



DCHA

DAIRY CALF & HEIFER ASSOCIATION

GOLD STANDARDS



*Setting the
benchmarks
for your herd's
future.*

DCHA GOLD STANDARDS | FOURTH EDITION

Performance and production standards for dairy calves and heifers, from birth to freshening

The Dairy Calf & Heifer Association Gold Standards are industry benchmarks and best management practices intended to guide dairy calf, dairy-beef and heifer raisers in growing the most healthy, efficient and profitable dairy/dairy-beef animals possible. The Gold Standards have been developed using published data and input from DCHA leaders and advisors. While individual herd goals, current level of attainment and geography may vary, the Gold Standards are meant to provide a framework for successful dairy replacement raising. Use this information to identify areas for improvement, conduct training and implement plans that support the performance targets you want to attain.

DCHA would like to recognize the expertise and collaboration of the Gold Standards Committee in bringing forward this edition.

Committee members: Clint Al-Ag, Jason Anderson, Dr. Brett Boyum, Jamie Franken, Dr. Robert James, Dr. Justin Graham, David Mathes, TJ McClure, Dr. Terri Ollivett, Elizabeth Quinn Tommell, Pam Selz-Pralle

© COPYRIGHT 2009, 2010, 2011, 2016, 2022 and 2023 Dairy Calf & Heifer Association (DCHA). All rights reserved. This material may not be used or copied without permission from DCHA. For permissions, please contact info@calfandheifer.org.

PERFORMANCE STANDARDS

These are the objective measures used to evaluate performance of dairy heifers. Production Standards refer to practices that are associated with achievement of “performance.”

HEALTH STATUS

PNEUMONIA

Pneumonia is defined as a case of respiratory disease that requires individual animal treatment. Pneumonia typically yields calf morbidity. Morbidity is defined as the rate of disease in a population. Pneumonia Treatment Morbidity = number of pneumonia treatment events in a given time frame divided by total calves eligible to be treated in the same timeframe (e.g., weekly pneumonia morbidity = 23 pneumonia treatments/1,080 calves = 2% morbidity).

To objectively detect pneumonia, use the Calf Health Scoring Chart (vetmed.wisc.edu/fapm/wp-content/uploads/2020/01/calf_respiratory_scoring_chart.pdf) and/or lung ultrasound. These practices help calf raisers define a treatable case of pneumonia and monitor respiratory health over time.

Lung ultrasound—considered the “best practice”—is an intensive detection tool that finds pneumonia, even when other symptoms do not appear. Lung ultrasound may be used as a diagnostic check to establish a baseline understanding regarding the impact of clinical and subclinical pneumonia. Then, determine points in time to evaluate if pneumonia has increased or decreased, based on management changes. Also, lung ultrasound may be used to establish a morbidity/mortality trigger point that leads to conducting lung ultrasound on more calves.

TARGET MORBIDITY RATES DUE TO PNEUMONIA	
AGE	% MORBIDITY
Prewearing	<10
Postweaning to 120 days	<10
120 to 180 days	<2

SCOURS

Scours is defined as a case of diarrhea that requires any intervention for more than 24 hours, not including electrolytes.

TARGET MORBIDITY RATES DUE TO SCOURS	
AGE	% MORBIDITY
Prewearing	<15
Postweaning to 120 days	<2
120 to 180 days	<1

SURVIVAL RATE

TARGET SURVIVAL RATE

Given that some calves are born with a heartbeat and breathing, yet die not long after birth, the age of 24 hours shall be used to distinguish between “dead-on-arrival” (stillbirth) and “live birth.”

SURVIVAL RATE TARGETS	
AGE	%
<i>After live birth</i>	
24 hours to 60 days	≥97
61 to 180 days	≥98
6 months to freshening	≥99

GROWTH RATE

TARGET GROWTH RATE

- From 24 hours to 56 days of age, a calf should at least double its birthweight.
- Target growth rate beyond weaning depends on a herd's mature size, which is influenced by breed and herd genetic goals. An individual herd's mature size is defined as the average weight of third-lactation cows, in mid-lactation. Nutritional management should focus on heifers reaching breeding bodyweight at the desired age (see Figure 1).
- Develop a herd-specific growth curve, which is based on the herd's mature animals.

Figure 1

HEIFER GROWTH AND % MATURE WEIGHT AGE	MATURE BODYWEIGHT 3RD LACTATION					
	1,000 454 assumes birthweight of 60 pounds		1,400 635 assumes birthweight of 80 pounds		1,600 618 assumes birthweight of 85 pounds	
	TARGET WEIGHT	APPROXIMATE ADG TO NEXT TARGET	TARGET WEIGHT	APPROXIMATE ADG TO NEXT TARGET	TARGET WEIGHT	APPROXIMATE ADG TO NEXT TARGET
	POUNDS KG	POUNDS KG	POUNDS KG	POUNDS KG	POUNDS KG	POUNDS KG
Birth	60 27	1.1 0.50	80 36	1.4 0.64	85 39	1.5 0.68
Weaning ~56 days	120 54	1.4 0.63	160 73	2.0 0.91	170 77	2.2 1.0
90 days	178 80	1.4 0.63	228 104	2.0 0.91	245 111	2.3 1.04
First breeding 55% 12 months	550 250	1.0 0.45	770 349	1.40 0.64	880 400	1.8 0.82
Post 1st calf 85%	850 386		1,190 540		1,360 315	

From 8th Revised Edition – Nutrient Requirements of Dairy Cattle. 2021. National Academies of Sciences, Engineering, Medicine. National Academy Press, Washington, D.C. | ADG = average daily gain

REPRODUCTION

Begin breeding a heifer when she reaches 55% of the herd's mature bodyweight. Economics dictate that considerable savings occur in heifer rearing programs when the days to reach desired growth goals for first breeding occur at 12 to 13 months of age for Holsteins. Some data indicate that well-managed Jersey heifers reach breeding goals 1 to 2 months earlier than Holsteins.

If heifers are achieving 55% of mature bodyweight before the target age, they are physiologically mature enough to be pregnant. Heifers that calve earlier are more productive, assuming they meet the post-calving bodyweight benchmark.

Aim for heifers to freshen at 22 to 24 months of age. Just prior to calving, heifers should be at 95% of the herd's mature bodyweight. After calving, they should be at 85% of mature bodyweight.

Before calving, pregnant heifers' body condition score should range from 3.25 to 3.50—on a 5-point scale.

Begin breeding
heifer when she reaches

55%

**HERD'S MATURE
BODYWEIGHT**

PREGNANT HEIFER MANAGEMENT

- Check heifers for pregnancy 35 to 45 days post-breeding to identify open heifers. Quickly return open heifers to a breeding program.
- Reconfirm pregnancies before 200 days pregnant.
- With your veterinarian, create a pre-fresh vaccination protocol.



Check for pregnancy
35–45 DAYS
POST-BREEDING

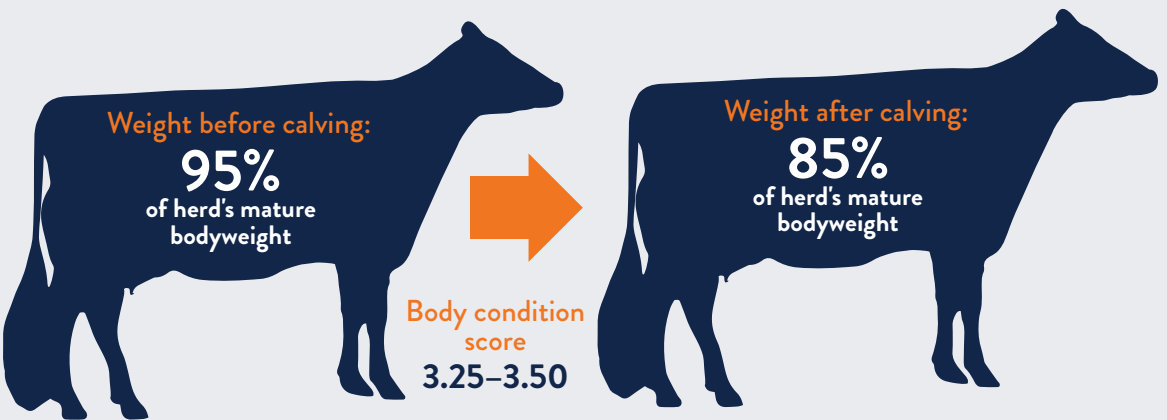
FIGURES

Figure 2

HEIFER CONCEPTION, PREGNANCY RATE TARGETS		
SEMEN TYPE	TARGET FIRST-SERVICE CONCEPTION RATE	TARGET PREGNANCY RATE *
Conventional semen	70%	47%
Sexed semen	60%	37%
Beef semen	70%	47%
In vitro fertilization/embryos	60%	40%

* Percent of heifers that become pregnant out of the total number of heifers eligible to become pregnant in a given 21-day period.

Lauer, M., and Fricke, P. 2022. Weight or wait? How defining breeding eligibility of heifers impacts first lactation milk production. University of Wisconsin-Madison Department of Animal and Dairy Sciences and UW-Madison Division of Extension.





PRODUCTION STANDARDS

These are the recommended practices that enable achievement of the performance goals previously described. In most cases, these management practices are relevant – regardless of breed or facility location.

NEWBORN CARE

REMOVAL FROM MATERNITY

Provide clean, dry bedding in a well-drained and well-ventilated calving environment. Avoid heat stress conditions. The calving facility should foster timely care of the calf and post-partum cow. Remove calves from the maternity pen as soon as possible to prevent injury and illness. Clean and disinfect the calving pen soon after each calving.

NAVEL DISINFECTION

Thoroughly disinfect the navel with 7% tincture of iodine or 1:1 chlorhexidine/70% alcohol mixture within 30 minutes of birth. Repip the navel within 12 hours to ensure drying and disinfection.

DISBUDDING

Work with your herd veterinarian to develop pain management protocols. Use a local anesthetic to mitigate immediate pain. Acceptable disbudding methods include application of caustic paste or electric or gas iron to destroy the horn-producing corium. The use of caustic paste is less effective if applied after 2 weeks of age. Disbud calves at the youngest age possible.

COLOSTRUM PROGRAM

COLOSTRUM HARVEST

- Work with your herd veterinarian to develop a herd vaccination protocol to enhance colostrum quality for both mature cows and heifers.
- Collect first-milking colostrum within 2 hours of calving. However, research indicates greater benefits from harvest within 30 minutes of calving. Cool colostrum to <40 F (4 C) if it's not fed immediately.
- Follow strict hygiene protocols for udder preparation, milking equipment, collection and storage vessels, and feeding utensils (e.g., esophageal feeders, nipples and bottles).

Figure 1



For more details, refer to the American Association of Bovine Practitioners recommendations at: aabbp.org/Resources/AABP_Guidelines/Dehorning-2019.pdf.

Consider using polled sires to breed heifers and cows.

IDENTIFICATION

Tag every calf as soon as practical after birth, preferably with a radio-frequency identification (RFID) tag.

MEASUREMENT

Measure and record birthweight and height.

BVDV SCREENING

- Work with your veterinarian to develop a bovine viral diarrhea virus (BVDV) control program.
- Test each calf for BVDV within 1 week of birth. This can be done via ear notch or blood-PCR (polymerase chain reaction) test.

COLOSTRUM FEEDING

- Hand feed properly managed colostrum equal to 10% of the calf's bodyweight – within the first 2 hours of life (**see Figures 1, 2, 3, 4 and 5**).
- When practical, continue to feed second and third milkings for the next 3 to 4 feedings.
- Feed colostrum that is 101 to 105 F (38 to 40 C). Warm frozen or cold colostrum via recirculating water that is 120 F (49 C).
- Feed 3 quarts of colostrum for every 60 pounds of calf bodyweight.

Figure 2



COLOSTRUM MANAGEMENT

- Colostrum should be free of blood, debris and mastitis.
- Feed colostrum preferably within 30 minutes of harvest (or within the first 2 hours of life), or chill to 60 F (15.5 C) within 30 minutes before refrigerating or freezing.
- Feed refrigerated colostrum within 24 hours of harvest.
- Store extra frozen colostrum for up to 1 year in a frost-free freezer. Package colostrum in one-time-use, zipper-closure bags or single-use, disposable commercial colostrum storage products. These bags are convenient for storing and thawing.
- Test colostrum for quality with an on-farm tool, such as a Brix refractometer, or use a lab-based colostrum immunoglobulin G (IgG) test. The Brix refractometer is an excellent on-farm screening tool to identify colostrum suitable for the first colostrum feeding.
- Heat treat colostrum for optimal disease prevention.
 - Heat treat colostrum to 140 F (60 C) for 60 minutes.

- Do not feed pooled colostrum unless it has been heat treated. Feeding pooled colostrum without heat treating it increases disease transmission risk.

BACTERIA COUNT OF COLOSTRUM	STANDARD PLATE COUNT (CFU/ML)	COLIFORMS (CFU/ML)
Fresh colostrum	<50,000	<5,000
Heat-treated colostrum	<20,000	<100

- Measure bacteria count of colostrum monthly and when there is increased disease.
- If clean, high-quality maternal colostrum is not available, feed commercial colostrum replacer (NOT supplement) to deliver 200 IgG at first feeding.

TESTER TYPE	TARGET COLOSTRUM LEVELS
Brix refractometer	≥22%
Lab-based Colostrum IgG	≥50g/L

Figure 3

TARGET PASSIVE IMMUNITY LEVEL MEASURE IN CALVES 2-7 DAYS OF AGE				
PASSIVE IMMUNITY CATEGORY	SERUM IgG CONCENTRATION (G/L)	EQUIVALENT TP (G/DL)	EQUIVALENT BRIX %	% CALVES*
Excellent	≥25.0	≥6.2	≥9.4%	>40%
Good	18.0-24.9	5.8-6.1	8.9-9.3%	~30%
Fair	10.0-17.9	5.1-5.7	8.1-8.8%	~20%
Poor	<10.0	<5.1	<8.1%	<10%

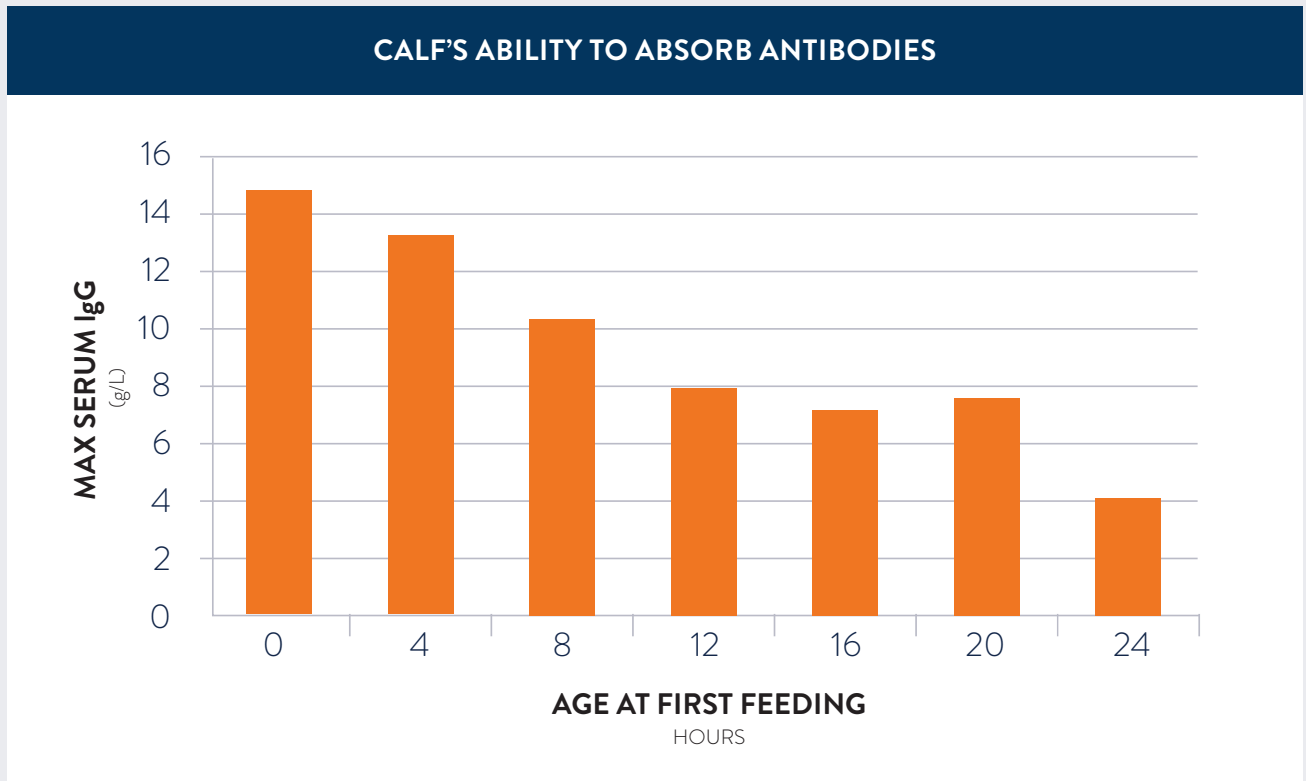
*Consensus recommendation for percent of a farm's calves in each category. Modified from Lombard et al., Journal of Dairy Science 2020.

Figure 4

COLOSTRUM ABSORPTION		
HOURS AFTER BIRTH	SERUM IGG	ABSORPTION EFFICIENCY
0 to 1	Maximum (100%)	51.8%
2	-3.7% (96.3%)	48.5%
3	-7.4% (92.6%)	45.3%
4	-11.1% (88.9%)	42.0%
5	-14.8% (85.2%)	38.8%
6	-18.5% (81.5%)	35.6%

Godden, S.M., Lombard, J.E., and Woolums, A.R. 2019. Colostrum Mangement for Dairy Calves. Vet Clin North Am Food Anim Pract. 35(3): 535-556. doi: 10.1016/j.cvfa.2019.07.005

Figure 5



Stott, G.H., D.B. Marx, B.E. Menefee, and G.T. Nightengale. 1979. Colostral Immunoglobulin Transfer in Calves II. The Rate of Absorption. J Dairy Sci, 62:1766-1773. DOI: [https://doi.org/10.3168/jds.S0022-0302\(79\)83495-5](https://doi.org/10.3168/jds.S0022-0302(79)83495-5)

NUTRITION & WATER

Structure your nutrition program to achieve health and growth standards defined in the Growth Section. It is highly recommended that calves be weighed at birth, weaning and when handled for routine procedures to enable measurement of average daily gain.

PREWEANED CALF MANAGEMENT

Recognize that the goal for preweaned calf nutrition, especially during the first weeks of life, is to meet the nutrient requirements for growth and maintenance. This requires feeding sufficient milk/milk replacer to account for differences in environmental conditions and disease challenges. In most cases, this amount is more than 1.5 pounds of milk/milk replacer solids per day.

- Use separate pails for water, milk/milk replacer and calf starter grain.
- Offer clean water continuously from day 1 of life and refresh or replace daily.

LIQUID DIET

- Nutritional requirements can be met with milk or a high-quality milk replacer. Strive to feed milk/milk replacer with a consistent solids content and at a temperature of 101 F (38 C).
- Pasteurize milk fed to calves. Feed the milk as soon as possible to prevent microbial growth.
- Provide at least a 6-hour gap between milk/milk replacer feedings, if fed 3 times daily (preferred), and 8 hours if fed twice daily. Avoid feeding intervals greater than 12 hours.
- Feed the youngest calves first to enhance biosecurity and at the milk's/milk replacer's optimal temperature.
- Establish routine cleaning and sanitation protocols for milk-feeding equipment. Because biofilm accumulation is common, periodically check equipment cleanliness via either bacteria culturing or adenosine triphosphate (ATP) testing.
- The desired solids level of the liquid diet is 12 to 15%.

CALF STARTER

- Calf starter feed should be palatable and contain at least 20% crude protein.
- Starters can be pelleted or texturized, but avoid finely ground, dusty feeds, which discourage intake.

- Feed starter grain within the first few days of life and refresh or replenish daily.
- Calves should be weaned using a step-down method where milk/milk replacer is reduced gradually, rather than dropping to once-a-day feeding.
- Intake of calf starter will depend on milk/milk replacer feeding amounts and the availability of fresh starter and sufficient water.
- Separate water and starter feed vessels to avoid feed and water contamination, and reduced palatability of water and starter feed.
- Forage does not need to be fed to preweaned calves. However, offering limited quantities of chopped grass or small grain straw has been used successfully to assist in rumen development without impairing total nutrient intake. This is especially relevant when calves are housed on sawdust bedding.

WEANING

- Early weaning (<6 weeks of age) is discouraged as intake of calf starter is rarely adequate to provide sufficient nutrients for the desired gains of ~1.5 pounds/day (0.07 kg).
- Strive for a stress-free transition, which involves reduced milk/milk replacer solids intake. Abrupt weaning by reducing milk/milk replacer to once-daily feeding is discouraged, because it is stressful to the calf.
- Weaning is most successful when reductions in milk/milk replacer are made in a step-down fashion while feeding twice daily over a period of at least 14 days.
- Calves should be consuming at least 2 pounds (0.91 kg) of starter daily for three consecutive days prior to beginning the weaning process.
- If calves are individually housed, delay placing them in group pens until at least 1 week after cessation of feeding milk/milk replacer.

POST WEANING NUTRITIONAL MANAGEMENT

- Structure the nutritional program in accordance with the animal's needs, forage availability and facilities.
- Formulate diets to achieve desired rates of gain, as shown in the performance standards for the given breed and size goals.

Table 1

TOTAL RATION PROTEIN TARGETS FOR WEANED HEIFERS	
DRY MATTER BASIS	
AGE/BODYWEIGHT POUNDS, KG	%
120 days 264, 120	16.6
225 days 506, 230	14.4
350 days 726, 330	12.6
475 days 924, 420	11.7
600 days 1,166, 530	12.7

NASEM. 2021. Nutrient Requirements of Dairy Cattle. National Academies Press. Washington, D.C.

- Put replacement heifers in groups with similar nutrient requirements. Heifer groups include post-weaning, pre-breeding, breeding, pregnant and pre-calving groups.
- Follow the suggested total protein targets for post-weaned heifers as shown in **Table 1**.

WATER

Conduct water suitability tests every 6 months to ensure water quality and safety, using the guidelines in **Table 2**.

Table 2

WATER QUALITY AND SAFETY GUIDELINES			
ITEM	EXPECTED	BORDERLINE	CONCERN
pH	6.8 to 7.5	<6 and >8.4	<5.5 and >8.5
Total Dissolved Solids	<500 ppm	>500 ppm	>1,000 ppm
Calcium	0 to 43 ppm	>100 ppm	> 200 ppm
Chloride	0 to 100 ppm	>100 ppm	>300 ppm
Copper	0 to 0.2 ppm	>0.2 ppm	>0.5 ppm
Iron	0 to 0.2 ppm	>0.2 ppm	>0.3 ppm
Manganese	0.05 ppm	>0.05 ppm	>0.05 ppm
Magnesium	0 to 29 ppm	>50 ppm	>125 ppm
Nitrate	0 to 44 ppm	>50 ppm	>100 ppm
Nitrate-nitrogen	0 to 10 ppm	>11.4ppm	>22.7ppm
Phosphorus	0 to 0.7ppm	>0.7ppm	>0.7ppm
Potassium	0 to 20 ppm	>20 ppm	>20 ppm
Sodium	0 to 3 ppm	>50 ppm	>200 ppm
Sulfate	0 to 50 ppm	>50 ppm	>300 ppm
Zinc	0 to 5 ppm	>5 ppm	>25 ppm
Total bacteria/100 ml	<200	>1,000	>1,000,000
Fecal coliform/100 ml	<1	>1	>10
Fecal streptococcus/100 ml	<1	>3	

Derived from Don Sockett, David Beede, Tim Johnson, Bob Riesberg and Nutrient Requirements of Dairy Cattle (2021).

HEALTH MANAGEMENT

Work with your veterinarian to establish a valid veterinary-client-patient relationship (VCPR) and develop and maintain current health management protocols. The basic principles of a VCPR include:

- Maintain written agreements for working relationships.
- Identify and designate a Veterinarian of Record that is knowledgeable of current industry standards and aligns with the farm's health and management goals.
- Clarify all relationships with consultants and other veterinarians.
- Provide written protocols.
- Ensure that treatment records are maintained adequately – either electronically or as a written record.
- Provide drugs or prescriptions for specific timeframes and specific protocols.

VACCINATIONS

- Develop a vaccination program in collaboration with your veterinarian to create protocols addressing the unique characteristics of your dairy enterprise environment.
 - Incorporate the use of diagnostic tools to optimize effectiveness of the vaccination program.
 - Ensure that the vaccination program considers the complete development (birth to maturity) of the individual animal.
- Growers with multiple source farms should consider the challenges and disease-prevention goals of each client's herd and the impact on the grower's facility.

PARASITE CONTROL

- Collaborate with your veterinarian to develop a protocol for preventing and monitoring parasitic diseases and issues.
- Manage the farm's environment to discourage parasites and pests, including regularly hauling manure, cleaning up spilled milk and preventing standing water.

CLINICAL DISEASE PREVENTION AND MANAGEMENT

- Prevention is cost effective. It is achieved with development of optimal high levels of immunity and low levels of pathogen exposure.
- Optimal immunity can be reached following practices outlined in Production Standards under Colostrum Management, Nutrition and Health Management –Vaccinations.

- Optimal low levels of pathogen exposure is achieved by following the practices outlined throughout the Production Standards section.
- When animals are clinically ill, follow these guidelines:
 1. Document all cases of clinical illness; at a minimum, record:
 - Date of treatment
 - Identification of animal treated
 - Disease/condition being treated
 - Name of treatment used
 - Dose administered
 - Route of administration
 - Duration of treatment
 - Specified withdrawal times for milk and meat to ensure food safety
 - Name of person administering the treatment
 2. Treatment of a group at risk for a specific disease should be recorded for each animal so accurate disease incidence can be calculated.
 3. Work with the herd veterinarian to develop treatment protocols that clearly define progression from one treatment to the next, including treatment interval and assessment for retreatment.
 4. Select treatment protocols based on the veterinarian's recommendation for the condition and follow the full course of therapy (versus the "drug of the day" or each employee's "favorite" treatment).
 5. Use properly mixed electrolytes liberally with enteric disease (scours) and continue to offer milk/milk replacer. Do not mix electrolytes with milk or milk replacer. Feed electrolytes at the midpoint between regular feedings of milk/milk replacer.
 6. Administer antibiotics according to their prescribed dose, frequency and route of administration.
 7. Follow the herd veterinarian's advice, monitor treatment outcomes and determine if additional treatments are needed.
- Use feed-grade antibiotics in accordance with the Veterinary Feed Directive (VFD) and only under the prescription of your herd veterinarian with whom you have a valid VCPR.
- Use water-soluble antibiotics only under the prescription of your herd veterinarian with whom you have a valid VCPR.
- Consider incorporating nutraceutical products and/or probiotics—documented as effective by published research—to help support normal digestive and respiratory health as a part of an integrated clinical disease prevention and management protocol.

BIOSECURITY

1. Establish robust biosecurity measures on farm to help reduce exposure to disease from on-farm and off-farm sources, and support bio-containment actions when disease breaks in the current population.
2. Enlist the assistance of your veterinarian and other animal disease specialists to outline the goals of your biosecurity protocol that will protect your animals, support safe food production and ensure business continuity.
3. With your biosecurity expert team, conduct a thorough risk assessment of the operation to determine where disease can enter the farm or transfer among animals when threats occur. Outline low-risk, medium-risk and high-risk points, and then identify the areas and practices that need the most attention. Key focus areas include:
 - Farm perimeter control
 - Off-farm animal introductions
 - Feedstuffs and water
 - Cleaning and sanitation
 - On-farm animal and employee movement (youngest to oldest animals)
 - Pest, parasite and fly control
 - Preventive health programs
4. Create a documented risk management protocol that targets all identified threats.
 - Include animal movement, employee access/movement and external visitor records.
 - Establish biocontainment actions for on-farm disease outbreaks, including ability to quickly isolate and quarantine diseased animals.
5. Conduct initial and ongoing training sessions for owners, employees and frequent visitors.
6. Post signs to establish biosecurity notification at farm entry points that provide employees and visitors with instructions for your business.
7. Review protocols regularly and adjust where needed to continually improve biosecurity measures and execution.

EMPLOYEE TRAINING

- Establish an employee education and training program with the help of your veterinarian.
- Provide all employees with:
 1. Current protocols that clearly detail how they are to perform their jobs
 2. Education on the basic knowledge needed to understand the importance of following established protocols
 3. New employee training at hiring
 4. Continuing education one to two times a year for current employees
 5. Routine protocol monitoring to ensure protocol compliance
 6. Protocol performance feedback
 7. Humane animal handling, movement, restraint and stockmanship training
 8. How to identify an animal that needs medical attention
 9. Zero tolerance for mistreatment and/or neglect of animals

HOUSING & ENVIRONMENT

HOUSING FOR CALVES AND HEIFERS OF ALL AGES SHOULD BE:

- Clean – based on removal of soiled bedding, use of water and use of alkaline detergents and sanitizers, and rinsing and drying
- Dry and well drained to incorporate sufficient slope to feeding and resting area, and drains to accommodate removal of urine, manure and cleaning materials
- Ventilated appropriately for environmental conditions, regarding temperature, humidity and air speed, to provide 4 to 6 air changes per hour during cold weather and substantially more during warm weather
- Well bedded (6 to 10 inches [15 to 25 cm] of dry bedding) with nesting scores appropriate for calf size and environmental conditions
- Sheltered from inclement weather
- Equipped with shade in outdoor housing settings

SPECIFIC HOUSING AND ENVIRONMENT STANDARDS

Pre-partum cows

Provide cooling for pre-partum cows when the Temperature Humidity Index (THI) exceeds 72. Under heat stress conditions, cooling fosters improved cow and calf health, and cow productivity.

Newborn calves

- Environment should be clean and protected from other animals for physical safety and biosecurity.
- Remove calves from maternity area within 6 hours after birth.

- In addition to providing dry bedding, ensure that the calf's hair coat is dry and fluffed, particularly when the ambient temperature is <60 F (<16 C).
- Consider using a warming environment when the temperature is <60 F (<16 C).
- Protect from heat stress with adequate shade and air movement during warm weather.

Preweaned calves

- For group housing, provide at least 35 square feet (3.3 square meters) of resting space per calf.
- If calves are housed individually, situate pens or hutches so calves can see one another.
- Thoroughly clean and disinfect preweaned calf housing areas between calves.

THI Chart for Calves

Temp °F	% Relative Humidity																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
68	63	63	63	63	64	64	64	64	65	65	65	66	66	66	66	67	67	67	67	68	68
70	63	64	64	64	65	65	65	66	66	66	67	67	67	68	68	68	69	69	69	70	70
72	64	65	65	65	66	66	67	67	67	68	68	69	69	69	70	70	70	71	71	72	72
74	65	66	66	67	67	67	68	68	69	69	70	70	70	71	71	72	72	73	73	74	74
76	66	67	67	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75	76	76
78	67	68	68	69	69	70	70	71	71	72	73	73	74	74	75	75	76	76	77	77	78
80	68	69	69	70	70	71	72	72	73	73	74	75	75	76	76	77	78	78	79	79	80
82	69	69	70	71	71	72	73	73	74	75	75	76	77	77	78	79	79	80	81	81	82
84	70	70	71	72	73	73	74	75	75	76	77	78	78	79	80	80	81	82	83	83	84
86	71	71	72	73	74	74	75	76	77	78	78	79	80	81	81	82	83	84	84	85	86
88	72	72	73	74	75	76	76	77	78	79	80	81	81	82	83	84	85	86	86	87	88
90	72	73	74	75	76	77	78	79	79	80	81	82	83	84	85	86	86	87	88	89	90
92	73	74	75	76	77	78	79	80	81	82	83	84	85	85	86	87	88	89	90	91	92
94	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
96	75	76	77	78	79	80	81	82	83	85	86	87	88	89	90	91	92	93	94	95	96
98	76	77	78	79	80	82	83	84	85	86	87	88	89	90	91	93	94	95	96	97	98
100	77	78	79	80	82	83	84	85	86	87	88	90	91	92	93	94	95	97	98	99	100
102	78	79	80	81	83	84	85	86	87	89	90	91	92	94	95	96	97	98	100	101	102
104	79	80	81	82	84	85	86	88	89	90	91	93	94	95	96	98	99	100	101	103	104
106	80	81	82	84	85	86	88	89	90	91	93	94	95	97	98	99	101	102	103	105	106
108	81	82	83	85	86	87	89	90	92	93	94	96	97	98	100	101	103	104	105	107	108
110	81	83	84	86	87	89	90	91	93	94	96	97	99	100	101	103	104	106	107	109	110
112	82	84	85	87	88	90	91	93	94	96	97	99	100	102	103	105	106	108	109	111	112
114	83	85	86	88	89	91	92	94	96	97	99	100	102	103	105	106	108	109	111	112	114
116	84	86	87	89	90	92	94	95	97	98	100	102	103	105	106	108	110	111	113	114	116
118	85	87	88	90	92	93	95	97	98	100	102	103	105	106	108	110	111	113	115	116	118
120	86	88	89	91	93	94	96	98	100	101	103	105	106	108	110	111	113	115	117	118	120

RESTING SPACE REQUIREMENTS FOR HEIFERS – BEDDED PACK

AREA PER ANIMAL	BODY WEIGHT POUNDS KG						
	132 60	220 100	331 150	441 200	661 300	882 400	1,100 500
Bedded resting area per animal square feet/square meters	35 3.3	35 3.3	35 3.3	35 3.3	40 3.7	50 4.6	60 5.6

Bedded Pack Housing. The Dairyland Initiative. <https://thedairylandinitiative.vetmed.wisc.edu>

- Check dry surfaces for cleanliness using a luminometer (ATP meter). Periodic assessments can help find areas where cleaning and sanitation protocols may need adjustment.
- Manage bedding and the floor or base, and promote drainage of manure, urine and liquids to minimize ammonia production.
- Minimize environmental (cold and heat) stress in outdoor-housed calves.

Weaned calves

- Housing conditions
 1. Provide a skid-free walking surface.
 2. Offer adequate feeding space for all animals to consume sufficient dry matter.
 3. In freestall housing, provide at least one freestall per heifer.
 4. Provide an abundant supply of high-quality water, which is available at all times.
 5. Protect heifers from extreme heat and cold.
 6. Bedding should be comfortable and clean.
 7. Ventilate barns so the environment is dry.

Figure 6

RESTING SPACE REQUIREMENTS – FREESTALL				
APPROXIMATE AGE MONTHS	BODY WEIGHT POUNDS KG			
	400–600 181–272	600–800 272–363	800–1,000 363–454	1,000–1,200 454–544
LARGE-SIZE HOLSTEINS MONTHS	~6 – 10	~11 – 13	~14 – 16	~17 – 21
SMALL-SIZE HOLSTEINS MONTHS	~6 – 10	~11 – 14	~15 – 18	~19 – 22
STALL FEATURE	STALL DIMENSIONS INCHES METERS			
Stall width (on center)	34 0.86	38 0.97	42 1.07	45 1.14
Total stall length facing a wall	80 2.03	88 2.24	96 2.44	108 2.74
Outside curb to outside curb for head-to-head platform	Not Recommended		180 4.60	192 4.90
Distance of the rear curb to the brisket locator (maximum height 3 inches/7.6 cm)	Not Recommended		64 1.63	66 1.68
Width of rear curb	6–8 0.15–0.20	6–8 0.15–0.20	6–8 0.15–0.20	6–8 0.15–0.20
Horizontal distance of the neck rail from the rear point of the curb for mattress stalls	46 1.17	55 1.40	64 1.63	66 1.70
Horizontal distance of the neck rail from the rear point of the curb for deep bedded stalls	40 1.02	49 1.25	58 1.47	60 1.52
Distance from rear edge of divider loop to point of curb	9 0.23	9 0.23	9 0.23	9 0.23
Height of brisket locator above top of curb loose-bedded stall or mat/mattress surface	Not Recommended		3 0.08	3 0.08
Height of upper edge of bottom stall divider rail above top of curb (loose-bedded stall for mat/mattress surface)	8 0.20	8 0.20	10 0.25	10 0.25
Interior diameter of the stall divider loop	24 0.61	28 0.71	30 0.76	33 0.84
Height of neck rail above top of curb loose-bedded stall or mat/mattress surface	34 0.86	38 0.97	42 1.07	45 1.14
Horizontal distance from brisket locator to loop angle	Not Recommended		20–22 0.51–0.56	20–22 0.51–0.56
Rear curb height	6 0.15	8 0.20	8 0.20	8 0.20

Heifer Freestall Dimensions. The Dairyland Initiative. <https://thedairylandinitiative.vetmed.wisc.edu>

HANDLING & TRANSPORTATION

HANDLING

- Handle cattle gently to help keep them calm. Provide a quiet and stress-free environment for animals.
- When moving animals, use stockmanship techniques that accommodate the natural instincts of cattle and do not involve striking or force.
- Calves must never be handled using only their tails, neck, ears, hide or a single leg.
- Establish a zero-tolerance policy for animal abuse.
- Establish quarantine facilities for sick or injured animals.

TRANSPORTATION

- Wash and disinfect vehicles used to transport animals between trips to reduce pathogen exposure.
- Equip transportation vehicles with flooring that ensures secure footing and absorbs urine and manure.
- Calves should be dry, well hydrated and able to stand and walk on their own before transportation.
- Help animals avoid additional stress from transport by vaccinating and disbudding more than one week before long-haul transportation.
- More specific transport guidelines can be found at: aabp.org/Resources/AABP_Guidelines/transportationguidelines-2019.pdf and calfcareqa.org/Media/CalfCare/Docs/ccqa-manual_digital.pdf

TRIP PREPARATION

- Minimize the length of the trip as much as possible.
- When hauling young calves in ambient temperatures <60 F (<15 C), provide deep bedding and/or calf jackets.
- Cover one-half to two-thirds of a trailer's holes if transporting calves in colder temperatures.
- At >78 F (25 C), consider transporting calves at night or early morning to mitigate heat stress.
- If a trip is longer than 24 hours, consider stopping and providing electrolytes and feed, as this has been shown to reduce dehydration.
- Prior to transporting a new group of animals, wash and disinfect the trailer. Then, add new bedding.

RECOMMENDED TRAILER STOCKING

CALF WEIGHT	SPACE PER DAIRY ANIMAL
Up to 100 pounds 45.5 kg	4 square feet 0.37 square meter
200 pounds 90.7 kg	6 square feet 0.55 square meter
Up to 440 pounds 200 kg	9 square feet 0.83 square meter
Up to 1,200 pounds 545.5 kg	13 square feet 1.2 square meters
More than 1,200 pounds >545.5 kg	16 square feet 1.5 square meters

FASS recommendations for minimum area allowances for transporting calves and cattle. AABP 2019.

EUTHANASIA

There are instances in which euthanasia is the most humane option for a convalescing animal.

- If an animal is in pain and suffering with no possibility of recovery, perform euthanasia using AABP and/or American Veterinary Medical Association (AVMA) guidelines.
- DCHA supports and endorses the cattle euthanasia guidelines established by AABP and AVMA.

RESOURCES

- **A Scoping Review of On-farm Colostrum Management Practices for Optimal Transfer of Immunity in Dairy Calves**
<https://pubmed.ncbi.nlm.nih.gov/34350226/>
- **Average Daily Gain in Preweaned Holstein Heifer Calves**
https://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/dairy17/adg-preweaned-holstein-heifer.pdf
- **BC SPCA Comments on the Introductory Survey for Code of Practice for the Transportation of Livestock and Poultry**
<https://spca.bc.ca/wp-content/uploads/Transport-code-of-practice-initial-survey-BC-SPCA-Submission-FINAL.pdf>
- **Biosecurity Practices for Dairy Operations**
<https://texashelp.tamu.edu/wp-content/uploads/2016/02/Biosecurity-Practices-For-Dairy-Operations.pdf>
- **Body Condition Scoring for Dairy Replacement Heifers**
https://www.vet.cornell.edu/sites/default/files/1d_Elanco_Heifer_BCS_Guide_9.pdf
- **Characterization of Holstein Heifer Fertility in the United States**
<https://pubmed.ncbi.nlm.nih.gov/17106123>
- **Colostrum Feeding and Passive Immunity of Preweaned Holstein Heifer Calves**
https://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/dairy17/colostrum-feeding-passive-immunity-heifer-calves.pdf
- **Colostrum Management for Dairy Calves**
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7125574>
- **Consensus Recommendations on Calf- and Herd-level Passive Immunity in Dairy Calves in the United States**
<https://pubmed.ncbi.nlm.nih.gov/32448583>
- **Considerations When Transporting Dairy Animals**
<https://nationaldairyfarm.com/product/consideration-when-transporting-dairy-animals>
- **Dehorning Guidelines**
https://www.aabp.org/Resources/AABP_Guidelines/Dehorning-2019.pdf
- **Do Calves Need a Heat Stress Chart?**
<https://www.techmixglobal.com/dairy/knowledge-center-2/calf-articles/calf-article-heat-stress-chart>
- **Establishing and Maintaining the Veterinarian-Client-Patient Relationship in Bovine Practice**
http://aabp.org/Resources/AABP_Guidelines/VCPRGuideline_032020.pdf
- **Feeding the Newborn Dairy Calf**
<https://extension.psu.edu/feeding-the-newborn-dairy-calf#section-8>
- **Guidelines for the Humane Euthanasia of Cattle**
http://www.aabp.org/Resources/AABP_Guidelines/EUTHANASIA-2019.pdf
- **Proper Cleaning and Disinfection of Livestock Trailers and Calf Pens**
Available from Donald Sockett, Wisconsin Veterinary Diagnostic Laboratory, at: dsockett@wvdl.wisc.edu.
- **Transportation & Fitness for Transport**
https://www.calfcareqa.org/Media/CalfCare/Docs/ccqa-manual_digital.pdf
- **Transportation and Fitness-to-travel Recommendations for Cattle**
https://www.aabp.org/Resources/AABP_Guidelines/transportationguidelines-2019.pdf
- **Weight or Wait? How Defining Breeding Eligibility of Heifers Impacts First Lactation Milk Production**
<https://dairy.extension.wisc.edu/articles/weight-or-wait-how-defining-breeding-eligibility-of-heifers-impacts-first-lactation-milk-production>

NOTES

*DCHA recognizes the following sponsors for the reproduction and distribution
of the fourth edition of the DCHA Gold Standards:*



#ScienceHearted



Cottonwood Feeders
PENALOSA, KS





www.calfandheifer.org