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The Dairy Well audit program was developed with the input of farmers, veterinarians, dairy processors and dairy supply chain customers. The Dairy Well audit program is driven by science, founded in compassion and dedicated to improving the welfare of dairy cattle one farm at a time. It is our belief that from a business and social perspective, animal welfare is the bedrock of a sustainable dairy farm and industry. The goal of the Dairy Well audit program is to provide a path and a goalpost to the dairy industry in providing for the welfare of dairy cattle. Unlike other industry audits, there is no score, no pass or fail. Instead we have chosen high standards asking that every farm make efforts to improve to meet the standards over time, giving every farm the opportunity succeed.

Dr. Walker would like to thank the farmers that graciously participated in the pilot program to test the program and the members of the scientific committee* for their extraordinary commitment and contribution to the development of the Dairy Well audit program. Their time, energy, expertise and above all patience, were without end and are reflected in the program in its depth, practicality and quality. Blair Downey is also deserving of special thanks for her efforts and diligence in developing the auditor training and helping further refine the program.

*Scientific Committee: Dr. Nigel Cook, Dr. Temple Grandin, Dr. Lana Kaiser, Dr. Jan Shearer, Dr. Carolyn Stull, Dr. Cassandra Tucker and Dr. Nina von Keyserlingk

Thank You

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I. Animal Welfare Audit Overview

Guiding philosophy
The Dairy WellSM audit program is based on scientific evidence, and is developed and refined through expert perspective and consensus among professionals, in response to further discovery and public perception. A sustainable animal welfare program must consider the vulnerability of the animal and adequately address the responsibility owed to the animal. A given farm practice can only be justified when there are ethically defensible reasons beyond the basic practicalities of animal use. Program policy must therefore be ethically grounded, reflecting current social norms, acknowledging our responsibility to the animal as well as the science, available data and expert opinion. In this document, we provide transparency about our rationale for key decision points within the Dairy WellSM audit program about resources and environment, common painful procedures, animal-based measures and udder health. Also included is information about the public perspective, when available. Our hope is that this transparency will make these decisions relatively easy to revisit as further information becomes available and perspectives shift. The audit will be reviewed and updated every three years so that it will continue to reflect the most current science and social norms.

Auditing
Farmers and veterinarians are encouraged to incorporate the Dairy Well audit as a regular self-assessment in their herd health program. Official Dairy Well audits must be done by a 2nd or 3rd party that is certified and in good standing with PAACO for dairy auditing. It is understood that at the initial publication of the Dairy Well audit, PAACO dairy auditor certification is not available. Until such time, Dairy WellSM audits may only be done by a person with a bachelor’s degree or above with a minimum of 5 years’ experience in the handling, care and welfare of dairy cattle and trained by one of the audit authors.

The Dairy Well audit program was written to serve as both a 2nd party process incorporating the feedback, guidance and follow-up necessary to drive meaningful continuous improvement, and a 3rd party process focused solely on evaluating conformance to the criteria. It is understood that 3rd party processes will not typically allow for follow-up, demonstration of corrective actions or re-evaluation. It is the responsibility of the party requesting the 3rd party audit to provide follow-up or guidance on the required actions based on the farms performance.

Accurately assessing the welfare of dairy cattle requires that auditors have close contact with the animals on the farm. Walking through pens of loose cattle or through confined housing areas can be dangerous for the cattle and personnel if the auditors are not trained in proper cattle behavior and stockmanship. It is therefore recommended that auditors have documented experience handling and working closely with dairy cattle prior to performing any dairy animal welfare audit.

Biosecurity
Auditors must always practice proper biosecurity, making sure to wear protective clothing and shoe covers that can be properly disinfected between farms. Care must be taken moving from groups of animals that are housed or managed separately to minimize the risk of spreading infectious agents from one group of animals to the next. Cattle should not be handled and if so, gloves should be worn and hands must be washed. Auditors must also adhere to any additional biosecurity measures required/posted by the farm management.
A. Format

The Dairy Well℠ Program includes:

1. An introductory meeting* 90 days prior to the audit which includes:
   a. An overview of the program expectations, required documents and the audit process.
   b. A Pre-Audit checklist (Appendix C1) for the collection of specific information about animal numbers, milking schedule, employee duties, location of age-specific groups and facility design will be completed in advance and used to prepare for the farm audit.

   *Direction for 3rd Party Auditors: When the Dairy Well℠ program is used for a 3rd party audit, the introductory meeting may be eliminated. However, the pre-audit check list should be completed prior to the audit to allow for proper planning and execution of the audit.

2. An on-farm audit which includes:
   a. Review and verification of animal caregiver training, health records, and Standard Operating Procedures (SOPs).
   b. Observation of animal handling
   c. An evaluation of the dairy cattle and their environment

3. A review and discussion of audit results*, including:
   a. Identifying areas of concern
   b. Identifying specific items for which corrective action plans will be developed

4. A plan for follow-up visits to document efforts made to effectively address areas of concern, thereby promoting the concept of continuous improvement*

   *Direction for 3rd Party Auditors: If the Dairy Well℠ program is used for a 3rd party audit it is the responsibility of the party requesting the 3rd party audit to provide follow-up or guidance on the required actions based on the farms performance. Steps 3 and 4 may be carried out by the 3rd party audit provider’s customer.

The Dairy Well℠ audit is divided into three sections. Firstly, a listing of the Critical Criteria; namely practices necessary to meet critical animal care standards. Secondly, core competencies (Level 1 criteria), industry standard indicators of management that are associated with best practice and industry standard prohibitions (i.e. tail docking), and thirdly, measurable outcomes where continuous improvement may be required to improve the welfare of the cattle on the farm (Level 2 criteria).

Observations are limited to those that can be verified at the time of the audit and do not rely on self-reporting. The farm is expected to demonstrate that it is meeting each of the Critical Criteria, has completed or is practicing each of the Level 1 core competencies and that management strives to meet these standards daily. Regardless of the criteria outlined in the following audit, it is expected that the farm adheres to all federal and state laws regarding the care and use of animals.
On the day of the audit, the necessary documents to evaluate sections B1, B3, C3, C4 and C5 must be made available for review and a knowledgeable individual such as the farm manager or herdsperson must be available at the time of the audit should questions arise or translation be necessary. On the day of the audit, accommodation must be made to safely evaluate all cattle and facilities. For the audit to proceed in a safe manner all breeding bulls (if present in pens that will be entered for observations) MUST be removed to a separate area.

B. Continuous Improvement:
Level 2 criteria are founded on the principle of continuous improvement, and focus on animal welfare outcome measures that will be tracked over time and benchmarked against available national data. There is no “PASS” or “FAIL” assigned to any Level 2 criteria. Benchmarking is used to measure performance using a specific indicator (outcome measure) which is then compared to available data from dairy farms. Benchmarking is a means for each farm to evaluate their current performance relative to others and promotes evidence based decision making, by identifying key areas requiring improvement.

In all cases, each Level 2 outcome is supported by science based evidence where available and in the few instances where there is a gap in science, outcomes considered to be generally accepted important indicators of an animal’s health and welfare are used. It is recognized that in many instances a measure at a single point in time of an outcome is not necessarily indicative of a specific problem on a farm. Therefore, where the farm does not meet the goal for Level 2 outcomes the farm owner/manager will be required to prepare a corrective action plan for the specific outcome, identify the underlying cause of the problem and implement a plan aimed at correcting it.

C. Compliance & Verification:

3rd Party Process – Each farm will be audited to each criterion in the instrument and the outcome reported to the 3rd party audit client. Any critical non-conformance should be reported directly to the client. It is the responsibility of the client to coordinate and ensure any necessary follow-up.

Possible designations for 3rd party audit outcomes include:

1) Critical Non-Conformance
2) Non-Compliant – Level 1 Criteria are not complete
3) Dairy Well Assured – All Critical and Level 1 Criteria are met, Level 2 Goals not met
4) Dairy Well Elite- All Critical, Level 1 and Level 2 Criteria & Goals are met

2nd Party Process - Each farm is expected to meet all Critical Criteria and Level 1 criteria at the time of the initial animal welfare audit. An immediate corrective action will be required from any farm not compliant with Critical Criteria. When Critical Criteria are not met, the farm will be subject to a follow-up audit within 48 hours to determine if the problem has been corrected, automatically be placed on probation and ranked in the lowest benchmark requiring an audit in 6-9 months.

A farm failing to implement an immediate corrective action on a specific Critical Criteria during the initial audit or that does not demonstrate that the critical area has been satisfactorily addressed at the time of the follow-up will be designated as having a “Critical Non-Conformance”.

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A farm that fails to demonstrate compliance with the Level 1 criteria will be designated “Non-Compliant” and expected to make corrective actions within the subsequent 90 days.

A farm that has demonstrated completion of all Critical and Level 1 criteria will be designated as “Dairy Well™ Assured”.

Farms that do not meet the Level 2 goals set forth are expected to work with their veterinarian of record, nutritionist and herd health team to develop a detailed plan that must be submitted within 90 days, that also includes an implementation schedule and actions that will be taken to address the area(s) in need of improvement. A farm that fails to develop and submit such a plan within 90 days, or fails to begin implementation of the plan by the next audit will be designated as “Non-Compliant.” A farm that has met all Critical Criteria, Level 1 criteria and achieves the current goals established in Level 2 will be designated “Dairy Well™ Elite”. At no time, will a “score” or “grade” be assigned to a single farm.

Possible designations for 2nd party audit outcomes include:

1) Critical Non-Conformance
2) Non-Compliant – Level 1 Criteria are not complete; or Corrective Action Plans have not been developed for Level 2 criteria at the 90-day follow-up
3) Dairy Well Assured – All Critical and Level 1 Criteria are met, Level 2 Goals not Met
4) Dairy Well Elite- All Critical, Level 1 and Level 2 Criteria & Goals are met

After the initial audit, a follow-up audit may be needed in 48 hours (in the case of a failure in a Critical Criterion), or more likely, in 6 to 30 months depending on their initial performance and ongoing efforts to improve. Farms non-compliant with Level 1 criteria must demonstrate they have completed the outstanding Level 1 criteria within 90 days. Depending on the item and the accessibility of paper work, the verification of criteria consisting solely of paperwork (completion of SOPs, confirmation of improved SCC, signed VCPR form and approved drug lists) may be submitted remotely. Other Level 1 items including evidence that tail-docking has stopped, training and record keeping will require an onsite visit to confirm actual practices are in place. Farms meeting all the Level 1 criteria, but not meeting one of the goals outlined for each outcome measure in Level 2, will be re-audited on a schedule based on their benchmarking performance for locomotion and severe hock injuries, as these are areas where national data are currently available. The re-audit interval will be the shortest period suggested across locomotion and severe hock injury benchmarked outcomes.

For example, in the case of severe lameness (as defined in section I), the farm will be compared to benchmark data from locomotion survey data collected across the U.S. (Section I2, Table 2). As shown in Figure 1, the data has been divided into benchmark groups (quartiles) for the bottom 25%, middle 50% and top 25% of farms, with thresholds between groups. The farm will be re-audited on the following benchmark schedule:

- Bottom 25% will be re-audited in 6-9 months
- Middle 50% will be re-audited in 12-16 months
- Upper 25% will be re-audited in 24-30 months
Supporting documentation and scientific justification for the specifications for each outcome measure (i.e. locomotion) are provided later in each section of the document. Outcomes will be rounded to the nearest whole number.

Figure 1. Benchmarking of the outcome measure ‘severe locomotion’ based on most recent available locomotion data. For example, if a farm had a total of 2.8% of the cows scored as severely lame, the number would be rounded to 3% placing the farm in the middle 50% of farms for severe locomotion and thus a re-audit will be required in 12-16 months.

D. Sample Methodology:
Auditors will observe animal handling and care, examining representative subsets of each life stage housed on the farm including calves (bulls and heifers), growing and breeding age heifers, dry cows, lactating cows and any pens for sick/injured animals. Animals housed off the primary farm site, but for which the farm is responsible for their daily care and feeding, will be included in the audit. General observations will be made of all pens and housing areas. Specific outcomes will be measured in specific pens as described below using a sample size calculator (Appendix F) to determine the minimum number of animals that must be scored in each group. The sample methodology presented is guided by three goals: 1) to determine a reasonably accurate value of the prevalence for each outcome 2) to limit the time required to conduct the audit to 4-6 hours and, 3) to minimize bias.

Sample group - On farms where there is more than 100 animals and more than one pen for each life-stage (heifers, dry cows and lactating cows) the Dairy Well audit applies a select group sampling approach (Table 2). The primary driver for this decision was making sure we can evaluate locomotion as accurately as possible given the goals described above. Evaluating locomotion requires that cows are observed while walking and preferably while being viewed in full view from the side. This view is best achieved on most farms by observing cows walking back to their pen after milking. Practical limitations such as multiple pens and long milking times limit the ability to score all cattle in some herds during a single visit. Therefore, in herds with more than one lactating cow pen, lameness will be scored on the highest producing, oldest pen of cows or whichever pen represents the majority of those cows. All other outcomes will be scored using a single representative pen for heifers, lactating cows and dry cows. Hospital or sick pens, if present, will also be evaluated for all outcomes specific to the life-stage group of the pen. This approach allows for the inspection all pens for general condition and scoring of pens typically confined such that scoring for...
individual outcomes is manageable. Specific sample procedures for each outcome measure are described in Table 1, briefly, the following representative animal groups will be scored:

*Milk-fed calves* — Housing for milk fed calves may be individual, paired or group housing. Numbers may range from a few to several hundred or a thousand. If housed individually, in pairs or groups and there are fewer than 100 calves present, all of the calves will be scored. If greater than 100 calves are present the sample calculator will be used to determine the number of calves scored. If housed in groups, the sample calculator will be used to determine the minimum number to score in each milk-fed calf pen. Regardless of the housing system, a random sample will be taken across the entire age range of milk-fed calves to obtain the number determined by the sample size calculator.

*Heifers* — Heifers are commonly housed in groups and managed extensively with limited confinement, often in large pastures. If there are fewer than 100 heifers present, ALL heifers (or the minimum number as defined by the sample size calculator) will be scored. If more than 100 heifers, the oldest group/pen of bred heifers will be scored. The sample size calculator will be used to determine the minimum number of heifers that should be scored applying a random sampling procedure within the pen. On farms with several small pens of heifers, the number to be scored will based on the total number of heifers and then spread evenly across each pen. While it is not possible to keep track of each animal scored, efforts will be made not to score the same heifer twice.

*Lactating Cows* — The sampling approach is determined by the animal number and housing. In herds consisting of a single lactating group, **ALL** lactating cows will be scored for locomotion upon exiting the parlor. The remaining outcomes will be scored after milking in the pen. In large herds with multiple pens, **ALL** cows in the highest producing, oldest pen will be scored exiting the parlor and hocks and knees should be scored in the parlor on a different pen. The sample size calculator will be used to determine the minimum number of cows to score for hocks and all other outcome measures. While it is not possible to keep track of each animal scored, efforts will be made not to score the same cow twice. Tie-stall barns typically allow for all cows to be scored while in the stalls during milking. If released from tie-stalls, locomotion should be evaluated upon release from the stall. We do not require that cows be released from tie-stalls if it is not the normal procedure for the farm. In robotic parlor herds (AMS) the sample calculator will be used and locomotion will be scored inside the pen along with other outcomes. It is recognized that it may not be possible to accurately assess locomotion in herds with AMS.

*Dry Cows*— Dry cows are commonly housed in groups and managed extensively with limited confinement in large pastures. If there are fewer than 100 dry cows present, **ALL** (or the minimum number as defined by the sample size calculator) dry cows will be scored. If more than 100 dry cows and if multiple dry cow groups are present, the group of dry cows furthest into their dry period will be scored. The sample size calculator will be used to determine the minimum number of dry cows that should be scored applying a random sampling procedure within the pen. While it is not possible to keep track of each cow scored, efforts will be made not to score the same cow twice.
**Hospital/Special Needs Pen** - Where hospital pens or special needs pens exist, the sample size calculator will be used to determine the minimum number of cows to be scored.

**Sample Size** – It would be ideal to score every cow in each pen evaluated. However, except for locomotion where it is possible to score every cow as they exit the parlor, it is difficult to score every cow in a pen as many housing systems do not have lock-ups. To address this, a sample size calculator is used (applying a confidence interval of 95% and precision “e" of 5%) to determine the target for the minimum number of cows to sample for each life-stage group/pen. Determining sample size (n) is very important. Samples that are too large may waste time, resources and money and samples that are too small may lead to inaccurate results. To achieve the best representation of the population, the minimum sample size needed to estimate the population mean (µ) will be calculated for each group.

**Sample size for a given life-stage to be scored in a pen or group is calculated using the formula:**

\[ n = \frac{NX}{(X + N - 1)} \]

- Where \( X = Z^2 \times p \times (1-p) / e^2 \) = 384.16
- where “Z" = 1.96 for 95% CI
- “p” is expected true proportion= 50% (results in the largest sample size)
- “e” is desired precision (half desired CI width) =5%

Inputs are the assumed true value for the proportion, the desired level of confidence, the desired precision of the estimate and the size of the population. The desired precision of the estimate (acceptable error in the estimate) is half the width of the desired confidence interval. For example, if you would like the confidence interval width to be about 0.1 (10%) you would enter a precision of +/- 0.05 (5%). Auditors may use the table provided (Appendix F) or perform the calculation for each specific group/pen size. If using Appendix F table, round the group or pens size number UP to the nearest value in the table.

**E. Audit Process:** The audit was designed to allow for the most accurate assessment of lameness and is therefore dependent on the farm milking schedule. As a result, the order in which each outcome is measured/assessed may vary from farm to farm. It is ideal to score individual age groups at or around feeding to allow for assessment of cattle while standing, however, this may not be possible. Level 1 criteria may be evaluated at the beginning, middle or end of the audit, depending on the availability of management and employees. Critical criteria will be evaluated throughout the audit. It is best to coordinate with management prior to the audit to establish when, during the course of the audit they will be available to review paper work and treatment records.
<table>
<thead>
<tr>
<th>Measure</th>
<th>Ideal sampling</th>
<th>Minimum sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Animal-based outcomes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locomotion</td>
<td>One entire pen of lactating¹ cows scored as they leave the parlor. All cows in hospital² pen</td>
<td># of lactating¹ cows in the pen scored determined by calculator</td>
</tr>
<tr>
<td>Hygiene, Neck &amp; Other injuries</td>
<td>All calves³ and one entire pen of lactating¹ cows, dry cows, heifers⁶ and the hospital² pen (lactating and young stock)</td>
<td># of animals in lactating¹, dry, heifer⁶, calves³ groups and hospital² determined by calculator</td>
</tr>
<tr>
<td>Body condition</td>
<td>All calves³ and one entire pen of lactating¹ cows, heifers⁶ and the hospital² pen (lactating and young stock)</td>
<td># of animals in lactating¹, heifer⁶, milk-fed calf groups and hospital² determined by calculator</td>
</tr>
<tr>
<td>Injuries⁴</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hocks, Knees</td>
<td>One entire pen of lactating¹, dry cows and all cows in hospital² pen</td>
<td># of animals in lactating¹, dry and hospital² determined by calculator</td>
</tr>
<tr>
<td>Broken tails⁶</td>
<td>One entire pen of lactating¹ cows, heifers⁶ and cows in hospital²</td>
<td># of animals in lactating¹, heifer⁶ and hospital² determined by calculator</td>
</tr>
<tr>
<td>Tail docking</td>
<td>All calves³ and one entire pen of animals representing first lactation cows (the pen/group with the majority of those cows)</td>
<td># of calves³ and first lactation cows determined by calculator</td>
</tr>
<tr>
<td><strong>Facility-based outcomes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shade/protection</td>
<td>All pens will be evaluated for shade and additional protection</td>
<td></td>
</tr>
<tr>
<td>Water troughs/bowls</td>
<td>Access: Check that all animals have access to water. Cleanliness: All troughs in the pens of each group scored for hygiene will be evaluated for cleanliness using the water score card (1 pen per life stage group)</td>
<td></td>
</tr>
<tr>
<td>Trainers</td>
<td>When present, the placement of trainers will be evaluated on all cows during milking</td>
<td></td>
</tr>
<tr>
<td>Space</td>
<td>Space will be evaluated for each calf scored for animal-based outcomes and for the hospital pen</td>
<td></td>
</tr>
<tr>
<td>Lying Surface</td>
<td>Lying surface will be evaluated for calves and heifers</td>
<td></td>
</tr>
</tbody>
</table>

¹highest milk producing, oldest cows (which ever pen has the majority of these cows)
²Hospital includes any group of cows, calves or heifers being kept separate for treatment, aka. “sick pen”, “special needs pen”
³Calves include milk-fed calves are to be scored across all represented ages (e.g. if there are 200 calves housed individually, score 132 calves from youngest to oldest such that the sample measured represents the range of sizes of calf kept the housing system)
⁴best case scenario is that hock and knee injuries are scored in the milking parlor
⁵when possible, animals are scored with full visibility (both sides, front of knees); when this is not possible a single side of the animal may be scored and/or the knees only evaluated from behind for swelling only
⁶oldest group of heifers, or whichever pen has the majority of these heifers will be scored
⁷When completing repeated audits as a 2nd party, if broken tails have been documented previously, the auditor should look for evidence of new/recently broken tails in order to evaluate if the problem persists. This should be done by looking for broken tails in the first lactation heifers and for newly broken tails in the hospital pen.
Critical Audit Criteria

A. Critical Criteria –
Evidence of non-compliance in the following 3 areas is considered a critical non-conformance. A corrective action must be made immediately if during a 2nd party audit. For 2nd or 3rd party audits, the audit may continue if the incident has not disrupted the audit process to the point at which it cannot be completed that day, otherwise the audit will be postponed. If a critical criteria is not met during a 2nd party audit the farm will be re-visited in 48 hours to complete the audit if it was postponed or to make sure a process has been established to prevent future recurrences and a follow-up visit will take place within 90 days to make sure the established process continues to address the issue.

A1. Access to water – All ages of cattle must have access to potable water.

Scientific evidence  The water requirement for animals is affected by many factors, including environmental temperature, diet (particularly ration dry matter and sodium content), milk production level and age, (see review provided in NRC, 2001). Water intakes of adult dairy cattle are very variable, dependent in part on milk production, and typically average around 20 to 30 gallons (76 to 114 liters) per cow per day. Increases in ambient temperatures have been reported to increase water intake 1.2 kg/°C (West, 2003) to 50 to 60 gallons (189 to 227 liters) per cow per day. Feeding whole milk or milk replacer is not a substitute for water (Vasseur et al. 2010) and after weaning off milk, calves rapidly began to consume ~ 2 gallons (8 to 9 liters) of water per day. Calves require access to water beginning on the first day of life.

Since there is no sound scientifically proven requirement for waterer space and access, the Dairy Well audit requires that all cattle merely have access to water. Research does, however, support the provision that the water be clean, fresh and potable. Willms et al. (2002) reported that when cattle were provided a choice of freshwater or water contaminated with 0.005 % fresh manure by weight they avoided the contaminated water. Moreover, growing yearling heifers provided with clean drinking water gained more weight than heifers provided with water from a pond. If water contains compounds that diminish palatability, cattle will reduce their water consumption (Grout et al. 2006) or seek alternative water sources (Digesti and Weeth, 1976). These findings justify the additional assessment that the water available be clean and free of gross contamination.

There is no formal or agreed upon measure of gross contamination of water cleanliness. Thus, we developed a method to consistently evaluate the admittedly subjective general cleanliness of the water. We are not aware of any practical, on-farm method to measure the cleanliness of water that does not include chemical testing, therefore water cleanliness will be included as a Level 2 criterion.

Expert perspective and consensus among professionals  Water is an essential nutrient for life and its constant availability to cattle of all ages is required. The OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle states that: “All cattle, including unweaned calves, need an adequate supply and access to palatable water that meets their physiological
requirements and is free from contaminants hazardous to cattle health.” In Canada the National Farm Animal Care Council’s Code of Practice for the Care and Handling of Dairy cattle (2009) states that: “Cattle must have access to palatable and clean water in quantities to meet their needs.”

Evaluation –
A1. Mark yes if water is available to ALL cattle including calves. Ponds, creeks and other natural water sources will be considered acceptable provided it is evident the water source is not temporary.

References

National Farm Animal Care Council. 2009. Code of Practice for the Care and Handling of Dairy Cattle, Copyright held jointly by Dairy Farmers of Canada and the National Farm Animal Care Council.

A2. Acts of Abuse or Neglect – Willful acts of abuse or neglect are not tolerated.

Evidence of abuse or neglect during an audit, if not reprimanded (without evidence that there is a process in place to intervene and correct the problem) is considered a critical non-conformance. Evidence includes, but is not limited to with-holding treatment for broken limbs, dragging a live animal, intentional application of a prod or sticks to sensitive parts of the animal, deliberate slamming of gates on animals, hitting\(^a\) or kicking\(^b\) or maliciously driving animals over another, repeated use of an electric prod on an individual animal, restraining a cow with nose tongs, moving cows with hip lifts \(^c\), spraying cows with water in the face with a hose or twisting a tail beyond 90 degrees or in such a way that the tail breaks.

\(^a\)Hitting defined: when an arm swings back, behind the frontal plane of the body and then forward or is lifted above shoulder level and then down.
bKicking defined: when the leg is swung back, behind the frontal plane of the body and then forward.

cMoving with hip lifts defined: when a cow is transported to another location within the pen or elsewhere in the facility. Hip lifts may be used to raise the cow from a laying position to facilitate the placement of a mat, sled or rope or to reposition the cow off the down side.

A3. Non-Ambulatory Cattle Evaluation

Cattle that cannot rise without assistance or stand or walk normally unassisted are considered non-ambulatory. The failure to provide proper care and treatment of non-ambulatory cattle continues to serve as a major source of criticism of the dairy industry. While caring for non-ambulatory cattle can be a challenge, it should be considered a medical emergency and must be done humanely. This requires that every farm have an established procedure that provides both the initial steps and follow-up treatment for each cow.

Scientific evidence The AABP defines cows that are disabled, unable to rise, stand or walk normally unassisted to be non-ambulatory. Recent estimates from the USDA (National Animal Health Monitoring Survey) (NAHMS 2016) that approximately 234,000 dairy cows of the estimated 9 million lactating cows in the US became non-ambulatory in 2014, of which approximately 18% (42,000) died naturally on farm (i.e. were not euthanized) (USDA 2016). The available science supports the notion that quality of nursing care can affect the recovery of non-ambulatory dairy cattle (Stojkov et al., 2016).

Expert perspective and consensus among professionals The AABP has established guidelines (Appendix D1) for the care of non-ambulatory cattle that must be incorporated into the SOP.

(a) Care – All non-ambulatory cattle must be provided overhead shade and shelter, fresh feed within reach (nose length) and soft, dry bedding (if not on pasture). Non-ambulatory cattle must be moved such that they remain beneath shade to protect them from excessive heat such that their respiratory rate remains within normal limits (not greater than 60 to 70 breaths per minute). Water must be available and managed such
that hydration is maintained. Hydration will be evaluated by using the “skin tent.” Ideally water is provided continuously using low-profile troughs with a wide base to avoid tipping. (See Appendix A2 for direction on performing and interpreting the skin test test)

(b) Protection - Non-ambulatory cattle must be isolated from other ambulatory cattle to minimize risk of injury from other cows. Severely lame cows maybe housed with non-ambulatory cows as they are not likely to move fast enough to risk walking over/on other cattle in the pen.

(c) Timely Euthanasia - Cows or calves that are moribund or with a catastrophic injury (fractured limbs) must receive immediate action which includes either prompt medical treatment by a veterinarian or euthanasia. Moribund cattle are those which are near death and are often found lying flat on their sides, unable to maintain themselves in sternal recumbency (sitting upright with their head elevated).

Public Perspective The most commented characteristic reported by 491 US citizens when asked about the ideal characteristics of a dairy farm was in regard to concerns about cow treatment, specifically stating that the farmer or workers should treat cows well, humanely, and with kindness (Cardoso et al., 2016).
**Evaluation** - All non-ambulatory cattle on the farm will be evaluated on the day of the audit. If no non-ambulatory cattle are present, the area where such cattle are kept will be inspected for evidence that provisions are consistent with the requirements outlined above.

**A3a.i. Shade** - Mark yes if all non-ambulatory cattle are provided overhead shade such that respiratory rate remains within normal limits (not greater than 60 to 70 breaths per minute). Mark NA if there are no non-ambulatory cattle to observe the day of the audit.

**A3a.ii. Water** - Mark yes if all non-ambulatory cattle are provided water such that hydration is maintained. Hydration will be evaluated by using the “skin tent.” (see Appendix A-2 for direction on performing skin test test). Mark NA if there are no non-ambulatory cattle to observe the day of the audit.

**A3a.iii. Feed** - Mark yes if all non-ambulatory cattle are provided fresh feed within reach (nose length). Mark NA if there are no non-ambulatory cattle to observe the day of the audit.

**A3a.iv. Soft Bedding** - Mark yes if all non-ambulatory cattle are provided soft dry bedding (if not on pasture). Bare rocks, wire, metal or concrete are not considered a soft lying area. Mark NA if there are no non-ambulatory cattle to observe the day of the audit.

**A3b. Protection** – Mark yes if the area designated for non-ambulatory cattle isolates non-ambulatory cows from other ambulatory cattle.

**A3c. Timely Euthanasia** - Mark yes if there was physical evidence that moribund cows and calves receive immediate action. Mark NA if there are if there are no non-ambulatory cattle to observe the day of the audit.

**References**


LEVEL 1 Audit Criteria – Animal Care & Handling

Any Level 1 criterion that is not been met on the day of a 2nd party audit will require a corrective action to be completed within 90 days (3 months).

B. Training – Training employees (including family members) on proper stockmanship is essential to protecting the health and welfare of all cattle on the farm. A written log must be kept providing documentation of training.

B1. Schedule - Who should receive training and when?
(a) New Hires - Before being allowed to independently care for or handle calves, heifers or cows, all newly hired caregivers must first work with staff knowledgeable about the animal care duties and proper stockmanship.

(b) Existing Employees - All caregivers and site management personnel receive refresher training for their specific duties at least annually (either by official training programs or during documented management meetings).

Evaluation- Records/training logs will be reviewed to determine if all current employees have received initial and annual refresher training by verifying current employee names with the log and date of training.
B1a. Mark yes if training log confirms that all new employees have received training. Mark NA if the farm does not have any new employees.

B1b. Mark yes if training log confirms that all existing employees receive refresher training annually. Mark NA if the farm does not have any employees.

B2. Delivery and Confirmation of Training - What form of training is acceptable and how should it be conducted?
(a) Training must be done in a language easily understood by the caregiver. Accepted forms of training include video, webinars, computer modules, hands-on and verbal.

Evaluation –
B2. 2 caregivers will be selected at random by the evaluator and asked when, how and what type of training was provided. (If necessary, the farm must be sure to have a person available who can translate for the auditor)
Mark yes if caregiver confirms that they have received training. Mark NA if the farm has no employees or if there were no employees available for interview.
**B3. Content** - Every individual who works with cattle (stockperson) must be trained on the proper care and handling of cattle.

(a) **Cattle Care Agreement**: All employees (including owners and managers) and service providers (including the herd veterinarian, nutritionist and hoof trimmers), who may come into contact with cattle on the farm must each review and sign a *Cattle Care Agreement (see Appendix C2 for the template)* with a corresponding endorsement signature from the owner/manager. By signing *The Cattle Care Agreement*, each person acknowledges that they understand the proper care and handling practices for all cattle on the farm.

(b) **Stockmanship** - Every stockperson must review the following Merck & Co. Dairy Care 365 Learning Modules: (1) Introduction to Dairy Stockmanship (2) Low Stress Handling of dairy calves and heifers (3) Handling Down cows and, (4) Newborn Care and Handling. Other forms of formal stockmanship training can be substituted* for 1 or all of the modules if training and content can be verified. Acceptable verification includes a letter from the provider and an agenda describing the material covered in the training.

*PAACO certified auditors must make themselves familiar with the Merck modules so they may evaluate if substituted content is sufficient.

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**Evaluation –**

**B3a.** Confirm that for each employee and service provider, the cattle care agreement has been signed within last 12 months. Mark yes if each employee and service provider has signed the Cattle Care Agreement.

**B3b.** Confirm that for each employee stockperson, there is a record (as described in B1) of stockmanship training in the training log within last 12 months. Mark yes if the training log confirms that all employees have watched Merck Dairy Care Modules or have received equivalent training. Mark NA if the farm has no employees.
B4. Confirmation of Acceptable Stockmanship-

(a) Stockmanship – Caregivers will be evaluated to be sure that cows are moved calmly and quietly without excessive force. Excessive force includes directly forcing cows to move by repeatedly using physical tools (crowd gates, electric prods, and sticks), yelling, kicking, hitting, chasing, poking or prodding cows, forceful spraying of water in the face with a hose or excessive twisting of tails (greater than 90 degrees such that tails may break). It is unacceptable to move calves by dragging or by pulling their ears.

Evaluation-

B4a. Mark yes if cows are moved calmly and quietly without excessive force. Mark No if caregivers are heard yelling or whistling loudly or moving cows quickly such that it causes slips or falls. *Hitting or kicking cattle, tossing calves, dragging calves or grabbing calves by the ears would also qualify as an act of abuse which results in a critical non-conformance (A2).*

**Hitting defined:** when an arm swings back, behind the frontal plane of the body and then forward or is lifted above shoulder level and then down.

**Kicking defined:** when the leg as swung back, behind the frontal plane of the body and then forward.

B4b. Slips and Falls – If slips or falls are noted during the audit make note of the number and situation. This data will be collected for future review.

C. On Farm Practices

C1. Tail Docking - Routine tail docking is prohibited.

**Scientific evidence** There is no evidence that tail docking provides any benefit to the cow through improved udder health or hygiene (reviewed by Sutherland and Tucker, 2011). Indeed, in the only national study looking at hygiene on 265 U.S. dairy farms, Lombard et al. (2010) reported that hygiene was better on farms that did not tail dock compared with those that did. The procedure appears to cause some acute pain, but chronic pain has not been evaluated beyond the presence of neuromas (Eicher et al., 2006). Docked cattle have more flies on their hind end (reviewed by Sutherland and Tucker, 2011). Although the consequences of increased flies on behavior is not well studied, increased fly load on beef cattle housed on rangeland has been reported to cause increased restlessness and tail swishing, and decreased feeding behavior (Harvey and Launchbaugh, 1982; see also review by Kamut and Jezierski, 2014). Worker comfort is often cited as a reason to dock, but there is no scientific evidence that has addressed this aspect of tail docking cattle. Trimming the switch alone is thought to provide benefit in terms of cleanliness and worker comfort, but, again, has not been evaluated by research.

**Expert perspective and consensus among professionals** Veterinary associations including the American Veterinary Medical Association (AVMA), Canadian Veterinary Medical Association
(CVMA), American Association of Bovine Practitioners (AABP) along with the National Mastitis Council and National Milk Producers Federation (NMPF (2016)) have publicly stated that they do not support the practice.

Public perspective Four states (California, Ohio, Rhode Island and New Jersey) have banned the practice of tail docking. An online survey found that 79% of the 178 participants were opposed to the practice (Weary et al., 2011), for a variety of reasons including no evidence of benefit for the cow, that docking is painful for cows, that it is unnatural, and that tails are important for controlling flies.

| Evaluation – |
| C1. Evidence of routine tail docking currently taking place will be evaluated by checking for freshly docked tails in the milk-fed calf and first lactation cow groups (or whichever group has the majority of first lactation cows). Mark yes if there is no evidence of routine tail docking currently taking place. [To allow for the re-entry of heifers onto the farm that may have been tail docked beginning 2016, there can be no evidence of cattle entering the herd with docked tails as of Jan. 2018] |

References

C2. Udder Health – The average somatic cell count (SCC) for the previous 3 and 12-month period must be <400,000 cells/ml

Scientific Evidence Mastitis is an inflammatory response of the mammary gland typically caused by bacteria and has a negative impact on animal welfare, milk quality and production (Hillerton and Berry, 2005). Some infections are contagious in nature, therefore cows with subclinical infections, while not showing signs of infection, pose a risk to other cows in the herd (Hillerton and Berry, 2005). Management of mastitis should rely on the use of cow level SCC testing in addition to health records tracking clinical disease (Ruegg and Pantoja, 2013) (Rhoda and Pantoja, 2012). Recent reports indicate that less than 50%
of US dairy farmers perform regular cow level SCC testing (USDA, 2010b). While the SCC can vary between each individual quarter, an individual cow SCC of 200,000 cells/ml has been recognized universally as the threshold for subclinical mastitis, however, clinical infections may raise the SCC of an individual cow over 9 million cells/ml (Rhoda and Pantoja, 2012). Due to this wide variation in SCC it is difficult to estimate the prevalence of mastitis in the herd based on bulk tank SCC data (Schukken et al., 2003). Use of one or a few tests a month to evaluate the udder health presents obvious challenges, particularly in smaller herds where a single cow can have a dramatic influence on the results (Barkema et al., 1998). These latter authors also differentiated management practices between low (<150,000) and high (250-400,000) cell count herds and found that lower count herds paid stricter attention to hygiene (Barkema et al. 1998 b). While SCC is not a perfect indicator it is an easily accessible high-level indicator of overall management. Within this audit, the average SCC over 3 and 12 months is used as an indicator of overall management. As better record keeping is established as a requirement of the Dairy Well program, future versions will aim to incorporate reporting of clinical mastitis rates or prevalence.

**Expert perspective and consensus among professionals** The European Union, Canada, Australia, New Zealand, Norway and Switzerland have each established bulk tank milk (BTM) SCC limits of 400,000 cells/ml using a 3-month rolling geometric mean. The US limit remains at 750,000 cells/ml. While many dairy farms do not keep accurate clinical mastitis records or have access to cow level SCC data, US regulations require herd level reporting of SCC via monthly BTM testing. Looking at the average BTM SCC over a specified period likely provides a more accurate picture of the overall herd udder health while not allowing a single month or test to be overly influential.

**Public Perspective** Consumers today are concerned with the quality of their milk (Cardoso et al., 2016). Quality in the eye of the consumer includes aesthetic attributes as well as safety, concerns for how the food is made and the impact the production systems have on animal welfare as well as the environment (Mitchell, 2001).

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**Evaluation –**

**C2.** Available SCC data will be evaluated. SCC data available from either the processor, official Dairy Herd Improvement Association (DHIA) testing, or official state tests may be used to evaluate this criterion. If more than 1 test is available for each month, each will be used in calculating the arithmetic mean for the previous 3 months and 12 months. Mark yes if both means are less than 400,000.

**References**


Barkema, H. W., Y. H. Schukken, T. J. G. M. Lam, M. L. Beiboer, G. Benedictus and A. Brand 1998. Management practices associated with low, medium, and high somatic cell counts in bulk milk. J. Dairy...

C3. Veterinarian Client Patient Relationship (VCPR) – Having an established VCPR is essential to the health and welfare of the cattle on the farm as it ensures oversight of health records and treatment. See Appendix D2 for AABP guidelines on establishing a VCPR.

(a) VCPR – A VCPR form (example provided, Appendix C3) must be signed by the veterinarian of record (VOR) and current within last 12 months

(b) Approved drug list – An approved drug list (example provided, Appendix C4) must be present and be signed by the veterinarian of record within the last 12 months – stating drug, indication, dose, route and with-hold (withdrawal) times.

Evaluation-
C3a. VCPR - A copy of a signed, current VCPR (example provided, Appendix C3) must be made available. Mark yes if a VCPR form has been signed by the veterinarian of record within the last 12 months.
C3b. Approved Drug List – The approved drug list must be made available. Three drugs present on the farm will be compared to the approved drug list. Of mature cattle and calves have separate storage areas, check 3 from each area. Mark yes if the approved drug list is complete and signed by the veterinarian of record within the last 12 months. Farms that can provide evidence of Food Armor® certification will be given credit for meeting both criteria. Third party auditors should take a picture of the drug list and submit it to their employer for review.

C4. Records – Maintaining identification of individual animals and health records in a herd setting are essential to ensuring animal health and welfare as they are necessary to monitor the health
of the individual as well as the herd, evaluate if therapies are adequate, and identify areas in need of attention.

(a) Individual animal identification – To maintain adequate records animals must be individually identified in a way that is easy to read. Calves (including bull calves), heifers, bulls and cows should each be identified by a unique, readable identification (ID) which can either be an ear tag or neck band. While some states require herd level brand ID, hot iron or freeze branding for individual ID is prohibited. Calves that are to be sold must have at a minimum, a metal or plastic ear tag/clip with the ID recorded.

(b) Health Records – Up to date health records, including disease, treatment and mortality must be kept for all animals at all life stages. Treatment records must include the animal ID, treatment date, reason for treatment, treatment dose, route and duration with appropriate milk and meat with-holds.

Evaluation –

C4a.i-.iii. Individual ID - Presence of individual animal ID will be confirmed on male and female calves, heifers and cows during the observations made for Level 2 criteria. Mark yes for each age life stage group that has some form of individual animal ID. It is recognized that newborn calves may not be tagged immediately. Mark yes, if there is evidence that calves are tagged within 24 hours.

C4b. Health Records - Health records, including treatment, morbidity (including injury), and mortality events for all animals will be confirmed for all age groups by comparing three calves and three lactating cows in the hospital/marked for treatment with current treatment lists (examples provided, Appendix C5). If there are fewer than three animals in either pen, evaluate all treatment for all animals in the pen. If there are no animals currently being treated, confirm that treatment

C5. Written Standard Operating Procedures (SOPs) – Establishing a minimum set of standard SOPs, detailing written instructions to achieve uniformity of the performance of a specific function, are essential to demonstrate a farm has a plan in place for promoting the health and welfare of the cattle. Having SOPs facilitates proper training of caretakers and ensures that processes have been established for critical areas on the farm, which can be easily referred to in cases of emergency. SOPs must be available in a language understood by the caretaker expected to complete the task. Templates are provided (Appendix B) for each SOP to allow for ease of use, but may be substituted with SOPs developed by the individual farm and their veterinarian of record. SOPs marked with an * have specific requirements that must be included regardless of the author of the SOP as there is clear professional guidance from the AVMA and/or AABP for what should be done. If the SOPs do not adhere to the AVMA and AABP guidelines the farm must work with the VOR to update the SOP accordingly. To allow for consistency in the evaluation of SOPs, a SOP requirement summary sheet and templates have been provided highlighting specific items that must be included in each SOP. These are highlighted in **BLUE underlined italics** in each
SOP template (see SOP requirement list Appendix B2). SOPs must be signed by the veterinarian of record. In lieu of signing each SOP, the VOR may complete and sign the Annual SOP Review Checklist affirming that each SOP has been reviewed and reflect current practices on the farm. As farms are allowed to create their own SOPs, which may include combined 1 or more topics, it is the responsibility of the auditor to become familiar with the SOP requirements and AVMA and AABP guidelines so that they may evaluate adequately whether all areas are addressed and if SOPs are consistent with the referenced guidelines.

(a) SOPs
1. Herd Health Plan – includes at a minimum an SOP for vaccine, parasite, hoof health, udder health and sick cow monitoring programs.
2. Non-Ambulatory Cattle Care*
3. Euthanasia*
4. Management of the living environment for each age group
6. Fitness for Transport*
7. Maternity Management
8. Emergency Response
9. Biosecurity
10. Personnel Training

Evaluation –
C5a. A copy of each SOP, signed by the veterinarian of record, must be available for review. In lieu of signing each SOP, the VOR may complete and sign the Annual SOP Review Checklist affirming that each SOP has been reviewed and reflect current practices on the farm. SOPs will be reviewed to ensure that they meet the guidelines set forth by the AVMA and AABP as listed in the SOP requirement list. Mark yes if ALL the SOPs are complete and meet the minimum requirements. SOPs are not required for procedures that are not done on the farm. If it is observed that farm practices are not consistent with the written SOP, the farm does not get credit for the written SOP.
C6. Confirmation of employee familiarity with the SOP – While SOPs are necessary to establish that farm management has identified practices on the farm essential to promote the health and welfare of the cattle, the presence of an SOP is no guarantee that practices have been shared, understood or being followed. It is critical to confirm that employees have been instructed on specific SOPs and are implementing the SOPs correctly.

Evaluation –
C6. One SOP will be chosen at random and one of the caregivers responsible for that SOP will be interviewed. Mark yes if the caregiver confirms knowledge of the SOP and demonstrates clear understanding of their duty in agreement with the SOP. Mark NA if the farm has no employees or there were no employees on the farm at the time of the audit.
LEVEL 2 Audit Criteria — For the purpose of 2nd party audits, any Level 2 criterion that is not met on the day of the audit will require a corrective action to be developed and submitted within 90 days. Corrective action plans (CAPs) can be mailed, faxed or emailed in lieu of an on-site visit.

The Dairy Well audit has been designed to provide the best opportunity to evaluate various animal welfare outcome measures consistently and adequately. When possible, it is preferred to time the evaluation of each age group around feeding so that they are standing, making observations of injuries, body condition and hygiene possible. It is recognized that this is not always manageable. If groups of animals are lying down while operations are being recorded, it is recommended that the auditor walk amongst the animals, quietly, as this will often encourage them to stand. Cows believed to be non-ambulatory may be provided encouragement to stand (gentle knee to the rump) in an effort to evaluate their ability to stand. All other cattle should be left lying if they do not rise after a calm walking of the pen, and only cows standing will be evaluated. If the resulting number of cows scored is less than required by the minimum sample calculator, use the number scored and provide an explanation in the comment/notes section.

D. MILK FED CALVES - Resource Based - General Housing/Facility Design & Management:

D1. Environment – Facilities should be designed, constructed and maintained to provide and promote animal health and welfare, reduce the risk of injury, provide protection from extreme weather and prevent the development of injury.

(a) Pens/Housing Lying surface and Hygiene—All calf housing should be maintained in a manner to provide all calves’ access to a soft, dry resting area which minimizes injury. The “dryness” of the resting areas is evaluated using the hygiene score card (Appendix A3). The comfort of the resting area is evaluated in animal based measures using neck and other injuries. Lying surface will be evaluated by the presence of floor covering if not housed on pasture or grass. Bare rocks, wire, wood, metal or concrete are not considered a soft lying area.

(b) Space - All calves should have enough space to allow them to groom all parts of their body and turn fully around. Tethers may be used provided the tether is long enough that a calf can turn fully around and access shade/shelter when needed.

(c) Shelter – All calves should be provided protection from inclement weather such that they are able to avoid drafts, heat stress and cold stress.

(d) Additional Protection or measures to address extreme weather – All calves should be provided additional protection from inclement hot and cold weather. This may include overhead shade, fans, deep bedding, heat, calf jackets, an increase in calories fed or tools such as temperature gauges to monitor calf housing for temperature.
(e) **Water Cleanliness** – All calves should have access to clean water free of gross contamination including feed or feces.

*Scientific evidence* Lying down is an important behavior for growing cattle. Dairy calves typically spend about 18 h/d lying down (Chua et al., 2002; Panivivat et al., 2004), occupying about 70 to 80% of the day (Panivivat et al., 2004; Hänninen et al., 2005). Data suggest that inadequate lying times reduce growth and welfare level of dairy calves (Hänninen et al., 2005). Dairy calves showed clear preference for drier sawdust bedding and aversion to concrete lying surfaces (Camiloti et al., 2012). Also, Ninomiya and Sato (2009) found that greater amounts and more frequent additions of bedding increased sleeping posture and lying time in calves. In conclusion, access to soft and dry bedding is very important for growing calves.

Calves groom diverse parts of the body beginning at a very young age (Chua et al., 2002). Restriction of movement, and especially the ability to turn around, decreases calves’ possibility to perform natural behaviors, which start to occur at a space allowance below 16 sq ft (1.5 m²) (Le Neindre, 1993).

The thermo-neutral zone in young milk fed calves is dependent on age, nutrient intake, amount of subcutaneous fat, and length and thickness of hair coat (NRC 2001). Extreme climatic conditions cannot be compensated by thermoregulatory mechanisms of calves and result in increased mortality and morbidity and reduced weight gain, performance, and long-term survival of dairy calves (Donovan et al., 1998; Snowder et al., 2006). Thermic stress has a negative impact on animal welfare level (Silanikove, 2000).

During winter, placement of wet calves in outdoor hutches is not recommended (Callan and Garry, 2002). Provision of sufficient dry bedding to reduce cold stress and drafts in calves is essential when housing calves, particularly during cold conditions (Lago et al., 2006). During summer, calves housed in hutches are susceptible to heat stress depending on the environmental temperature (Moore et al., 2012). Elevation of the rear side of the hutch by 8 inches (20 cm) has been reported to cause the internal hutch temperatures to be cooler than external temperatures, as well as lowering hutch carbon dioxide levels and calf respiratory rates (Moore et al., 2012).

Although there is a growing body of evidence indicating that weight gains and health are improved when calves are provided milk volumes in excess of 10% BW equivalent (see review by Khan et al., 2011) the available evidence suggesting that calves increase milk intake in response to cold temperatures is inconclusive (e.g. Scibila et al., 1987; Richard et al. 1988; Borderas et al. 2009).

The use of calf jackets to provide additional thermal comfort for young milk fed calves has gained popularity over the last decades. To our knowledge, the scientific work available on this topic is limited to a single study evaluating the efficacy of calf jackets on the immunocompetence and performance of calves over the first 60 days of life artificially.
reared outdoors with and without jackets with that of calves reared indoors (Earley et al., 2004). This study found no benefits of calf jackets on these parameters.

Provision of a heat lamp for 24 hours has been found to be useful for resuscitating calves during the first 24 hours of life (Uystepruyst et al., 2002). Calves also show a preference for heated areas during the milk feeding period regardless of the milk feeding level and tend to be closest to the heat lamp during the coldest periods of the day when compared to warmer times of the day (Borderas et al., 2009).

To our knowledge no scientific work has looked at the effects of fans on reducing the impact of heat stress on milk fed calves. However, given the numerous beneficial effects known regarding adult cattle and the provision of cooling strategies, we speculate that calves would also benefit from cooling such as the use of fans in hot weather.

Being kept in muddy environments reduces growth rate in beef steers (Morrison et al., 1970), and decreased productivity may be mediated by additional energy requirements associated with walking in mud (Dijkman and Lawrence, 1997). Muddy and manure laden environments are thought to increase health problems such as lameness, as exposure to moisture can weaken the integrity of the hoof (Borderas et al., 2004).

The quality and management of housing and bedding is also reflected in the cattle’s hygiene. The goal is for at least 75% of the animals to score less than a three using the hygiene score card (Appendix A3). There are methodological challenges associated with scoring hygiene (repeatability of scores, scoring individual animals in pens without restraint, for example), but we have opted to include such measures to give some estimate of the degree of extremely dirty animals within a group, based on an assessment of the degree of manure contamination of the upper leg and flank (areas in contact with the lying area). Based on Cook and Reinemann (2007), the top 25% of farms could achieve 92 and 83% cows with reasonably clean upper legs and flanks in free and tie-stall housing, respectively. As there is no available literature on the nature and frequency of calf-hood injuries, we will begin by collecting observations of neck and other injuries.

**Expert perspective and consensus among professionals** The National Farm Animal Care Council of Canada (2009) Code of Practice for the Care and Handling of Dairy Cattle requires the following for young unweaned calves: 1) Calves must have a bed that provides comfort, insulation, warmth, dryness and traction. 2) Bare concrete is not acceptable as a resting surface. 3) Housing must allow calves to easily stand up, lie down, turn around, adopt normal resting postures, and have visual contact with other calves, 4) The bedded area for group-housed calves must be large enough to allow all calves to rest comfortably at the same time and 5) calves should be given 25% BW equivalent of milk intake in cold weather.

The OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle state that 1) newborn calves are susceptible to hypothermia. The temperature and ventilation of the birthing area should consider the needs of the newborn calf. Soft, dry bedding and supplemental heat can help prevent cold stress and 2) young calves are at particular risk of thermal stress. Thus, special attention should be paid to management of the thermal environment (e.g.
provision of additional bedding, nutrition or protection to maintain warmth and appropriate growth).

The OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle has come out with a clear standard in terms of ammonia levels stating that: “The ammonia level in enclosed housing should not exceed 25 ppm.” Given that this recommendation is based almost entirely on pig, laying hen and poultry meat studies and there is essentially no validated information on how best to measure this in dairy production systems the Dairy Well audit will not measure ammonia levels at this time.

**Public perspective** The first animal welfare policy documents published in the United Kingdom - The Brambell Report (1965) - stated that farm animals should have the freedom to "stand up, lie down, turn around, groom themselves and stretch their limbs". Within the United States the landmark passing of Proposition 2 in 2008 in California resulted in the following: “As of January 1, 2015: calves raised for veal, egg-laying hens and pregnant pigs be confined only in ways that allow these animals to lie down, stand up, fully extend their limbs and turn around freely.” The European Directive Section 2008/119/EC that housing calves individually is not allowed after 6 weeks of age. Although there is a growing body of evidence regarding the positive effects of providing social housing for young calves (see review by Costa et al., in press) the Dairy Well program will not audit this particular issue at this time.
**Evaluation**
Evaluate hygiene and housing for all calves on milk using the appropriate sample methodology for the number of calves and housing type.

**D1a.i. Hygiene** - Using the hygiene score card descriptions (Appendix A3) mark yes if >75% of calves score a 1 or 2. Mark NA if there are no milk calves on the facility.

**D1a. ii. Lying surface** – Mark yes if ALL calves are provided a soft substrate to lie on. Mark NA if there are no milk calves on the facility. **Bare concrete, rocks, wood, wire, metal are not considered a soft lying area.**

**D1b. Space** - Mark yes if all calves scored have enough room to turn around and lie down. Evidence for this includes calves facing both directions in the pen/hutch during the evaluation, feces at both the front and rear of a pen/hutch. Mark NA if there are no milk calves on the facility.

**D1c. Shelter** - Mark yes if the pen/hutch provides calves the opportunity to access an area protected from inclement weather. Mark NA if there are no milk calves on the facility.

**D1d. Additional Protection** – Depending on the time of year observation of such provisions may not be possible. In such cases, mark which additional protections are currently in place in addition to any reported by the owner/manager. Mark yes if at least one additional measure is provided for heat and cold. Shade may include permanent shade structures (other than the hutch/pen itself), patches of trees or temporary cloth (raised seasonally). Rows of trees may be considered as a wind break but not shade. The area of shade provided will not be measured at this time. Mark NA if there are no milk calves on the facility.

**D1e. Water Cleanliness** - If large troughs are used, the ‘clean water sheet’ (Appendix A1) must be easily read while submerged 6-10 inches below the water surface in 3 areas. All troughs in calf pens scored will be checked. Individual water sources, including water buckets used for calves, should be free from manure or other gross contamination. It is recognized that small amounts of grain or feed may be present as a result of calves eating. Small amounts of feed, algae along the bottom or sides of bucket are acceptable. Algae floating on the surface, fecal contamination or large amounts of feed obstructing the surface of the water resource need to be addressed. All water troughs/buckets scored must be in acceptable condition to meet this criterion. Mark yes if ALL water troughs/buckets are clean.
References


National Farm Animal Care Council. 2009. Code of Practice for the Care and Handling of Dairy Cattle, Copyright held jointly by Dairy Farmers of Canada and the National Farm Animal Care Council.


E. Animal Based Welfare Measures - Milk fed calves

**E1. Body Condition** - Calf body condition will be used as a high-level indicator of the overall quality of calf care as it may be impacted by several critical management areas including: dry cow, calving, colostrum and feeding management and sanitation. If more than 3% of calves are noted as being emaciated it is a sign that one or more of the management areas need improvement and should be addressed.

(a). **Condition** – No more than 3% of calves should score a 3 (emaciated as evidenced by prominent ribs, spine, hooks and pins); no more that 15% of calves should score a 2 (poor condition). (Pictures available/described in Appendix A4)

(b) **Care** - No calves should be emaciated *without current records providing evidence of ongoing treatment*.

**Scientific evidence** Body weight alone is not a good indicator of body reserves, as cattle of a specific weight may vary in terms of height and fat covering (Roche et al., 2004). The scale used to measure body condition score (BCS) in cows differs between countries, but low values always reflect emaciation and high values reflect obesity (Roche et al., 2004). In the United States, BCS is most often evaluated using a 5-point scale where 1 and 2 reflect emaciation and 4 and 5 reflect obesity (Edmonson et al., 1989). Roche et al., (2009) conclude that thin cows are at risk for succumbing to lameness, dystocia and ill health. Work on sheep provides some evidence that emaciation can induce hunger. Verbeek et al., (2012) reported that ewes with a low BCS (=2) were prepared to work harder for access to food compared to ewes of higher BCS (3 or 4).

To our knowledge there is no validated BCS system for dairy calves. Some authors (e.g. Batemen et al., 2009) have used a scoring system initially developed for cows, which is based on a 1 to 5 system using 0.25-unit increments with 1 being emaciated and 5 being obese (Wildman et al., 1982). Given that emaciated animals are particularly susceptible to cold stress and likely hunger, we assume that there are important benefits of preventing...
emaciation in all classes of dairy cattle (calves, heifers and adult cows). Given there is no data currently available that directly addresses this issue, current goals have been set using industry guidelines published by the Dairy Calf Heifer Association (2016). We will update this goal as necessary to reflect available data upon revision of the audit every 3 years.

Expert perspective and consensus among professionals The National Farm Animal Care Council of Canada (2009) Code of Practice for the Care and Handling of Dairy Cattle, in regard to BCS, states that animals with a body condition score indicating emaciation (as defined by Dairy Well as evidenced by prominent ribs, spine, hooks and pins) must not be transported. The OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle, including lactating and non-lactating states that: 1) “...body condition score outside an acceptable range... may be [an] indicator of compromised welfare.”

Evaluation - Evaluate body condition and housing for all calves on milk using the appropriate sample methodology for the number of calves and housing type.

E1a. i. Emaciated Body Condition - Use the calf body condition score card (Appendix A4) to evaluate for evidence of emaciation. Mark yes if ≤ 3% are observed to be emaciated. Mark NA if there are no milk calves on the facility.

E1a. ii. Poor Body Condition - Use the calf body condition score card (Appendix A4) to evaluate for evidence of calves with poor body condition. Mark yes if ≤15% of the calves are observed to have poor condition. Mark NA if there are no milk calves on the facility.

E1b. Care - Check treatment records to confirm treatment of emaciated calves if emaciated calves are observed. Mark yes, if treatment records confirm treatment of calves. Mark NA if there are no emaciated calves or if there are no milk calves on the facility.

References


National Farm Animal Care Council. 2009. Code of Practice for the Care and Handling of Dairy Cattle, Copyright held jointly by Dairy Farmers of Canada and the National Farm Animal Care Council.


**E2. Injuries** – Housing and handling should be provided such that risk of injury is minimized.

**Evaluation** – Evaluate injuries on the same calves evaluated for body condition. If a hospital pen is present for milk fed calves, score the entire pen and record the total as a percent separately.

**E2ai & ii.** Count and note the % of moderate & severe injuries as described in the score sheet (Appendix A6). Specifically, in calves, wounds from caustic paste that may have smeared or run down the face/ear, or rubbed onto other calves in group pens should be noted. Specifically, in calves, wounds from caustic paste that may have smeared or run down the face/ear should be noted.

**E3. Painful Procedures** – SOPs will be reviewed for *all painful procedures practiced on farm* for use of pain mitigation and acceptable methods. Only disbudding/dehorning will be evaluated by examining calves during the audit as other painful procedures including castration, extra teat removal and branding are often done off site OR are difficult to confirm based on observation without handling the calves. SOPs must be signed by the veterinarian of record and describe the age at which the procedure is done, pain mitigation provided, method used and the person responsible.

**Disbudding or dehorning**

(a) **Method** - Paste or Cautery can be used.

(b) **Age completed** – should be completed before 8 weeks of age

(c) **Analgesia** – should always be provided

(d) **Anesthesia** – should always be provided
**Scientific evidence**

*Age.* The current convention is to disbud at or before 8 weeks of age (AVMA, 2008). To minimize the damage and invasiveness of the procedure, it should be carried out before this time.

*Method and pain relief.* Cautery methods are the most common (68% heifers, USDA, 2010a) and there is ample evidence that both a local nerve block and administration of a non-steroidal anti-inflammatory (NSAID) reduce the behavioral and physiological signs of pain (Stafford and Mellor, 2011). Use of paste to chemically destroy horn tissue is less common (9% operations, USDA, 2010a), but is also painful (Stafford and Mellor, 2011). The best way to alleviate this pain is unclear, as evidence about the efficacy of both local anesthesia and analgesia is mixed (Stafford and Mellor, 2011, Braz et al., 2012). Thus, both local anesthesia and analgesia are required as a precautionary measure. For chemical disbudding, however, use of a ring block as part of the local anesthesia is not recommended, as it may interact with the caustic paste and cause pain (Vickers et al., 2005).

*Expert perspective and consensus among professionals* The AVMA recognizes that “combined use of an anesthetic and analgesic appears to represent the most effective method for controlling pain associated with dehorning” (AVMA, 2008). The above decisions are more stringent than the recommendations outlined by AABP, in that we require disbudding at an earlier age while AABP recommends the procedure be before the horn base is less 1” in diameter, (AABP, 2014). The NMPF (2016) has similar guidelines in terms of age, but is broader in their recommendations about pain mitigation referring to consultation with herd veterinarian, rather than the multimodal approach required by Dairy Well.

*Public perspective* An online survey of 354 participants found that 90% thought pain relief should be provided for disbudding/dehorning (Robbins et al., 2015).
**Evaluation** – Evaluate the same calves for disbudding/dehorning that were evaluated for body condition.

**E2a. Method**- Calves will be observed for evidence of the method used to dehorn/disbud. Mark the box which best describes the method being used. If there are any injuries as the result of disbudding/dehorning, including burns (caustic or hot iron) beyond the cornual ring, these should be counted in the injury section.

**E2b. Age**- Calves will be observed for evidence of the age used to dehorn/disbud. Mark yes if calves the protocol indicates that calves are disbudded/dehorned <8 weeks of age and there is evidence that it is being carried out at the time specified in the protocol.

**E2c. NSAID provided** – Mark yes if the protocol indicates an NSAID is provided and there is evidence that NSAID are being used (i.e. NSAID on approved drug list, in drug cabinet and or employee describes proper use).

**E2d. Local provided**- Mark yes if the protocol indicates a local is provided and there is evidence that a local is being given (i.e. Local anesthetic on approved drug list, in the drug cabinet, employee describes use and lack of excessive burn margins.)

References


**Castration** - Both local and NSAID should be provided at the time of castration and the procedure completed as young as possible. Use of bands or rubber rings at all ages are discouraged.
Scientific evidence

Method. Castration by banding is known to cause lasting pain (Thuer et al., 2007, Marti et al., 2010, Becker et al., 2012), more than either crushing or surgical removal. This pattern of chronic pain is apparent in older animals, but also those castrated with bands or rings at 5-7 days of age (up to at least 48 days afterward) (Molony et al., 1995). Thus, because use of bands or rings cause pain over a longer period than other methods, and this pain is not easily controlled by local anesthetic or NSAIDs, their use is discouraged.

Age. Comparisons among ages are fraught with challenge, as the physiology and behavior change with time. There are several arguments supporting the idea that performing castration at a younger age is beneficial. Firstly, castrating smaller animals results in less tissue damage because the testes are also smaller. Secondly, it has been proposed that younger animals heal quicker (and therefore are assumed to experience pain for a shorter length time) than older animals. There is preliminary evidence suggesting that this is the case of surgical castration (less than 1 wk vs 10 to 11 wk) (Norring et al., preliminary data). Despite these benefits, painful procedures earlier in life make animals more sensitive to pain at a later age. For example, lambs castrated at 1 day of age are more responsive to tail docking several weeks later than lambs castrated at 10 days of age (McCracken et al., 2010). At the time of writing, it is unknown if castrating calves early in life has this type of sensitizing effect.

Pain relief. Both local anesthesia and NSAID provide immediate benefit, when provided in combination, in young dairy calves (Webster et al., 2013). Neither likely address long-term pain, over days and weeks of healing (Mintline et al., 2014).

Expert perspective and consensus among professionals The AVMA discourages use of banding/rings as a method of castration (American Veterinary Medical Association, 2012) because of the long-term pain associated with this method. The above decisions are more stringent than the recommendations outlined by American Association of Bovine Practitioners, in that we require pain relief at any age and discourage the use of band/rings (American Association of Bovine Practitioners, 2014).

Evaluation – This is addressed in section B5a. As confirmation of this would require handling of individual calves, the presence of an SOP will be considered sufficient. There are no additional questions in the audit tool regarding castration beyond the presence of an SOP.

References


Extra Teat Removal and Branding Extra teats should be removed at a young age, before 12 weeks and farmers should work with their veterinarians to mitigate the pain associated with the procedure or elect to avoid the procedure all together. Pain mitigation is required for branding. Branding should only be done to meet state or export requirements. Branding for individual identification and face branding is prohibited.

Scientific evidence Hot-iron and freeze branding are painful at the time of the procedure (Schwartzkopf-Genswein et al., 1998). Hot-iron brands remain more sensitive than unbranded tissue throughout the healing process (Tucker et al., 2014). Little is known about how to control either the immediate or long-term pain associated with this procedure, thus branding should be limited to meet state or export requirements, is not allowed to be used for individual identification and never done on the face.

Similarly, extra teat removal has not been studied, nor is any information available about how to mitigate pain associated with the process. Early removal is recommended to minimize the amount of tissue damage associated with the process.

The decision points in both cases were to err on the side of caution, in the absence of scientific evidence.

Expert perspective and consensus among professionals National Milk Producers Federation (NMPF, 2016) recommends that branding be done concurrently with dehorning and castration to take advantage of pain relief provided for these procedures. They also recommend consultation with the herd veterinarian to evaluate the necessity of branding.

National Milk Producers Federation recommends extra teat removal at the earliest age possible and to consult the herd veterinarian about pain mitigation during this process. NFACC (2009) Canadian Code of Practice for the Care and Handling of Dairy Cattle requires that teat removal must be performed by trained personnel and recommends pain control.

Evaluation -
This is addressed in section B5a. As confirmation of this would require handling of individual calves, the presence of an SOP will be considered sufficient. There are no additional questions in the audit tool regarding castration beyond the presence of an SOP.

References
National Farm Animal Care Council. 2009. Code of Practice for the Care and Handling of Dairy Cattle, Copyright held jointly by Dairy Farmers of Canada and the National Farm Animal Care Council.

F. GROWING HEIFERS Resource Based - General Housing/Facility Design & Management

F1. Environment - Facilities should be designed and maintained to provide and promote animal health and welfare, reduce risk of injury and provide protection from extreme weather.
   (a) Housing - Growing heifers should be provided with a soft and dry resting area - designed to limit injury. The “dryness” of the resting areas is evaluated using the hygiene score card (Appendix A3). Lying surface will be evaluated based on the presence of ground cover if not housed on pasture/grass/dry lot. Bare rocks, wire, metal or concrete are not considered a soft laying area.

   (b) Shade - Overhead shade should be available to provide protection from heat stress and inclement weather.

   (c) Additional protection from inclement weather - Additional protection from inclement weather should be provided. Such provision may be in the form of one or more of the following: overhead shade at the feed bunk, fans, soakers, wind breaks or other.
(d) **Water Cleanliness** – All heifers should have access to clean, fresh water free from gross contamination including feed, algae or feces.

**Scientific evidence**

(a) **Housing.** Cattle show clear preferences for soft and dry lying areas (Tucker et al., 2003, Fregonesi et al., 2007) and lying time is reduced when surfaces are hard (Haley et al., 2000) or wet (Haley et al., 2000, Fregonesi et al., 2007). Unyielding and poorly bedded lying surfaces are the key risk factor for leg injuries, namely swelling, open wounds and hair loss on the hock and knees (Barrientos et al., 2013, Zaffino Heyerhoff et al., 2014).

The goal is for at least 75% of the animals to be reasonably clean on the upper leg and flank. There are methodological challenges associated with scoring hygiene (repeatability of scores, scoring individual animals in pens without restraint, for example), but we have opted to include such measures to give some estimate of the degree of extremely dirty animals within a group, based on an assessment of the degree of manure contamination of the upper leg and flank (areas in contact with the lying area). Based on Cook and Reinemann (2007), the top 25% of farms could achieve 92 and 83% cows with reasonably clean upper legs and flanks in free and tie-stall housing, respectively. As there is no available literature on the nature and frequency of injuries in weaned heifers, we will begin by collecting observations of broken tails, neck and other injuries.

(b) **Shade.** There are lines of evidence that dairy cattle are motivated to seek shade in warm ambient conditions. They will chose shade over other important behaviors, such as rest (Schütz et al., 2008) and show preferences for shade that provides relatively more protection from solar radiation (Schütz et al., 2009). Shade seeking is one of the first responses to solar radiation and mitigates increases in physiological responses to heat, such as respiration rate and body temperature (West, 2003).

(c) **Additional protection from inclement weather: fans, soakers, wind breaks.** When dairy cows accumulate heat load, production and welfare problems result, including increased body temperature, decreased milk yield (Wheelock et al., 2010) and fertility (De Rensis and Scaramuzzi, 2003), and in extreme cases, mortality (Stull et al., 2008, Morignat et al., 2014). Compared to shade alone, soakers reduce body temperature, respiration rate, and localized air temperature (Kendall et al., 2007, Chen et al., 2013). If given a choice, cows prefer to feed from bunks with soakers; they spend more time at the bunk with them than those without (Chen et al., 2013). Fans improve heat loss and are often provided in combination with soakers (West, 2003). In winter, cattle will use man-made windbreaks (Olson and Wallander, 2002) and shelters that provide protection from rain (Vandenheede et al., 1995). In addition to use of windbreaks, cattle also use conspecifics for protection (Graunke et al., 2011) and will orient towards the sun in cold winter weather (Gonyou and Stricklin, 1981). Although most of the evidence about the use of wind breaks and response to cold weather comes from literature with beef cattle, we assume that benefits of protection also apply to dairy animals.
(d) Water Cleanliness - See section A1.

**Expert perspective and consensus among professionals** The NFACC (2009) Code of Practice for the Care and Handling of Dairy Cattle requires that lying areas minimize hock and knee injuries and deems that bare concrete and hard rubber mats without bedding are unacceptable. The NMPF (2016) recommends that protection from heat and cold be provided to animals of all age classes. Both NMPF (2016) and European-wide Welfare Quality use a hygiene scoring system to assess the cleanliness of the environment. Although the OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle recognizes shade, water cooling and fans as appropriate for heat abatement, they only clearly require that sick or non-ambulatory cattle should be provided shade. To our knowledge, few other organizations directly address the ability to groom and exercise untethered.

**Public perspective** Some European countries (e.g. Switzerland) require exercise for tethered cattle and within the US there have been numerous state laws passed banning tethering or restricting the movement of other species, namely sows and veal calves. The continued use of tie stall housing is being questioned in some European countries. For example, building new tie stall housing in Norway was outlawed in 2004, with a complete ban of this housing type scheduled for 2023 (Barkema et al., 2015). Within the US, some animal welfare labels, such as Certified Humane and Animal Welfare Approved, will not allow tethered cattle into their dairy programs, presumably because they place emphasis on the animals’ ability to perform natural behaviors such as walking, grooming and social contact. Regarding hygiene and housing, a recent online survey of 491 US citizens reported that participants placed great value on dairy cows being clean, healthy and free of disease equating these characteristics to improved milk quality (Cardoso et al., 2016).
**Evaluation** – Evaluate hygiene and housing for heifers using the appropriate sample methodology for the number of heifers.

**F1a.i. Hygiene** - Using the hygiene score card descriptions (Appendix A3), mark yes if >75% of heifers score a 1 or 2. Mark NA if heifers are not raised on the farm.

**F1a.ii. Lying Surface** – Mark yes if the ALL heifers are provided additional substrate to lay on (sawdust, straw, compost or other bedding acceptable). Bare mattresses, concrete or water beds do not count as a substrate. Mark NA if heifers are not raised on the farm.

**F1b. Shade** – Evaluate all heifer pens for shade. Shade may include permanent shade structures, patches of trees or temporary cloth (raised seasonally). Rows of trees may be considered a wind break but not shade. The area of shade provided will not be measured at this time. Mark yes if shade is provided to every group of heifers. Mark NA if heifers are not raised on the farm.

**F1c. Additional Protection** – Evaluate all heifer pens for additional protection. Depending on the time of year observation of such provisions may not be possible. In such cases mark which additional protections are currently in place in addition to any reported by the owner/manager. Mark yes if at least one additional measure is provided for heat and cold. Mark NA if heifers are not raised on the farm.

**F1d. Water Cleanliness** - If large troughs are used, the ‘clean water sheet’ (Appendix A1) must be easily read while submerged 6-10 inches below the water surface in 3 areas. All troughs in the heifer pens scored for hygiene will be evaluated. Individual water sources should be free from manure or other gross contamination. It is recognized that small amounts of grain or feed may be present because of cattle eating. Small amounts of feed- or algae along the bottom or sides of troughs/waterers are acceptable. Algae floating on the surface, feces or large amounts of feed obstructing the entire surface of the water resource need to be addressed. All water troughs scored must be in acceptable condition to meet this criterion. Mark yes if ALL the troughs/buckets are clean.

**References**


G. Growing Heifers - Animal Based Welfare Measures -

G1. Body Condition
(a) There should be no emaciated (saw toothed spine, prominent ribs, hooks and pins) heifers
(b) If present, emaciated heifers should be receiving treatment.

**Scientific evidence** Body weight alone is not a good indicator of body reserves, as cattle of a specific weight may vary in terms of height and fat covering (Roche et al., 2004). The scale used to measure BCS in cows differs between countries, but low values always reflect emaciation and high values reflect obesity (Roche et al., 2004). In the United States BCS is most often evaluated using a 5-point scale where 1 and 2 reflect emaciation and 4 and 5 reflect obesity (Edmonson et al., 1989). Roche et al., (2009) conclude that thin cows are at risk for succumbing to lameness, dystocia and ill health. Work on sheep provides some evidence that emaciation can induce hunger. Verbeek et al., (2012) reported that ewes with a low BCS (=2) were prepared to work harder for access to food compared to ewes of higher BCS (3 or 4).

Given that emaciated animals are particularly susceptible to cold stress and likely hunger, we assume that there are important benefits of preventing emaciation in all classes of dairy cattle (calves, heifers and adult cows).

**Expert perspective and consensus among professionals** The National Farm Animal Care Council of Canada (2009) Code of Practice for the Care and Handling of Dairy Cattle, in regards to BCS, states that animals with a body condition score indicating emaciation (as defined by Dairy Well as cattle with a saw-toothed spine, prominent ribs, hooks and pins) must not be transported. The OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle, including lactating and non-lactating states that: “...body condition score outside an acceptable range... may be [an] indicator of compromised welfare.”
**Evaluation** – Evaluate body condition (using the cow body condition score card, Appendix A5) on the same heifers scored for hygiene. If a hospital or chronic pen is present for heifers, score the entire pen and record the total as a percent separately.

**G1a.** Mark yes if there were no emaciated heifers observed. Mark NA if heifers are not raised on the farm.

**G1b.** Check treatment records to confirm treatment if emaciated heifers are noted. Mark yes emaciated heifers are receiving treatment. Mark NA if there were no emaciated heifers noted or heifers are not raised on the farm.

**References**


National Farm Animal Care Council. 2009. Code of Practice for the Care and Handling of Dairy Cattle, Copyright held jointly by Dairy Farmers of Canada and the National Farm Animal Care Council.


**G2. Injuries** – Housing and handling should be provided such that risk of injury is minimized.

**Evaluation** – Evaluate injuries on the same heifers evaluated for body condition and hygiene using the neck and other injury scorecard (Appendix A6). If a hospital or chronic pen is present for heifers, score the entire pen and record the total as a percent separately.

**G2a. Broken tails** - Count and note the % of broken tails as described in the broken tail score card (Appendix A9).

**G2bi & ii. Neck & Other Injuries** - Count and note the % of moderate and severe neck and other injuries as described in the score sheet.
H. LACTATING COWS Resource Based - General Housing/Facility Design & Management:

H1. Environment - Facilities should be designed and maintained to provide and promote animal health and welfare, reduce risk of injury and provide protection from extreme weather. The quality of the space provided regarding comfort will be further evaluated using locomotion and injury scores.

(a) Housing- Cows should be provided a soft and dry resting area designed to limit injury. The “dryness” of the resting areas is evaluated using the hygiene score card (Appendix A3). The “softness” of the resting area is evaluated in animal based measures using hock and knee scores.

(b) Shade - Overhead shade should provide protection from heat stress.

(c) Protection - Additional protection from inclement weather should be provided. Such provision may be in the form of one or more of the following: overhead shade at the feed bunk, fans, soakers, wind breaks or other.

(d) Water Cleanliness – All lactating should have access to clean, fresh water free from gross contamination including feed, algae or feces.

(e) Tie Stalls & Stanchion Barns –
   1. For tie-stall and stanchion barns, cows should be released daily from stalls, and allowed to groom and move freely (untethered).
   2. Trainers – Trainers should not touch the cows while standing in a normal position in the stall.

Scientific evidence

a) Housing - Soft and dry resting area. Cattle show clear preferences for soft and dry lying areas (Tucker et al., 2003, Fregonesi et al., 2007) and lying time is reduced when surfaces are hard (Haley et al., 2000) or wet (Haley et al., 2000, Fregonesi et al., 2007). Unyielding and poorly bedded lying surfaces are the key risk factor for leg injuries, namely swelling, open wounds and hair loss on the hock and knees (Barrientos et al., 2013, Zaffino Heyerhoff et al., 2014).

The goal is for at least 75% of the animals to score <3 using the hygiene score card. There are methodological challenges associated with scoring hygiene (repeatability of scores, scoring individual animals in pens without restraint, for example), but we have opted to include such measures to give some estimate of the degree of extremely dirty animals within a group, based on an assessment of the degree of manure contamination of the upper leg and flank (areas in contact with the lying area). Based on Cook and Reinemann (2007), the top 25% of farms could achieve 92 and 83% cows with reasonably clean upper legs and flanks in free and tie-stall housing, respectively.
b) Shade. There are lines of evidence that dairy cattle are motivated to seek shade in warm ambient conditions. They will choose shade over other important behaviors, such as rest (Schütz et al., 2008) and show preferences for shade that provides relatively more protection from solar radiation (Schütz et al., 2009). Shade seeking is one of the first responses to solar radiation and mitigates increases in physiological responses to heat, such as respiration rate and body temperature (West, 2003).

c) Additional protection from inclement weather: fans, soakers, wind breaks. When dairy cows accumulate heat load, production and welfare problems result, including increased body temperature, decreased milk yield (Wheelock et al., 2010) and fertility (De Rensis and Scaramuzzi, 2003), and in extreme cases, mortality (Stull et al., 2008, Morignat et al., 2014). Compared to shade alone, soakers reduce body temperature, respiration rate, and localized air temperature (Kendall et al., 2007, Chen et al., 2013). If given a choice, cows prefer to feed from bunks with soakers; they spend more time at the bunk with them than those without (Chen et al., 2013). Fans improve heat loss and are often provided in combination with soakers (West, 2003). In winter, cattle will use man-made windbreaks (Olson and Wallander, 2002) and shelters that provide protection from rain (Vandenheede et al., 1995). In addition to use of windbreaks, cattle also use conspecifics for protection (Graunke et al., 2011) and will orient towards the sun in cold winter weather (Gonyou and Stricklin, 1981). Although most of the evidence about the use of wind breaks and response to cold weather comes from literature with beef cattle, we assume that benefits of protection also apply to dairy animals.


e1) Tie-Stalls - Cows are released daily from stalls, allowed to groom and move freely (untethered). When untethered, cattle use this time to groom parts of the body that they cannot reach while tied (Krohn, 1994, Loberg et al., 2004), interact with other cows and to move (Loberg et al., 2004, Veissier et al., 2008). Tie-stall farms that provide outdoor access have lower levels of lameness (Popescu et al., 2013) and reduced risk of hock injuries (Keil et al., 2006) than those that do not. Cattle with daily exercise have fewer illnesses requiring veterinary attention and had fewer hock injuries (Gustafson et al., 1993) than those with no exercise. We speculate that weather and cleanliness of the environment may mediate some of the health benefits of outdoor access, in part, because of discrepancies within the literature. For example, year-round exposure increased risk for common hoof disorders in one study (Cramer et al., 2009), but not in another (Regula et al., 2004). Finally, longer intervals between periods of exercise has shown to increase aggression when cattle are released into a group, at least in some breeds (Castro et al., 2011). The importance of allowing tied cattle opportunities for social interaction, both positive and negative, has received relatively little attention from the scientific community. Indeed, little is known about the timing and amount of outdoor access needed to provide benefits. Studies vary in the level of detail provided, from asking farmers to categorize outdoor access as “never, seasonally or year-round” (Cramer et al., 2009) to controlling the distance walked (2-3 km/d for 6 mo/year and 400 to 800 m/d for 6 mo/year vs. tied without any exercise; Gustafson et al., 1993). In summary, the literature overall indicates that being released from tie stalls/stanchions is beneficial from an animal welfare perspective compared to being tied
without this opportunity. However, many questions remain about the optimal environment (pasture vs. outdoor yard vs. indoor open area) and release frequency (number of days, spacing between days) and duration (number of hours/d, distance walked). We framed this decision point in terms of daily access as a best guess based on this uncertainty.

**e2) Electric cow trainers do not touch animals in a standing position.** Cattle find electric shock aversive (Pajor et al., 2000). Electric cow trainers reduce the amount of manure in the back of the stall and moisture in the sole horn (Bergsten and Pettersson, 1992). Moreover, their use is positively associated with the prevalence of dirty cows on tie-stall farms (Zurbrigg et al., 2005b) and is a risk factor for mastitis (Oltenacu et al., 1998), possibly because they are seen as a way to improve hygiene and thus used on farms with this challenge. In addition, their use is also a risk factor for hock (Zurbrigg et al., 2005b) and soft tissue injuries (Busato et al., 2000).

**Expert perspective and consensus among professionals** The National Farm Animal Care Council of Canada (2009) Code of Practice for the Care and Handling of Dairy Cattle requires that lying areas minimize hock and knee injuries and deems that bare concrete and hard rubber mats without bedding are unacceptable. They also require correct placement of electric cow trainers. The NMPF (2016) recommends that protection from heat and cold be provided to animals of all age classes. Both NMPF (2016) and European-wide Welfare Quality use a hygiene scoring system to assess the cleanliness of the environment. Although the OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle recognizes shade, water cooling and fans as appropriate for heat abatement, they only clearly require that sick or non-ambulatory cattle should be provided shade. To our knowledge, few other organizations directly address the ability to groom and exercise untethered.

The OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle has come out with a clear standard in terms of ammonia levels stating that: “The ammonia level in enclosed housing should not exceed 25 ppm.” Given that this recommendation is based almost entirely on pig, laying hen and poultry meat studies and there is essential no validated information on how best to measure this in dairy production systems the Dairy Well audit will not measure ammonia levels at this time.

**Public perspective** Some European countries (e.g. Switzerland) require exercise for tethered cattle and within the US there have been numerous state laws passed banning tethering or restricting the movement of other species, namely sows and veal calves. The continued use of tie stall housing is being questioned in some European countries. For example, building new tie stall housing in Norway was outlawed in 2004, with a complete ban of this housing type scheduled for 2023 (see review Barkema et al., 2015). Within the US, some animal welfare labels, such as Certified Humane and Animal Welfare Approved, will not allow tethered cattle into their dairy programs, presumably because they place emphasis on the animals’ ability to perform natural behaviors such as walking, grooming and social contact. Lastly, a recent online survey of 491 US citizens reported that participants placed great value on dairy cows being clean, healthy and free of disease equating these characteristics to improved milk quality (Cardoso et al., 2016).
**Evaluation** – Evaluate hygiene and housing for lactating cows using the appropriate sample methodology for the number of cows in the pen/group being scored.

**H1a. Hygiene** – Using the hygiene score card descriptions (Appendix A3), mark yes if >75% of cows score a 1 or 2.

**H1b. Shade** – Evaluate ALL lactating cow pens for shade. Shade may include permanent shade structures, patches of trees or temporary cloth (raised seasonally). Rows of trees may be considered a wind break but not as shade. The area of shade provided will not be measured at this time. Mark yes if shade is provided to **every** group of lactating cows.

**H1c. Additional Protection** – Evaluate all lactating cow pens for additional protection. Rows of trees may be considered a wind break but not as shade. Mark yes if at least one additional measure is provided for heat and cold to **every** group of lactating cows.

**HF1d. Water Cleanliness** – If large troughs are used, the ‘clean water sheet’ (Appendix A1) must be easily read while submerged 6-10 inches below the water surface. The troughs in the pen scored for hygiene will be evaluated. Individual water sources should be free from manure or other gross contamination. It is recognized that small amounts of grain or feed may be present as a result of cattle eating. Small amounts of feed, algae along the bottom or sides of troughs/waterers are acceptable. Algae floating on the surface, feces or large amounts of feed obstructing the surface of the water resource need to be addressed. All water troughs scored must be in acceptable condition to meet this criterion. Mark yes if **ALL** the troughs/buckets are clean.

**H1e.i. Tie-Stall Release** – Mark yes of the owner reports that cows are released from tie-stalls or if you observe that the practice is in place. Check the boxes that best describe the area to and period for which cows are released.

**H1e.ii. Tie-Stall Trainers** – Mark yes if trainers do not touch any of the observed cows while standing in a normal position.

**References**


I. Lactating Cows Animal Based Welfare Measures

I1. Body Condition

(a) Emaciated cows; as defined by a saw-toothed spine, prominent ribs, hooks and pins (illustrated in Appendix A5), should not be present in the lactating herd and if so noted there should be records providing evidence of ongoing diagnosis and treatment.

Scientific evidence Body weight alone is not a good indicator of body reserves, as cattle of a specific weight may vary in terms of height and fat covering (Roche et al., 2004). The scale used to measure BCS in cows differs between countries, but low values always reflect emaciation and high values reflect obesity (Roche et al., 2004). In the United States BCS is most often evaluated using a 5-point scale where 1 and 2 reflect emaciation and 4 and 5 reflect obesity (Edmonson et al., 1989). Roche et al., (2009) conclude that thin cows are at risk for succumbing to lameness, dystocia and ill health. Work on sheep provides some evidence that emaciation can induce hunger. Verbeek et al., (2012) reported that ewes with a low BCS (=2) were prepared to work harder for access to food compared to ewes of higher BCS (3 or 4).

Given that emaciated animals are particularly susceptible to cold stress and likely hunger, and are at greater risk for disease, we assume that there are important benefits of preventing emaciation in all classes of dairy cattle (calves, heifers and adult cows).

Expert perspective and consensus among professionals The NFACC (2009) Code of Practice for the Care and Handling of Dairy Cattle, in regards to BCS, states that animals with a body condition score indicating emaciation (as defined by Dairy Well to be saw toothed spine, prominent ribs, hooks and pins) must not be transported. The OIE (2015) Terrestrial Animal Health Standards for Dairy Cattle, including lactating and non-lactating states that: 1) “…body condition score outside an acceptable range... may be [an] indicator of compromised welfare.”

Evaluation - Evaluate body condition using the cow body condition score card (Appendix A5) and the appropriate sample methodology for the number of cows in the pen/group being scored.

I1a. Count and record the number and percent of emaciated cows. The hospital/sick or lame pens will also be evaluated for the presence of emaciated cows and to document if they are receiving treatment. Record separately, both the percent total of emaciated cows in the scored lactating pen and sick pen. Mark yes if there were no emaciated cows.

I1b. If emaciated cows are noted, treatment records will be checked to confirm the cow(s) are receiving treatment. Mark yes if all emaciated cows were receiving treatment. Mark N/A if there were no emaciated cow on the day of the audit.
References


National Farm Animal Care Council. 2009. Code of Practice for the Care and Handling of Dairy Cattle, Copyright held jointly by Dairy Farmers of Canada and the National Farm Animal Care Council.


I2. Locomotion – See Appendix A8 for descriptions of locomotion scoring.

(a) Lame – No more than 15 % of the scored lactating cows should be “lame”

(b) Severely Lame – No more than 1% of the scored lactating cows should be “severely lame”
(i) Severely lame cows should be kept separate from the lactating group and be receiving treatment. Treatment will be verified by comparing current treatment records with cows currently identified as severely lame.

(c). Locomotion Performance Benchmark: The timing of a follow-up audit to confirm that corrective actions have been implemented and to evaluate progress will be determined based on the poorest performing outcome benchmark across locomotion and hocks.

<table>
<thead>
<tr>
<th>Locomotion Performance Benchmark:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top 76-100%</strong></td>
</tr>
<tr>
<td><em>(≤15% moderate lameness, ≤1% severe lameness)</em></td>
</tr>
<tr>
<td><strong>Middle 26-75%</strong></td>
</tr>
<tr>
<td><em>(16-32% moderate lameness, 2-5% severe lameness)</em></td>
</tr>
<tr>
<td><strong>Bottom 25%</strong></td>
</tr>
<tr>
<td><em>(&gt;32% moderate lameness, &gt;5% severe lameness)</em></td>
</tr>
</tbody>
</table>
Scientific evidence - The worldwide prevalence of lameness (cows showing noticeable weight transfer off the affected limb) in dairy herds is ~ 25% across studies based in Austria, Canada, China, Finland, Germany, Italy, Netherlands, New Zealand, Norway, UK and the US (eg. Amory et al., 2006; Barker et al., 2010; Chapinal et al., 2014; Dippel et al., 2009; Fabian et al., 2014; Kielland et al., 2009; Popescu et al., 2014; Sarjokari et al., 2013; von Keyserlingk et al. 2012), with a trend toward lower prevalence in grazing systems (e.g. 8%, New Zealand; Fabian et al. 2014), and a higher prevalence in confinement housed freestall herds.

Dairy producers tend to underestimate the amount of lameness in their herds (Espejo et al, 2006; Fabian et al., 2014), and it is clear from recent reports in the US that interventions to reduce the risk for lameness are lagging (e.g. von Keyserlingk et al. 2012). However, there exists enormous variation between and within countries and production systems, suggesting that lameness is not an inevitable consequence of current dairy management and housing practices.

By setting goals that match the achievable levels of lameness observed in the upper quartile of dairy herds, and using the degree of non-conformance to determine the interval between re-evaluations, it is hoped that Dairy Well locomotion assessments will drive the motivation required to substantially reduce lameness risk in our dairy industry.

Benchmarks were set based on review of the available peer reviewed literature since 2003 summarized in Table 2, and access to individual herd data from recent surveys of US dairy herds (von Keyserlingk et al., 2012; Cook et al., 2016). The cut-points will be evaluated and adjustments incorporated every three years when the audit is updated taking into consideration new published literature.

Expert perspective and consensus among professionals Lameness – an abnormal gait caused by a painful lesion to one or more limbs – is a serious, debilitating condition affecting dairy cattle, which impacts an individual cow’s ability to eat, rest, milk, reproduce and survive in the herd. It is a painful condition causing obvious suffering during life, and creates significant challenges for the humane handling of cattle at slaughter.
While score 2 and 3 cows will be recorded where possible, it is understood that scoring is difficult to achieve in tie-stalls as evaluating locomotion in a standing position has proven to be inadequate. Therefore, in situations where cows are not released from their stalls the locomotion evaluation will be judged on severely lame cow thresholds alone. Where cows in tie-stalls are released daily, locomotion scores will be observed after milking when cows are released from the barn.

<table>
<thead>
<tr>
<th>First Author</th>
<th>Date</th>
<th>Reference</th>
<th>Country</th>
<th># herds</th>
<th>Mean Lameness %</th>
<th>Range Lameness %</th>
<th>Mean Severe Lameness %</th>
<th>Range Severe Lameness %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barberg</td>
<td>2007</td>
<td>JDS 90:1575-1583</td>
<td>USA (MN)</td>
<td>12</td>
<td>7.8</td>
<td>0 to 22.4</td>
<td>1.2</td>
<td>0 to 16.7</td>
</tr>
<tr>
<td>Richert</td>
<td>2013</td>
<td>JDS 96:5018-5026</td>
<td>USA (NY, OR, WI)</td>
<td>282</td>
<td>8</td>
<td>0 to 54</td>
<td>1.8</td>
<td>0 to 20.2</td>
</tr>
<tr>
<td>Fabian</td>
<td>2014</td>
<td>VetJ 201:31-38</td>
<td>NZ</td>
<td>59</td>
<td>8.3</td>
<td>1.2 to 36</td>
<td>1.8</td>
<td>0 to 20.2</td>
</tr>
<tr>
<td>Cook</td>
<td>2016</td>
<td>JDS 99:5879-5891</td>
<td>USA (WI)</td>
<td>66</td>
<td>13.2</td>
<td>2.8 to 36.1</td>
<td>2.5</td>
<td>0 to 15.7</td>
</tr>
<tr>
<td>Westin</td>
<td>2016</td>
<td>JDS 99:3732-3743</td>
<td>Canada and US</td>
<td>36</td>
<td>15</td>
<td>2.5 to 46</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Amory</td>
<td>2006</td>
<td>JDS 89:1509-1515</td>
<td>Netherlands</td>
<td>19</td>
<td>16.5</td>
<td>3.8 to 30.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kielland</td>
<td>2009</td>
<td>JDS 92:5487-5496</td>
<td>Norway</td>
<td>232</td>
<td>16.9</td>
<td>4.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Husfeldt</td>
<td>2012</td>
<td>JDS 95:5626-5075</td>
<td>USA (MN)</td>
<td>34</td>
<td>17.1</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rutherford</td>
<td>2009</td>
<td>VetJ 180:95-105</td>
<td>UK</td>
<td>80</td>
<td>17.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solano</td>
<td>2015</td>
<td>JDS 98:6978-6991</td>
<td>Canada</td>
<td>141</td>
<td>20.8</td>
<td>0 to 69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook</td>
<td>2003</td>
<td>JAVMA 223:1324-1328</td>
<td>USA (WI)</td>
<td>30</td>
<td>22.5</td>
<td>7.3 to 51.9</td>
<td>3.1</td>
<td>0 to 16.7</td>
</tr>
<tr>
<td>Sarjokari</td>
<td>2013</td>
<td>Live Sci 156:44-52</td>
<td>Finland</td>
<td>87</td>
<td>23</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Nash</td>
<td>2016</td>
<td>JDS 99:6494-6506</td>
<td>Canada</td>
<td>100</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huxley</td>
<td>2004</td>
<td>Vet Rec 155:237-239</td>
<td>UK</td>
<td>15</td>
<td>24.2</td>
<td>6.8 to 55.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Espejo</td>
<td>2006</td>
<td>JDS 89:3052-3058</td>
<td>USA (MN)</td>
<td>50</td>
<td>24.6</td>
<td>2 to 62</td>
<td>6.1</td>
<td>0 to 20.6</td>
</tr>
<tr>
<td>King</td>
<td>2016</td>
<td>JDS 99:9069-9079</td>
<td>Canada</td>
<td>41</td>
<td>26.2</td>
<td>2.5 to 57.5</td>
<td>2.2</td>
<td>0 to 12.2</td>
</tr>
<tr>
<td>Popescu</td>
<td>2014</td>
<td>Italian J An Sci 13:2940</td>
<td>Italy</td>
<td>60</td>
<td>26.7</td>
<td></td>
<td></td>
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<td>Popescu</td>
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<td>JDS 95:7399-7408</td>
<td>Canada</td>
<td>42</td>
<td>27.9</td>
<td></td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>von Keyserlingk</td>
<td>2012</td>
<td>JDS 95:7399-7408</td>
<td>USA (CA)</td>
<td>39</td>
<td>30.8</td>
<td></td>
<td>3.6</td>
<td></td>
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<tr>
<td>Chapinal</td>
<td>2014</td>
<td>JDS 97:4309-4316</td>
<td>China</td>
<td>34</td>
<td>31</td>
<td>7 to 51</td>
<td>10</td>
<td>0 to 27</td>
</tr>
<tr>
<td>Dippel</td>
<td>2009</td>
<td>JDS 92:5476-5486</td>
<td>Germany/Austria</td>
<td>103</td>
<td>33</td>
<td>0 to 81</td>
<td>16</td>
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<tr>
<td>Barker</td>
<td>2010</td>
<td>JDS 93:932-941</td>
<td>UK</td>
<td>205</td>
<td>36.8</td>
<td>0 to 79</td>
<td>5.3</td>
<td>0 to 31.2</td>
</tr>
<tr>
<td>von Keyserlingk</td>
<td>2012</td>
<td>JDS 95:7399-7408</td>
<td>USA (NY, PA)</td>
<td>40</td>
<td>54.8</td>
<td></td>
<td>8.2</td>
<td></td>
</tr>
</tbody>
</table>
**Evaluation** – Evaluate locomotion using the locomotion score card (Appendix A8) and the appropriate sample methodology for the number of lactating cows in the pen/group being scored. The hospital/sick or lame cow pens will also be evaluated to ensure that severely lame cows are receiving treatment and have not become emaciated. Record the total percent of cows scoring a 2 and 3 separately. The hospital/sick cow pen will be scored as well, the total percent recorded separately.

**I2a. Moderate Lameness** - Record the % of cows with a locomotion score of 2 (moderately lame) Mark yes if ≤15% of the cows score a 2

**I2b. Severe Lameness** - Record the % of cows with a locomotion score of 3 (severely lame). Mark yes if ≤1% of the cows score a 3.

**I2b.i** – Mark yes if severely lame cows are kept separate from the lactating group and are receiving treatment as verified by treatment records. If severely lame cows are not removed from the milking string for treatment, this is a non-conformance.

**I2c. Lameness Benchmark** - Mark the appropriate quartile benchmark by selecting the poorest performing outcome between moderate and severe lameness.

**References**


I3. Injuries – will be evaluated using the scores described in appendix A.

(a) Hocks (Appendix A7): No more than 1% of lactating cows should have severe hock lesions

(b) Severe Hock Performance Benchmark: The timing of a follow-up audit to confirm that corrective actions have been implemented and to evaluate progress will be determined based on the poorest performing outcome benchmark across locomotion and hocks.

Severe Hock Performance Benchmark:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Severe Hocks</th>
<th>Follow up audit in months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 76-100% (≤1% severe hocks)</td>
<td></td>
<td>24-30 months</td>
</tr>
<tr>
<td>Middle 26-75% (2-7% severe hocks)</td>
<td></td>
<td>12-16 months</td>
</tr>
<tr>
<td>Bottom 25% (&gt;7% severe hocks)</td>
<td></td>
<td>6-9 months</td>
</tr>
</tbody>
</table>

(c) Knees (Appendix A10): No more than 1% of lactating cows should have severe knee scores

(d) Neck & Other Injuries (Appendix A6): No more than 2% of lactating cows should have severe neck injuries.

(e) Tail (Appendix A9): 0% of the lactating cows should have tail injuries

Scientific evidence

Hock injuries
There is considerable variation in the degree of hock injuries reported for dairy cattle worldwide and the available data are summarized in Table 3. The range between herds is 0 to 100% with an overall mean ~ 54%.
Table 3. Summary of hock injuries in peer reviewed studies worldwide since 2000 (Cook, in press)

<table>
<thead>
<tr>
<th>First Author</th>
<th>Date</th>
<th>Journal Reference</th>
<th>Country</th>
<th># herds</th>
<th>All lesions (hair loss and abrasion/swelling) %</th>
<th>All lesion range</th>
<th>Severe lesions (abrasion/swelling) %</th>
<th>Severe range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lombard</td>
<td>2010</td>
<td>JDS 93:4668-4676</td>
<td>USA</td>
<td>297</td>
<td>23.5</td>
<td></td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>Barberg</td>
<td>2007</td>
<td>JDS 90:1575-1583</td>
<td>USA (MN)</td>
<td>12</td>
<td>25.1</td>
<td>2 to 43.9</td>
<td>1</td>
<td>0 to 3.3</td>
</tr>
<tr>
<td>Chapinal</td>
<td>2014</td>
<td>JDS 97:4309-4316</td>
<td>China</td>
<td>34</td>
<td>40</td>
<td>6 to 95</td>
<td>5</td>
<td>0 to 50</td>
</tr>
<tr>
<td>Potterton</td>
<td>2011</td>
<td>JDS 94:2952-2963</td>
<td>USA (WI)</td>
<td>66</td>
<td>40.1</td>
<td></td>
<td>9.2 ulcer 25.3 swelling</td>
<td></td>
</tr>
<tr>
<td>von Keyserlingk</td>
<td>2012</td>
<td>JDS 95:7399-7408</td>
<td>Canada</td>
<td>42</td>
<td>42.3</td>
<td></td>
<td>3.7</td>
<td></td>
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<tr>
<td>Brenninkmeyer</td>
<td>2013</td>
<td>PrevVetMed 109:236-245</td>
<td>Germany/Austria</td>
<td>105</td>
<td>50</td>
<td>0 to 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook</td>
<td>2016</td>
<td>JDS 99:5879-5891</td>
<td>USA (WI)</td>
<td>66</td>
<td>50.3</td>
<td>3.7 to 97.2</td>
<td>12.2</td>
<td>0 to 80.9</td>
</tr>
<tr>
<td>von Keyserlingk</td>
<td>2013</td>
<td>JDS 95:7399-7409</td>
<td>USA (CA)</td>
<td>39</td>
<td>56.2</td>
<td></td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Kieland</td>
<td>2009</td>
<td>JDS 92:5487-5496</td>
<td>Norway</td>
<td>232</td>
<td>60.5</td>
<td></td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>Zaffino-Heyerhoff</td>
<td>2014</td>
<td>JDS 97:173-184</td>
<td>Canada</td>
<td>87</td>
<td>62</td>
<td></td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Nash</td>
<td>2016</td>
<td>JDS 99:6494-6506</td>
<td>Canada</td>
<td>100</td>
<td>72</td>
<td></td>
<td>52</td>
<td></td>
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<tr>
<td>Weary</td>
<td>2000</td>
<td>JDS 83:697-702</td>
<td>Canada</td>
<td>20</td>
<td>72.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huxley</td>
<td>2004</td>
<td>Vet Rec 155:237-239</td>
<td>UK</td>
<td>15</td>
<td>78.6</td>
<td>0 to 90</td>
<td>58.3</td>
<td>0 to 100</td>
</tr>
<tr>
<td>von Keyserlingk</td>
<td>2014</td>
<td>JDS 95:7399-7410</td>
<td>USA (NY, PA)</td>
<td>40</td>
<td>81.2</td>
<td></td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>Rutherford</td>
<td>2008</td>
<td>JDS 91:2265-2274</td>
<td>UK</td>
<td>80</td>
<td>37.2 to 49.6</td>
<td></td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Zurbrigg</td>
<td>2005</td>
<td>JDS 88:3201-3210</td>
<td>Canada</td>
<td>317</td>
<td>Not reported</td>
<td></td>
<td>Not reported</td>
<td></td>
</tr>
</tbody>
</table>

Hock injuries are multifactorial, but the most common risk factor is the hardness or abrasiveness of the lying surface. Hock injuries have received more attention than alterations on other parts of the body, and there is no consistent scoring system used. Many scoring systems treat hock injuries as a progression: hairless patch to hairless patch and/or swelling or ulceration. However, little work has evaluated if etiology progresses in this manner, nor what the effect of scoring system has on estimates of prevalence. For example, the size of the hairless patch is often scored with a threshold (10 and 25 mm are most common), but no work has determined the biological importance of these injuries (nor these thresholds) to the animals. As a result, while mild hock injuries provide valuable information about the quality of the lying surface, because of difficulty setting a benchmark with the available information, we have opted to emphasize severe injury, involving swelling and/or ulceration in the timeline for re-evaluation and continuous improvement. There are reports of dramatic improvements in hock injuries corresponding with benchmarking exercises on commercial dairies (Chapinal et al., 2014).
Benchmarks were set based on review of the available peer reviewed literature since 2000 summarized in Table 3, and access to individual herd data from recent surveys of US dairy herds (von Keyserlingk et al., 2012; Cook et al., 2016). The cut-points will be evaluated and adjustments incorporated every three years when the audit is updated taking into consideration new published literature.

**Knee injuries**

Knee injuries, such as hair loss and swelling, are more pronounced when cows are kept on hard or abrasive surfaces (Rushen et al., 2007, Zaffino Heyerhoff et al., 2014). Straw yards have fewer knee injuries than freestalls (Haskell et al., 2006) and they are anecdotally less common on farms that use less abrasive sand bedding (Fulwider et al., 2007). Knee injuries are also more common on farms where cows have been observed slipping or falling when moved to milking compared to farms where no slipping was observed (Zaffino Heyerhoff et al., 2014). Similarly, knee injuries are less likely to be seen on farms with rubber in front of the feed bunk, compared to those with bare concrete floors (Zaffino Heyerhoff et al., 2014).

There is considerable variation in the degree of knee injuries reported for dairy cattle worldwide and the available data are summarized in Table 4.

Table 4. Knee injuries in dairy cattle in peer reviewed studies since 2004. (Cook, in press)

<table>
<thead>
<tr>
<th>First Author</th>
<th>Date</th>
<th>Journal Reference</th>
<th>Country</th>
<th># herds</th>
<th>All lesions (hairloss and abrasion/swelling) %</th>
<th>All Lesion Range</th>
<th>Severe lesions (abrasion/swelling) %</th>
<th>Severe range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kielland</td>
<td>2009</td>
<td>JDS 92:5487-5496</td>
<td>Norway</td>
<td>232</td>
<td>35.3</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zaffino-Heyerhoff</td>
<td>2014</td>
<td>JDS 97:173-184</td>
<td>Canada</td>
<td>87</td>
<td>37</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huxley</td>
<td>2004</td>
<td>Vet Rec 155:237-239</td>
<td>UK</td>
<td>15</td>
<td>50</td>
<td>0 to 83.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook</td>
<td>2016</td>
<td>JDS 99:5879-5891</td>
<td>USA (WI)</td>
<td>66</td>
<td>53</td>
<td>7.0 to 100.0</td>
<td>6.2</td>
<td>0 to 35.1</td>
</tr>
<tr>
<td>Nash</td>
<td>2016</td>
<td>JDS 99:6494-6506</td>
<td>Canada</td>
<td>100</td>
<td>65</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>von Keyserlingk</td>
<td>2012</td>
<td>JDS 95:7399-7408</td>
<td>USA (CA)</td>
<td>39</td>
<td></td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>von Keyserlingk</td>
<td>2013</td>
<td>JDS 95:7399-7409</td>
<td>USA (NY, PA)</td>
<td>40</td>
<td></td>
<td>23.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Benchmarks were set based on review of the available peer reviewed literature since 2004 summarized in Table 4, and access to individual herd data from recent surveys of US dairy herds (von Keyserlingk et al., 2012; Cook et al., 2016). The cut-points will be evaluated and adjustments incorporated every three years when the audit is updated taking into consideration new published literature.

**Neck Injuries and other parts of the body**

Injuries occur on other parts of the body, most commonly on the neck. Feed rail height is a risk factor for neck injuries (Zurbrigg et al., 2005b, Kielland et al., 2010, Zaffino Heyerhoff et al., 2014).
In general, farms with lower rails have higher odds of being affected, compared to farms with higher feed rails. This pattern is most evident in herds with 1) post-and-rail systems and 2) taller cows (Kielland et al., 2010). Cows kept on farms with functional cow trainers also have a higher risk of soft tissue injury, most commonly on the trunk (Busato et al., 2000). The ‘≤ 2% with severe neck, and “other injury” goal is based on the top 25% of Wisconsin free-stall farms reported in Cook et al. (2016).

**Prevalence information for neck injuries reported in the literature:**
- 1.3% hair loss, swollen or broken skin (Busato et al., 2000)
- 3.8% hair loss, broken skin or scabs (Zurbrigg et al., 2005a)
- 6% swollen (Kielland et al., 2010)
- 6.6 % hair loss, 2% swollen or ulcerated (Cook et al., 2016)
- 9% (Zaffino Heyerhoff et al., 2014)
- 15% hair loss (Kielland et al., 2010)
- 50% median value includes ‘mild to severe’ injury (median, mild to severe) (Huxley et al., 2004)

**Trunk injuries reported in the literature:**
- 6.5% (Busato et al., 2000)

**Ribs and back injuries reported in the literature:**
- 20% median value includes ‘mild to severe’ injury (median, mild to severe) (Huxley et al., 2004)

**Back, hook or pin injury reported in the literature:**
- 3.6% (Cook et al., 2016)

**Broken Tails**
Broken tails are a potential sign of poor stockmanship and rough handling. Zurbrigg et al. (2005a) reported a prevalence of 3.3% of cattle in tie-stall farms. Tails can be broken through interaction with the environment, by being stepped on by other cows, or through rough handling.

**Expert perspective and consensus among professionals**
Injuries are undesirable and are thought to be painful for cows. It is common to include injury assessment in welfare programs, as in the NMPF (2016) Dairy F.A.R.M. program (hocks and knees) and in the European-wide Welfare Quality (injuries on the entire body). The NMPF (2016) states that broken tails are a sign of inhumane handling.
Evaluation - Evaluate injuries using the appropriate sample methodology for the number of cows in the pen/group being scored. [See Appendix A for score descriptions]. The final number for each outcome will be the total % out of the total number of cows in the scored lactating pen.

I3a. i. Moderate Hock Lesions – Count and record the percent of cows with moderate (score=2) hock lesions.

I3a. ii. Severe Hock Lesions – Count and record the percent of cows with severe (score=3) hock lesions.

I2b. Severe Hock Benchmark - Mark the appropriate quartile benchmark for the percent of severe hocks.

I3c. i. Moderate Knee Lesions - Moderate knee lesions will not be scored during audits as it is typically not possible to visualize the front of the knee to allow proper evaluation.

I3c. ii. Severe Knee Lesions - Count and record the percent of cows with severe (score=3) knee lesions. Mark yes if the percent of severe knee lesions is ≤1%.

I3d. i. Moderate Neck & Other Injuries - Count and record the percent of cows with moderate (score=2) injuries.

I3d. ii. Severe Neck & Other Injuries - Count and record the percent of cows with severe (score=3) injuries. Mark yes if is ≤2%.

I3e. Tails - Count and record the percent of cows with broken tails. Mark yes if there were no observed broken tails. If this evaluation is done as a follow-up having confirmed broken tails previously look for evidence of new/recently broken tails.

References


J. SICK COWS Resource Based - General Housing/Facility Design & Management:

**J1. Environment** - Facilities should be designed and maintained to provide and promote animal health and welfare, reduce risk of injury and provide protection from extreme weather.

(a) **Housing** - There should be a dedicated pen, exclusively for cows that are sick. Cows should be provided a soft and dry resting area designed to limit injury. The “dryness” of the resting areas is evaluated using the hygiene score card. The “softness” of the resting area is evaluated in animal based measures using hock scores.

(b) **Shade** - Overhead shade should be provided for protection from heat stress.

(c) **Protection from inclement weather** - Additional protection from inclement weather should be provided. Such provision may be in the form of one or more of the following: overhead shade at the feed bunk, fans, soakers, wind breaks or other.

(d) **Lying Space** - Bedded area should provide 100 sq. ft./cow (9.2 m²/cow) or one stall per cow. Space allocation for bedded areas has received little attention in adult dairy cows.
(e) **Bunk Space** - Feeding area should provide 30” (75cm) of accessible bunk space per cow.

(f) **Water Cleanliness** – All sick cows/calves should have access to clean, fresh water free from gross contamination including feed, algae or feces.

**Scientific evidence**

a) **Housing.** Cows will seek isolation (e.g. lying in a corner of covered pen) if given the opportunity when ill (Proudfoot et al., 2014). In addition to their motivation to avoid other cows during this vulnerable time, dedicated sick pens provide the opportunity for caregivers to frequently monitor at-risk animals and those undergoing treatment. See Section H for justification of hygiene.

b) **Shade** – See Section H for justification

c) **Protection from inclement weather** – See Section H for justification

d) **Lying Space** - Space allocation for bedded areas has received little attention in adult dairy cows. Lying times on rubber mats are highest (13.8 h/24 h) and lowest at 113 sq. ft. (10.5 m²) and 32 sq. ft. (3.0 m²), respectively; intermediate stocking densities also result in an intermediate amount of rest (Schütz et al., 2015). Aggressive behavior and interruptions of lying behavior decline when more space is provided, particularly once each cow has 65 sq. ft. (6.0 m²) (Schütz et al., 2015). Experimental studies show that providing 1 stall/cow allows higher lying times and less competition than overstocking (e.g. Winckler et al., 2015).

e) **Bunk Space/Feeding Area** - Reducing the space available for cows to eat increases competition (Mentink and Cook, 2006; Huzzey et al., 2006). For example, DeVries et al. (2004) showed that doubling feeding space from 0.5 m to 1.0 m per cow reduced by half the number of aggressive interactions while feeding; and these effects were greatest for subordinate cows. During peak feeding times sick cows spend less time eating than do cows that are healthy (Huzzey et al., 2007; Goldhawk et al., 2009). Providing a head lock feed barrier mitigates the effects of aggression, particularly for subordinate cows (Huzzey et al., 2006).

f) **Water Cleanliness** - See section A1.

**Expert perspective and consensus among professionals** Segregating sick animals is recommended by the NFACC (2009) Canadian Code of Practice for the Care and Handling of Dairy Cattle. The Danish Agricultural Advisory Center recommends 6.5 m²/cow in bedded areas for large breeds (8.5 m²/cow total, Anonymous, 2001). The NMPF (2016) recommends 90 to 120 ft²/cow in the bedded area for large cows. The NFACC (2009) Code of Practice for the Care and Handling of Dairy Cattle requires 120 ft² (11 m²)/cow in bedded pack systems; they recommend 160 ft² (15 m²) in maternity areas. The range of values reflects the lack of scientific study in this area; the requirement of this program is an informed guess that errs
on the side of giving cows more space. Although there is no research that has directly identified the minimum amount of feed bunk space required per sick cow, general industry consensus is that 24” (60 cm) is the minimum required for each healthy cow; thus, this program requires 30” (76 cm) of feed bunk space per sick or compromised cow.

**Public perspective** US citizens, not involved in the dairy industry (n=491), participating in an online survey on dairy farming (Cardoso et al., 2016) showed concern for the health of cows, stating that cows must be healthy, without disease, and must receive veterinarian care. Some participants also commented on the facilities specifying that they should be good, safe and clean for the cows.
Evaluation - If there is a dedicated pen for sick or injured animals evaluate it for the following items. If there is no such pen, mark “No” for J1a.i and NA for the remainder of section J. Evaluate hygiene using the appropriate sample methodology for the number of cows in the pen/group being scored.

J1a.i. Dedicated Pen - Mark yes if there is a dedicated sick pen for sick or injured animals.

J1a.ii Hygiene – Count and record the percent of cows that score a 1 or 2. Mark yes if >75% of cows score a 1 or 2.

J1b. Shade – Evaluate the hospital pen for shade. Shade may include permanent shade structures, patches of trees or temporary cloth (raised seasonally). Rows of trees may be considered a wind break but not as shade. The area of shade provided will not be measured at this time. Mark yes if the hospital pen provides shade.

J1c. Additional Protection - Evaluate the hospital pen for additional protection. Mark yes if at least 1 additional protection is present for both heat and cold stress.

J1d. Lying Space – Measure the area provided for the hospital pen. Mark yes if the area provides at least 100 sq. ft per cow. (9.2m²/cow).

J1e. Bunk Space/Feeding Area – Mark yes if the feeding area provides at least 30” (75 cm) of accessible bunk space per cow.

J1f. Water Cleanliness - If large troughs are used, the ‘clean water sheet’ (Appendix A1) must be easily read while submerged 6-10 inches below the water surface in three areas. All troughs in the sick pens scored will be checked. Individual water sources should be free from manure or other gross contamination. It is recognized that small amounts of grain or feed may be present as a result of cattle eating. Small amounts of feed, algae along the bottom or sides of troughs/waterers are acceptable. Algae floating on the surface, feces or large amounts of feed obstructing the entire surface of the water resource need to be addressed. All water troughs scored must be in acceptable condition to meet this criterion. Mark yes if ALL the troughs/buckets are clean.

References


K. Sick Cows Animal Based Welfare Measures: (see Lactating cows section H and I for justification)

**K1. Body Condition** – No emaciated (saw toothed spine, prominent ribs, hooks and pins) cows should be present without current records providing evidence of ongoing treatment.

**K2. Lame Cow Care** – The sick/hospital/special needs or lame pens will be evaluated to count lame cows and to ensure that severely lame cows are receiving treatment and have not become emaciated.

**K3. Hocks and Knees & Injuries** – Cows with severe lesions or injuries should be receiving treatment.
Evaluation – Evaluate locomotion, body condition and injuries using the appropriate sample methodology for the number of cows in the sick/hospital pen. It is recognized that some cows in this pen may not be able to be evaluated for locomotion if they are not willing (although able) to rise. The auditor should make a gentle attempt to make cows rise, but should not force any cow to get up. Data from sick/hospital pen scoring will be used to inform development of benchmarks in future revisions.

**K1. Body Condition** – Count the number of emaciated cows. Confirm that any emaciated cow in the pen is receiving treatment by examining current treatment records. Mark yes if emaciated cows are receiving treatment.

**K2a. i. Moderately Lame** – Count the number of cows with a locomotion score of 2 and record the percent based on the total number scored, not the total number in the pen.

**K2a. ii. Severely Lame** - Count the number of cows with a locomotion score of 3 and record the percent based on the total number scored, not the total number in the pen.

**K2b. Care** – Confirm that severely lame cows are receiving treatment by checking treatment records. Mark yes if severely lame cows are receiving treatment.

**K3a. i. Moderate Hocks** – Count and record the number of cows with moderate (score=2) hock lesions and record the percent based on the total number scored, not the total number in the pen.

**K3a. ii. Severe Hocks** – Count and record the number of cows with severe (score=3) hock lesions and record the percent based on the total number scored, not the total number in the pen.

**K3b. i. Severe Knees** - Count and record the number of cows with severe (score=3) knee lesions and record the percent based on the total number scored, not the total number in the pen.

**K3c. i. Moderate Neck & Other Injuries**- Count and record the number of cows with moderate (score=2) injuries and record the percent based on the total number scored, not the total number in the pen.

**K3c. ii. Severe Neck & Other Injuries** - Count and record the number of cows with severe (score=3) injuries and record the percent based on the total number scored, not the total number in the pen.

**K3d. Broken Tails** - Count and record the number of cows with broken tails paying particular attention for evidence of newly broken tails.
L. DRY COWS – Resource Based - General Housing/Facility Design & Management
(see lactating cows section H and I for justification as dry cow needs are similar to lactating cows)

L1. Environment - Facilities should be designed and maintained to provide and promote animal health and welfare, reduce risk of injury and provide protection from extreme weather.

(a) Housing - Cows should be provided a soft and dry resting area designed to limit injury. The “dryness” of the resting areas is evaluated using the hygiene score card. The “softness” of the resting area is evaluated in animal based measures using hock scores. At least 75% of cows should be reasonably clean on the upper leg and flank.

(b) Shade - Overhead shade should be present to provide protection from heat stress

c) Protection - Additional protection from inclement weather should be provided. Such provision may be in the form of one or more of the following: overhead shade at the feed bunk, fans, soakers, wind breaks or other.

d) Water Cleanliness – All dry cows should have access to clean, fresh water free from gross contamination including feed, algae or feces.
Evaluation - Evaluate hygiene using the appropriate sample methodology for the number of cows in the pen/group being scored.

L1a. Hygiene - Using the hygiene score card descriptions (Appendix A-1), mark yes if >75% of dry cows score a 1 or 2.

L1b. Shade – Evaluate all dry cow pens for shade. Shade may include permanent shade structures, patches of trees or temporary cloth (raised seasonally). Rows of trees may be considered a wind break but not as shade. The area of shade provided will not be measured at this time. Mark yes if ALL dry cows are provided shade.

L1c. Additional Protection - Evaluate all dry cow pens for additional protection. Mark yes if at least 1 additional protection is present for both heat and cold stress.

L1d. Water Cleanliness - If troughs are used, the ‘clean water sheet’ (Appendix A1) must be easily read while submerged 6-10 inches below the water surface in three areas. The troughs in the pens scored for hygiene will be evaluated. Individual water sources should be free from manure or other gross contamination. It is recognized that small amounts of grain or feed may be present as a result of cattle eating. Small amounts of feed, algae along the bottom or sides of troughs/waterers are acceptable. Algae floating on the surface, feces or large amounts of feed obstructing the entire surface of the water resource need to be addressed. All water troughs scored must be in acceptable condition to meet this criterion. Mark yes if ALL the troughs/buckets are clean.
M. Dry Cows Animal Based Welfare Measures: *see Lactating cows section H and I for justification*

**M1. Hocks and Knees & Injuries**— Cows with severe lesions or injuries should be receiving treatment. Results from dry cow evaluations will be used to inform future revisions of the Dairy Well audit program.

**Evaluation**— Evaluate injuries using the appropriate sample methodology for the number of cows in the pen/group being scored.

**M3. Injuries** -

**M3a. i. Moderate Hocks**— Count and record the number of cows with moderate (score=2) hock lesions and record the percent based on the total number scored, not the total number in the pen.

**M3a. ii. Severe Hocks**— Count and record the number of cows with severe (score=3) hock lesions and record the percent based on the total number scored, not the total number in the pen.

**M3b. i. Severe Knees**— Count and record the number of cows with severe (score=3) knee lesions and record the percent based on the total number scored, not the total number in the pen.

**M3ci and ii. Neck and Other Injuries**— Count and record the number of cows with neck and other injuries on any other part of their body (hips, flank, face etc.) and record the percent based on the total number scored, not the total number in the pen.