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General Information

The Animal Health Centre works to diagnose disease and monitor animal health which is essential to British Columbia’s agrifood industry. Laboratory findings are used to monitor the status of animal health in British Columbia. Ongoing surveillance and reporting of listed diseases to appropriate agencies is a crucial role of the Animal Health Centre and has important implications for product export certification. In addition, the diagnosis of diseases that may be transmitted from animals to people is important to health authorities.

Staff veterinarians and laboratory scientists investigate and identify major livestock and companion animal diseases that could have potentially devastating effects on the food supply or pose a threat to public health. Up to 70% of all diseases affecting people come from animals. An even larger percentage of newly-emerging diseases originate with animals.

Animal Health Centre

The Animal Health Centre provides world class veterinary diagnostic services that protect the health of all animals in B.C. to support disease prevention, control and eradication. The Animal Health Centre protects human health, with the timely and accurate diagnosis of zoonotic diseases that transmit from animals to humans, in both the public health and the food safety sectors. The Animal Health Centre is a leading accredited full-service veterinary laboratory in western Canada, offering more than 400 laboratory diagnostic tests for agents that may be found in wild and domestic birds, mammals, fish, reptiles and amphibians.

Mandate

The mandate of the Animal Health Centre is to diagnose, monitor and assist in controlling and preventing animal disease in British Columbia.

Mission

Our mission is to support the sustainability of animal agriculture while serving to protect the well-being of the people of British Columbia through the surveillance, regulatory compliance, risk assessment and development of strategies to address risk.

Diagnostic Testing and Services

A full range of fee-for-service diagnostic testing, including Bacteriology, Histopathology, Molecular Diagnostics, Necropsy, Serology and Virology are accepted from veterinarians, livestock producers, the general public and other government agencies.

While primarily concerned with food-producing animals, the Animal Health Centre also provides diagnostic services for companion animals, captive and free-ranging wildlife, zoo animals, fish, fur-bearers and bees.
Billing

In accordance with the *Animal Health Act*, the Lieutenant Governor in Council may make regulations designating laboratories as provincial laboratories, and respecting fees that may be charged by provincial laboratories, including fees for diagnostic examinations and post-mortem services, services performed for the purpose of gathering evidence for a legal proceeding and providing analytical or interpretive reports.

- Section 5 of the Laboratory Fees Regulation states, “a provincial laboratory may charge the fees set out in the [Fee] Schedule in respect of services performed or laboratory reports provided under the *Animal Health Act* or the *Ministry of Agriculture and Food Act*”.

- Note that all charges are payable at the time of submission. Results will not be released until payment has been received.

- Accepted Methods of Payment: VISA, MasterCard, American Express, Debit, Cheque (payable to “Minister of Finance”) or Electronic Fund Transfer.

- Fees listed do not include applicable taxes.

- Out of province submissions will be charged at the fee plus 50%.
Disclosure of Results

- The veterinary professional responsible for your case will report their findings, diagnoses and recommendations for control (if applicable), in a written report.

- Whenever possible, it is preferable for our veterinary professionals to report directly to a veterinarian. The veterinarian has an established relationship with the animal and client, and can help to interpret results for the client.

- If results are urgently required, contact the Animal Health Centre directly at 604-556-3003 before submitting the specimen. Preliminary results can often be available within a day or two by contacting the Animal Health Centre directly.

- Results are sent primarily to the client. Reports will only be sent to third parties if indicated on the sample submission form. Exceptions will only be made in the instance that a notifiable or reportable disease is suspected. In this case both the Chief Veterinarian of British Columbia and the Canadian Food Inspection Agency (CFIA) must be notified. Cases of suspected animal abuse will also be reported to the Society for the Prevention of Cruelty to Animals (SPCA). Results will only be sent upon receipt of payment.
The Ministry of Agriculture’s Animal Health Centre is located in the Abbotsford Agricultural Centre. Our mailing address is:

1767 Angus Campbell Road
Abbotsford BC V3G 2M3

From Highway 1
- Take exit 92 toward Mission
- Merge onto BC-11 N
- Turn Right onto Delair Road
- Turn Right onto Angus Campbell Road
Contact Information

Local phone: 604-556-3003

Toll free: 1-800-661-9903

Front office email: PAHB@gov.bc.ca

Submission forms can be emailed to: PAHB.Submissions@gov.bc.ca

Website: www.gov.bc.ca/animalhealthcentre

Hours of operation: The Animal Health Centre is open Monday to Friday from 8:30 A.M. until 4:30 P.M. Please note that the Animal Health Centre is closed on Statutory Holidays.
Our Management Team

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Accreditations

The Animal Health Centre is accredited by:

The American Association of Veterinary Laboratory Diagnosticians (AALVD) - full accreditation:  [www.aavld.org/accredited-laboratories](http://www.aavld.org/accredited-laboratories)


Canadian Food Inspection Agency (CFIA)
Equine infectious anemia (EIA)
General Submission Procedures

Submission of samples or whole animals can be facilitated in several ways. Please call the Animal Health Centre at 604-556-3003, or visit our website for more information. All submissions must have a submission form accompanying them. If the correct paperwork is not received within 24 hours for fresh fish, horses, and cattle, then the animal will be disposed of without necropsy or testing. All other animals and samples will be held for 5 business days prior to disposal. Please understand that any delay may compromise the diagnostic integrity of the specimen.

Submission Forms

Submission forms may be completed at the branch either written or typed at the front office of the Animal Health Centre reception desk. We will only accession animals and samples submitted with the current official Animal Health Centre submission forms, which can be accessed via our website [www.gov.bc.ca/animalhealthcentre](http://www.gov.bc.ca/animalhealthcentre). Non-official (e.g., clinic-specific) forms, prior versions of Animal Health Centre forms, and species inappropriate forms (e.g., using the Mammalian form for an Avian submission) will not be accepted.

A completed submission form must be received with every submission in order for that submission to be processed. Incomplete submission forms will not be processed. At a minimum, this should include:

- Complete contact information for the client and veterinarian (if a veterinarian is involved)
- The species and/or breed, sex, and age of the animal
- A complete history of affected animal(s) indicating suspected disease(s) if possible. Taking the time to write out a thorough but concise history will help to ensure that all factors are taken into consideration when examining the animal/specimen, selecting tests, and making the final diagnosis and recommendations. Medical records or other laboratory results (i.e., bloodwork) can be included with the submission form if they are relevant to the case. However, please do not attach medical records in lieu of writing out a complete history on the submission form.
- Any relevant treatments or vaccinations.

If the form we receive is incomplete or incorrect, then our front office staff will contact you to request the needed paperwork/information. However, it is ultimately the responsibility of the submitter to ensure that the correct paperwork/information is submitted to the Animal Health Centre in a timely manner.

Please note that samples submitted without a submission form will not be accepted. Animals or samples sent to the Animal Health Centre with an incomplete submission form will be placed on hold. Fresh fish, whole horses and cattle will be held for 24 hours only. All other samples will be held for 5 business days prior to disposal.
For necropsy cases and ‘portions’ cases (i.e., cases where a necropsy has been done in the field), tests will be selected at the discretion of the pathologist.

For all other cases, clearly indicate on the submission form the specific test(s) requested.

The submission form should accompany the animal or specimen. For specimens shipped to the Animal Health Centre, enclose submission information in a separate plastic bag and pack it at the top of the box.

The Animal Health Centre is able to send animals <40 kg for private cremation at the discretion of the pathologist. For animals >40 kg, special cremation options are available. Contact the Animal Health Centre for more information about cremation.

**Whole Animal Submissions**

Up to 3 animals, 8 birds or 5 fish can be submitted within a single submission so long as the animals within the submission represent the same disease process (e.g., show similar clinical signs of disease). If separate tests on individual animals are required, then those animals should be submitted separately.

Samples from animals included in a single submission will be pooled and a single report will be issued. If it is important to separate animals for testing, then that should either be clearly indicated on the submission form (extra charges will apply) or those animals should be separated out into different submissions.

Poultry <8 kg and fish of any size may be submitted alive for euthanasia (live fish must be submitted in water).

All other animals must be submitted dead. The Animal Health Centre will not euthanize live animals other than poultry or fish.

**How to Package Your Samples for Submission**

**General Sample Packing Guidelines:**

- Before collecting specimen(s), check the sample requirements for the particular test you require. You can find this in the appropriate section of the fee guide or online at: [www.gov.bc.ca/animalhealthcentre](http://www.gov.bc.ca/animalhealthcentre).

- Ensure that all samples are adequately labelled with the animal identification and any other relevant information.

- Paperwork should be placed in a zip lock bag within the outer layer of packaging to prevent it from getting wet from ice packs or contaminated from the sample itself.
• Ideally do not tape paperwork to the outside of the shipping box as if it is not seen right away it is often cut when opening packages upon arrival.

• When sending in samples from multiple animals, be sure to indicate whether you would like the samples to be pooled or run individually so we know how to process the samples. Each sample container should be labelled clearly with the animal identification, so it is known which sample is from which animal.

**Liquid Samples or Samples in Formalin:**

• Ensure sample is in a twist top, leak proof container.

• Tape around the top of the lid to prevent leakage and the lid from coming off.

• Ensure that this container is placed inside another sealed container, i.e. an individual zip lock bag, or other larger container.

• It is best to send in a box with packing material around it to reduce impact during shipping.

• If sending in a shipping bag, ensure that the sample is tightly wrapped with bubble wrap or other protective material.

• Paperwork should be placed outside of the original packaging for the formalized/liquid samples in its own zip lock bag. This way if the sample leaks or the ice packs sweat, the paperwork does not get wet or contaminated.

**Examples of Well Packaged Samples**

Individually labelled, sealed containers for fecal analysis. 

Twist top container, taped around the edges to prevent leakage.
Place inside of a ziplock bag to prevent leaking from the first container.

Place inside a third protective outer layer. Ice packs added to keep sample frozen/cool during transport. Add packing material if there is a lot of space in the box to prevent the sample from moving around too much.

Place paperwork in its own ziplock bag to keep it dry and place it on the outer layer of the package, but still within the box.
Improper Sample Packaging:

- Contaminates paper work.
- Can make submission form unreadable causing delays in the processing time of your sample.

Submission Methods

Ensure that containers used to transport and ship specimens meet the requirements of the *Transportation of Dangerous Goods Act* (TDG). In most cases, Type 1B packaging, i.e., watertight inner packaging surrounded by absorbent material, watertight secondary inner packaging and sturdy outer packaging (corrugated cardboard) should be used. **For cases where there may be a zoonotic pathogen present, ensure that samples are transported and labelled accordingly.** For more information about TDG visit their website at: [www.tc.gc.ca/eng/tdg/act-menu-130.htm](http://www.tc.gc.ca/eng/tdg/act-menu-130.htm)

Direct Delivery

- Weekday delivery between 8:30 a.m. and 4:30 p.m., deliver as early in the day as possible.
- Large animals are not accepted for unloading between 12:30 p.m. and 1:00 p.m.
- Please check in with the front office and complete the appropriate submission form before unloading whole animals.
- Live animal submissions must arrive in a disposable container. Once a container enters the post mortem room it will be destroyed.
Mail

- Samples must be well preserved so that they arrive in suitable condition for examination.
- Samples must be adequately packed so they do not leak per TDG guidelines.
  - Each tissue must be submitted in a separate, labelled, sealed bag. Please indicate:
    - the source of the sample (e.g. rectal, liver, etc.), and
    - the number of vials included with each submission.
- Separate labelled samples are required for each test (e.g. bacteriology, virology, etc.) as they are sent to different sections of the Animal Health Centre for processing. Additional charges will apply for any sample that needs to be split for processing.
- Paired sera must be tested on the same day to render a meaningful comparison.
- A completed history sheet and submission form is best received in its own separate plastic bag.
- Clearly indicate the total number of items submitted for each submission, on the submission form.
Common Disease Conditions

If in doubt about how to proceed with a case submission, please consult our lists of Tests and Preferred Specimens on our website: www.gov.bc.ca/animalhealthcentre or consult the duty pathologist at the Animal Health Centre at 1-800-661-9903 or 604-556-3003 during regular office hours.

Abortion

A. History:

Please provide as complete information as possible on the dam, herd, or management system: e.g. herd size, general level of management and herd health status, recent additions to herd, numbers of pregnant animals in herd, previous abortions or indications of infertility, number of abortions/stillbirths/weak neonates in herd, parity of the dam, stage of gestation, nutritional status of dam, previous illnesses or stresses, vaccination status of the dam and any signs of illness. The AHC Mammalian Submission Form provides a valuable template to compile pertinent farm identification, historical information and signalment.

B. Selecting and Submitting Samples:

- Based on the degree of autolysis, maceration and possible scavenging, the placenta and fetal remains should be submitted for post mortem examination. Submission of a fetus, placenta and if possible, a serum sample from the dam afford the best likelihood of rendering a diagnosis.

- As an agent and/or lesions may not be present in all fetuses, if possible, please submit multiple fetuses (up to 3 fetuses may be presented in a single submission).

- If submitting the entire fetus is not possible, please submit as complete a set as possible of tissues as listed below. A serum or milk sample from the dam may also be provided.

C. Samples Required:

- Frozen or refrigerated: for routine bacteriology, virology, molecular studies, trace mineral analysis and ancillary diagnostic studies, fresh tissues, including: placenta, stomach contents (1-2 ml), fetal heart blood (1-2 ml), heart, lung, spleen, liver, kidney, and brain should be collected. Antibiotic resistance profiles may also be requested (Kirby Bauer disc diffusion).

- Formalin fixed: placenta, lung, liver, kidney, spleen, heart, adrenal gland, thymus, thyroid, small intestine (2 pieces), large intestine with meconium (2 pieces including meconium), brain, eyelid, and skeletal muscle.
Bovine Abortion

- **Bacteriology**: placenta, lung, and stomach content (1-2 ml).
- **Histology**: placenta (cotyledon and intercotelydonary regions), lung, liver, kidney, spleen, heart, adrenal gland, thymus, thyroid, small intestine (2 pieces), large intestine with meconium (2 pieces including cecum and spiral colon), brain, eyelid, and skeletal muscle.
  - In-house immunohistochemistry is available on formalin-fixed tissues for Bovine Viral Diarrhea Virus (BVDV), Bovine Herpesvirus-1/ Infectious Bovine Rhinotracheitis (BHV-1/IBR), *Leptospira* spp., and *Neospora caninum*.
- **PCR/Virology**: heart, lung, spleen, liver, kidney, and brain.
- **Radioimmunodiffusion/Ig Quantification/Serology**: heart blood (1-2 ml).
- **Serology/Trace Mineral/Vitamin**: dam serum submission.

Ovine/Caprine Abortion

*Note: all small ruminant abortions should be considered a potential zoonotic risk due to *Coxiella burnetii* infection and should be handled with appropriate precautions, including use of personal protective gear and thorough hand washing and disinfection of fomites.*

- **Bacteriology**: placenta, lung, and stomach content (1-2 ml).
- **Histology**: placenta (cotyledon and intercotelydonary regions), lung, liver, kidney, spleen, heart, adrenal gland, ileum, thymus, thyroid, small intestine (2 pieces), large intestine with meconium (2 pieces including cecum and spiral colon), brain, eyelid, and skeletal muscle.
  - In-house immunohistochemistry is available on formalin-fixed tissues for *Toxoplasma gondii* and *Neospora caninum* and tissue blocks can be sent to a reference laboratory for *Coxiella burnetii*.
- **PCR/Virology**: heart blood (1-2 ml), heart, lung, spleen, liver, kidney, and brain.
- **Serology/Trace Mineral/Vitamin**: dam serum submission.

Equine Abortion

- **Bacteriology**: placenta, lung, stomach content (1-2 ml).
- **Histology**: placenta (including samples of cervical star), lung, liver, kidney, spleen, heart, adrenal gland, ileum, thymus, thyroid, small intestine (2 pieces), large intestine with meconium (2 pieces including cecum and colon), brain, eyelid, and skeletal muscle.
  - In-house immunohistochemistry for Equine Herpes Virus 1 (EHV-1) is available on formalin-fixed tissues.
• **PCR/Virology**: heart blood (1-2 ml), heart, lung, spleen, liver, kidney, and brain.

• **Serology/Trace Mineral/Vitamin**: dam serum submission.

**Porcine Abortion**

• **Bacteriology**: placenta, lung, stomach content (1-2 ml).

• **Histology**: placenta (including samples of cervical star), lung, liver, kidney, spleen, heart, adrenal gland, ileum, thymus, thyroid, small intestine (2 pieces), large intestine with meconium (2 pieces including cecum and colon), brain, eyelid, and skeletal muscle.
  
  o In-house immunohistochemistry is available on formalin-fixed tissues for Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) and Porcine Circovirus 2 (PCV-2).

• **PCR/Virology**: heart blood (1-2 ml), heart, lung, spleen, liver, kidney, and brain.

• **Serology/Trace Mineral/Vitamin**: dam serum submission.

**Diarrhea**

**A. History:**

Please provide pertinent information on the herd and management system: e.g. herd size, prior episodes of clinical disease, general level of management and herd health status, animal age, numbers of animals affected, onset/duration of problem, vaccination history, and any administered treatments. The AHC Mammalian Submission Form provides a valuable template to compile pertinent farm identification, historical information and signalment.

**B. Selecting and Submitting Samples:**

• Acutely affected and untreated animals are the preferred individuals for sampling.

• Appropriately fixed gut sections are critical for effective histological analysis of enteric diseases. To ensure rapid tissue fixation, gut sections should be collected and preserved as soon as possible following death (preferably <10 minutes post mortem).

• To further aid fixation, the margins of sampled bowel may be cut or incised, then gently rinsed in fresh water to expose the mucosa prior to immersion in formalin.

• When specific tests are requested, please submit replicate tissue samples, in separate labelled Whirl-Pak bags for each lab section and test requested. Alternatively, submit representative portions of tissues or entire organs and indicate on the submission form, for the pathologist to select tests at their discretion.
C. Samples Required:

- As intestinal lesions may be multifocal to segmental, always collect multiple intestinal samples for histology (preferably three segments each of ileum and jejunum, and at least one each of duodenum, cecum, colon and stomach). Include any abnormal areas and margins of intestinal segments with gross lesions.

- For all submissions, please include routine histological and fresh or frozen tissues outside of the gastrointestinal tract, such as liver, kidney, spleen, and lung.

**Bovine/Ovine/Caprine Enteritis**

*Note: for testing of scouring calves < 2 weeks of age please see [Calf Scouras Package](#)*

- **Bacteriology:** feces, ligated small and large intestine segments, and mesenteric lymph nodes (aerobic and anaerobic culture).
  - Special culture for *Salmonella* spp, *Yersinia* spp. and *Campylobacter* spp. available.
  - PCR toxin genotyping (virulence factors) is available for *Clostridium perfringens* and *Escherichia coli* isolates.

- **Histology:** esophagus, forestomachs (rumen, rumen pillars, reticulum, omasum), abomasum, mesenteric lymph node, duodenum, jejunum, ileum with Peyer’s patch, spiral colon, cecum, and any area of the gastrointestinal tract with gross lesions.
  - In-house immunohistochemistry is available on formalin-fixed tissues for Bovine Viral Diarrhea Virus (BVDV) and Bovine Coronavirus (BCV). Ear notch submission for BVDV immunohistochemistry may also be submitted.

- **Parasitology:** feces (*Cryptosporidium* wet mount, fecal flotation or sedimentation, Modified McMaster quantitative fecal egg count).
  - Unless otherwise requested the Modified McMaster quantitative fecal egg count will be performed on all sheep and goat fecal samples while routine fecal flotation will be performed on cow fecal samples.

- **PCR/Virology:** feces, ligated segments of small and large intestine, and mesenteric lymph node.
  - PCR for *Mycobacterium paratuberculosis* is available.

- **Serology/Radioimmunodiffusion (Bovine):** antemortem serum or post mortem heart blood sample (colostral IgG).

**Equine Enteritis**

- **Bacteriology:** feces, ligated segments of small and large intestine, and mesenteric lymph nodes (aerobic and anaerobic culture).
Special culture for *Salmonella* spp., *Yersinia* spp. and *Campylobacter* spp. available.

- PCR toxin genotyping (virulence factors) is available for *Clostridium perfringens* and *Escherichia coli* isolates.

- **Histology**: esophagus, stomach, mesenteric lymph node, duodenum, jejunum, ileum with Peyer’s patch, cecum, colon, and any area of the gastrointestinal tract with gross lesions.
  - In-house immunohistochemistry is available for *Lawsonia intracellularis*.

- **Parasitology**: feces (fecal flotation or sedimentation).

- **PCR/Virology**: feces, small intestine, large intestine, and mesenteric lymph node.

- **Serology**: liquid feces (*Clostridium difficile* Toxin A & B ELISA).

**Porcine Enteritis**

- **Bacteriology**: feces, small intestine, large intestine, mesenteric lymph node (aerobic and anaerobic culture).
  - Special culture for *Salmonella* spp., *Yersinia* spp. and *Campylobacter* spp. available.
  - PCR toxin genotyping (virulence factors) is available for *Clostridium perfringens* and *Escherichia coli* isolates.

- **Histology**: esophagus, stomach, mesenteric lymph node, duodenum, jejunum, ileum with Peyer’s patch, cecum, colon, and any area of the gastrointestinal tract with gross lesions.
  - In-house immunohistochemistry is available on formalin-fixed tissues for Transmissible Gastroenteritis Virus (TGEV), Porcine Circovirus 2 (PCV-2), and *Lawsonia intracellularis*.

- **Parasitology**: feces (fecal flotation or sedimentation).

- **PCR/Virology**: feces, small intestine, large intestine, and mesenteric lymph node.
  - PCR available for Porcine Parvovirus.

- **Serology**: liquid feces (*Clostridium difficile* Toxin A & B ELISA).

**Canine/Feline Enteritis**

- **Bacteriology**: feces, ligated segments of small and large intestine, and mesenteric lymph nodes (aerobic and anaerobic culture).
  - Special culture for *Salmonella* spp., *Yersinia* spp. and *Campylobacter* spp. available.
  - PCR toxin genotyping is available for *Clostridium perfringens* and *Escherichia coli* isolates.
- **Histology**: esophagus, stomach, mesenteric lymph node, duodenum, jejunum, ileum with Peyer’s patch, cecum, colon, and any area of the gastrointestinal tract with gross lesions.
  - In-house immunohistochemistry is available on formalin-fixed tissues for canine parvovirus (CPV), canine distemper virus (CDV), feline coronavirus (FIP).
- **Parasitology**: feces (fecal flotation).
- **PCR/Virology**: feces, small intestine, large intestine, and mesenteric lymph node.
- **Serology**: liquid feces (*Clostridium difficile* Toxin A & B ELISA).

**Pneumonia**

**A. History:**

Please provide a complete description of the herd and management system, including herd size, general level of management and herd health status, animal age, numbers of animals affected, onset/duration of problem, vaccination history, and any treatment administered. The [AHC Mammalian Submission Form](#) provides a valuable template to compile pertinent farm identification, historical information and signalment.

**B. Selecting and Submitting Carcasses and Tissue Samples:**

- Tissues from acutely affected and untreated animals are preferred samples.
- When specific tests are requested, please submit replicate tissue samples, in separate labelled Whirl-Pak bags for each lab section and test requested. Alternatively, submit representative portions of tissues or entire organs and indicate on the submission form, for the pathologist to select tests at their discretion.

**C. Samples Required:**

- Histology samples from several areas of affected and unaffected lung should be taken, including samples along the junction of affected and unaffected lung as well as the pleural surface. Regional lymph nodes, thymus, tonsils and a sample of trachea should also be submitted if gross lesions are observed.
- Submission of additional tissues, including liver, kidney, spleen and heart for routine histology and bacteriology is recommended.

**Bovine Pneumonia**

- **Bacteriology**: affected areas of lung, pleural fluid/swab, tracheobronchial aspirate, or broncho-alveolar lavage fluid, and bronchial or other reactive thoracic lymph nodes (aerobic culture and *Histophilus somni* enriched culture).
- **Histology**: multiple lung samples from cranial and caudal lobes from both left and right lungs, include borders of affected and unaffected areas, trachea, bronchial lymph nodes, thymus, and tonsils.
  - In-house immunohistochemistry is available on formalin-fixed tissues for Bovine Viral Diarrhea Virus (BVDV), Bovine Respiratory Syncytial Virus (BRSV), and Bovine Herpesvirus-1/ Infectious Bovine Rhinotracheitis (BHV-1/IBR).
- **Parasitology**: feces (fecal flotation and Baermann for larvae of lungworm).
- **PCR/Virology**: lung, trachea, bronchial lymph nodes, tonsils, and nasal swabs.
  - PCR available for BRSV, BHV-1, BHV-2, BHV-4, bovine adenovirus, bovine coronavirus, bovine parainfluenza-3 and *Mycoplasma bovis*.

**Ovine/Caprine Pneumonia**
- **Bacteriology**: affected areas of lung, pleural fluid/swab, bronchial or other reactive thoracic lymph nodes (aerobic culture).
- **Histology**: multiple lung samples from cranial and caudal lobes from both left and right lungs, include borders of affected and unaffected areas, trachea, bronchial lymph nodes, thymus, and tonsils.
- **Parasitology**: feces (fecal flotation and Baermann for larvae of lungworm).
- **PCR/Virology**: lung, trachea, bronchial lymph nodes, tonsils nasal swabs.
  - PCR available for caprine arthritis and encephalitis (CAE) and *Mycoplasma spp.*

**Equine Pneumonia**
- **Bacteriology**: affected areas of lung, pleural fluid/swab, tracheobronchial aspirate, or broncho-alveolar lavage fluid, guttural pouch, and bronchial or other reactive thoracic lymph nodes (aerobic culture).
- **Histology**: multiple lung samples from cranial and caudal lobes from both left and right lobes, include borders of affected and unaffected areas, trachea, bronchial lymph nodes, thymus, and tonsils.
  - In-house immunohistochemistry is available on formalin-fixed tissues for Equine Herpes Virus 1 (EHV-1).
- **PCR/Virology**: lung, trachea, bronchial lymph nodes, and nasal/pharyngeal swabs.

**Porcine Pneumonia**
- **Bacteriology**: affected areas of lung, pleural fluid/swab, tracheobronchial aspirate, or broncho-alveolar lavage fluid, bronchial or other reactive thoracic lymph nodes (aerobic culture and *Hemophilus parasuis* enriched culture).
Please note that *Streptococcus suis* type II has been recovered from pig submissions and appropriate caution should be exercised with pneumonic lungs.

- **Histology:** multiple pieces of lung from cranial and caudal lobes from both left and right lungs, include borders of affected and unaffected areas, trachea, bronchial lymph nodes, thymus, and tonsils.
  
  - In-house immunohistochemistry is available on formalin-fixed tissues for Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), Porcine Circovirus 2 (PCV-2), Influenza A Virus.

- **Parasitology:** feces (fecal flotation and Baermann for larvae of lungworm).

- **PCR/Virology:** lung, trachea, bronchial lymph nodes, pleural fluid/swab, tonsil, and nasal swabs.

**Canine/Feline Pneumonia**

- **Bacteriology:** affected areas of lung, pleural fluid/swab, tracheobronchial aspirate, or broncho-alveolar lavage fluid, bronchial or other reactive thoracic lymph nodes, and tonsils (aerobic and fungal culture).

- **Histology:** multiple pieces of lung from cranial and caudal lobes from both left and right lungs, include borders of affected and unaffected areas, trachea, bronchial lymph nodes, thymus, and tonsils.
  
  - In-house immunohistochemistry is available on formalin-fixed tissues for Canine Distemper Virus (CDV), Feline Coronavirus (FIP), Influenza A Virus.

- **Parasitology:** feces (fecal flotation and Baermann for larvae of lungworm).

- **PCR/Virology:** lung, trachea, bronchial lymph nodes, tonsil, nasal swabs.
  
  - Note: for CDV PCR please also include samples of kidney, bladder, brain, tonsillar or conjunctival scrapings.
Fish Pathology and Diagnostic Testing

With three dedicated ACVP board certified fish pathologists and a post-doctoral fish pathology scholar, the Animal Health Centre is Canada's leading fish pathology service, providing high quality gross and histopathological interpretation and diagnostic testing for marine and freshwater fish throughout British Columbia, Canada, and internationally. The Animal Health Centre is fully accredited by the AAVLD (American Association of Veterinary Laboratory Diagnosticians) and is one of the few diagnostic laboratories in Canada that can offer full service fish health testing including pathology, virology, bacteriology, and molecular diagnostic testing. Submissions from any species of farm-reared, hatchery, wild, or aquarium fish are accepted.

A. History:

With each submission please provide a complete description of the fish management system, including group size, general level of management and fish health status, number of fish affected, onset/duration of problem, clinical signs, vaccination history, prior disease, and any treatment administered. The AHC Fish Submission Form provides a valuable template to compile pertinent farm/owner identification, historical information and signalment.

B. Selecting and Submitting Samples:

- Acutely affected and untreated fish are the preferred individuals for sampling.
- Fish tissues rapidly decay (autolyze) after death - e.g. the lining of the gill (lamellar epithelium) will begin to detach within about 5 minutes of death - as such the best tissue quality is obtained by sampling and preserving anesthetized fish.
- If dead fish are the only specimens available, tissue samples destined for histopathological evaluation should be collected and preserved in 10% neutral buffered formalin as soon as possible after death.
- Either sampled tissues, sampled tissues in histocassettes, or whole formalin fixed fish can be submitted for histopathological evaluation.
- When whole formalin fixed fish are submitted ensure adequate penetration of fixative to internal organs, tissues, and structures by:
  - Excising a wedge section of the coelomic wall to expose the coelomic cavity and organs
  - Removing the operculum to expose the gill arches
  - Removing the dorsal surface of the head to expose the brain
- For adequate fixation:
  - Ensure that the volume of fixative is at least 10 × tissue volume of the container
  - Ensure that no tissue thickness is greater than 1cm
When using histocassettes, ensure that tissue volume is less than 50% of the cassette volume and please avoid squishing tissues into the cassette.

- Because bile will digest tissues before fixative penetration, ensure that bile does not touch tissues to be examined by histopathology. Bile can also be aspirated from the gallbladder using a small needle and syringe.

- Samples for molecular diagnostic testing (PCR) can be either kept chilled or frozen, and should be shipped on ice - ideally frozen samples should always stay frozen (e.g. shipped on dry ice).

- Bacterial culture swabs or tissues destined for bacteriology should be kept chilled on ice or refrigerated and shipped chilled on ice (do not freeze swabs or tissues destined for bacterial culture).

- When specific tests are requested, submit replicate tissue samples, in separate labelled Whirl-Pak bags for each lab section and test requested. Alternatively, submit representative portions of tissues or entire organs and indicate on the submission form, for the pathologist to select tests at their discretion.

C. Samples required:

- **Bacteriology:** kidney swab (kidney for larger fish or if no swabs are available), coelomic fluid/swab, organ swabs or tissue samples from organs/tissues with gross lesions (aerobic culture).

- **Histology:** gill, liver, spleen, heart, head kidney, trunk kidney, stomach, intestinal ceca and mesentery, distal intestine and mesentery, gonad, brain, eye, and skin/skeletal muscle (include a transverse section of the lateral line). Also include specific lesions and margins if they are identified.
  
  - In-house immunohistochemistry for *Piscirickettsia salmonis* is available on formalin-fixed tissues.

- **PCR/Virology:** for routine diagnostics include pooled samples of spleen, kidney, liver, heart, and gill (tissues from up to a maximum of five fish can be pooled for molecular diagnostic testing).

For a complete list of available fish diagnostic tests and preferred samples please consult the *Virology and Molecular Diagnostics- Lists of Tests and Preferred Specimens* on the Animal Health Center Website.

If in doubt about how to proceed with a case submission, please consult one of the fish pathologists at the Animal Health Centre at 1-800-661-9903 or 604-556-3003 during regular office hours or email: PAHB@gov.bc.ca
Departments, Fee Schedules and Submission Procedures

Pathology

All specimens, whether an entire animal, tissues, blood samples or swabs are received first by the Pathology (Necropsy) section of the Animal Health Centre for evaluation by a pathologist.

A necropsy is the post-mortem examination of an animal to determine cause of disease or death. It involves dissecting an animal and conducting a detailed examination of all organ systems. Necropsies are performed by veterinary pathologists, who are veterinarians with specialty training in the diagnosis of animal disease based on macroscopic and microscopic tissue examination, as well as the use of diagnostic tests.

Necropsy samples are often referred to other laboratory sections (e.g. bacteriology, virology, and histology) for further testing. When all necessary tests have been completed, results are collated by the pathologist assigned to the case into a final written report that is emailed, faxed or mailed to the owner and/or the referring veterinarian.

Our target turnaround time, from submission to final reporting, is 10 business days. You may receive information about your case during this period at the discretion of the pathologist or case coordinator. Some cases may take more than 10 business days to complete (for example, complex cases, neurological cases, cases requiring testing by external laboratories, etc.).

The Pathology (Necropsy) section of the Animal Health Centre is a modern, fully equipped, computerized, environmentally safe, 320 square metre area with adequate capacity to handle both large and small animals. Accompanying the main Necropsy suite are five additional rooms for sample processing, photography, and histology preparation. There are an additional two rooms with HEPA-filtered safety cabinets that may be used to examine animals or tissues with potential zoonotic or foreign animal disease agents.
Post Mortem Examination

The routine post mortem examination fee includes opening the animal, full gross examination by the pathologist, incineration of the body and preparation of either an interim and/or final interpretive case report. Every post mortem is conducted at the sole discretion of the pathologist who shall determine what, if any, procedures and tests are necessary to complete the case following the gross examination. The pathologist may include, at their discretion, up to 5 additional tests under the post mortem examination fee for case completion. Individual tests included in the fee: up to 10 histopathology slides, routine bacterial culture of up to 5 tissues, fecal floatation and PCR analysis or viral culture of single or pooled tissues. If the pathologist determines that additional testing is necessary after employing the 5 included tests, the submitter will be contacted and the case discussed. If further tests are approved by the submitter, additional charges as per the fee schedule will apply. Once all tests are completed, the pathologist will prepare the final interpretive case report, including the results of all tests conducted, for the submitter. Submitters are welcome to discuss, over a reasonable time period, the final case results with the pathologist. Tests deemed unnecessary for case completion by the pathologist can be requested by submitters for their interest at an additional charge for each test.
Tissue Specimens

- Samples for bacteriology, virology, or molecular diagnostics should be sent fresh or frozen.
- For fresh and frozen samples, submit tissues in individual containers that are clearly labelled with the name of the tissue. Submit separate samples for each test required as they are sent to separate lab areas.
- When requesting histopathology, please try to submit formalin-fixed rather than fresh tissues. This will prevent rotting while in transit.
  - For proper fixation, tissues should be no more than 0.5 cm thick at the thickest point. Please use 10% neutral buffered formalin to fix tissues and ensure that a ratio of one part tissue to 10 parts formalin (by volume) is used for initial fixation.
  - Note that formalin fixed tissues do not need to be placed in individually labelled bags. Simply mark the bag with the words “Fixed” and “Histology” and indicate the fixed tissues included in the submission on the submission form.
  - Do not freeze samples for which you may require histopathology.

Abortion Specimens

- Please detail all relevant clinical history on the submission form. For example, parity of the dam, signs of illness, nutritional status, previous illnesses or stresses, vaccination history, general level of management and herd health status, recent additions to herd, previous abortions or indications of infertility.
- If possible, please submit the entire fetus and placenta. If that is not possible, please submit the following tissues:
  - Frozen or refrigerated: placenta, stomach contents, fetal heart blood, lung, liver, kidney and spleen, brain.
  - Fixed: lung, liver, kidney, spleen, brain, heart, adrenal gland, ileum, thymus, thyroid, eyelid, skeletal muscle.

Specimen Packaging and Shipment

- At a minimum, specimens should be placed in a watertight package and surrounded by absorbent material before being placed into a secondary watertight package. The secondary watertight package should, in turn, be placed into a sturdy outer package.
- A specimen may not be processed if contamination of the packaging poses a risk to personnel or if the specimen is spoiled, contaminated, or inappropriate.
- For whole animals and fresh/frozen samples, the outer package should be well insulated. Use a Styrofoam box or other insulated container and keep samples cool using ice packs, filling empty spaces with newspaper, bubble wrap, etc.
• For formalin-fixed tissues, to avoid transporting large volumes of formalin and/or to reduce risk of leakage, fix samples for at least 24 hours (depending on the size of the tissue – brain samples will require longer to fix) then drain the formalin and wrap the samples in a formalin or water-soaked paper towel.

• Animals and samples may be dropped off at the Animal Health Centre or sent to the Animal Health Centre via courier.

• Do not ship samples to arrive on weekends or holidays.

• Please contact the Animal Health Centre directly at 604-556-3003 if you have any questions.
## Pathology (Necropsy): Tests and Fees

<table>
<thead>
<tr>
<th>Test</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional time required to conduct examination (in excess of 1 hour)</td>
<td>$150.00 per hour</td>
</tr>
<tr>
<td>Additional time required to interpret/respond to client (in excess of 1 hour)</td>
<td>$150.00 per hour</td>
</tr>
<tr>
<td>Calf Scours package*</td>
<td>$110.00</td>
</tr>
<tr>
<td>Creation of documentation or photographs</td>
<td>$150.00</td>
</tr>
<tr>
<td>Disposal of Remains onsite (no examination provided).</td>
<td>$150.00</td>
</tr>
<tr>
<td>Histopathology, Bacteriology and Virology-All Other Animals</td>
<td>$250.00</td>
</tr>
<tr>
<td>Histopathology, Bacteriology and Virology-Production Animals</td>
<td>$110.00</td>
</tr>
<tr>
<td>Non-commercial poultry (from flocks of poultry with 100 birds or less). The first submission (per client on an annual basis)</td>
<td>$25.00</td>
</tr>
<tr>
<td>Non-commercial poultry (from flocks of poultry with 100 birds or less) subsequent submissions (beyond the first submission)</td>
<td>$140.00</td>
</tr>
<tr>
<td>Post Mortem-All Other Animals</td>
<td>$250.00</td>
</tr>
<tr>
<td>Post Mortem-Production Animals</td>
<td>$140.00</td>
</tr>
<tr>
<td>Post Mortem-Fetus-All Other Animals</td>
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</tr>
<tr>
<td>Post Mortem-Fetus-Production Animals</td>
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<tr>
<td>Post Mortem-Neurological/spinal cord (add on))</td>
<td>$100.00</td>
</tr>
<tr>
<td>Preparation and packaging of remains (&lt;40 kg) for private cremation.</td>
<td>$250.00</td>
</tr>
</tbody>
</table>

*The Calf Scours Package will be for fecal samples from scouring calves affected during the first 2 weeks of life (excluding necropsy cases). Sample eligibility includes scouring calves that are 0-2 weeks old as well as calves that are > 2 weeks of age but where scour originally developed during the first 2 weeks of life. The package includes the following tests: culture and sensitivity, which includes enriched *Salmonella* sp. culture, polymerase chain reaction (PCR)-based typing of *E. coli* to detect enterotoxigenic and enteropathogenic strains, direct fecal smear for *Cryptosporidium* spp., and PCR testing for rotavirus and coronavirus. This package represents a 36% savings over ordering these tests individually. You can order the package by indicating “Calf Scours Package” in the “Other” section under “Services Requested” in the Mammalian Submission Form.

**Production animals:** animals kept or dealt with primarily for the purpose of producing animal products or by-products, such as alpaca, cattle, goats, llama, sheep, swine, fur bearing animals, game farm animals, rabbits, poultry, fish and public display animals (e.g. zoos and aquariums).

**Post mortem examinations** include necropsy with gross (macroscopic) examination and up to five additional tests (e.g., histopathology, bacteriology, virology, and molecular diagnostics). Tests will be selected at the discretion of the duty pathologist. Specific test requests may be subject to additional charges.
Private Cremation and the Release of Remains

We are now able to release animals weighing less than 40kg to a licensed pet crematorium for private cremation.

- This service must be arranged independently through a vet clinic or licensed crematorium.
- Animals will only be released once the case is completed by the pathologist and no public health risk has been identified. Animals deemed a risk to humans or domestic animals (i.e., those with serious infectious diseases) will not be released.
- This service must be arranged prior to the post mortem procedure and the Animal Health Centre must be notified at the time the animal arrives.
- A signed release form is required.
- If a paw print impression is requested please have vet clinic staff prepare it before the animal is sent to the Animal Health Centre. Under special circumstances, post mortem staff may be able to create a clay paw impression if the client provides the clay impression kit.
## Parasitology: Tests and Fees

<table>
<thead>
<tr>
<th>Test</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baermann examination for lungworm</td>
<td>$27.00 per sample</td>
</tr>
<tr>
<td>Cryptosporidium spp.- direct smear</td>
<td>$27.00 per sample</td>
</tr>
<tr>
<td>Fecal flotation</td>
<td>$27.00</td>
</tr>
<tr>
<td>Fecal egg count</td>
<td>$27.00</td>
</tr>
</tbody>
</table>
Bacteriology

The Bacteriology section of the Animal Health Centre offers extensive microbiological services for the isolation and identification of a wide range of bacterial and fungal pathogens from avian, mammalian, aquatic, reptile, feed and environmental specimens.

The laboratory workup may include aerobic, anaerobic and microaerophilic culture, as well as enrichment culture for a number of specific pathogens including *Salmonella*, *Campylobacter*, *Listeria* and many others. Identification of bacterial and fungal organisms is performed using standard microbiological culturing techniques, various biochemical testing methods and in some cases DNA sequencing.
Antimicrobial Susceptibility Testing

Antimicrobial susceptibility testing (AST) is performed using the Kirby-Bauer disk diffusion assay and follows Clinical and Laboratory Standards Institute (CLSI) guidelines. AST testing is performed on organisms that are deemed clinically significant. We may not perform AST testing in cases where organisms are recovered from environmental sources, are common contaminants or are considered normal flora as these do not provide useful information and may promote unnecessary antibiotic usage.

Specimens for Bacterial and Fungal Culture - Submission Requirements

Proper collection and handling of diagnostic specimens are critical for the success of bacterial and fungal culture. Diagnostic specimens for bacterial and fungal culture should be collected immediately after the animal first develops clinical signs and prior to any antimicrobial treatment. Collection of samples must be performed aseptically to prevent microbial contamination and overgrowth of primary pathogens. Improper handling and transport of specimens will hamper the recovery and identification of significant bacterial or fungal pathogens. Samples should be sealed and transported in a secure container to prevent leakage during shipment.

Collection and Storage

Samples must be aseptically collected, individually labelled and refrigerated immediately after collection. Samples that cannot be shipped the same day to the Animal Health Centre should be stored at 4°C for a maximum of two days. Depending on type of submission, samples must be kept chilled or frozen. The use of ice pack refrigerants to keep specimens chilled during transit is extremely important. If specimens are frozen, they must remain frozen in transport and not allowed to thaw.

Submission Guidelines

**Environmental samples: (dust, sawdust, bedding material):** For culture of environmental samples please submit approximately 100gm (about 1 cup) of a representative sample in a securely sealed container or Ziploc bag. Do not submit environmental samples in specimen gloves. Please note that environmental samples submitted to the Animal Health Centre are for culture only, no antibiotic sensitivities will be performed on environmental samples.

**Environmental sponges/drag swabs/boots:** environmental sponges, drag swabs, or booties may be submitted for Salmonella spp. culture. Please ensure specimens are double bagged and identifications are written clearly using permanent marker on each specimen bag. The exterior of the bag must be clean and dry.
• Commercially available environmental sponges may be utilized for environmental Salmonella testing. Sponges should be submitted in a Whirl-Pak bag with the top tightly rolled over multiple times and then the metal tabs folded over to ensure no leakage of specimen.

• Drag swabs (or gauze swabs) may be used for environmental Salmonella testing. The swabs must be submitted in a Whirl-Pak bag with the top tightly rolled over multiple times and then the metal tabs folded over to ensure no leakage of specimen. DO NOT submit more than 4-5 pieces of gauze per specimen bag. If using a liquid (such as buffered peptone water) to moisten swab then use only enough liquid to moisten the swab, do not saturate it.

• Booties may be used for environmental Salmonella testing. Submit booties in a sealed and labelled bag (large Whirl-Pak or Ziploc bag).

**Feed (fresh or dry):** for feed testing submit approximately 50-100 gm (about 1 cup) of a representative sample. For dry samples submit in a securely closed container or Ziploc bag. For moist or liquid feed samples submit in a securely closed container. Do not use Whirl-Pak or other bags for moist or liquid specimens. Please note that feed samples submitted to the Animal Health Centre are for culture only, no antibiotic sensitivities will be performed on feed samples.

**Fluff:** fluff samples may be submitted for the detection of Salmonella spp. Please submit fluff in a securely closed specimen cup or Whirl-Pak bag. Do not overfill the specimen cup or bag; the fluff samples should fill no more than ¼ of the specimen cup or bag.

**Fresh tissues:** whenever possible, submit fresh tissues in a sterile, leak proof container for bacterial and fungal culture. Tissue samples should be kept separate and if possible, the ends of intestinal specimens should be ligated and intestinal samples separated from other tissues. Whenever possible, submit a 2-5cm piece of tissue with any lesions present. Autolyzed tissues are not suitable for culture.

**Feces:** submit approximately 5-10gm (1-2 tsp) in a securely sealed sterile container. Outer surfaces of the container must be clean and dry. Do not submit feces in plastic bags or gloves.

**Fluids (aspirates, pus, exudate etc.):** all fluid or semi-fluid specimens should be collected aseptically in a sterile, leak-proof specimen container or vial. DO NOT submit syringes with needles attached.

**Swabs:** when fresh tissues, fluids or feces are not available, specimen swabs may be submitted for bacterial and/or fungal culture. Only use swabs with appropriate bacterial (aerobic or anaerobic) transport media for collection and shipment to the laboratory.

DO NOT submit dry swabs to the Bacteriology laboratory. Swabs for anaerobic culture must be submitted in an anaerobic culture transport media to ensure recovery of anaerobic organisms.

DO NOT FREEZE TRANSPORT SWABS FOR BACTERIAL CULTURE

**Milk:** proper collection of milk samples is of paramount importance for identification of mastitis associated pathogens. Aseptic technique is necessary when collecting milk samples to prevent contamination by commensal organisms found on the cows' skin, udder, and teats; hands of the sampler; and in the barn environment. Contaminated samples result in misdiagnosis, increased
work and expense and misinterpretation of results. Contamination can be avoided by following the procedures described below.

**Materials for Sampling Milk:**

- Sterile vials or tubes – do not use plastic or Whirl-Pak bags for milk sampling.
- 70% alcohol (ethyl or isopropyl).
- Cotton balls or gauze soaked in 70% alcohol, or commercially prepared, individually packaged alcohol swabs.
- Examination gloves.
- Cooler with ice or freezer packs for storing samples.
- Racks for holding sample tubes or vials while sampling cows, and for cooler storage.
- Disinfectant for cleaning teats (effective germicidal products used for pre-milking teat disinfection are recommended).
- Paper towels or individual cloth towels.
- Means of identifying samples: permanent ink pen (with ink that is stable in both water and alcohol) or typed labels.

**Sampling Technique:**

- Label tubes prior to sampling (date, farm, cow, quarter).
- Brush loose dirt, bedding, and hair from the udder and teats. Thoroughly wash with germicidal product and towel dry dirty teats and udders before proceeding with sample collection. Udders should be washed as a last resort.
- Discard several streams of milk from the teat (strict foremilk) and observe milk and mammary quarters for changes in consistency or appearance of milk that may indicate clinical mastitis. Record all observations of clinical signs.
- Dip all quarters in an effective pre-milking teat disinfectant and allow at least 30 seconds contact time.
- Dry teats thoroughly with an individual paper or cloth towel.
- Beginning with teats on the far side of the udder, scrub teat ends vigorously (10 to 15 seconds) with cotton balls or gauze moistened (not dripping wet) with 70% alcohol. Teat ends should be scrubbed until no more dirt appears on the swab or is visible on the teat end. A single cotton ball or alcohol swab should not be used on more than one teat. Take care not to touch clean teat ends. Avoid clean teats coming into contact with dirty tail switches, feet, and legs. In herds where cows are not cooperative, begin by scrubbing the nearest teat until clean, obtain the sample, and move to the next teat.
• Begin sample collection from the closest teat and move to teats on the far side of the udder. Remove the cap from the tube or vial but do not set the cap down or touch the inner surface of the cap. Always keep the open end of the cap facing downward. Maintain the tube or vial at approximately a 45 degree angle while taking the sample. Do not allow the lip of the sample tube to touch the teat end. Collect one to three streams of milk and immediately replace and tightly secure the cap. Do not overfill tubes, especially if samples are to be frozen.

• To collect a composite sample (milk from all four quarters in the same tube), begin sample collection with the nearest teats and progress to the teats on the far side of the udder. 1-2 ml of milk should be collected from each quarter of the udder.

• When samples are taken at the end of milking or between milkings, teats should be dipped in an effective germicidal teat disinfectant following sample collection.

• Store samples immediately on ice or in some form of refrigeration. Samples to be cultured at a later date (more than 48 hours) should be frozen immediately.

Reference: Microbiological Procedures for the Diagnosis of Bovine Udder Infection and Determination of Milk Quality. [NMC publication, 2004]

Bacteriology: Tests and Fees

<table>
<thead>
<tr>
<th>Test</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobic Bacteria Culture and Sensitivity –</td>
<td>$60.00</td>
</tr>
<tr>
<td>All Other Animals</td>
<td></td>
</tr>
<tr>
<td>Aerobic Bacteria Culture and Sensitivity -</td>
<td>$40.00</td>
</tr>
<tr>
<td>Production Animals</td>
<td></td>
</tr>
<tr>
<td>Anaerobic Bacteria Culture –</td>
<td>$60.00</td>
</tr>
<tr>
<td>All Other Animals</td>
<td></td>
</tr>
<tr>
<td>Anaerobic Bacteria Culture –</td>
<td>$40.00</td>
</tr>
<tr>
<td>Production Animals</td>
<td></td>
</tr>
<tr>
<td>Anthrax Screening-Navy Test Kit</td>
<td>$25.00</td>
</tr>
<tr>
<td>Antibiotic Susceptibility</td>
<td>See Aerobic Culture</td>
</tr>
<tr>
<td>Avibacterium spp.-Culture</td>
<td>See Aerobic Culture</td>
</tr>
<tr>
<td>C.chauvoei, novyi, septicum, sordellii</td>
<td>$40.00</td>
</tr>
<tr>
<td>fluorescent antibody detection.</td>
<td></td>
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<tr>
<td>Campylobacter spp.</td>
<td>$40.00</td>
</tr>
<tr>
<td>Clostridium perfringens detection-culture</td>
<td>$40.00</td>
</tr>
<tr>
<td>Cryptosporidium spp.-direct smear</td>
<td>$27.00</td>
</tr>
<tr>
<td>DNA Sequencing-Bacterial Strain</td>
<td>$103.00</td>
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<tr>
<td>DNA Sequencing-Fungal Strain</td>
<td>$103.00</td>
</tr>
<tr>
<td>Fungal Culture and Identification</td>
<td>$40.00</td>
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<tr>
<td>Giardia-Antigen Detection</td>
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<tr>
<td>Test Description</td>
<td>Fee</td>
</tr>
<tr>
<td>------------------</td>
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</tr>
<tr>
<td>Haemophilus spp.-Culture</td>
<td>See Aerobic Culture</td>
</tr>
<tr>
<td>Klebsiella Culture of Sawdust or Environmental Sample</td>
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</tr>
<tr>
<td>Listeria Monocytogenes Enrichment and Isolation</td>
<td>$40.00</td>
</tr>
<tr>
<td>Milk Culture (up to 4 samples)</td>
<td>$33.00</td>
</tr>
<tr>
<td>Milk Culture (additional samples &gt;4)</td>
<td>$8.25 per sample</td>
</tr>
<tr>
<td>Ornithobacterium rhinotracheale-Culture</td>
<td>See Aerobic Culture</td>
</tr>
<tr>
<td>Salmonella culture-enrichment, isolation, identification and serotyping (PHAC)-analysis of environmental samples (fluff sponge, environmental monitoring)</td>
<td>$40.00</td>
</tr>
<tr>
<td>Salmonella culture-enrichment, isolation, identification and serotyping (PHAC)-Diagnostic Specimen</td>
<td>$40.00</td>
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<tr>
<td>Streptococcus equi-culture/PCR combined</td>
<td>$95.00</td>
</tr>
<tr>
<td>Streptococcus suis-Culture</td>
<td>See Aerobic Culture</td>
</tr>
</tbody>
</table>
Histopathology

The histopathology section of the Animal Health Centre is responsible for the routine preparation of stained tissue sections mounted on glass microscope slides.

Many tissues are derived from necropsies completed within the Animal Health Centre, while others originate from fixed tissues submitted by veterinarians. Prepared tissue sections encompass all varieties of animal species, including fetal tissues.

Tissues are trimmed from necropy specimens previously fixed in 10% neutral buffered formalin. Overnight, automated tissue processors take the tissues through increasing concentrations of ethanols followed by xylene and, finally, into molten paraffin wax. Tissues are then embedded into molds and cooled in the freezer. The resulting blocks are sectioned at 3-6um thick using a manual microtome and mounted onto glass microscope slides. After spending 35 minutes in a 65°C oven, they are placed onto the automated stainer.

Sections are stained routinely with hemotoxylin and eosin (H&E) prior to microscope examination. Stained tissue sections are ready for examination by the pathologist approximately twenty-four hours after fixed tissues are forwarded to the Histopathology section. Specific diagnostic tests using special stains may also be used, if required. Immuno-histochemistry staining for specific pathogens (disease-causing agents) has been introduced to assist the pathologist by directly identifying these pathogens in tissue sections.

Histopathology - Submission Requirements

If histopathology is required, please try to fix samples in formalin at the time they are taken. Shipping samples fresh will result in rotting during transit, which will impede microscopic tissue examination. Please also avoid freezing samples, as freezing damages the tissue and will also impede microscopic examination.
Preparation of Fixed Tissue with Formalin

Specimens should be no thicker than 5 mm at the thickest point. Other dimensions (e.g. length) are not critical; however, the sample should be large enough to provide an adequate field of study. For larger tissues that must be submitted intact (e.g. brain), it is best to make several deep cuts into the tissue so that the formalin can penetrate more quickly.

A 10 to 1 ratio of formalin to tissue (by volume) is essential for adequate fixation. Samples should be allowed to fix in 10% neutral buffered formalin for at least 24 hours.

Once the sample is fixed, it can be transported using just enough formalin to cover the tissue. Alternatively, this tissue can be wrapped in formalin-soaked paper towel.

Recipe for 10% Neutral Buffered Formalin

- Formaldehyde 35-40% strength - 10 ml
- \((\text{Na}_2 \text{H}_2 \text{PO}_4 \cdot \text{H}_2 \text{O})\) Sodium phosphate monobasic monohydrate - 0.4 gm
- \((\text{Na}_2 \text{H}_4 \text{PO}_4)\) Sodium phosphate dibasic anhydrous - 0.65 gm
- Water - to 100 ml

Histopathology: Tests and Fees

<table>
<thead>
<tr>
<th>Test</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histopathology-Production Animals</td>
<td>$62.00</td>
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<tr>
<td>Histopathology-All Other Animals</td>
<td>$95.00</td>
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<tr>
<td>Immunohistochemistry (for first sample)-</td>
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<tr>
<td>Production Animals</td>
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<td>Immunohistochemistry (for first sample)-</td>
<td></td>
</tr>
<tr>
<td>All Other Animals</td>
<td>$95.00</td>
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<tr>
<td>Immunohistochemistry (additional samples up to 10)-Production Animals</td>
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<tr>
<td>Immunohistochemistry (additional samples up to 10)-All Other Animals</td>
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</tbody>
</table>
Molecular Diagnostics

The Molecular Diagnostics section of the Animal Health Centre offers diagnostic testing for a wide range of animal pathogens using molecular biology based methods such as conventional and real-time PCR tests and DNA sequencing.

Diagnostic and Proficiency Testing

This section develops and validates Polymerase Chain Reaction (PCR) methods for detection and typing of pathogens important to domestic poultry, wild and exotic birds, food and fur bearing animals, companion animals, wild and zoological species, marine mammals and aquaculture salmonids.

In addition to routine diagnostic testing, the Molecular Diagnostics section undergoes proficiency testing conducted by the National Centre for Foreign Animal Diseases and USDA’s National Veterinary Services Laboratory.

Molecular Diagnostics - Submission Requirements

Proper collection and handling of diagnostic specimens are critical for the success of virus detection and virus isolation techniques. As peak virus titers are usually present at the onset of clinical signs, diagnostic specimens for virus detection and virus isolation should be collected immediately after the animal first develops clinical signs. Collection of samples during the acute phase of viral infection usually provides sufficient amount of virus for detection by various assays. Samples collected later in the course of infection may lead to false negative results or misdiagnosis when secondary bacterial infection is involved.

The Animal Health Centre currently, uses Polymerase Chain Reaction (PCR) assays, virus isolation, Electron Microscopy (EM), Fluorescent Antibody Test (FAT) for direct detection of viruses in clinical samples. Many of the samples used for PCR can also be used for virus isolation if collected and stored properly.
Collection and Storage

Samples must be aseptically collected and kept refrigerated immediately after collection. Samples that cannot immediately be transported to the laboratory should be stored at 4°C for a maximum of two days. Samples must be kept frozen at –70°C or lower for long term storage. The use of ice pack refrigerants to keep the specimens cold while in transit is extremely important for virus detection. If specimens are frozen, they must remain frozen in transit and not be allowed to thaw out.

**Swabs for virology testing (PCR, virus isolation and EM):** Viral swabs can be submitted in virus transport medium (VTM) or Universal Transport Medium (UTM) or Brain Heart Infusion broth (BHI).

- Use only dry polyester or dacron swabs on plastic handles for collection and submission of swab samples for virus isolation and PCR tests.
- After thoroughly swabbing the area of interest, place the swab in the collection tube containing 3-5 ml of VTM or UTM or BHI and swirl vigorously.
- Squeeze the liquid off the swab (press and roll) along the inside wall of the tube and discard swab into a disinfectant solution.
- Securely close the cap and clean the outside of each tube and seal the tubes in plastic zip lock bags.
- Store swabs at 4°C and transport immediately to the Animal Health Centre.

**DO NOT use:** Cotton-tipped or calcium alginate swabs, swabs with wood or paper handles or swabs in bacterial transport media and agar may not be used. Residual bleach and other chemicals in cotton swabs and wooden handles and agar in the bacterial transport media can be inhibitory to PCR and may inactivate viruses.

**Swabs for bacterial PCR tests:** Swabs can be submitted in sterile saline or PBS. Swabs submitted in bacterial transport media are not suitable for PCR testing.

**Fresh tissues:** Whenever possible, submit fresh tissues in a sterile, leak proof container for virus isolation and PCR assays. Autolyzed tissues are not suitable for virus isolation.

**Whole blood:** Use tubes containing anti-coagulants such as citrate (blue stopper), EDTA (purple stopper) or heparin (green stopper) and submit a minimum of 5 ml.

**Feces:** Submit approximately 10gm (10 – 20ml volume) in securely closed sterile container. Outer surfaces of the container must be clean and dry. Do not submit feces in plastic bags or gloves.
# Molecular Diagnostics: Tests and Fees

Each test from the Molecular Diagnostics lab costs $35.00 + tax unless otherwise indicated.

<table>
<thead>
<tr>
<th>Test</th>
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</thead>
<tbody>
<tr>
<td>Acipenserid herpesvirus 1 (AciHV-1)</td>
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<tr>
<td>Acipenserid herpesvirus 2 (AciHV-2)</td>
</tr>
<tr>
<td>Actinobacillus pleuropneumoniae</td>
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<tr>
<td>Acute Bee Paralysis Virus</td>
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<tr>
<td>African swine fever virus</td>
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<tr>
<td>Aleutian Mink Disease</td>
</tr>
<tr>
<td>Anaplasma marginale</td>
</tr>
<tr>
<td>Apicomplexa Screening</td>
</tr>
<tr>
<td>Arthrobacter davidanieli</td>
</tr>
<tr>
<td>Avian Adenovirus</td>
</tr>
<tr>
<td>Avian Eencephalomyelitis Virus</td>
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<tr>
<td>Avian Hemorrhagic Enteritis Virus</td>
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<tr>
<td>Avian Infectious Bronchitis Virus</td>
</tr>
<tr>
<td>Avian Infectious Laryngotracheitis Virus</td>
</tr>
<tr>
<td>Avian Influenza (A1) Virus (matrix, H5 and H7 typing)</td>
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<tr>
<td>Avian Nephritis Virus</td>
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<tr>
<td>Avian Paramyxovirus-1</td>
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<tr>
<td>Avian Polyoma Virus</td>
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<tr>
<td>Avian Reovirus</td>
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<tr>
<td>Avibacterium paragallinarum (infectious coryza)</td>
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<tr>
<td>Avipoxvirus</td>
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<tr>
<td>Bartonella henselae</td>
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<td>Batrachochytrium dendrobatidis</td>
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<td>Batrachochytrium salamandrivorans</td>
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<tr>
<td>Bearded Dragon Adenovirus</td>
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<tr>
<td>Betanodavirus</td>
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<tr>
<td>Blue Tongue Virus</td>
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<tr>
<td>Bonamia ostreae</td>
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<td>Border Disease Virus</td>
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<td>Bordetella avium Virus</td>
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<tr>
<td>Bovine Adenovirus Type 1,2,3,4-8</td>
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<td>Bovine Coronavirus</td>
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<td>Bovine Herpesvirus- 4</td>
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<td>Bovine Herpesvirus-1</td>
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<td>Bovine Papillomavirus</td>
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<td>Bovine Parainfluenza 3 Virus</td>
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<tr>
<td>Bovine Parvovirus</td>
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<tr>
<td>Bovine Respiratory Syncytial Virus</td>
</tr>
<tr>
<td>Bovine Viral Diarrhea Virus Types 1 &amp; 2</td>
</tr>
<tr>
<td>Brachyspira hyodysenteriae</td>
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<tr>
<td>Brachyspira pilosicoli</td>
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<tr>
<td>Virus/Microorganism</td>
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<tr>
<td>Brucella spp.</td>
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<tr>
<td>Canine Adenovirus Type 1 &amp; 2</td>
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<tr>
<td>Canine Coronavirus</td>
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<tr>
<td>Canine Distemper Virus</td>
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<tr>
<td>Canine Herpesvirus-1</td>
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<td>Canine Influenza Virus</td>
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<td>Canine Parainfluenza Virus</td>
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<tr>
<td>Canine Parvovirus a,b,c</td>
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<td>Caprine Arthritis Encephalitis</td>
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<tr>
<td>Ceratonova shasta</td>
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<td>Chicken Anemia Virus</td>
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<td>Chicken Astrovirus</td>
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<tr>
<td>Chlamyphila abortus</td>
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<td>Chlamyphila psittaci</td>
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<td>Classical Swine Fever Virus</td>
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<td>Clostridium piliforme (Tyzzer's)</td>
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<td>Coxiella burnetii</td>
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<td>Cricket Paralysis Virus</td>
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<td>Cryptosporidium spp.</td>
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<tr>
<td>Deformed Wing Virus</td>
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<td>Dichelobacter nodosus (Sheep Footrot)</td>
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<td>Duck Viral Enteritis</td>
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<tr>
<td>Encephalitozoonosis (rabbits &amp; birds)</td>
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<td>Epizootic Haematopoietic Necrosis Virus (EHNV)</td>
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<tr>
<td>Epizootic Hemorrhagic Disease 1 &amp; 2</td>
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<tr>
<td>Equine Coronavirus</td>
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<td>Equine Herpes Virus -1 (Neuropathogenic)</td>
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<td>Equine Herpes Virus 1, 2, 3, 4 and 5</td>
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<td>Equine Influenza Virus</td>
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<td>Equine rhinitis A Virus (Equine Rhinovirus-1)</td>
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<td>Feline Immunodeficiency Virus</td>
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<td>Feline Panleukopenia Virus</td>
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<td>Fish Totivirus</td>
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<td>Helicobacter hepaticus</td>
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<td>Herpesvirus - Consensus</td>
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<td>Infectious Bovine Rhinotracheitis</td>
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<td>Infectious Salmon Anemia Virus</td>
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<td>Influenza Virus Consensus-Matrix</td>
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<td>Johne’s (Mycobacterium paratuberculosis)</td>
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<td>Koi Herpes Virus (Cyprinid herpesvirus 3) (KHV)</td>
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<td>Neospora caninum</td>
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<td>Ovine Herpes 2 Virus (MCF - Sheep)</td>
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<td>Ovine Progressive Pneumonia Virus</td>
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<td>Parameoba perurans</td>
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<td>Parapoxvirus</td>
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<td>Parvovirus Consensus</td>
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<td>Phocine Distemper Virus</td>
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<td>Pigeon Circo Virus</td>
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<td>Piscine myocarditis virus (PMCV)</td>
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<td>Piscine Orthoreovirus (PRV)</td>
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<td>Piscirickettsia salmonis</td>
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<td>Porcine Circovirus 1 &amp; 2 a, b</td>
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<tr>
<td>Porcine Delta Coronavirus</td>
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<tr>
<td>Porcine Epidemic Diarrhea Virus</td>
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<tr>
<td>Porcine Parovivirus</td>
</tr>
<tr>
<td>Porcine Reproductive &amp; Respiratory Syndrome Virus</td>
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<tr>
<td>Potomac horse fever (Neorickettsia risticii)</td>
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<tr>
<td>Proventricular Dilatation Disease</td>
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<td>Pseudogymnoascus destructans (Bat white-nose syndrome)</td>
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<tr>
<td>Psittacine Beak &amp; Feather Virus</td>
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<tr>
<td>Psittacine Herpes Virus</td>
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<td>Rabbit Hemorrhagic Disease</td>
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<tr>
<td>Rickettsia salmoninarum</td>
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<tr>
<td>Reticuloendotheliosis Virus</td>
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<td>Rotavirus A-Mammal</td>
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<td>Salmon Alphavirus (SAV)</td>
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<td>Salmonid Herpes virus-1 (SalHV-1)</td>
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<tr>
<td>Seneca Valley Virus (SVV)</td>
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<td>Sarcocystis neurona</td>
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<td>Seal Herpes Virus</td>
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<td>Snake Paramyxovirus</td>
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<td>Spring Viremia of Carp Virus (SVCV)</td>
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<tr>
<td>Squirrel Adenovirus</td>
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<tr>
<td>Streptococcus equi equi</td>
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<tr>
<td>Streptococcus equi subspecies equi test-production animals $75.00</td>
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<tr>
<td>Streptococcus equi subspecies equi test-all other animals $95.00</td>
</tr>
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<td>Streptococcus iniae</td>
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<tr>
<td>Streptococcus suis</td>
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<tr>
<td>Swine Delta coronavirus</td>
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<tr>
<td>Swine Influenza Virus, matrix, H1N1, H3N2 and pH1N1-09</td>
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<tr>
<td>Taura Syndrome Virus (TSV)</td>
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<td>Tenacibaculum maritimum (formerly F. maritimus)</td>
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<tr>
<td>Torovirus-Bovine</td>
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<td>Torovirus-Porcine</td>
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<tr>
<td>Toxoplasma gondii</td>
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<tr>
<td>Virus/Microbial Pathogen</td>
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<td>------------------------------------------------</td>
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<tr>
<td>Transmissible Gastroenteritis Virus</td>
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<tr>
<td>Trichomonas gallinae</td>
</tr>
<tr>
<td>Tritrichomonas foetus</td>
</tr>
<tr>
<td>Turkey Coronavirus</td>
</tr>
<tr>
<td>Ureaplasma diversum</td>
</tr>
<tr>
<td>Viral Hemorrhagic Septicemia Virus</td>
</tr>
<tr>
<td>West Nile Virus</td>
</tr>
<tr>
<td>Western Equine Encephalomyelitis</td>
</tr>
<tr>
<td>White Spot Syndrome Virus (WSSV)</td>
</tr>
<tr>
<td>White Sturgeon Herpesvirus 1&amp;2 (Acipenserid herpesvirus 1&amp;2)</td>
</tr>
<tr>
<td>White Sturgeon Iridovirus (WSIV)</td>
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<tr>
<td>Yellow Head Virus (YHV)</td>
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<tr>
<td>Yersinia ruckeri</td>
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</tbody>
</table>
Serology

The Serology section of the Animal Health Centre offers serological testing for a wide range of avian and mammalian pathogens primarily utilizing ELISA (Enzyme Linked Immunosorbent Assay) methods.

In addition to routine diagnostic testing, the Serology section undergoes proficiency testing conducted by the Canadian Food Inspection Agency, National Centre for Foreign Animal Disease and the USDA's National Veterinary Services Lab.

The Serology section is accredited by the CFIA for Equine Infectious Anemia and Brucellosis (BPAT) testing. This lab is also an approved Johne's disease (*M. avium subsp. paratuberculosis*) testing lab, having successfully passed NVSL serology panels since 1999.

Serology Samples - Submission Requirements

Serological tests can be used to determine:

1. if an animal has been infected by a particular pathogen
2. if a specific pathogen is linked to a clinical disease
3. if an animal has elicited an antibody response following vaccination

A single serum sample from an animal provides some indication of exposure to a pathogen at a point in time. However, paired serology on 5-10 age matched cohorts including clinically affected and apparently healthy animals is necessary to assess the potential disease dynamics within a group of animals. Acute and convalescent-phase sera collected from the same animal constitute paired sera. The acute-phase serum is taken as soon as the animal first develops clinical signs and the convalescent-phase samples usually at least 2 weeks later. Paired sera should be submitted together.
Enzyme linked immunosorbent assay (ELISA), Agar Gel Immunodiffusion (AGID), hemagglutination inhibition (HI) and virus neutralization (VN) are the major serological assays performed at the Animal Health Centre. Additionally, the Animal Health Centre performs radial immunodiffusion (RID) assay for total antibody quantification in cattle and horses.

**Guidelines for Serum Samples**

Quality of serum samples submitted for serological assays can have a significant impact on final assay results. For example, hemolyzed or lipemic serum can lead to unreliable test results. Please use the following guidelines to submit serum samples to ensure timely service and accurate test results:

- Use only untreated serum tubes or serum separation tubes for collection.
- After collection keep the blood samples at room temperature until serum has separated from the clot (30-60 minutes).
- Centrifuge tubes to separate the serum from the clot. Pour or draw off serum into clean tubes.
- Submit serum only. Freeze and thaw cycles during shipping and/or storage can lead to hemolysis, if serum is not separated from the clot.
- Ship samples to the Animal Health Centre with ice packs to keep sera cold while in transit.
- If samples cannot immediately be transported to the Animal Health Centre, refrigerate the serum at 2–7°C for up to 5 days or freeze at 20°C for long-term storage. **DO NOT** freeze blood.
- Submit a minimum of 2 ml serum per animal for large animals and 0.5ml serum per bird for avian submissions.
- Outside of the tubes must be clean and dry to avoid contamination. Label large animal tubes with ID numbers using permanent marking pen on the side of the tube.
- Place the serum tubes in Styrofoam or cardboard boxes designed to hold the tubes. Do not submit in bags.
- When submitting more than 20 large animal samples at a time, please send an MS Excel file of the Animal IDs by e-mail to PAHB@gov.bc.ca. To do this, simply enter the animal IDs in a single column identified as “Animal ID”. The Animal Health Centre report will contain the IDs as entered in the file. Place sample tubes in the same order in the rack/box as in the MS Excel file.

**DO NOT** submit serum samples that are grossly hemolyzed (dark-red color) or lipemic (milky appearance).
Serology: Tests and Fees

Each test from the Serology lab costs $10.00 + tax unless otherwise indicated.

<table>
<thead>
<tr>
<th>Test</th>
<th>Test</th>
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<tbody>
<tr>
<td>Avian Adenovirus Group 1 AGID</td>
<td>Immunoglobulin-Bovine IgG, IgM-by RID</td>
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<tr>
<td>Avian Encephalomyelitis (AE) ELISA*</td>
<td>Immunoglobulin-Equine IgG, IgM-by RID</td>
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<tr>
<td>Avian Influenza (A1) AGID</td>
<td>Immunoglobulin-Porcine IgG by RID</td>
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<td>Avian Influenza (A1) ELISA*</td>
<td>Infectious Bovine Rhinotracheitis (IBR) Virus (BHV-1) VN</td>
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<td>Avian Paramyxovirus 3 (PMV3) HI</td>
<td>Infectious Bronchitis Virus (IBV) ELISA*</td>
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<td>Avian Reovirus (REO) ELISA*</td>
<td>Infectious Bursal Disease (IBD) ELISA*</td>
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<tr>
<td>Blue Tongue Virus (BTV) (ELISA)</td>
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<tr>
<td>Bordetella avium ELISA*</td>
<td>Infectious Laryngotracheitis (ILT) ELISA*</td>
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<tr>
<td>Bovine Leukemia Virus (BLV) ELISA</td>
<td>Mink Distemper Virus (CDV) -VN</td>
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<tr>
<td>Bovine Parainfluenza Virus Type-3 VN</td>
<td>Mycobacterium paratuberculosis (Johne’s) ELISA</td>
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<tr>
<td>Bovine Respiratory Coronavirus VN</td>
<td>Mycoplasma gallisepticum (MG) ELISA*</td>
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<td>Bovine Respiratory Syncytial Virus (BRSV) VN</td>
<td>Mycoplasma gallisepticum (MG) HI</td>
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<td>Bovine Viral Diarrhea Virus (BVDV) Type 1&amp;2 VN</td>
<td>Mycoplasma meleagris (MM) ELISA*</td>
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<td>Brucella BPAT CFIA form 5159 or 5473 required</td>
<td>Mycoplasma synoviae (MS) ELISA*</td>
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<td>Canine Distemper Virus (CDV) VN</td>
<td>Mycoplasma synoviae (MS) HI</td>
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<td>Caprine Arthritis Encephalitis (CAE) ELISA</td>
<td>Neospora caninum ELISA</td>
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<td>Chick Anemia Virus (CAV) ELISA*</td>
<td>Newcastle Disease Virus (NDV) ELISA*</td>
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<td>Clostridium difficile Toxin A&amp;B ELISA</td>
<td>Newcastle Disease Virus (NDV) HI</td>
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<td>Coxiella burnetti (Q fever) ELISA</td>
<td>Ornithobacterium rhinotracheale (ORT) ELISA*</td>
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<tr>
<td>Equine Herpes Virus 1 (EHV-1) VN</td>
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<td>Equine Influenza Virus HI</td>
<td>Transmissible Gastroenteritis (TGE) Virus VN</td>
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<tr>
<td>Equine Viral Arteritis (EVA) VN</td>
<td></td>
</tr>
<tr>
<td>Hemorrhagic Enteritis Virus (HE) ELISA*</td>
<td></td>
</tr>
</tbody>
</table>

*Please note that Avian tests by ELISA have a $10.00 charge for the first sample for each test. Additional samples for the same test will be charged at 3 samples for $10.00. After the first sample, it is most cost effective to submit subsequent samples in groups of 3.

For example, the per test charge for 10 blood samples would be as follows: $10.00 for the first sample and 9 samples at $30.00 ($10.00 per 3 samples) = $40.00 per test. Multiply this by the number of tests requested for your total charge.
**Virology**

The diagnostic virology section of the Animal Health Centre offers an extensive and complete virology laboratory service for the detection of viral infections in domestic poultry, wild and exotic birds, food and fur bearing animals, companion animals, wild and zoological species, marine mammals and aquaculture salmonids.

The virology section performs virus isolation in cell culture and embryonated chicken eggs and uses techniques such as Electron Microscopy (EM), Fluorescent Antibody Test (FAT), Virus Neutralization (VN), Hemagglutination (HA) and Hemagglutination Inhibition (HI) for the detection of viruses, viral antigens and antibodies produced in response to viral infections.
Specimens for Virology and Molecular Diagnostics - Submission Requirements

Proper collection and handling of diagnostic specimens are critical for the success of virus detection and virus isolation techniques. As peak virus titers are usually present at the onset of clinical signs, diagnostic specimens for virus detection and virus isolation should be collected immediately after the animal first develops clinical signs. Collection of samples during the acute phase of viral infection usually provides sufficient amount of virus for detection by various assays. Samples collected later in the course of infection may lead to false negative results or misdiagnosis when secondary bacterial infection is involved.

The Animal Health Centre currently uses Polymerase Chain Reaction (PCR) assays, virus isolation, Electron Microscopy (EM), Fluorescent Antibody Test (FAT) for direct detection of viruses in clinical samples. Many of the samples used for PCR can also be used for virus isolation if collected and stored properly.

Collection and storage: Samples must be aseptically collected and kept refrigerated immediately after collection. Samples that cannot immediately be transported to the Animal Health Centre should be stored at 4°C for a maximum of two days. Samples must be kept frozen at –70°C or lower for long term storage. The use of ice pack refrigerants to keep the specimens cold while in transit is extremely important for virus detection. If specimens are frozen, they must remain frozen in transit and not be allowed to thaw out.

Swabs for virology testing (PCR, virus isolation and EM): Viral swabs can be submitted in virus transport medium (VTM) or Universal Transport Medium (UTM) or Brain Heart Infusion broth (BHI).

- Use only dry polyester or dacron swabs on plastic handles for collection and submission of swab samples for virus isolation and PCR tests.
- After thoroughly swabbing the area of interest, place the swab in the collection tube containing 3-5 ml of VTM or UTM or BHI and swirl vigorously.
- Squeeze the liquid off the swab (press and roll) along the inside wall of the tube and discard swab into a disinfectant solution.
- Securely close the cap and clean the outside of each tube and seal the tubes in plastic zip lock bags.
- Store swabs at 4°C and transport immediately to the Animal Health Centre.

DO NOT use: Cotton-tipped or calcium alginate swabs, swabs with wood or paper handles or swabs in bacterial transport media and agar may not be used. Residual bleach and other chemicals in cotton swabs and wooden handles and agar in the bacterial transport media can be inhibitory to PCR and may inactivate viruses.

Fresh tissues: Whenever possible, submit fresh tissues in a sterile, leak proof container for virus isolation and PCR assays. Autolyzed tissues are not suitable for virus isolation.
**Whole blood:** Use tubes containing anti-coagulants such as citrate (blue stopper), EDTA (purple stopper) or heparin (green stopper) and submit a minimum of 5 ml.

**Feces:** Submit approximately 10gm (10 – 20ml volume) in securely closed sterile container. Outer surfaces of the container must be clean and dry. Do not submit feces in plastic bags or gloves.

### Virology: Tests and Fees

<table>
<thead>
<tr>
<th>Test</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian Adenovirus Isolation</td>
<td>$40.00</td>
</tr>
<tr>
<td>Avian Beak and Feather Virus-EM</td>
<td>$47.00</td>
</tr>
<tr>
<td>Avian Enteric Viruses (Astro/Rota/Picorna/others)-EM</td>
<td>$47.00</td>
</tr>
<tr>
<td>Avian Herpes Virus (other) Isolation</td>
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<tr>
<td>Avian Influenza (A1) Virus Isolation</td>
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<td>Avian Paramyxovirus-1 (APMV-1) Newcastle Disease Virus) Isolation</td>
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<tr>
<td>Avian Pox Virus Isolation</td>
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<td>Avian Reovirus Isolation</td>
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<tr>
<td>Avian Yucaipa Virus (PMV2) Isolation</td>
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<tr>
<td>Bovine Adenovirus Isolation</td>
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</tr>
<tr>
<td>Bovine Enteric Viruses (Rota/Corona/Astro/others)-EM</td>
<td>$47.00</td>
</tr>
<tr>
<td>Bovine Herpes Mammalitis Virus-EM &amp; Isolation</td>
<td>$40.00</td>
</tr>
<tr>
<td>Bovine Papular Stomatitis Virus-EM &amp; Isolation</td>
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<tr>
<td>Bovine Parvovirus-EM</td>
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</tr>
<tr>
<td>Bovine Respiratory Syncytial Virus (BRSV) Isolation</td>
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<td>Bovine Rotavirus - EM</td>
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<td>Bovine Viral Diarrhea (BVD) Isolation</td>
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<td>Service</td>
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<tr>
<td>Canine Coronavirus-EM &amp; Isolation</td>
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<td>Canine Parainfluenza Virus Isolation</td>
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<tr>
<td>Canine Parvovirus-EM</td>
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<td>Contagious Ecthyma (ORF) POX-EM</td>
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<td>Duck Viral Enteritis (DVE) Isolation</td>
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<td>Duck Viral Hepatitis (DVH-1) Isolation</td>
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<tr>
<td>Electron Microscopy-All Other Animals</td>
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<td>Electron Microscopy-Production Animals</td>
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<tr>
<td>Equine Adenovirus (Resp. Disease) Isolation</td>
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<td>Equine Herpes Virus 4 Isolation</td>
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<tr>
<td>Feline Calicivirus Isolation</td>
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<td>Feline Coronavirus-EM</td>
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<tr>
<td>Feline Panleukopenia (Parvo) Virus Isolation</td>
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</tr>
<tr>
<td>Feline Viral Rhinotracheitis (Herpes) Isolation</td>
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</tr>
<tr>
<td>Fowl Pox Virus-EM</td>
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<td>Frog Iridovirus Isolation</td>
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<tr>
<td>Hemagglutinating Encephalomyelitis Virus (HEV) Isolation</td>
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<td>Hemorraghic Enteritis Virus (HE) Detection-EM</td>
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<td>Inclusion Body Hepatitis (Adenovirus) Isolation</td>
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<td>Infectious Bovine Rhinotracheitis (IBR)</td>
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<td>Isolation</td>
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<td>Infectious Bursal Disease (IBD) Isolation</td>
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<tr>
<td>Infectious Canine Hepatitis (ICH) Isolation</td>
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<td>Infectious Hematopoietic Necrosis Virus (IHN) Isolation</td>
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</tr>
<tr>
<td>Infectious Laryngotracheitis (ILT) Isolation</td>
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<tr>
<td>Infectious Pancreatic Necrosis Virus Isolation</td>
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</tr>
<tr>
<td>Infectious Salmon Anemia Isolation</td>
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</tr>
<tr>
<td>Mink Distemper Virus (CDV) Isolation</td>
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</tr>
<tr>
<td>Mink Enteric Viruses (Rota/Corona) Isolation</td>
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</tr>
<tr>
<td>Pacheco’s Disease (Herpes) Virus Isolation</td>
<td>$50.00</td>
</tr>
<tr>
<td>Phocid Morbillivirus Isolation</td>
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</tr>
<tr>
<td>Porcine Enteric Viruses (Corona/Rota/Astro)-EM</td>
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</tr>
<tr>
<td>Porcine Parvovirus Isolation</td>
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<tr>
<td>Porcine Pox Virus-EM</td>
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<tr>
<td>Quail Bronchitis (Adenovirus) Isolation</td>
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<tr>
<td>Rabbit Herpes Virus Isolation</td>
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<tr>
<td>Rabbit Papova Virus-EM</td>
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<tr>
<td>Swine Influenza Virus Isolation</td>
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<tr>
<td>Torovirus (Breda) Isolation</td>
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<tr>
<td>Transmissible Gastroenteritis (TGE) Virus-EM</td>
<td>$47.00</td>
</tr>
<tr>
<td>Vesicular Stomatitis Virus Isolation</td>
<td>$40.00</td>
</tr>
<tr>
<td>Viral Hemorrhagic Septicemia Virus (VHS) Isolation</td>
<td>$40.00</td>
</tr>
</tbody>
</table>

*Where applicable, each test includes cell culture, egg inoculation, and fluorescent antibody testing.*
External Testing and Fees

While the Animal Health Centre is the leading accredited full-service veterinary laboratory in Western Canada some tests are not available at this facility. For external testing and shipping please observe the following fees.

External Lab Testing - Client Requested

<table>
<thead>
<tr>
<th>Administrative fee for forwarding specimens</th>
<th>Within British Columbia</th>
<th>$7.00/pkg of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To other provinces</td>
<td>$40.00/pkg of samples</td>
</tr>
<tr>
<td></td>
<td>Outside of Canada</td>
<td>$49.00/pkg of samples</td>
</tr>
</tbody>
</table>

Courier fees

At cost

External lab to bill client directly for testing fees.
Notifiable Diseases

The *Animal Health Act* defines notifiable disease as follows:

A **notifiable disease** is an environmental toxin, infestation, syndrome or transmissible disease that is prescribed as a notifiable disease for the purpose of implementing monitoring measures:

(a) to determine its presence, identity, nature, effects or spread
(b) to avoid barriers to trade
(c) for other reasons in the public interest

The Reportable and Notifiable Diseases regulation requires that a report be made to the office of the Chief Veterinarian within 24 hours if you have reasonable grounds to suspect that a reportable or notifiable disease has occurred.

**Bee Diseases**

Infestations of the following are prescribed as notifiable diseases in respect of bees:

- *Acarine* disease (tracheal mite infestation)
- *Achroia grisella* (Lesser wax moth)
- *Galleria mellonella* (Greater wax moth)
- Varroa mite

Illness in bees caused by any of the following are prescribed as notifiable diseases

- Acute bee paralysis virus
- Black queen cell virus
- Chalkbrood
- Deformed wing virus
- European foulbrood
- Israel acute paralysis virus
- Kashmir bee virus
- Nosema disease
- Sacbrood disease virus
- Varroa destructor virus
Bird Diseases
The following are prescribed as notifiable diseases in respect of birds:
- Avian chlamydiosis caused by *Chlamyphila psittaci*
- Influenza A in poultry, other than as described in section 1 (1) (b) or (2) of Appendix 1
- Fowl cholera caused by *Pasteurella multocida*
- Fowl pox

Cattle Diseases
The following are prescribed as notifiable diseases in respect of cattle:
- Bovine trichomoniasis
- Bovine genital campylabacteriosis

Crustacean Diseases
The following are prescribed as notifiable diseases in respect of crustaceans:
- Crayfish plague caused by *Aphanomyces astaci*
- Infectious hypodermal and haematopoietic necrosis caused by infectious hypodermal and haematopoietic necrosis virus
- Infectious myonecrosis caused by infectious myonecrosis virus
- Necrotizing hepatopancreatitis
- White tail disease caused by *Macrobrachium rosenbergii* nodavirus and extra small virus

Finfish Diseases
The following are prescribed as notifiable diseases in respect of finfish:
- Bacterial kidney disease caused by *Renibacterium salmoninarum*
- Enteric red mouth disease caused by *Yersinia ruckeri*
- Epizootic ulcerative syndrome caused by *Aphanomyces invadans*
- Furunculosis caused by *Aeromonas salmonicida*
- Gyrodactylosis caused by *Gyrodactylus salaris*
- Oncorhynchus masou virus disease caused by *Oncorhynchus Masou* virus
- Red sea bream iridoviral disease caused by Red Sea bream iridovirus
- Streptococcosis caused by *Streptococcus iniae*
- Viral haemorrhagic septicaemia
**Horse Diseases**
The following are prescribed as notifiable diseases in respect of horses:
- Equine herpes myeloencepalopathy
- Equine rhinipneumonitis
- Equine viral arteritis

**Mollusc Diseases**
Illness in molluscs caused by any of the following is prescribed as a notifiable disease:
- *Bonamia exitiosa*
- *Bonamia roughleyi*
- *Marteilia sydneyi*

The following are prescribed as notifiable diseases in respect of molluscs:
- Abalone viral mortality caused by abalone hepes-like virus
- Brown ring disease caused by *Vibrio tapetis*
- QPX caused by quahog parasite unknown
- Seaside organism disease caused by *Haplosporidium costale*
- Withering syndrome of abalone caused by *Xenohaliotis californiensis*

**Swine Diseases**
The following are prescribed as notifiable diseases in respect of swine:
- Swine delta coronavirus
- Influenza A
- Porcine epidemic diarrhea
- Transmissible gastroenteritis

**Diseases Affecting Multiple Species**
The following are prescribed as notifiable diseases in respect of any animal:
- Anaplasmosis
- Epizootic hemorrhagic diseases
- Johne’s disease
- Lyme disease caused by *Borrelia burgdorferi*
- Malignant catarrhal fever
- Rocky Mountain spotted fever caused by *Rickettsia rickettsii*
- *Salmonella* Dublin
- *Salmonella* Enteritidis
- *Salmonella* Heidelberg
- *Salmonella* Typhimurium
- West Nile Virus

Salmonella is prescribed as a notifiable disease if found in an environmental sample taken in a place where an animal is, or has been, housed.
Reportable Diseases

The *Animal Health Act* defines reportable disease as follows:

a **reportable disease** is an environmental toxin, infestation, syndrome or transmissible disease that is prescribed as a reportable disease for the purpose of implementing preventive, control or eradication measures:

(a) to safeguard animal health  
(b) to safeguard public health in relation to environmental toxins, infestations, syndromes or transmissible diseases that are or may be transmissible from animals to humans  
(c) to avoid barriers to trade  
(d) for other reasons in the public interest

Reportable diseases include transmissible diseases, environmental toxins, infestations and syndromes. Some reportable diseases are zoonotic meaning they can be transmitted to humans.

The Reportable and Notifiable Diseases regulation requires that a report be made to the office of the Chief Veterinarian within 24 hours if you have reasonable grounds to suspect that a reportable or notifiable disease has occurred.

**Bee Diseases**

Infestations of the following are prescribed as reportable diseases in respect of bees:

- *Aethina tumida* (Small hive beetle)  
- *Apis cerana* (Eastern honey bee or Asian honey bee)  
- *Apis mellifera capensis* (Cape bee)  
- *Apis mellifera scutellata* (African honey bee)  
- *Apis vilutina* (Asian predatory wasp)  
- *Tropilaelaps clareae* (Asian bee mites)  
- *Vespa mandarinia* (Asian giant hornet)

Illness in bees caused by American foulbrood is prescribed as a reportable disease.

**Bird Diseases**

The following are prescribed as reportable diseases in respect of birds:

- Fowl typhoid caused by *Salmonella Gallinarum*  
- Any strain of H5 or H7 avian influenza A virus  
- Infectious laryngotracheitis
- *Mycoplasma gallisepticum*, but only in turkeys kept or dealt with for commercial purposes
- Newcastle disease
- Pullorum diseases caused by *Salmonella* Pullorum

Avian influenza A viruses other than strains of H5 or H7 are prescribed as reportable diseases in respect of birds if there is
- A positive influenza A matrix PCR result, and
- High flock morbidity showing severe clinical signs, including any of the following:
  - Signs of respiratory distress
  - Swelling of the sinuses or head
  - Reduced vocalization
  - A marked reduction in food or water intake
  - Cyanosis of the unfeathered skin, wattles and comb
  - Uncoordinated or nervous behaviour
  - Diarrhea
  - A marked drop in egg production
  - A high and rapidly escalating flock mortality

**Cattle Diseases**
The following are prescribed as reportable diseases in respect of cattle:
- Bovine cysticercosis
- Bovine spongiform encephalopathy
- Bovine tuberculosis caused by *Mycobacterium bovis*
- Contagious bovine pleuropneumonia
- Lumpy skin disease

**Crustacean Diseases**
The following are prescribed as reportable diseases in respect of crustaceans:
- Taura syndrome
- White spot disease
- Yellow head disease
**Finfish Diseases**
The following are prescribed as reportable diseases in respect of finfish:
- Ceratomyxosis caused by *Ceratomyxa Shasta*
- Epizootic haematopoietic necrosis
- Infectious haematopoietic necrosis
- Infectious pancreatic necrosis
- Infectious salmon anaemia
- Koi herpesvirus disease
- Spring viraemia of carp
- Whirling disease caused by *Myxobolus cerebralis*
- White sturgeon iridoviral disease

**Horse Diseases**
The following are prescribed as reportable diseases in respect of horses:
- African horse sickness
- Contagious equine metritis
- Eastern, Western and Venezuelan equine encephalomyelitis
- Equine infectious anaemia
- Equine piroplasmosis caused by *Babesia caballi* or *Theileria equi*.

**Mollusc Diseases**
Illness in molluscs caused by any of the following is prescribed as a reportable disease:
- *Bonamia ostreae*
- *Marteilia refringens*
- *Marteiliodes chungmuensis*
- *Mikrocytos mackini*
- *Perkinsus marinus*
- *Perkinsus olseni*

MSX disease caused by *Haplosporidium nelsoni* in molluscs is prescribed as a reportable disease.
**Sheep and Goat Diseases**  
The following are prescribed as reportable diseases in respect of sheep and goats:  
- Peste des petits ruminants  
- Scrapie  
- Sheep and goat pox

**Swine Diseases**  
The following are prescribed as reportable diseases in respect of swine:  
- African swine fever  
- Classical swine fever  
- Swine vesicular disease

**Diseases Affecting Multiple Species**  
The following are prescribed as reportable diseases in respect of any animal:  
- Anthrax  
- Bluetongue  
- Brucellosis caused by *Brucella abortus, melitensis, ovis* or *suis*  
- Chronic wasting disease or cervids  
- Foot and mouth disease  
- Plague caused by *Yersina pestis*  
- Pseudorabies  
- Q Fever caused by *Coxiella burnetti*  
- Rabies  
- Rift Valley fever  
- Rinderpest  
- Trichinellosis caused by *Trichinella spiralis*  
- Tularaemia caused by *Francisella tularensis*  
- Vesicular stomatitis

The following zoonotic viral hemorrhagic fevers are prescribed as reportable diseases in respect of any animal:  
- Arenaviruses Chapare, Guanarito, Junin, Lassa, Lujo, Machupo and Sabia
• Bunyaviruses
• Filoviruses Ebola and Marburg
• Flaviviruses Kyasanur forest disease virus, Omsk hemorrhagic fever and yellow fever
• Hantaviruses Dobrava, Haantan, Puumala, Saaremaa and Seoul
• Nairovirus Crimean-Congo hemorrhagic fever

Without limiting the mandatory reporting section of the Act, an illness affecting any animal that is known to be, or that may be, zoonotic in nature is prescribed as a reportable disease if any of the following signs or indicators are present:

• the illness has never, or has rarely been, observed in British Columbia.
• the illness appears in a species in which the disease has never, or has rarely, been observed.
• the illness has, or appears to have, a higher pathogenicity than usual.
• An illness in any animal is prescribed as a reportable disease if clusters of the illness include more animals, appear more frequently, or appear over a larger geographic area than usual.

Illness in any animal caused by any of the following environmental toxins is prescribed as a reportable disease:

• asbestos
• creosote
• dioxins
• fuel, if it contains, or may contain, a substance that is toxic to animals
• lead
• Poly-chlorinated Biphenyls (PCBs)
Salmonella Enteritidis Facts for Small Flock Owners

What is Salmonella Enteritidis?

Salmonella Enteritidis or “SE” is a bacteria that can be present in live poultry and cause illness in people.

How does Salmonella spread to and affect poultry?

Poultry, including chickens and turkeys, can become infected with many strains of Salmonella, including SE. Salmonella bacteria are normal intestinal flora of poultry and their presence does not usually cause any signs of illness in poultry. In general, Salmonella bacteria are transmitted from one bird to another during contact with droppings (fecal - oral route); manure piles, dead carcasses, barn dust and rodents (rats and mice) can also be important sources of Salmonella for chickens.

How does Salmonella spread from chicks and poults to people?

People handling the chicks or poults can be infected with Salmonella when the bird or its droppings are exposed to a person’s mouth, eyes or nose (e.g. kissing birds, touching one’s face after handling birds or their environment). The risk can be reduced by avoiding close contact and thorough hand washing after handling the birds and anything the birds were in contact with such as water, feed, bedding, or housing.

How does Salmonella get into eggs?

Some types of Salmonella, such as SE, can infect hens reproductive tracts (ovary and oviduct). From the ovary, SE can contaminate the inside of an egg before the shell is formed. These eggs will not look or taste any different than other eggs. However, humans or other animals including pets can become ill after consuming contaminated eggs that are not cooked thoroughly. SE can also enter the egg from the outside of the shell if it is cracked. If an SE infected egg is fertilized and hatched, the baby chick can be infected, and will infect others around it.
**What should I do with the eggs from my flock?**

You cannot tell which eggs are contaminated with SE. All eggs should be stored under refrigeration and prepared so that both the white and yolk are cooked thoroughly (that is, both the yolk and white are cooked “hard”, not soft or runny). Cracked and/or dirty eggs should be discarded. Always wash your hands after handling or preparing eggs.

**What should I do with meat from my flock?**

All poultry should be properly butchered using hygienic techniques to reduce the level of contamination. Standard safe food preparation techniques should be used to further reduce the risk of foodborne illness. These techniques include thoroughly cooking poultry to an internal temperature of 74 - 85°C, (depending on the product), hand washing after contact with raw poultry, using only clean utensils and preparation surfaces which are cleaned after use to prevent cross-contamination of other foods.

**What should I do if I am selling my poultry or poultry products?**

Please ensure your customers are aware of the risks of SE and techniques to reduce the risks.

**In the future, how can I prevent and control SE in my flock?**

The focus should be first to prevent the entry of SE into the flock, second, to prevent carry-over into the next flock, and third, to reduce the risk of contaminated eggs. The following steps will significantly reduce the risk of Salmonella contamination of the flock and eggs.

- Purchase chicks or pullets from commercial sources like feed stores or hatcheries.
- Start and maintain an effective rodent control program.
- Restrict visitors to your farm, especially those who have been on other farms. Have clean boots for visitors so that they don’t track germs onto your farm.
- Remove manure routinely from the bird area.
- Carry out a thorough cleaning and disinfection prior to introduction of a new flock.
- Consult your veterinarian about these and other options to keep your birds healthy.
- Have an “all-in all-out” policy so that there is no contact between birds from the group going out of lay and the new flock.
Historic Information on West Nile Virus Infection in British Columbia

For current information on equine cases of West Nile Virus (WNV) please consult the equine disease report on our website: www.gov.bc.ca/animalhealthcentre. In the years since its initial North American detection in New York in 1999, West Nile Virus (WNV) has been reported throughout the United States and in most Canadian provinces. WNV is transmitted primarily to wild birds by infected mosquitoes. Mosquitoes can also transmit WNV to humans, horses and occasionally to other animals. The first evidence of WNV infections acquired in British Columbia (B.C.) was reported in 2009. The table below reports the number of WNV cases and the number tested in B.C. based on WNV surveillance since 2009.

Summary of Annual Number of WNV Positive Indicators (& Number Test1)

<table>
<thead>
<tr>
<th>Year</th>
<th>Humans</th>
<th>Mosquito Pools2</th>
<th>Birds</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>0 (219)</td>
<td>Not applicable</td>
<td>2 (37)</td>
<td>10</td>
</tr>
<tr>
<td>2015</td>
<td>0 (300)</td>
<td>Not applicable</td>
<td>0 (29)</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>0 (836)</td>
<td>0 (236)</td>
<td>0 (0)</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>1 (862)</td>
<td>1 (290)</td>
<td>1 (5)</td>
<td>1</td>
</tr>
<tr>
<td>2012</td>
<td>0 (438)</td>
<td>0 (1,912)</td>
<td>0 (22)</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>0 (415)</td>
<td>0 (2,282)</td>
<td>0 (40)</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>1 (325)</td>
<td>0 (2,092)</td>
<td>5 (233)</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>3 (379)</td>
<td>10 (2,482)</td>
<td>0 (144)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>5 (3,744)</td>
<td>11 (9,294)</td>
<td>8 (510)</td>
<td>15</td>
</tr>
</tbody>
</table>

1 A mosquito pool can contain up to 50 mosquitoes that are tested at one time. The number of horses tested is unknown.

2 In 2015, surveillance of mosquitoes for WNV was discontinued.

2016 was the first year positive WNV indicators were detected in the Kootenays (specifically the south Kootenays), with nine equine WNV cases and two WNV infected crows. The other 2016 equine case occurred in the Fraser Valley. A Kootenays equine case and the Fraser Valley case had arrived from Alberta and the United States, respectively so WNV infection of these horses outside of B.C. cannot be ruled out. Prior to 2016, all positive results in all species had been located in the Okanagan, with the exception of one horse located in the Fraser Valley. Although variable across the province and from year to year, typically June to September is the risk period for WNV infection. Positive indicators have been detected in B.C. in the months of August and September.

Detection of WNV in crows and other corvids (ravens, crows, magpies, jays), which are very sensitive to the infection, is often used as an early warning of its presence in mosquitoes. Since
April 2003, the Animal Health Centre has worked in close cooperation with the Canadian Wildlife Service of Environment Canada, and the B.C. Ministry of Forests, Lands and Natural Resource Operations.

The Ministry of Environment, British Columbia Centre for Disease Control (BCCDC) and the Regional Health Authorities monitor for the presence of the WNV in dead corvid species. Information on dead bird reporting in B.C., including online reporting by members of the public, is available at the Ministry of Environment website. In certain situations and areas, dead birds may also be tested.

Horses with WNV can exhibit a range of signs such as stumbling, confusion, listlessness, head pressing, lack of appetite, inability to stand, seizures and weakness. In severe cases (about 30%), horses that develop clinical signs will die or be euthanized. Although there is no specific treatment for the diseases, there are vaccines to prevent WNV in horses. Horse owners should consult with their veterinarian about WNV vaccination including timing of vaccination, routinely drain standing water around homes and barns to reduce mosquito breeding sites, and use insecticides according to the label when needed.

WNV is a B.C. provincially notifiable disease. The Public Health Veterinarian at the Animal Health Centre, on behalf of the province’s Chief Veterinarian, collects information on horses with WNV and shares this information with the BCCDC. As a federal immediately notifiable disease, laboratories suspecting or diagnosing a horse with WNV are required to contact the Canadian Food Inspection Agency (CFIA). Please see the CFIA WNV case definition for horses. The federal and provincial governments’ roles with notifiable diseases is limited to information collection for surveillance purposes, a regulatory response is not elicited.

Additional Information can be found on our website www.gov.bc.ca/animalhealthcentre
Wildlife Diseases of Concern

Bovine Tuberculosis

Bovine tuberculosis (BTB) is a highly contagious disease caused by *Mycobacterium bovis* bacteria. It can debilitate and kill bison, moose, deer, elk, goats and cattle. BTB can also infect people. Although rare, infections in people can lead to severe illness and even death.

This is a serious disease that has significant effects on agricultural economies, wildlife management and public health.

We do not know of any case of BTB in B.C. wildlife. However, there have been several recent cases in B.C. cattle, and in other places BTB has moved between wild animals and livestock.

Although we believe B.C. wildlife is at low risk for BTB, the B.C. Wildlife Health Program is concerned about the BTB cases in B.C. cattle. It is starting to collaborate with a number of interest groups, First Nations, the B.C. Ministry of Agriculture and the Canadian Food Inspection Agency to prove that no wildlife in B.C. have been infected with BTB. We cannot be sure that wildlife is free of BTB until we look for it.

How Can You Help?

Watch for signs of BTB, and report to the local conservation officer or the B.C. Wildlife Health Program. Please include photos if possible, and save any samples for testing.

If you are a hunter, please check the lungs and rib cage of every animal you field dress and butcher and look for signs of BTB which include

- Coughing and labored breathing, poor body condition (in late stage disease).
- Multiple round gritty lumps in lymph nodes, lungs and rib cage

If you hunt in Management Unit 8-23, please submit your deer head for testing.

Drop off locations in the North Okanagan:

- Any B.C. Wildlife or Conservation Officer Service office (during business hours)
- Sundowner Meats, 2611 Hwy 6, in Lumby
- RT Ranch Sausage and Custom Cutting, 39 Byers Road, off Highway 6, between Lumby and Cherryville
Chronic Wasting Disease
B.C. wildlife biologists are calling on hunters, especially in the Peace and East Kootenay regions to help monitor for chronic wasting disease (CWD), a deadly infection that affects the central nervous system of cervids - members of the deer family. The disease is widespread in the Canadian prairies and is moving west toward the B.C. border. The B.C. Wildlife Health Program has been monitoring for CWD since 2002 and has yet to find an infected animal in this province.

The disease is caused by an abnormal protein called a prion. These prions are transmitted through infected saliva, urine, feces, even plants and soil. Signs of infection in deer include weight loss, poor coordination, stumbling and trembling.

While it is similar to bovine spongiform encephalopathy - the so-called mad cow disease - there is no direct evidence that CWD can be transmitted to humans. That said, as a precaution, any animal suspected or confirmed to have CWD should not be eaten.

Hunters are asked to bring deer, moose and elk heads to drop off location (below) for testing. Meanwhile, anyone encountering a sick deer exhibiting the symptoms of CWD (thin, drooling, poor coordination, stumbling) should report it to the provincial Wildlife Health Program.

Drop off locations across B.C.:
Any B.C. Wildlife or Conservation Officer Service office (during business hours).

Peace Region
- North Peace Rod and Gun Club, Fort St John
- Peace Taxidermy, Hwy 29
- Richard's Meat, Pouce Coupe

Kootenay Region
- Gwinner's Country Butcher, Kimberley
- Rick’s Fine Meats, Cranbrook
- Wes's Country Meats, Fernie

Know the Risks
If you hunt in areas that CWD affects wild deer, do not bring an intact carcass or any high risk tissues (brain, spinal cord, lymph nodes, organs) back to B.C. This is prohibited by law (BC CWD Regulation). Human importation of infected tissue is the highest threat of introduction to B.C. wildlife.
White Nose Syndrome

White nose syndrome (WNS) is a rapidly spreading disease that causes high levels of mortality in bat populations. It is caused by a fungus (*Pseudogymnoascus destructans*).

Bats infected with WNS develop a white fungus on their nose and wing membranes during the hibernation period, although this fungus may not always be obvious on infected bats.

Since the winter of 2006, WNS has killed over 6 million bats in eastern North America but had not been detected in western North America. However, in March 2016 a single bat carrying the disease was found in Washington State; this is the first case west of the continental divide. It has not yet been detected in B.C.

WNS can be devastating to affected colonies with mortality rates of 80% to 100% in some cases. Steep bat population declines in eastern North America resulted in an emergency listing of Little Brown and Northern Bats under the federal Species at Risk Act in 2014.

Bats are important to both the environment and economy. Bats are major predators of invertebrates, helping to control forest, agriculture and urban pests. For example, endangered Little Brown Bats can eat 600 mosquitoes per hour. Researchers estimate that bats provide billions of dollars in pest control services annually in North America.

**Help Stop the Spread of White Nose Syndrome**

Humans may accidentally pick up and transport this fatal fungus. Therefore, protocols have been developed for how to decontaminate clothing and equipment that have been used in high-risk environments such as caves and mines or around bat habitats. Protocols should be followed by any person who is conducting work around bats and/or bat habitats.

Additionally, long distance transport vessels such as semi-trucks, RV campers, truck trailers, and cargo ships, can inadvertently transport infected bats into new areas. It is important to be vigilant about closing potential roosting sites (such as cargo hatches, trailers, storage cabinets) to bats at night. It is also important to look for roosting bats in corners and structural crevices of cargo holds and trailers if they have been left open overnight. Bats can also crawl into tent awnings and umbrellas to roost. It is important to unfurl such potential roost locations and check for bats before leaving a site.

The Province, in partnership with the B.C. Community Bat Program and other concerned groups, are asking the public to be on the lookout for dead or sick bats that may have contracted the invasive fungal disease that causes WNS.

**Please help by reporting bats that are flying or found dead, during winter and early spring to the B.C. Community Bat Program at 1 855 922-2287 or info@bcbats.ca**

Never touch a bat with your bare hands due to a risk of rabies. If you do find a dead bat, collect it in a plastic bag using leather gloves and label the bag with the date, location, your name and contact information, then put the bag in the freezer and contact the B.C. Community Bat Program.
Pneumonia in Wild Sheep

Pneumonia is the most prevalent and devastating disease syndrome in bighorn sheep. Some wild sheep populations have a history of large-scale die-offs because of pneumonia outbreaks. Some of these outbreaks happened directly after contact with domestic sheep or goats.

Historically, domestic sheep and goats have evolved in herd situations where these organisms are commonly found. Wild sheep are especially vulnerable to pneumonia as they have not had the same exposure. Domestic sheep and goats located near wild sheep territory can therefore pose a problem if not managed appropriately, with proper barriers to prevent interactions between wild and domestic species.
Q. What does the Animal Health Centre do?
A. The Animal Health Centre is a diagnostic laboratory that examines samples to discern cause of death, or determine the nature of an ailment that may be present in the sample.

Q. Do you only examine animals that are part of the agricultural industry?
A. No, the Animal Health Centre is happy to examine companion animals such as cats or dogs, zoo or aquarium species, as well as wildlife.

Q. Do you spay or neuter animals?
A. No, the Animal Health Centre is a diagnostic facility. We do not provide medical services to live animals.

Q. Can you expedite my requested testing and results?
A. No, depending on the nature of your requested test proper time must be allocated to ensure the integrity of the test and its results are as accurate as possible.

Q. Do you accept walk-in clients?
A. Yes, the Animal Health Centre is happy to accept walk-in clients both new and existing.