

Annual Report
2021-2022

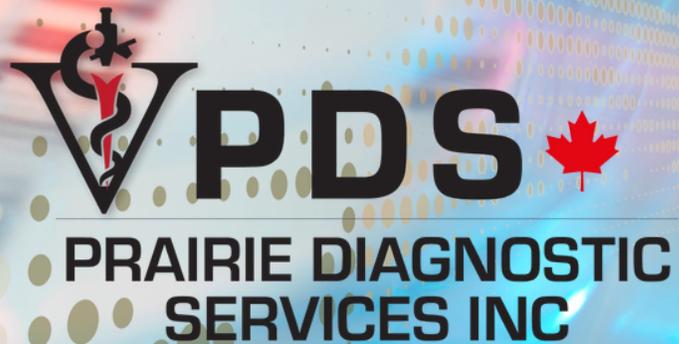




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- Our Core Values
 - Integrity
 - Respect
 - Teamwork
- Open Communications
- Service Excellence
- Innovation

Overview of **Prairie Diagnostic Services**

Prairie Diagnostic Services Inc. (PDS) is a non-profit corporation created by a partnership of the Province of Saskatchewan and the University of Saskatchewan. Located on the campus of University of Saskatchewan, PDS is dedicated to providing veterinary diagnostic services and is accredited by the Standards Council of Canada (SCC) to ISO/IEC 17025 standard for specific tests listed on our Scope of Accreditation and also fully accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD) for all species.

Our Vision

To better the health of animals, people, and the world, by applying laboratory testing, knowledge and expertise.

Our Motto

Healthier animals, healthier world.

Our Mission

Provide client-focused laboratory services and expertise in diagnostics, surveillance, teaching and research in support of animal health, public health, and environmental health, food safety and economic wellbeing.



Board of Directors



Dr. Wayne Lees

Chair of the Board
Chief Veterinary Officer of Manitoba (Retired)



Dr. Julie de Moissac

Vice-Chair of the Board
Veterinary Practitioner, Mixed Animal Practice
Bratton Road Vet Holdings



Dr. Barry Blakley

Faculty Member
Department of Veterinary Biomedical Sciences
Western College of Veterinary Medicine



Dr. Nancy deWith

Animal Health Veterinary Officer,
British Columbia
Canadian Food Inspection Agency /
Government of Canada



Dr. Grant Maxie

Director
Animal Health Laboratory
Laboratory Services
University of Guelph (Retired)



Mr. Robert Pentland

Director of Financial Services
Saskatchewan Ministry of
Agriculture



Dr. Susan Cork

Professor
Faculty of Veterinary Medicine
University of Calgary



Dr. William Murphy

Associate Professor
Edwards School of Business
University of Saskatchewan



Mr. Pat Pitka

Chief Financial Officer
Genome Prairie Inc.



Dr. Trent Wennekamp

Veterinary Practitioner
Mixed Animal Practice
Lloydminster Animal Hospital



Mr. Lee Whittington

CEO
Four Oaks Investments



Dr. Elemir Simko

Faculty Member
Department of Veterinary Pathology
Western College of Veterinary Medicine



Mr. Venkata Vakulabharanam

Executive Director - Livestock Branch
Saskatchewan Ministry of Agriculture



Mr. Derek Hoffman

Lawyer, Strategic Advisor and
Founder of Hoffman Group



Message from Board Chair

As the 2021-22 fiscal year ends and a new one begins, the PDS CEO, staff and leadership team have shown exceptional dedication and resilience in the face of yet another year of pandemic challenges. PDS staffers and professionals have continued to deliver top-quality animal health diagnostic services to western Canadian clients. This is reflected in recent client satisfaction surveys that showed PDS is held in very high regard by those it serves.

Despite challenges, over the last year, work has been underway to refine the focus of PDS and to help prepare it for the future. A recent strategic planning workshop, held under the able facilitation of Brooke Klassen from the Edwards School of Business, has been an important tool to help set the stage. Coming out of that session, it was agreed that, going forward, the key areas of focus will be on:

- enhancing the role of PDS in the animal and human health system, by taking a One Health holistic approach
- embarking on a process of continuous improvement, both in service delivery and in management of the organization
- enhancing client and stakeholder relationships, by seeking and creating opportunities for strategic collaborations
- promoting a healthy and vibrant work environment, by becoming an employer of choice
- embracing scientific excellence through innovation and research, and
- looking to the future, to ensure PDS remains at the forefront of the animal health early warning system for Canada.



As these aspirational goals are turned into concrete targets, I am very optimistic that PDS will continue to play a pivotal role in protecting the regional and national systems for animal health, food safety and veterinary public health.

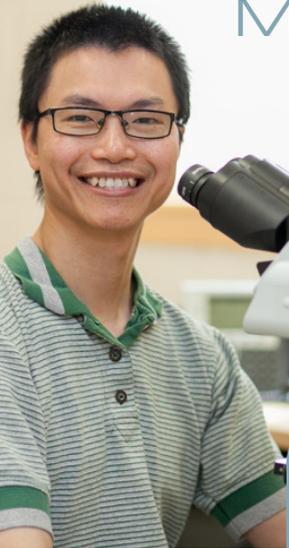
Following the annual general meeting in September of 2022, a number of board members will be ending their terms. I want to personally thank Dr. Susan Cook and Mr. Derek Hoffman for their excellent service and sage advice, and to welcome Dr. Susantha Gomis who is replacing Dr. Elemir Simko for a year, while he is on sabbatical leave. This will also be my last report as chair, as I too am stepping down at the end of this term. Dr. Julie de Moissac has graciously agreed to move up from vice-chair to assume the role of chair. Julie brings with her a wealth of experience, having served on many boards and committees in the world of veterinary medicine and beyond. Her wise counsel will be a tremendous asset to the smooth operation of the board going forward.

Finally, I want to say that serving on the PDS board of directors has been a real privilege. It's a great organization with a bright future. Thank you to all for making this a very rewarding experience for me for the last six years as a board member.

Dr. Wayne Lees, Chair
PDS Board of Directors



Message from CEO



PDS continued to provide top-quality diagnostic services. This is vital for the veterinary community, farmers, and animal owners. Our diagnostic results translate into clinical actions for prevention, therapy, and management of diseases.

Another fiscal year has ended for PDS. And for three consecutive years, the PDS team achieved strong operational results while fulfilling our mandates to provide animal health laboratory services, and to support research and teaching. Workforce challenges had been one of the common pains while organizations are operating in the current public health reality. The PDS team endured and persevered through this year. Such dedication is one single most significant factor for the success in recent years.

agencies use our test results to make important decisions during the outbreak. This is yet another vivid demonstration of the strategic importance of PDS to the economy and society.

One highlight of this year is the offering of the endocrinology tests. Supported by Prairies Economic Development Canada, PDS was able to purchase state-of-the-art equipment to conduct endocrinology tests. This is a strong addition to our already comprehensive testing portfolio.

PDS completed the Strategic Plan 2022-2025. Focuses on clients, innovation, partnerships and organizational excellence has been reaffirmed, while goals, objectives and actions are designed under these areas. This strategic cycle is important to prepare PDS for the changing animal health landscape, in which animals are becoming healthier and healthier, while decentralized tests are more and more available. The focus of laboratories will transition from sickness to health and from conducting to creating tests.

Our new vision statement is “To better the health of animals, people, and the world, by applying laboratory testing knowledge and expertise”, which describes very well the inspiration and potential of PDS. Healthier animals, healthier world. This is what PDS can help society to achieve!

Dr. Yanyun Huang
Chief Executive Officer
Prairie Diagnostic Services Inc.

Individual diagnostic data is also utilized as intelligence through our participation in various surveillance initiatives, such as the Western Canadian Animal Health Network (WeCAHN), Canadian Animal Health Surveillance System (CAHSS) and Western Canadian Swine Intelligence Network (CWSHIN), among others.

At the time of writing, Canada is still experiencing an outbreak of Highly Pathogenic Avian Influenza. PDS is an integral part of the response to this outbreak. The team anticipated the outbreak before it occurred and made important adjustments to ensure testing capacity is adequate. Veterinarians, farmers, and government



What do our clients say?

PDS continues to receive strong positive client feedback. This year, our Net Promoter Score is 40, a 6 point improvement from last year's result, which was already considered a good score. Here are some of our clients' comments:

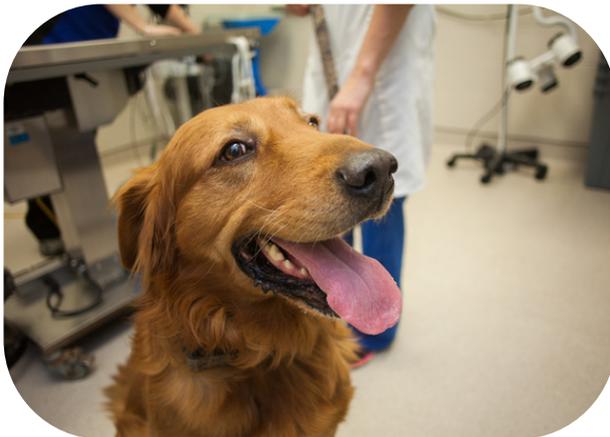
"Great customer service with friendly staff. Prompt results that are updated if necessary. Access to a great variety of tests."

"PDS is easy to deal with and provides fast results."

"Website is easy to use and when we have problems or questions, no one at PDS minds if we call with a question and we love this. :)"

"Pathology reports are more detailed."

"I really appreciate the small staff in reception - the fact that when I call I am most always going to speak to either Leslie, Doug or Pauline. I feel like I sorta 'know' them after all these years and that's nice. Also, I like getting an answer when I phone, and not having to go through a message and pressing various different buttons on my phone to finally be able to speak to a human, and then having them tell me that I actually have the wrong department, etc., etc."



Year at a Glance

131,669 tests conducted



5 tests developed or improved

14,198 tests for regulated diseases



\$548,838 equipment investment

11 peer-reviewed publications

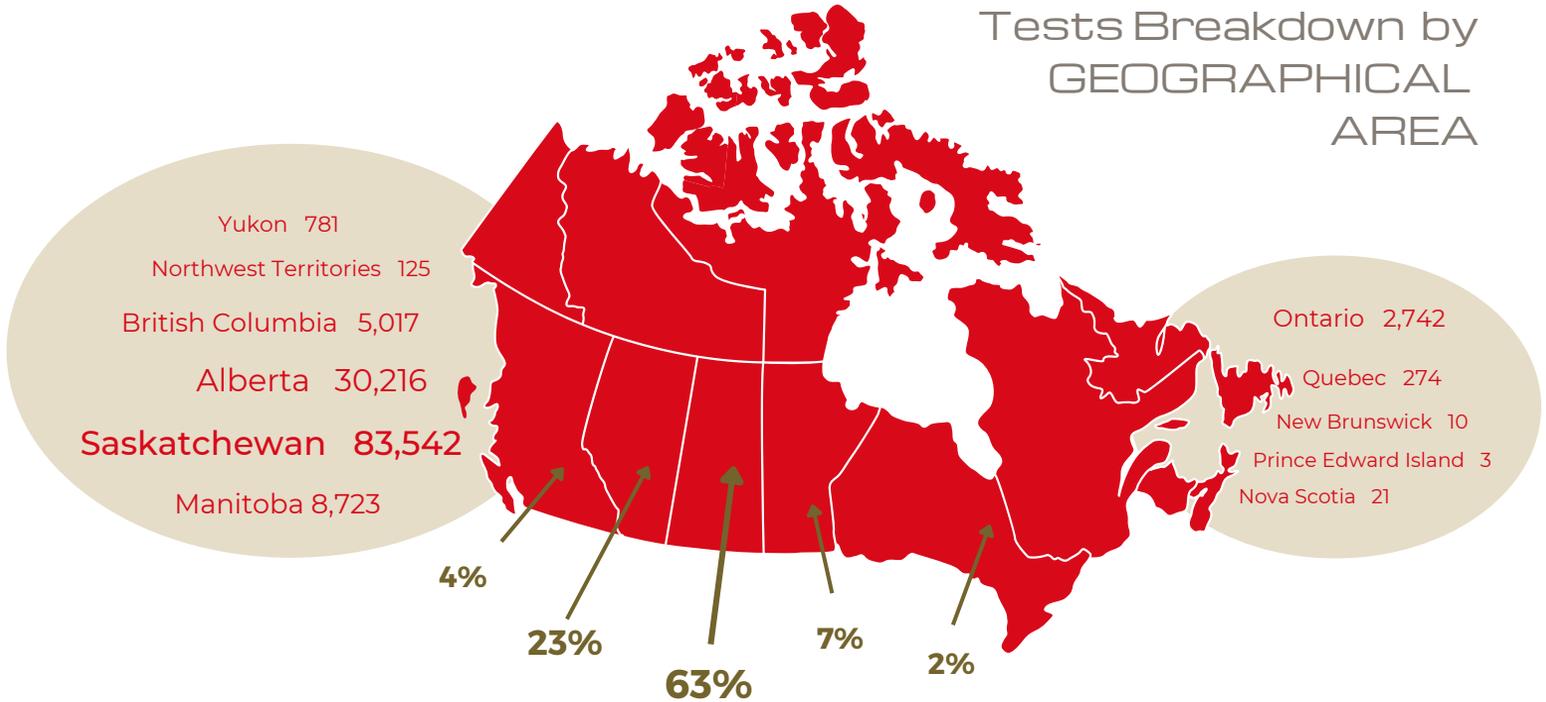


Net promoter score from client survey: 40



Diagnostics

Tests Breakdown by GEOGRAPHICAL AREA



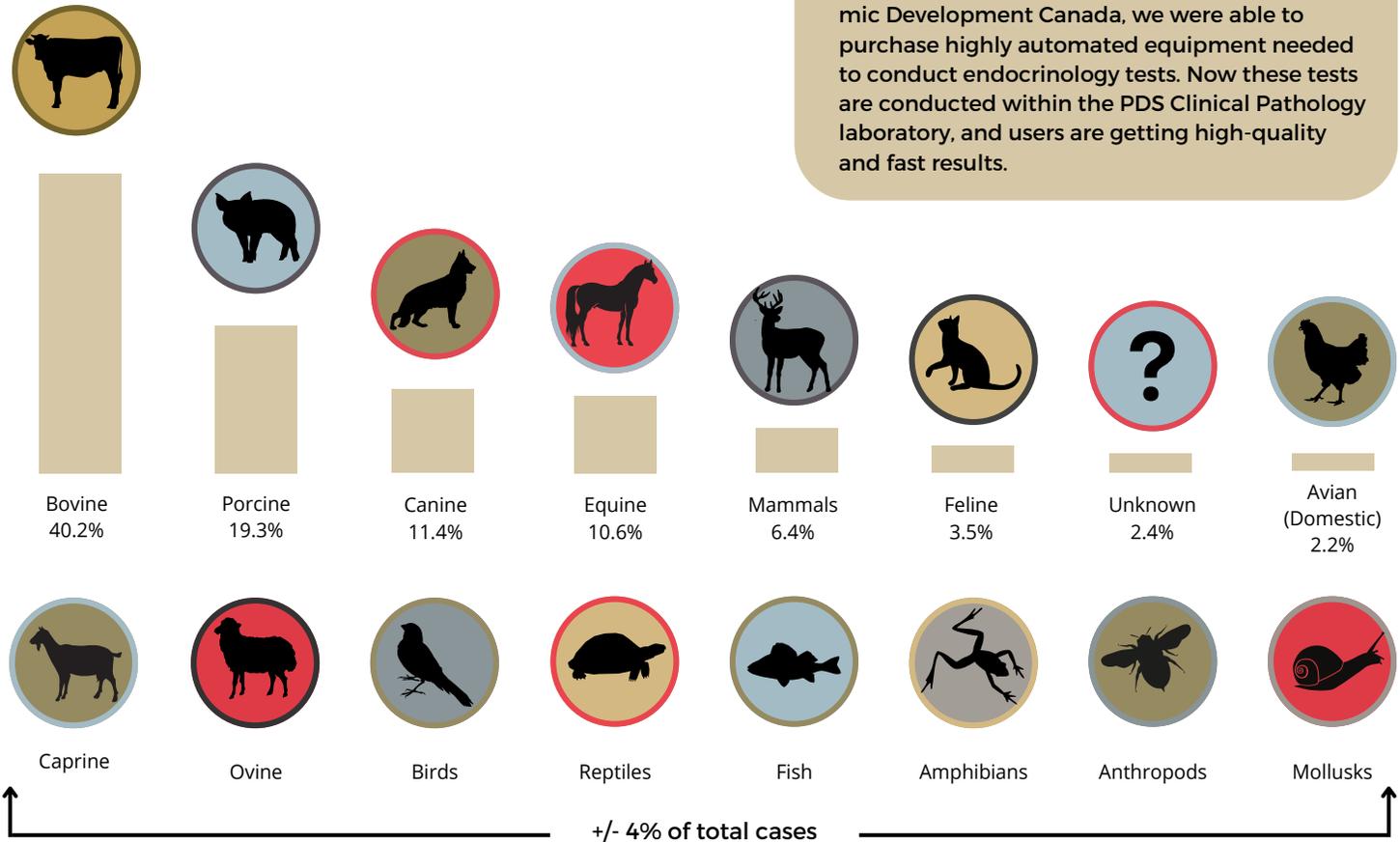
Between May 2021 and April 2022, PDS received about 42,000 cases, and conducted close to 132,000 tests, which represent a stable testing activity. The prairie provinces (Saskatchewan, Alberta, and Manitoba), which compose 93% of the total submissions, continue to be the main geographical areas that PDS serves. PDS also occasionally supports other Canadian provinces and conducts small numbers of digital pathology internationally.



Noteworthy this year is the devastating flood in BC causing their laboratory shutdown. PDS, and other Canadian publicly funded laboratories, provided needed diagnostic supports to the BC veterinarians, animal owners and industries during the shutdown.

PDS continues to provide diagnostic services for all species to veterinary communities. The top four species PDS serves are bovine, porcine, equine, and canine, comprising a total of 81% of samples.

Tests Breakdown by SPECIES



The test development of this year focused on endocrinology. New analytes include T4, TSH, Cortisol, phenobarbital, and progesterone. More analytes are in the development process. PDS previously contracted these tests to another laboratory. With the support of Prairies Economic Development Canada, we were able to purchase highly automated equipment needed to conduct endocrinology tests. Now these tests are conducted within the PDS Clinical Pathology laboratory, and users are getting high-quality and fast results.

Applied Research

In 2021, Prairie Diagnostic Services applied research portfolio has expanded with a significant award from the Saskatchewan Agriculture Development Fund. Bovine Reproductive Sequencing panel (BovReproSeq) development project (\$240,000 funding; principal investigator Dr. Yanyun Huang) which aims to provide a comprehensive one-for-all bovine reproductive failure investigation support.

“Genomic ASSETS (Antimicrobial Stewardship Systems from Evidence-based Treatment Strategies) for livestock” core activities have culminated in 2021 with over 3000 samples collected and processed by PDS to form the future foundation of rapid genomics-based Bovine Respiratory Disease diagnostic service.

The work has started on the design and implementation of a high-throughput automated molecular diagnostic laboratory under the “IntegrOMES” (Integrated Genomics for Sustainable Agriculture and Environmental Stewardship) initiative. The PDS team in partnership with the National Centre for Foreign Animal Diseases at the National Microbiology Laboratory (NCFAD NML) has identified Hamilton NGS STAR robotic

platform to become a centerpiece for this progressive workflow. The robot installation and commissioning are in progress as of the time of this report.

With the ongoing evolution of Mitacs programs, PDS has been qualified as an eligible industry partner for the “Mitacs Accelerate” funding. To enhance our capacity for applied research, PDS had entered into partnership agreements with the University of Saskatchewan and Simon Fraser University to host postdoctoral fellows who will be working under the PDS professionals’ supervision within the existing projects portfolio.

To support the novel genomics-based services and enhance the value proposition for research and clinical clients, PDS is investing in expanding the bioinformatic support capacity. BioSeqDB system has been envisioned, designed, and implemented in collaboration with the Simon Fraser University team, led by Dr. William Hsiao, to serve as a production environment for all the PDS sequencing data management and analysis.

In 2021, PDS has added a second high-performance server to support the growing demand for sequencing data management and analysis. This critical infrastructure is an organic extension of the PDS Laboratory Information Management System (LIMS) required for a modern diagnostic laboratory to function.

Other notable applied research milestones in 2021 include the PDS collaboration with Dr. Janet Hill to investigate novel antimicrobial resistance mechanisms in *Mannheimia haemolytica*, Saskatchewan Agriculture Development Fund award to a group led by Dr. Sarah Wood to develop antimicrobial control of European foulbrood in the Western Canadian beekeeping industry, and the PDS collaboration with Dr. Behzad Toosi on developing Artificial Intelligence application for early canine cancers detection based on routine clinical pathology data.



Surveillance

Animal health surveillance is a distinct element of the PDS core mandate. In 2021 PDS stepped up to support several animal health surveillance programs in Alberta and British Columbia due to unexpected setbacks with the respective local veterinary laboratory capacity. Special recognition goes to the PDS project management and bacteriology laboratory teams for responsive set up and successful management of the extensive British Columbia Salmonella in poultry surveillance program.

PDS continues to serve as a home base for the Western Canadian Animal Health Network (WeCAHN). Governments of the four Western provinces (Manitoba, Saskatchewan, Alberta, and British Columbia) in partnership with livestock industries have confirmed their commitment to WeCAHN by supporting a second funding cycle after the original project funding sunset.

In 2021, WeCAHN added a Small Ruminant Network which held its first meeting in October of 2021. The event was well received and followed an established format with discussion of a current clinical impressions survey between private veterinary practitioners, representatives from the western veterinary diagnostic laboratories, the two western veterinary colleges, provincial veterinarians, and industry. In response to an identified need for Knowledge Translation Tool describing prudent antimicrobial use and outlining some common diseases, WeCAHN is drafting a series of infographics on selected disease topics, with the generous support of the Canadian Animal Health Surveillance System.

WeCAHN Beef Network participants discussed a case series of neonatal hepatic necrosis identified in prairie beef calves in the spring of 2022, first at an ad hoc meeting of laboratorians and provincial veterinarians and veterinary faculty, and then at the beef network meeting. Work is ongoing to identify cause(s).

The Beef Network worked through a series of online meetings and questionnaires in the fall of 2021, to identify topics of greatest priority to network members. Most highly prioritized outcomes were emerging diseases, defined as a disease occurring for the first time in a location, or increasing in frequency, or appearing in a new population; bovine tuberculosis, pre-weaning bovine respiratory disease; calf mortality; antimicrobial resistance; Johne's disease, calf diarrhea, Foot and Mouth Disease, and Salmonella spp.

WeCAHN Dairy Network has had ongoing discussions over the winter and spring regarding the impacts of extreme weather on dairy health in the west, from transmission of pathogens such as Salmonella, to increased cases of Clostridial diseases.

WeCAHN Poultry Network had demonstrated its great value to the industry, practitioners, and governments through the Highly Pathogenic Avian Influenza outbreak in the spring of 2022. Over 100 participants attended an information webinar on HPAI for small-scale flocks co-hosted by WeCAHN in March 2022 just prior to the first detection of HPAI in western commercial poultry. WeCAHN continues to host listservs for veterinary practitioners serving small-scale producers and has recently compiled a public listing of practitioners/practices in western Canada accepting small-scale clients.

WeCAHN is working on using Statistical Process Control (SPC) charts to visualize the PDS data over time, identify outliers, and possibly identify trends. Recently this work has been expanded to fitting time series models (ARIMA and Holt-Winter smoothers), which allows the option of forecasting as well as studying historical trends.



Quality Assurance

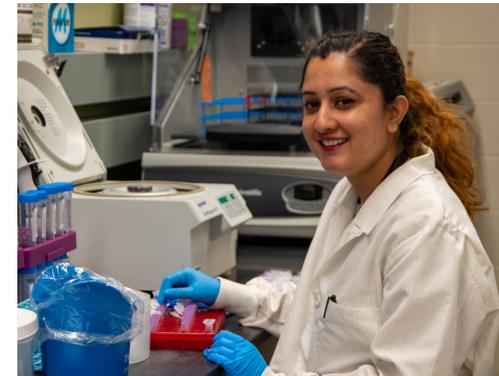


PDS implements a Quality Management System in accordance with the current version of the ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories, Standards Council of Canada, and the current version of the standard AAVLD Requirements for an Accredited Veterinary Medical Diagnostic Laboratory, American Association of Veterinary Laboratory Diagnosticians, Inc.

The laboratory participates in proficiency test programs, inter-laboratory comparisons, and in-lab assessments to ensure the standard of testing expertise is maintained.

Highlights from the 2021-2022 year include:

- The Standards Council of Canada conducted a three-day virtual audit in November 2021 with the Microbiology Laboratory. The laboratory was audited based upon the technical and management requirements of the ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories standard.
- Successful re-accreditation of the Prairie Diagnostic Services – Microbiology section was granted and the Scope of Accreditation was updated in April 2022.



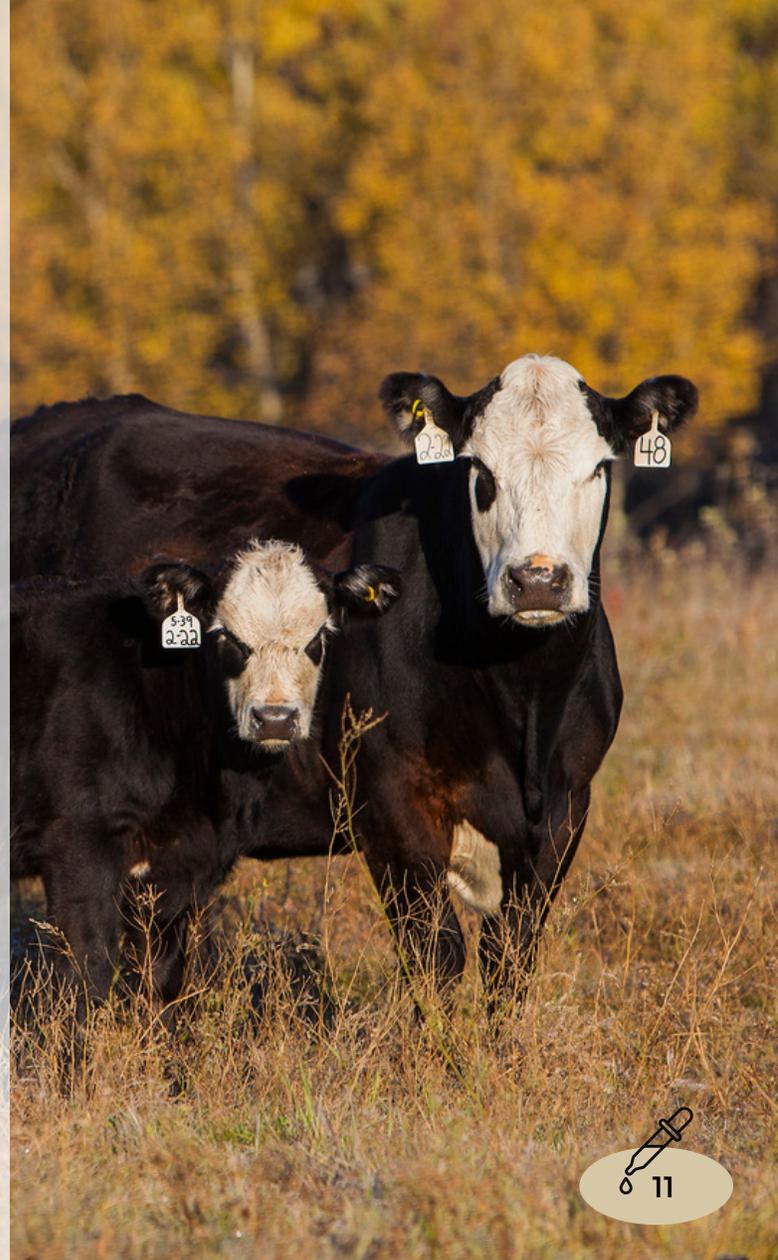
Looking Forward

With all the achievements in recent years, PDS is facing a happy problem – because of the advancement of the veterinary profession, animals are healthier and healthier, and the need for testing sick animals may decrease.

This, on one hand, is a great phenomenon. It shows the positive impact of the veterinary profession, which PDS is proudly part of, on our society. On the other hand, if PDS does not adapt to this situation, the public funding's efficiency may be affected.

PDS is preparing itself through the current strategic cycle for a healthier world. We are increasing our focus towards health, while maintaining excellent diagnostic expertise as a critical public resource. We are diversifying into underserved yet important sectors and areas in the prairies. Test development and projects will also gear towards the need for prevention, health monitoring and surveillance.

With an excellent and dedicated team, PDS is bettering the health of animals and the world!



Journal Publications

Zabrodski, M. W., DeBruyne, J. E., Wilson, G., Moshynskyy, I., Sharafi, M., Wood, S. C., ... & Simko, E. (2022). Comparison of individual hive and apiary-level sample types for spores of *Paenibacillus* larvae in Saskatchewan honey bee operations. *Plos one*, 17(2), e0263602.

Zhang, M., Liu, C. C., Huang, Y., Hill, J. E., Araya, M. B., Ojkic, D., & Gagnon, C. A. (2022). Phylogenetic analysis of porcine circovirus 3 circulating in Canadian pigs. *Veterinary Medicine and Science*.

Cherewyk, J. E., Parker, S. E., Blakley, B. R., & Al-Dissi, A. N. (2022). Sustained vascular contractile response induced by a R and S-epimer of the ergot alkaloid ergocristine, and attenuation by a non-competitive antagonist. *Journal of Animal Science*.

Sarich, J., Stanford, K., Schwartzkopf-Genswein, K. S., McAllister, T. A., Blakley, B., Penner, G. B., & Ribeiro, G. O. (2021). Effect of Ergot Alkaloids and a Mycotoxin Deactivating Product on in vitro Rumen Fermentation Using the Rumen Simulation Technique (RUSITEC). *Journal of Animal Science*, 99(Supplement_3), 78-78.

Fenton, H., Cluff, H. D., Blakley, B., & Rothenburger, J. L. (2022). Hepatic fibrosis and mineralization in a free-ranging barren-ground caribou (*Rangifer tarandus groenlandicus*) from the Northwest Territories. *The Canadian Veterinary Journal*, 63(2), 157.

Mayer, M. N., Sukut, S. L., Blakley, B., Waldner, C. L., Adesina, K., Belotta, A. F., & Koehncke, N. K. (2022). Workers should take steps to mitigate surface lead exposure when using lead-containing personal protective equipment. *Veterinary Radiology & Ultrasound*, 63(1), 23-29.

Chohan, M. R., Singh, J., Cowan, V. E., Munro, B. J., Blakley, B., McKinnon, J., & Anzar, M. (2021). Sustained low-dose ergot alkaloids minimally affect post-thaw sperm characteristics in mature and yearling Angus bulls. *Theriogenology*, 176, 163-173.

Cherewyk, J., Grusie-Ogilvie, T., Blakley, B., & Al-Dissi, A. (2021). Validation of a New Sensitive Method for the Detection and Quantification of R and S-Epimers of Ergot Alkaloids in Canadian Spring Wheat Utilizing Deuterated Lysergic Acid Diethylamide as an Internal Standard. *Toxins*, 14(1), 22.

Almoussa, A., Yonpam, R., Blakley, B., & Al-Dissi, A. N. (2022). Prolonged absorption and susceptibility to enterohepatic circulation after oral administration of ergot alkaloids in ewes. *Canadian Journal of Veterinary Research*, 86(2), 108-112.

Niroula, N., Lim, Z. L., Walker, S., Huang, Y., Gerds, V., Zriba, S., ... & Chen, J. M. (2022). Domestic pigs experimentally infected with *Mycobacterium bovis* and *Mycobacterium tuberculosis* exhibit different disease outcomes. *Tuberculosis*, 133, 102167.

Costa, M. D. O., Harding, J. C. S., Huang, Y., & Nosach, R. (2022). *Streptococcus equi* subsp. *zooepidemicus* infection of pigs leads to shedding in faeces and a carrier state. *Transboundary and Emerging Diseases*.

Burgess, H. J., & Kerr, M. E. (2022). What is your diagnosis? Skin mass in a cat. *Veterinary Clinical Pathology*.



Conference Presentations

Zabrodski, M.W., DeBruyne, J.E., Wilson, G., Moshynskyy, I., Sharafi, M., Wood, S.C., Kozii, I.V., Thebeau, J., Klein, C.D., Medici de Mattos, I., Sobchishin, L., Epp, T., Ruzzini, A.C., Simko, E. Comparison of individual hive and yard-level sample types for spores of *Paenibacillus* larvae in Saskatchewan honey bee operations with recent outbreaks of AFB.

- Platform Presentation and Poster (virtual): ACVP/ASCPV 2021 Virtual Annual Meeting (Oct. 30 – Nov. 2, 2021)
- Oral Pres.: SBDC 2021 Annual Conv. (Nov. 18–19, 2021), Saskatoon, SK, CA
- Oral Pres. (virtual): 2022 American Bee Res. Conference (Jan. 13–14, 2022)

Zabrodski, M.W., Wilson, G., Moshynskyy, I., Sharafi, M., Reitsma, L., Castano Ospina, M., DeBruyne, J.E., Wentzell, A., Wood, S.C., Kozii, I.V., Klein, C.D., Thebeau, J., Masood, F., Medici de Mattos, I., Cloet, A., Brown, B., Roulin, M., Liebe, D., Sobchishin, L., Epp, T., Ruzzini, A.C., Simko, E. Improving methods of control of American foulbrood in honey bees in Saskatchewan.

- Poster (virtual): Life and Health Sci. Res. Expo (May 6, 2021), Saskatoon, SK, CA – First Prize in Category
- Poster (virtual): Canadian Animal Health Laboratorians Network (June 7–9, 2021), Calgary, AB, CA – First Prize
- Highlighted Poster (virtual): ACVP/ASCPV 2021 Virtual Annual Meeting (Oct. 30 – Nov. 2, 2021)
- Oral Pres.: SBDC 2021 Annual Conv. (Nov. 18–19, 2021), Saskatoon, SK, CA

Zabrodski, M.W., Simko, E. Scorbatic osteochondrodysplasia in a guinea pig.

- Oral Pres. (virtual): 2021 Western Con. of Vet. Diagnostic Pathologists (Oct. 13–14, 2021), Saskatoon, SK, CA – First Prize

Zabrodski, M.W., Wilson, G., Moshynskyy, I., Sharafi, M., DeBruyne, J.E., Reitsma, L., Castano Ospina, M., Wentzell, A., Wood, S.C., Klein, C.D., Kozii, I.V., Medici de Mattos, I., Thebeau, J., Sobchishin, L., Roulin, M., Liebe, D., Cloet, A., Brown, B., Epp, T., Ruzzini, A.C., Simko, E. American foulbrood.

- Invited Oral Pres. (virtual): Calgary and District Beekeepers Assoc. (May 26, 2021)

Blakley, B., (2021). Mycotoxins Affecting Pigs in Western Canada. Presented at the Western Canadian Association of Swine Veterinarians, Saskatoon, SK, October 21-22, 2021. The Rhodes Lecture.

Huang Y., (2021). Respiratory Pathology of Swine. Presented at the Western Canadian Association of Swine Veterinarians, Saskatoon, SK, October 21-22, 2021.

Huang Y., (2021). Moving animal laboratory diagnostics forward with genomics. Online presentation organized by Genome Prairie.





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Western College of Veterinary Medicine

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