

ASSESSMENT, SCORING AND DISEASE MANAGEMENT OF DAIRY CALVES



Sheila M. McGuirk, DVM, PhD

SCHOOL OF
VETERINARY MEDICINE
University of Wisconsin-Madison

Advancing animal and human health with science and compassion



Basic Care Package

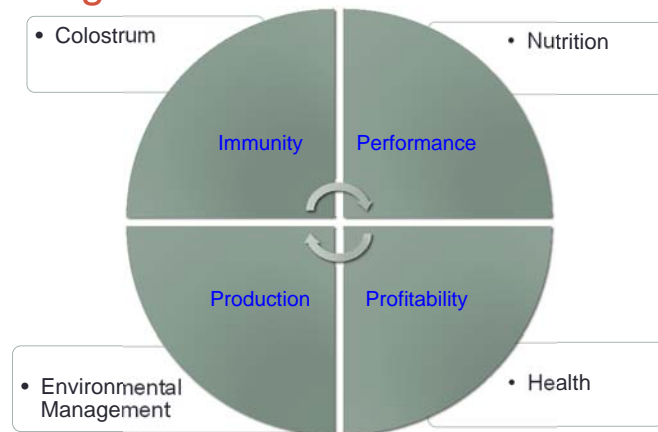
Five C's

- Colostrum
- Calories
- Consistency
- Comfort
- Cleanliness

Health Screening and Management



Making a Difference



Reducing Mortality in the First 24-hours

- Most calves that die within 24-hours of birth are alive when born
- With normal presentation, sustained progress, observe but do not assist
- If moved during labor, allow time for labor to resume



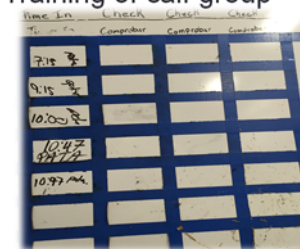
Herd Goals for Dairy Calves

- Stillbirth rate for whole herd less than 6%
 - First lactation: less than 8%
 - Second lactation and greater: less than 4%
- Stillbirth rates > 10%, need calving management training
- Not more than 30% of calvings need assistance
- Calves dying in first 24-48 hours: < 2%
- Calves dying 48 hours to weaning: < 5%



Achieving Goals: Have a Calving Plan

- Standard procedures are understood and recorded
- Intervention criteria are established
 - Time
 - Progress
 - Position of Calf
- Good labor area
 - Space
 - Cleanliness
 - Lighting
 - Restraint capability
- Hygiene and lubrication during assistance
- Good records
- Attention to calving ease in sire selection
- Training of calf group



Reducing Mortality in the First 24-hours

- Prevent dystocia
 - Sire calving ease (SCE) < 8%
 - Daughter calving ease (DCE < 6%)
- Assist only when necessary
- Particular attention to first calf heifers and cows with twins
- Train, train and retrain
- Monitor equipment, supplies, calving cows and records



Training to Reduce Stillbirths

1. Description of signs associated with labor stages
2. Learn when and how to assist
3. Know how to correct abnormal presentation, position or posture of calf
4. Calving hygiene practices
5. Accurate record keeping
6. Expected communication
7. Newborn calf care



Unassisted Vaginal Delivery is Best for the Calf and the Cow

- Vaginal delivery improves calf vigor and survival
- Outside the pen supervision every 15 minutes
- Assist only when necessary
 - Abnormal position
 - Sustained lack of progress
 - 70 min after amniotic sac appearance*
 - 65 min after feet appearance*
- Use proper assistance protocols
- Call for help before it is too late



*Schuenemann GM et al, JDS 2011

Observation for Normal Behavior

- Head righting in minutes
- Sitting in 5 minutes
- Attempts to stand within 15 minutes
- Standing within 1 hour
- Temp high at birth, declines to 101-102 by 1 hour
- Suckling within 2 hours



Drug-Free Resuscitation



- Postural drainage
- Topline towel rub from tailhead to poll
- Towel stimulation of ears, eyes and nose
- Compress and shake trachea
- Ice-water in ear
- Pinpoint nasal pressure
- Suction nose and throat
- Infrared radiant heat

Ice Water Technique



- 60 cc of ice water in the ear
- 250 to 500 cc over the poll of the head
- Results in vigorous head shaking
- Improved pulmonary gas exchange

Navel Care

- Prevent infection
 - Spontaneous rupture
 - Clean calving environment
 - Immediate removal to well-bedded calf pen
 - Clean colostrum
 - Navel disinfection - spray or dip cord
 - 1,2, and 7% iodine
 - 0.5% chlorhexidine
 - Navel-Guard



Put Colostrum Testing Into Action

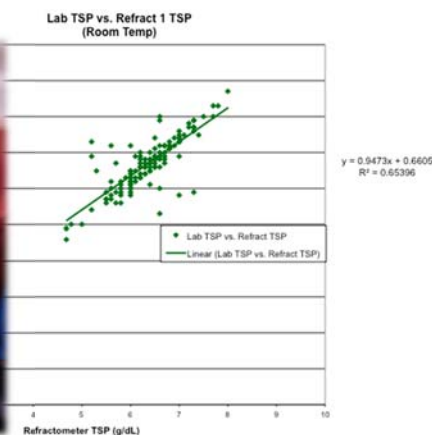
Mark High-Risk Calves



Classify Herd Status

- Failure of Passive Transfer Based on serum total protein (STP)
 - More than 20% below 5.5 gm/dl
 - More than 10% below 5.2 gm/dl

Refractometer Calibration



A systematic review of colostrum protocols may be needed.

- Colostrum Volume
 - Less than 4 quarts given by esophageal feeder
 - Less than 3 quarts suckled
- Colostrum Quality
 - High producing cows
 - Delayed milking
 - Calf suckles
 - Cow leaks
 - Short dry period
- Poor absorption
 - Delayed feeding
 - Bacterial contamination
 - Additives in maternal colostrum
 - Calving assistance



Training to Use the Esophageal Feeder



Selective Use of Esophageal Feeder

- Standing position for calf if possible
- Calf must be able to maintain sternal recumbency
- Not for use in calf with respiratory effort
- Not for use in calf with abdominal distension
- Equipment is sanitized and in good condition
- Do not force feed milk/milk replacer without veterinarian's recommendation
- Limit forced milk feedings (usually 3 or less)

Equipment Selection

Colostrum



Pass the feeder only once!

Oral Electrolyte Solution



Keep the nose below the ears.





How many esophageal feeders are needed?

The number should equal the maximum number of calves that might need an esophageal feeder in one day – colostrum or oral electrolyte solution.

Sanitizing the Esophageal Feeders



Are We Feeding Enough?

Ration Results	
Milk Dry Matter Intake :	1.50 (lbs/day)
Starter Dry Matter Intake :	0.45 (lbs/day)
Energy Allowable Gain :	1.81 (lbs/day)
Diet ME :	2.00 (Mcal/lbs)
Diet NEm :	1.68 (Mcal/lbs)
Diet NEg :	1.34 (Mcal/lbs)
Diet CP :	19.5%
Diet DCP :	17.4%
ADP Allowable Gain :	1.16 (lbs/day)

- NRC Simulation Program
- Use actual ration inputs
- Assumptions may be needed for starter intake
- Adjust for calf body weight
- Use environmental temperature
- Have a plan

Average Daily Gain (lb/day)
1.0
1.2
1.6
1.8
2.0
2.0
1.4

Assumptions Needed for NRC Calculator

Week	Body Weight	Estimated Starter Intake (lb)	Average Daily Gain (lb/day)
1	Ave birth wt	0.25	1.0
2	Birth wt +7	0.5	1.2
3	Week 2 + 8.4	0.75	1.6
4	Week 3 + 11.2	1.0	1.8
5	Week 4 + 12.6	1.5	2.0
6	Week 5 + 14	2.0	2.0
7	Week 6 + 14	3.0	1.4

ADG (lb): Holstein 80 lb birth weight – 2 wks

Temperature	20:20	22:20	24:18	28:20
20° F	1.2	1.2	1.2	1.3
40° F	1.4	1.5	1.5	1.6
60° F	1.4	1.5	1.6	1.9
80° F	1.4	1.5	1.6	1.9

95 lb at 14-days

- 0.5 lb starter intake;
- 10 oz powder per 2 qt water
- 6 qt/day

protein

energy

Protein and energy

ADG (lb): Holstein 80 lb birth weight – 2 wks

Temperature	20:20	22:20	24:18	28:20
20° F	1.8	2.0	2.0	2.1
40° F	1.8	2.0	2.2	2.4
60° F	1.8	2.0	2.2	2.6
80° F	1.8	2.0	2.2	2.6

95 lb at 14-days

- 0.5 lb starter intake;
- 10 oz powder per 2 qt water
- 8 qt/day

protein

energy

Protein and energy

NRC Ration Results

8-qts 20:20 MR @ 20°

Ration Results

Milk Dry Matter Intake : 2.50 (lbs/day)

Starter Dry Matter Intake : 0.45 (lbs/day)

Energy Allowable Gain : 2.19 (lbs/day)

Diet ME : 2.07 (Mcal/lbs)

Diet NEm : 1.75 (Mcal/lbs)

Diet NEg : 1.40 (Mcal/lbs)

Diet CP : 21.7%

Diet DCP : 19.6%

ADP Allowable Gain : 2.13 (lbs/day)

Crude Protein Balance : -7 (g)

Monitor Feeding Consistency

- Total solids
- Temperature
 - Mixing
 - Feeding
- Delivery – same feed from first to last calf
- Additives
- Timing
- Between feeders
- Water delivery within 20 to 30 minutes of milk/milk replacer feeding



Total Solids

Calculate

- 10 oz powder = 0.625 lb
- 2 qt water = 4.17 lb
- $\frac{0.625}{0.625 + 4.17}$
- = 13% solids

Total Solids

- < 2% change per day
- Never > 18%

Measure



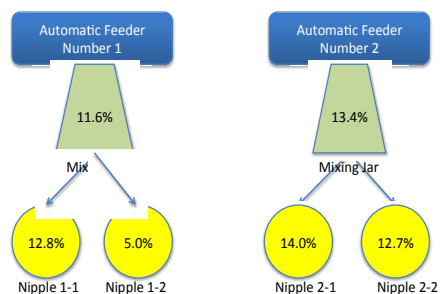
Variability may be more than you expect.

Days	28:20 - weight	22:18 - volume
1	12.2	15.6
2	11.5	17.0
3	12.5	19.3
4	8.8	16.0
5	10.9	14.4

Koepnick and McGuirk, 2010

Milk Delivery Consistency

- What is calculated
- What is in the machine or bucket
- What the calf drinks



The Importance of Water

- Fed after every feeding
 - Winter and summer
 - Starting by day 3
- Delivered warm
- Especially with diarrhea
- Absolutely necessary for calves getting electrolytes
- Allows the calf to "correct" feeding errors

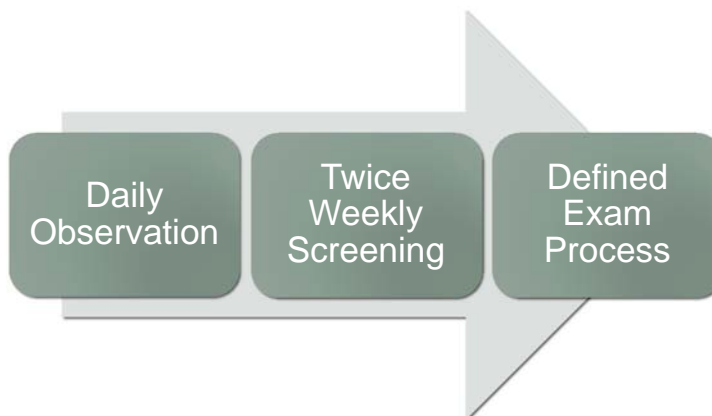


Regularly Assess Milk Quality

Sample Type	Total Bacterial Count	Goals (cfu/ml) Total Coliform Count	Total <i>E. coli</i> Count
Colostrum	< 100,000	< 10,000	< 1,000
Waste Milk	< 500,000	< 200,000	< 1,000
Pasteurized waste milk	< 20,000	< 1,000	< 100
Milk replacer	< 10,000	< 1,000	0

With automatic feeders, collect milk through the nipple.

Managing Calf Health



Early Detection for More Effective Treatment



Effective and Efficient Calf Health Screening

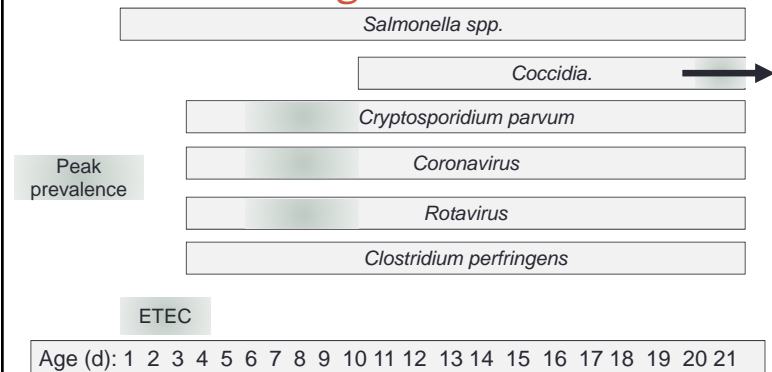
- Maximize disease detection
- Facilitate early intervention
- Minimize treatment cost
- Gather data
 - Track incidence/prevalence
 - Treatment response
 - Cost
- Reduce mortality
- Shorten disease duration
- Improve treatment outcomes



Address the Most Important Conditions of Calves

Producer-Attributed Cause of Death	Percent
Scours, diarrhea, or other digestive	56.5
Respiratory	22.5
Unknown reason	7.8
Calving problem	5.3
Other known reason	4.3
Lameness or injury	1.7
Joint or navel problem	1.6
CNS, incoordination, depression	0.3

The common bugs...



Health Evaluation Must Not Penalize

- Calves
- Screeners
- Examiners
- Treatment Crew

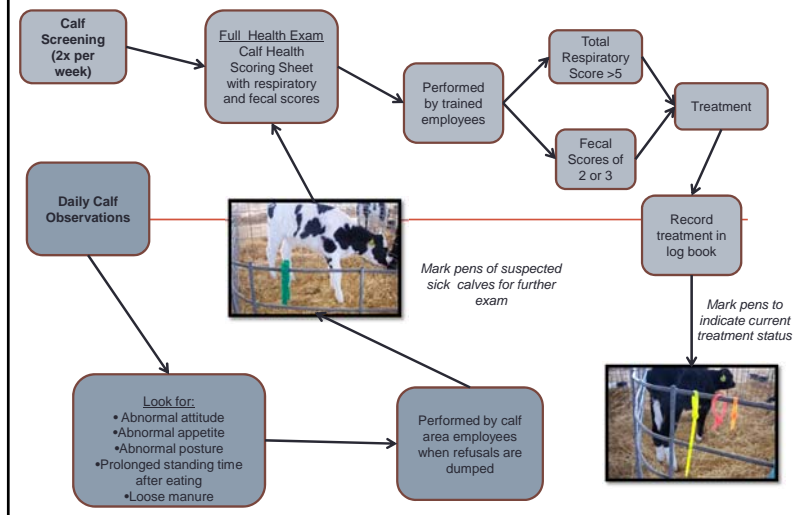


Labor Needs: It Takes a Trained Team

- 1 FTE/100 calves for routine chores
- 0.5/100 calves for health management



It Takes a Defined Process



Daily Observation

- Accomplished during other chores
 - Picking up bottles
 - Dumping milk/water
 - Putting out calf starter
- Calves still standing when most are lying
- Calves slow to get up for feed



Screeners Find...

- Calves still standing when 90% are lying down or calves still lying when 90% are standing
- Diarrhea
- Bleeding (anywhere)
- Discharge – eyes or nose
- Sunken eyes
- Abnormal posture
 - Arched back
 - Tilted head
 - Star-gazing
- Coughing calves
- Breathing effort/noise



Timing of Health Screening

- Incorporate some aspects into normal chores
 - Collecting milk buckets/bottles
 - Delivering water
 - Picking up refusals



- Last calves standing after feeding
- Last calves to rise at feeding time

Mark Calves/Pens that Need Full Exam



Full Exam by Highly Trained Workers (1)

Temperature

- > 103°F
- < 100°F

Head position

- Tilted
- Star gazing
- Dropped or extended

Discharge

- Eyes
- Ears

Full Exam by Highly Trained Workers (2)

Nasal Discharge

- Color
- Amount

Cough

- Spontaneous
- Induced

Breathing Pattern

- Rapid
- Grunting
- Abdominal effort/snap

Full Exam by Highly Trained Workers (3)

Navel

- Thick
- Painful or hot
- Discharge or malodorous

Legs

- Lamé, won't get up
- Swelling
- Crooked

Feces

- Loose
- Watery
- Blood

Screening Tools

Calf Health Scoring App

Group Pen Respiratory Scoring

Diagnostic Testing May Help



Post-Mortem Exams are Useful

- Training to open dead calves
 - Collect samples
 - Take pictures for the Veterinarian



Treatments Needed

- Written protocols from a veterinarian who is actively involved by participation, training and monitoring results
- Treatment crew that has good skills, cares about animals, has patience, gets results
- Manager who leads by example
- Communication is essential
 - Exam to treatment crew
 - Treatment to manager
 - Manager to records
 - Stall side markers help



Treatment Status



Avoid Calf Vaccination Pitfalls

- Vaccinating sick/stressed calves
- Multiple vaccines at once
- Gram negative bacterial components
 - *Pasteurella* and *Mannheimia*
 - *Salmonella*
- *Mycoplasma bovis*
- Half-dose vaccinations

Where are your weak points?

- | | |
|---|---|
| <ul style="list-style-type: none">• Delayed removal from maternity• Contaminated colostrum• Esophageal feeder• Warming area bedding• Calf pen bedding• Inadequate nutrition• Limited water• Contaminated feed• Feed refusals dumped in calf housing• Limited time between successive occupants | <ul style="list-style-type: none">• Failure to remove bedding or stall base between calves• Lack of sanitation protocols for feeding equipment• Delayed disease detection• Incomplete/ineffective treatment• Cold stress• Over vaccinating |
|---|---|

