CalfCare On-Farm Events

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CALFCARE 2023
'BACK TO BASICS'

- Calf rearing KPIs
- Know your number
- Feeding calf milk replacer
- Management at weaning
- Signs of calf health

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This series of CalfCare events is being run with the help and support of the local Co-op in each region.

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AHI gratefully acknowledges the financial and other contributions of our stakeholders.

To contribute to an economically, socially and environmentally sustainable farming and agri-food sector through improved animal health and welfare.

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KNOW YOUR NUMBER

How many calves can your calf house accommodate safely?

For every calf house there is a magic number – that is the number of calves that it can safely house. Keeping more than the magic number can put your calves at risk. The number depends on:

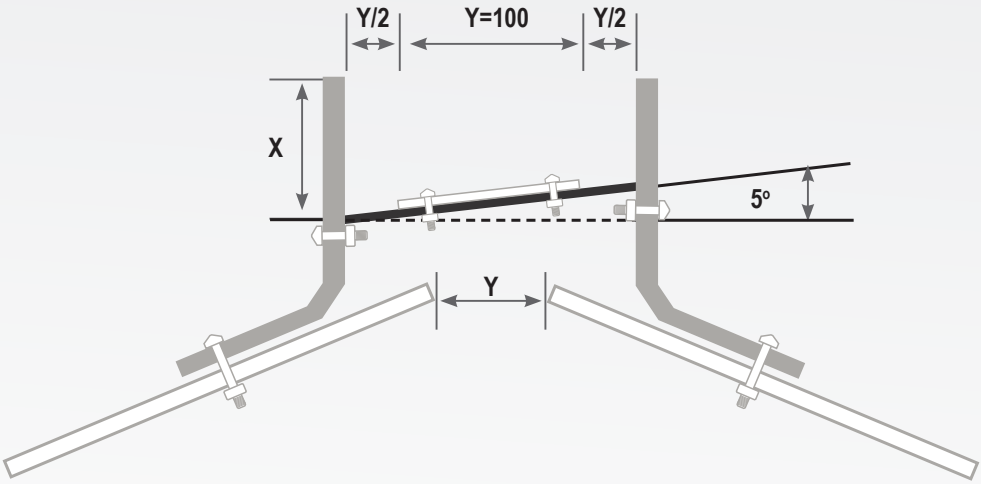
- The floor area of the house.
- The ventilation and drainage in place.

Floor area

Calves up to 100kg require a pen area of at least 1.67m^2 each. Better performance and less disease are associated with 2-2.5m^2 per calf with a cubic air capacity of 6-8 cubic metres/calf. The smaller the floor area, the less calves that we can house safely in the building. If we keep an excessive number of calves in a house, we increase the risk of spreading scours in the house and the bedding will need to be refreshed more often.

Adequate ventilation

- Fresh air sweeps out the dust, ammonia and bugs.
- Fresh air acts as a biocide – viruses will survive for a shorter period of time in fresh air than in stale air.
- Need an outlet and an inlet:
  - » The outlet is 0.04m^2/calf e.g. 2m^2 for 50 calves.
  - » The inlet is two to four times the area of the outlet e.g. 2-4m^2 for 50 calves on two sides of a calf shed.



- Keep dust to a minimum – rolling out bales of straw is more effective than shaking up straw at keeping the dust load down. Do not use a straw blower. Dust creates irritation and makes it easier for bugs to become established in the airways of the calf.
- Yorkshire boarding is preferable to space boarding or vented sheeting. It provides draught free air into the shed without allowing in the rain. As it is made from wood it provides more insulation than tin, so helping to keep calves warm.
- A calf house should not share an air space with older animals. Smaller group sizes (8-12) in each pen are easier to manage.
- A roof pitch of 22° (a rise of 1 in 2.5) gives the best performance under 'stack effect' and 'wind effect' ventilation.

A draught is a flow of air of greater than 0.5m/second that gets in below the animals height.

- Calf sheds should be sealed to 4 feet (1.2m) in height to prevent draughts from occurring.
- Calves need fresh air but it's important to control the speed at which it enters the house.
- Calves perform best at 15-20° Centigrade as they do not generate sufficient heat to insulate themselves from colder temperatures until their rumen is fully developed. This happens sometime after they are weaned off milk onto a solid diet.
- Deep beds of straw are an effective way of protecting the young calf from the cold. They should be able to 'nest' so that their legs are covered by straw when lying down.
- Breathable washable calf jackets are useful for a dry new born calf up to one month of age - from then on they are starting to generate more of their own heat as the rumen starts to develop.

Dry/good drainage

Moisture must be controlled for two reasons because it:

- Increases survival and spread of bugs.
- Decreases the temperature in the calf house e.g. a damp pen vs a dry pen.

To allow good drainage the slope of the floor should be 1:20 and it should be smooth so that water does not pool but drains away freely. Areas of wet concrete should be kept to a minimum as these greatly reduce the temperature in the shed.

When the calves are in their pens in the shed, it is advised that you do not wash down the calf house floors, or utensils such as buckets in the calf house itself.

When the shed is emptied, deep cleaning with power washers, steam cleaners and appropriate disinfectants should be carried out as soon as possible afterwards. Once cleaned out and disinfected a long rest period is an effective means of ensuring that bugs are eliminated from the calf house.

If your number is less than the number of calves you need to house

Decide on what you are going to do if your magic number falls short of the planned number of calves that you need to house this coming spring.

- Sell calves earlier than planned – remember calves must be retained on farm for at least the mandatory two weeks.
- Provide temporary accommodation – each bay of a conventional hay shed (15 ft. X 22 ft.) for example can accommodate approximately 15 young calves comfortably.
- Move some of the older calves outdoors and provide in situ shelter or access to a shed at night time or in wet weather.

FEEDING THE YOUNG CALF

Ensuring calves are well fed during the milk feeding period is essential for good health and weight gain. During the first weeks of life, the calf is entirely dependent on milk as a source of nutrition. Traditional milk feeding systems for dairy calves have been based on daily feeding rates of 8% to 10% of body weight (~4 litres/day). These 'restricted' feeding systems were intended to encourage the calf to eat a greater quantity of concentrate feed from an earlier age. However, they seriously limit growth potential as they only allow 20%-30% of biologically normal growth and are detrimental to calf health and welfare. A higher plane of nutrition facilitates physiologically appropriate growth rates, better immune function, and lower incidences of disease and mortality.

In a Moorepark experiment, calves were fed 4 litres (~10% of birth bodyweight) or 6 litres (~15% of birth bodyweight) of milk. Calves fed 4 litres of milk were lighter at five weeks of age than those fed 6 litres. At five weeks of age the reticulo-rumen is still underdeveloped and calves fed a restricted quantity of milk are not capable of increasing intake of starter concentrate and forage to such a degree that they can fully compensate for the lower supply of energy from milk. As can be seen from the quantity of whole milk powder available daily for growth in Figure 1, feeding calves a greater volume of milk tends to reduce the number of days taken to reach a target weaning weight. Furthermore, the research at Moorepark found that there was no difference in incidences of diarrhoea between calves fed 4 litres or 6 litres of milk.

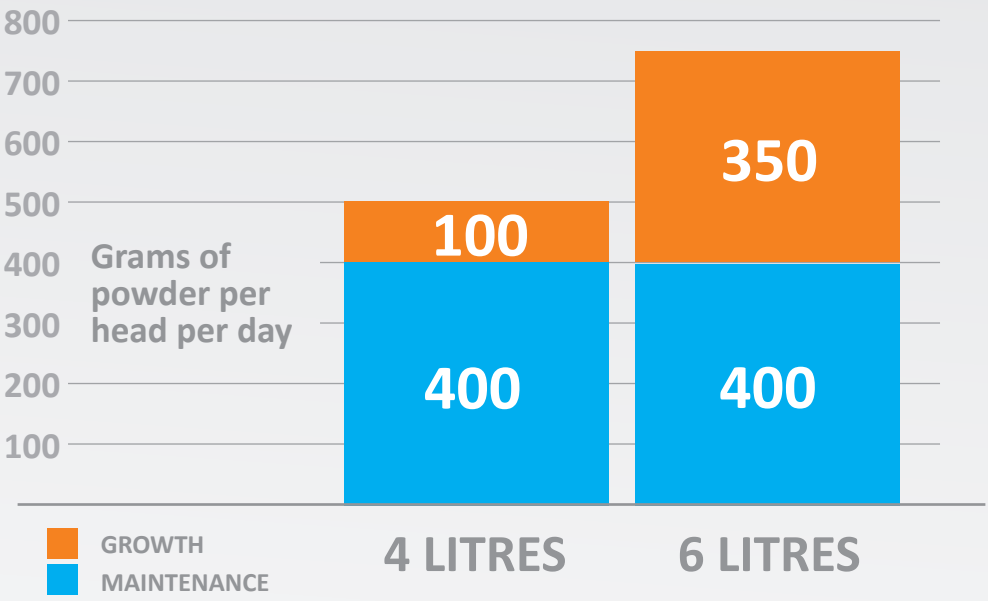


Figure 1. Grammes of whole milk powder required for maintenance and available for growth at 4 litre and 6 litre daily feeding rates (assuming a 12.5% dilution rate in solution).

It is important that calves are fed enough milk so that they have sufficient energy to grow and stay healthy. It is recommended that calves are fed 15% of their birth bodyweight, so for a 40 kg calf that is equal to 6 litres/day (containing 750 grams of calf milk replacer), which is divided into two equal feeds for at least the first four weeks of life. Of the 750 grams fed, approximately half is required for maintenance of the calf (see Figure 1) and the remainder is available for growth. If you plan to feed milk once-a-day, calves must be at least **four weeks** of age. Calves must also be thoroughly checked a second time during the day and have ad lib access to concentrates.

Feed conversion efficiency (the animal's relative ability to turn nutrients into growth), peaks during the milk feeding period at around 50% compared with less than 10% from 11 months to calving. The calf's ability to use feed efficiently declines with age and because liquid milk is more nutritious and digestible than concentrate, feed efficiency is highest during the period. What's more, prior to puberty heifer growth is focused more in bone and muscle development, whereas in later life heifers gain more fat and are therefore less efficient.

The colostrum 1,2,3 rule is considered best practice for the new-born calf. Transition milk is milkings 2-6 from freshly calved cows. On farms where there are no underlying cow health issues, such as Johne's disease, calves should be fed transition milk. While the concentration of antibodies in transition milk declines with each milking, it is still a better feed source than whole milk or good quality milk replacer for calves who have received their colostrum feed. Although no additional antibodies can be absorbed across the gut wall after 24 hours of age, there is a local protective intestinal effect and feeding at least four feeds of transition milk, after the initial colostrum feed, has been shown to reduce the incidence of illness in calves.

After the calf has received all feeds of transition milk, it should be offered whole milk or good quality milk replacer. If feeding whole milk, no waste milk, milk with antibiotic residue or high SCC milk should be fed. Information on choosing a good quality milk replacer is available on the AHI website in the leaflet Early Nutrition and Weaning of the Dairy Calf.

As a guide, the quantity of milk fed to calves should be gradually increased over the first week of life to ensure that calves are drinking 6 litres per day by the time that they are 6 days old.

When feeding milk replacer, ensure a good quality concentrated whey protein or skim milk replacer is fed and follow the Animal Health Ireland guidelines. In summary, the following specifications are recommended:

- Protein content: 23-26% (predominantly dairy protein sources).
- Fat content: 16 to 20%.
- Ash content: 7-8%.
- Fibre content: maximum of 0.1%.

Days	Milk type	Litres/ feed	Feeds/ day	Meal
1	Colostrum	3 litres first	2 or 3	-
2-5	Transition milk	2.5 litres	2	Access
6-10	Milk replacer/ whole milk	3 litres	2	Ad lib
11-28	Milk replacer/ whole milk	3 litres	2	Ad lib
29-56	Milk replacer/ whole milk	3 litres	1 or 2	Ad lib
57-70	Milk replacer/ whole milk	3 litres	1	Ad lib

MANAGEMENT OF THE CALF AT WEANING

During the first weeks of life, the calf is entirely dependent on milk as a source of nutrition, with the digestion of milk occurring in the abomasum. Young calves are pseudo-monogastric animals meaning that they have little to no rumen development in early life. Appropriate pre-weaning nutritional management facilitates adequate rumen development, which in turn enables a calf transition successfully to a non-milk diet at weaning. Pre-weaning nutrition affects calves' growth rates, health and ability to deal with stress and adverse thermal conditions. A careful balance between achieving adequate growth rates and promoting rumen development is necessary in order to get the calf weaned successfully.

The intake of calf starter concentrates is the single most important factor in rumen development. For this reason, it is important that calves have access to clean, palatable starter concentrates as soon as possible, even though they will only eat small amounts in the first 3 weeks of life. Providing a small amount fresh every day reduces wastage, encourages calves to eat and allows you to monitor intakes. When feeding calves, it is best to remove any unfinished concentrates and feed them to older animals.

Calves fed coarse starter mix initially eat more and have greater weight gains than calves fed pelleted starters. The coarseness is also of benefit for the growth of the muscle layers in the rumen wall. When a calf is born, the rumen is very small and undeveloped. It does not contribute to digestion at all at this stage. To encourage early development of the rumen, the calf needs to start eating calf starter concentrates and drink water. This development is both physical and microbial, both of which are pertinent to sufficient rumen function.

Why is water important for calves?

The development of the rumen depends on the chemical end-products of bacterial fermentation of the starter concentrates. For the fermentation to take place the bacteria need water. Regardless of milk feeding system or concentration of milk replacer fed, calves need free access to clean, fresh drinking water. Milk and milk replacer bypass the rumen, so cannot be relied upon to facilitate fermentation. A calf requires four to five litres of water for every 1 kg of concentrates fed. Therefore, it is recommended to provide calves with clean, fresh water at all times.

Weaning should begin only in a healthy calf that is consuming sufficient concentrate feed.

It is important to remember that regardless of the system used to feed milk, it is artificial. When calves suckle cows they are not weaned for up to 10 months of age. In this scenario rumen development is far slower and so weaning is later. The ultimate aim of weaning should be a healthy calf with a sufficiently developed rumen.

How should I wean?

Manual feeding systems

If calves are being fed manually more than once-a-day, the first move is to change to once-a-day feeding. This is best to do approximately 1 month prior to weaning to allow calves time to adjust to the new regime and further develop their rumen prior to reducing total liquid feed amount. Once they are accustomed to one feed daily and consuming 1kg of concentrates consistently, reduction in liquid feed can begin.

Both solids and water content should be reduced at the same rate during weaning. Do not feed dilute milk replacer or water down whole milk. Reduction of milk feeding should ideally be carried out over the course of two weeks, reducing the amount of liquid feed every other day.

Automatic feeding systems

In automatic feeding systems calves can be fed 3-5 times per day and often larger amounts of total daily liquid feeds are also offered. In these systems it is far more difficult to ascertain the level of concentrate feed any individual calf is consuming, therefore weaning should be as gradual as possible. This would be a weaning protocol of approximately four weeks, reducing the amount very gradually so that calves are weaned gradually.

Although weaning should be based around concentrate intake, a guide to desirable weights is included in the table below. Target weaning weights for replacement heifers are based on their mature weights. Weaning can safely take place when the heifer has reached at least 15% of her target mature weight. The data presented in Table 1 below contains the recommended weaning and predicted mature weights for heifers of different maintenance sub-indexes.

Maintenance sub index	€0	€10	€20
Target weaning weight (kg)	86	80	73
Pre-calving weight (kg)	575	530	485

Table 1: Target weaning weights and predicted mature weights of replacement heifers of different maintenance sub-indexes. The maintenance sub-index is one of eight indices that make up the EBI of a cow. Cows with a higher maintenance sub-index tend to be lighter mature weight than cows with a lower maintenance sub-index. Typical values for Holstein Friesian cows and for cows with British Friesian or New Zealand genetics range from €0-10 and €10-20 respectively.

The target weights detailed in Table 1 are not the average weights of the heifers in each category. They are the minimum figure for the individual heifers – the average may be higher. Aim to rear as uniform a group of heifers as possible – this may mean splitting the heifers into lighter and heavier groups.

Note on summer scour

AHI have recently developed a more detailed leaflet on summer scour syndrome see https://animalhealthireland.ie/assets/uploads/2022/02/CalfCare-Scouring-Calf-Syndrome-2022-FINAL.pdf?dl=1

Summer scour syndrome is a collection of clinical signs, characterised by scour and rapid weight loss which is not caused by the common infections/infestations of calves at grass. It typically occurs in dairy calves during their first grazing season, within a month of turnout to grass and up to 12 months of age. Affected calves are unresponsive to treatment resulting in high morbidity and the common bacterial, parasitic and viral causes of these clinical signs have not been detected. Other clinical signs include lethargy, weakness and lack of rumination, which can progress to profound weakness and death. Some calves may develop severe oral and oesophageal ulceration or ulceration on the muzzle. Not all calves in the group are affected and severity can vary from year to year and farm to farm.

The cause is not definitively known and multiple theories exist as to what the most likely risk factors are. The one common factor to all cases is a grazing diet (exclusively or partially) in recently weaned calves. An infectious cause has not yet been identified and the disease is thought to relate to nutritional issues, such as when the rumen is insufficiently developed to digest forage. A diagnosis of summer scour syndrome can only be made following an investigation to rule out other common causes of scour at grass, including worms, coccidiosis, ruminal acidosis from heavy concentrate feeding, or mineral issues such as molybdenum toxicity.

Avoiding summer scour - for farms that have experienced this problem

Guidelines to help prevent summer scour syndrome in first season grazing young stock

Steps to prevention	Why?
Review calf rearing process.	Discuss with your vet and farm advisors if your calf rearing strategy is optimal. It may be appropriate to delay weaning to at least 10 weeks of age.
Wean calves gradually.	Gradual weaning ensures a smooth transition from a milk diet to a forage diet, concentrates should be introduced to calves from the first week in life. Begin weaning up to 4 weeks before removing milk completely and calves should be eating at least 1kg of concentrate daily consistently before weaning. See AHI leaflet on Early Nutrition and Weaning.
When weaning, make no other dietary changes.	Other dietary changes will increase stress and take longer for the calf to adjust. For farms with Summer Scour Syndrome issues and depending on the farm facilities and the type of grazing available, it might be worthwhile to consider retaining calves indoors on a concentrate and high fibre diet for at least 1 week after weaning before turnout to pasture.
Ensure calves have high levels of fibre in the diet from stemmy grass or older swards, when first turned out to pasture.	Calves need adequate levels of fibre and on farms with Summer Scour Syndrome issues, this may include grazing more stemmy grass covers or providing an additional fibre source (straw or hay). For farms with these issues, calves should avoid grazing reseeded pastures, or paddocks with very leafy (lush) grass for at least 2 months after turnout.

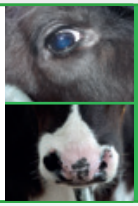
Strip graze calves to encourage consumption of both the leaf and stem of the grass.	Calves may prefer 'sweeter more luscious grass' but will not be able to digest large amounts of it.
Avoid pastures that have had slurry or nitrogen applied recently.	Slower growing pastures have less ammonia and more fibre.

SIGNS OF CALF HEALTH

The leading causes of morbidity and mortality in pre-weaned calves are scour and pneumonia. Regardless of the management on farm, the approach to treatment and control of scour cases is broadly similar regardless of the exact pathogen or pathogens present. A pathogen is an organism that causes disease. The same is true for pneumonia in that control and prevention has a similar approach regardless of the specific viruses or bacteria involved.

Identify common problems

Signs of good health and vigour



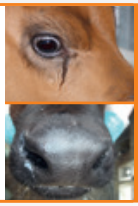
Respiratory

- Bright
- Playful
- Curious
- Keen to drink milk
- Clear eyes and nose
- No cough
- Normal temp. (<39.5)

Scour

- Clean hindquarters
- Well-formed faeces
- Normal temp.

Look for early signs of disease



Respiratory

- Should be quiet
- Slow to stand
- Still drinking milk
- Discharge from eyes and nose
- Cough on movement
- High temp. (> 39°C)

Scour

- Dirty hindquarters
- Loosefaeces
- Normal temp.

Late signs of disease

Respiratory

- Dull
- Reluctant to stand unaided
- Off milk
- Severe discharge with pus
- Frequent coughing and wheezing
- High temp. (> 39°C)

Scour

- Wet hindquarters
- Hair loss
- Dehydrated
- Watery faeces
- Variable temp.

Calf diarrhoea

Causes

Calf scour refers to watery or custard like faeces that results when the gut is damaged and normal function is lost leading to loss of salts and water in the form of diarrhoea. There are several causes, most of which are infectious. They include bacteria such as E. coli and Salmonella, viruses such as Rota/corona viruses and parasites such as Cryptosporidium and Coccidia. Most calf scour is transmitted by the 'faecal-oral route' where calves become infected from oral contact with the faeces (dung) of other calves, from the calf environment/calf pen, other calves but also via utensils, trailers, the clothing/boots or any mechanism that allows the calf in contact with the infected faeces.

Calf scour is readily recognisable, and the symptoms vary with severity. Calves may be bright and alert or depressed with varying degrees of dehydration (noted by sunken eye). Depending on the level of dehydration calves become weak and sometimes collapsed. Mortality can be high in outbreak scenarios and calves are more likely to be more severely affected if they have mixed infections, such as Rotavirus and Cryptosporidium together at the same time.

Diagnosis

- It is not possible to distinguish the cause of calf scour by the type of scour or clinical signs.
- Submit faecal samples (in sterile containers) from untreated, scouring calves in the early stages of a disease outbreak to your veterinary practitioner or laboratory to confirm the cause of the scour.
- Take dead calves to a veterinary laboratory for post-mortem.

How do I treat the scouring calf?

REMOVE - Removing the scouring calf from the group – this helps prevent the spread of infection and gives the calf a better chance of recovery. Scouring suckler calves and their dams should be separated from other calves and their mothers. Calves should be isolated in a well bedded pen well away from other healthy calves.

REHYDRATE - The most important part of treating scour is fluids. Healthy calves need a minimum of 4 litres of fluid a day, but scouring calves need **an additional** 4 litres to replace lost fluids. Give two extra feeds (2 litres at each extra feed) per day of a good quality oral rehydration solution when the calf starts scouring and while scouring persists, even if the calf is bright and alert. These should be given separately from the milk feeds (for example, at lunchtime and again late in the evening). It is safe to give these fluids by stomach tube, assuming you are competent and confident with the technique.

FEED MILK - Continue to offer scouring calves normal amounts of milk or milk replacer as long as they want to drink. **Do not feed diluted milk to calves**. Continue to feed with milk or good quality milk replacer as it does not cause, worsen or prolong scour. **Milk or milk replacer should not be stomach-tubed, as it will not be properly digested and this can lead to the build-up of acids in the rumen and damage the ruminal wall**.

Other treatments – Your vet will be able to advise based on the farm diagnosis. Depending on the cause of scour there are other treatments specific to the type of scour. It is very useful to know the diagnosis as there are some treatments that can be used as preventatives also, which may help in the outbreak type scenario.

Do I need to give antibiotics?

Antibiotics do not work against parasites and viruses that most often are responsible for scour. They should not be routinely used in the management of mildest cases of calf diarrhoea. However, they should be used (by injection form only), if the calf is very sick, if it has blood in the scour or if it has a temperature >39.5^{O}C.

Pneumonia

A range of bacteria and viruses that are present on most farms cause calf pneumonia. Viral infection usually occurs first followed by secondary bacterial infection. Normally a case of calf pneumonia will involve more than one pathogen or organism that causes disease. Stressful events such as transport, weaning etc. often affect the animal's immune system and can result in a case of pneumonia.

How do I treat a calf with pneumonia?

Preventing pneumonia by managing animals correctly is preferable to treating outbreaks. Antibiotics are ineffective against viral infections. However, where bacterial infection is suspected, antibiotic treatment is required. Anti-inflammatory drugs can also be useful. Veterinary advice should be sought for recommendations on treatment protocols. Early diagnosis is crucial to maximise the chance of successful treatment. Early signs of disease are dullness, increased respiratory rate (blowing), coughing, discharge from eyes and nose and fever (over 39.5°C). Discuss with your vet, who will be best placed to diagnose what pathogens are present on the farm. They will provide targeted specific advice on an appropriate treatment protocol for any potential pneumonia cases and identify when veterinary intervention is required.

When should I call the vet?

A sick calf should be seen by your vet if it:

- Refuses to drink for several feeds in one day.
- It is down or very weak.
- Its eyes are very sunken from dehydration.
- Its temperature is >39.5°C.
- It has not responded to treatment administered on farm within 24 hours.

Vaccination

Vaccination is a very helpful way to improve immunity to certain diseases and is a major tool in the armoury in the fight against Antimicrobial Resistance (AMR) and reducing antibiotics. Every farm should have it's own vaccination programme, designed and adapted by your vet for your farm. No vaccine eliminates the risk of disease. However, vaccines can certainly be a great help in reducing disease severity if administered correctly to animals who are able to respond appropriately to the vaccine. Scour vaccinations administered to cows in advance of calving are useful to increase colostral antibodies to certain common scour-causing pathogens such as Rotavirus, Coronavirus and E.coli. An investment in these vaccines means that careful attention must be paid to ensuring the calf gets fed colostrum and transition milk to ensure the benefit of the vaccine is delivered to the calf. There are many combinations of pneumonia vaccines on the market, your vet is best placed to devise a farm-specific protocol. Most calf pneumonia vaccine protocols involve either intranasal vaccines delivered once off that last for a shorter time or injectable vaccine courses that offer longer protection. Whatever programme is decided on, it is vital that vaccines are stored and administered as per manufacturer's instructions and that they are not given to sick calves.

Don't forget pain relief!

Disbudding and castration are painful procedures and require the relevant local anaesthetic protocols to minimise pain for the animal. In addition to local anaesthetic, calves should also receive a non-steroidal anti-inflammatory (painkiller) if undergoing any of these stressful procedures to minimise stress and reduce the impact on their immune system.

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