

## Managing Calves in Groups and Feeding with a Computerised Feeder

A growing number of calves are group-housed and fed using computerised feeders during the milk feeding period. Computerised feeders have many benefits including less labour requirement, and the ability to feed the calf high volumes of milk little and often.

Social housing also has its own advantages: high milk fed calves (which are often reluctant to eat starter) housed in pairs from 1 week of age, consume more starter before weaning, compared to individually housed calves, due to peer stimulation<sup>1</sup>. The more starter that is consumed before weaning, the better the rumen development at weaning, and subsequent growth after weaning.

Calf diarrhoea and bovine respiratory disease are the most common causes of poor health and death in young calves; approximately 50% suffer from diarrhoea, and around 40 to 45% are diagnosed with respiratory disease during the milk feeding period (Table 1). Most of these will be the result of common infections; but there will be many contributory factors such as colostrum intake, management and housing, including building design (ventilation, temperature, humidity), cleanliness of pens and feeders, pen size and proximity to other calves and older cows<sup>2</sup>.

**Table 1. Incidence of calf disease in pre-weaned calves on UK farms**

	Study A (11 farms)	Study B (1 farm)
Number of calves	492	100
% with diarrhoea	48%	56%
% with respiratory disease	46%	37%

Source: Study A<sup>2</sup> (11 farms across south east England, 2011-12). Study B<sup>6</sup> (1 farm in north west England, 2011-13)

*Recent work carried out at Liverpool University has compared feeding calves restricted volumes of milk replacer twice daily (up to 6 L/d until day 56, with weaning at 63 days), with ad libitum feeding (up to 16 L/d until day 63, with weaning at 84 days)<sup>6</sup>.*

Calves fed restricted volumes were individually housed and fed 5 L/d, via individual buckets until approximately 21 days of age, and subsequently group housed (fed 6 L/d via a group trough). Ad libitum fed calves were group housed and fed via a computerised feeder from birth. As expected, calves fed ad libitum grew faster over the first 12 weeks of life, with the biggest difference within the first 3 weeks; calves fed ad libitum grew at 0.72 kg/d up to 3 weeks, compared to restricted fed calves gaining only 0.17 kg/d.

More of the calves fed ad libitum via a computerised feeder suffered from diarrhoea and pneumonia (Table 2). There are several possible reasons for the higher level of disease recorded:

- 1. Teat:** the use of a single teat for multiple calves can increase the spread of bugs from calf to calf via saliva & nasal secretions
- 2. Bedding:** calves fed ad libitum produce more urine & liquid faeces resulting in wet bedding, which is a source of bugs
- 3. Exposure to Disease:** calves fed ad libitum shared a teat for longer since they were weaned 3 weeks later (at 12 weeks) than the restricted fed calves (at 9 weeks); the higher level of disease over the milk feeding period will reflect, in part, this longer period of teat sharing.
- 4. Housing:** automatic feeding systems should only be used in buildings that provide a low background risk for calf pneumonia



Calf diarrhoea did not have any impact on growth during the pre-weaning and post weaning periods, and there were no calf deaths. This reflects the early detection and prompt treatment with an oral fluid mixture (throughout which, milk feeding was continued); and highlights the importance of prompt treatment to minimise any long-term negative effects.

**Table 2. Incidence of calf disease from birth to 12 weeks on one dairy farm in north west England<sup>6</sup>**

	Group: computerised feeder	Individual (0-21 d), group (>21 d): manual feeding
Calf diarrhoea	72%	40%
Pneumonia	56%	18%
Mortality	0%	0%
Growth rate	0.89 kg/d (0-12 weeks)	0.57 kg/d (0-9 weeks)

*Other work has shown that the number of calves suffering from diarrhoea and pneumonia is similar when comparing individual, manual feeding to group housing with a computerised feeder (Table 3).*

**Table 3. Incidence of calf disease during the milk feeding period on dairy farms across the US & Canada**

	Group, computerised feeder	Individual, manual feeding
Calf diarrhoea	23%	23%
Respiratory disease	17%	22%
Mortality	4%	3%

*Source: Group, computerised feeder<sup>3</sup> (17 farms in Canada; median group size 10 calves; median peak milk allowance 10L/d). Individual, manual feeding<sup>4</sup> (19 farms in Minnesota & Ontario).*

A number of management practices have been identified that can help reduce the risk of calf diarrhoea and respiratory disease on farms using automated milk feeders<sup>3</sup>:

**Milk Volume:** The primary source of nutrition for a calf during the first 3 to 4 weeks of life is milk, since starter intake is minimal. As a guide, following the colostrum feeding period of approximately 1 to 3 days, feed 5 L of milk per day until one week of age, then from one week onwards offer a minimum of 6 L/d. Ensure calves reach

their peak milk allowance by 2 weeks of age at the latest. Feeding more milk from an early age has several benefits:

- 1. Energy:** feeding more milk provides the calf with more energy, enabling it to mount a better immune response & improve its health
- 2. Cross-sucking:** providing the calf with enough milk will eliminate cross-sucking (cross-sucking is only an issue for group housing, when calves are hungry)
- 3. Competition:** feeding enough milk will satisfy the calf & reduce competition at the feeder (hungry calves being fed low milk volumes will occupy the feeder for longer, increasing competition)
- 4. Cold Weather:** feeding more milk during periods of cold weather (<10°C for a calf aged <3 weeks) helps ensure the calf has enough energy to keep warm as well as grow (if calves are not fed enough, growth rates plummet & they become more susceptible to diseases)

**Milk Solids:** Increasing the mixing rate of milk replacer increases the amount of energy and protein provided to the calf, improving its health.

*Feeding calves milk with a total solids of at least 13% (i.e. 130g per litre of mixed milk) reduces the number of calves with respiratory disease, compared to feeding milk mixed at <10% (i.e. 100g per litre of mixed milk)<sup>3</sup>.*

Always mix milk replacer at a minimum of 12.5% solids (i.e. 125g milk powder per litre of mixed milk). If using a milk replacer with a crude protein content of 26%, mix at 15% (i.e. 150 g/L of mixed milk) to ensure the correct balance of energy to protein is supplied. Always mix milk replacer according to the manufacturers recommendations, and mix at the chosen concentration consistently.

**Feeder Hygiene:** Many of the bacteria, viruses and parasites that are known to be the cause of calf diarrhoea, are present in the farm environment. A good level of cleaning and hygiene of the feeding equipment is essential for all systems (buckets and a computerised feeder).



If feeding equipment is not cleaned properly, the milk being fed can become contaminated: *calves drinking milk with a high total bacterial count ( $\geq 100\,000$  cfu/ml) are more likely to suffer from diarrhoea<sup>3</sup>*. Computerised feeders have both automated and manual cleaning functions.

*Running the automated cleaning function 3 times a day reduces the incidence of calf diarrhoea, compared to running it only once or twice a day<sup>3</sup>.*

Set your feeder to run the automated cleaning function 3 times a day, with each cleaning running before the major feed times (e.g. 10am, 3pm and 10pm). Running the automated cleaning function several times a day, together with manual cleaning, will reduce bacterial contamination in the milk being fed.

**Teat:** The use of a single teat for multiple calves poses a risk for poor calf health, since bugs can be passed in saliva and nasal secretions from calf to calf via the teat. Attention must be given to the teats and tubes / pipes on a computerised feeder. At the start of a new calving season, place brand new teats and tubes on the feeder. The teat should then be swapped for a clean one daily (some producers are changing teats twice a day). The teat should be removed, washed with a brush in warm water using washing up liquid, rinsed under running tap water, and placed in a clean bucket with a sterilising solution (e.g. Milton sterilising fluid). The teat can be left in the bucket for up to 24 hours (i.e. ready for the next day). If using other products, it is important to ensure the teat is not tainted and rinsed properly.

**Bedding:** Bedding quality is critical in terms of reducing the incidence of both calf diarrhoea and respiratory disease, since bedding saturated in manure is one of the primary sources of the bugs involved.

*Adding fresh bedding every 2 to 3 days (compared with more than every 7 days) reduces the number of calves with diarrhoea<sup>3</sup>. But as the depth of the wet bedding pack increases, calves are more likely to suffer from respiratory disease<sup>3</sup>. At least 7.6 cm of dry bedding should separate the calf from accumulated manure<sup>5</sup>.*

Always remove dirty bedding frequently to prevent the accumulation of manure (and potential bugs), before adding fresh bedding every 2 to 3 days. If beds are often wet, despite regular addition of straw, poor drainage may be an issue.

**Introduction to Groups:** Calves housed in pairs from 1 week of age consume more starter compared to calves individually housed<sup>1</sup>.

*Furthermore, introducing calves to a group pen at less than 8 days of age has been shown to reduce the incidence of respiratory disease compared with introducing calves to the group pen at more than 8 days of age<sup>3</sup>.*

Once calves are introduced to the computerised feeder, it allows them to drink higher volumes of milk (since multiple meals can be provided throughout the day). This larger volume of milk provides the calf with more energy, which in turn improves its health. Calves should be individually housed for the first week of life, before being moved into a pair or group (and introduced to a computerised feeder) at 1 week of age. If the introduction to a group and a computerised feeder is going to be delayed beyond 1 week of age, calves should have access to high milk allowances immediately after colostrum feeding (at least 6 L/d from 1 week of age).

**Group Size:** A large group size, and a large age range within a group (since older calves can infect younger calves with less mature immune systems) increase the disease risk. The ideal group size for young calves is 12 to 15 calves per group (maximum of 20 calves per group). Many computerised feeders are designed to feed 30 to 35 calves per feed station. If calves are housed in larger groups of up to 30 to 35, minimise the age range between these calves within the group (ideally 7 days, maximum 21 days range).

**Air Space:** Older animals are a source of infection for young calves that are less able to cope with bugs in their environment, due to their less mature immune system.





*Calves housed in group pens located in barns where older cattle are housed, are more likely to suffer from calf diarrhoea and respiratory disease<sup>3</sup>.*

Always house young calves in a separate calf unit to reduce the spread of disease from older to younger, more susceptible calves.

**Ventilation:** The bacteria and viruses which cause pneumonia survive better in moist, stale, stagnant air; this air needs to be removed and replaced by fresh air. Ventilating calf buildings with fans, if designed and sited appropriately can ensure a ready supply of fresh air.

**Water:** It is a legal requirement to provide water to calves aged over one week; although it is recommended to provide calves with water from day 1. Diarrhoea is typically seen most frequently during the first 2 weeks of life, with some cases during weeks 3 and 4. If a calf does not have access to water during these first few weeks, it will worsen the dehydration caused by diarrhoea and increase the risk of calf death<sup>2</sup>. Always provide calves with fresh, clean water from day 1, and keep water bowls clean. Ensure there is an adequate supply of water; if there are more than 20 calves per group, provide the calves with 2 water points.

**Calf health is not simply dependent upon the type of housing and / or feeding system: it is the attention to detail of many management factors that is essential for minimising calf disease.**

#### References

<sup>1</sup>Jensen MB, Duve LR & Weary DM (2015) Pair housing & enhanced milk allowance increase play behavior & improve performance in dairy calves. *J. Dairy Sci.* 98:2568-75

<sup>2</sup>Johnson KF, Chancellor N, Burn CC & Wathes DC (2017) Prospective cohort study to assess rates of contagious disease in pre-weaned UK dairy heifers: management practices, passive transfer of immunity & associated calf health. *Vet Rec Open* 4

<sup>3</sup>Medrano-Galarza C, LeBlanc SJ, Jones-Bitton A, DeVries TJ, Rushen J, de Passillé A, Endres MI & Haley DB (2018) Associations between management practices & within-pen prevalence of calf diarrhea & respiratory disease on dairy farms using automated milk feeders. *J. Dairy Sci.* 101 In Press

<sup>4</sup>Windeyer MC, Leslie KE, Godden SM, Hodgins DC, Lissemore KD, & LeBlanc SJ (2014) Factors associated with morbidity, mortality, & growth of dairy heifer calves up to 3 months of age. *Prev. Vet. Med.* 113:231-40

<sup>5</sup>McGurik SM (2008) Disease management of dairy calves & heifers. *Vet. Clin. North Am. Food Anim. Pract.* 24:139-153

<sup>6</sup>Curtis GC, Argo CMcG, Jones D & Grove-White DH (2016) Impact of feeding & housing systems on disease incidence in dairy calves *Vet. Rec.* 179:512



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## Top Tips:



1. Colostrum Management – remember the 4 Qs (quickly, quantity, quality, squeaky clean)
2. Milk Volume – offer at least 6 L of milk per day from 1 week of age & ensure the peak milk allowance is reached by 2 weeks
3. Mixing Rate - mix at a minimum of 12.5% solids (125g/L of mixed milk). If using a 26% crude protein milk replacer – always mix at 15%
4. Feeder Hygiene - set the feeder to run the automated cleaning cycle 3 times per day (at 10am, 3pm, 10pm; i.e. before the major feed times)
5. Teat - change & clean the teat daily
6. Bedding - add fresh bedding every 2 to 3 days to ensure it remains clean & dry
7. Group Size – the ideal group size is 12-15 calves per group (with a maximum of 20 calves per group). Always keep the age range to a minimum (ideal 7 days, maximum 21 days)
8. Air Space – house young calves in a separate unit to avoid them sharing air space with older animals
9. Ventilation – ensure a ready supply of fresh air
10. Water - provide clean fresh ad libitum water from day 1



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