CARE4DAIRY

Heifer Welfare

Good practice

Best practice

Nutrition

Best practice farms optimise the quality and performance of their heifers by providing tailored nutrition in a clean, safe and enriched environment which supports optimal health, welfare and human-animal interactions.

Why is this important?

As immature animals, heifers will continue to require nutrition to support growth and reproductive performance. Ensuring heifers receive tailored nutrition will be a vital investment to ensure a long, healthy and productive life.

Good practice

Watering

- Clean water must be freely available at all times.
- There must be at least one water drinker (i.e., an individual drinker or collective water trough) for every 10 heifers. Provide 90 cm of trough space for every 10 heifers.
- Heifers must have access to an adequate volume of clean, palatable water enabling them to maintain healthy hydration irrespective of their diet and the temperature of their environment. Heifers need approximately 40 L of drinking water per day (this will vary depending on environmental temperature, moisture content of feed, breed, size, health status and cycle stage). Water flow should be sufficient to prevent stagnation.
- Drinking water must meet the same potability criteria as for humans (constituent minerals and potential for pathogens). If the drinking water is not running water (e.g. rain, borehole, pond) it should be tested annually as a minimum as well as whenever problems are observed. Attention should also be paid to open wells contaminated by surface water, where infectious agents often accumulate after periods of rain.
- Water troughs/ drinkers should be easily accessible for both the heifers (if possible from two sides) and humans (for maintenance), positioned in high traffic areas but on a stable, drained area (not close to gateways) and drinkers should be cleaned at least once a week and immediately if identified as dirty or contaminated. Stagnation of water should be avoided.
- Where water intake appears to have reduced (drop in production, drop in feed intake, dry dung, animals hesitating or jostling at drinkers, bawling and sucking noises) the troughs/ taps must be checked for any problems (e.g. lack of flow, contamination or leakage).

Feeding

- Heifers must have daily access to a palatable ration that meets their nutritional needs (energy, proteins, vitamins and minerals), promotes satiety and maintains skeletal growth, body condition, health, and vigour. Advice may be sought from a veterinary advisor or cow nutritionist.
- The composition of diets must be adjusted for growth rate, reproductive stage, body size, environmental temperatures and range of foodstuffs offered (e.g. pasture, hay, silage, concentrates). Consult your veterinarian or a nutrition specialist for advice. Use of regular body condition scoring enables adjustment for over or underweight animals.
- Heifers should have the opportunity to graze outdoors, where weather conditions permit, however heifers out on pasture may require supplementation of roughage, concentrates and trace elements.
- The nutrient content of feeds should be checked (e.g. with nutrition tables and/or analysis) to ensure that diets are balanced and feed is free of spoilage.
- Roughage must be provided to increase chewing time and rumination (fibre combined with saliva helps to reduce the risk of acidosis).

- Roughage should be available continuously (frequently push up feed in the bunk) and concentrates provided on a consistent schedule.
- Changes to diet composition should be introduced gradually to allow heifers and their digestive tracts (rumen & microflora) to adjust. This will include when they are given access to pasture.
- In hot weather, feed should be distributed early in the morning and late in the evening (cooler times of the day) and the fibre content reduced because digestion of cellulose requires energy and produces extra heat because of the digestion process.
- After 6 months of age, both mineral and fibre content of the diet should be gradually increased. If this includes more than 2 kg of concentrate, feeding should be divided into 2 meals.
- Both the macro (phosphorus, calcium, vitamin E) and trace element (copper, zinc, sulphur, selenium) composition of the diet should be calculated. Provide 150-200 g/day per heifer of mineral supplementation. Total calcium input should be limited to 60 g per day and magnesium 40g per heifer per day.
- Where salt blocks are provided, they should be located away from water sources.
- Farms should source their feed ingredients and concentrate from authorised companies who perform a risk-based control plan for residues and contaminants. Where raw ingredients are used, a risk- based surveillance plan should be established to ensure the absence of mycotoxins, other toxins or other contaminants.
- Feed should be visibly clean, not contain obvious mould and be free of contamination from faeces, rubbish, sticks, tree leaves or toxic plants. For less visible sources of contamination, testing should be regularly completed to ensure there is no evidence of waste, powder, poisonous plants or any other potential source of microbes, parasites or toxins.
- Feed should be stored in a suitable environment to protect its quality and prevent contamination with toxic or harmful substances, especially pesticides and chemicals stored on the farm. Birds, wild or domestic animals should be prevented from accessing stored feeds. The “best before” date indicated on label should be respected.

Monitoring heifer growth

- Optimising skeletal development results in taller heifers that experience fewer calving difficulties and higher milk yield. A satisfactory benchmark is that heifers should achieve 30-35% of mature body weight at 6 months, 60-65% at 15 months and about 90% at 24 months of age.
- Weight gain and body condition scores (BCS) should be monitored for each animal, with consideration of their individual progress and published benchmark values for the breed. Dietary adjustments should be made to encourage under/ overweight animals to reach target weights.
- Heifers should be weighed/measured at the same time of the day and at the critical timepoints (before and after insemination, at the time of pregnancy confirmation and prior to calving). If it is not possible to weigh all animals in the group, a representative group of heifers should be selected with the same animals weighed each time. The diet should then be adjusted to achieve weight targets.
- Heifer body weight, BCS and average daily gains should be monitored at key stages (e.g. before weaning, before breeding) and feeding strategies refined or weaning delayed to achieve targets. Aim for average daily gains, in post-weaned heifers, calving at 24 months of age, of 600- 1000g per day, depending on the breed.
- Puberty in dairy heifers is more related to body weight and BCS than to age. Heifers should be weighed or measured regularly and when they reach 55-65% of their expected mature body weight they should be considered ready for insemination. Although there is a considerable breed variation in the age at which the heifers reach puberty, on average this happens at approximately 15 months of age, with the optimal first calving age between 22 and 24 months of age.
- Body condition scores at the time of calving should be between 3-3.5 (on a 5-point scale). During the final 3 weeks of pregnancy heifers should be fed a ration similar to the lactating herd, with amounts adjusted based on the BCS at this time.
- Both excessively fat and thin heifers are at higher risk of difficult or obstructive labour and the requirement for assisted calving. Heifer BCS should be monitored and their diet adjusted accordingly during the latter stages of pregnancy.

Heifer Welfare

- Heifer BCS should be optimised to reduce the risk of lameness caused by claw injuries. Overweight heifers are vulnerable to strain from the additional weight loading and underweight heifers (without the cushioning of the digital fat pads) have thinner, more vulnerable claws.
- Careful management of BCS in early pregnancy will help avoid the need for nutritional restrictions during the last trimester, which increase the risk of complications such as: compromised placenta and foetal weight, and weak contractions during labour (deficient relaxation of the pelvic musculature/ligaments which aids natural calving).

Best practice

- **Best practice** farms have at least 2 water sources in the area available to the heifers, providing at least one source for every 10 animals. Water should be provided from an open surface.
- **Best practice** farms keep the cows and heifers in separate areas so they can be fed separately.
- **Best practice** farms allow heifers to have daily access to pasture, except in extreme weather. The time spent on pasture should be determined by the weather, daylight hours available and ideally individual preference by the heifers, i.e. a choice based system. To ensure a high plane of nutrition for heifers managed at pasture, best practice is to assess grazing residuals daily. Heifers should be moved to a fresh allocation of pasture based on meeting target post-grazing heights.
- **Best practice** farms develop the composition of appropriate transition diets with input from nutritional advisors (e.g. veterinarian) to minimise the risk of postpartum disorders.
- **Best practice** farms provide individualised diets for each animal to ensure a smooth transition from gestation to lactation diet.
- **Best practice** farms harvest forage at the right stage and test forage quality throughout the growing season to ensure optimal nutrition.
- **Best practice** farms provide feed uniformly and make it available all day. The feeding schedule should be kept consistent and allow adequate time to maintain food availability in each area where animals are kept.
- **Best practice** farms allow all heifers to choose to eat roughage at the same time. The space allowance is crucial to ensure that all of the heifers have access to their daily feed allocation without compromising their time budget (i.e. decreasing lying time).
- **Best practice** farms keep accurate records of individual heifer weights and BCS to allow meaningful adjustments to be made promptly. They should be weighed after weaning, at six to eight months of age, before breeding, at breeding, when pregnancy is confirmed and before calving. Their average daily gains should be calculated. On best practice farms heifers are weighed or measured at regular intervals (as opposed to reliance on BCS or weighing once or twice at landmark intervals). This allows better feed management for each individual and refinement of future decision making at the herd level.
- **Best practice** farms regularly (minimum of annually) test both nutritional and hygienic quality of concentrate and roughage provided on the farm.
- **Best practice** farms monitor environmental temperature and humidity of feed stores to ensure they are kept at the optimum value, as indicated on the food label. This may include use of automatic sensors or probes.
- **Best practice** farms with a high incidence of illness or injury from ingestion of foreign objects use endo- ruminal magnets. This is not an alternative to environmental management which should minimise the risk of ingesting unsuitable objects.

Heifer Welfare

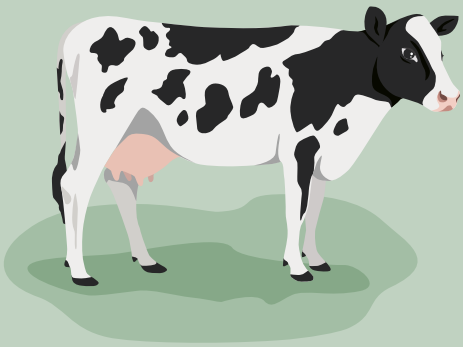
Good practice

Best practice

Nutrition Summary

Farm

Farms which monitor heifer development and adapt their management protocols accordingly will benefit from improved performance and profitability.



Heifers

Heifers provided with a safe environment and optimal nutrition are more likely to benefit from healthy growth and development and resilience to both stress and risk of disease.

Handler

Clear farm management protocols, with provision of training and appropriate equipment and handling facilities, will help ensure farm personnel remain safer and happier in their role.

CARE4DAIRY

Heifer Welfare

Good practice

Best practice

Environment

Best practice farms optimise the quality and performance of their heifers by providing a clean, safe and enriched environment which supports optimal health, welfare and human- animal interactions.

Why is this important?

Heifers need an environment which continues to accommodate their rapidly growing physical and mental needs, whilst reducing the impact of potentially stressful novel experiences and procedures related to dairy management.

Good practice

- Providing ample access to feed and water troughs by ensuring the animals can eat or drink in synchrony and the food/water is topped up continuously, will reduce the risk of injury from resource guarding or trampling.
- When heifers are on pasture and the distance between the water trough and the grazing area is less than 200 metres, 10% of the herd must be able to drink at the same time. Greater than 200 metres, longer troughs are required, enabling 20% of the heifers to drink simultaneously.
- Water troughs should be positioned at a height 60-75 cm above the ground, with a 5-10cm lip. The water depth should be a minimum of 10 cm. The flow must be at least 12 litres/min at an individual drinker and 20 litres/min at a collective water trough.
- Keep at least 50 cm between water circuits and electric circuits. At pasture, avoid installing water troughs close to electric fences.
- Ensure feeding surfaces are smooth and elevated by 10-15 cm, so that they are higher than the standing area. Check the prevalence of neck injuries and ensure comfortable positioning is feasible for the group.
- Group housed heifers require at least 70 cm of linear feed bunk per animal.
- Heifers should be grouped separately from the mature herd to reduce the impact of resource guarding by bigger, more experienced animals. Groups should be kept stable to prevent conflict when new animals are introduced.
- Heifer accommodation (indoors or outside) should support positive social interactions whilst giving adequate space for subordinate individuals to keep a distance from more dominant ones.
- A total indoor area – including lying area - of at least 9 m²/heifer should be provided.
- When loose-housed heifers should have access to a lying area with clean, dry deformable bedding and space to choose to lie in different orientations.
- When housed in cubicles there should at least 5% more cubicles or lying areas per heifer in the herd to avoid competition and encourage them to lie down and rest. Lying areas and adequate quantities of bedding should be provided, to ensure they are clean and slurry kept to a minimum, to help prevent damage to skin, feet and udders. In cubicle housing, it is advisable to provide cubicles for heifers at 6-12 month old, as a means of training them at young age and giving them time to adjust.
- Cubicles should be designed with sufficient length, width, fittings and bedding to enable the heifer to lie down and stand up comfortably. This may require smaller cubicles than that of the adult cows to prevent them from lying incorrectly or getting injured. Inadequate cubicles increase the risk of injuries or lesions of the skin, udder or feet.
- Dry, soft and deformable lying surfaces, preferably deep bedding, should be provided because they result in longer lying times (encouraging rest and rumination) and ease lying down and rising movements.

Heifer Welfare

Environment

- The lying area must be comfortable. When using a concrete base soft bedding must be added (i.e. 15 cm sand, 30 cm litter bedding, or soft mattress). When using mats and mattresses in cubicles a bedding with a minimum depth of 5 cm of compressed material (i.e. compressed because of the animal lying on it) should be provided. For instance, this corresponds to 3 kg of straw per day to be provided per cubicle space.
- Cubicle dimensions should have a width: 0.83 × heifer height at the withers (m), resting length: 1.1 × heifer diagonal length (between point of shoulder and pin bone; m), head-to-head, if space sharing: 1.8 × heifer diagonal length (m), non- space sharing cubicles (i.e. cubicle against a wall): 2.0 × heifer height (m).
- Other features that should be provided for cubicles are: neck rail height: 0.80–0.90 × heifer diagonal length (m), or withers height x 0.75; brisket board height: maximum 10 cm (either round or without sharp edges), curb height 15–20 cm (no sharp edges), partitions should not present obstacles in the head lunging space, and should be flexible. Slope of the lying area between 2-5%.
- Heifers should not be permanently housed in tie-stalls because of the continuous and severe restriction of movement and social behaviour, difficulties of lying down, rising, and finding comfortable resting postures. No new housing systems should rely on tie-stalls, although, it is still considered acceptable for limited time periods for events such as provision of veterinary treatment. Tie-stalls should be phased out. Where tethering is currently unavoidable, it is important that the tether is long enough to allow comfortable rising and lying down, observation and handling and the heifers need regular access to loafing areas and/or pasture, to reduce the impact of restricted movement, resting and social behaviours.
- Both the comfort of the stalls and the environmental conditions (light, noise, temperature etc.) should be managed to encourage the heifers to spend significant time off their feet and enjoying good quality rest to help reduce the risk of developing lameness. Advised minimum light intensity 100 lux for at least 10 hours of the day and a period of darkness for at least 6 uninterrupted hours.
- All the walkways, collecting and exercise areas, both indoors and outside, that are used by the heifers should provide stable, moderately abrasive, non-slip, dry flooring to reduce the risk of injury and wear and tear on their feet and limbs.
- Walkways adjacent to feeding areas should be at least 4.3m wide.
- Heifers should have regular access to pasture where weather conditions permit.
- Both indoors and outside, walkways should be designed to minimise the need for sharp turns and bottle necks, as well as the overall distance the heifers have to travel between resources.
- Tracks for pasture access should be suitable for long-distance walking (e.g., even surfaced, free from stones and debris).
- Quarantine should be enforced for all purchased animals, according to the instructions (duration and care) given by your veterinary advisor. It is advised to purchase animals only from farms of equal or better health status.
- Isolated animals should be easily segregated from the herd, whether on an individual or group basis, to ensure appropriate biosecurity measures (clean to dirty traffic, minimal exposure of staff or other animals, etc).
- Biosecurity procedures should be employed and documented to prevent disease spread. The farm should be secured with fences or other systems to avoid contact with other species of animals, or neighbouring herds of the same species, the entry of visitors to the farm should be regulated, appropriate cleaning and disinfection should be employed (e.g. with chlorine bleach, quaternary ammoniums, iodophors) and rodents and insects should be controlled. Pesticides and authorised disinfectants should be used according to the prescribed directions.
- Loading of live animals should consider both biosecurity and stress reduction for the heifers.
- Farms should ensure heifers have good thermal comfort, especially during the first year. Providing animals with adequate thermal comfort potentially increases fertility and promotes good welfare.
- Overheating is associated with decreased fertility due to hormonal imbalances and decreased quality of oocytes. Grazing animals should have access to shade, and cattle housed indoors should have access to cooling systems (i.e., sprinklers with forced ventilation) if the regional climate warrants this.

Heifer Welfare

- Heifers exposed to cold temperatures (chilly or windy conditions) are at higher risk of suffering from dystocia. Where the regional climate warrants it, appropriate shelter and additional bedding should be provided to help reduce this risk.
- Floors should be kept as clean as possible and adapted to prevent slipping during mounting behaviour or whilst lame. Injuries caused by slips or falls can affect reproductive performance as well as reducing welfare.
- Heifers should have access to a calving area which provides a clean, non-stressful environment for calving. There is an increased risk of vulval stenosis and dystocia in first time calvers attributed to high levels of stress and cortisol release.
- Excessive moisture in lying areas should be avoided by ensuring suitable elevation, replenishing of bedding and adequate ventilation. If cattle are to be refreshed by spraying or fogging in hot weather, this should be done away from lying areas.
- Dirty animals are at higher risk of skin, localised and systemic infections (e.g. mastitis or lameness). Use cleanliness scoring to assess the heifer group and take remedial action where necessary (e.g. washing animals and/ or use of brushes, additional bedding to reduce soiling and monitoring of individual heifers who may not be self- grooming due to ill- health).

Best practice

- **Best practice** farms habituate their heifers to the calving area during the final weeks of their pregnancy. This allows them to become familiar with the new environment and provides an opportunity for dietary adjustments to be made based on BCS/ weight. Heifers are accessing a new environment, with a different arrangement for provision of food and water and whilst they adjust, stress levels might increase whilst food intake declines. They are also at higher risk of injury because they are smaller and inexperienced, so managing them on their own improves their safety and physical health.
- **Best practice** farms provide their heifers with daily access to well-managed pasture (i.e. well-drained, provision of shelter and/or shade) from weaning until at least 3 weeks before calving except in extreme weather. This offers the opportunity to walk/ run/ play freely on varying surfaces, providing exercise, improved muscle and foot condition and enhanced immunity to strongyle parasites, as well as mental wellbeing. When permanently accommodated outdoors, sufficient shelter and comfortable lying areas should be provided.
- **Best practice** farms have strategies for ongoing ground surface maintenance, both indoors and outside, to minimise the risk of injuries resulting in lameness.
- **Best practice** farms use deep-bedded comfortable barns for heifers when housed. Where used, best practice farms introduce heifers to cubicles towards the end of gestation, using reward-based training, and provide at least 10% more cubicles than heifers.
- **Best practice** farms use foot baths for the prevention of lameness as well as a treatment option for limiting the spread of infectious foot lesions. Routine hoof trimming should be carried out at least once before calving (not during peak pregnancy).
- **Best practice** farms monitor the time each individual heifer spends lying down and resting, to ensure they are comfortable and have time to rest their feet and legs to avoid developing lameness.
- **Best practice** farms have rubber coated flooring (or other deformable, non-slip standing and walking surface) at the feed manger and in the alleys because it improves gait and ease of walking for the heifers and increases feeding time. This is important in areas where the heifers have to turn sharply, congregate or compete for space, both indoors or outdoors.

Heifer Welfare

Farm

Farms which monitor heifer development closely and adapt their management protocols accordingly will benefit from improved performance and profitability.

Heifers

Heifers provided with a safe environment are more likely to benefit from healthy growth and development and resilience to both stress and risk of disease.

Handler

Clear farm management protocols, with associated provision of training and appropriate equipment and handling facilities, will help farm personnel to remain safe and happy in their role.

CARE4DAIRY

Heifer Welfare

Good practice

Best practice

Health

Best practice farms optimise the health and welfare of their heifers through veterinary consultation, planning and documenting their prophylactic and responsive health and medical management protocols.

Why is this important?

Healthy animals are more likely to perform well in both their growth and reproductive capability. Supporting their physical and emotional wellbeing will improve resilience of heifers, protecting their immune systems and ensuring they are better equipped to cope with unavoidable illness or injury.

Good practice

- Hygiene and cleanliness must be kept to a high standard to help prevent infection and/or disease transmission.
- Advice should be taken from your veterinary advisors to ensure appropriate disease prevention and control measures are in operation. Boot washing facilities and disinfection points (footbaths) should be provided at the entry point to the farm unit as well as the entry point to areas where livestock are kept.
- Assessment of management-related disease hazards should be undertaken regularly. A farm-specific plan should be developed, with support from a veterinarian regarding treatment and prevention, based on disease patterns and risks present on-farm (including metabolic disease). Such a plan might include use of vaccinations, parasiticidal treatments and dietary adjustments etc.
- The herd should be inspected regularly. This will require farmers to allocate time every day for inspections, as well as that required to take any remedial action necessary.
- Heifers should be given both opportunity and encouragement to exercise (walking and moving freely) for adequate bone and muscle development. Access to well managed pasture can help to reduce problems with claws, feet and legs.
- Heifers should be observed for signs of lameness daily and lame heifers, whether mild, moderate or severely lame, should be treated immediately and for the duration of the lameness.
- Farmers should be able to recognise signs of lameness and conduct gait scoring using a standardised method such as provided in **Table 1**

	PAIN LEVELS				
Signs	**No pain**	**Mild**	**Moderate**	**Severe**	**Very severe**
General signs	• Content and quiet • Grazing or eating at feeder • Curious about surroundings • Moves away when approached • Normal interaction with herd and calf (if a cow)	• Mild posture change • Stiff or subtle lameness • Less interested in surroundings • May warn off herd mates by head shaking or bunting	• Away from herd • Quiet, dull eyes • Abnormal posture-stiff, not moving, arched back, lame • Rough hair coat • Decreased appetite • Calf at foot may be hungry or bawling	• Away from herd • Stiff, unwilling to move • Not eating • Unkempt appearance • Weight loss • Abnormal posture-head down, tucked tail, arched back, ears down	• Rapid shallow respirations • Open mouth breathing • bulging eyes • Depressed • Grunting • Teeth grinding • Not eating • Rigid posture or down
Reaction to palpation of affected site	Animal not bothered by palpation anywhere	Animal may or may not react to palpation of an affected site (wound, swelling, injury, surgical site etc): pull away, kick, vocalize	Animal reacts to palpation may try to run away or act aggressive when handled	Animal moves away from palpation may kick or bellow or be rigid	Animal is rigid or unresponsive

Table 1
Animal signs associated with pain levels (adapted from IVAPM and Care4Dairy resources on assessment of pain in cattle, De Boyer & Ledoux 2023)

Heifer Welfare

- Feet should be checked (legs and feet lifted for inspection) and hooves trimmed or treated, if necessary by a professional hoof trimmer, properly trained farmer or veterinarian, to prevent overgrowth. Heifers who have experienced lameness should be checked more frequently. The ICAR claw health atlas can be used to identify claw disorders.
- Severely lame heifers should be accommodated where they can be kept comfortable, protected from trampling by other animals, observed and treated easily (e.g. medications or remedial management) and with feed and water in close proximity. They should be within sight of the other heifers, to reduce stress from social isolation.
- Treatment for lameness should target the area of concern (bone, joint, skin, soft tissue or claw) and depending on the severity, input from a veterinarian or professional hoof trimmer enlisted.
- Pain management (including non-steroidal anti-inflammatory medications) should always be considered for lame heifers, to minimise the detrimental effects on the heifer's welfare. This will also reduce the impact on restricted movement, reductions in food or water intake and immune suppression caused by the stress associated with pain.
- Foot baths should be used when infectious disease affecting the feet of heifers has been identified, in order to help limit spread.
- When buying a heifer the feet and claws should be checked for early signs of pathology (appearance of swelling, overgrown claws, bleeding points/ bruising/ lesions or any signs of infection) and if acquiring a new animal on farm, consider whether a period of isolation may be beneficial where there may be risk of disease transmission.
- Monitoring and recording of any signs of oestrus ('heat'; which can be erratic in juvenile animals) for the first few cycles should be undertaken to identify heifers' more fertile second and subsequent oestrus cycles.
- When selecting bulls, it is important to include breeding values for calving, to reduce the risk of calving problems, preferably using multi-trait selection. These programs include fertility and health traits, the goal of which is to increase both the herd's productivity and welfare.
- Where feasible, use of female sexed semen in heifers should be considered, to enhance fertility and reduce the risk of dystocia (as the female calves are smaller).
- During the 'transition period' (3 weeks before and after calving) heifers should be monitored closely as they are at higher risk of illness due to hormonal fluctuation, immune suppression and inevitable stress associated with their first parturition.
- The transition period also increases the risk of mastitis in heifers so attention should be given to both prevention and prompt treatment of mastitis.
- Heifers should be observed for signs of mastitis as part of routine observation. If injury or trauma to the udder has occurred, remedial action should be taken immediately to help prevent deterioration.
- Ensure flies are controlled. Flies carry bacteria which can infect the udder and increase the risk of mastitis.
- Management of heifers can involve changes to group composition, environment, diet and use of interventions (vaccinations, examinations etc.). These changes can challenge the immune system of young animals making them more susceptible to disease. To minimise the effects of this, positive behaviours should be encouraged (play, exploration and positive social interactions), group composition should be kept stable, the environment should be comfortable, safe and clean and diets tailor made, balanced and only gradually adapted to allow time for rumen stabilisation.
- Individual health should be monitored daily by those handling the heifers. Farm personnel should have appropriate training and experience in both normal and problematic behaviours so that signs of stress, injury or disease are identified and rectified immediately. It is important that time for both observation and recording of findings is allocated and prioritised in the daily farm schedule.
- Heifers should have prompt access to medical care by suitably qualified professionals (e.g. veterinarians) for illness or injury. Early intervention helps to reduce the welfare and financial cost of treatment whilst minimising loss of performance (fertility or yield).

Health

Heifer Welfare

- Farmers should provide effective first aid treatment for sores, wounds, injuries and swellings and, where relevant, seek veterinary advice or assistance.
- Appropriate type, dosage and duration of pain relief should be provided by a veterinarian for any inflammatory conditions (acute or chronic).
- Veterinary assessment at regular intervals and in response to any complications will help to improve reproductive health on the farm and improve successful timing of insemination.
- Bacteriology testing enabling culture, identification and antibiotic sensitivity testing of any identified pathogens will enable targeted treatment and prevention programs to be developed on farm.

Best practice

- **Best practice** farms have a written health and welfare plan devised with input from veterinarians and allied professionals. This will include prophylactic health management and a plan for triaging illness/injury cases to optimise performance and reduce risk. This should be reviewed and updated each year based on data collected on farm.
- **Best practice** farms monitor heifer weight and BCS monthly as a minimum (as opposed to relying on one or two key decision making timepoints) to enable tracking of each individual heifer's progress and support nutrition planning for future seasons.
- **Best practice** farms procure veterinary oversight for infectious disease management. This ensures regular testing/ prophylaxis is in place for the main infectious diseases: mastitis (Staphylococcus, Streptococcus, E. coli), salmonellosis, paratuberculosis, tuberculosis (in relevant geographical areas), brucellosis (in relevant geographical areas), infectious bovine rhinotracheitis, bovine viral diarrhoea, digital dermatitis.
- **Best practice** farms ensure farm personnel are trained in and familiar with use of pain scoring in heifers to inform use of pain-relieving medications and/ or the need to seek veterinary intervention.
- **Best practice** farms record performance data (relating to growth, Feed Conversion Ratio (FCR), fertility etc) as well as morbidity (e.g. scour, mastitis, lameness) and mortality (planned and accidental) so that management practices and planning can be adapted accordingly.
- **Best practice** farms objectively assess calving seasons. For example, recording: number of heifers requiring assisted calving, incidence of post- calving complications (e.g. retained placenta or uterine infections), incidence of last trimester abortions.
- **Best practice** farms ensure that a contingency plan is available to the farmer in case of outbreak of contagious diseases close to the farm. This may be tailored to the individual farm, in consultation with veterinary advisors, or drafted for a group of farms in close proximity with similar measures in place.
- **Best practice** farms make every effort to ensure individual heifers have adequate time resting in clean and dry conditions, that stressful interactions with people or other animals are avoided and that if signs of ill health or changes in demeanour are detected, interventions are both timely and effective. Stress increases the risk of disease being exacerbated (e.g. sub-clinical mastitis becoming more severe).

Heifer Welfare

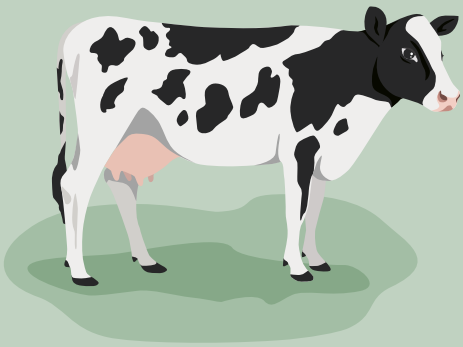
Good practice

Best practice

Health Summary

Farm

Healthy heifers are more likely to perform well for the farm, improving their cost effectiveness and reducing the cost of losses from illness/ injury.



Heifers

Ensuring their environment is safe and the risks from infectious, parasitic and nutritional disease are mitigated as much as is possible, will protect heifer health and welfare.

Handler

Training, planning and support from farming and veterinary advisors will improve the confidence of those caring for the heifers and support their own health, job satisfaction and resilience at work.

CARE4DAIRY

Heifer Welfare

Good practice

Best practice

Behaviour

Best practice farms have confident heifers who express a range of positive natural behaviours by providing an enriched indoor & outdoor environment with kind, animal- centred human- animal interactions.

Why is this important?

Environmental enrichments (social, nutritional, occupational, sensory and physical) promote cognitive and behavioural health in heifers. This supports stress resilience and facilitates long- term adaptation to changing farm conditions, transport, and to life in a herd. Attentive care and positive interactions with humans enhance welfare, production performance and favour safe and easy handling.

Good practice

- Heifers should have access to diets that fulfil their nutritional requirements, but also satisfy their behavioural needs, with sufficient forage to encourage rumination.
- Feeding times should be linked to the heifer's activities. Increasing the number of meals per day stimulates animals to exercise and interact socially, promoting positive feelings.
- To prevent both over and under eating by individual animals as a result of resource guarding behaviours, it is important that feeding stations provide adequate feed space, allowing all of the heifers to eat comfortably at the same time. Heifers are herd animals, so the entire group want feed simultaneously. Failure to provide sufficient space to allow the group to feed together will create unnecessary stress.
- Group composition should be kept as stable as possible, to minimise the risk of conflict and resource guarding. If mixing groups of heifers, best to do so in an outdoor spacious environment, reducing the risk of injury due to fighting, falling or slipping.
- Adopt multiple strategies to minimise resource guarding and the effects of competition at feeding stations (e.g. increase feeding frequency, use physical barriers, increase the quantity of feed offered, and make sure there is enough space at feeding stations, e.g. >70cm or one head lock per animal).
- Heifer accommodation must provide opportunities for social, mental and physical enrichment which will help to reduce development of problematic behaviours (e.g. resource guarding or stereotypies). If there is cross-sucking between two heifers, they may be separated or offered alternative, more appropriate, substrates to suckle (delivering milk through artificial teats with slow flow and/ or provide dry teats). Cross suckling is a re-directed behaviour, expressing the needs of the animal are not properly fulfilled. Mother bonded rearing is best to prevent cross-suckling and other re-directed behaviour.
- Heifers should have access to an outdoor environment, with proper sheltering and resources, to significantly improve both welfare and performance.
- Heifers should be able to move freely (loose-housing systems) indoors or outdoors, and express their socially motivated behaviours, such as rubbing, head butting, licking and mounting as part of their natural oestrus behaviours.
- In cubicle housing systems, flooring should not be slippery to allow postures associated with self-grooming to be adopted. Deep litter lying areas should be used to avoid swollen joints due to hard lying surfaces. A lying space ratio of more than one cubicle per heifer should be given on all farms to allow all animals to lie at the same time. Comfortable and spacious lying areas are also important to promote rumination.

Heifer Welfare

- Behavioural management of groups of heifers should be practised to ensure they remain calm (as far as is feasible) when handled or moved between areas. The following stressful experiences should be minimised to reduce the risks of injury or resultant lameness: resource guarding, crowding of animals in a confined area and standing for extended periods, without the opportunity to lie down or rest. If mixing of groups is unavoidable and a new heifer or heifers are added to an otherwise stable group, it is better to manage this in a large, open area as opposed to a confined space, whether indoors or outside. Provision of space will help reduce conflict and also the risk of injury from fighting or slips and falls if the animals are startled or trying to run away.
- Positive human- animal interactions (such as stroking by humans) should be practised routinely as this will help to minimise fearful responses to handling and improve behaviour in the milking parlour.
- Animals should be handled gently to avoid unnecessary stress during routine management practices (e.g. dosing, restraint for AI or pregnancy diagnosis) and this will help reduce development of problematic behaviours (avoidance, flinching or kicking) in the future, around calving or during milking.
- Heifers should be trained using positive reinforcement to cope with common farm practices such as moving and loading.
- Heifers should be introduced to the group of lactating cows for 2-3 weeks during the 3-6 week period prior to calving. They can then be habituated to the milking parlour using positive reinforcement.
- Changes in behaviour can indicate a response to stress, illness or injury. Training farm personnel to observe and interpret these changes in behaviour is important to ensure rapid identification and response to problems.
- Farm personnel should ensure they respect the physiological needs of the heifers and their ability to cope with their environment.
- Staff with responsibilities for heat detection and insemination should be trained to perform these tasks.
- Heifers should be managed to optimise easy observation and recording of oestrus behaviours (clear mucous discharges, red swollen vulva, mounting other heifers, agitation and dirty flanks). Moving animals may make oestrus behaviours easier to observe. 21-day records should be available for all cycling heifers.
- Observation of the heifers to ensure they can lie down and stand up comfortably, without risking injury (head, neck, body or limbs) or contamination or damage to their udder, is vital. If difficulties are identified remedial action should be taken immediately.
- Observe the heifer group to ensure positive behaviours are regularly identified: resting and rumination, play, self-grooming and allo- grooming (affiliative behaviour between cows) will help gauge the mental wellbeing of the group.
- Observe the heifer group to identify problematic behaviours will help guide corrective measures. Problematic behaviours include resource guarding, startling or rushing behaviours when approached by humans or when the group is being moved, repetitive behaviours, excessive sucking or biting of fixtures, isolation from the group.
- Ensure adequate space and bedding to allow heifers to express normal peri-parturient (pre and post calving) behaviours. This is particularly important for heifers as novice mothers, to maximise the benefits to their calves and reduce stress for the heifers. Soft bedding in a comfortable, private calving box or pen, that has visual contact with the heifer group should be provided.
- After calving, allow heifers to interact with their calf and exhibit normal maternal behaviours (examining, licking and nuzzling their calf). Intervention is required if problematic behaviours are noticed (for example, preventing the calf access to feed). The exception is where the risk of disease is such that heifer and calf must be separated immediately.

Heifer Welfare

Best practice

- **Best practice** farms have management protocols, developed with assistance from relevant farming and veterinary advisors. These protocols include: preventative healthcare, nutrition, dry- off management, design of the calving area, supervision of calving, policies on intervention during calving. These are continuously assessed for effectiveness and adapted accordingly.
- **Best practice** farms use food to enrich the heifers' environment, providing a wide variety of enjoyable food types, perceived to be rewarding by the animals.
- **Best practice** farms encourage positive human-animal interactions during feeding. By using associative learning, the presence of humans equates to accessing favoured food stuffs. For animals raised on pasture, make sure that they are close by and observing you when you offer or add the food stuff to the environment. These interactions must be consistently positive and occur on a regular basis to have a positive cumulative effect.
- **Best practice** farms provide brushes in all loose-housing systems. The number and positioning of the brushes will be dependent on herd numbers and the environment they have access to, both indoors and outside.
- **Best practice** farms offer heifers a choice between different environment types (e.g. pasture/ outdoor and indoor housing) to improve animal welfare, health and production.
- **Best practice** farms provide a variety of enrichments (olfactory, visual, tactile, social) to encourage a range of healthy behaviours, which promote good health and welfare of the herd.
- **Best practice** farms maintain and replenish enrichments to add complexity and novelty to the environment and encourage continued interactions with them by the heifers.
- **Best practice** farms promote positive human-animal relationships by increasing opportunities of positive interactions between farm handlers and heifers. This might include calm and gentle handling, touching, petting, quietly talking or using associative learning with positive rewards (i.e. food or strokes). Staff should receive ongoing training in the importance of positive human-animal interactions.
- **Best practice** farms avoid negative interactions with animals by ensuring staff are properly trained, facilities and equipment are appropriate for use and well maintained and that adequate time is allocated for moving animals or any other planned interventions (e.g. dosing, foot care, pregnancy testing, scanning etc.).
- **Best practice** farms move heifers at their own pace with positive encouragement, and where possible, without the use of vehicles, dogs, loud noise and force.
- **Best practice** farms are proactive in planning and preparation of heifers (through gentle interactions, familiarisation with the environment and equipment, using positive reinforcement training) to cope with stressful processes, such as foot care or medical interventions.
- **Best practice** farms move heifers to the calving area in stable groups (minimum of two) to ensure ongoing social support in a novel environment.
- **Best practice** farms observe and document both positive and negative behaviours of the group and individual heifers (with or without the aid of sensors and camera equipment). This will help identify potential problems, prompt intervention and assist with future decision-making.
- **Best practice** farms actively evaluate how precision livestock farming for behaviour monitoring (e.g. sensors, bolus, image or sound based) can help gather data on individual and herd health (e.g. health, reproductive data, food intake, rumination time etc.). This data could be useful to guide environmental changes that improve the conditions for the heifers all year around, reducing stress and improving health, but should be considered an adjunct as opposed to an alternative to well- trained farm personnel.
- **Best practice** farms may use automated activity monitoring systems (i.e. precision livestock farming) to improve reproductive performance.

CARE4DAIRY

Heifer Welfare

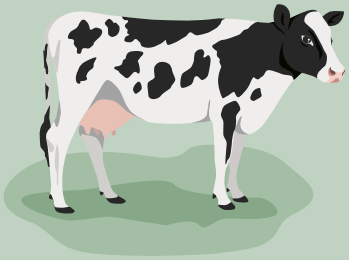
Good practice

Best practice

Behaviour Summary

Farm

Considerate grouping and management of heifers within the herd will promote health and welfare, therefore improving performance on farm and reducing potential losses.



Heifers

Provision of a positive, enriched environment will help optimise cognitive development and heifer welfare. This will enhance resilience and their adaptation to future life experiences on the farm and if transported.

Handler

Providing attentive care and regular positive interactions with heifers will make working conditions with cattle easier, safer, and more efficient in terms of time and technique.

Take pride in all of your farm's good and best practices towards animal welfare!

Additional resources

Care4Dairy.eu

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