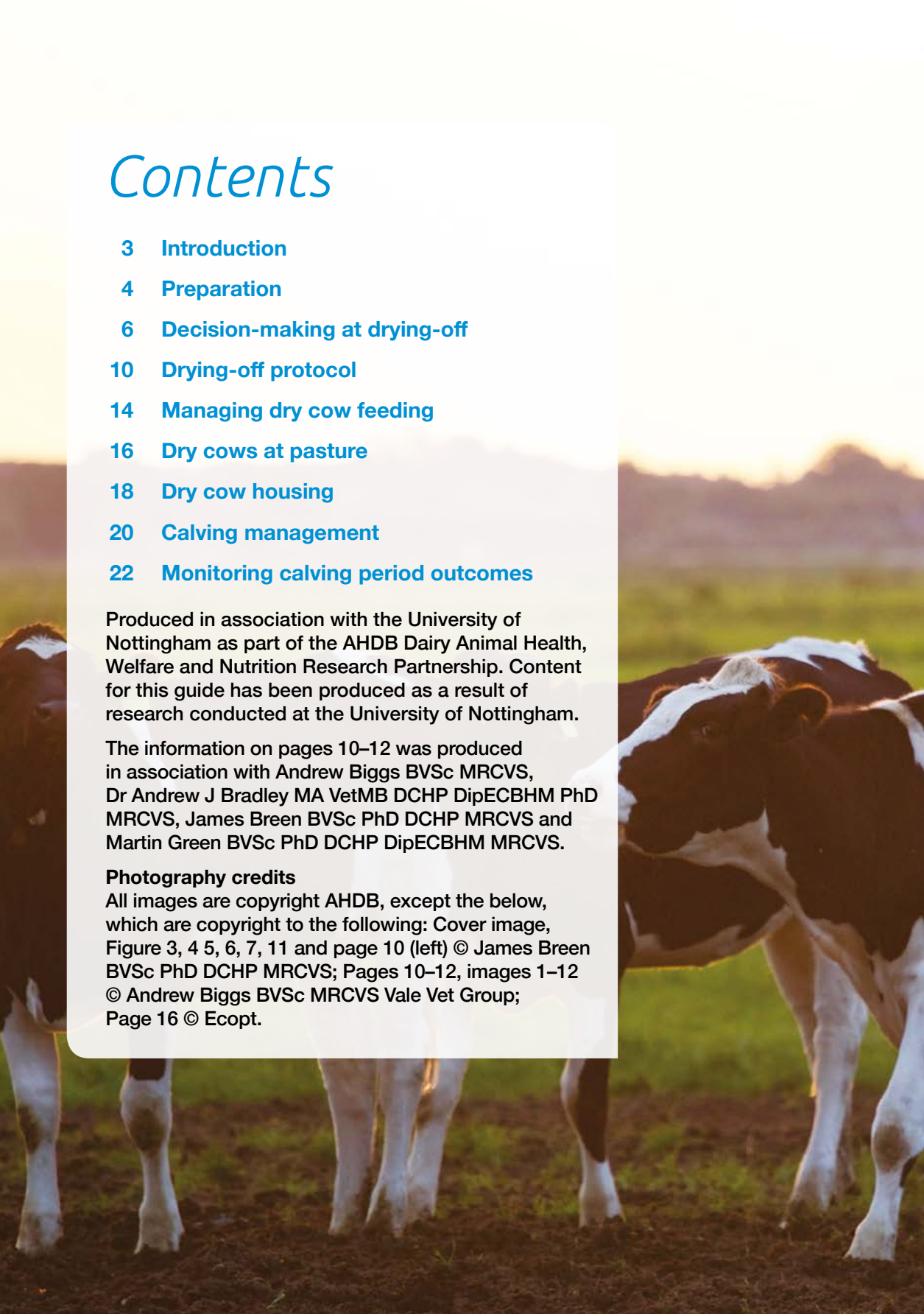
- 3 Introduction**
- 4 Preparation**
- 6 Decision-making at drying-off**
- 10 Drying-off protocol**
- 14 Managing dry cow feeding**
- 16 Dry cows at pasture**
- 18 Dry cow housing**
- 20 Calving management**
- 22 Monitoring calving period outcomes**

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Introduction

A practical guide to effective mastitis control

Mastitis treatment and control is one of the largest costs to the dairy industry in the UK, and is a significant factor affecting the welfare of dairy cows.

Lasting between 40 and 60 days, the dry period is a crucial period which allows the dairy cow and her udder to recover and repair for the upcoming lactation. The dry period is the most important time for curing long-term infections, reducing the number of high-somatic-cell-count (SCC) cows and the number of cows with repeat cases of mastitis.

Many of the mastitis cases in the first 30 days of lactation are a result of infections picked up from the environment during the dry period and around calving. New udder infections develop when cows pick up the bacteria that cause ‘environmental mastitis’ from manure and dirt in their environment.

The best way to reduce the incidence of mastitis is to protect cows from getting new infections. A successful dry period involves taking the right steps to prepare the cows for lactation through nutrition, udder protection and housing decisions. This resource provides practical guidance to help you achieve the best results.

For a more detailed mastitis/udder health investigation, consider the Dairy Mastitis Control plan mastitiscontrolplan.co.uk



Derek Armstrong
Lead Veterinary Science Expert

This resource has been produced as part of the QuarterPRO initiative. Other resources include:

- *Managing mastitis*
- *Control of environmental mastitis in lactation*
- *Control of contagious mastitis*
- *Control of heifer mastitis*
- *The QuarterPRO approach factsheet*

Table 1. Main patterns of mastitis on dairy farms

Mastitis pattern	When most cows get infected	Where most infection was picked up from
Dry period environmental	Dry period	Environment
Lactating period environmental	Lactation	Environment
Lactating period contagious	Lactation	Other cows

Preparation

Getting cows ready

Getting cows ready for the dry period involves several key areas:

- Optimising cow body condition score
- Reducing milk yield
- Calculating optimum dry period length
- Reviewing dry cow feeding

Optimise cow body condition score

Extended lactation length (more than 340 days, giving a calving interval of 400 days) is likely to lead to over-conditioned cows at drying-off, resulting in:

- Increased risk of metabolic disease
- Poor immune function in transition
- Potential increases in subclinical (somatic cell count in cows) and clinical mastitis infections

Make sure to body condition score each cow 2–4 weeks before drying-off. The **Body condition scoring** factsheet uses photos to show you how to score your cows and can be found at ahdb.org.uk/knowledge-library/body-condition-scoring-flow-chart to guide you. At dry-off, cows should have a body condition of 2.5–3.0. For cows outside this range, consider the points below, in consultation with your nutritional adviser:

- Drying-off low-body condition score (BCS) cows early to allow recovery of some body condition
- Milking over-conditioned cows for longer with restricted energy intake

Aim to dry off 90% of cows with a body condition score between 2.5 and 3.0.

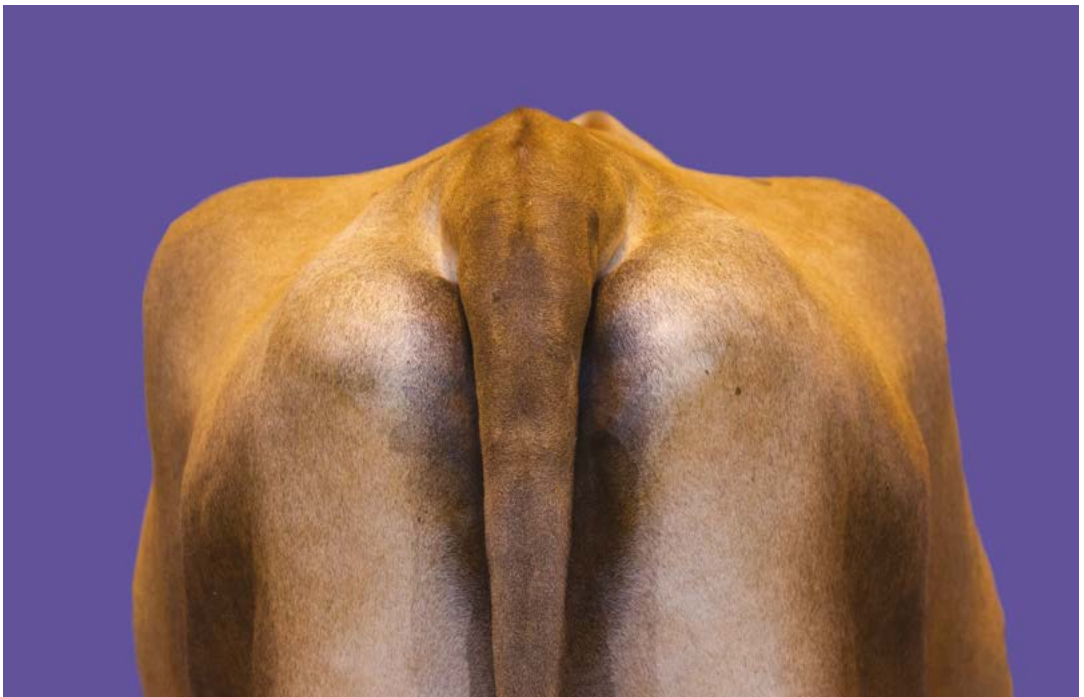


Figure 1. Cow at body condition score 3



Reduce milk yield before drying-off

Only dry cows off when they are producing 15 litres of milk or less. Drying cows off at more than 15 litres is a risk for new infection and this cannot be reduced by the use of antibiotic dry cow therapy.

If a cow is producing less than 5 litres, dry her off immediately to reduce infection risks. Cows must not be milked once daily before drying off.

Strategies to reduce milk yield depend on whether it is an individual cow issue or more of a herd-wide problem. Example strategies are shown in Table 2.

Table 2. Example strategies for reducing milk yield before dry-off for individuals and herd

Individual	Herd
Regrouping	
Ration change	
Home-mix	Change voluntary waiting period ¹
	Change dry period length

¹ Target voluntary waiting period before first service: 44–55 days 12.5 MJ/kg DM and 18% protein.

Calculate dry-off dates and length of dry period

Calculate the drying-off dates by using expected calving dates, milk yield and body condition scores. The drying-off period may vary between cows, but all should have a dry period of 40–60 days.

Assessment of farm data reveals that dry periods of less than 35 days, or longer than 70 days, are costly in terms of lifetime yield. Establish optimum lengths for the dry period depending on lactation number.

Drying-off period too short

Associated with reduced yield in next lactation and increased risk of new infection.

Drying-off period too long

May result in over-condition, metabolic disease, increased risk of new infection and is also associated with a reduction in lifetime yield.

Reviewing dry cow feeding

This is an important element of preparation due to its influence on the cows' immune status, both during the dry period and in the subsequent lactation. See Managing dry cow feeding, page 14.

Decision-making at drying-off

Dry cow treatments are a vital element of mastitis control and must be selected appropriately in order to get the best results. Depending on the herd bulk milk somatic cell count and the individual cow infection status, the most suitable regime for dry cow therapy will vary between herds.

It is essential to:

- Develop, implement and regularly review a dry cow strategy for your cows with your vet, who must advise and prescribe the most suitable products
- Treat all cows in the herd with an internal teat sealant
- Use aseptic technique, irrespective of dry cow therapy choice



Options for dry cow therapy

Use appropriate options for treatment and prevention of infections for all cows in the herd. Different dry cow therapy products may be used for different cows (i.e. a 'selective' approach), in consultation with your vet.

Teat sealants

Scientific evidence worldwide, including the UK, shows that internal teat sealants work and significantly reduce the risk of new infection while the cow is dry. Use internal teat sealants for all cows at drying-off, both in combination with antibiotic for infected cows and alone in uninfected cows.

If you cannot use internal teat sealants, you could opt for external teat sealants, which are regularly reapplied during the dry period, although their effectiveness is less well-proven.

Antibiotics

Antimicrobial resistance: using antibiotics responsibly

Responsible use means turning to antibiotics as little as possible but as much as necessary. Current concerns over antibiotic resistance mean it is necessary to review blanket treatment of antibiotic dry cow therapy. Discuss antibiotic use and your dry cow treatment strategy with your vet. More information at: ruma.org.uk/cattle

Antibiotic dry cow therapy

If using antibiotic dry cow therapy for high-SCC, infected cows, the antibiotic must have an appropriate spectrum of activity against the most important bacterial causes that lead to increased SCC in the herd. Giving antibiotics to low-SCC, uninfected cows can be detrimental and increase the risk of

these cows developing mastitis in the next lactation.

It is recommended that highest priority critically important antibiotics (HP-CIAs) are not routinely used at drying-off. The use of injectable antibiotic at drying-off is not recommended and there is no evidence this method is effective.

What are critically important antibiotics (CIAs)?

Use of antimicrobials in livestock can select for bacteria that are antimicrobial resistant. There is a risk these antimicrobial-resistant bacteria can spread to people through milk and meat. All antimicrobial classes used in human medicine have been categorised according to their relative importance for treating infections in people. The highest priority critically important antimicrobials (HP-CIAs) are antibiotics which are most important to human health should antimicrobial resistance develop.

The HP-CIAs should only be used in livestock as a last resort after sensitivity testing has been conducted, and when no other antibiotic would be clinically effective. The antibiotics placed in this category by the European Medicines Agency (EMA) are the third- and fourth-generation

cephalosporins, quinolones, including fluoroquinolones, and polymyxins, including colistin. The EMA's Antimicrobial Advice Ad Hoc Expert Group (AMEG) constantly reassesses the impact on human health of using different antibiotics in animals, alongside the need to treat disease in animals for health and welfare reasons. The classes of antimicrobials categorised as HP-CIAs may change over time.

It is a requirement of the Red Tractor Dairy Standards that HP-CIAs must only be used as a last resort under veterinary direction. To prevent antimicrobial resistance, it is critical to avoid using HP-CIAs unless there is no other product effective against the condition being treated.

Use antibiotics in your dry cow treatment strategy as little as possible but as much as necessary, and in consultation with your vet. Only use HP-CIAs as final resort under direction from your vet.

Vaccination

Low-SCC herds could consider mastitis vaccination to reduce severe clinical mastitis.



Determining individual cow infection status

It is important to determine the individual cow infection status for selective dry cow therapy. To do this:

- Use a drying-off list (available from many on-farm software packages and milk-recording organisations) and look at cows that are due to go dry

- Use individual cow somatic cell counts from three consecutive milk recordings, alongside clinical mastitis history for the last three months, to determine individual cow infection status (Figure 2)
- Classify each cow as uninfected, recovered or chronically infected (Table 3)

Use the information in the chart on page 9 to choose an appropriate dry cow therapy strategy for individual cows. Consult your vet for advice.

Table 3. Example drying-off list to classify infection status of cow and suggested treatment

Cow ID	PD	Dry	Due	Clinical mastitis date	Cell count history ('000)			Status	Suggested treatment
					April	May	June		
1	+	06 Jul	04 Sep		151	261	286	Chronically infected	Antibiotic and sealant
2	+	08 Jul	06 Sep	17 Jan	139	108	147	Recovered	Sealant alone
3	+	18 Jul	16 Sep		1,609	138	116	Unsure	Antibiotic and sealant
4	+	23 Jul	21 Sep		34	42	49	Uninfected	Sealant alone
5	+	25 Jul	23 Sep		123	73	90	Uninfected	Sealant alone

Chronically infected: Cows with more than one SCC >200,000 cells/ml for the last three consecutive monthly recordings.

Recovered: Cows that previously had a high cell count or a clinical case of mastitis, but SCC <200,000 cells/ml for the last three consecutive monthly recordings and have not had clinical mastitis in the last three months.

Uninfected: Cows SCC <200,000 cells/ml and no clinical mastitis during last three months before dry-off.

Note: This process highlights the importance of using individual SCC data to help inform likely infection status of individual cows and the best treatment for them at dry-off.

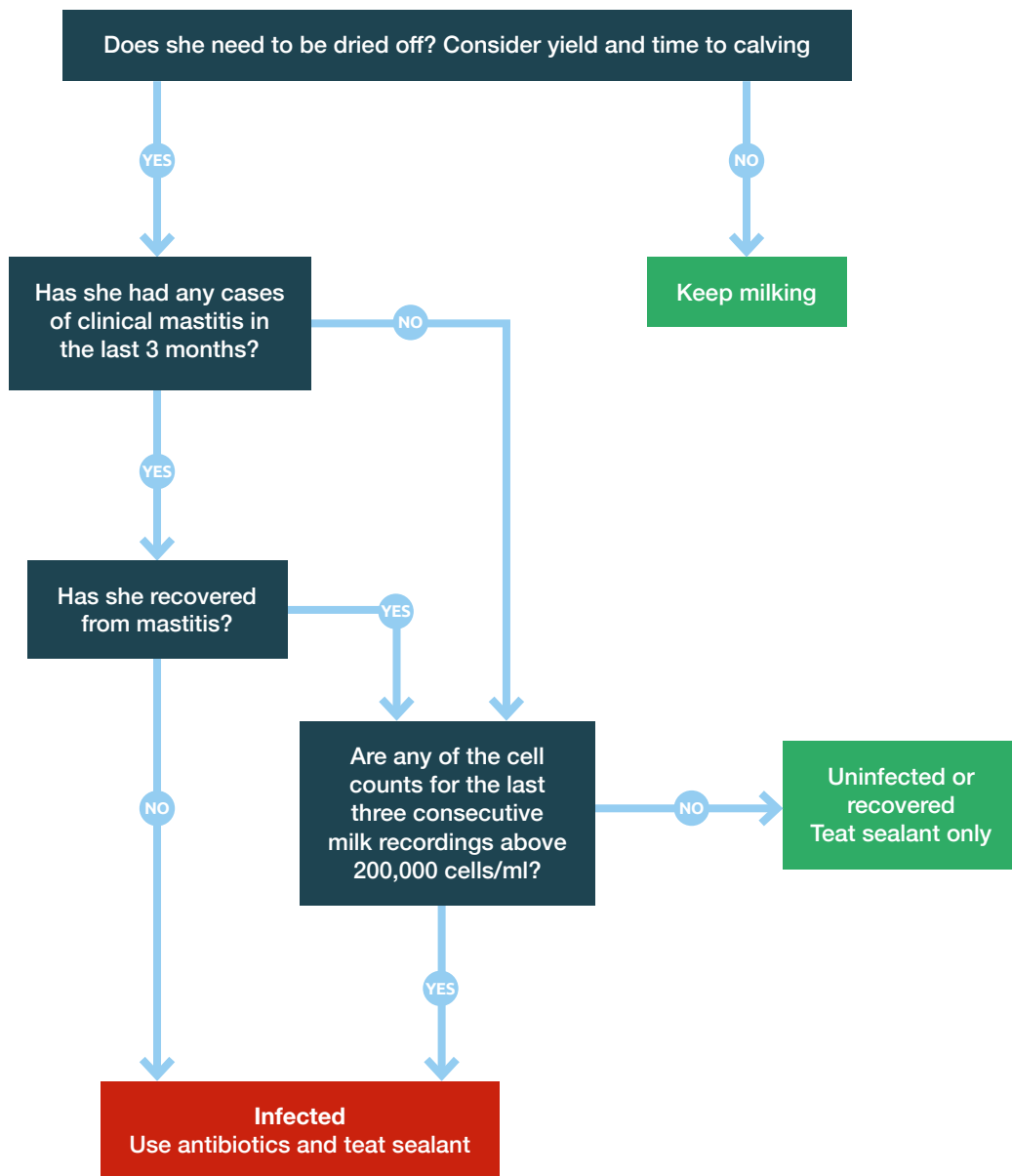


Figure 2. Determining individual cow infection status for selective dry cow therapy method

Drying-off protocol



Drying-off requires a lot of care, time and excellent hygiene. To achieve a successful drying-off procedure, do not carry it out during milking. Instead, shed cows to be dried off after their last milking so they can easily be brought back into the parlour later after it is cleaned down. Do not trim tails and hooves at the same time as drying-off because of the serious risk of teats becoming contaminated.

Irrespective of dry cow therapy choice, it is important to be as sterile as possible when administering dry cow therapy to avoid introducing infection into the teat. Poor infusion technique can cause damage to the teat canal and increases the risk of mastitis and can result in cows dying.

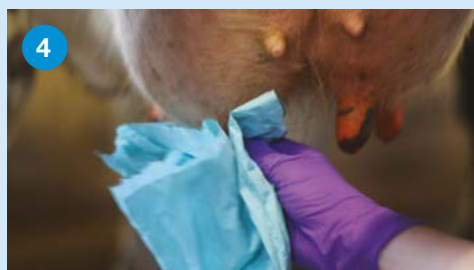
For more information (including videos), please visit: ahdb.org.uk/drying-cows-off-early A recommended protocol is outlined overleaf. An A2 poster of the protocol is available for order, suitable for displaying where your team can see it. It can be ordered from your local Knowledge Exchange Manager or directly at publications@ahdb.org.uk

Remember

To discuss the training needs of your team with your vet.



Identify cows to be dried off, for example with stock-marker spray on her leg.



Wipe teats to be dried off with an individual paper towel per teat, paying particular attention to the teat end. Start with the teats furthest away, moving to the closest teat.



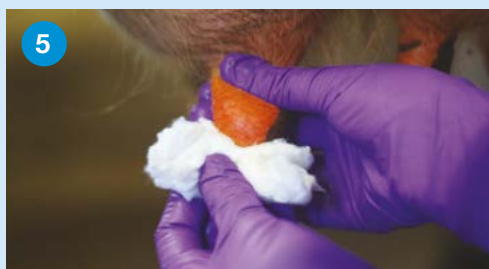
ANTIBIOTIC: Using a partial insertion technique, infuse the whole antibiotic tube into the teat. Only insert the tube end and maintain a gentle pressure to stop the product leaking around the nozzle. Do not let go of the teat.



Wash arms and hands clean. Wear a fresh pair of disposable gloves and keep clean and dry. Replace gloves frequently, preferably between cows.



Pre-dip each teat using a fast-acting disinfectant – leave on for at least 30 seconds.



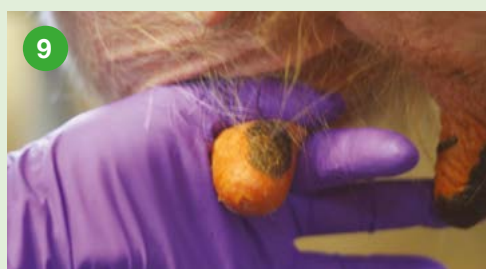
Keeping hold of the teat in one hand, wipe the teat and teat end with cotton wool soaked in surgical spirit. Focus on getting the teat end spotless. If there is dirt on the cotton wool after you have cleaned the teat end, repeat with a fresh piece of cotton wool. Do not let go of the teat.



Ideally, an assistant should help prepare the tubes and hand them to you. If using internal teat sealant only, proceed to step 9.



ANTIBIOTIC: Without letting go, massage the antibiotic up the teat canal. Slide your non-tube hand down the teat after infusing and hold the teat end without touching the teat orifice to allow you to massage the contents up towards the udder with your tubing hand.



TEAT SEALANT: When using teat sealant, use the crook of your first finger and thumb to pinch the base of the teat where it joins the udder. The teat will bend towards you. Hold the pinch until the product has been infused into that teat.

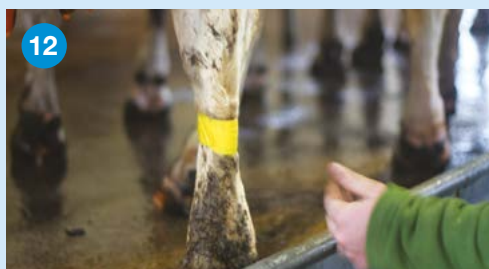
[Drying-off protocol continues overleaf.](#)



TEAT SEALANT: Wash arms and hands clean. Wear a fresh pair of disposable gloves and keep clean and dry. Replace gloves frequently, preferably between cows. When infusing teat sealant, cleanliness of the teat end is absolutely critical.



After each teat has the appropriate product infused, it should have post-milking teat dip or spray applied.



Check that the cow is permanently identified as treated. This reduces the chances of milking a dry cow with antibiotic and causing antibiotic failure.



Allow the cow to stand in a clean yard for at least 30 minutes before moving to dry cow accommodation or pasture.



In pasture-based systems, avoid recently dried-off cows walking long distances immediately after drying-off.



Check udders daily for signs of mastitis.

During the dry period, check udder daily

Observe cows daily during the dry period

Look out for swollen quarters. If the quarters look swollen, move the cow to appropriate handling facilities and check udders manually.

Check swollen quarters manually

Manually check for swelling, heat, hardness, redness and pain and compare between all quarters. It is important to avoid handling or stripping unaffected quarters so that the teat seal or plug remains intact. If suspicious, consult with vet before treating as a clinical case.

A full course of treatment should be used, and each treatment given at the recommended time intervals, as per the label. Remember to record full details of the clinical case and treatment.

Removing teat sealant

The dry period ends with the calving-down of the cow and the start of the next lactation. It is important that teat sealant must be fully stripped out prior to attaching the cluster at the first milking of the lactation. To do this:

- Pinch the base of the teat where it joins the udder with one hand
- With the other hand, strip each teat with one long, slow action
- Generally, the teat sealant can be removed in one long 'string'. If not, strip 10–12 times while pinching the base of the teat

Teat sealant must not enter the bulk milk tank. This is to prevent blackspot in cheese and accumulation of sealant in filters of the milking machine.

Some milk buyers require farmers to complete training on the use of teat sealant, which is provided by the farm vet in conjunction with the product manufacturer guidelines. A certificate of completion lasts for three years.

Speak to your vet

Speak to your vet about MilkSure training on how to safeguard residue-free milk. Visit milkasure.co.uk



Withdrawal periods for dry cow antibiotics

There is no withdrawal time for internal teat sealant, but there is for intramammary antibiotics. Due to the long-acting nature of the antibiotic dry cow tubes, there is a prolonged milk withdrawal period. Care must be taken to observe withdrawal times, especially if cows calve early.

If a cow calves early:

- Check the dates for their dry cow therapy withdrawal period
- Instructions must be appropriately followed for each antibiotic product

Failure to adhere to withdrawal periods may lead to an antibiotic residue failure. If there is any doubt, milk can be tested using an inhibitory substance test.

Managing dry cow feeding

Dry cow feeding is an important element of a mastitis control plan because it can influence the cows’ immune status, both in the dry period and in the subsequent lactation, and hence the ability to remain free from mastitis infections.

Review dry cow feeding

The primary aim of dry cow feeding is to maintain body condition by ensuring adequate energy intake and to ensure cows start their new lactation in the best possible nutritional status.

Review dry period feeding and ration in consultation with your nutritional adviser and vet.



Table 4. Dry Period timeline

Early (Dry-off to 21 days)	Late or ‘transition’ cows (21 days to expected calving date)
Feed a bulky, low-energy ration of 9–10 MJ ME/kg DM	
13–14% crude protein in the dry matter is adequate for dry cows at any stage. Aim for a minimum of 1,200 g/day of metabolisable protein	
Target DMI of >12 kg DM/cow/day	
Do not overfeed (as in any phase), but particularly starch – predisposes to poor transitioning	Ensure ration has appropriate long fibre content to maintain daily intake and rumination, for example >3 kg of long chop that is at least 3 cm in length, in consultation with your nutritional adviser
	Ensure levels of selenium are 0.3 mg/kg DM and vitamin E are 1,200 IU/cow/day, or higher in high-yielding herds Low levels of selenium and vitamin E can affect immune status and increase the risk of mastitis
Analyse forages for minerals to ensure correct mineral balance in ration	
Monitor and maintain BCS at scores 2.5–3 through to calving	
Do not allow them to get fat	
Minimise stress and pen/group moves in the run-up to calving as this can reduce DMI	

Optimise feeding-area design to maximise dry matter intake. In particular, ensure you:

- Clean out feed troughs daily
- Provide cows with at least 0.75 m of feed space per cow in transition
- Maintain correct feed barrier or rail position and height – observe cows for hair loss or swelling on the neck as this may indicate that the neck rail is too low
- Provide a smooth/shiny surface in the feed trough as it improves intake

Providing dry cows with optimal feeding spaces will help maintain high intakes in the late dry period. It is important to regularly appraise your dry cow management to make sure conditions are optimised by reviewing the points above and making improvements where needed.

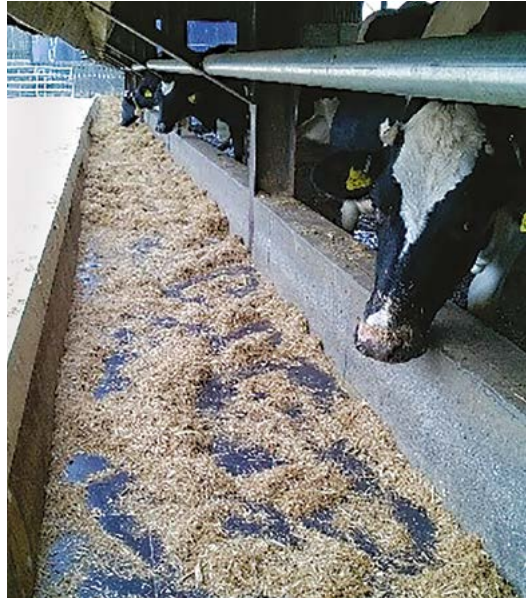


Figure 3. Optimal feeding space for dry cows with a smooth surface, encouraging greater intakes



Figure 4. Optimal dry cow feeding space, as shown, will encourage high intakes

Dry cows at pasture



Time at pasture can be a considerable risk period for clinical mastitis and increased somatic cell counts, due to exposure to different disease-causing bacteria, as well as variable environmental conditions.

Where dry cows are managed at pasture

When dry cows are kept at pasture, it is important that they are only kept in the same paddock for a maximum of two weeks, followed by resting the paddock for at least four weeks. This is to both prevent build-up of mastitis-causing bacteria and to prevent the ground from becoming poached. Further management considerations to reduce the risk of mastitis are to:

- Maintain adequate field drainage to avoid surface flooding or severe poaching
- Move dry cows to a different field if severe poaching of the land and/or gateways occurs
- Manage poaching around gateways/feeders (e.g. using multiple gateways or bark)

Summer mastitis

Flies can transmit bacteria that are involved in causing the summer mastitis complex (known as 'August bag'), which is most prevalent during the grazing months. To avoid summer mastitis:

- Ensure good fly control through frequent reapplication of a pour-on product (monthly depending on product) for all dry cows through the summer period
- Avoid high-risk areas associated with summer mastitis (e.g. fields near to trees and damp, sheltered areas)
- Isolate dry cows with summer mastitis to stop the spread of infection

Calculating stocking density at pasture

Stocking dry cow paddocks at the correct density can reduce cases of summer mastitis and prevent ground from becoming poached.

Never exceed a stocking density of 100 cows/acre/day in a two-week period (one acre is 50 by 100 yards and one hectare is 2.5 acres)

The stocking density calculation should always be based on the group with the highest stocking density for the longest time.

Calculation

Cow acre days = (number of dry cows in group per number of acres grazed by that group) x days

Useful questions to ask yourself when calculating stocking density are:

- What is the largest field grazed by dry cows and how long did the largest group of dry cows spend there?
- What is the smallest field grazed by dry cows and how long did the largest group of dry cows spend there?

Example

A spring-calving herd reports an increased bulk milk somatic cell count in May and June. Analysis of the cell count data highlights that 30% of cows are >200,000 cells/ml at the first milk recording after calving (dry period new infections).

Using the Mastitis Control Plan, the farmer explains that the outwintered dry group of 120 cows is moved daily around areas of the paddock that are pre-arranged with bales, having access to 0.2 ha each day. This works out to be a stocking rate of 240 cow acre days (120 cows in 0.5 acre for 1 day) – a ‘target’ stocking density at pasture is 100 cow acre days, so, ideally, we would try to double the size of the bale area, at least in the early part of the dry period when susceptibility to new infection is so high.

Calculation

1 hectare = 2.5 acres, therefore
0.2 hectares = 0.5 acres. Stocking rate is cows/acre/day ($120/0.5/1=240$)



Figure 5. A good way to manage dry cows at pasture



Figure 6. Dry cows at pasture



Figure 7. A gateway into a field and the immediate area overlaid with bark to limit or prevent poaching on the land

Further information on calving paddocks is available on the AHDB website at ahdb.org.uk/news/calving-paddocks-checklist

Dry cow housing

The environment of dry cows must be managed at least as well as for milking cows. Dry cow accommodation must be maintained so as to minimise the risk of injury and bacterial colonisation to the teats and udder.

Ventilation

Ventilation of dry cow housing must be good to:

- Create a dry atmosphere to reduce bacterial numbers on bedding
- Control environmental mastitis (decreases bacterial survival time)
- Avoid draughts in all dry cow housing

For further information on ventilation of dry cow housing, please see ahdb.org.uk/knowledge-library/dry-cow-housing

The following items must be assessed:

- **Outlet provision** – For adult cows, the outlet should be at least 0.15 m²/cow
- **Inlet allowance** – The total inlet area must be at least 2 x outlet area, divided down each side of the building
- **Forced or mechanical ventilation** – This could be used to improve the natural ventilation in dry cow housing



Figure 8. Shows lifting side inlet ventilation

Loafing, feeding, scraping and slurry removal

Loafing areas include non-lying, non-bedded, non-passageway and non-feeding space, which allow cows to spread out, reducing faecal contamination and bullying. Requirements are:

- Must be at least 3 m²/cow
- Feeding area should be at least 0.75 m of feed space per cow
- Alleyways, loafing and feeding areas should be scraped often enough to keep alleyways and all walking surfaces clean (twice daily may be sufficient)
- Automatic scrapers must run often enough to keep alleyways clean and slurry must not overflow the sides of the scrapers

Score cow cleanliness regularly to check hygiene standards for the dry cows, using the AHDB Cleanliness scorecard, available at ahdb.org.uk/knowledge-library/cleanliness-scorecard

Cubicles

Cubicles for dry cow groups at any stage should conform to the same standard as for the milking cows.

There must be:

- At least 5% more cubicles than dry cows in the group available
- Appropriately sized cubicles for dry cows

Inorganic bedding material

Inorganic bedding in cubicles, such as sand, is better for controlling environmental mastitis as there is poorer bacterial survival than on organic bedding. Therefore it should be used wherever possible, and clean material should be applied to the cubicles every other day.

Organic bedding material

If using organic bedding material in cubicles, such as straw or sawdust, clean material should be applied every day. It is important to make sure that if sawdust is used, it should be kiln-dried to reduce the risk of introducing pathogens.

Inorganic/organic bedding use in cubicles

Regardless of bedding material used, dung, soiling and wet bedding must be removed from cubicles twice daily. Making sure that there is sufficient bedding should maintain a dry environment and retain cow comfort, and drying agents (e.g. lime) should also be used to improve dryness.



Figure 9. Example of cow housing with sand cubicles

Yards used for dry cows

Dry cows require a bedded lying area of 1.25 m²/1,000 litres of milk/cow (herd annual milk yield), regardless of the bedding material used. Both straw and sand yards are commonly used for dry cows and they both have advantages and disadvantages.

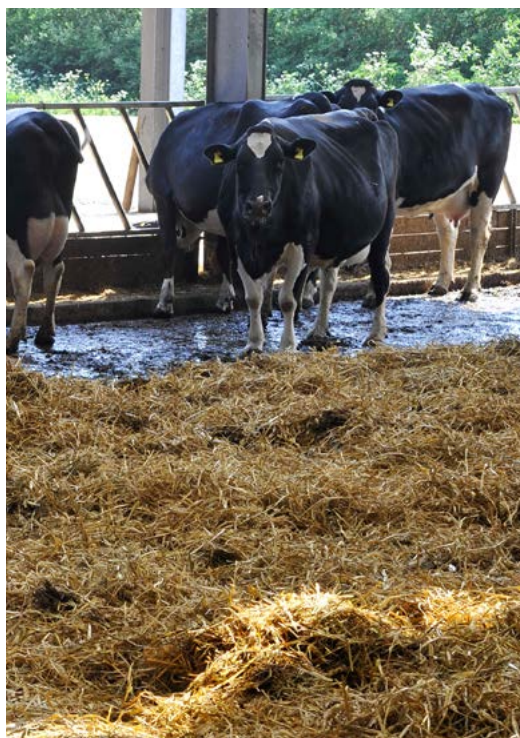
Straw yards for dry cows have excellent drainage, +/- sand on top of hardcore or concrete.

They should:

- Aim to use 250 kg to bed each dry cow each month during the housing period
- Use unchopped straw
- Have new, clean, dry straw added once daily and the straw bedding should be spread evenly
- Be completely cleaned out every month

Sand yards for dry cows can be very labour-intensive but lower the risk of new mastitis cases. They should:

- Only have washed sand or sea sand applied
- Be cleared of dung from lying areas twice daily
- Be spread with fresh, clean sand in the lying areas once daily
- Be completely cleaned out every six months (or earlier if necessary)



Calving management

Good environmental management for calving cows is essential to prevent new udder infections. In particular, extra attention should be paid to calving cows in the 24 hours before and after calving.

Minimise stress and bacterial exposure

Providing the cow with a clean, comfortable and dry environment in which to proceed through calving, ensuring that stress is minimised and the udder and teats are exposed to low levels of disease-causing bacteria when the cow is lying during calving are key to preventing new udder infections. To do this:

- Ensure all flooring areas are non-slip, with good grip
- Regularly remove dung from calving yards and pens to avoid build-up of cow and calf disease-causing bacteria, to keep calving cows clean and minimise the risk of mastitis
- Scrape alleyways, loafing and feeding areas used by calving cows twice daily
- Provide at least 2 m²/cow loafing area for calving cows
- Keep calving areas well-ventilated at all times – see page 18, Dry cow housing

Calving in individual calving pens

Ideally, all cows should calve in individual calving pens with at least 15 m²/cow lying space/cow in both pens and yards. Ensure pens are cleaned between calvings.

Calving at pasture

See page 16, Dry cows at pasture for further information on calving at pasture.

Calving in straw yards

Managing calving cows in yard systems bedded with straw remains popular. However, it can prove difficult because the risk of new intramammary infection is very high at calving and space is often limited, particularly when shared with cows in the final 2–3 weeks (the transition period). Make sure that your straw calving yards have:

- Adequate drainage, which will avoid pooling of liquid and keep surface of bedding dry
- Excellent drainage at the base, possibly with sand on top of hardcore or concrete
- 250 kg of unchopped straw used to bed each calving cow each month
- New, clean straw added daily and straw bedding should be spread evenly
- Complete clean out every month

Calving in sand yards

Managing calving cows in sand yards can be very labour-intensive, but, in general, the risks of new intramammary infections are lower in calving cows kept on sand yards and bedding costs are reduced. However, aim to get cows onto a straw bed during calving. Make sure that your sand calving yards have:

- Used washed sand or sea sand
- Dung removed from lying areas twice a day
- Fresh, clean sand spread in the lying areas at least once daily
- Complete clean out at least every six months (or earlier if necessary)

Immediate post-calving period (less than 24 hours after calving)

Adequate provision for feeding space is essential to avoid competition between cows and build-up of dung in the passageways as cows queue to feed. It is also important to maximise calving cow dry matter intake and therefore energy input.

Cows in the calving areas must:

- Have access at all times to good-quality feed that meets their nutritional requirements, whether in pens or yards
- Receive the lactating cow diet immediately from the onset of calving
- Have at least 0.6 m feed space/cow
- Have access to potable water at all times
- Be observed for signs of mastitis or other diseases in the first 24 hours after calving
- Have each quarter stripped within four hours of calving to check for mastitis
- Be milked for the first time within 24 hours of calving

There are various aspects to management of the cow and calf that are important to promote health and that have been associated with mastitis.

- The calf should be left for a maximum of 24 hours with the dam after calving
 - Depending on the disease status of the cow, you may need to implement earlier removal of the calf
 - You must know the disease status of your cows (particularly Johne's disease) so that you can do this
- Calves must not have the opportunity to suckle other cows as well as their dam

Remember

Detailed advice on calving management is available in the *InCalf* guides for both block and all-year-round systems from the AHDB knowledge library at ahdb.org.uk/knowledge-library



Figure 10. Example of a poached outdoor calving paddock

Monitoring calving period outcomes

It is vital to monitor the outcome of dry period management to understand improvements for the future. These should be measured in terms of:

- New intramammary infections (for cows dried off uninfected and for heifers calving into the herd)
- Apparent failures to cure (for cows dried off infected)
- The rate at which clinical mastitis and other diseases around calving are reported

From a mastitis perspective, measures of a successful dry period are:

- The percentage of cows with clinical events
- The percentage of cows calving down uninfected

Follow the steps below to record these measures.

1. Collate clinical events

It is important to collate records of clinical events to understand whether your dry period management is successful. It is useful to record cow ID, calving date and if mastitis occurs within the first 30 days of lactation for every cow. Targets include:

- Less than 5% of cows should develop milk fever in any 12-month period
- Less than 5% of cows should be diagnosed with a Left Displaced Abomasum (LDA) in the first two weeks of lactation during the last 12 months
- No more than one cow in every 12 should have a clinical mastitis case in the first 30 days after calving

Use SCC data

Use the SCC data from the first milk recording (5–30 days in milk) to calculate the following rates.

Dry period new infection rate

The percentage of cows moving from uninfected status at dry-off to infected (SCC >200,000 cells/ml) should be <10%. The percentage of maiden heifers calving in with high SCC should be <10%.

Dry period cure rate

The percentage of cows moving from infected status at dry-off (SCC >200,000 cells/ml) to uninfected status (SCC <200,000 cells/ml) should be >85%.

Using electronic records

If you use electronic records for documenting clinical mastitis, your vet will be able to monitor the rate at which cows get mastitis in the first 30 days of lactation. This is therefore another tool to monitor how successful the dry period has been.

2. Calculate the percentage of cows calving down uninfected

The California Milk Test (CMT), also known as the California Mastitis Test, can be used to check all quarters of each cow for mastitis after calving. It is recommended to use CMT on day four after calving, and no more than 10% of cows should be CMT-positive at day four after calving.

California milk test (CMT)

The basis of a CMT is to give an indication of which quarter has a raised cell count by testing each quarter individually.

The test is based on the reaction between a reagent and milk to give a positive test. If a quarter is infected, the CMT mixture will appear thickened and gel-like.

Equipment

- CMT paddle
- Gloves
- Reagent
- Recording sheet

How to do the CMT

1. Foremilk each quarter.
2. Draw 2–3 squirts of milk from each quarter into the respective ring of the paddle (one quarter per ring).
3. Add an equal amount of CMT mixture to each ring and gently mix the two liquids together using a swirling action. This will colour the milk.

Reaction to the CMT can be graded 0–3, other than just positive and negative, and with experience the user may be able to estimate SCC (this is by no means an accurate determinant).

Grade 0: Negative result. The mixture of milk and test fluid remains unchanged when swirled, giving a likely SCC range of <200,000 cells/ml.

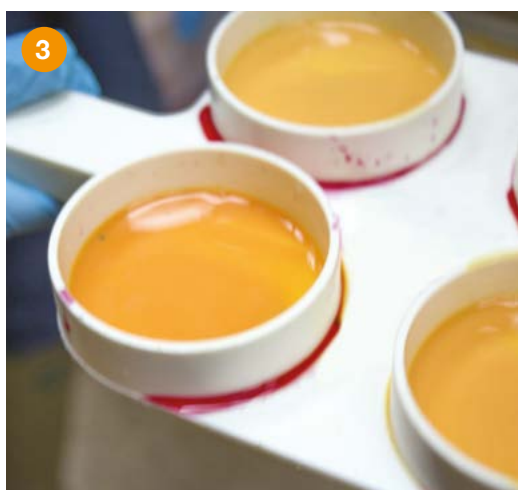
Grade 1: Weakly positive result. The mixture of milk and test fluid becomes slightly mucoid when swirled, giving a likely SCC range of <200,000 cells/ml.

Grade 2: Positive result. The mixture is mucoid but can still tip out a small volume of liquid when swirled, giving a likely SCC range of >200,000 cells/ml.

Grade 3: Strong positive result. The mixture is mucoid and jelly-like, with no excess fluid to tip out when swirled, giving a likely SCC range of >400,000 cells/ml.

Remember:

AHDB has produced a video, available on the AHDB Dairy YouTube channel, called *California Milk Test* to show this process. Further information on the AHDB Dairy Mastitis Control Plan can be found on the AHDB website: ahdb.org.uk/mastitis-control-plan



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