UNIVERSITY OF CALGARY
FACULTY OF VETERINARY MEDICINE

Kutz Research

CANADIAN WILDLIFE HEALTH COOPERATIVE

**FACULTY OF VETERINARY MEDICINE**

# Community-Based Wildlife Health Monitoring

## 2025 Wildlife Health Monitoring and Disease Investigation Workshop

March 11th – 14th, 2025
University of Calgary Spy Hill Campus | Calgary, Alberta

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**Suited up and ready to roll!** Susan Kutz, Dayna Goldsmith, Nathan Mannilaq, Frances Anaittuq, Paul Ikuallaq, Anthony Bearspaw, Russell Akeeagok, Pat Klengenberg, Fabien Mavrot, Danielle Nowosad, Enooyak Sudlovenik, Stephanie Behrens, Shelby Lucas (Clarence Kaiyogana and Tommy Mariq joined us remotely).

# Hosts

The **Kutz Research Group**, led by Dr. Susan Kutz, is a team of researchers and graduate students seeking to understand the health of wildlife and applying that knowledge to support sustainable subsistence use and conserve healthy ecosystems. We work in close partnership with northern Indigenous communities to understand the impacts of diseases and parasites on animals and food safety and security, to support safe harvesting and food-consumption practices, and to inform co-management groups and other decision-makers.

The **Canadian Wildlife Health Cooperative** (CWHC) is a cross-Canada network of partners and collaborators dedicated to wildlife health. The organization includes internationally renowned wildlife disease diagnosticians and researchers, experts in population health, educators, and policy advisors. The CWHC is dedicated to generating knowledge needed to assess and manage wildlife health, and to working with others to ensure that knowledge gets put to use in a timely fashion.

The **Soghigian Lab** is interested in understanding causes and consequences of parasite and vector (disease-transmitter) diversity. We investigate why biting insects are such a problem, while often their near relatives are benign or even beneficial. We will be using genomic tools and evolutionary methods to answer questions about biting-insect vectors and pathogens in the Arctic.

# Sponsors

**We sincerely thank all our sponsors and contributors who helped make this workshop possible. We also thank the many University of Calgary staff who helped organize and facilitate this event!**

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# About this workshop

Harvesting of country food and sport hunting are important parts of life for Indigenous Peoples in many parts of Canada. Country food represents a cheaper, healthier alternative to store-bought foods in remote northern communities. Harvesting country food from the land is also an important practice associated with mental and social wellness and spiritual and cultural identity.

Increasingly, harvesters across the North are reporting abnormalities in wildlife, sometimes things they haven't seen before. Harvesters have concerns about changes in wildlife health, how these are affecting wildlife populations, and whether harvested animals are still safe to eat.

This workshop at the University of Calgary was initiated by the Kutz Research Group in response to communities' concerns. It was conducted in partnership with the Canadian Wildlife Health Cooperative with the aim of exchanging knowledge on:

i) Tools and approaches to monitoring wildlife health;
ii) What to do when you see something in a harvested animal that is unusual or concerning.

Ultimately, we hoped that the sessions would increase participants' confidence in their ability to assess and manage abnormal findings in harvested animals. Workshop sessions were video-recorded to the extent possible, as it is hoped these can be brought to the North and shown during community visits, workshops, and trainings to reach the widest possible audience concerned with wildlife health and monitoring.

# Our goals

**To learn about:**

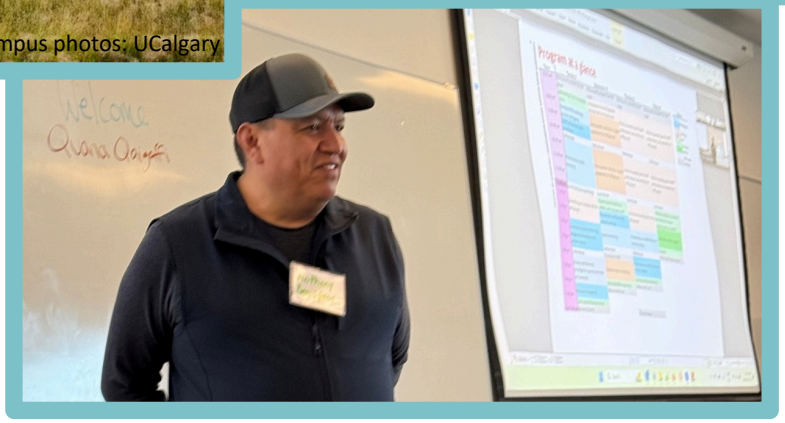
- Passive health surveillance and disease outbreak investigations
- Terrestrial and marine mammal health monitoring programs and their outcomes
- A new insect monitoring program underway (Kutz Research Group and Soghigian Lab); how this connects with ongoing wildlife disease monitoring efforts
- Best practices in meat hygiene
- Capacity-building for wildlife monitoring in the North
- How Indigenous Knowledge is significantly impacting wildlife health monitoring
- How health monitoring information can be used to support wildlife co-management

**To do some hands-on practice:**

- Assess the general health of an animal when butchering
- Collect animal samples for routine health monitoring
- Collect samples when there is disease/something abnormal
- See how samples are analyzed in the laboratory

**Note:** See the **Glossary of Terms** used during the workshop (Appendix I).
Photo credits: S Kutz and F Mavrot unless noted otherwise.


Campus photos: UCalgary



# WORKSHOP Day 1 – March 11, 2025

## DAY 1 MORNING:

Everyone gathered early at University of Calgary's Spy Hill Campus, home of the Faculty of Veterinary Medicine's Clinical Skills Building (the CSB, where all workshop classroom, necropsy, and laboratory sessions and tours were held) and the Veterinary Sciences Research Station. It was exciting to bring everyone together: 10 participants from **remote Nunavut and NWT communities** (Sachs Harbour, Kugluktuk, Ulukhaktok, Cambridge Bay, Gjoa Haven, Taloyoak, Kugaaruk, Baker Lake, Behchokǫ̀) and from **Stoney Nakoda Nations** (Alberta); two veterinary pathologists and other contributors from the **Canadian Wildlife Health Cooperative** (CWHC) and **UCalgary's Diagnostic Services Unit**; technicians, graduate students, postdocs, and other presenters from **Kutz Research Group**, as well as members of the **Soghigian Lab** (see Appendix II: Participants and Team).

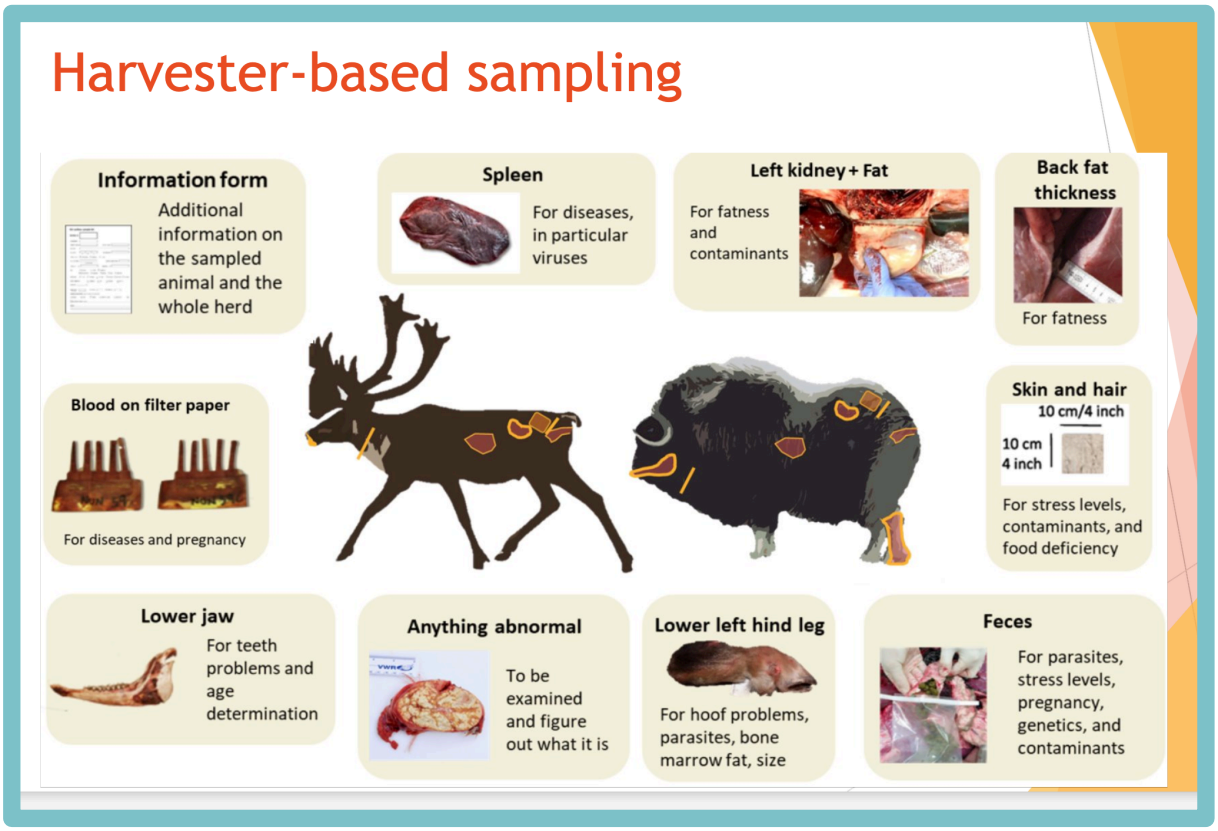
We started the day with (coffee and) a welcome and land acknowledgement by Anthony Bearspaw (Stoney Nakoda Nations) and lead organizers **Drs. Fabien Mavrot** and **Susan Kutz**. This was followed by Paul Ikuallaq's Opening Prayer and around-the-table introductions with people's personal goals for the workshop.

Susan Kutz introduced the workshop, giving participants a snapshot of the preparation (several road-killed deer were collected over weeks to be used for the postmortem sessions!), goals, and agenda. **Dr. Damien Joly** also introduced the CWHC and its aims and operations in disease surveillance.

We then dove into the main morning session on the **Muskox and Caribou Community-Based Wildlife Health Monitoring/Surveillance (CBWHS) Program** (presented by Susan Kutz and some of her team), an initiative that has operated for more than 10 years as a partnership among communities' hunter-trapper organizations/committees (HTOs), territorial governments, and the Kutz Research Group. This collaboration is successful and ongoing in Kugluktuk, Ulukhaktok, and Ekaluktutiak (Cambridge Bay), with approximately 400 caribou and 600 muskoxen hunter kits collected and analyzed since 2014. The program is currently expanding to Sachs Harbour, NT, Baker Lake, NU, and additional Kitikmeot Region communities, all represented at the workshop.

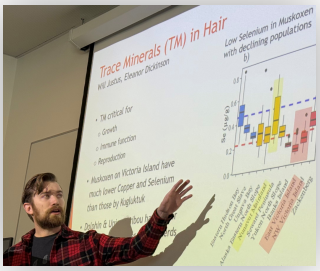
**How it Works:** The CBWHS Program **brings together multiple knowledges** (harvester-based sampling/data, Indigenous Knowledge [IK] interviews, and Western science) and **elevates the Indigenous Voice** to generate conservation (including food security) and public health (food safety) **information for decision- and policy-makers at local and broader levels.**


Susan described the **harvester sampling kits**, with the important "**data sheet**" (the types of information hunters fill out in this form and why) and touched on the various **samples requested** (including **anything unusual or abnormal** that a harvester might find when butchering). She also explained about the **IK interviews** (group and individual) and the ways mapping and animal-numbers information are collected using "participatory methods" (e.g., piling dry beans to represent different muskox group sizes).




The rest of the session was presented by Kutz team members (postdoctoral researchers, graduate students) who went through **what each of the hunter-collected samples is tested for** and what can be learned from them. They also briefly summarized the various Kutz research studies using these samples. All these **targeted studies originate directly from and are seeking answers to communities' concerns** about wildlife health.

**Dr. Eleanor Dickinson**, Postdoctoral Researcher – looking at scientific data and IK about "health indicators" (e.g., backfat thickness, bone marrow fat, and many more) and combining results to create a "traffic-light" system that can signal (sooner not later!) whether populations are stable, increasing, decreasing.




**Will Justus**, PhD student – testing trace minerals (TMs, which all mammals need for immunity, reproduction, etc.) in muskox and caribou hair and in vegetation around Kugluktuk and Ekaluktutiak to see if levels of any TMs are low and how this might impact individual and population health.

**Erica Suitor**, PhD candidate – examining muskox jaws and incisor (front) teeth to enable age determination (which is important to be able to understand what's happening in populations) and to assess and understand incisor abnormalities/damage, which are worse in Victoria Island muskoxen than in mainland muskoxen.

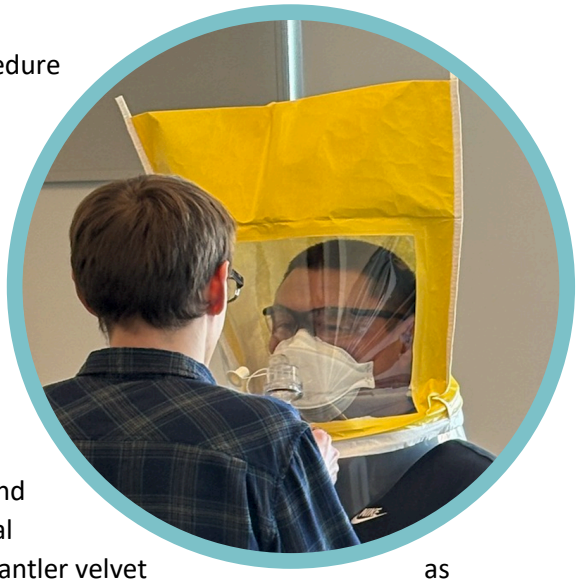
**Jessie Olson**, MSc student – taking a step into the largely unknown area of viruses in caribou, Jessie is using filter-paper blood samples and spleen tissues to develop a caribou-specific laboratory test that can

detect exposure to pestiviruses. This group of viruses may affect caribou reproduction so they're of particular interest regarding health and population resilience.

**Misbah Uddin**, PhD student – using "abnormal" tissue submissions (e.g., kidneys, legs, muscle with abscesses or swellings) to get a clear picture of what the disease "brucellosis" (transmissible between animals and humans) looks like in caribou versus muskoxen so that harvesters can be aware and careful. Brucellosis has been known to affect some populations of arctic caribou but its detection in muskoxen is relatively new, so it's very important to define exactly how this disease appears in muskoxen.

**Dr. Olivia Hee**, Postdoctoral Researcher – tested filter-paper blood samples to see whether these worked for detecting pregnancy in muskoxen (they worked!) and found that brucellosis-exposed females had lower pregnancy rates than those not exposed.

## DAY 1 AFTERNOON:



Over the lunch period, there was a detailed **mask-fitting** procedure where each participant had a mask fit to their specific face contours; this was required personal protective equipment to enter the room/s where carcass dissections and examinations would be done.

After the noon break, half of the participants visited the **Veterinary Sciences Research Station**, an outdoor facility at the Spy Hill Campus where a group of captive reindeer are housed. Dr. Gregory Muench, veterinarian in charge of the herd's care and maintenance, described the daily work with the animals. Reindeer are the exact same species as caribou and are valuable for several paths of human and veterinary medical research at University of Calgary: for example, i) investigating antler velvet as tissue that regenerates, which is a rare and interesting process; ii) testing reindeer blood-on-filter-paper samples (useful in arctic conditions whereas glass-tube blood samples are not) to see whether they can detect bacteria (e.g., *Brucella*) or virus exposure in caribou.

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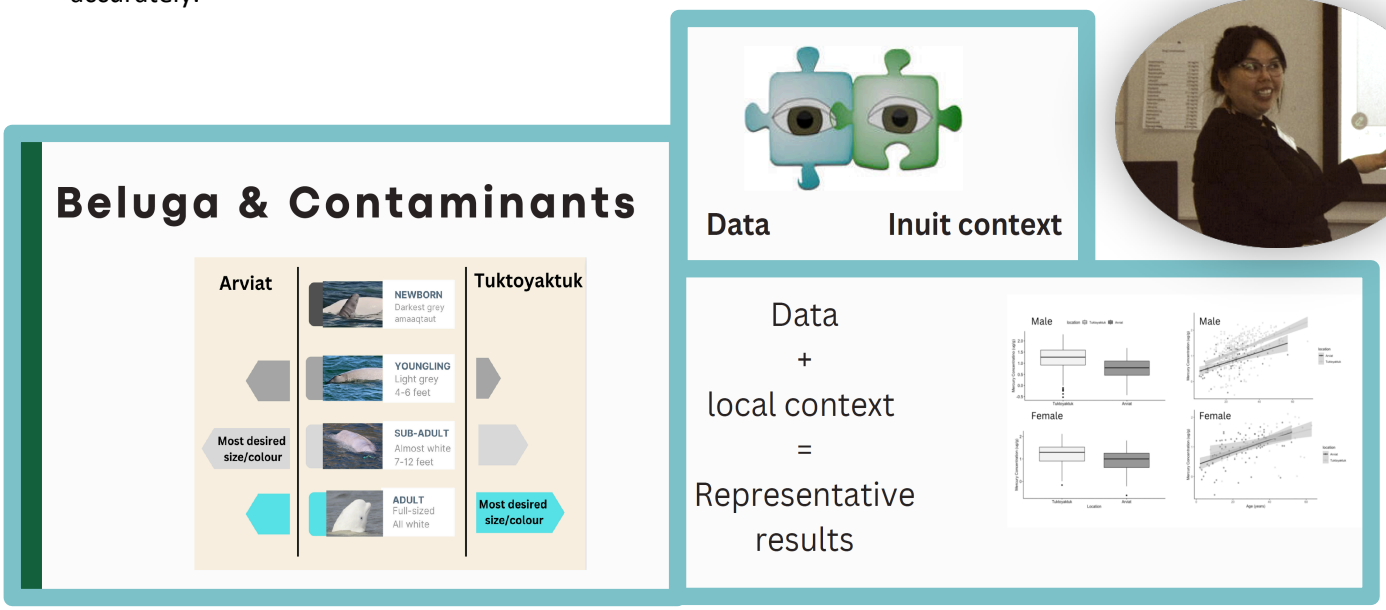
Afternoon talks continued, focusing on the importance of IK in community-based wildlife health monitoring, how things unfolded during a recent unsettling disease outbreak in caribou, and the typical approach that scientists and veterinary pathologists take for disease outbreaks in animals.

**Dr. Enooyak Sudlovenik** (CWHC consultant) described a study of **contaminant concerns (food safety and animal health) in beluga whales** harvested at different locations in the Arctic. She reminded everyone that IK is *collective knowledge* that reflects Indigenous worldviews, is adaptive, and is acquired

over time. Enoo described how "two-eyed seeing" (collecting both IK and Western science data) was the only way that the study findings—the true food safety risks—could be interpreted accurately.




Slides: E Sudlovenik

Not surprisingly, testing showed that older beluga contained higher contaminant levels than younger whales. However, IK interviews told that Arviat harvesters preferred to catch smaller younger whales, whereas Tuktoyaktuk harvesters selected full-grown adults. Without this local context, the investigators might have assumed that these communities face similar levels of contaminant intake from eating beluga. Instead, **because the team had IK about the different harvesting preferences, they were able to better estimate the true contaminant risk of consuming beluga** in Arviat versus Tuk.

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**Fabien Mavrot** presented the results of harvester interviews conducted in Ulukhaktok on muskox health and population dynamics. This work showcased how IK can inform on important population trends and metrics (e.g., herd size, number of calves) that are difficult to collect regularly over long periods using traditional Western science approaches such as aerial surveys. The interviews in Ulukhaktok also provided important insight on emerging diseases/syndromes that helped guide sample collection and testing.

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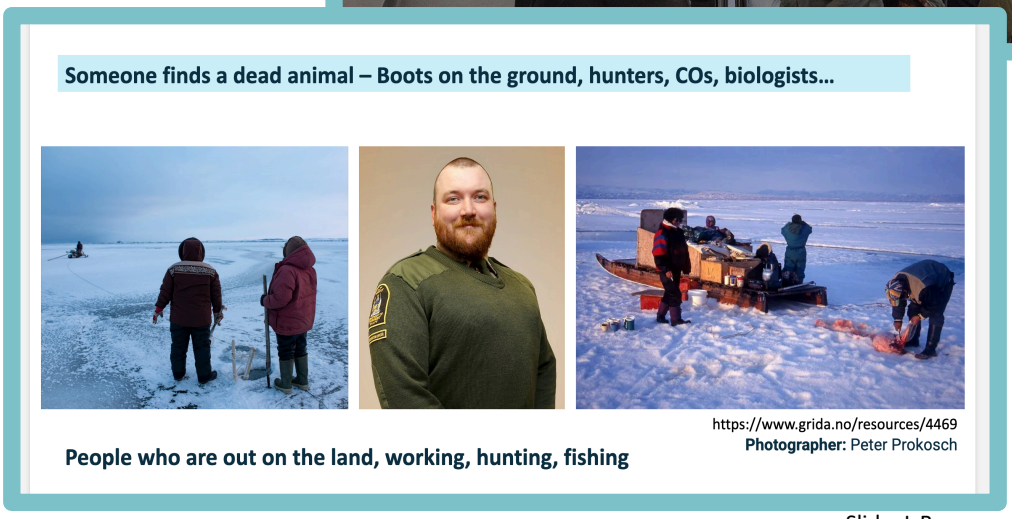
Veterinary pathologist **Dr. Laura Bourque** (CWHC) explained the steps of a disease outbreak investigation. She pointed out that even though the World Organization for Animal Health (OIE) prescribes a stepwise protocol for this (i.e., "verify outbreak → diagnose → make a case definition → describe where disease is occurring and how it spreads," etc.), things almost always get crazy and it's usually not a process of one step after the other!


Slide: L Bourque

***You find a dead animal.***

***Now what do you do???***

Laura emphasized that one main first step is to, before disturbing a body too much or cutting it, walk around and inspect so that you can **describe the lesion (the main abnormality/ies)**: compare side to side (left vs right) or between individuals; are all the organs where they're supposed to be?; do organs, haircoat etc. look healthy?; is there too much fluid somewhere?; is the fluid coloured, bloody, or is it pus?; are there any lumps or bumps, wounds, crusts?, etc.

Second, she urged the importance of taking **LOTS of good-quality photos**: whole carcass at **distance and close up**, and ideally with the lesion visible and everything centered well. She also said to ensure the lesion is always **in focus** and make sure to **place a ruler or knife or something beside** to give the viewer sense of scale. Other key points were to **only take samples if you're comfortable**, always **wear gloves** and other protective gear when sampling, include a **wide margin around any lesion** you cut out, and to **clean/disinfect your knife** after or ideally **use a separate knife** if you have one.

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When a harvester from a community in the CBWHS Program submits "something strange or unusual" as part of a hunter sampling kit or submits separately to the local wildlife office, this is where it ends up: **University of Calgary's Diagnostic Services Unit (DSU)**.

The DSU is where CWHC veterinary pathologist **Dr. Dayna Goldsmith**, along with other specialists (parasitologists, microbiologists, and more), examine it and hopefully find a diagnosis!

As a lead-up to Wednesday's hands-on workshop sessions, Dayna introduced herself as the point person for "abnormal" CBWHS Program submissions (e.g., suspected *Brucella* lesions and many more) and explained the DSU's role in the program. She outlined the facility, all the different types of work done there, the many professionals and disciplines (parasitology, virology, bacteriology, microbiology, and more), and why all the work is important.

Dayna then walked us through slides showing the steps of a **complete diagnostic necropsy**:

- case history (anything known or estimated about age, location, circumstances, etc.)
- macroscopic examination (what you see with the naked eye)
- microscopic examination (what you see with a microscope)
- other types of tests

She emphasized the importance of **keeping yourself safe** with personal protective equipment when you examine or cut into any dead animal, and underlined that **sample quality/preservation** is vital to getting answers. In many cases, Dayna said, decomposition (rotted tissue) and other challenges make it impossible to reach a diagnosis. These are all things highly relevant to harvesters sampling on the land.

# WORKSHOP Day 2 – March 12, 2025

## DAY 2 MORNING:

On Wednesday morning, the group assembled at the CSB once again and suited up with the required personal protective equipment to enter the necropsy room. After explaining the various equipment and areas of the room, Dayna led us through the systematic steps of a complete **diagnostic necropsy on a young female cougar**. The group engaged enthusiastically, asking and answering questions along the way. Differences between cats and ungulates like deer, caribou, and muskoxen were highlighted, and people were interested in Dayna's dissection techniques and explanations of the pathological findings and her deductions regarding cause of death.

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After the necropsy and a coffee break, the group watched full step-by-step **demonstrations of the hunter sampling kit and animal health assessment** by Susan and Fabien. Using an exact kit from the CBWHS Program and working with a deer carcass, the presenter at each station showed how to fill in **the data sheet** for the kit—explaining the "why" for each piece of information requested—and then demonstrated how to dissect and collect **each sample and measurement requested** in the kit.

This session prompted a lot of back-and-forth discussion, as participants watched, asked excellent questions, and offered valuable tips and on-the-land perspectives. People asked about the rationale, practicality, and “wiggle room” for collecting certain samples. There was also talk of ways to possibly prioritize samples when out on the land in extreme cold and under pressure from incoming weather or darkness. Some harvesters explained that certain described collection requirements could be problematic; for example, at certain times of year when caribou hide and hair are valued for clothing, cutting a hole in the rump to assess backfat and collect hair is not preferred -- is there any other location this could be done?

These and other kinds of feedback were discussed at length; they are welcomed as they help the UCalgary team (who analyze the samples) to understand limitations and continually fine-tune the collection kits as much as possible. The goal is to make the kits as easy/positive to collect as possible, while recognizing that some stringent specifics are required for technical aspects of testing and analysis to be valid. It’s a balance.

Overall, participants were keen to learn and get into this session. The information and experiences prompted good discussion and people seemed to grasp solid understanding of the kits and the processes for completing them in the field.

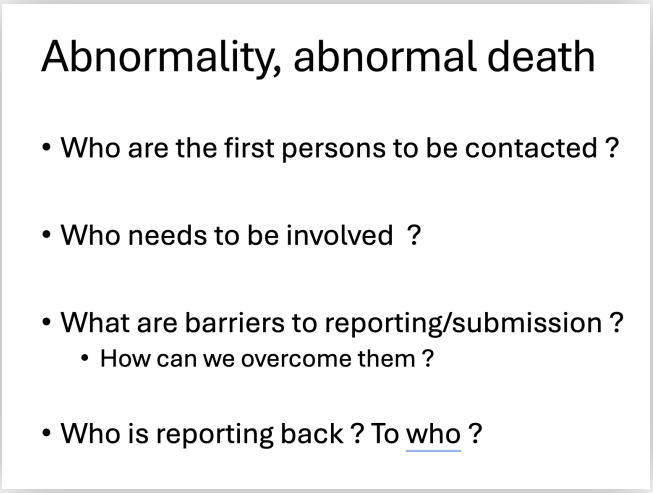
## DAY 2 AFTERNOON:

When we broke for lunch, the other half of the group went on a tour of the reindeer facility. Afterwards, we did a deeper dive into a topic of great interest to all:

***What do you do when you find an abnormality or suspicious death?***

Harvesters feel a weight of responsibility to bring home country food that is safe to share with children, Elders, and others in community. Several workshop participants expressed that this is especially a concern now, as many are observing more sick animals on the land. **Fabien Mavrot** and **Russell Akeeagok** (Kugluktuk HTO representative, Government of Nunavut Wildlife Officer) led a session about **an outbreak of a new caribou disease** that Kugluktuk harvesters recently faced and reviewed **important steps in the disease investigation and reporting process**.

Over a 2-week period in **August-September 2023**, Kugluktuk harvesters encountered nine Bluenose-East caribou with abnormalities they had never seen: **green-yellow liquid** and/or **sticky yellow stuff** on abdominal organs; **strange bruising** and sticky yellow stuff on the muscle surface just under the skin (in the "fascia"). Fearful, they abandoned all the carcasses and no samples were taken initially; however, they reported to the local Wildlife Office. This is where Russell came in. As Wildlife Officer, he was the first point of contact when some of the alarmed hunters came to report what they'd seen. In his role to protect wildlife, ecosystems, and public safety, Russell took action.




During the session, Russell gave everyone an excellent description of the events, his thinking processes, and the steps he and others took during this disease outbreak investigation:

- receiving initial reports from the hunters
- how these led him to think there was "something going on"
- his contact with the government biologist and with the Kutz Research Group
- things he had to consider in preparing to go out to sample (including personal protection)
- the challenges of finding and sampling the animals a few days after they had been hunted
- the photos and samples collected - getting guidance from Fabien/the Kutz team
- how samples were further processed in Kugluktuk and expedited to UCalgary
- the reporting back of results

Russell talked about his **role as a bridge between harvesters and the southern researchers and diagnosticians**. He emphasized the importance of trust, saying that harvesters need to feel they can report abnormalities when they've left dead animals on the land due to safety concerns. He stressed the importance of the Wildlife Office having an open-door policy, and of having good relationships with the researchers to be able to get results back in a timely manner.

Fabien pointed out that the approach and outcomes of this outbreak show how the long-term collaborative **Community-Based Wildlife Health Monitoring (CBWHS) Program is effective at helping communities address disease concerns**. When Russell reached out to Fabien as CBWHS Program Lead, the Kutz Research Group and the UCalgary Diagnostic Services Unit were able to jump in and help right away. Phone calls and Zoom sessions helped guide about locating the carcasses quickly, taking key photos, and collecting and processing specific samples safely. Fabien had recently been in Kugluktuk and had provided ongoing training for Government of Nunavut Wildlife Technician Terry Milton while there. Terry was able to process the samples as needed and ship them to Calgary.

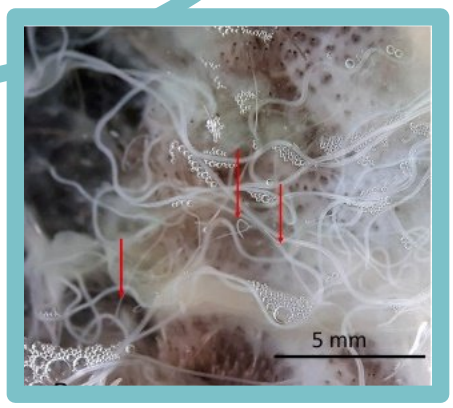
**CBWHS in Outbreaks:**
**Rapid effective north-south communication led to quick sampling, photos, and timely diagnosis!**

**… plus an "all clear" regarding food safety**

## Sample processing in Kugluktuk

- Kutz Research group visited a few weeks before for training
- Zoom session
- Samples in formalin (not frozen!)
- Shipped to Calgary

**Terry Milton**
Wildlife Technician, Gov. of Nunavut




Once the samples arrived, they were swiftly examined and even tested using a new laboratory test the Kutz team had developed. Experts were able to identify **two parasitic worms** (from the family of **"filarioid"** worms) that are **transmitted by biting insects** and that are likely to become an increasingly common health issue in the Arctic as insects are expanding north.

Importantly, the entire information exchange and diagnosis occurred very quickly; **the results were reported back within a few weeks (October 2023)** and Fabien and the UCalgary team were able to assure the community that caribou infected with these parasites are safe to eat.

However, Pat Klengenberg (President of the Olokhaktomiut Hunters and Trappers Committee in Ulukhaktok) explained to the group **how difficult it is for harvesters to take the meat of a sick animal**. He said that even when the risk for people is low, that low risk might not be acceptable when weighed against the wellbeing of relatives and friends sharing the meat. Pat also noted that severe changes in the meat might also affect the pleasure of eating it. He said, **"Country food should be not only safe, but also enjoyable."**

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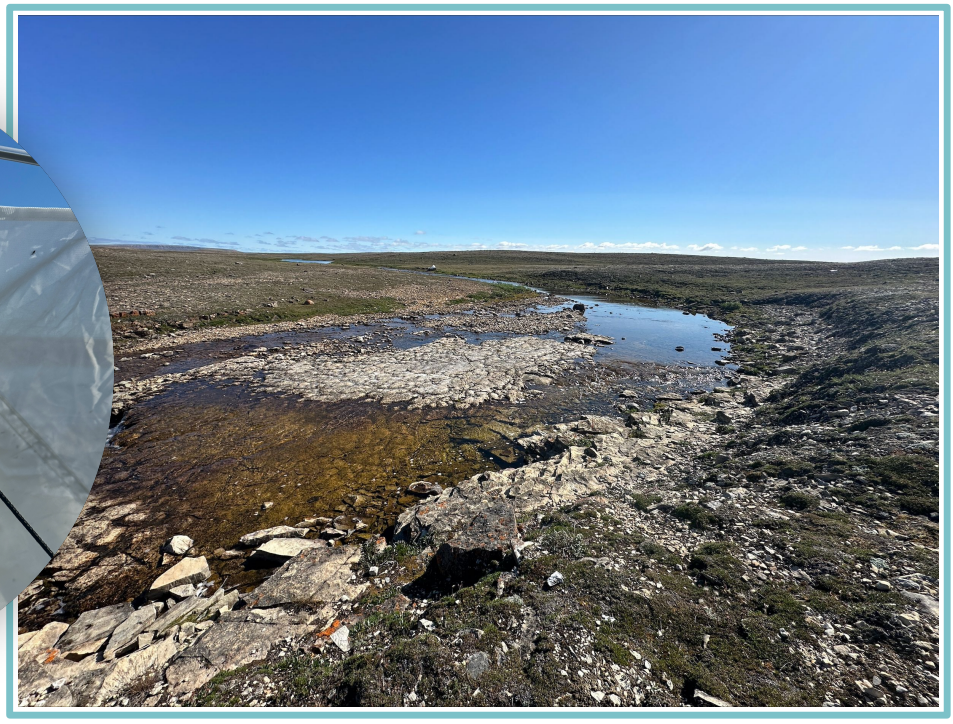
A really interesting aspect of climate change is **insects in the North**! Many people across the Arctic are noticing and reporting insects they haven't seen there before. **Dr. John Soghigian** (Assistant Professor, UCalgary) and **Danielle Nowosad** (soon-to-be Postdoctoral Researcher with Kutz/Soghigian Labs) talked about new research that is getting underway this year in connection with the CBWHS Program. The focus is changes in northern biting insects (BIs) and their possible wildlife disease impacts.

Dani leads the community-based **Kitikmeot Biting Insect Monitoring Program**, which is currently running in Kugluktuk and expanding to other communities. Insect trapping and testing have identified BI species that haven't been found at these northern latitudes before. Biting insects can potentially transmit disease to caribou and other animals (i.e., act as "disease vectors"), so if higher numbers of them and their geographic range/survival are shifting northward, this could risk wildlife health. There is much more to learn! John is an expert in mosquitoes and other biting flies. He explained that changes in "phenology" (natural cycles of animals and plants) with climate change are important, too; with warmer temperatures in the North, mosquitoes can now undergo more life cycles in one season, producing much higher numbers per season. John's lab does genetic testing and will be working with Dani and other researchers to identify BI vectors and pathogens that these BIs (and arctic animal hosts) carry that could be spread, potentially affecting caribou and muskox populations and other species. In addition to the research discussion, workshop participants got to view some insects very close-up under the microscope in the lab!



Photos by D Nowosad