

Early Identification of Sick Calves Important to Their Survival and Future Milk Production



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Introduction

The health of dairy calves early in life (their first 8 weeks) directly impacts future milk production and longevity in the dairy herd. Protecting the future health, performance, and survivability of calves starts with timely feeding of adequate amounts of high-quality colostrum (see section below for key points) and disinfecting the navel with 7% tincture of iodine or a chlorhexidine solution. In addition, dairy calf managers must be able to identify sick calves and provide supportive therapy early for the best survival rates and to minimize effects on long-term productivity.

In multiple National Animal Health Monitoring Surveys, dairy producers and their veterinarians indicated that scours (diarrhea) occurred in 24% of dairy calves prior to weaning and that 12% of calves had respiratory issues (pneumonia). Scientists have indicated that incidence rates of pneumonia are much higher than indicated by producers and are often go undetected.

The highest risk for scours occurs within the first month of life. Young dairy calves with scours can become severely dehydrated quickly. If they are not treated in a timely manner, their chances of survival can decrease tremendously. Respiratory issues more often are seen when calves are stressed particularly around weaning time. However, the first episode may be traced to the pre-weaning period and may go undetected.

Excellent dairy calf managers can spot diseases early and treat these calves so they have the best chances of recovering quickly. To help train employees and family members to detect illnesses in dairy calves, we provide a check sheet with common symptoms to evaluate. Once sick calves have been identified and more closely examined, protocols developed with your local veterinarian should be implemented to treat these calves. In addition, reviewing management practices and instituting changes can help prevent illnesses in young dairy calves.

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Start by Reviewing Critical Control Points with Colostrum Management

- **Feed colostrum within 6 hours of birth.** Absorption of antibodies decreases with age and is essentially non-existent by 24 hours of age.
- **Hand-feed an adequate amount of colostrum** — 4 quarts to Holsteins; 3 quarts for Jerseys. Studies have shown that first lactation milk yields are higher in calves fed 4 quarts versus 2 quarts of colostrum at birth.
- **Feed high-quality colostrum** where quality has been measured (i.e., with a colostrometer or Brix refractometer where reading is greater than 22%) and feed to provide a total of 100-150 g IgG.
- **Make sure bacteria counts are low in colostrum.** Milk colostrum into a clean bucket from cows prepped for milking. Colostrum should be collected as close to calving as possible. Feed colostrum within 1 hour of collection, or refrigerate or freeze it immediately upon collection. Use clean plastic bottles filled with frozen water to lower the temperature of colostrum at harvest before/while being refrigerated or frozen.
- **Remove calves from dams at birth** to avoid suckling around legs and brisket, which can result in the consumption of manure.

Identifying Potentially Sick Calves

Step 1: Identify calves needing more careful evaluation at and just before feeding times. With automatic calf feeders, review data often throughout the day to detect calves getting sick.

Part 1: Response to calves at feeding time.	
If you answer "no" to a question below, examine these calves more closely using the questions listed under Step 2: Closer Inspection.	
Yes	No
<input type="checkbox"/>	<input type="checkbox"/>
Does the calf get up and actively position itself at its milk feeding station?	
<input type="checkbox"/>	<input type="checkbox"/>
Does the calf want to drink its milk?	
<input type="checkbox"/>	<input type="checkbox"/>
Does the calf drink its milk at its normal expected rate?	
<input type="checkbox"/>	<input type="checkbox"/>
With automatic feeding stations, does the calf drink its normal allocation of milk within the allocated time frame?	
<input type="checkbox"/>	<input type="checkbox"/>
Are the calf's ears erect, and is the calf alert? Droopy ears are a sign of illness (See Fig. 1).	



Figure 1. An alert calf with erect ears.



Figure 2. Everting a calf's lower eyelid to detect the degree of dehydration.

Part 2: Additional observations at each feeding.

If any problems are detected, calves should be examined more closely using the questions listed under Step 2: Closer Inspection.

What is the calf's manure consistency?

Check the description that is the closest. Calves that are scouring need additional fluids and need to be examined more closely and should be fed last to prevent spread of diseases to healthy calves.

Pudding consistency – normal fecal consistency

Yogurt consistency – fecal consistency does not warrant feeding electrolytes

Maple syrup consistency and/or strong odor – too thin. Calf needs closer examination, and electrolytes should be fed in addition to and separately from milk.

Apple juice consistency – too thin. Calf needs closer examination, and electrolytes should be fed in addition to and separately from milk.

Yes No

Is the calf coughing and/or has a discharge from its nose or eyes? If so, closer examination of the calf is needed for potential respiratory illnesses. Your veterinarian can help you diagnose the source of the problem and prescribe the best course of action. Antibiotics should be used as directed by your local veterinarian.

Step 2: Closer Inspection (for calves with potential illness detected through questions answered in Step 1)

Calf's Vital Signs or Physical Measurements		
If a calf's vital signs are outside the normal range (that is, you have answered "yes" to any question), implement treatment protocols that have been developed with the help of your local veterinarian.		
Yes	No	
Normal or expected calf vitals		
	Is the calf's temperature elevated?	101° to 103°F is normal
	Is the calf breathing rapidly?	24 to 26 breaths per minute is normal in calves less than 1 month of age and 15 to 30 breaths per minute in older calves
	Is the calf's heart rate elevated?	100 to 140 beats per minute is normal in calves (twice as fast as a cow). An irregular heart beat is one sign of illness.
	Are the calf's eyes sunken into the eye socket? (Gently evert the calf's lower eyelid and observe the amount of space between the eyeball and the lower eyelid.)	Healthy calves have a minimal amount of space between the lower eyelid and eyeball (less than 2 mm or a little more than 1/16th of an inch). As the calf becomes dehydrated, the amount of space between the eyeball and lower lid increases. (See Fig. 2)
	When the skin of the neck is pinched and gently rotated 90°, a tent of the skin forms. Does this skin tent return to normal within 2 seconds? (See Fig. 3)	Normally, expect the tenting of skin to return to normal within 2 seconds. Greater than 2 seconds indicates dehydration.
	Are the calf's gums dry and white?	Normally, a calf's gums are moist and pink. Dry, white gums are a symptom of severe dehydration (8-10% dehydration).
	If the calf is lying down, does it fail to get up when given a small amount of persuasion?	For calves that are unable to rise, contact and/or follow your veterinarian's recommendations immediately. These calves may need IV fluids (fluids administered directly into the blood) to help treat the dehydration and possible acidosis. If not treated appropriately and quickly, this calf may die.



Figure 3. Performing a "skin tent" test. On a healthy calf, the skin should return to normal within 2 seconds.

Electrolytes Important for Scouring Calves

Calves can lose 5% to 10% of their body weight daily in fluids due to scours. To replace these lost fluids, electrolytes should be fed in addition and separately to the calf's allocation of milk. Electrolytes alone do not provide an adequate amount of energy for the calf to fight off the disease and maintain body weight. To determine if additional treatments (i.e., antibiotics) are needed to help the calf recover from scours or pneumonia, farmers should work with their local veterinarian to develop treatment protocols that reflect the needs and diseases seen on their dairy operation (known as standard operating procedures, or SOP).

EARLY IDENTIFICATION OF SICK CALVES IMPORTANT TO THEIR SURVIVAL AND FUTURE MILK PRODUCTION (CONT)

Calf Symptoms ¹	% dehydration	Daily amount of electrolytes needed for 100-lb calf ^{**}	Total daily amount of fluids (milk plus electrolytes)
<ul style="list-style-type: none"> • Scours • Strong suckling reflex • Skin tent returns to normal in less than 2 seconds 	5-6 %	3 quarts of electrolytes plus 4-6 quarts of milk	7-9 quarts
<ul style="list-style-type: none"> • Scours • Calf still has sucking reflex • Skin tent returns to normal in 2-6 seconds • Sunken eyes • Mild depression; calf may be weak 	6-8% (moderately dehydrated)	4 quarts of electrolytes plus 4-6 quarts of milk	8-10 quarts
<ul style="list-style-type: none"> • Scours • Calf lying down; rises only when encouraged • Skin tent returns to normal in greater than 6 seconds • Very sunken eyes; white and dry gums • Calf depressed; calf may be weak 	8-10% (severely dehydrated)	IV fluids needed to provide adequate fluids and to correct blood pH caused by imbalance of acids and bases in the blood (known as metabolic acidosis)	Contact veterinarian and follow his or her advice
<ul style="list-style-type: none"> • Death 	Over 14%		

* Overfeeding electrolytes causes little detriment to calves. However, underfeeding electrolytes can prolong scours and not correct the dehydration and loss of electrolytes.

** The number of quarts of electrolytes needed in addition to the fluids from milk is equal to $((\text{Weight of the calf} * (\% \text{ dehydration}/100))/2)$

¹Kehoe, S. and J. Heinrichs. Electrolytes for dairy calves. Penn State Extension Publication DAS 05-104.

EARLY IDENTIFICATION OF SICK CALVES IMPORTANT TO THEIR SURVIVAL AND FUTURE MILK PRODUCTION (CONT)

Prevention

Instituting key management practices can help prevent illnesses in young calves and minimize disease spread. Below is a check sheet identifying some of the areas to review on a regular basis to help prevent illnesses in calves.

YES	NO	Management practices	Why this practice is important
		Are sick calves fed last?	When sick calves are not fed last, diseases can be transmitted to healthy calves.
		Do you wash your hands and boots before and after feeding and/or examining/handling calves?	Several calf diseases are transmissible to humans in addition to other calves. In addition, fecal contamination is the most likely cause in the spread of infectious agents causing scours.
		<p>Are calf buckets and bottles for feeding milk washed according to the following procedures after each feeding?</p> <ul style="list-style-type: none"> • Rinse in lukewarm water (not hot water) • Wash using 140°F water with detergent and bleach. (You may need to use gloves because of the hot water temperature.) Keep water >120°F just like milking equipment, and USE A BRUSH. • Rinse with warm water and an acid rinse. • Let air dry. 	To prevent bacteria growth in feeding equipment and the spread of disease, follow the same washing procedures for cleaning milking equipment used to harvest milk for human consumption.
		If an esophageal feeder is used, is it washed after each use according to the procedure listed above? A small brush should be used to clean the tubing. Store clean and keep dry.	
		Are sick calves given their allotment of milk in addition to electrolyte solutions?	Scouring calves need nutrition provided by milk. Calves that are not provided with milk often get weaker, may not respond to treatment, and do not grow as well as those provided with their daily allocation of milk.

EARLY IDENTIFICATION OF SICK CALVES IMPORTANT TO THEIR SURVIVAL AND FUTURE MILK PRODUCTION (CONT)

YES	NO	Management practices	Why this practice is important
		Are electrolytes given when calves have scours and/or are dehydrated?	Scouring calves can lose 5% to 10% of their body weight in water from scouring in one day. Electrolyte solutions are needed in addition to milk to provide fluids and maintain blood pH. Overfeeding electrolytes causes little detriment to calves. However, underfeeding electrolytes can prolong scours and not correct the dehydration and loss of electrolytes.
		If calves are housed in calf hutches, are they provided shade (shaded by trees or shade cloth that blocks greater than 80% radiation) when daytime temperatures are over 75°F?	Calves that are heat stressed have a lower growth rate and immune response when challenged by disease-causing agents.
		Are calves housed in an environment that is dry and draft-free, but provides adequate ventilation at the calf pen level?	To prevent the spread of disease in a calf housing facility, pens need draft-free ventilation and dry bedding. Air movement is needed just above the calf to move bacteria-laden air out of the facility.
		Is clean, dry bedding provided for each calf, especially as the weather gets colder?	Within the first 3 weeks of life, the thermal neutral zone for calves is between 60° and 77°F because they are born with little body fat to keep them warm. After 3 weeks of age, the lower critical comfort temperature drops to 50°F. When temperatures drop below these levels, deeply bedding calves with straw so the legs are covered can help keep them warm.
		Are calf hutches moved and washed and sanitized between calves? If calves are group housed with an automatic feeder, are facilities and feeder cleaned and sanitized after each group of calves and left vacant for minimum of 15 days?	Cleaning and sanitizing calf housing between calves prevents the spread of disease. The most common method for transmission of agents that cause scours is through ingestion of fecal matter.

EARLY IDENTIFICATION OF SICK CALVES IMPORTANT TO THEIR SURVIVAL AND FUTURE MILK PRODUCTION (CONT)

YES	NO	Management practices	Why this practice is important
		Do you have protocols established for handling calves that become sick?	<p>Establishing a sound working relationship with your local veterinarian is critical. Utilizing his or her help in establishing standard operating procedures for sick calves can help speed the recovery of calves and result in prudently using antibiotics and other treatment protocols on your dairy operation.</p> <p>In addition, vaccination protocols need to reflect diseases and conditions on your operation. Your local veterinarian's advice is critical when developing and implementing these protocols.</p>
		Have you reviewed these protocols with your local veterinarian?	
		Have you discussed with your local veterinarian vaccination protocols needed to prevent problems in your operation?	