

# Regional Veterinary Laboratories Report

February 2021

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 586 carcasses and 462 foetuses during February 2021. Additionally, 2,543 diagnostic samples were tested to assist private veterinary practitioners with the diagnosis and control of disease in food producing animals. This report describes a selection of cases investigated by the Department of Agriculture, Food and the Marine's (DAFM) veterinary laboratories in February 2021.

The objective of this report is to provide feedback to veterinary practitioners on the pattern of disease syndromes at this time of the year by describing common and highlighting unusual cases. Moreover, we aim to assist with future diagnoses, encourage thorough investigations of clinical cases, highlight available laboratory diagnostic tools and provide a better context for practitioners when interpreting laboratory reports.

## CATTLE

Enteritis and pneumonia were the most commonly reported diagnoses at necropsy in cattle in the RVLs during February 2021.

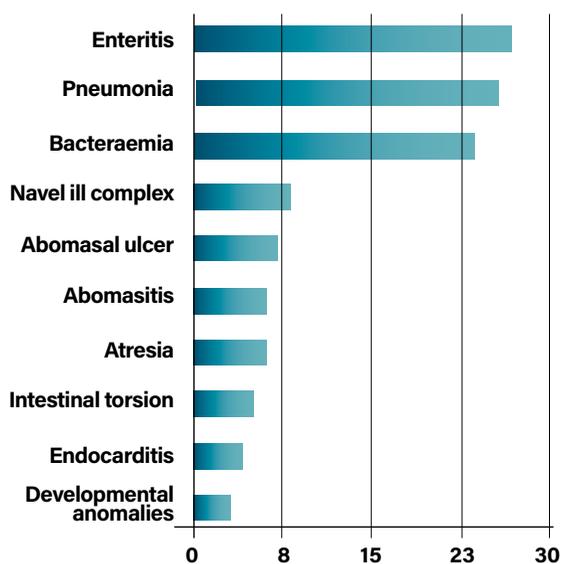


Table 1: The most common diagnoses in cattle submitted for necropsy in February 2021.

## GASTROINTESTINAL TRACT

### Abomasal ulceration



Figure 1: A perforated abomasal ulcer. Photo: Alan Johnson.

A three-week-old Friesian calf was submitted to Limerick RVL. It had been housed in a group on an automatic feeder. Two previous deaths had occurred; some bloating had been reported in the group. This calf presented with bloating in the morning and deteriorated and died within hours. Necropsy disclosed acute peritonitis associated with perforation of an abomasal ulcer. Focal haemorrhagic lesions and diffuse oedema were seen in the abomasal mucosa. *Escherichia coli* was the only pathogen isolated from the lesion. Histopathology showed lesions of abomasitis with some *Sarcina*-like bacteria present.

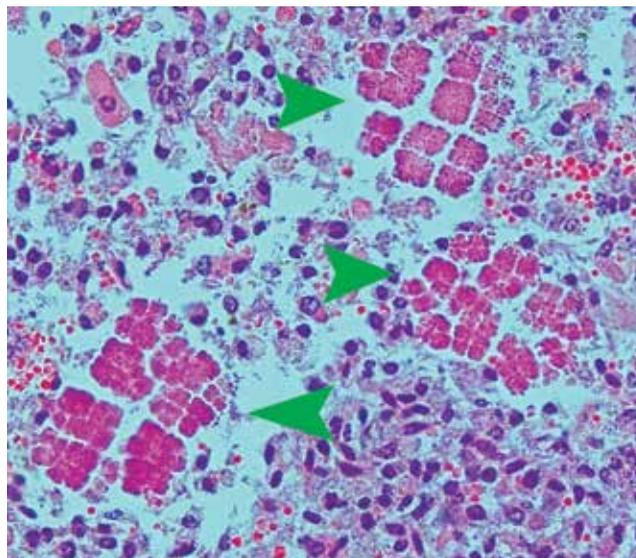


Figure 2: Cuboidal bacterial colonies of *Sarcina* sp. (arrowheads) amidst cellular debris in the abomasal contents of a calf. Photo: Alan Johnson.

A three-week-old calf which had stopped suckling the previous day and had previously exhibited melaena was submitted to Sligo RVL. On necropsy, the carcass appeared pale. There was an approximately 2cm diameter abomasal ulcer surrounded by granulation tissue adjacent to an exposed mucosal artery. There were large amounts of haemorrhage present in both the stomach and intestines. The cause of death in this calf was abomasal ulceration with subsequent haemorrhage. No infectious aetiology was identified. Ulcers may occur spontaneously or may be associated with stress.



**Figure 3: Abomasal ulceration in a calf. Photo: Shane McGettrick.**

A 12-year-old cow was submitted to Athlone RVL for post-mortem examination. She had stopped eating five days earlier and was drooling from the mouth; an intestinal blockage was suspected. There was a large 20 x 20 x 10 cm diameter well-demarcated, firm white mass with multifocal areas of haemorrhage and necrosis in the liver adjacent to the diaphragm. In addition, there were multifocal 1-2 cm diameter darker/purple irregular lesions throughout the liver suggestive of telangiectasia (focal dilation and congestion of hepatic sinusoids commonly seen in older cows). The intestines were practically empty. Histopathology of the liver showed a poorly differentiated neoplastic mass likely to be metastatic, and telangiectasia was present in the liver also. A diagnosis of a metastatic hepatic tumour was made, but the primary tumour was not identified.



**Figure 4: A hepatic tumour, thought to be a metastasis. Photo: Denise Murphy.**

### INTESTINAL TORSION/ENTERITIS

A 13-day-old calf with suspected colic had been treated and improved for a few days but subsequently died overnight. Other calves in the herd showed signs of diarrhoea. On examination at Kilkenny RVL the calf was very dehydrated and there was an intestinal torsion, likely to have occurred secondary to the enteritis. Faecal samples tested positive for rotavirus and *Campylobacter jejuni*. The clinical significance of *C. jejuni* as a cause of calf enteritis is doubtful; however, *C. jejuni* is a common cause of gastroenteritis in humans.

### ROTAVIRUS

Calves are most susceptible to rotavirus enteritis between one and three weeks of age. Adult animals are the primary source of rotavirus infection for neonatal calves. The severity of clinical signs depends on several factors including the age of the animal and the immune status of the calf which depends on the absorption of colostral antibodies immediately after birth. Rotavirus targets the villi in the upper small intestine causing shortening and fusion of villi which results in malabsorption leading to diarrhoea.



**Figure 5: Dilated and necrotic intestines which have undergone a torsion about the mesentery. Photo: Aideen Kennedy.**

### RESPIRATORY TRACT

#### Pneumonia

Athlone RVL examined a three-day-old calf with a history of weakness and inappetence, with no response to treatment. The calf had been stomach tubed. On necropsy, there was severe, diffuse congestion and consolidation of the right lung, with partial involvement of the left lung. There were fibrinous adhesions to the costal pleura on the right which were more severe cranioventrally. *Mannheimia haemolytica* was cultured from lung tissue, and polymerase chain reaction (PCR) testing detected *M. haemolytica* DNA. Histopathological examination of the lung revealed a severe, acute, fibrinosuppurative bronchopneumonia and pleuritis. A diagnosis of bronchopneumonia and pleurisy caused by *M. haemolytica* was made. It was possible that stomach tubing of this calf may have resulted in aspiration of foreign material, which subsequently resulted in bronchopneumonia and pleurisy developing.



**Figure 6: Bronchopneumonia, largely confined to the right lung, suggesting a possible history of aspiration. Photo: Sarah Delaney.**

A ten-year-old cow with a history of 'pining' for several weeks was submitted to Kilkenny RVL. The cow originally had respiratory signs and failed to respond to antibiotic treatment. On necropsy, there was a severe chronic pneumonia. Caudally, there was bullous emphysema and abscessation. Cranioventrally, there was consolidation with multifocal abscessation. The changes to the lung were severe and affected most of the parenchyma with little functional tissue remaining. Bilaterally, both kidneys were enlarged and pale with multifocal white pinpoint lesions. PCR results were positive for *Mycoplasma bovis* and bovine herpesvirus 4 (BHV4). *Pseudomonas sp.* was also cultured; this organism causes a wide range of opportunistic infections. It may occasionally cause acute systemic disease. In cattle, clinical conditions arising from infection with this organism include mastitis, metritis, pneumonia, dermatitis and enteritis. The changes observed on histopathology were chronic and suggested a bacteraemia or septicaemia. A review of the control of bovine respiratory disease on the farm of origin was recommended.



**Figure 7: Purulent infection in the lungs of an adult cow. Photo: Aideen Kennedy.**

### URINARY/REPRODUCTIVE TRACT

#### Uterine torsion

Sligo RVL received a six-year-old cow for postmortem examination. The animal had been noticed anorexic some days previous to death. On necropsy, there was a substantial amount of blood-tinged abdominal fluid. The gravid uterus appeared enlarged with a thickened and friable wall. There was a uterine torsion at the pelvic outlet. Uterine torsion was diagnosed as cause of death.



**Figure 8: Uterine torsion in a cow, third trimester gravidity. Photo: Shane McGettrick.**

#### Tubulonephritis

Dublin RVL investigated a case of unexpected death in a three-month-old suckler bull calf. No premonitory presenting signs were reported; the calf was found dull and recumbent one morning and expired within an hour of discovery having received antibiotics. On gross necropsy, the calf was in good body condition, but there were no ingesta present in the abomasum or rumen. There were multifocal small areas of abomasal mucosal haemorrhage/erosion. Bilaterally, the renal cortices were diffusely uniformly pale. On urinalysis glucosuria, proteinuria and acidic urinary pH were detected. Histopathological examination of both kidneys revealed 60 to 70 per cent of renal cortical and medullary tubules were variably dilated and filled with protein casts, necrotic neutrophil casts, cellular casts and rarely bacterial colonies. There was marked bilateral interstitial fibrosis and multifocal interstitial infiltrates of lymphocytes. Within the liver there were multifocal small areas of necrosis with infiltration of some neutrophils. No other significant histological lesions were identified. No bacteria were isolated from the urine or liver cultures. The main finding was severe, bilateral, chronic/active suppurative tubulonephritis with secondary interstitial nephritis, which would have caused profound impairment of normal renal function, consistent with the urinalysis results obtained. Given the extent of the kidney lesions, renal failure was the most likely cause of death. The fibrosis and leukocyte infiltrate in the kidney imparted the pale discoloration to the parenchyma observed on gross examination. A causative agent was not identified by culture in this case, although bacteria were observed and a suppurative inflammatory response supports a bacterial cause. Moderate necro-suppurative hepatitis was also present, the most common cause of which is bacterial, yet no bacteria were isolated from the liver either. The presence of bacterial lesions in both kidneys and liver raises the possibility of bacteraemia, but typical bacteraemic lesions were not present in the lung. The antemortem administration of antibiotics may have hampered efforts to isolate bacterial agents in this case.



**Figure 9: A bovine kidney with a pale cortex, found to be due to tubulonephritis and interstitial nephritis. Photo: Margaret Wilson.**

#### Acute Mastitis

An eight-year-old Friesian cow was submitted to Athlone RVL for necropsy with a history of sudden death. The cow had been dried off the previous week; there were three similar losses on the farm. On gross examination, the mammary

gland was diffusely oedematous and haemorrhagic with purulent fibrinous material and brown blood-stained watery fluid present in the ducts, and multifocal areas of necrosis. *E. coli* was cultured from the mammary gland and Antibiotic Sensitivity Testing revealed resistance to several antibiotics including Ampicillin, Tetracycline, Enrofloxacin, Sulphamethoxazole/Trimethoprim, Streptomycin and Kanamycin. Histopathology of the mammary gland revealed a multifocal, necrotising, suppurative mastitis. A diagnosis of *E. coli* mastitis and secondary toxæmia was made.



**Figure 10: Acute mastitis due to infection with *Escherichia coli*. Photo: Sarah Delaney.**

### CARDIOVASCULAR SYSTEM

#### Vegetative endocarditis

A ten-month-old bovine was submitted to Kilkenny RVL for necropsy with a history of suspected oesophageal obstruction. On gross examination, there was a severe suppurative vegetative endocarditis affecting the left and right atrio-ventricular valves. The lungs were oedematous with free fluid in the thoracic cavity. There was extensive subcutaneous oedema affecting the ventral throat region. The liver had a 'nutmeg' appearance on cross-section, typically associated with chronic passive venous congestion in the hepatic circulation. A diagnosis of vegetative endocarditis with associated left- and right-sided heart failure was reached. The initiating source of infection was not detected. Frequently, the source of infection can be in an organ distant to the heart.



**Figure 11: A 'nutmeg' pattern of congestion in a bovine liver, a common finding in cases of cardiac insufficiency. Photo: Maresa Sheehan.**

#### Ventricular septal defect

A five-week-old calf was submitted to Sligo RVL for necropsy. The calf was reported to be slow to drink and slightly panting from birth and needed veterinary attention a few days prior to death; despite initial improvement the animal deteriorated and died. On gross examination, the heart appeared enlarged, rounded and presented with some ischaemic areas on the myocardium. There was a ventricular septal defect, approximately 3cm in diameter. The liver was firm and presented with areas of a 'nutmeg' pattern. Ventricular septal defects can occur sporadically and can lead to heart failure.

### NERVOUS SYSTEM

Athlone RVL examined a five-day-old calf with a three-day history of staggering. The calf was initially treated for meningitis with no response and it was subsequently euthanised. On necropsy, the liver was diffusely enlarged, pale and nodular with a firm consistency. A diagnosis of congenital hepatic fibrosis was made based on histopathological examination of the liver. This is a rare, sporadic condition thought to be due to abnormal biliary development and it may have a genetic basis. Hepatic encephalopathy is a possible cause of nervous signs reported in the history.



**Figure 12: Congenital hepatic fibrosis in a calf. Photo: Sarah Delaney.**

### MISCELLANEOUS

#### Atresia

Sligo RVL received a two-day-old calf which had been euthanised. No meconium had been passed since birth and the PVP suspected an intestinal atresia. Necropsy revealed an *atresia coli* (grade three, complete discontinuity of the colon). This is a sporadic but relatively common congenital defect incompatible with life. In this case, the animal had small amounts of meconium in the rectum that had been produced in the colon distal to the defect. The cause is not known; a genetic association has not been conclusively proven.



**Figure 13: Distended intestinal segments due to a grade three *atresia coli*. Photo: Shane McGettrick.**

**Lymphoma**

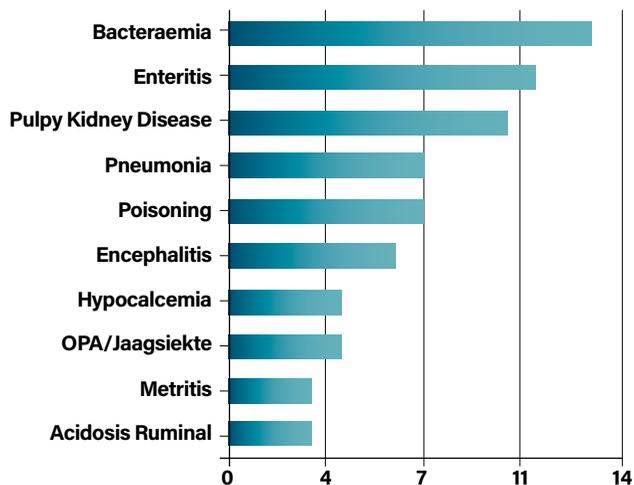
A five-week-old calf was submitted to Kilkenny RVL. The calf had been unresponsive to treatment for diarrhoea. On necropsy, the calf was moderately dehydrated and there was a generalised mild lymphadenopathy. The liver was very enlarged (over 40cm in length) and had multifocal, small, firm white lesions. Bilaterally, the kidneys were enlarged and pale with multifocal, firm white lesions. A diagnosis of lymphoma was confirmed on histopathology.



**Figure 14: Multifocal lesions of lymphoma in a bovine liver. Photo: Aideen Kennedy.**

**SHEEP**

Bacteraemia and enteritis were the most common diagnoses at necropsy in sheep in the RVLs during February 2021.



**Table 2: The most common diagnoses in ovine animals submitted for necropsy in February 2021.**

**GASTROINTESTINAL TRACT**

**Intestinal torsion**

A nine-year-old ewe which had stopped eating and drinking approximately five days before death was submitted to Sligo RVL. On necropsy, there was an area of necrosis of the distal ileum close to the ileo-caecal junction. The intestine was discoloured dark red, but the lumen was patent. The affected area was surrounded by fibrin indicating an antemortem acute event. It was diagnosed that there most likely had been an antemortem intestinal torsion of an intestinal loop, which had resolved at time of PM, but which resulted in segmental necrosis and intestinal obstruction.



**Figure 15: Thickened and reddened intestinal section in a case of intestinal torsion and stenosis. Photo: Shane McGettrick.**

**Fasciolosis**



**Figure 16: Haemorrhagic fluke tracts in a liver of a ewe with chronic-active fasciolosis. Photo: Shane McGettrick.**

Sligo RVL received a one-year-old hogget which had been found dead after being observed to be slightly dull. Three further animals had died in the days previously on the farm. On necropsy, there were large amounts of pleural effusion and ascites. There were multiple haemorrhagic tracts in liver parenchyma. Large amounts of adult liver fluke *Fasciola hepatica* were recovered from the gall bladder. Severe, chronic-active fasciolosis was diagnosed as cause of death in this animal. Prompt treatment of cohort animals was advised. However, the referring practitioner was warned that further losses were likely if parasite burdens and accumulated damage to the liver parenchyma were similarly severe in other animals on the holding.



**Figure 17: Adult liver fluke recovered from a gall bladder of a ewe with chronic-active fasciolosis. Photo: Shane McGettrick.**

#### Rumen acidosis

A seven-year-old ewe was submitted to Athlone RVL for post-mortem examination. She had lambed three days earlier and was noticed "off form" two days after lambing, when she became recumbent and died. There was grain in the rumen and soft intestinal contents and faeces. The rumen pH was 4.9, which is lower than normal and suggestive of ruminal acidosis. Histopathology of the rumen showed vacuolation of the superficial epithelium with neutrophil infiltration consistent with chemical rumenitis. A diagnosis of ruminal acidosis was made, and advice was offered to review the level of concentrates in the diet.

#### Hepatitis/enteritis

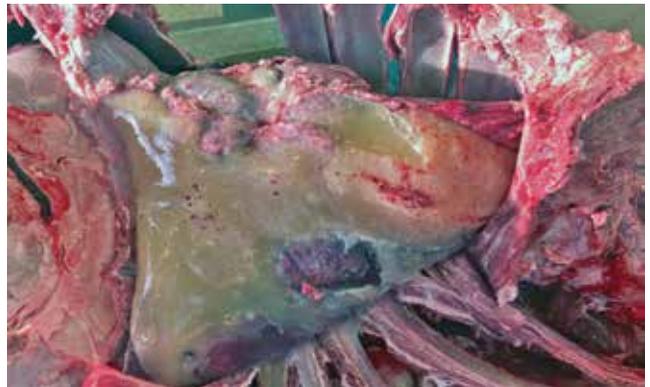
Three two-week-old lambs were submitted to Kilkenny RVL. Over ten lambs had died from a flock of 300. Two of the lambs had multifocal-to-coalescing foci of necrosis and multifocal purulent abscessation in the liver. *Fusobacterium necrophorum* was cultured from the livers. *F. necrophorum* is an obligate anaerobe that is a normal inhabitant of the alimentary tract, respiratory tract, and reproductive tract. It is typically an opportunistic pathogen, causing a variety of suppurative and necrotic infections including hepatic necrobacillosis. The third had no visible hepatic lesions but was dehydrated, with scant intestinal contents and faecal staining on the hind quarters, and these findings suggested an enteritis. All three lambs had moderate burdens of *Cryptosporidium* oocysts on faecal samples. This disease is difficult to control and it was advised that all lambs should be born in a clean environment and fed adequate colostrum. Further advice included ensuring strict hygiene at feeding, appropriate disinfectant selection, isolation of affected animals from healthy animals and the cleaning of rearing houses on a regular basis.



**Figure 18: Necrotic and purulent lesions in the liver of a two-week old lamb. Photo: Aideen Kennedy.**

### RESPIRATORY TRACT

#### Pleuropneumonia



**Figure 19: Severe pleuropneumonia in a ewe. Photo: Shane McGettrick.**

A three-year-old ewe which had been observed dull before death was submitted to Sligo RVL. On necropsy, there was severe fibrinous pleuropneumonia. There was well-demarcated consolidation affecting approximately 40 per cent of the lung parenchyma. *Mannheimia haemolytica* was cultured and detected by PCR in the lung tissue. The cause of death in this animal was severe pleuropneumonia caused by *M. haemolytica*. *M. haemolytica* belongs to the bacterial family Pasteurellaceae. Vaccines are commercially available.



**Figure 20: Well demarcated, ventral, pulmonary consolidation in a case of pleuropneumonia in a ewe. Photo: Shane McGettrick.**

### Ovine pulmonary adenocarcinoma (Jaagsiekte)

A four-year-old ewe was submitted to Athlone RVL for necropsy with a history of sudden death; she had been perfectly well when fed in the morning. Nine ewes had died in the previous four weeks, all very suddenly with no clinical signs observed beforehand. There was bilateral fibrinous consolidation of cranial lung lobes and there was a large, pale, firm, well-demarcated tumour in the right caudal lobe (8 x 8 x 4 cm). Histopathology of the affected lung showed multifocal-to-coalescing areas of acinar type structures with cuboidal-to-columnar alveolar epithelium and interstitial fibrosis consistent with ovine pulmonary adenocarcinoma (OPA). There were foci of suppurative bronchopneumonia, consistent with concurrent *Pasteurella*-type infection also. PCR tests for ovine lentivirus (the causative organism of ovine pulmonary adenocarcinoma) and *Mannheimia haemolytica* were positive. A diagnosis of OPA, also known as Jaagsiekte, was made. Terminally, sheep with this condition often succumb to a *Pasteurella*-type pneumonia.

### URINARY/REPRODUCTIVE TRACT

#### Mastitis

Sligo RVL received a five-year-old ewe with a history of mastitis. On necropsy, there was a severe gangrenous mastitis. *Staphylococcus aureus* was cultured from the udder. Histopathology revealed diffuse, acute, severe fibrino-purulent mastitis with vast amounts of bacteria present.

Mastitis is a common, often underestimated, problem in ewes, usually occurring after lambing. Most commonly, isolated pathogens are *Staphylococcus aureus* and *Mannheimia haemolytica*, but other *Staphylococcus spp.* and *Streptococcus spp.* as well as *Trueperella pyogenes* have been reported in the past as well. *S. aureus* often causes peracute, sudden death as it causes acute necrotising or gangrenous mastitis. Apart from severe disease in the ewe and sudden deaths, lamb deaths due to starvation or depressed weight gain can be observed. Moreover, it has been reported that starving lambs, in the process of stealing milk from other unaffected ewes, can spread the infection by cross sucking.

### MISCELLANEOUS

#### Abscessation

A six-year-old ewe was delivered to Sligo RVL with a history of ill thrift. Previous blood tests had not revealed any causes. On necropsy, there was a large abscess, approximately 15cm in diameter, present in the neck close to shoulder level and involving tissue dorsal to the oesophagus leading to occlusion of the oesophageal lumen. Large amounts of dry forage material were present in the oesophagus. There were multifocal lung abscesses and severe dehydration. Cause of death in this ewe was suspected to be choking due to a large abscess compressing cervical structures and occluding the oesophagus. This abscess and lung lesions had been present for some time. The signs are likely to have had an insidious onset. The site of the neck abscess was considered unusual. *Streptococcus spp.* was isolated from lesions and is a cause of abscessation in sheep. Introduction is likely to have been via a skin wound or injection site.

### Dosing gun injury

A seven-week-old lamb which had been found dead was submitted to Sligo RVL. Necropsy revealed a 2cm-sized retropharyngeal abscess. Internal body fat was depleted. *Trueperella pyogenes* was cultured from abscess material. The location of the abscess was considered typical for a dosing gun injury.



**Figure 21: Retropharyngeal abscess in a lamb, typical for a dosing gun injury. Photo: Shane McGettrick.**

A four-year-old ewe was found dead and submitted to Kilkenny RVL. On the liver, there was a chronic nodular mass approximately 9cm in length. Within the nodular area, there was both consolidated tissue, grey in colour, and also small foci of pus. Based on histopathology, a hepatocellular carcinoma was suspected. This tumour has been previously reported in ruminants including sheep.



**Figure 22: A hepatic carcinoma in an ovine liver. Photo: Aideen Kennedy.**

### GOATS

Three one-week-old goat kids were submitted to Limerick RVL for necropsy. One was found to have suffered a mesenteric torsion; testing of intestinal contents from the affected area was positive for *Clostridium perfringens* but negative for its associated toxins. *C. perfringens* is considered part of the normal intestinal flora in ruminants, while toxins of *C. perfringens* may undergo proteolysis after the death of the animal. ELISA results that are positive for *C. perfringens* bacteria but negative for *C. perfringens* toxins do not therefore confirm or rule out *C. perfringens* enterotoxaemia. Nonetheless, vaccination with a multivalent clostridial vaccine might be considered.

The remaining kids were found upon necropsy to have signs of pneumonia and pulmonary congestion. Bacterial culture isolated *Mannheimia haemolytica*. PCR testing returned a positive result for *Mannheimia haemolytica*, *Biberstina trehalosi* and *Mycoplasma ovipneumoniae*.