

# Thunder Bay Regional Health Research Institute

2017-2018 Annual Report Summary







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# Thunder Bay Regional Health Research Institute

Incorporated as the Thunder Bay Regional Research Institute in December 2007 and renamed the Thunder Bay Regional Health Research Institute in November 2016, the organization is the research arm of the Thunder Bay Regional Health Sciences Centre. Its mandate is to facilitate clinical research -particularly in the area of imaging and related fields strategic to regional health care needs. Current research areas include but are not limited to cancer, cardiac disease, stroke, orthopaedics, Indigenous health, and lung disease. The Health Research Institute also supports clinical trials at the Health Sciences Centre, which has been one of Canada's Top 40 Research Hospitals since 2010 thanks in large part to the activities of the Health Research Institute.

#### **2020 STRATEGIC PLAN**

## Healthier

Enhance research to improve the health outcomes of the people of NWO and beyond.

## Wealthier

Enhance philanthropic and other support and generate revenue through science and partnerships.

## Smarter

Enhance the academic environment.



With acknowledgment of the Council of Academic Hospitals of Ontario

www.healthierwealthiersmarter.ca

#### VISION



#### **MISSION**

To be an international leader in health technology research and other strategic health innovation, that improves the health of the people of Northwestern Ontario (NWO) and others.

#### **VALUES**

Excellence, Collaboration, Innovation, Integrity, Respect, Accountability

#### **PHILOSOPHY**

Patients and Families are at the centre of everything we do.

To read our full Annual Report 2017/2018, please view it online at:

www.TBRHRI.ca/2017-2018AnnualReport

## Message from the Board Chair & CEO





Technology has been more and more a driver of health care. Technology can assist in overcoming

several of Northwestern Ontario's geographical and cultural barriers to care. It can help us streamline and improve access to care so that we are able to provide the right care to the right person at the right time, no matter where they live in the region.

That's where "smart health" comes in. Smart health is an umbrella term for connected and interconnected health solutions for diagnosing, monitoring, treating, and advising patients. It uses technologies such as smart phone apps, internet, and even video technology in innovative ways to overcome those barriers and improve patient care.

We are currently exploring how smart health technology can bring smart health solutions to the region and to achieve the objectives of the Hospital's Strategic Plan 2020, while we progress with the three Strategic Directions of our Health Research Institute's Strategic Plan:

#### Healthier

Indigenous health has been identified as one of the Hospital's five key directions and is one of the directions in the Health Research Institute's 2020 Strategic Plan. The Health Research Institute will be working with Hospital staff and others to engage Indigenous leaders and communities to learn more about the communities that we serve and their health needs. Our goal is to research and develop programs and services that can be adapted to each community need and capacity. Smart health can help us reach that goal, providing opportunities to overcome the specific geographical, cultural, language, and other barriers to care.

#### Wealthier

The Health Research Institute was founded on the understanding that homegrown solutions work best for a unique region such as Northwestern Ontario. Health care delivery here faces a specific set of challenges like no other in the world. Our scientists and researchers generate research funding that supports homegrown projects. One example is the joint project between Dr. Naana Jumah and Dr. Chris Mushquash that will help develop pre-natal services for Indigenous mothers and

increased health education for Indigenous high school students in Thunder Bay. That financial support speaks volumes to the quality of our researchers, and how well respected they are in their fields.

One of our first steps in 2018 is to hire a smart health technology scientist at the Research Institute with a joint appointment at Lakehead University. Many digital tools can enhance distance health and indeed most areas of health care - perhaps an overwhelming number of tools. We need someone who can determine the best tools for us and our partners in health, and investigate how we can use smart health technologies such as apps, sensors, and other software-based solutions.

It's early days for smart health technology, but we plan to implement new technology over the next several years that will significantly improve patient care at our Hospital and in the region, keeping patients closer to home.

Our new venture into smart health relies on other research programs as well as academic, clinical, and community affiliates. We are looking to partner with Mohawk College in Hamilton and their mHealth & eHealth Development and Innovation Centre (MEDIC) - which is itself a partnership with McMaster University - to assist us in finding the right digital health solutions. This will allow us to share resources and be able to focus on how the technology will be able to improve health care delivery in Northwestern Ontario rather than start using the technology from scratch.

Our Clinical Trials program is expanding its partnerships with pharmaceutical companies, device makers, and software developers to provide new options for our patients. This year, the Council of Academic Hospitals of Ontario (CAHO), of which the Thunder Bay Regional Health Sciences Centre is a member, was selected by the Ministry of Health and Long-Term Care as an Innovation Broker. This initiative allows partner hospitals to connect with tech vendors to bring new patient care advances to the bedside faster.

These partnerships will support the Hospital's Strategic Plan 2020 and will assist the Health Research Institute to meet its 2020 Strategic Plan Directions of becoming Healthier, Wealthier, and Smarter,

**Clint Harris** 

Chair. Board of Directors

CEO

## Board of Directors

Chair of the Board, Thunder Bay Regional Health Research Institute; Publisher and General Manager, The Chronicle-Journal

#### Jean Bartkowiak

CEO. Thunder Bay Regional Health Research Institute and President & CEO, Thunder Bay Regional Health Sciences Centre

#### Dr. Andrew Dean, PhD

Vice-President, Research & Innovation, Lakehead University

#### Tom Kehoe, MBA, CFA

Investor, Abiwin Ventures Ltd

#### Dr. Penny Moody-Corbett

Associate Dean of Research, Northern Ontario School of Medicine; Former Associate Dean of Research and Graduate Studies for the Faculty of Medicine at Memorial University; Senior member, Canadian Institutes of Health Research

#### Aldéa Landry, CM, PC, QC

Lawyer & President, Landal Inc.; Former Cabinet Minister and Deputy Premier, New Brunswick

#### Christine Napierala, CPA, CA

Financial Manager, Hydro One Remote Comm

## Dr. Gordon Porter

Chief of Staff. Thunder Bay Regional Health Sciences

#### Dr. Abraham Rudnick

(January, 2018 delegated by Chief of Staff)

**Executive Vice President** Research & Development, Thunder Bay Regional Health Sciences Centre and Chief Scientist. Thunder Bay Regional Health Research Institute

#### Dr. Jim Madder

President, Confederation College

#### Stan Beardy

Chief, Muskrat Dam First Nation: Forme Ontario Regional Chief

#### Dr Pam Wakewich

Past Director, Centre for Rural & Northern Health Research: Sociology and Women's Studies and Professor, Lakehead University

Partner, Fasken Martineau DuMoulin LLP.

#### Dr. Mark Poznansky

Past President & CEO, Ontario Genomics Institute Past President & CEO, Robarts Research Institute

#### Dr. Sheldon Tobe

Professor in Medicine Staff Physician, Division of Nephrology, University of Toronto: Professor and Heart and Stroke Foundation Chair. Aboriginal and Rural Health Research, Northern Ontario School of Medicine

## Scientists

#### Naana Afua Jumah, MD, BASc, DPhil, FRCSC

Obstetrician Gynaecologist, Thunder Bay Regional Clinician Scientist Thunder

Bay Regional Health Research Institute Assistant Professor, Northern

Ontario School of Medicine

#### Alla Reznik, Ph.D.

Professor and Canada Research Chair in Physics of Medical Imaging, Physics Department, Lakehead University

Scientist, TBRHRI

New materials and technologies, for x-ray and PET detectors in medical imaging.

#### Ingeborg Zehbe, PhD, DSc

Lakehead University/ TBRHRI Research Chair

Scientist TBRHRI

Associate Professor, Northern Ontario School of Medicine

Aspects of virus-induced cancer: basic research, anti-cancer therapeutics and prevention & screening

#### Jane Lawrence-Dewar, Ph.D.

Adjunct Professor, Lakehead University Applies imaging to

understand changes in the brain following injury

#### Laura Curiel, Ph.D., P.Eng

Lakehead University/ TBRHRI Research Chair Assistant Professor. Lakehead University

Development of guidance technology for non-invasive treatment of uterine fibroids, cervical cancer, and prostate cancer with high intensity focused ultrasound (HIFU) (Until December 31st, 2017. Laura is now an Associate Scientist based in Calgary.)

#### Mitchell Albert, Ph.D.

Lakehead University/ TBRHRI Research Chair in Molecular Imaging and Advanced Diagnostics Director, MR Research Program, TBRHRI Professor of Chemistry

Lakehead University

Adjunct Professor of Biology, Biotechnology, Health Sciences and Physics. Lakehead University

Adjunct Professor, Northern Ontario School of Medicine Hyperpolarized Xenon Functional MRI of the brain in patients with Alzheimer's

Hyperpolarized Xenon Biosensor MR Molecular Imaging in animals models of Alzheimer's Disease

Hyperpolarized Gas and Inert Fluorinated Gas MR imaging of the lungs in patients with pulmonary disease

#### Samuel Pichardo, Ph.D.

Adjunct Professor, Lakehead University

Clinical trials and development of guidance technology for high intensity focused ultrasound (HIFU) treatment of uterine fibroids, combination of HIFU with radiotherapy new applications of HIFU for pediatrics and ultrasound transducer technology, software tools for MRI-guided HIFU and characterization of transcranial ultrasound. (Until September 14th, 2017. Sam is now an Associate Scientist based in Calgary.)

#### Michael Campbell, Ph.D.

Lakehead University/ TBRHRI Research Chair Assistant Professor, Department of Chemistry,

Lakehead University

Researching new imaging agents for Central Nervous System disorders and developing new systems for the production. purification and distribution of radionuclides and radiotracers.

#### **Associate Scientists**

#### Christopher Phenix, Ph.D.

Development of probes to image enzymatic biomarker activity and molecular imaging of enzymes important for human health Associate Scientist located at

University of Saskatchewan. Affiliated with TBRHRI until May, 2017

#### Boguslaw Tomanek, Ph.D.

Associate Professor Radiation Therapy Degree Program, Department of Oncology, University of Alberta Multi-modal molecular imaging and gradient-free

Associate Scientist located at University of Alberta. Affiliated with TBRHRI until June, 2017

#### Oleg Rubel, Ph.D.

Investigation of material properties of selenium and development of new piezoelectric material

Associate Scientist located at McMaster University. Affiliated with TBRHRI until January 2018



#### **GOALS**

- 1. Partner with Indigenous researchers & communities to advance their health priorities.
  - a. Develop a shared vision and research priorities.
  - b. Conduct environmental scan of Indigenous research landscape.
- 2. Investigate & apply assessment and intervention solutions that are responsive to our geographic challenges.
  - a. Develop solutions that increase access to screening and diagnostics for people living in remote Indigenous communities.
  - b. Apply solutions to increase screening and diagnostics for broader populations.
  - c. Foster adoption of strategic health-related technology among local health care practitioners.

#### 3. Strengthen local clinical research.

- a. Increase patient opportunities to participate and engage in
- b. Streamline investigator initiated trials.
- c. Advocate for hospital participation in CAHO/ ARTIC initiatives.



Screening device may improve breast cancer detection

A high-resolution, highsensitivity Positron Emission Mammography (PEM) detector has been developed by Lakehead University and the Health Research Institute with the help from local partners. It's a medical imaging system that could dramatically improve detection of breast cancer in certain women.

MORE ONLINE

## CAHO Streamlines Access to Digital Health Technologies

Health Research Institute Screening Algorithm Adapted by CAHO Innovation Broker



Dr. Amarjit Chahal, Manager of Business Development at the Health Research Institute, said that innovative digital health technologies have great potential to help residents across Northwestern Ontario overcome various barriers to care.

The Thunder Bay Regional Health Research Institute is taking advantage of a new Council of Academic Hospitals of Ontario (CAHO) initiative to streamline access to new digital health and other innovative health technologies for testing, ultimately benefiting patients faster. CAHO, which is the Ministry of Health and Long-Term Care's Innovation Broker, created a system with one point of access for digital health vendors, making it easier for them to connect with the 23 member hospitals.

However, a new challenge arose: how so many applications within, four to decide which of the 33 proposals from 29 vendors (and growing) to pursue. For example, our Hospital must weigh the needs of the patient population in Northwestern Ontario as well as other considerations such as alignment with the Hospital's and Health Research Institute's strategic plans, and current infrastructure to support the research and potential care programs.

Dr. Abraham (Rami) Rudnick. Chief Scientist at the Health Research Institute and Executive Vice President of Research and Development for the Thunder Bay Regional Health Sciences Centre. developed a specialized algorithm to help make that decision - and it's an algorithm that CAHO's Innovation Broker has adapted for other hospitals to use.

"Everyone has a decision-making process for long-term projects such as purchasing a PET scanner, but many hospitals struggled to screen weeks," said Dr. Amarjit Chahal, Manager of Business Development at the Health Research Institute. "CAHO adapted our decision algorithm to make it generic so that all member hospitals could use it."

Currently, the Health Research Institute and Hospital are in the early stages of partnering with a vendor and a few other hospitals in the

province to research a new method for following up with patients after discharge using a digital health technology.

Digital health covers a wide range of options including devices, webbased solutions, and smart phone apps. It is a rapidly emerging field that will revolutionize the way health care is provided - particularly for distance health.

"These innovative digital health technologies have great potential to help residents across Northwestern Ontario overcome various barriers to care including geographical cultural, and language barriers," Dr. Chahal said. "Above all. these technologies will bring health care closer to home."

As examples, Dr. Chahal mentioned medication reminders that link back to the patient's physician to help with compliance, in-home sensors that could detect a fall in elderly patients, and a smart phone app that provides access to information vetted by their doctors and other trusted sources customized to their health needs.

"It's only been a year so far. More proposals are coming in, and now we have a process in place to prioritize and evaluate various digital health solutions, evaluate funding options, and make a decision as to which opportunities to follow."

Funding is another key consideration. The Health Research Institute and its partners in the above-mentioned project have applied for a Health Technology Fund grant through the Ontario Centres of Excellence.



#### **GOALS**

- 4. Engage stakeholders in philanthropy and other support of research.
  - a. Partner further with the Foundation.
  - b. Build awareness and promote interest in research.
  - c. Integrate community resources including, Business Development and commercialization with partners
  - d. Enhance industry investment to maximize grant matching opportunities.
- 5. Develop health technology products and assets.
  - a. Identify and pursue high potential opportunity areas.
  - b. Bring radioisotopes to market.
- 6. Secure a robust clinical trials program.

a. Enhance quality

- management system. b. Nurture clinical researchers.
- c. Mature as a Clinical Trials
- Ontario accruing site. d. Ensure industry and other sponsorship.

## Industry Partner Helps Cyclotron Program Access Global Markets



Dr. Jesse Walker, Director of Cyclotron Operations at the Health Research Institute, said that industry partnerships could help us reach global markets, particularly with radiometals.

The Cyclotron Program at the Thunder Bay Regional Health Research Institute took another step including diagnostic imaging and towards sustainability in May 2018. forming an alliance with an industry partner to market radioisotopes on the global stage. Not only will this help create new revenue sources, it will provide invaluable insights into which isotopes are needed most on the world markets.

"We hope to produce FDG for the Hospital in the near future, so it raises the question of what else we can do to make the cyclotron selfsustainable," said Dr. Jesse Walker, Director of Cyclotron Operations. "The cyclotron that we have comes with more capabilities than some models, so we are able to look at producing a variety of isotopes in addition to F-18."

Examples of such isotopes are radioactive metal isotopes such as Technetium-99m. Zirconium-89.

and Indium-111. This class of radioisotope has a variety of uses therapeutics. Many radiometals have long half-lives which means they have the potential to be transported globally from Thunder Bay.

Although the details about what will be produced and sold are still being determined, the agreement provides several potential options.

"We see this as an opportunity to partner with other experts in the field," Walker said. "The radioisotope market is more complex than one might think, so developing our own client base would be difficult. This partnership allows us to focus on the production and processing of isotopes."

"It gives us a clear path forward, knowing what isotopes their customers are looking for so that we can plan isotope development," Walker said.

That's important because every isotope may require a different development procedure. Often, the source metal has to be electroplated onto metal plates and irradiated. However, it's not a "one size fits all" process - preparation, irradiation and processing varies from metal to metal.

"The identity of the metals will dictate the chemistry. It will be similar in some instances, but it will take research to develop a process that works for each particular radiometal."





#### **GOALS**

- 7. Participate in development of academic programs relevant to our health research priorities.
  - a. Partner with academic institutions to offer educational training programs across the continuum (undergraduate, graduate, post-graduate, fellowship).
  - b. Recruit more strategic joint researchers with academic partners.
- 8. Facilitate a research culture.
  - a. Support a robust clinical research model.
- b. Facilitate the development of all researchers.
- Facilitate an environment that promotes interprofessional collaboration.
- Grow strategic research partnerships and networks to expand research capacity and impact.
  - a. Advance partnerships with regional stakeholders such as Indigenous communities and community hospitals.
  - b. Advance partnerships with other academic health science centers.
  - c. Facilitate active membership on key research organizations.



Reciprocity Agreement between Hospital and University Streamlines Research Ethics Board Reviews

A new reciprocity agreement between the Thunder Bay Regional Health Sciences Centre and Lakehead University has sped up the approval process for research projects. The agreement, signed on April 1st, 2017, reduces the duplication of work for the Research Ethics Boards (REBs) at both institutions. The collaboration illustrates the growing bond between the two institutions, especially pertaining to research.

MORE ONLINE

# Health Research Institute Hiring Three New Scientists to Support Current Projects and a New Direction (Smart Health)



Dr. Abraham (Rami) Rudnick, Chief Scientist, Thunder Bay Regional Health Research Institute

The Thunder Bay Regional Health Research Institute started the hiring process in 2018 for three new scientists in radiochemistry, biophysics, and smart health technology. The positions, which involve joint appointments at Lakehead University, will continue to build on the Research Institute's strengths and prepare for a new era of health care, particularly in relation to remote health technology and Indigenous health.

Dr. Abraham (Rami) Rudnick, Chief Scientist at the Health Research Institute and Executive Vice President of Research and Development for the Thunder Bay Regional Health Sciences Centre, said that although they have general goals for the positions based on the Health Research Institute's and Hospital's strategic plans, research project details will depend very much on the successful candidates.

"It's difficult to predetermine what specific areas of study they will follow since each scientist, even within our plans' scope, may bring particular skills, backgrounds, and interests. But we do have clear goals in mind that we want to accomplish," Rami said.

In radiochemistry, the goal will be to continue to develop and research new isotopes - and new applications - for the growing cyclotron program.

"Part of that is science and part of that business development. There are lots of opportunities for radioisotope research both for health and other applications," Rami said.

For the biophysics position, Rami

said that they are looking for a scientist who will be able to add to the current strength in imaging research. The ideal candidate will have a strong background in computational skills.

"That's a highly valued set of skills lately in biophysics - fully understanding the software aspects of working in biophysics."

The smart health technology position represents an exciting new domain of study for the Health Research Institute. Smart health represents various areas of rapidly expanding interest such as smart phone apps, online solutions, and Artificial Intelligence (AI) – decision support software for clinicians that can quickly analyze many pieces of information.

For Northwestern Ontario, the most immediate advantages will be in the area of distance health and particularly Indigenous health, overcoming barriers to care including geographical and cultural barriers

"We already have vendors coming our way with software solutions for clinical validation in various health care areas. The smart health scientist will also work with Lakehead's new digital health lab developing new solutions and hopefully testing them out at our Hospital and across the region," Rami said.

All three new scientists are expected to start their work at the Research Institute and Lakehead University by late 2018.



## 2017/2018 Strategic Plan Indicators

## **HEALTHIER**

ENHANCE RESEARCH TO IMPROVE THE HEALTH OUTCOMES OF THE PEOPLE OF NORTHWESTERN ONTARIO AND BEYOND

#### GOAL 1:

Partner with Indigenous researchers and communities to advance their indigenous health priorities.

#### INDICATOR

Percentage patient advised studies

#### **TARGET**

2%

(# of Patient Advised studies authorized within quarter/# Human Studies authorized within quarter)

#### **ACTUAL**

PENDING

#### GOAL 2:

Investigate and apply assessment and intervention solutions that are responsive to our geographic challenges.

#### **INDICATOR**

Percentage patient advised studies

#### **TARGET**

2%

(# of Patient Advised studies authorized within quarter/# Human Studies authorized within quarter)

#### ACTUAL

PENDING

#### GOAL 3:

Strengthen local clinical research.

#### INDICATOR

Percentage of patients participating in research

#### **TARGET**

1.29%

(# Patients participating in research/Total # of distinct patients, excluding Emergency Department and other select areas)

#### **ACTUAL**

**PENDING** 

## WEALTHIER

ENHANCE PHILANTHROPIC AND OTHER SUPPORT AND GENERATE REVENUE THROUGH SCIENCE AND PARTNERSHIPS

#### GOAL 4:

Engage stakeholders in philanthropy and other support of research.

#### **INDICATOR**

**Total Funding** 

#### **TARGET**

\$6.844.155

(Total funding, including Industry, Peer Reviewed Studies, Philanthropy and Miscellaneous)

#### **ACTUAL**

\$5,428,496

#### GOAL 5:

Develop health technology products and assets.

#### **INDICATOR**

Clinical research gross margin

#### TARGET

0.00%

(Gross Profit Margin: Net Profit from clinical trials & clinical research/ Gross Revenue from clinical trials & clinical research)

#### **ACTUAL**

-31.57%

#### GOAL 6:

Secure a robust clinical trials program.

#### **INDICATOR**

Total number of participants enrolled in clinical trials

#### **TARGET**

129

# Participants enrolled in clinical trials

#### **ACTUAL**

83

## SMARTER

ENHANCE THE ACADEMIC ENVIRONMENT

#### **GOAL 7:**

Participate in development of academic programs relevant to our health research priorities

#### GOAL 8:

Facilitate a research culture

#### GOAL 9:

**Grow strategic** and networks to expand research capacity and impact

#### **INDICATOR**

**Total Trainees** 

#### **TARGET**

16

CAHO definition: Actual number of graduate students and post docs, within the quarter. Excludes undergrads & volunteers.

#### ACTUAL

#### INDICATOR

# Faculty engaged in research

#### **TARGET**

90

CAHO definition: Actual number of MD & PhD faculty engaged in research as a Principal Investigator, Sub-Investigator, or Qualified Investigator - in clinical research plus TBRHRI scientists, within the quarter.

#### **ACTUAL**

105

research partnerships

#### **INDICATOR**

# Peer reviewed joint publications

## **TARGET**

30

Number of peer reviewed publications of TBRHRI and related scientists, physicians and staff

#### **ACTUAL**

13

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## A message from the Thunder Bay Regional Health Sciences Foundation

#### CLOSER-TO-HOME RESEARCH FOR CLOSER-TO-HOME CARE

Research drives better patient care. In turn, local research drives better local patient care. That's why the Thunder Bay Regional Health Sciences Foundation invests so much in local research. In fact, since 2008, 25% of funds distributed from the Health Sciences Foundation have supported research. By supporting the Thunder Bay Regional Health Research Institute, our donors help improve the level of healthcare in Northwestern Ontario now and in the future through research

breakthroughs, better equipment, and attracting the high-calibre healthcare professionals that make such a difference in our lives.

Some of our donors choose to direct their donations to research because they know that the research of today guides future care. For instance, a memorial donation is a wonderful and heartfelt way to remember a loved one who passed away. It is a way to honour their life's work, while supporting a researcher's and giving hope for the future.

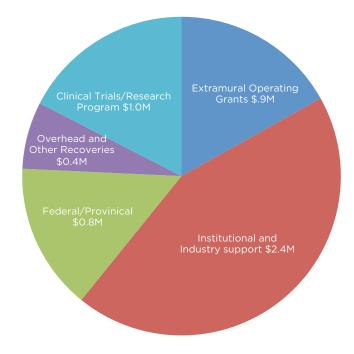
Our focus is always on closer-to home patient care. Supporting local research is yet another way of realizing that vision.



## 2017-2018 Financials

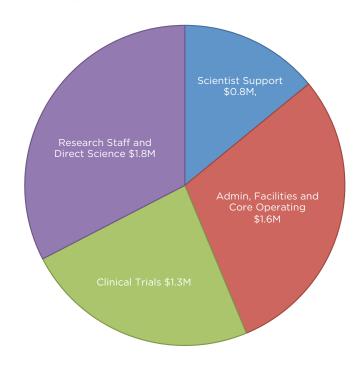
#### **REVENUE SOURCES**

Total = \$5.5M



#### **EXPENSES**

Total = \$ 5.5M



## **Funders** and Partners

#### **GOVERNMENT**













#### **ACADEMIC HEALTH SCIENCES CENTRES**







#### **ACADEMICS**









### **NOT FOR PROFIT**

#### **MaRS** Innovation









#### **INDUSTRY**





### **SOFIE**BIOSCIENCES



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To read our full Annual Report 2017/2018, please view it online at:

#### www.TBRHRI.ca/2017-2018AnnualReport

To read details about our Scientist's research please visit:

#### www.TBRHRI.ca/scientists



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