

Investigation of Neonatal Losses in Lambs



DR. PAULA MENZIES



Monitoring Reproductive Performance

REPRODUCTIVE EVENT

Females joined with male



Females conceive



Females abort

Females give birth



Total offspring born

PERFORMANCE MEASURED BY:

Mating Rate

Pregnancy Rate: by ewe & by litter size ratio

Abortion Rate

Lambing Rate

Periparturient disease rates

Distribution of lambing within breeding period

Age @ first lambing

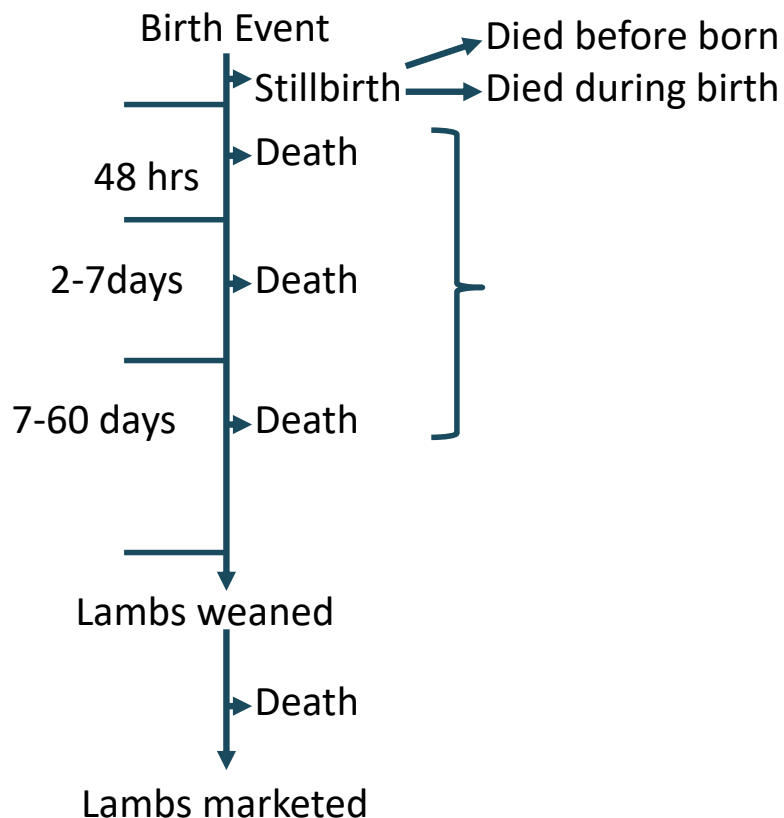
Born / exposure
Born / lambing

Litter size ratio

Lambs born per ewe per year

Measuring Youngstock Performance

REARING EVENT



PERFORMANCE MEASURED BY:

Stillbirth Rate

Pre-Weaning Mortality Rate

Lambs weaned / ewe exposed to ram
Lambs weaned / ewe lambing
Kg lamb weaned / ewe lambing

Post Weaning Mortality Rate

Lambs / kg lamb marketed / ewe lambing

Calculating youngstock mortality – denominator important

- Stillbirth % =

of lambs / kids born dead

of lambs / kids born alive and dead

- Pre-weaning mortality % =

of lambs / kids dying prior to weaning

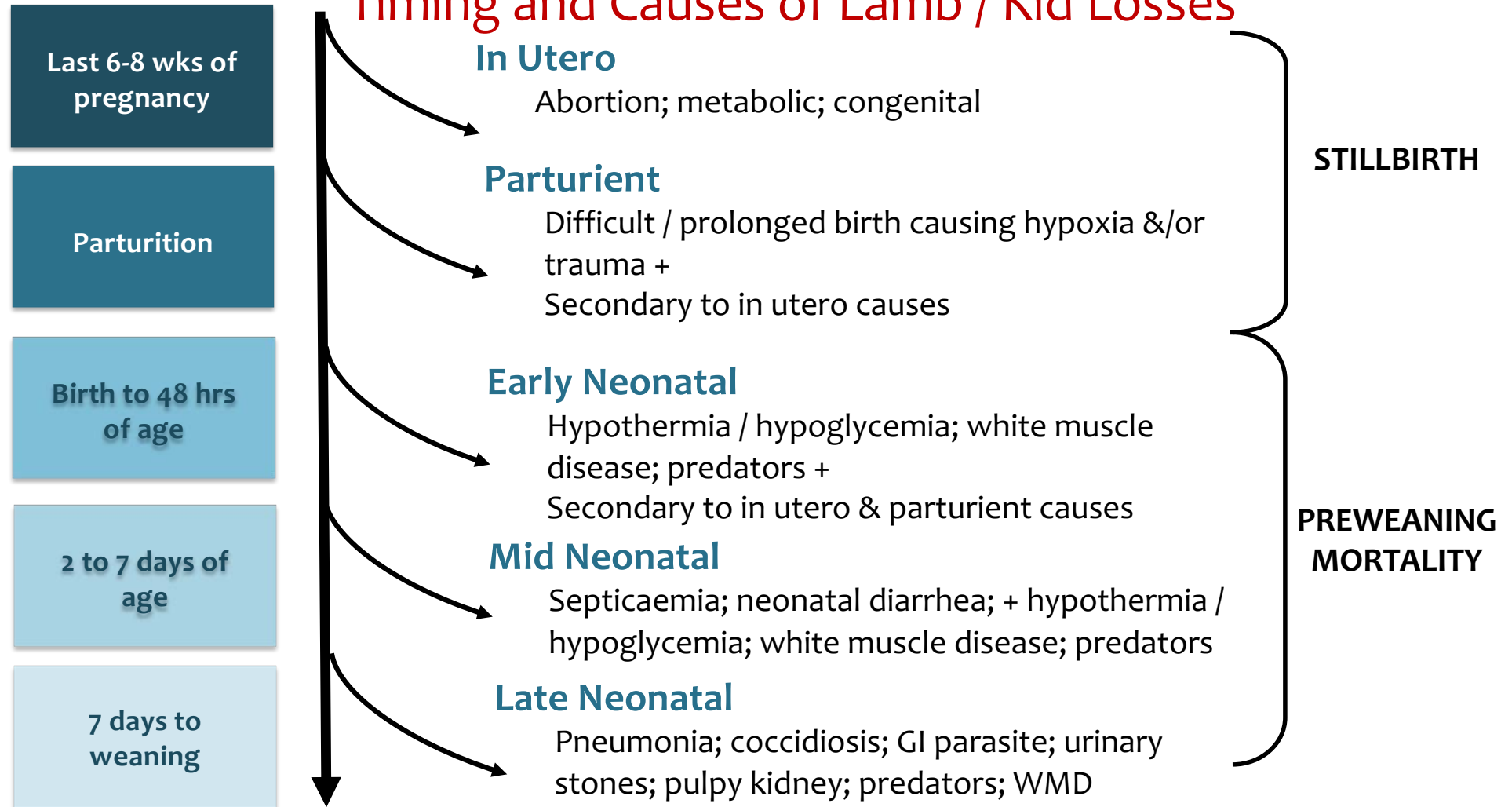
of lambs / kids born alive

- Post-weaning mortality % =

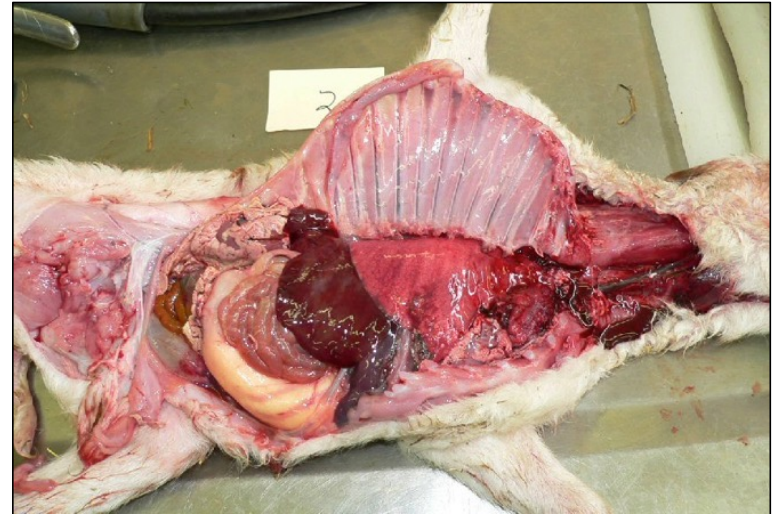
**# of lambs / kids dying from weaning to
market or breeding**

of lambs / kids weaned

Timing and Causes of Lamb / Kid Losses



Easy / important to postmortem lambs / kids that die



Can instruct your clients to perform neonatal postmortems and share results with you

Goal is to classify when and why the lamb / kid died



Before Birth

- Foot pads not worn
- Lungs not inflated
- Umbilicus blunt & empty
- GI empty but brown fat stores not depleted
- Placentitis?
- Enlarged thyroid glands?
- Trauma?



During Birth

- Foot pads not worn
- Lungs not inflated
- Umbilicus blunt or tapered
- GI empty but brown fat stores not depleted
- Swelling of head, body or limbs?
- Swelling of tongue?
- Ruptured internal organs with bleeding?



After Birth

- Foot pads worn?
- Lamb / kid cleaned off?
- Lungs inflated
- Umbilicus tapered / clot? / dry?
- Colostrum in abomasum?
- Colostrum in intestine?
- Fat stores adequate, depleted?
- Evidence of hypothermia?
- Dystocia related trauma?
- Other trauma / misadventure?
- Septicemia?
- Diarrhea?
- Pneumonia?
- White muscle disease?

Investigating Neonatal Losses



- **Place**
 - Facility away from humans and animals
 - Can clean up and disinfect
 - Plans for what to do with the carcasses
- **Protective clothing**
 - Coveralls dedicated to the task – launder separately
 - Disposable gloves
 - Boots that can be disinfected
- **Advise**
 - N95 mask & goggles for potential abortion cases



Investigating Neonatal Losses



- **Equipment**
 - Dedicated to this task
 - Scalpel handle
 - Disposable blades fit to handle
 - Tissue forceps
 - Forms for recording findings
- **Sharps container for used blades**
- **If need further diagnostic veterinary investigation**
 - Specimen bags for fresh or frozen samples
 - Formalin jars
 - Sharpie for labelling samples

Is this an abortion?



- Small fetus
 - Premature in appearance
- Did not breathe
- Amniotic fluid in abomasum
- Meconium in large intestine
- Placentitis ?
- If suspicious, treat as if may be zoonotic

Is this a stillbirth?



- Appears term
 - Hair coat
 - Size
- Lungs not inflated
- Empty abomasum
- Fat stores present
- Did not walk

Is this a post-partum death?



- Appears term
- Evidence that it breathed
- Check umbilicus
- Check fat stores

Investigating Mortality: History



Was this lamb really just “laid on” ?

- Age when died
- Condition of dam
- Litter size & fate of littermates
- Birth weight
- Assisted birth?
- Rejected by dam
- Treatment history
- Weather & barn conditions

Weight at Death

- If problems with excessive mortality, encourage routine weighing at birth
- < 2 kg: born with insufficient brown fat stores. Doesn't get up and nurse
- > 5 kg: more likely to experience dystocia (depending on breed)
- Can compare death weight to birth weight to see how lamb / kid has done since being born



External Appearance

- Meconium staining
 - Dystocia
- Not cleaned off
 - Mismothering / Stillborn
- Abnormal shape
 - Anasarca (water belly)
 - Swelling from dystocia
 - Congenital defect
- Perineal staining
 - Diarrhea



External Appearance

- Congenital deformities

- Cleft palate
- Atresia ani
- Arthrogryposis
- Is it genetic / infectious
- Stuff happens...



Cache Valley Virus



Did the Lamb / Kid Walk?



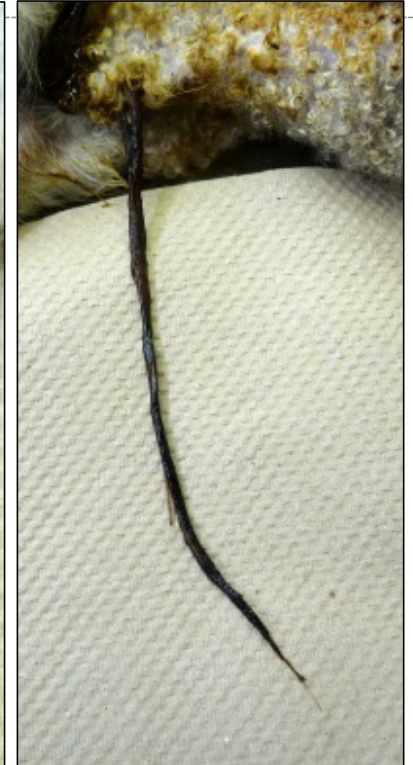
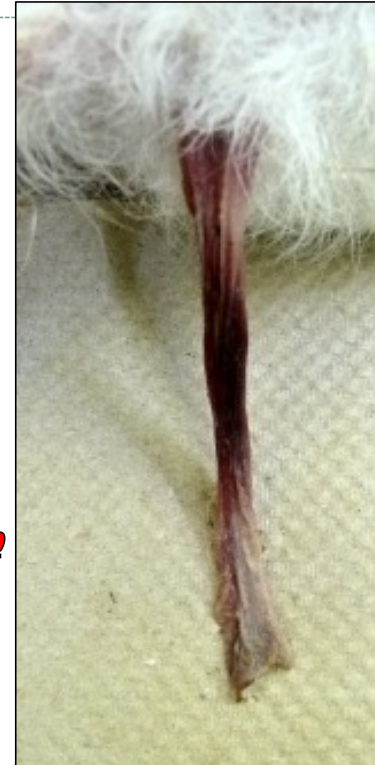
- Eponychium present
 - Did not walk
- Wearing of eponychium
 - Did walk



Umbilicus



- End of umbilicus blunt
 - Died before born
- End of umbilicus tapered
 - Died after born
- Does umbilicus contain a well-formed blood clot?
 - Survived immediate post-natal period
 - Adhered, survived a few hours
- Umbilicus dried up
 - Died at least several hours after born
- Umbilicus swollen and purulent
 - omphalophlebitis



Evidence of Navel Infection



- Follow umbilical vein, arteries to liver and urachus to bladder



Evidence of damage during lambing

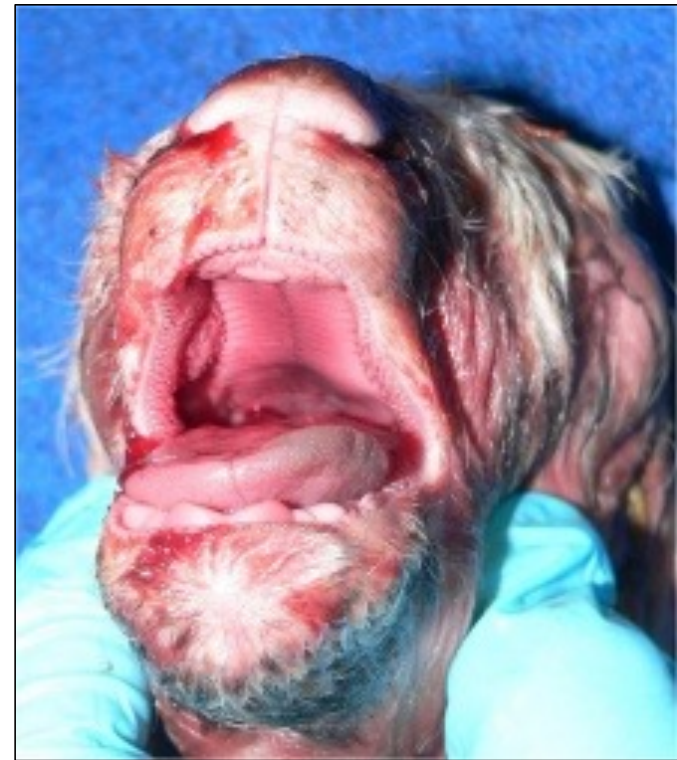


Swollen head indicates dystocia



Haemorrhage under skin of scalp

Swollen tongue indicates dystocia



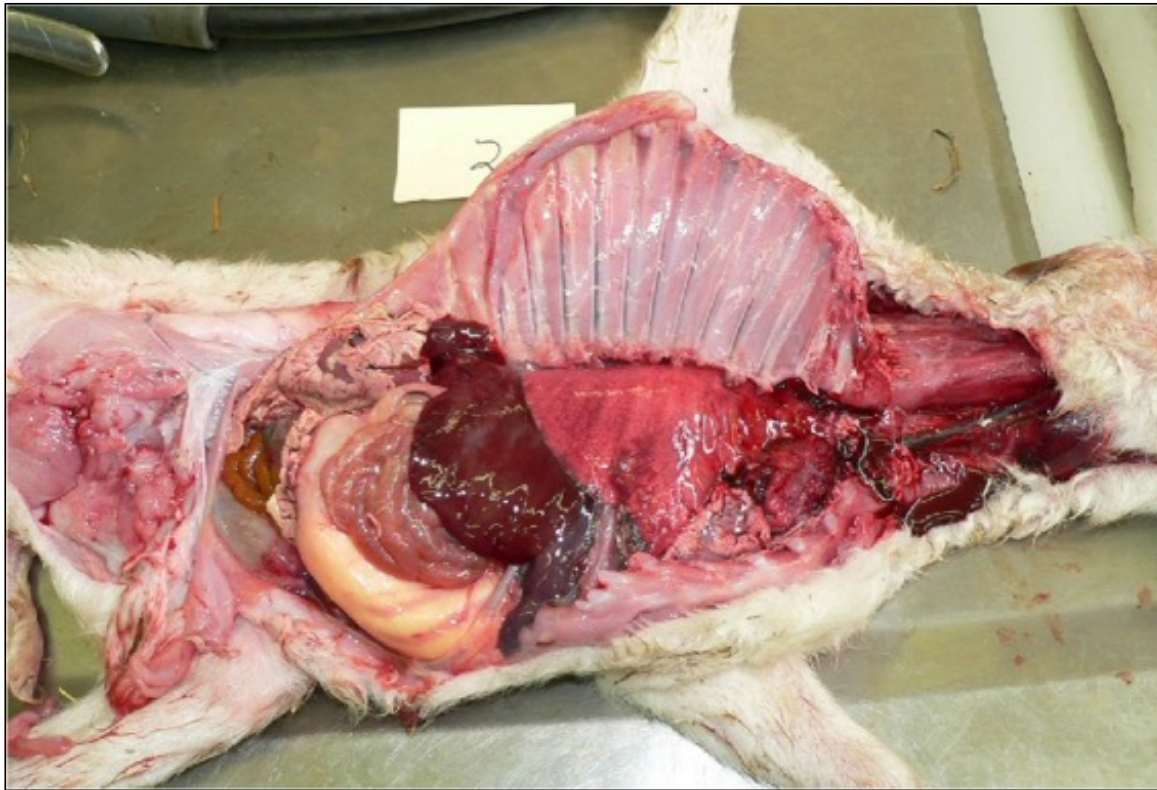
Swollen Extremities



- Hemorrhages and edema under the skin of limbs
- Limb trapped during lambing
- Severe hypothermia causing damage to tissues and blood vessels



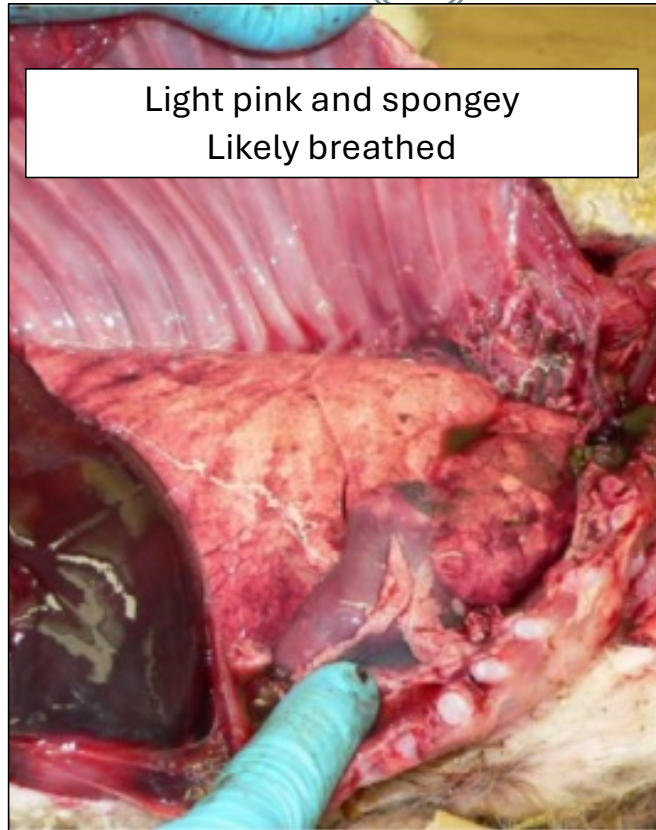
Open up – left side down



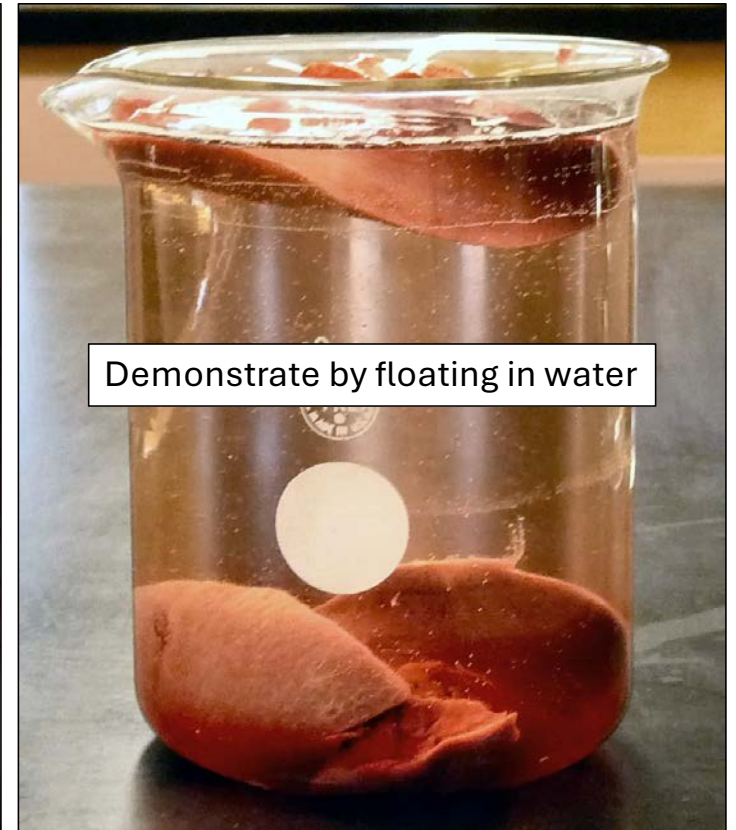
Did the Lamb Breathe?



Dark pink & solid
Didn't breathe



Light pink and spongy
Likely breathed



Demonstrate by floating in water

Assessing Starvation

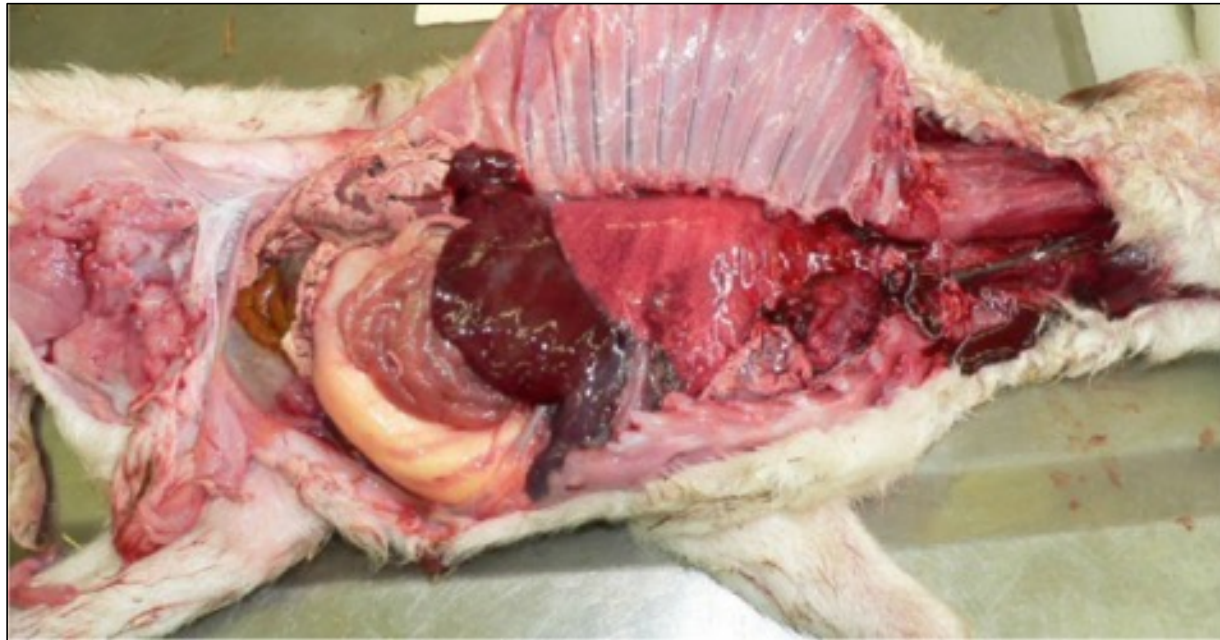


- Fat around heart and kidney (brown fat)
- Depleted in 5 to 12 hrs depending on
 - Amount born with
 - Environment
- If no fat, then starvation is part of cause of death
- Heart fat depleted first then kidney fat
- Presence of milk in abomasum
 - Was it tube fed?
 - Is there evidence of digestion?
 - Milk in small intestine and lymphatics

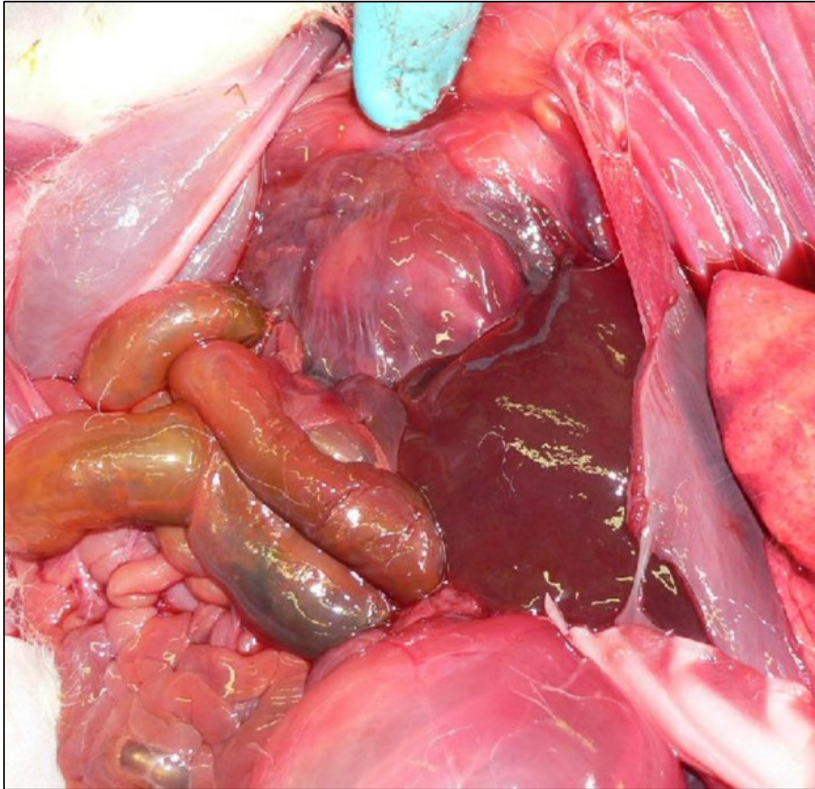
Did the Lamb / Kid Starve?



- Brown fat present around kidney and heart
- Milk in abomasum – intestines empty

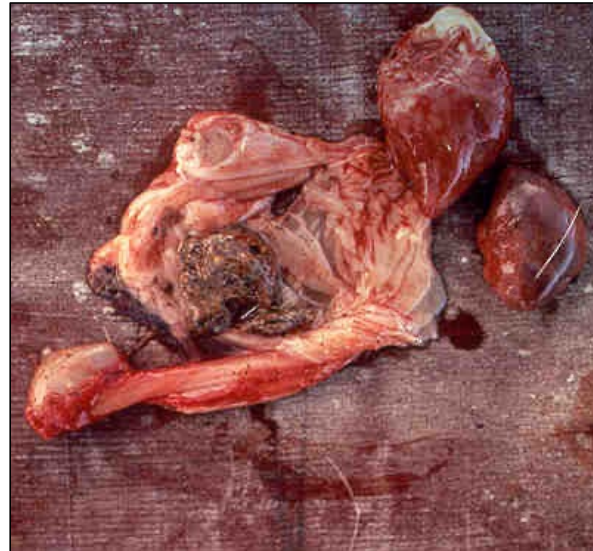
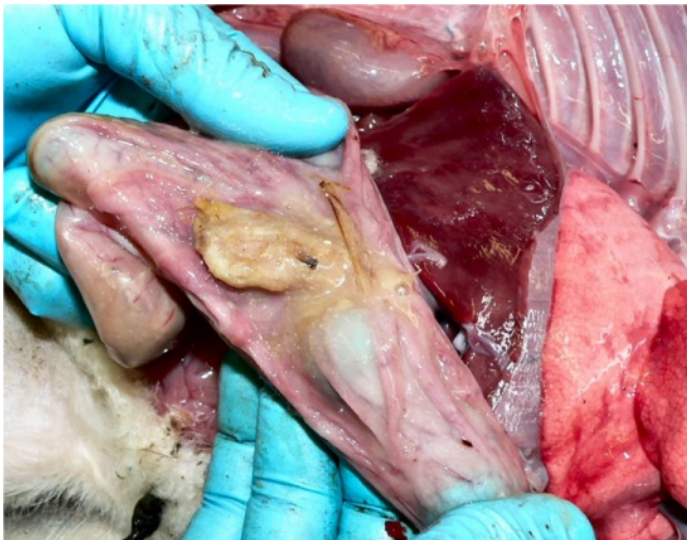


Did the Lamb / Kid Starve?



- No brown fat around kidney
- Abomasum and intestine empty

Did the Lamb / Kid Starve?

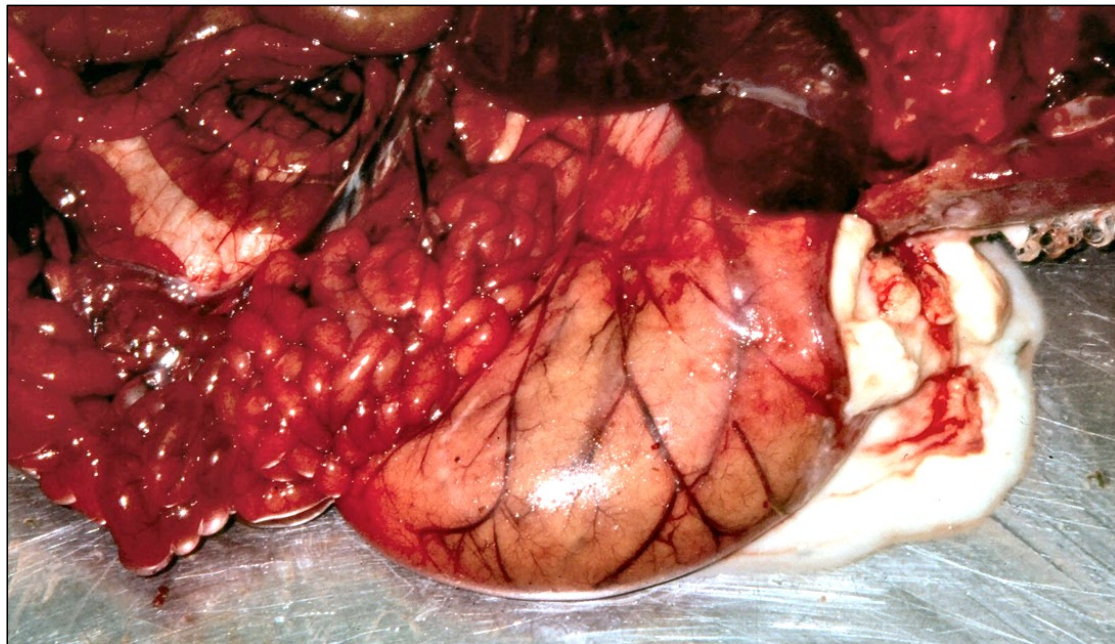


- Left: no milk in abomasum – bits of bedding present
- Right: no kidney fat, no heart fat, dirt in abomasum

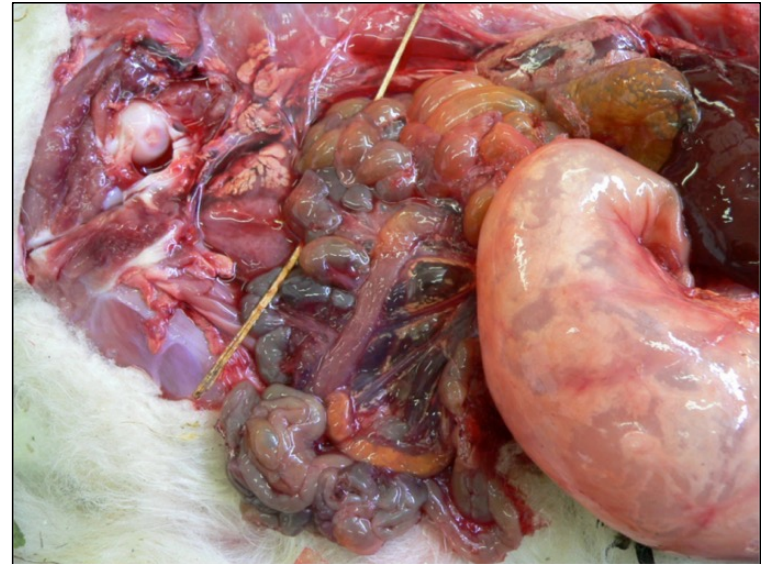
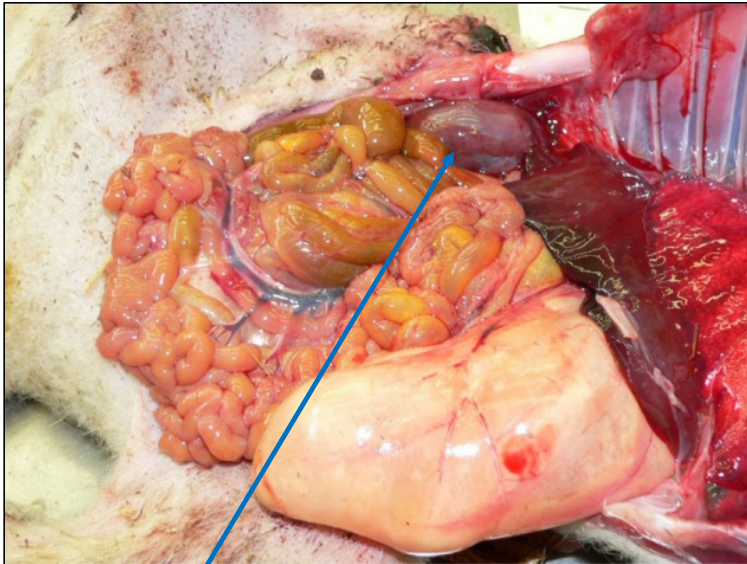
Did the Lamb / Kid Starve?



- Milk in abomasum and part of intestines demonstrating partial digestion



Did the Lamb / Kid Starve?

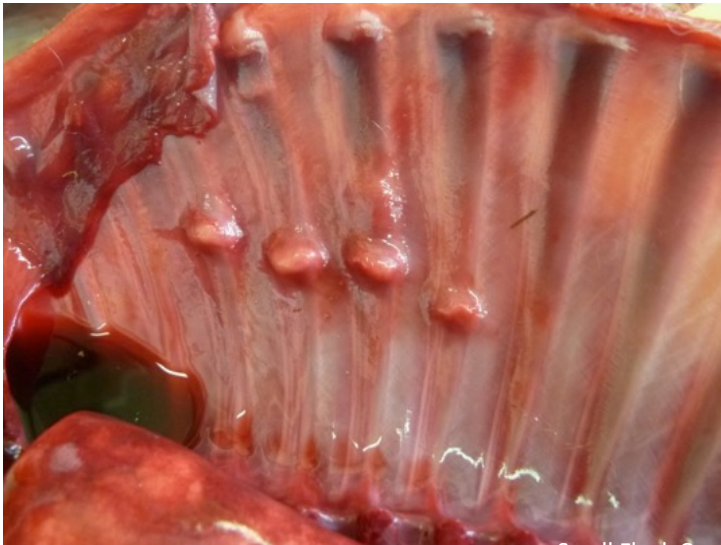


- Milk present in intestine and lymphatics indicating digestion
- Left: no brown fat around kidney so perhaps fed too late?

Was Death Due to Trauma?

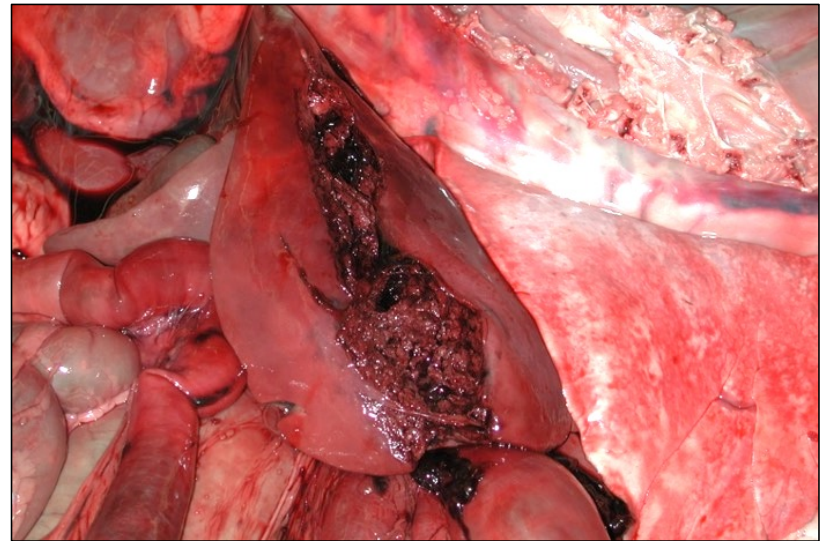
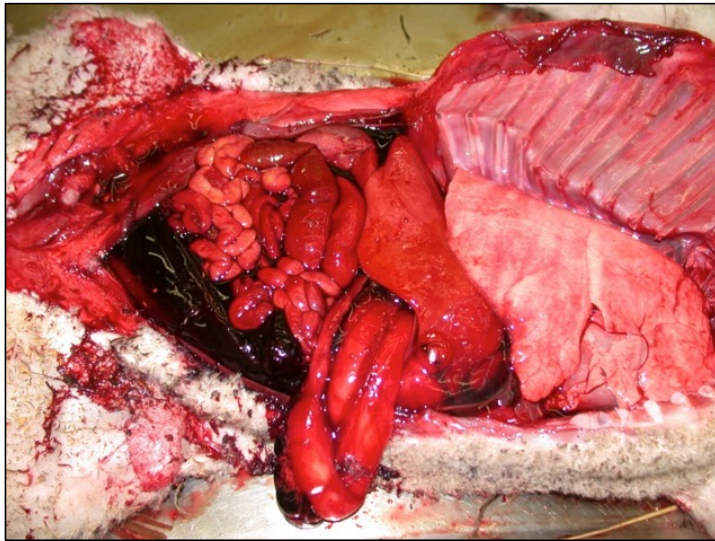


- During lambing or in the pen - misadventure
- Left: fractured ribs, often during birthing process
- Right: blood free in abdomen – what is the source?



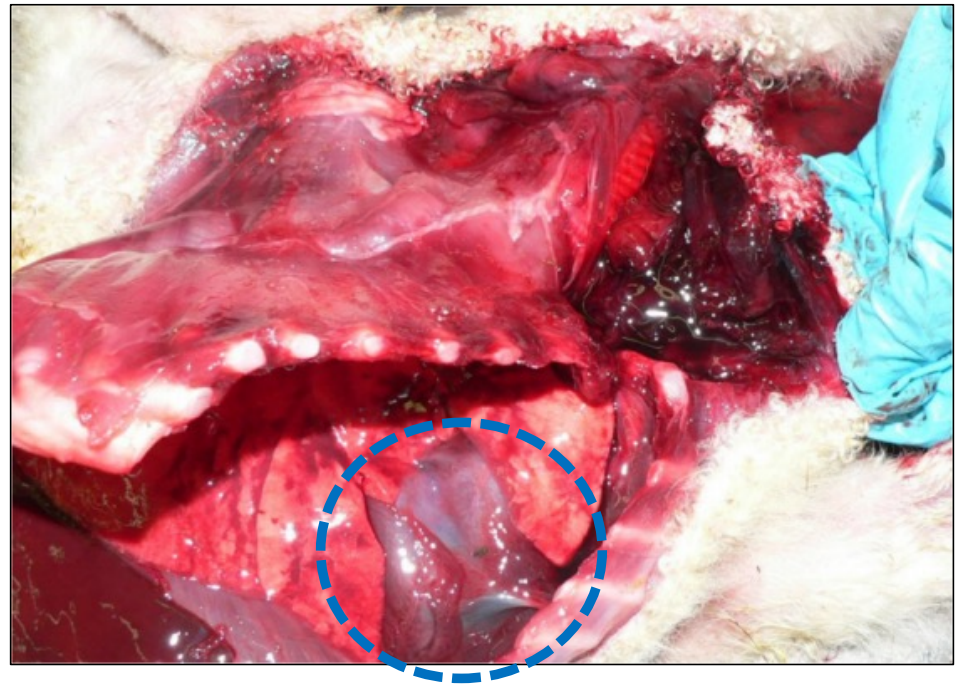
Small Flock Course_Lamb Postmortem Slides_P.vienzies

Was Death due to Trauma?



- Left: Blood in peritoneal cavity from a bleeding umbilicus
- Right: Ruptured liver – associated with vitamin E deficiency
- Note pale carcass (lungs)

Was Death Due to Trauma?

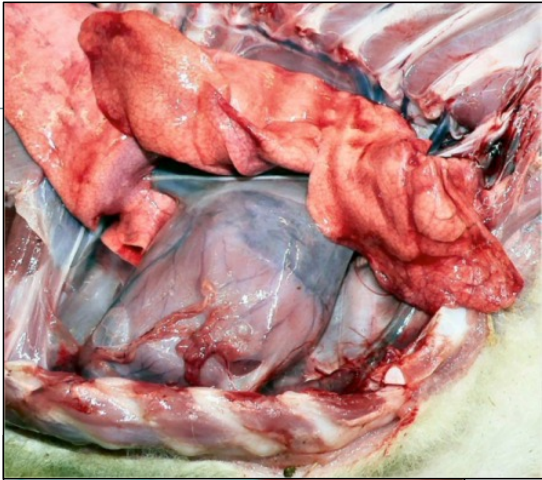


Lamb had a broken leg but was hypoglycaemic / hypothermic (no fat stores) and got stepped on by ewe

Evidence of Brain Trauma



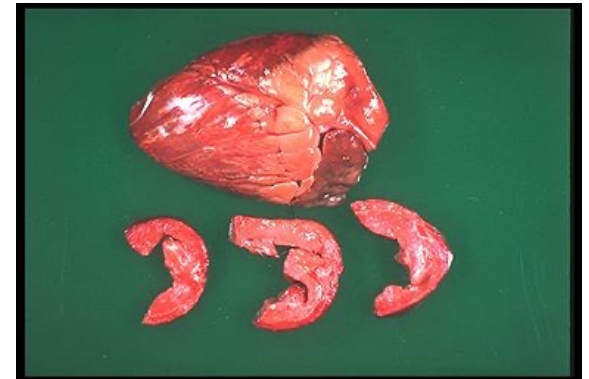
- Overt hemorrhage (subdural) or small hemorrhages through the white matter
- Usually from trauma secondary to dystocia
- Won't see grossly
- Can be associated with hypothermia and hypoglycemia



Evidence of White Muscle?

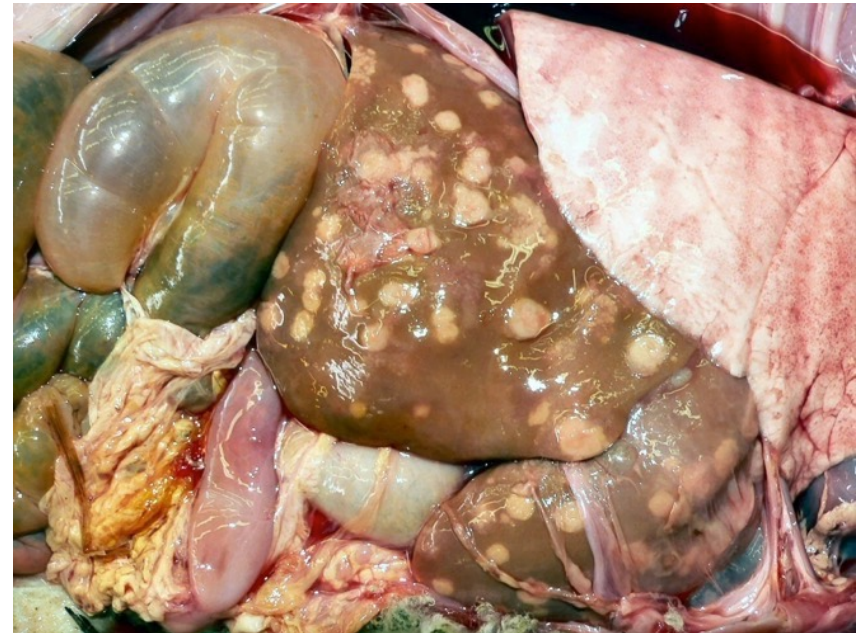
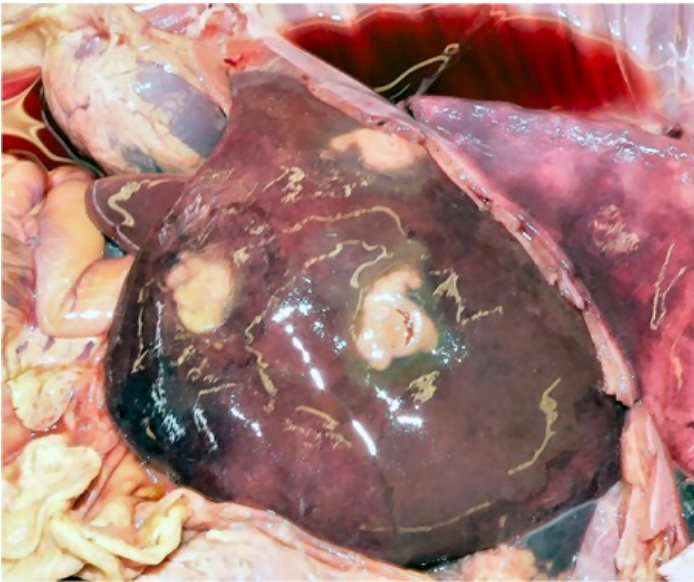


- Often only the heart is affected – sudden death
- This lamb had an enlarged heart with dilated ventricles, no evidence of congenital abnormality and pale myocardium
- Likely WMD
- Check diaphragm and tongue as well – more active muscles affected first
- Pale striations on muscle



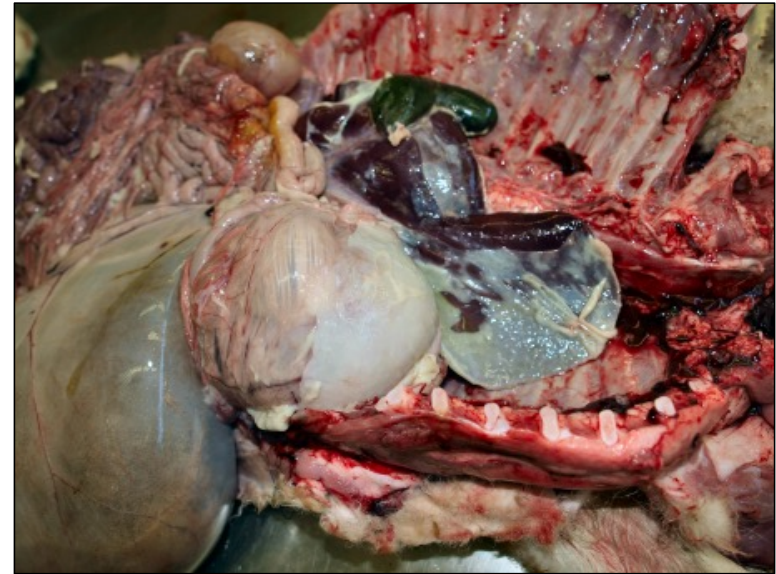
Murdoch U

Evidence of Septicemia?



- Liver abscesses
- Right: Focus was a tail – docking infection
- Left: No source found – failure of passive transfer?

Evidence of Septicaemia



- Left: clostridial infection from tail docking – unvaccinated flock
- Right: septicaemia in 5 week old lamb debilitated with coccidiosis (*Bibersteinia trehalosi*)

Evidence of Septic Arthritis?



- From joint ill or septicemia
- Open all joints



Evidence of Iodine Deficiency?

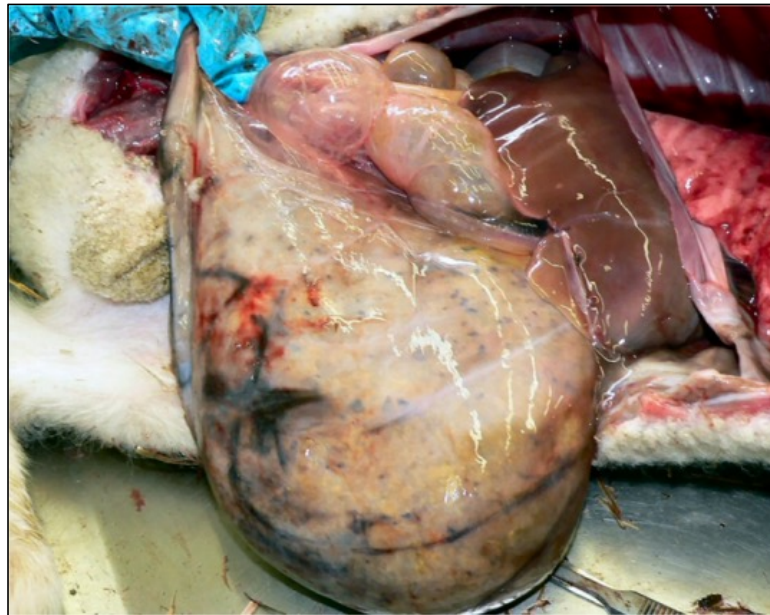


- Left: normal thyroid gland and thymus below it
- Right: greatly enlarged thyroid gland

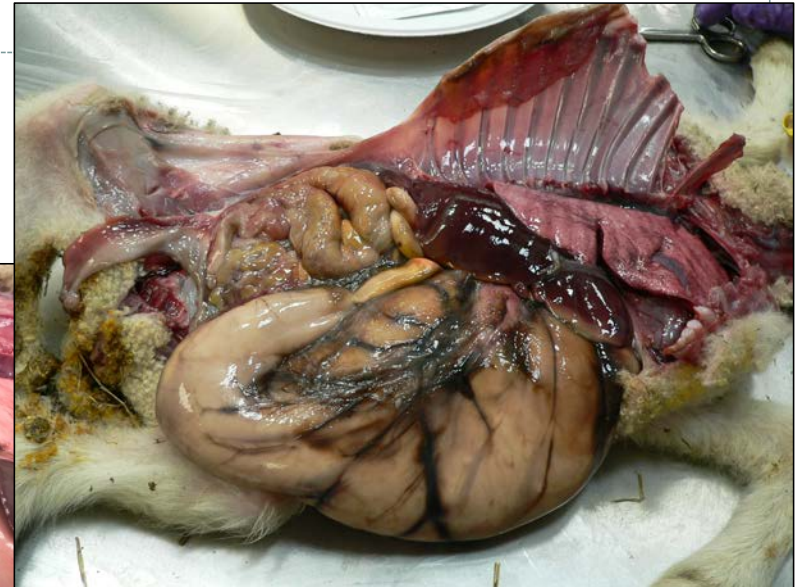
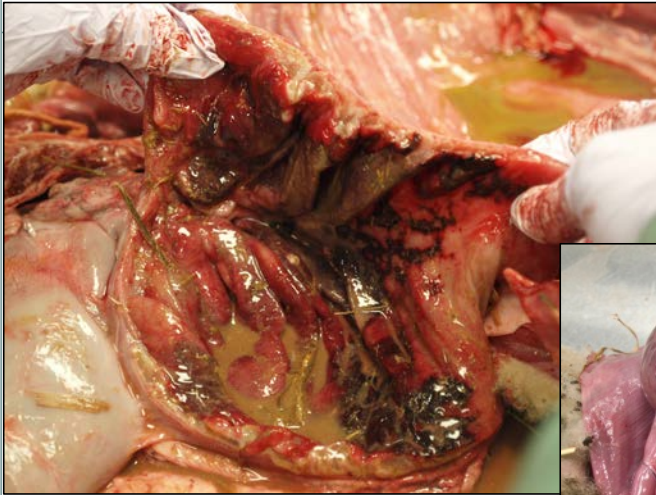
Evidence of Abomasal Bloat?



- This abomasum greatly enlarged and full of frothy material. Hemorrhages on the surface

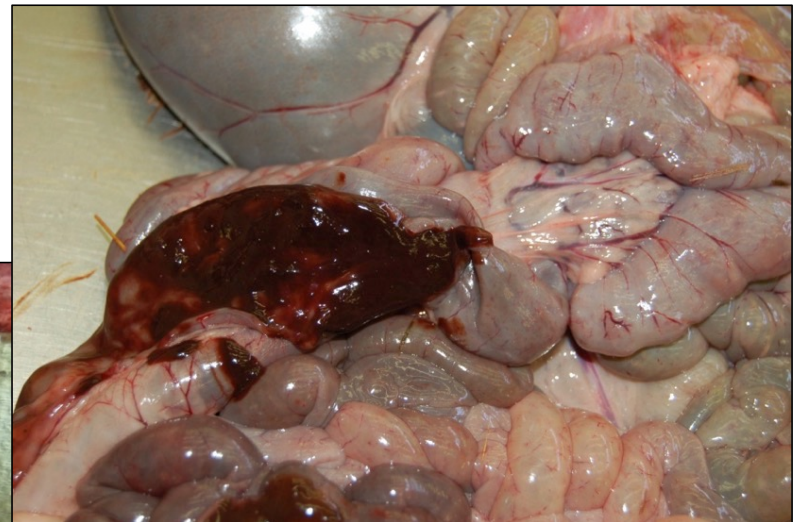
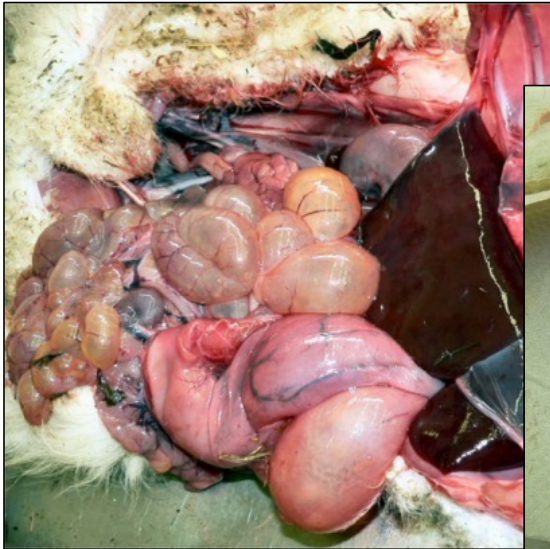


Evidence of Abomasitis / Abomasal Ulcers / Enteritis?



Evidence of Diarrhea?

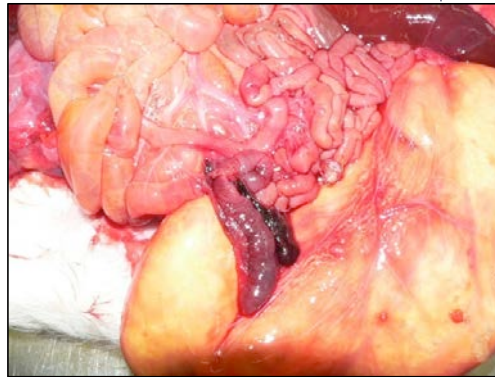
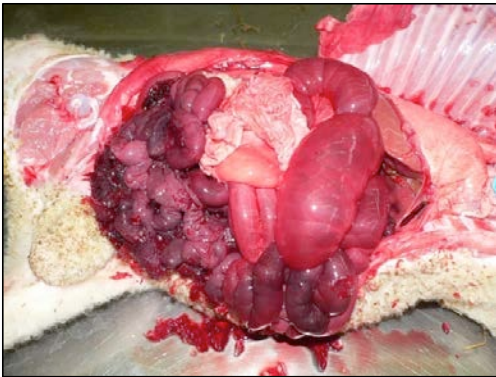
- Examine intestinal colour, content
- Thickened? Hyperaemic? Fibrin?



Evidence of Intestinal Accident



- Mesenteric torsion (red gut)
 - Lambs on heavy milk / carbohydrate diet
 - In animals grazing clover / alfalfa
 - Fermentation in intestine and caecum + small rumen + activity (e.g., shearing, playing)
 - Feed fibre in the diet before turning to lush pasture



Other intestinal accidents can occur:
volvulus, intussusception

Evidence of Pneumonia?



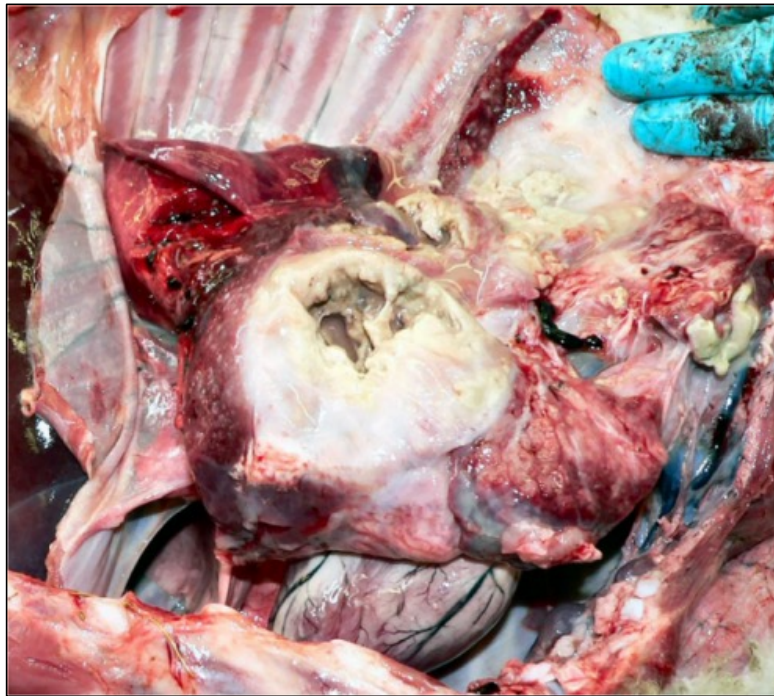
- Fibrinous pneumonia due to *Mannheimia haemolytica*



Evidence of Pneumonia?



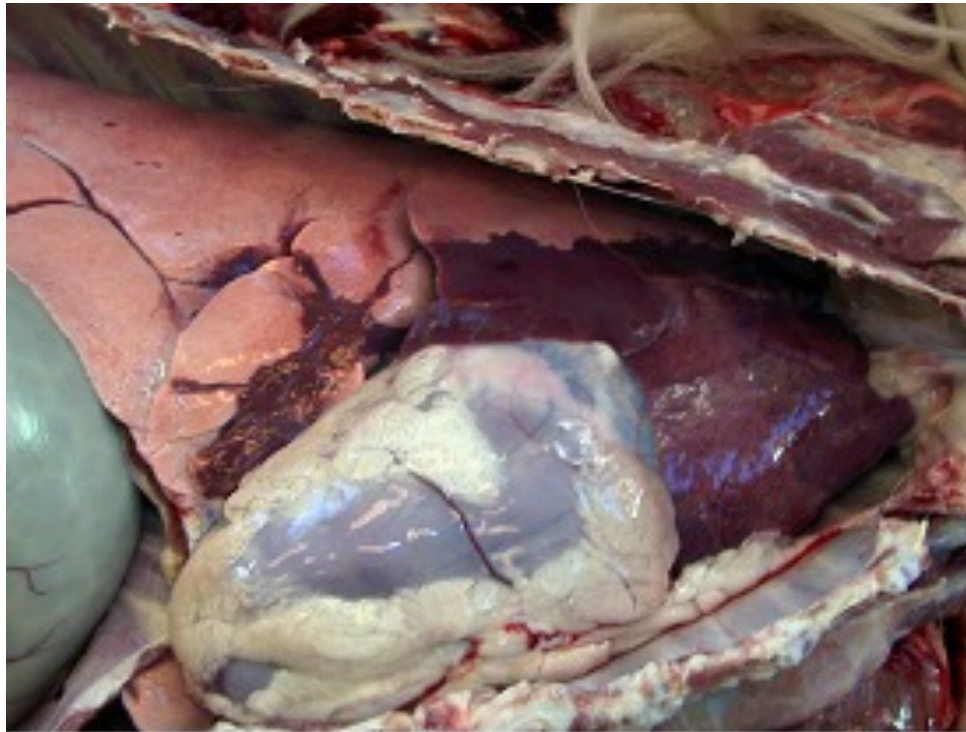
- Lung abscess – likely from aspiration pneumonia secondary to tube feeding



15 day lamb with severe *Mannheimia haemolytica* pneumonia



Mycoplasma ovipneumonia

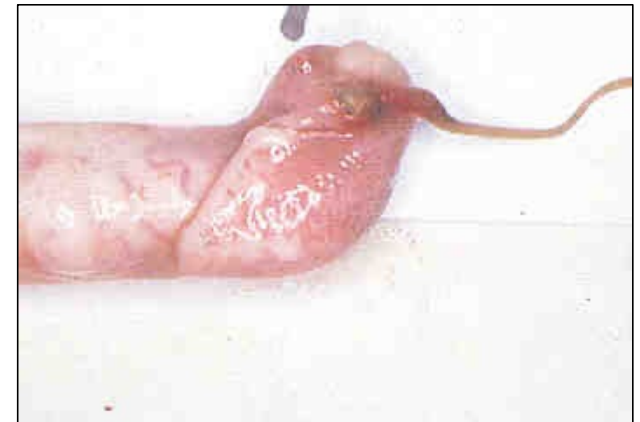
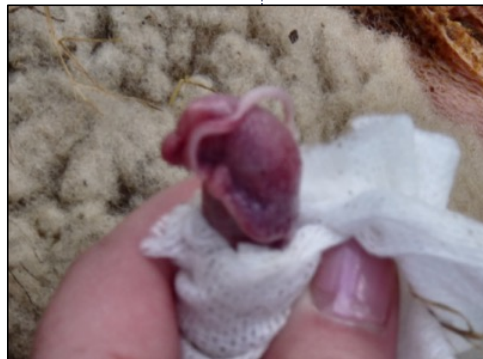


<http://www.nadis.org.uk/disease-a-z/sheep/respiratory-disease-in-adult-and-yearling-sheep/>

Evidence of Urinary Tract Disease?

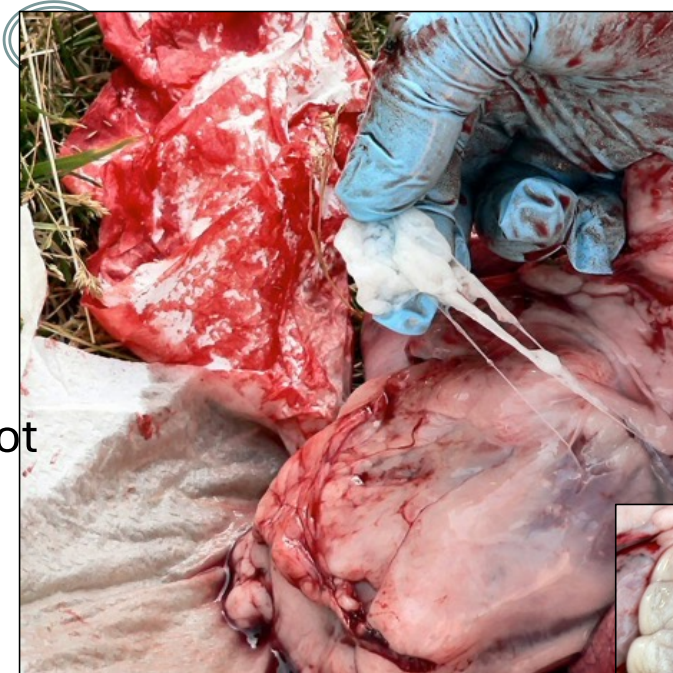
- Urolithiasis

- Older lamb / kid
- Enlarged bladder or ruptured bladder with stones
- Urethral rupture in prepuce
- Follow urethra from penis to bladder



Evidence of Enterotoxaemia (lambs) d.t. *C perfringens* D

- Usually > 5 weeks old
 - 4 to 5 months is prime
- Sudden death
- Must open immediately
- Pericardial effusion with chicken fat clot
- Empty intestines
- Ecchymoses on heart
- Kidneys may be mushy or normal
- Older sheep and goats – severe enteritis with dysentery



Categorizing Mortality



- Nutritional
 - Of the dam (small / heavy birth weight; adequate brown fat)
 - Of the lamb / kid (failed to nurse; WMD etc)
- Lambing / kidding management
 - Dystocia; mismothering etc
- Environment
 - Too cold; dirty
- Infectious
 - Pneumonia, diarrhea but often influenced by management
- Simple categorization provides information – informed action

