CVO Newsletter

PEI Department of Agriculture

May 2025
Issue #4

The latest news, views, and announcements from your provincial Animal Health Team

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Bovine Chondrodysplasia

- By Katelyn Visser

Chondrodysplasia is a condition caused by a developmental bone defect due to disrupted endochondral osteogenesis, that occurs for various reasons (Agerholm et al., 2016). These reasons can be genetic, nutritional, or occasionally from maternal ingestion of toxins. In some cases, the calves can survive, with their physical condition improving over time; in other cases, the condition is lethal. Cases of chondrodysplasia have been found on the Island over the years, multiple having lethal outcomes. Below you will find a summary of this condition as well as links to recent studies with more information.

Bovine chondrodysplasia is characterized by calves born with shortened long bones; the diaphyses are much shorter than normal, while the epiphyses are enlarged (Schwertz et al., 2022). Calves can also have a shortened, domed head, and laxity and/or rotation in limb joints. Additionally, there is often marked disorganization of the chondrocytes in the physeal and metaphyseal regions of bones (Schwertz et al., 2022). The presentation can be varied between calves depending on multiple factors, including the root cause of the disorder.

Several mutations can cause calves to be born Chondrodysplastic; for example, mutations in the ACAN gene in Dexter cattle, as well as C0L2A1 in Holstein cattle, have led to lethal congenital Chondrodysplasia known as “bulldog syndrome” (Agerholm et al., 2016). A non-lethal form of chondrodysplasia has led to the size of the Dexter breed that we select for today (Davidson). Due to selective breeding in Dexter cattle, this mutation is an issue as individuals heterozygous for the defective allele produce the desired characteristic of short legs, so the allele is retained in relatively high frequencies, leading to the possibility of lethal chondrodysplasia (Cavanagh et al., 2007).

A form of chondrodysplasia can also be due to deficiencies in certain minerals, particularly manganese. In some geographic locations, when pregnant cows are not supplemented with manganese during gestation, their calves are born with dwarfism caused by chondrodysplasia (Schwertz et al., 2022). Manganese "is a necessary microelement for the activation of glycosyltransferases involved in the biosynthesis of glycosaminoglycan" (Schwertz et al., 2022). Without manganese, there is an increase in the destruction of glycosaminoglycans in cartilage, which negatively impacts the development of bones that undergo endochondral ossification. Additionally, deficiencies in zinc can also lead to congenital bone deformities, as "zinc is essential for bone development and is the most abundant trace element in bone" (Cave et al., 2008). Maternal nutritional deficiency in manganese and zinc leads to a higher prevalence of chondrodysplasia in the herd than is typical with genetic forms of chondrodysplasia (Schwertz et al., 2022).

Chondrodysplasia can also be caused by maternal exposure to plant toxins or other toxicities (Stalker et al., 2021). Various forms of dwarfism in livestock are due to teratogens and their effects on fetal development. The development and orientation of chondrocytes can be impacted by teratogens, leading to various forms of chondrodysplasia. This appears to be a less common cause of the condition than genetic mutation or nutritional deficiencies.

Monitoring mineral uptake and tracing genetic lines in herds can be effective methods to mitigate the risk of congenital bovine chondrodysplasia. Several studies discuss the causes and effects of chondrodysplasia in calves.

Click here for more information (Links and Bibliography)

Webinars

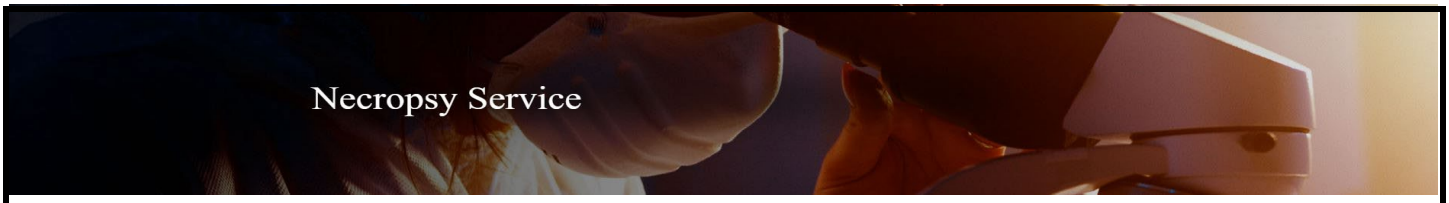
Thursday, May 29
Advancing Predictive Models and Decision Support Systems for AIV control
https://www.eventbrite.com/e/advancing-predictive-models-and-decision-support-systems-for-aiv-control-tickets-1320247167819?aff=oddtdtcreator

Recorded webinars available on demand and with CE credit!
https://www.beefresearch.ca/webinars/

Staff Focus

Kelly Hughes

Kelly is the Policy Advisor and Emergency Response Coordinator for the PEI Department of Agriculture. She works with the Animal Health Section and the Department in the areas of food safety, biosecurity, emergency preparedness, and traceability through presentations, committee and program work (with industry and all levels of government), and policy support. She is also the Premises ID Registrar for livestock traceability for the province. Kelly, her husband and children have a small, first-generation dairy farm in Kellys Cross. In her "off time", Kelly enjoys helping around the farm, being involved with 4-H, and spending time with family and friends. If you have any Premises ID, biosecurity, or emergency preparedness questions or concerns, please reach out to Kelly anytime.



Summary of necropsy reports completed January to March 2025

(Under the Supporting Local Producers with Diagnostic Services agreement)

Table 1: Number of submissions, necropsies, and samples by species and age completed from January to March 2025.

Species	Submission			Necropsy			Samples		
	Young	Adult	**Total**	Young	Adult	**Total**	Young	Adult	**Total**
Bovine	29	8	**37**	32	6	**38**	-	3	**3**
Porcine	3	1	**4**	4	-	**4**	-	1	**1**
Equine	3	-	**3**	3	-	**3**	-	-	**-**
Ovine	-	3	**3**	-	3	**3**	-	-	**-**
Caprine	-	3	**3**	-	3	**3**	-	-	**-**
Avian	-	1	**1**	-	1	**1**	**-**	**-**	**-**
Total	**35**	**16**	**51**	**39**	**13**	**52**	**-**	**4**	**4**

Note: The number of necropsies can exceed the number of submissions because a single submission may include more than one animal necropsy.

Bovine: The most common diagnosis in cattle this quarter was bronchopneumonia, which represents 44% (18) of the necropsies performed for this species. **For more details, please see the diagnostic information for each category (calves and adult cattle) in Table 2 below.**

Table 2: Frequency of the pathogens causing bronchopneumonia in Bovines.

Pathogens	Age of Animal		Frequency
	Young	Adult	
BRSV	8	-	8
Mycoplasma	6	-	6
Pasteurella Multocida	-	4	4
Mannheimia haemolytica	1	3	4
Histophilus somni	3	-	3
Trueperella pyogenes	3	-	3
PI3	1	-	1
Streptococcus	1	-	1
E coli	1	-	1
Total	**24**	**6**	**30**

Note: The frequency total is greater than the number of necropsies performed due to coinfection.

Diagnoses in calves (32)

- The most common diagnosis in calves this quarter was various forms of pneumonia, (34.4% (11) including embolic pneumonia, chronic pneumonia, chronic interstitial pneumonia, broncho-interstitial pneumonia, bronchopneumonia, fibrinosuppurative bronchopneumonia, necrosuppurative bronchopneumonia, among others. (See Table 2 above.)

- Calf diarrhea (28% (9)), caused by coronavirus, rotavirus, *cryptosporidium, enterotoxigenic E. coli,* and *enterococcus*, was found to be the second most diagnosed condition in calves during this period
- Emaciation/parasites and selenium deficiency
- Abortion (Underlying cause was not definitively identified. Placenta disease was suspected but as the placenta was not submitted this could not be confirmed. Other possible causes include maternal factors such as hypoxemia, anemia, hypovolemia, etc.)
- Neonatal death (Probably maternal disease, prolonged parturition, cold temperature, etc.).
- Myodegeneration and necrosis accompanied by low selenium and vitamin E, indicating a diagnosis of nutritional myopathy or white muscle disease.
- Intestinal volvulus
- Probable clostridial infection
- Abomasal volvulus
- Severe emaciation/low muscle mass, with atlanto-occipital malformation of the dens
- Hypovolemia due to severe intra-abdominal hemorrhage arising from a large liver laceration
- Probable chemical acidosis
- Unclear, but pneumonia possible, causing respiratory failure
- Open diagnosis due to moderate to marked autolysis.

Diagnoses in adult cattle (8):

- Diagnoses in adult cattle are led by various forms of pneumonia, (34.4% (6)) including interstitial pneumonia, fibrinous pleuropneumonia, and chronic active focal bacterial bronchopneumonia, among others. (See Table 2 above.)
- Rumen acidosis (Grain overload)
- Lung sample cultured *Pasteurella multocida, Klebsiella pneumoniae, and Trueperella pyogenes*
- Probable cardiac arrhythmia

Porcine

Diagnoses in swine (4):

- Salmonella sepsis. Rotavirus B and C and poor body condition.
- Diarrea (Rotavirus B/ *enterotoxigénic E. coli*)
- Enteritis with villus blunting (Rotavirus B and C)
- Unknown (Sample tested for CanSpotASF program) negative for *African Swine Fever*
- Open (Possible peracute sepsis)

Equine

Diagnoses in foals (3):

- Abortion - causes not identified (3)

Ovine

Diagnoses in lambs (3):

- Not determined (2)
- Meningoencencephalitis with multiple abscesses in the head

Caprine

Diagnoses in goats (3):

- Degenerative myelopathy
- Uncertain diagnosis due to freezing and thawing of the carcass has resulting in some loss of cell detail (Parasites suspected to have contributed to the death)
- Terminal hypoglycemia (likely)

Avian

Freeze/thaw artifact and autolysis may have obscured subtle lesions in this case. In general, there was no indication of infectious/inflammatory or chronic degenerative disease, nor was there any evidence of neoplasia.

Antimicrobial resistance

Eleven pathogens were submitted for antimicrobial susceptibility testing, with 1 showing resistance (Table 3). Remember, this test is available by request, has an additional fee, but qualifies for the subsidy program (billed separately from the necropsy).

Table 3: Frequency of pathogen resistance by species, categories, and antimicrobial agents to which they were resistant.

Pathogens	Frequency	Species	Category	Antimicrobial Resistance
Pasteurella multocida	1	Bovine	Calf	Gamithromycin
				Spectinomycin
				Tetracycline

We'd love to hear your ideas or suggestions for veterinary continuing education (CE) programs we could offer. Please share any topics or formats you think would be beneficial.

We must all be cognizant of the external impacts that are impacting both local and national primary sectors right now. If you or someone you know needs help, please refer them to the free mental health resources that exist at:

FARMERSTALK.CA

902-894-8006

1-800-736-8006

We would greatly appreciate your help in promoting this survey on mental health in agriculture. Please share the link and encourage your agriculture contacts to take a moment to complete the survey. **https://gov.questionpro.ca/AgriculturePEI**

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HAVE SOMETHING YOU WOULD LIKE TO SEE INCLUDED IN THE NEXT NEWSLETTER? CONTACT YOSDANY!