

NEONATOLOGY: OVINE



BASICS

OVERVIEW

- Preweaning lamb mortality typically consumes 10%–35% of the lamb crop each year. The majority of loss occurs shortly after parturition and often goes unrecognized by producers.
- As is the case with neonates of other species, disease involving newborn lambs occurs with little warning. Consequences to the newborn lamb are usually severe and treatment is often unrewarding. Thus, from an economic perspective, prevention is more important than individual animal treatment.
- In most flocks, the causes of lamb mortality can be divided into several basic categories that can be used to catalog 75%–85% of all preweaning mortality.
- Typically these basic categories include the following problems:
 - Starvation/hypothermia
 - Stillbirth/dystocia
 - Pneumonia
 - Abortion
- The relative importance of each category is generally defined by production system and management decisions. While these basic categories are useful for defining mortality patterns within a given flock, it is important to remember that the significance of each category will vary between flocks and from year to year.
- Furthermore, production system design (producer decisions) often impacts lamb mortality to a greater extent than infectious diseases (*see Figures 1 and 2*).
- Prevention programs for lamb mortality need to address environment, weather, forage resources, available markets, disease prevention, nutrition, genetic selection, maternal behavior, labor, and facility resources.
- Due to the complex intertwined character of management factors affecting prevention programs, it is often difficult to affect a change in mortality patterns during the same lambing season.

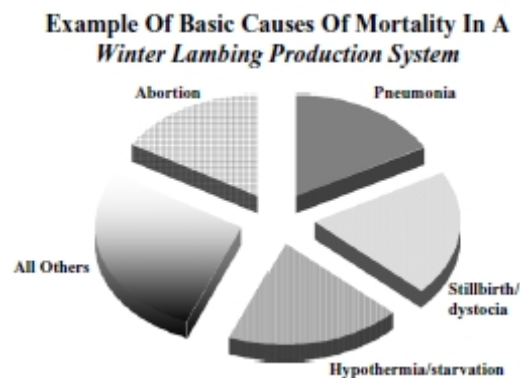
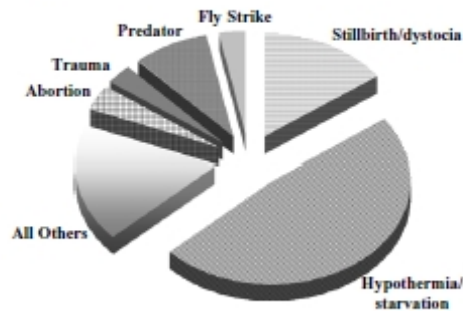


Figure 1: Causes of Mortality in a Winter Lambing System

Example Of Basic Causes Of Mortality In A Spring Pasture Lambing Production System



Note the basic unimportance of infectious causes!

Figure 2: Causes of Mortality in a Spring Lambing System

Common Causes of Lamb Mortality and Treatment

Hypothermia/Starvation Complex

Simple Hypothermia

- Usually presents 6–8 hr following birth
- Lambs weak, lethargic, often comatose
- Cold mouth, weak to no suckle reflex
- Gaunt, with empty abdomen
- Normal lamb temperature is 101°–102°F; mild hypothermia: 99°–100°F; severe hypothermia: < 99°F
- Affected lambs usually have adequate brown fat and blood sugar
- Arises from excessive heat loss which can occur as a result of
 - Cold environmental temperature
 - Wet birth coat, evaporation
 - Wind chill
 - small body mass (low birth weight) - large surface area to weight ratio increases susceptibility to heat loss when adverse conditions
 - Poor mothering ability
 - Lack of movement (no heat generated)
 - Hypoxia during delivery (due to dystocia): Can't regulate body temperature for several days.
- Treatment:
 - Provide warmth!!
 - Producers fail to recognize the importance of thermal management
 - Remove from ewe and dry
 - Supplement with warm dry heat @ 100°–103°F maximum temp.
 - Tube feed with 120–200 ml of colostrum (dose at 20 ml/lb body weight)
 - Return to ewe when rectal temperature normal (1–3 hours)
 - Assure future nutrition (i.e., check ewe for deficits)

Hypothermia secondary to starvation

- Over 6–8 hr old
- Clinical signs similar to simple hypothermia
- Arises from inadequate heat production due to starvation

- Depleted brown fat
- Hypoglycemia
- Compounded by limited intake of colostrum
- Treatment is directed at restoring blood glucose and providing warmth
 - If able to stand or in sternal recumbency and can support head: treat as for simple hypothermia
 - If comatose: also inject 40 cc of 20% warm dextrose solution intraperitoneally.

Contributing factors and flock management to prevent hypothermia and starvation

- Gestational nutrition
 - Smaller lambs chill more rapidly.
 - Energy levels during early and late gestation influence birth weight.
 - Failure to address increased energy demands associated with late gestation and/or increased fetal numbers (twins/triplets)
 - Available shelter and fleece status impact nutritional requirements (more energy needed).
 - Poor quality/quantity of colostrum
 - Weigh first lambs—document size, then correct nutrition: commercial lambs should weigh 9–11 lb at birth.
 - Underfeeding the ewe may also affect maternal bond.
- Replacement selection pressure
 - Breed variations in wool cover and tan fat deposition at term
 - Prolificacy: how much is too much?
 - Mothering instinct and lamb vigor
- Lactational nutrition: an issue if starvation occurring in older lambs
- Vitamin E–selenium: routinely add to feeds/salt in deficient areas.
- Protection from environmental conditions
 - Important in winter-lambing systems if housing suspect: Weather issues (temperature, wind chill, rain, snow and ice storms), especially if pasture lambing
 - Schedule lambing for weather conducive to lamb survival
 - Utilize: Historical weather data; ground temperature data (start lambing when > 50°F); natural protection—rough areas, clump grasses, pine and artificial wind breaks
- Quantity and quality of help
- Lambing pen and group pen availability and use: need one lambing pen per 5–10 ewes
- Dam/lamb identification
- Unshorn ewes: prone to expose lambs to poor weather
- Lack of milk: due to secondary diseases
- On pasture: forced movement of lambs contributes to mismothering

Pneumonia

Individual Assessment and Treatment

- Confinement related—common in barn-reared lambs especially when lambing occurs during periods of transitional weather
- Uncommon in pasture operations
- Clinical signs typical of acute bacterial (*Pasteurella* spp.) pneumonia in other species
 - Elevated temp.—above 103.5°F
 - Moist, harsh lung sounds
 - Elevated respiratory rate
 - Depressed, lethargic, +/- nasal discharge or cough

- In problem flocks, sudden death may be only sign (*Pasteurella septicemia*)
- Severe lesions develop shortly after birth (first week)—difficult to treat
- Treated lambs that survive may relapse when stressed (weaning, weather, and transport)
- Common antibiotics used in treatment
 - SQ procaine penicillin or procaine penicillin/benzathine penicillin combination @ 10,000 to 20,000 IU/lb body weight SID (dose NA)
 - SQ long-acting tetracycline injectable products @ 5 mg/lb SID or 9 mg/lb every 48 hours (NA)
 - SQ ceftiofur @ 0.5–1.0 mg/lb SID (A)
 - SQ florfenicol @ 9 mg/lb every 48 hrs (NA)
 - SQ tilmicosin @ 4.5 mg/lb given once (NA). CAUTION: FATAL TO HUMANS, HORSES, AND PIGS
 - Oral and injectable sulfonamide or trimethoprim/sulfa combination products common
 - Anti-inflammatory: SQ flunixin meglumine @ 0.5 mg–1.0 mg/lb

Contributing factors and flock management to prevent pneumonia

- Inadequate ventilation is a primary issue
 - Facility overcrowding @ 12 sq ft/ewe common in problem flocks
 - Difficult for non-mechanical ventilation @ less than 20 sq ft/ewe
- Transitional weather compounds ventilation problems
 - Temperature fluctuations and increased humidity
 - Facilities—difficult to exchange enough air
- Addressing inadequate ventilation
 - Remove solid sidewalls
 - Replace sidewalls with (1) side-wall curtains; (2) greenhouse shade cloth (80/20 fabric); (3) hinged/sliding panels.
 - Open ridge vent and square for “chimney” drafting effect.
 - Place shade cloth over sliding doors.
 - Cover open-sided barns with shade cloth to prevent draft and weather stress, yet allow ventilation.
 - Ventilate “dead spaces” with fans.
- Prolonged lambing season—increases crowding, contamination, and stress and extends into transitional weather.
- Pneumonia secondary to starvation or selenium/tocopherol deficiency
- Excessive moisture in bedding at lamb level
 - Bedding quantity insufficient
 - Unshorn ewes “drag” moisture into barn.
- Drop-lot or “flow through/no mix” lambing systems helpful.
 - Advantages:
 1. Decreases crowding—fed outside
 2. Decreases pregnant ewe/newborn lamb contact (scours, pneumonia)
 3. Facilitates proper group feeding
 4. Facilitates observation
 5. Facilitates bulk feeding of round bales and silage
 6. Maximizes facilities
 7. Encourages routine procedures in lambing/group pens

- Disadvantages
 1. Occasional ewe lambs outside.
 2. Producer comfort
 3. Wool frosting
 4. Feeder cost and mobility
- Pneumonia issues reduced by drop-lot lambing system (lambs and ewes go directly to grass by 5–7 days old) or with pasture lambing system (unless poor weather)
- In problem pneumonia flocks routine SQ long-acting antibiotics have been given on days 1 and 3 after birth, such as benzathine/procaine penicillin-G combination (NA) or slow release tetracycline (NA)

Stillbirth/Dystocia

Individual Assessment and Treatment

- Common presentations associated with dystocia
 - 26.4% anterior presentation with head back
 - 25.0% anterior presentation with one leg back
 - 16.7% anterior presentation with elbow lock
 - 11.1% anterior presentation with both legs back
 - 12.5% posterior presentation with true breech
 - 8.3% others (multiple tangles and deformities)
- Posterior presentation normal in lamb
- Interventions for dystocia can include manual repositioning, caesarian section in valuable individuals, fetotomy or euthanasia

Contributing factors and flock management to prevent still birth/dystocia

- Stillbirth/dystocia mortality rate is fairly constant in most flocks at 2%–3% of lambs born each year, and difficult to reduce further unless specific conditions are able to be identified and rectified
- Contributing factors can include:
 - Nutrition
 1. Overfeeding—increased birth weight with dystocia
 2. Underfeeding—weak and stillborn lambs
 3. Triplet/twins/single size related to nutrition
 - Lambing supervision—delayed assistance
 - Breed differences—especially in bred ewe lambs
 - Skeletal deformities
 - Secondary to abortion outbreaks

Abortion

Individual Assessment and Treatment

- Abortion Outbreak (practical response until diagnosis)
 - 400 mg oral tetracycline/hd/day immediately (first 2–3 days)
 - Then reduce to 200 mg/hd/day after 2 or 3 days
 - Small flocks: SQ long-acting tetracycline @ 5 mg/lb as switched to oral
 - Continue oral tetracycline through lambing—unless diagnosis or response dictates otherwise
 - When possible, feed in bunks— not on ground.
 - Clean up abortions and placentas
 - Isolate aborted ewes until discharge ceases (3 wk).

- Vaccinate late-lambing groups.
- Treat retained placentas as needed.

Contributing factors and flock management to prevent stillbirths/abortions

- Fairly constant occurrence at about 1%–2% of the ewe flock, > 2% in one flock is action level.
- Sheep abortions—transmission via ingesting contaminated material
 - Infected fetal fluid
 - Infected manure or urine from carrier ewes
 - Licking aborted fetuses
 - Infected hay or grain—especially if fed on ground
- *Campylobacter* and *Chlamydia* often follow new ewe additions to the flock.
 - Carrier ewes (in gallbladder to manure)
 - Bird vectors
 - Closed flock important for prevention
- Toxoplasmosis—cat feces contaminating hay and grain
 - No vaccine in United States
 - No treatment
 - Monensin added to gestation feed may help prevent (NA)
- Vaccination for *Campylobacter* and/or *Chlamydia*
 - Effectiveness variable
 - Often unavailable
 - Use only ovine strain vaccines
 - If open flock or problem flock
 - Two doses, to new arrivals or replacements, before breeding and midpregnancy
 - Booster yearly before breeding
- Closed flock with no problems: no vaccination
- Use caution (especially women of childbearing age) when handling dead lambs and placentas - especially if investigating an abortion problem since there is the potential for zoonotic transmission of several causative diseases.

Scours

Individual Assessment and Treatment

- *E. coli* scours
 - Difficult to treat once signs appear; work at prevention in remaining lambs
 - Rapid multiplication of *E. coli* in intestine with endotoxin release leads to diarrhea, dehydration, and death in 12–36 hours
 - Predisposing factors
 - Insufficient colostrum
 - Hypo motile intestine—anorexia
 - Contaminated environment
 - Treatment
 - If standing/depressed, ~ 5%–10% dehydrated, give oral fluids and antibiotics
 - If sternal/depressed, ~ 10%–15% dehydrated, give SQ and IV fluids and antibiotics
 - If comatose, ~ 15%–20% dehydrated, can attempt to treat but likely unsuccessful.
 - Spectinomycin is a common piglet scour medication in oral pump formulation—dose @ 5 mg/lb SID or BID (NA)
 - Trimethoprim/sulfa oral syrup or tablets @ 15–20 mg/lb SID or BID (NA)

- *Coccidia* Scours
 - Common cause of scours in 3–8-week-old lambs born in confinement
 - Clinical scours may occur 4–5 days before oocysts appear in fecal material, therefore lambs are often treated based on history
 - Nursing lambs require individual treatment with oral sulfa or amprolium drench for five consecutive days which is labor intensive/impractical with larger groups of lambs, hence prevention is superior.

Contributing factors and flock management to prevent scours

- *E. coli* scours: contributing factors include
 - Prolonged lambing season: environmental *E. coli* concentration increased
 - Environmental conditions conducive to *E. coli* survival and transmission
 - Humidity and warmth associated with transitional weather
 - Unshorn ewes increase moisture in facility.
 - Facilities concentrate organisms: lambing pen and common entry areas
 - Poor sanitation
 - Lack of colostrum intake
 - In flock outbreaks:
 - Change location of lambing pens
 - Increase bedding
 - Prophylactic antibiotic at birth
 - Spectinomycin oral syrup or trimethoprim/sulfa oral syrup or tablet (NA)
 - Time antibiotic before clinical signs occur; usually dose on days 1, 2, and 3 following birth.
 - If annual problem, vaccinate ewes prior to lambing.
- *Coccidia* Scours: contributing factors include
 - Environmental and sanitation factors similar to those listed for *E. coli*
 - Ewes are asymptomatic carriers—oocysts in manure
 - Prevention: aimed at decreasing oocysts shed into lambing barn environment from the ewe flock. Ewes treated 30 days prior to entering lambing area with:
 1. Lasalocid in feed @ 30 grams/ton of feed or
 2. Monensin in feed @ 15 grams/ton of feed (NA) or
 3. Decoquinatate in feed or free-choice salt mix (NA) or
 4. Amprolium or sulfonamide compounds in drinking water or feed (NA)
 - Weaned lambs: treat as a group in drinking water with oral sulfa or amprolium medications.
 - Unweaned lambs: treat as individuals or decide to not treat and let immunity develop (3–6 weeks).

Omphalophlebitis

Individual Assessment and Treatment

- Difficult to treat since infection is localized in liver and joints
- Usually affects lambs 10 days to 3 weeks old
 - Lambs, gaunt, depressed, weak
 - Elevated temperature 103.5°–106°F
 - Swollen, hot, fluid-filled joints
- Prevention is superior
- Systemic treatment with antibiotics similar to those utilized in pneumonia

Contributing factors and flock management to prevent omphalophlebitis

- Commonly a flock problem when transitional weather, crowding, and lack of bedding cause poor environmental conditions in lambing area
- Contributing factors and management suggestions are similar as for lamb pneumonia and *E. coli* scours
- Infection can be prevented by application of iodine (often 7% strong tincture) to the navel soon after birth. Fresh solution should be used to prevent contamination.
- In problem flocks, long-acting penicillin or tetracycline can be administered to newborn lambs as described for pneumonia prevention.

Enterotoxemia

Individual Assessment and Treatment

- Commonly referred to as “overeating disease” or “pulpy kidney”
- Difficult to treat as signs are acute
- May exhibit convulsions shortly before death
- Glucose may be found in urine (from hepatic glycogenolysis)
- Oral antibiotics and antitoxin can be given to treat lambs, but are usually unsuccessful so prevention is far superior

Contributing factors and flock management to prevent enterotoxemia

- Commonly associated with feed changes to high-concentrate rations
- Also common in orphaned lambs fed milk replacer
- Exercise caution when introducing lambs to grain rations
- Vaccinate ewes 4–6 weeks prior to lambing to encourage passive protection in the colostrum
- Vaccinate their lambs at 3–4 weeks and again at 6–8 weeks of age.
- If ewes are not vaccinated prior to lambing, vaccinate lambs during first few days of life and again at about 4 weeks of age.



MISCELLANEOUS

SEE ALSO

- Agricultural Practices Contributing to Disease (www.fiveminutevet.com/ruminant)
- Colostrum and Milk Replacers (www.fiveminutevet.com/ruminant)
- Diarrheal Diseases: Small Ruminant
- Escherichia coli
- Ewe Flock Nutrition (www.fiveminutevet.com/ruminant)
- Perinatal Lamb Mortality

ABBREVIATIONS

- (A) = approved
- (NA) = unapproved use

Suggested Reading

Rook, J. S., Schoolman, G., et al. 1990, Nov. Diagnosis and control of neonatal losses in sheep. *Advances in Sheep and Goat Medicine—The Veterinary Clinics of North America* 6(4):531–63.

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Acknowledgment The author and editors acknowledge the prior contribution of Joseph S. Rook.