ANNUAL REPORT 2020/2021

RESEARCH & INNOVATION

Transforming the future of healthcare

Alberta Health Services

Enhancing healthcare for Albertans

The importance of researchers and innovators

They help keep Albertans healthy and independent

They improve the quality and safety of care for Albertans

They provide access to potentially life-changing treatments

They update or replace outdated treatments and technologies

They take good ideas and turn them into something even better

They shorten the pathways to diagnosis and treatment

They achieve more with the same or fewer resources

They improve conditions for the AHS workforce and other Albertans

They encourage highly qualified professionals to join AHS

Thank you to the advisory team who worked with the Health Evidence and Innovation department, as well as the contributors: Shelley Boettcher, Michael Brown, Melissa Fabrizio, Gregory Harris, Gabriel Hartzler, Leah Hennel, Sharman Hnatiuk, Pamela Hyde, Evan Isbister, Lindsey Kemp, Marni Kuhlmann, Laughing Dog Photography, Marc Leduc, Adrianna MacPherson, Nicole Ouellet, Kit Poole, Kass Rafih, Gillian Rutherford, Amelia Schofield, Adrian Shellard, Derek Shimozawa, Richard Siemens, Dr. Victoria Suen, Dr. Kathryn Todd, Nicole Tjepkema.

Cover photo: Maria Holandez cradles her daughter, Zoila. See ‘Technology puts healthcare right at home’: Pages 22-23. Photo by Leah Hennel

Alberta Health Services

Illustration: ipopba

Research and innovation transform healthcare

WRITTEN BY DR. KATHRYN TODD AND MARC LEDUC

Meeting virtually with patients and families, in the comfort and safety of their own homes. Creating evidence-based care supports for aging Albertans. Finding fresh ways to help our youngest patients. Celebrating and supporting the next generation of healthcare providers and researchers.

The past couple of years have certainly been challenging for all Albertans, mostly because of the ongoing COVID-19 pandemic. The team at Alberta Health Services (AHS) responded quickly and found ways to ensure Albertans could access new treatments and continue efforts to better understand their healthcare needs in every corner of the province.

The secret to that success? Research, evidence and innovation.

It starts with a healthcare issue—COVID-19, for instance. Or cancer. Or epilepsy.

To make advances in treatment and care, we need to carefully study what is happening to understand what needs to change.

Research is about asking questions, collecting evidence based on those questions and then transforming that evidence into knowledge that can be applied by healthcare providers, patients, their families and the public. The more new information we discover, the more our knowledge expands.

And knowledge is the foundation upon which quality healthcare—the kind we aim to provide at AHS—is based.

On the following pages, you'll find myriad examples of how AHS and our partners conducted research and sought to apply innovative solutions to healthcare challenges in our province.

Maternal fetal medicine, EMS research into cardiac arrests, home hemodialysis, virtual hospitals, tuberculosis care for people in remote and rural parts of Alberta—research and innovation in AHS touches all of us at some point in our lives.

Of course, AHS could not improve care through research and innovation without the ongoing generous support of our patients, partners, educational institutions and foundations. They inspire us to do better, every day, as we make improvements to healthcare across the province, this year and always. ■

Dr. Kathryn Todd and Marc Leduc. Todd is Vice President, Provincial Clinical Excellence, AHS, while Leduc is Senior Provincial Director, Health Evidence and Innovation, Provincial Clinical Excellence, AHS.

A researcher studies CAR-T cells at the University of Alberta.

Photo by Richard Siemens, University of Alberta

New treatments

Innovative cancer therapy uses immune system to attack tumours

WRITTEN BY ADRIANNA MACPHERSON
(with files from AHS staff)

Imagine if you could re-engineer your immune system to target and attack cancer growing in your body. Chimeric antigen receptor (CAR) T-cell therapy is doing just that.

CAR T-cell therapy is an innovative treatment that uses a patient's own immune system to battle cancer cells. It's a promising therapy in patients who have failed standard treatments (such as chemotherapy, radiation or surgery), and can be the only viable option for some patients.

Dr. Michael Chu is a Medical Oncologist at Alberta Health Services (AHS) and an Assistant Professor of Oncology in the Faculty of Medicine & Dentistry. He is leading a project to manufacture and test locally produced CAR T-cells for the treatment of leukemia and lymphoma.

"One of the big problems with most cancers in people is that their immune systems have a strange defect in that they can't recognize cancer cells," says Chu, who is also a member of the Cancer Research Institute of Northern Alberta. "CAR T-cells get around that by genetically manipulating the immune system."

Chu's clinical trial started in spring 2021, with a target enrolment of up to 60 patients. In the trial, cells are being produced at the U of A's Alberta Cell

> In the future, this will allow us to customize a cell therapy product for a patient

Therapy Manufacturing facility along with another facility in Calgary. The initial clinical trial will focus on crafting CAR T-cells for patients with leukemia and lymphoma.

In addition to the clinical trial, it is expected that about 150 patients will be eligible to receive CAR T-cell therapy in Alberta over the next three years as a standard of care by using CAR T-cells manufactured in the U.S.

Patients will receive treatment at Edmonton's Cross Cancer Institute, Calgary's Tom Baker Cancer Centre and Alberta Children's Hospital. That program is led by Dr. Mona Shafey, Director of the Alberta Blood and Marrow Transplant Program.

"Working in close partnership with AHS, members of Alberta's research community are developing and bringing novel cancer therapies to Albertans, meaning that people can get care closer to home," says Dr. Paula Robson, AHS Scientific Director for Cancer Care Alberta and the Cancer Strategic Clinical Network.

"Dr Chu's trial is demonstrating that Alberta's cancer research and clinical environments can work together to accelerate innovation, ultimately improving outcomes for Albertans facing cancer."

The CAR T-cell projects are supported by the Alberta government and the Alberta Cancer Foundation, which announced in August 2020 that they would join forces to provide $15 million in funding for the clinical trial, as well as for providing CAR-T-cell therapy as a standard of care.

Throughout the past decade, additional support to make the treatment a reality has been provided by the University Hospital Foundation, Cure Cancer Foundation, Allard Foundation, Myeloma Alberta Support Society and thousands of individual donors.

Dr. Ted Braun, then-AHS' Vice President and Medical Director, Clinical Operations, noted at the time that the program moved forward very quickly, thanks to the generous funds from the provincial government and others.

"The time from receiving funding to treating our first patient was under six months," Braun says. "This is a great addition to our already outstanding cancer care program in Alberta."

With the clinical trial, there are numerous benefits to having the cells crafted in Alberta rather than abroad, says Chu.

The first, on a practical level, is cost. Until now, CAR T-cells were not manufactured in Alberta, making treatment difficult to access and incredibly costly. According to Chu, CAR T-cells can be manufactured for about $55,000 per patient, whereas current pharmaceutical treatments cost nearly $500,000 per patient.

The ability to craft cells in-house also allows the therapy to be more customizable.

"This is a great example of precision medicine. While we are targeting a particular bar code on cancer cells, that's not necessarily the right bar code for everyone. By creating a program like this, in the future, this will allow us to customize a cell therapy product for a patient," says Chu.

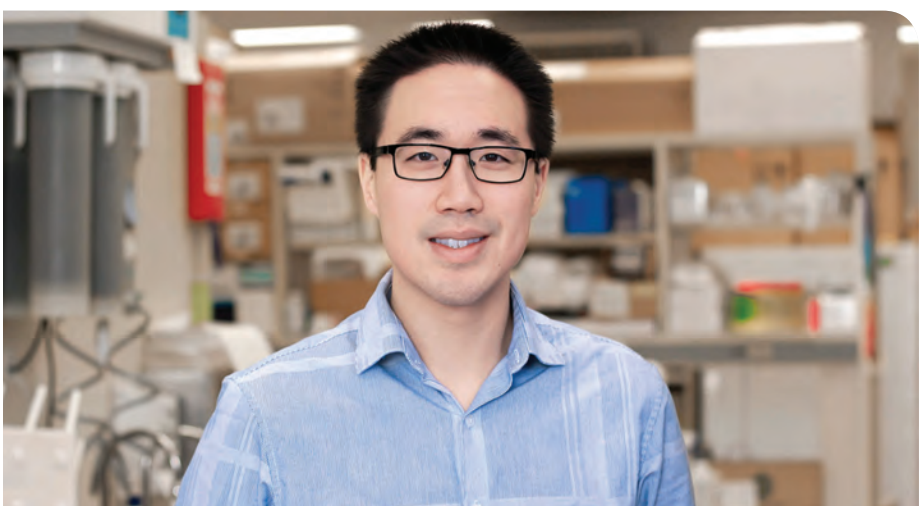
There's also a possibility that having the cells available locally will yield higher-quality cells for treatment. Until now, pharmaceutical versions of CAR T-cells used in Edmonton have been produced elsewhere and needed to be frozen before transport. Creating the cells locally eliminates this need, Chu says.

Alberta is just the third province to offer CAR T-cell therapy, which is also available in Ontario and Quebec. ■

—An earlier version of this story appeared in the University of Alberta's Folio magazine in April 2021

Dr. Michael Chu, an Assistant Professor of Oncology in the Faculty of Medicine & Dentistry at the University of Alberta, is spearheading a project to manufacture and test locally produced chimeric antigen receptor (CAR) T-cells for the treatment of leukemia and lymphoma.

Photo by Melissa Fabrizio



Sick babies can now receive heart transplants from donors with different blood groups

U of A researcher Dr. Simon Urschel with patient George Kemp. George, now five years old, is in kindergarten. He's looking forward to skating and swimming lessons.

Photo by Lindsey Kemp

Pediatric heart-transplant method allows more surgeries, better outcomes

WRITTEN BY GILLIAN RUTHERFORD

A pediatric heart transplant procedure —once deemed impossible—is now routinely being carried out in Alberta, thanks to a team of provincial researchers.

Pediatric heart transplantation from a donor with a different blood group (ABO-incompatible) was first performed in 1996 by a team led by Dr. Lori West. West, an Alberta Health Services' (AHS) Transplant Cardiologist, Stollery Children's Hospital since 2005, realized that infants under the age of about 18 months have immature immune systems that allow them to accept life-saving replacements for their defective hearts from donors with incompatible blood types. Recent research has confirmed the new procedure to be at least as effective in the long-term as the traditional approach, according to a study published in *The Lancet Child & Adolescent Health* in March 2021.

"It has helped these very sick babies to get transplants faster, with better outcomes, and live as long as children who received a matched blood-group heart," says principal investigator Dr. Simon Urschel.

He is an Associate Professor of Pediatrics in the University of Alberta's Faculty of Medicine & Dentistry, Director of Pediatric Cardiac Transplantation at the Stollery Children's Hospital and member of the Women and Children's Health Research Institute (WCHRI).

About 50 per cent of Canadians are born with type O blood, while 35 per cent have type A and 15 per cent have type B or AB blood. Organs from a donor with type O blood can be accepted by anyone, but adult type O patients can receive only type O organs. Being able to cross the ABO barrier in pediatric heart transplantation means that twice as many organs can be used for type O infants born with heart defects.

The rule mandating ABO-compatible donors had been made for older patients and had never been revisited for infants, says West, who moved to Edmonton in 2005. She is the Canada Research Chair (Tier 1) in Cardiac Transplantation, and Director of the Alberta Transplant Institute and the Canadian Donation and Transplantation Research Program.

"Transplantation has always been about pushing the boundaries of risks in order to offer reasonable options to patients who would otherwise have no options," she says.

Urschel and his team analyzed data from more than 2,200 infant transplant recipients in Canada, the United Kingdom and the U.S. from 1999 to 2018. The records were from the Pediatric Heart Transplant Society registry, an international research collaboration that collects data from 58 transplant centres. Three hundred and sixty four of the babies received ABO-incompatible transplants, while 1,842 received ABO-compatible hearts.

The post-transplant survival rate was the same between the two groups, as were the rates of acute and chronic organ rejection and the risk of developing leukemia after transplant. "However, as a surprise, recipients of ABO-incompatible hearts had fewer bacteria infections and other infections," Urschel says.

Urschel's team has shown that wait times have been significantly shortened, too, thanks to the innovative transplant technique.

"It's easier and faster to find a heart for these patients, which is crucial because they are extremely sick," he says. "This gives them a chance not only to survive, but to stay healthier and be in better condition before and after transplantation." ■

—An earlier version of this story appeared in the University of Alberta's Folio *magazine in March 2021*

Pediatric heart surgeon Dr. Lori West led a team that pioneered ABO-incompatible heart transplants after realizing that infants' immature immune systems wouldn't reject organs from donors of a different blood type.

Photo by Laughing Dog Photography, courtesy of *Folio*, University of Alberta

As of February 2022, George Kemp is about 18 months post-transplantation with no concerns. His mom is organizing several fundraising and awareness initiatives: Big Gifts for Little Lives and #becauseofadonor. **Visit** https://www.biggiftsforlittlelives.ca

New lab protocol alerts emergency doctors to potential misdiagnosis in house fire patients

WRITTEN BY NICOLE OUELLET

During his fourth year as a medical laboratory science student at the University of Alberta, Steven Dang embarked on a project at the Misericordia Hospital laboratory to help improve care for patients rescued from house fires.

Patients arriving at hospitals from house fires are often treated for cyanide poisoning because of toxic fumes generated by the flames. Standard treatment is the drug hydroxocobalamin, but its major side effect is that patients' blood plasma and urine turn red. This can interfere with certain test methods, leading to incorrect results that can affect patients' care and treatment.

Dang and his supervisors, Dr. Josh Raizman and Dr. Albert Tsui, both Alberta Precision Laboratories (APL) clinical biochemists and members of the U of A's Department of Laboratory Medicine and Pathology, developed a new protocol to alert emergency department doctors to the potential for misdiagnosing patients receiving hydroxocobalamin treatment.

The protocol is now being used in the Misericordia and University of Alberta hospitals, where patients suffering from smoke inhalation injuries are most commonly treated in Edmonton.

It has also been published in *Clinical Biochemistry*, one of Canada's leading medical laboratory journals.

Dang says his research began at the Misericordia lab when Raizman gave him a project that included looking at hydroxocobalamin interference in patients' lab tests and then developing a process to handle and report results.

"Of 77 tests analyzed, 35 per cent of them were compromised," Dang says. "We realized we needed to alert emergency doctors and labs. If a patient receives this drug, their test results may be inaccurate."

Another study objective was to identify other tests that may be impacted by the drug, as well as to prevent unreliable results from being added to patients' medical charts.

For example, the research found that hydroxocobalamin had the largest impact on a liver function test, altering results. If these results were incorrectly reported, the patient could be inaccurately diagnosed with liver failure, leading to unnecessary treatment.

The findings reinforce the lab team's integral role with the healthcare team.

"Our ED doctors and lab team said they found it to be helpful to have this flagged on a patient's medical chart, so that test results are interpreted accurately and a proper, timely diagnosis takes place," says Dang, who is now an APL medical laboratory technologist.

Raizman says an important aspect of the study was it involved taking data generated at the laboratory and applying it to improve patient care at the bedside.

"Our multidisciplinary approach, involving close collaboration between the laboratory and clinical staff, made this project successful," he says.

Raizman and his team are working on the next steps of the project to spread its findings throughout Alberta.

"It is important to note that this study is only applicable to instruments used in Edmonton, but we believe it will provide valuable information for other sites across the province," Raizman says.

Covenant Health provided a research grant to support the study. ■

When Steven Dang was a U of A medical laboratory science student, he helped develop a lab protocol for emergency department doctors to alert them to the potential for misdiagnosing patients receiving a specific treatment following having been in a house fire. Today, Dang is an APL medical laboratory technologist.

Photo by Evan Isbister

David Sereda says the Calgary Comprehensive Epilepsy Program at the Foothills Medical Centre has helped him and his family deal with the physical and mental ramifications of his epilepsy diagnosis.

Photo by Leah Hennel

Epilepsy program treats more than the physical symptoms of the disorder

WRITTEN BY SHELLEY BOETTCHER

David Sereda was a baby when he had his first seizure.

But he wasn't formally diagnosed with epilepsy until he was 41 years old, after more than a dozen seizures as an adult. "I had another seizure and, in the process, dislocated my shoulder, so I ended up in emergency," he recalls. "The emerg doctor said I urgently needed to be seen by the neurology team."

He became an outpatient at the Calgary Comprehensive Epilepsy Program for the next eight years and, in Spring 2021, he spent three weeks in the Foothills Medical Centre's Seizure Monitoring Clinic under the care of epilepsy specialists from the program.

Their goal? To see if he qualified for surgery and to find more data that could help with his treatment.

The Calgary Comprehensive Epilepsy Program offers assessment and treatment options for pediatric and adult patients with epilepsy and seizure disorders.

Those options include anticonvulsant drug trials, surgery, vagal nerve stimulation, genetic testing and counselling, patient and family education and psychological counselling.

The program consists of 12 epilepsy specialists, three neurosurgeons, 27 researchers, plus a total of 60 nurses and allied health professionals from the University of Calgary's Hotchkiss Brain Institute and the Department of Clinical Neurosciences at University of Calgary's Cumming School of Medicine, as well as the Alberta Children's Hospital Research Institute.

It is the largest adult epilepsy program in Canada, and is one of the largest pediatric epilepsy programs, with patients from across Western Canada. In it, research collaborations are ongoing between adult and pediatric epileptologists and other scientists, and there's a transition clinic for patients moving from the pediatric epilepsy program to the adult program.

Dr. G. Campbell Teskey is the Cell Biology and Anatomy Deputy Head at the U of C's Hotchkiss Brain Institute and one of the researchers involved in the program. From his perspective, the program is important because it looks at the entire patient—not only a patient's physical symptoms.

> Epilepsy has far-reaching impacts on a person's life

"We are trying to prevent the weakness, memory issues and sudden death, as well as the fear, anxiety and depression that can occur in people with epilepsy," says Teskey, whose research on seizures that result in a stroke-like event provided some of the groundwork for the program. It showed that blood flow to the brain is severely reduced for that first hour after a seizure—the reason why many people with epilepsy experience brain fog and confusion after a seizure.

Building on Teskey's research, Dr. Paolo Federico, a physician at Foothills Medical Centre and Professor of Neurology and Radiology at the U of C, started a clinical trial using two common over-the-counter drugs that may improve blood flow to the brain after a seizure.

Federico attributes much of the program's success to the fact that it recognizes epilepsy has far-reaching impacts on a person's life.

"Patients with epilepsy are two to five times more likely to have significant mental health challenges than people without epilepsy," he says. "Taking care of their mental health concerns is just as important as taking care of their seizures."

Now 49, Sereda says the program and clinic have made a huge difference in his life. "The program has been invaluable in terms of understanding the epilepsy diagnosis," he says. "Getting the diagnosis was a big shift for us, but for others, it could be devastating."

A registered psychologist and former Alberta Health Services staffer, he attends the clinic every three to 12 months, depending on his seizures and medication needs. His family has also been able to access mental health resources and information. And, when he's not advocating for himself and others with epilepsy, he's spending time with his family and playing bass guitar in a band—leading a normal life, he says.

"My life is continually challenged by my epilepsy," he says. "But I try to keep things as happy and as well-functioning as I can." ■

Device may prevent disabling strokes

Researchers from Alberta Health Services (AHS) and the Universities of Alberta and Calgary are finding new ways to monitor and detect irregular heartbeat in stroke patients.

Norman Mayer is one of those patients. The Mayor of Camrose for 32 years, Mayer recalls being admitted to the emergency department in Camrose in October 2015 after experiencing sudden pain. There, he found out he had likely experienced a minor ischemic stroke, which is caused by a blockage in a blood vessel supplying the brain.

The healthcare team asked him if he would be interested in participating in the Post-Embolic Rhythm Detection With Implantable Versus External Monitoring (PER DIEM) clinical trial.

In the PER DIEM clinical trial, 300 Alberta patients who had suffered a stroke were randomly given one of two new devices used to monitor and detect atrial fibrillation, an irregular heartbeat. One is an implantable device that monitors each patient for 12 months. The other is an external device that monitors each patient for a 30-day period.

Atrial fibrillation causes one in four strokes. Detecting it early helps prevent further strokes in patients who have already experienced ischemic stroke. The trial found that the implantable device is three times more likely to detect atrial fibrillation than the external 30-day monitor. The implantable device has the added advantage of remote monitoring—crucial for rural Albertans.

Dr. Brian Buck is an AHS Stroke Neurologist.

Photo by Evan Isbister

Both devices, however, are an improvement over the older test, a 24-hour electrocardiogram monitor.

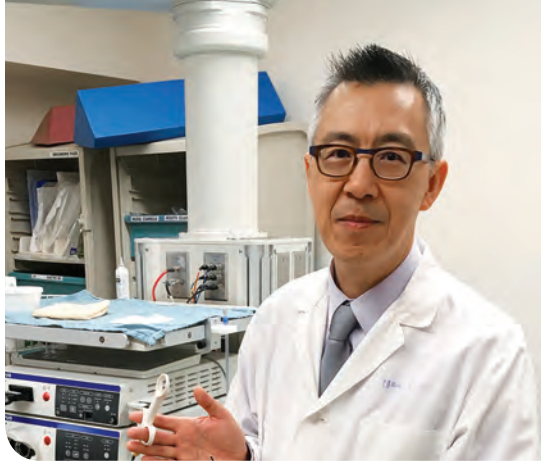
"Strokes, if not treated quickly, can leave healthy, independent individuals with permanent disability that dramatically impacts their quality of life," says Dr. Brian Buck, an AHS stroke Neurologist and Associate Professor of Medicine at the U of A.

"We believe those patients identified with atrial fibrillation will, for the rest of their lives, have a much lower risk of having a stroke in the future," Buck says.

The Cardiovascular Health and Stroke Strategic Clinical Network is also leading discussions to determine the best implementation strategy.

PER DIEM research was funded through Alberta Innovates' Partnership for Research and Innovation in the Health System (PRIHS) program and the Alberta Innovates CRIO grant (QuICR Alberta Stroke Program). Medtronic also gave in-kind support. Trial results were published in *JAMA* in June 2021. ■

—With files from the University of Alberta, Folio magazine in June 2021



RAH gastroeneterologist Dr. Clarence Wong.

Photo by Sharman Hnatiuk

Innovative surgery; speedy recovery

WRITTEN BY SHARMAN HNATIUK

Shortly after Denis Cho woke up from having his cancerous gastric tumour removed at the Royal Alexandra Hospital (RAH), he was told he could go home. He was ready for discharge from his day procedure.

While many elective surgeries have been postponed during the COVID-19 pandemic, the 61-year-old Cho was eligible for a minimally invasive method called endoscopic submucosal dissection (ESD), used for removing cancerous tissue from the gastrointestinal (GI) tract. His procedure in April 2020 went ahead since it did not require an operating room or overnight stay.

During ESD, patients receive sedation and a gastroenterologist passes an endoscope through the mouth to the GI tract where the tumour is located. The entire tumour is removed, along with surrounding tissue, by using instruments inserted through the endoscope.

"Traditionally, stomach cancer operations require an in-patient stay of several days and a recovery that could last a week," says Dr. Clarence Wong, a gastroenterologist at the RAH. "There are no pain receptors in the stomach, so in general, ESD patients require little or no medication for post-op pain control, and recover more quickly."

As of February 2022, 25 early-stage gastrointestinal cancer cases have received the innovative procedure at the RAH. All were discharged home within 24 hours of surgery. "I was back working days after my procedure," says Cho. ■

Fighting COVID drop by drop

Wastewater samples help identify local COVID-19 outbreaks

WRITTEN BY PAMELA HYDE

A study at three Calgary hospitals has proven that testing wastewater for COVID-19 can help identify cases and predict outbreaks in high-risk facilities.

Alberta Health Services (AHS), the University of Calgary and Advancing Canadian Wastewater Assets (a partnership between the U of C and the City of Calgary) made this finding as part of their ongoing monitoring of wastewater in Calgary and surrounding areas for COVID-19.

"Wastewater monitoring can give an early warning of infection. It is quite sensitive, can be used to detect variants and, in individual facilities, it strongly predicts outbreaks and new cases," says Dr. Michael Parkins, Associate Professor in the University of Calgary's Cumming School of Medicine.

The team expected rates of SARS-CoV-2 (the COVID-19 virus) in hospital wastewater to increase as more COVID-19 patients were admitted to the hospital, but were surprised to see the data show values spiking when hospital-acquired infections occurred.

"This shows that the bulk of traces of COVID-19 detected in wastewater corresponds to infections just prior to or at symptom onset, and it clearly shows the value of wastewater monitoring," says Parkins.

"Wastewater provides a more immediate signal than the clinical case data. Hospitals were ideal for demonstrating this concept because we could compare wastewater signals to comprehensive clinical data on patients. This adds confidence for monitoring in other high-risk locations, like meat-packing plants or long-term care facilities, where wastewater monitoring can stop an outbreak before it starts," Parkins says.

The study, published in *Water Research*, provides proof that wastewater testing has a critical role in monitoring individual facilities.

The work was supported through a Canadian Institutes of Health Research research grant, but that initial funding has concluded.

The group is seeking funding to make wastewater testing an ongoing part of Alberta's public health program.

"Wastewater testing is inherently inclusive, assessing the health of all members of society and does so at a tiny fraction of the cost of clinical testing," says Parkins. "It can revolutionize public health surveillance and monitoring." ■

—A longer version of this story first appeared on UCalgary.ca in June 2021

From left: Michael Parkins, Casey Hubert and Kevin Frankowski lead the COVID-19 wastewater monitoring project.

Photo by Adrian Shellard, U of C

Dr. Xiaoli Lilly Pang, ProvLab's Microbiology Program Leader, is leading efforts to test sewage for the presence of COVID-19 from 12 wastewater treatment plants across Alberta.

Photo supplied by the University of Alberta

Team tests effluent samples from long-term care homes

WRITTEN BY GILLIAN RUTHERFORD

Wastewater monitoring can predict outbreaks in high-risk facilities

A technician tests a wastewater sample for COVID-19 and its variants.

Photo by Evan Isbister

Alberta Health Services (AHS) and University of Alberta medical scientists are teaming up with Edmonton's drainage utility company and others to develop an early warning system for COVID-19 outbreaks in long-term care homes.

In January 2021, EPCOR, an Edmonton-based company that manages wastewater in parts of Alberta, began taking twice-weekly wastewater samples from manholes at 10 Edmonton long-term care facilities. The samples are then tested at Alberta's Public Health Laboratory (ProvLab) to detect and quantify the presence of the COVID-19 virus.

"Infected people can shed virus in their stool several days before clinical diagnosis," says principal investigator Dr. Xiaoli Lilly Pang, Professor of Laboratory Medicine and Pathology in U of A's Faculty of Medicine & Dentistry. Also ProvLab's Microbiology Program Leader, she has led efforts to test sewage from 12 wastewater treatment plants across Alberta.

"Getting an early warning at continuing care sites will allow us to identify cases, isolate them and stop the spread of disease sooner among this most-vulnerable population," says Co-principal Investigator Dr. Christopher Sikora, Adjunct Professor in U of A's School of Public Health and lead medical officer of health for AHS – Edmonton Zone.

Follow-up blood samples will be taken to study the immune response of staff and residents who test positive for COVID-19, those who are exposed but don't get sick, and those who are vaccinated.

Results will be added to a national COVID-19 immunological study database, says co-principal investigator Dr. Bonita Lee. She is Associate Professor of Pediatrics and AHS Assistant Director of Infection Prevention and Control at the University of Alberta Hospital, Mazankowski Alberta Heart Institute and Stollery Children's Hospital.

"We don't know much yet about the immunology for this disease and how it may be different for those who have already had the infection versus those without COVID-19 when they get the vaccine," Lee said.

"This study will help fill that knowledge gap."

The study is funded by the Public Health Agency of Canada through the COVID-19 Immunity Task Force, as well as the Canadian Institutes of Health Research. ■

—A longer version of this article appeared in the University of Alberta's Folio magazine in February 2021

Contact tracer Loree Eves works from her home in Calgary.

Photo by Leah Hennel

Contact tracing a cornerstone in fight against COVID-19

WRITTEN BY GREG HARRIS

During the peak of the COVID-19 pandemic's third wave, a team of schedulers with Alberta Health Services (AHS) Communicable Disease Control (CDC) spent close to 16 hours each day scheduling a workforce of nearly 2,600 case investigators and contact tracers.

Although the team had semi-automated tools to assist them, the number of variables involved in assigning staff, combined with the changing demands of the pandemic, made the exercise incredibly complex and time-consuming.

> Any time you have a workforce effectively organized and managed, there is a downstream benefit

Not long after, a potential innovative solution was proposed and an AHS working group was established that developed a homegrown solution—the Daily Automated Staff Assignment tool, or DASA—which helped slash the time needed to create schedules.

"DASA is a gift," says Tanya Platt, CDC Associate Manager, Case and Contact Tracing – COVID Response, who has been directly involved in CDC staff scheduling since September 2020.

"Any time you have a workforce effectively organized and managed, there is a downstream benefit. Staff start work each day knowing exactly what their assignments are—there is no time wasted figuring out what you're supposed to do."

Case investigation and contact tracing havw been a cornerstone in the fight against COVID-19 and have been imperative to tracking community spread, limiting virus transmission, and protecting Albertans. Making sure AHS case investigators and contact tracers are efficiently organized is key to its success.

"A significant opportunity that arose during the pandemic was the ability to collaborate with many other departments within AHS to use expertise across the organization," says Cindy Dribnenki, Director, CDC and COVID Response Team. "This project is an excellent example of cross-team collaboration that has resulted in significant efficiencies for the CDC team."

Thanks to a working group led by the Innovation and Business Intelligence team within Health Evidence and Innovation, with contributions from CDC, Information Technology, and Data & Analytics, a tool tailor-made to the needs of AHS schedulers was created.

DASA uses about 4,000 lines of code, integrates 81 different variables and deploys SharePoint, Tableau, and Microsoft Excel functionalities, as well

Kathy Ervin, Provincial Director of Diagnostic Laboratory systems, worked with several AHS teams to improve data entry.

Photo supplied

Technology helped speed up data entry to make it three times more efficient

as existing Provincial Staffing Services tools to accommodate the needs of AHS contact tracing schedulers. Scheduling considerations included knowledge levels and expertise of staff, roles, nature of assignment and type of investigation (hospital, school, or workplace).

"A tremendous amount of manual work needed to be done every day in scheduling staff," says Daniela Robu, Director, Innovation and Business Intelligence, and lead of the working group that developed DASA.

She credits Moushir Elbishouty and AbdAllah Elsheikh, senior consultants with the Innovation and Business Intelligence Team, with dealing with the complexities in assigning staff. "They managed to reduce the 16 hours of manual work to one hour through this automation," she says.

Robu notes that the next step is to develop a caseload prediction tool, which will use machine learning, to better anticipate the pandemic's shifting demands. "If we know six weeks in advance what the case numbers will be, it would help us plan our workforce resources to respond," she says.

Down the road, DASA may also be adapted for non-pandemic scheduling needs within AHS. ■

Bringing some MAGIC to the workplace

WRITTEN BY SHELLEY BOETTCHER

When it comes to Alberta Health Services (AHS) and healthcare, sometimes MAGIC is involved.

MAGIC—also known as Millennium Automatic Generated Interface COVID-19—was developed in the summer of 2020 and was available for first use on Sept. 9, 2020 to speed up laboratory entry data during COVID-19 testing. Millennium is the primary computer system used by Alberta Precision Laboratories' Provincial Public Health Laboratory for processing specimens and generating results.

Prior to MAGIC, the process of creating files—including a requisition—was taking two to three minutes per swab. That may not sound like a long time, but back then, the team was having to adjust from processing several hundred in a pre-pandemic situation to thousands per day as COVID-19 test requests came in.

"It quickly became necessary to look to technology to assist," says Kathy Ervin, Provincial Director, Diagnostic Laboratory Systems.

Several AHS teams came together, including Web Presence and Collaboration Services, the Personal Health Portal team, and the Millennium Interface, Reporting, and Application teams to refine and improve both the booking site and lab processing. They extracted information from the AHS COVID-19 test booking site that would let the lab team speed up each order entry. That information includes:

- A valid Alberta Personal Health Number to ensure that each person's results were available in Netcare and in the patient portal. Invalid entries cause failures in the process, so a "Check Digit" algorithm was added to prevent errors.
- Each patient's phone number, which was also validated to prevent errors.

"The outcome was three times more efficient data entry in the lab for the thousands of COVID-19 swabs collected daily," Ervin says. "It meant assessment centre appointments could be processed quicker and easier to best support AHS' response to the COVID-19 pandemic." ■

Lahni Thompson receives a COVID-19 booster vaccine from licensed practical nurse Ure Onwuka in Calgary.

Photo by Leah Hennel

Collaboration key to developing vaccine booking tool

WRITTEN BY GREG HARRIS

Today, with millions of doses of COVID-19 vaccines in the arms of Albertans, it might be easy to forget how exciting—and complex—the early days of the vaccine rollout were.

That is, unless you were part of the Alberta Health Services (AHS) group that worked around the clock to create and manage an ever-evolving online vaccine booking tool—in which case, it's a time you'll never forget.

"This was a time of extraordinary collaboration, involving colleagues in Public Health, Health Link, Communications, Information Technology, and more," says Michael Cleghorn, Executive Director, IT Community Care Services, who helped lead the development of the tool.

"Thanks to the work of these many different teams, we built in-house—in just six weeks—a custom vaccine booking system that was ready for Phase 1 of the immunization program."

The roots of the immunization booking tool can be traced to the COVID-19 online assessment tool, which was developed early in the pandemic to help people decide if they needed to be tested.

The assessment tool evolved to include the capability for booking COVID-19 tests. To date it has been accessed almost 20 million times and has helped book more than five million tests. It continues to be a valuable tool during the pandemic.

> We built in-house, in just six weeks, a custom vaccine booking system

On Jan. 4, 2021, when the immunization booking tool rolled out, AHS staff were the first to use it to schedule their shots. By Jan. 8, more than 10,000 staff had done so.

Fast forward to early May 2021, and the booking tool had evolved to accommodate more than 100,000 immunization appointments booked in a span of just five hours—an incredible achievement.

The road to success wasn't without a few bumps and other challenges, given the high volume of people accessing the tool.

"Along the way we increased server capacity, added Health Link phone lines and staff, and added a queuing tool to ease demand—all of which helped significantly," says Randal Blanton, Director, Enterprise Web. "There were other innovations as well, such as creating an option for family members to schedule their appointments together."

Eventually the improvements paved the way for a record-breaking day on June 18, 2021, when Albertans booked more than 170,000 appointments in a single day.

It hasn't been only the sheer volume of bookings to which the team has had to adapt. "Throughout the rollout, there have been changes in vaccine

Albertans were kept informed about what was coming next

availability, changes in the different eligibility requirements for the different vaccines, and short timelines in which to prepare," says Kass Rafih, Senior Provincial Director, Innovation and Digital Solutions.

"Not only did each change require that the tool itself be updated, we also had to be prepared with updated communications for our teams helping deliver the vaccine and to make sure Albertans were kept informed about what was coming next."

In August 2021, the immunization booking tool migrated from the AHS system to a different vendor system, a change that required significant work and coordination between different areas.

The booking tool continues to expand and meet fluctuating eligibility and volume demand for all Albertans. That's more than eight million doses of vaccine, and counting. ■

Calgary's Telus Convention Centre was the site of one of the AHS-run mass vaccination clinics.

Photo by Leah Hennel

Getting results by text and phone

Bringing COVID-19 test results to Albertans via automated phone calls and text message were early innovations of the pandemic that added convenience and increased safety.

By September 2020, Albertans were able to receive their results by text or by an automated call if they booked a COVID-19 test through ahs.ca/covid, or were tested on a drop-in basis at an AHS assessment centre.

Delivering results by these methods decreased, by a full day, the time it took for Albertans to receive their results after being swabbed. This enabled individuals who were asymptomatic and who tested positive to begin self-isolation sooner.

Those who chose not to receive a text or automated call received their results by a phone call from an AHS team member. At that time, in the fall of 2020, anyone who tested positive for COVID-19 was also contacted by phone by AHS' Public Health team for further follow-up and support.

Since the service was introduced, many millions of COVID-19 test results have been texted to Albertans. In six months alone, from August 2021 to February 2022, more than 2.1 million test results were sent. Faster delivery of testing results has been an important tool to help limit the spread of COVID-19. ■

Lab assistant Serhan Kustutan conducts COVID-19 serology testing at the Alberta Public Laboratory (ProvLab) in Edmonton. The lab is working with Alberta's Tomorrow Project, which is studying how virus antibodies change over time in the hopes of refining healthcare responses and treatment.

Photo by Evan Isbister

Researchers are testing today for tomorrow

In mid-2020, the Alberta Ministry of Health sponsored the Alberta's Tomorrow Project (ATP) to begin a serological study to assess the spread of COVID-19 in Alberta.

Working with ATP, Alberta Precision Laboratories (APL) introduced COVID-19 serology testing in June 2020. It is now a critical tool for COVID-19 surveillance studies—including ATP's study—in Alberta.

More than 4,000 people in Edmonton, Calgary, Red Deer and Lethbridge are participating in the ATP study, which looks for the presence of antibodies in blood. Those antibodies may indicate if a person has had an immune response to a COVID-19 infection and, if so, how their antibody levels change over time.

"We are adding data that will contribute to understanding correlations between COVID-19 and its risk or impact to different people, and fill gaps for researchers to understand the short- and long-term effects of this pandemic,"

> Studies will help us understand the short- and long-term effects of this pandemic

says Dr. Jennifer Vena, ATP's Scientific Director.

Shandra Harman, ATP's Strategic Director, is responsible for developing and implementing strategic initiatives to advance the project's health research in Alberta and beyond. "As the pandemic has evolved, our team has continued to find opportunities to support COVID-19 research that will help influence pandemic-response programs and healthcare decision-makers," Harman says.

APL implemented a new version of the test in 2021 to measure COVID-19 antibodies more accurately.

"Using a combination of antibody tests, APL collaborated with researchers to assess how COVID-19 antibodies change in response to infection, vaccination, or a combination of both," says Dr. Jamil Kanji, an Infectious Diseases Physician and Medical Microbiologist.

"Combining this information with data collected through studies such as the ATP study, provides valuable information to help improve understanding of the COVID-19 infection and how the vaccine works." ■

ANTIBODY STUDY TESTING BY THE NUMBERS

Alberta's Tomorrow Project COVID-19 Antibody Study aims to better understand antibody response from an acquired infection and the vaccines.

Preliminary numbers:

- Almost all of the **4,000** Albertans who participated (**99 per cent**) completed an online survey about COVID-19.
- Almost **four per cent** have had COVID-19.
- More than **95 per cent** of study participants are vaccinated.
- Roughly **73 per cent** of participants say they had no concerns about the vaccine.
- More than **90 per cent** of participants returned for their four-month follow-up appointment.

WHAT IS ALBERTA'S TOMORROW PROJECT?

Launched in 2001, Alberta's Tomorrow Project (ATP) is tracking **55,000** people over 50 years to better understand cancer and chronic diseases, with the goal of improving health outcomes for Albertans.

Since its inception:

- More than **950,000** questionnaires have been filled out by ATP participants.
- Biological samples have been collected from more than **30,000** participants.
- ATP's database houses more than **two billion** points of data.
- Nearly **200** papers and presentations have been published or delivered based on ATP data.

Above left and below: Testing at the Alberta Public Laboratory (ProvLab) in Edmonton, which is working with Alberta's Tomorrow Project to study how virus antibodies evolve.

Photos by Evan Isbister

Virtual care

Technology allows patients to upload their vital signs to a dashboard their care providers can monitor

Digital Remote Patient Monitoring in AHS virtual hospitals

WRITTEN BY GREG HARRIS

The introduction of home monitoring technology by Calgary's Complex Care Hub (CCH) and the Edmonton Zone Virtual Hospital (EZVH) is a success, according to patients, as well as the preliminary results of an evaluation.

Alberta Heath Services' (AHS) virtual hospitals began using Cloud DX, a new digital Remote Patient Monitoring (dRPM) technology in May 2020.

Cloud DX equips patients with a tablet, blood pressure monitor, pulse oximeter (for measuring blood oxygen levels), weigh scale and a thermometer, which lets patients upload their vital signs to a dashboard their care providers can monitor.

"dRPM was one of many factors that contributed to fewer CCH and EZVH patients accessing emergency department and acute care services in 2020," says Shy Amlani, Provincial Director, Virtual Health. "It's a relatively small sample size, but it is encouraging to see that this technology appears to be empowering patients to safely monitor their own health, while keeping them at home during the pandemic."

Since its introduction, about 350 patients have used dRPM technology, which offers a quicker and more reliable method of getting a patient's health data to care providers than exchanging the information by phone.

The average age of CCH and EZVH patients who have used dRPM is about 70. That includes stable home hospital patients with complex conditions, those recovering from surgery, and others learning to manage their chronic complex conditions by monitoring their vital signs and following an action plan.

Nicole Veronovici, Acting Director of the Edmonton Zone Virtual Hospital, notes that patients were generally positive about the technology.

"The majority of people using dRPM said it helped them feel more involved in their care, and that they felt their care was either better or much better, thanks to the technology," Veronovici says.

Dr. Michelle Grinman, Medical Lead, Calgary Complex Care Hub, says the availability and reliability of patient data has helped care providers with clinical decision-making.

"It has also enabled our program to evolve to a hybrid model of in-person and virtual acute care. Our patients and healthcare providers express high levels of satisfaction with the program and its technology platform," Grinman says. "The addition of dRPM has enabled our team to empower patients and to connect them with our care providers via secure videoconferencing."

AHS' virtual hospitals were established in 2018 to provide home-based acute care to patients in their own homes as an alternative to in-hospital care.

When the pandemic hit, virtual hospitals had an opportunity to expand their reach with dRPM technology.

"This is a great example of how AHS can improve patient care through the responsive adoption of innovative technologies in their home," says Patty Wickson, Executive Director, Innovation Evidence Evaluation & Impact.

"We owe it to our patients to find ways to quickly and safely introduce innovations that will benefit them."

Introducing dRPM technology required the collaboration of many different AHS teams, including clinicians, Virtual Health, Contracting, Procurement & Supply Management, Information Technology, Health Systems Knowledge & Evaluation, and Continuing Care.

The project was supported by a Canada Health Infoway grant.

AHS continues to evaluate the use of digital remote patient monitoring technology to better support the care of patients in its virtual hospitals. ■

Telehealth psychiatry changing the face of emergency mental health

WRITTEN BY SHELLEY BOETTCHER

Three years ago, Catherine Garon recognized the growing need for Telehealth psychiatry in her community of Cold Lake.

At the time, patients were being kept in the town's emergency department until they could be transferred by ambulance to St. Paul, about 120 km southwest of Cold Lake. There, they could meet in-person with a psychiatrist.

To get the help they needed, patients had to leave their home community, which potentially added to already high stress levels.

When a patient with a mental health concern had to travel via ambulance, regulations required that three EMS staff accompany them. The ambulance and staff then waited until the patient finished their treatment in St. Paul, before driving them back to Cold Lake. If the EMS crew needed to leave St. Paul to attend another call and the patient was discharged, the patient was sometimes stranded without a ride back to Cold Lake.

"But we didn't have any other way for patients to speak with a psychiatrist," says Garon, AHS Cold Lake Health Centre's Site Manager.

"I just knew there had to be a better way. Why couldn't we just put a patient in a room, dial up a psychiatrist and let them talk?"

Patients feel like they've been heard

Working with AHS psychiatry and Addiction and Mental Health, Garon and the team proposed to create a Telehealth Psychiatry pilot program and, in June 2020, the pilot was launched.

"Implementing a tele-psychiatry program in a rural community significantly improves access to psychiatric consultation in a way that is timely, convenient and cost-effective," says Edith Zuidhof-Knoop, North Zone Addiction and Mental Health Director. "Our team is excited to be part of this innovative project that takes away barriers to care. It also helps Cold Lake Health Centre staff provide the right care while patients remain in the community."

The Cold Lake healthcare team turned an under-used room into the Telehealth access point, installing videoconferencing technology and adding extra sound-proofing for patient privacy.

Then, formal criteria was developed to help doctors decide which patients are best suited for the program.

"Telehealth psychiatry is ideal for patients who need a medication adjustment or for women with non-severe postpartum depression and those who need to check in with their regular psychiatrist," Garon says.

"The patient can talk with the psychiatrist and then the psychiatrist can talk with the emergency room physician afterward to adjust the person's medication, make a mental health referral or complete whatever else needs to be done."

It isn't appropriate for every patient, but when it does work, patients overwhelmingly like the time-saving and stress-reducing process, says Garon. She estimates the Telehealth psychiatry system is helpful for about 30 per cent of the patients who seek psychiatric care at the Cold Lake Health Centre.

The pilot is now a regular part of the offerings for mental health patients at the facility. Evaluations are underway to determine how and when to expand the program to other AHS sites.

"Staff like it. Patients like it," Garon says.

"A lot of people love the fact they don't have to travel. They feel like they've been heard and that their concerns have been taken seriously." ■

Danny Kolotyluk says home hemodialysis is 'one of the best things I think I've ever done.' The Sherwood Park resident has access to round-the clock virtual care from nurses and technologists.

Photo by Evan Isbister

Patients enjoy greater independence and control over their health

WRITTEN BY MARNI KUHLMANN

Danny Kolotyluk is grateful to be among 100 patients currently doing home hemodialysis in the Alberta Kidney Care –North (AKC-N) program, a milestone that's being celebrated this year by Alberta Health Services (AHS) and the University Hospital Foundation (UHF).

"Home hemodialysis helps give patients in kidney failure more independence and control over their health, all while in the comfort of their own home," says Cathy Osborne, Senior Operating Officer for the University of Alberta Hospital (UAH), Mazankowski Alberta Heart Institute and Kaye Edmonton Clinic.

"Together with the UHF, whose donors generously support additional home hemodialysis equipment to the AKC-N program, our team is able to help provide a better quality of life for more than 100 Albertans on home hemodialysis."

That support has helped make the home hemodialysis program one of the largest in Canada.

> Like many patients, he dialyzes at night while he sleeps

In the past, Kolotyluk spent many hours at the hemodialysis unit at the UAH. With his kidneys no longer working properly, he needs hemodialysis treatments to remove excess fluid and waste products from his blood.

Facility or hospital-based hemodialysis requires a massive time commitment. Having to attend three times a week, for at least four hours each session, gave Kolotyluk a lot of time to think about a better option. He found that option through the Home Hemodialysis Program of AKC-N.

While traditional therapy is effective and safe, and healthcare staff do all they can to ensure people who come to hospital to dialyze have a good and comfortable experience, Kolotyluk says he found his experience "harsh"—as many others do—with cramping, headaches and nausea afterwards.

"I really wanted to get on home dialysis because we were doing the night shift, so I'd start at 6 and finish at 10 p.m.," adds the Sherwood Park resident.

Since switching to home hemodialysis, Kolotyluk can dialyze on his own schedule. Like many patients, he dialyzes at night while he sleeps. This slower, gentler form of dialysis is easier on the body than three-hour daytime treatments. Patients also benefit from fewer dietary and fluid restrictions, and feel better overall.

Patients have access to on-call help around the clock from the program's nurses and technologists, and receive extensive training before starting their hemodialysis at home.

"We make a very strong commitment to individuals who are learning to dialyze themselves. We're not going to send you home until you're comfortable, nor will we send you home until our nursing staff, the teachers, are also comfortable," says Dr. Robert Pauly, Medical Director, Home Hemodialysis Program. "We're really aiming for success once you get home."

For Kolotyluk, home hemodialysis has been life-changing. He reports having more time and energy and feels well enough to enjoy activities and outings with his wife of 45 years, Janine.

"It's been just incredible—one of the best things I think I've ever done." ■

Dr. Ryan Cooper is an Associate Teaching Professor of Infectious Diseases at the University of Alberta and a physician at the Royal Alexandra Hospital in Edmonton.

Photo by Evan Isbister

Virtual clinics mean TB patients receive quality care no matter where they live

WRITTEN BY SHELLEY BOETTCHER

Thanks to a virtual clinic, tuberculosis (TB) patients from rural and remote communities in Alberta can receive treatment in their own communities.

One of the world's most deadly communicable diseases, TB primarily affects the lungs and is spread by patients with active cases.

Latent TB means that you have the bacteria in your body but it isn't contagious. Active TB means you can spread it to others. Symptoms include persistent cough, fever, weight loss, night sweats and fatigue.

In Alberta, TB is rare and is found mostly in new Canadians born in countries with high rates, and Indigenous people living in rural and remote areas.

TB is preventable and curable. According to the World Health Organization, about 85 per cent of TB patients around the world are successfully treated.

There are two in-person tuberculosis clinics in Alberta: one in Edmonton and one in Calgary.

A virtual clinic was started in 1999 as an extension of those clinics, and allows specialized public health nurses and physicians to reach patients in rural and remote areas.

Since the virtual clinic began, the number of Indigenous TB patients has fallen dramatically in Alberta due to increased access to appropriate care. In fact, on First Nations active cases have dropped by as much as 56 per cent.

Patients with active TB are referred to the clinic by their local physician, a public health nurse or a community health nurse.

"The idea behind the virtual clinic is to improve the quality of TB care and prevention for Indigenous people and others living in rural and remote areas, far from major centres," says Dr. Ryan Cooper. He is an Associate Teaching Professor of Infectious Diseases at the University of Alberta and a physician at the Royal Alexandra Hospital in Edmonton.

> The virtual clinic ensures the same team continues to care for the patient

Unlike many virtual clinics, the virtual TB clinic relies more on in-person information gathering than telehealth. Local public health nurses work with each patient, getting histories and coordinating radiographic, microbiology and blood work.

The TB specialist reviews the patient's chart and sends an action plan back to the patient's clinical care team. Physicians can then order anti-TB drugs, which are dispensed from a central drug depot overseen by the virtual clinic. All medications and care are free of charge.

Each patient with active TB is followed by the virtual clinic for one to two years. "The virtual clinic ensures the same team cares for them over the course of their illness," Cooper says.

"If necessary, the patients have access to videoconferencing," adds Dr. Richard Long, Director of the Tuberculosis Program Evaluation and Research Unit at the University of Alberta. "And if they are very ill or their case is particularly complicated, they may be transferred to a local hospital or tertiary care centre."

Staff vary, but typically there is one physician and five nurses. They link by teleconference or videoconference with public health nurses throughout the province. Virtual clinic staff review about 50 files each week, some relating to patients with active TB and others relating to candidates for treatment of latent TB infection.

"The virtual clinic, combined with the in-person clinics, ensure that quality care —delivered by experienced healthcare professionals—is available to everyone in Alberta," Cooper says.

"Virtual clinics are especially important to Indigenous TB patients, given previous generations' experiences, when many were taken for treatment far from their families and homes," says Long. "Thanks to the in-person and virtual clinics, TB has largely vanished from Indigenous children in Alberta, which is not the case elsewhere." ■

Maria Holandez and her daughter, Zoila, participated in the AHS virtual care pilot project for premature babies in Calgary. “It is very helpful and convenient,” says Holandez.

Photo by Leah Hennel

Technology puts healthcare right at home

WRITTEN BY SHELLEY BOETTCHER

Telemedicine project focuses on high-risk pregnancies

When it comes to perinatal medicine, Alberta Health Services (AHS) uses telehealth technology—including Zoom and other platforms—to improve healthcare access during the COVID-19 pandemic for new and expecting parents in rural areas, as well as families.

The Maternal Fetal Medicine Telemedicine Initiative began as a pilot project in Spring 2021 in Lethbridge and Medicine Hat.

Previous to the initiative’s start, patients with high-risk pregnancies in rural communities in southern Alberta often had to travel several hours to larger centres to receive maternal fetal medicine care, says Dr. Titilayo Oluyomi, Department of Obstetrics and Gynecology, University of Calgary.

More than 50 patients have already participated in the program, which includes high-risk pregnancies such as twins, fetal growth restriction, previously diagnosed fetal anomalies that need follow-up, and more.

“The Maternal Fetal Medicine Telemedicine Initiative brings specialized prenatal ultrasound surveillance for high-risk obstetric patients in their home communities,” says Oluyomi.

She and Dr. Stephanie Cooper co-lead the initiative, which they designed with help from AHS Virtual Health, Pam Nugent (AHS Clinical Quality Improvement at Foothills Medical Centre), and the community collaborators in obstetrics and radiology.

Patients are typically referred to the program by their antenatal care providers, and then participate until delivery, or until the referring physician in the program is no longer needed. Throughout the course of their pregnancy, patients meet with the sonography team, radiologist and their Maternal Fetal Medicine physician.

Dr. Titilayo Oluyomi

Access to a computer and Internet are the preferred way to engage with the telehealth team, but telephone consultations are also available.

The project has been approved to continue beyond the Lethbridge pilot, which wrapped up in Spring 2021. Plans are in the works to expand it to other parts of the province in 2022. ■

Ensuring families stay safe, informed

Having a baby in the neonatal intensive care unit (NICU) is stressful at any time. Add a pandemic to the mix, and those stress levels skyrocket. How do you keep families and healthcare teams safe from COVID-19, yet ensure everyone has their questions answered in a thorough and timely manner?

That question is why the team at the Stollery Phillip C. Etches NICU at the Royal Alexandra Hospital recently turned to technology to connect families and staff.

Pre-pandemic, parents and caregivers could accompany staff as they did their morning rounds, meeting bedside with each tiny patient.

The multidisciplinary staff includes doctors, nurses, pharmacists, dietitians and respiratory therapists. On any given morning, pre-pandemic, as many as 10 people could be at each baby's bed, including the parents or caregivers.

But in early 2020, as the first wave of COVID-19 cases were climbing, the Stollery team realized it was no longer feasible to have so many people doing rounds in the 69-bed NICU. "Ten people crowding around one baby was a challenge before COVID-19, but the challenge became more acute during the pandemic," says Dr. Kumar Kumaran.

"How could we minimize the number of people but not take away that opportunity for each family to know how their baby is doing?"

Dr. Jennifer Toye suggested that they try virtual rounds, using Zoom to keep everyone in the loop, yet limiting the number of people physically at each bedside.

"No additional restrictions were made on caregiver in-person attendance, but some chose the option because they were isolating or it worked best with their life," she says.

With the help of Alberta Health Services Virtual Health, speakers, laptops and microphones were procured, and

Nicole Johnston, pictured here with her son Maximus, participated in the AHS virtual care pilot for premature babies in Calgary.

Photo supplied

Building strong virtual connections between families and care teams

privacy questions were addressed and solved. One or two NICU team members—typically a charge nurse and a clinician—did the rounds with a laptop and speakers, allowing people, potentially including the pharmacist, dietitian and others, to ask questions without physically being in the room. Reports and X-rays could easily be shared on screen, and time was made to ensure each person had an opportunity to weigh in.

"Families were thankful for the technology," says Kumaran. "They could still join in and ask questions and discuss what was going on with the team."

Based on positive feedback from parents, Toye says virtual rounds have continued for those who wish to use the service. ■

Virtual care helping preemie newborns

In March 2020, coincidentally just before the start of the COVID-19 pandemic in Alberta, the Alberta Health Services virtual care pilot project for premature babies in Calgary began. The project was designed to enhance family and provider experiences, and potentially save costs related to nursing time and travel.

"We were pleasantly surprised to be able to assess breastfeeding, bottle feeding, tone, activity and most developmental milestones using virtual care," says Karen Lasby, an AHS Clinical Nurse Specialist who helped create the program.

"It was less stressful and more convenient. Families were able to remain at home while still receiving the healthcare they needed."

Fifteen parents participated in a total of 43 virtual visits during the three-month pilot. Each virtual visit was an average of 31 minutes, compared to 60-minute averages for in-person appointments.

To be included in the program, each family needed either a computer with webcam or smart phone, email access, and fluency in English.

An infant weigh scale was loaned to each family, and parents were asked to weigh their infants before each virtual visit. "The loaning of infant weigh scales allowed us to continue quality care via virtual contacts during the early days of the pandemic," says Lasby.

Lasby and her team estimated that the three-month pilot saved approximately 850 km of travel, 21 hours of driving time, and about 28 hours of direct nursing time. Each nurse could schedule up to five virtual appointments, compared to two in-person visits per day.

In a survey at the end of the project, 100 per cent of parents felt virtual care improved their access to healthcare.

The pilot phase has ended but the program has been expanded for other new parents in Calgary. ■

Larissa Heron, left, is one of the students who took part in the Patient and Community Engagement Research (PaCER) certification program.

Photo by Evan Isbister

Fostering research success

Meet the next generation of healthcare

WRITTEN BY SHELLEY BOETTCHER

When it comes to healthcare, Alberta Health Services (AHS) believes in the importance of Indigenous knowledge and teachings.

Overseen by the AHS Indigenous Wellness Core (IWC), Honouring Life is a youth suicide prevention and life promotion program developed to build mental wellness, resiliency, and healthy lifestyle opportunities for First Nation, Métis and Inuit youth across the province. Grounded in Indigenous traditions and culture, Honouring Life supports building community capacity with community-developed and led Indigenous youth life promotion initiatives.

In late 2020, Honouring Life sponsored Indigenous young adults aged 18 to 24 from across Alberta to take part in the University of Calgary's one-year Patient and Community Engagement Research (PaCER) certification program.

The PaCER program seeks to teach learners research skills, as well as incorporate a research-based patient perspective into healthcare and health research.

The Indigenous students were mentored by both Kienan Williams, Program Lead for Innovation and Research for the IWC and PaCER's AHS sponsor liaison, and Tawnya Crowshoe, an AHS Indigenous Hospital Liaison at Pincher Creek Hospital and a previous graduate of the PaCER program.

Each cohort member was chosen by their respective communities and the IWC for their commitment to their communities and to health and life promotion.

The goal of the all-Indigenous cohort is to bring together and create a common ground between Indigenous and non-Indigenous ways of researching.

"When you do something in a lab, it's isolated. You're looking for truth, but the truth doesn't always extend to real-world applications," Williams says.

The Indigenous approach to research, however, is different, he explains: "We study things based on their relationship to others. Everything has a relationship to something else."

The students do not have to do research around suicide prevention as part of their schoolwork or their contribution to the PaCER program. However, once they are done their studies, all of the students plan to work in healthcare, ideally in their home communities.

"They have the potential to work anywhere," Williams says.

"The future is bright if we can continue to support their development."

Honouring Life funding currently ends in March 2022, but Williams hopes funding will be extended, to continue to support community-based life promotion projects and Indigenous youth mental wellness across Alberta. ■

Five of the young adults who took part in the University of Calgary's PaCER certification program in 2021

LARISSA HERON

Cree-Métis from Buffalo Lake Métis Settlement in Central Alberta, Larissa Heron is completing a Bachelor of Science degree with a focus on cellular biology at MacEwan University in Edmonton.

"I have been able to research methods of microbiology with a particular emphasis on appropriate public scientific knowledge transfer," says Heron, 22.

She plans to do cellular research in a medical laboratory after graduation: "Five years from now I would like to help incorporate Indigenous research methods into western healthcare institutions."

CHENOA CARDINAL

From the Enoch Cree First Nation near Edmonton, Chenoa Cardinal, 25, graduated with a Bachelor of Science degree from the University of Alberta in 2020. She's now continuing her studies and planning to take the Medical College Admission Test, with plans to work in healthcare, perhaps pediatrics, down the road.

"The more I grow and evolve, so do my interests," she says. "However, healthcare has always been the consistent goal. Growing up, it was easy to see the gaps and deficiencies with the healthcare available on reserves. I hope to close these gaps for all Indigenous children, especially those with no voice."

SHAYLENE SCARRETT

Shaylene Scarrett, 24, is from Siksika Nation near Calgary and is now studying psychology and Indigenous studies at Mount Royal University.

After finishing her undergraduate degree, she plans to attend graduate school to continue her psychology studies.

"I intend to work with Indigenous youth in mental health and addictions," Scarrett says. "I know my life experiences, interest in Indigenous mental health and passion for grassroots Indigenous organizing will guide me on the path I am meant to walk."

ERIK MORGAN

A member of the Métis Nation of Alberta, Erik Morgan, 24, graduated from the University of Lethbridge in 2020 with a Bachelor of Science degree, with honours in neuroscience. He's currently working on a Master of Science degree in neuroscience at McGill University in Montreal.

After graduation, he hopes to help develop and implement inclusive healthcare and research initiatives within the federal and provincial governments.

"Ideally, I would like to be working with provincial or federal governments to help establish policy and protocols to increase the overall mental health for Canadians," he says.

Clockwise, from top left: Shaylene Scarrett Erik Morgan, Chenoa Cardinal and Shayla Scott.

Photos by Leah Hennel
Photo of Erik Morgan supplied

SHAYLA SCOTT

Cree-Métis and Inuk, Shayla Scott, 23, graduated with a Medical Biophysics degree from Western University in 2020.

"Since graduating, I have worked on refining qualitative methods of analysis in Indigenous communities, manuscript writing, and editing," says Scott, now a Project Coordinator with the Sexual Health Network at Pauktuutit, the Inuit Women's Association of Canada.

In the future, she hopes to mentor Indigenous students pursuing healthcare careers, and she is considering becoming a family doctor.

"I hope to bridge northern cultural contexts with the institutional infrastructure that attracts many to the south," she says.

In an emergency training simulation, Marc Boutet, right, performs CPR on a mannequin, while Heather Cook manages the patient's airway, and Rhys Clark, left, performs a medication check.

Photo by Leah Hennel

Cardiac arrest research gives AHS paramedics the tools needed to give patients the best survival outcomes

Dr. Ian Blanchard knows Alberta Health Services' Emergency Medical Services teams (AHS-EMS) have about 10 minutes to intervene during a cardiac arrest.

"Our paramedics have to do a gold medal performance to give each patient the best chance at survival," says Blanchard, AHS-EMS Provincial Research Scientist.

But what does it take to improve that performance and create better outcomes? Questions like that are why AHS-EMS is a leading partner in EMS and paramedic research in Canada.

The concept of modern EMS and paramedic care is less than half a century old in Alberta. Focused on evidence-based decisions, it includes front-line and community paramedics, Emergency Communications Officers who answer 911 calls, and others. "EMS and paramedic research is broad and in its infancy," says Darren Sandbeck, Senior Provincial Director and Chief Paramedic.

Despite its youth, its importance is clear, says Jeanine Zotzman, an AHS Advanced Care Paramedic.

"It's about trying to get information out to our front-line paramedics," she says.

Take cardiac arrests. "If you or your loved one are having one, you'll need a paramedic who knows the latest research," says AHS Primary Care Paramedic Jennifer Bacon.

To support paramedics who lead out-of-hospital cardiac arrest resuscitations, AHS-EMS is part of the Canadian Resuscitation Outcomes Consortium (CanROC). Consisting of EMS and paramedics, fire services, physicians and researchers, CanROC is building a database to better understand out-of-hospital cardiac arrests and to create a platform for clinical trials across Canada.

"Think of CanROC as a bank storing all the information on every cardiac arrest in the country, " says Advanced Care Paramedic Ryan Lee.

"This information can be used by researchers to advance care."

An example is how AHS uses CanROC data to study the symptoms that may predict a sudden cardiac arrest. This initiative, the Canadian Sudden Cardiac Arrest Network (C-SCAN), seeks to understand sudden cardiac arrests that have no identifiable cause.

EduCATe—Multi-centre implementation of an Educational program to improve the Cardiac Arrest diagnostic accuracy of ambulance telecommunicators and survival outcomes for sudden cardiac arrest victims—is another national study underway in Alberta using CanROC data. In EduCATe, Emergency Communication Officers learn to recognize out-of-hospital cardiac arrests during 911 calls.

"Early recognition may allow our teams the opportunity to coach bystanders to help, and may give more information to first responders," says Lee.

Ultimately, it gives Albertans access to better healthcare—and better odds at staying alive, adds Dr. Mark MacKenzie, AHS-EMS Senior Medical Director. ■

PARAMEDIC SERVICES WEEK SHOWCASES FRONT-LINE RESEARCH STUDIES

Paramedic Services Week takes place in May each year. A highlight of the week is Alberta EMS and Paramedic Research Day, an opportunity for paramedics to present their studies to colleagues across the country.

In 2021, Alberta paramedics won special recognition for three studies that work toward improving the lives of Albertans:

- Dealing with Dying—Progressing Paramedics' Role in Grief Support, led by Tyne Lunn, an AHS Community Paramedic in Peace River.
- Developing a National Paramedic Workplace Violence Prevention Framework, led by Edmonton Paramedic Steve Sutton, AHS Provincial Air Ambulance Operations and Inter-Facility Patient Transfer Strategy.
- Closed Reduction of Anterior Shoulder Dislocations Performed by Ski Patrollers in the Alpine Prehospital Environment. Paramedic Kevin Palmer, from Banff, led the study.

Clinical trials elevate care for Albertans

Through AHS, patients and healthcare researchers have opportunities to be involved in research that improves health outcomes. Clinical Trials Alberta is dedicated to establishing Alberta as a destination for conducting high-quality clinical trials and consists of partnerships between academic, government, and research organizations that serve to:

- Promote Alberta's unique strengths to conduct high-quality clinical trials.
- Attract healthcare research and development investment to the province.
- Provide centralized access for the global healthcare industry to engage with the province's researchers.
- Enable collaboration between industry sponsors and Alberta investigators, sites and service providers.

CLINICAL TRIALS BY THE NUMBERS

- In 2021, Alberta Health Services received **1,467 requests** to initiate clinical studies (including surveys, physical tests and highly regulated clinical trials).
- AHS also supported cancer clinical trials, with **1,022 patients** enrolled.
- A further **891 patients** were involved in clinical studies that involved drugs or devices at AHS sites where Connect Care is active. ■

OnCore is taking care of business

At Alberta Health Services (AHS), some innovations are behind the scenes, making a difference for researchers who are improving healthcare across the province.

Take the OnCore Clinical Trial Management System (OnCore CTMS), for instance.

Launched in August 2021, OnCore CTMS is a new system designed to improve clinical trial infrastructure and management in Alberta.

Oncore was selected, purchased and installed jointly by AHS (primarily the Tom Baker Cancer Centre and Cross Cancer Institute), the University of Calgary and the University of Alberta.

The advantages include less administrative work for staff, which means time for additional studies, as well as improved study quality through standardization and adoption of best practices, and centralized, automated financial management and regulatory compliance processes and reporting.

The project is supported by funding from Alberta Innovates and the Alberta Strategy for Patient Oriented Research SUPPORT Unit (AbSPORU).

Alberta is the first province to bring OnCore to Canada.

Procurement was led by U of C. ■

Partnerships

AHS, foundations collaborate on COVID-19 supports

WRITTEN BY AMELIA SCHOFIELD

Whether funding new mental health programs, helping to establish a biorepository, or providing technology to help patients connect with loved ones, the generosity of Alberta Health Services' (AHS) philanthropic partners and their donors continued this past year.

One mental health program made possible with foundation support is the Child, Youth and Family Caregiver Education Series, led by AHS staff in Edmonton.

In partnership with the Mental Health Foundation, this AHS program provides free online mental health resources for parents and caregivers of children and youth. It aims to reduce the stigma of mental health challenges that children and adolescents experience. It also provides parents and caregivers with evidence-based mental health information and offers strategies to support mental wellness.

"Many young people's emotional and mental well-being has been impacted by the pandemic, while families struggle to balance work and childcare," says Deborah McKinnon, President and CEO of the Mental Health Foundation. "We wanted to empower caregivers by providing them access to evidence-based mental health information and strategies to support mental wellness at home.

"The Mental Health Foundation is proud to collaborate with AHS to offer free online programming for parents and caregivers of children and youth."

AHS and foundations also partnered to establish a biorepository for human COVID-19 samples. Supported by the Calgary Health Foundation, University Hospital Foundation, Alberta Cancer Foundation, Stollery Children's Hospital Foundation, Alberta Children's Hospital Foundation and Royal Alexandra Hospital Foundation, the biorepository allows for the long-term preservation of positive COVID-19 samples, giving medical-scientific researchers access to the biological material they need to further study the virus.

"Calgary Health Foundation and our donors recognize that targeted research is needed to enhance our understanding of this highly contagious virus and to accelerate the discovery of effective diagnostics, treatments and prevention for current and future outbreaks," says Mike Meldrum, President and CEO of the Calgary Health Foundation, the lead sponsor of the project.

"The partnership between philanthropy and healthcare means that we can do more, faster, and support the innovation that continues to be needed especially during these critical times."

In addition, AHS' philanthropic partners backed initiatives such as the Foundations of Gratitude campaign, which encouraged Albertans to place hearts in their windows to show appreciation for front-line workers.

"We are fortunate to partner with such committed organizations, and we are grateful for everything they do to help our patients and front-line workers," says Dr. Verna Yiu, AHS President and CEO. ■

HEALTHCARE PHILANTHROPY AT A GLANCE

Alberta Health Services is proud to partner with **69** foundations and **48** auxiliaries in communities across Alberta.

In 2020, foundations raised **$275 million** toward healthcare enhancements including equipment, programs, renovations, research and education.

Over the last five years, more than **450,000** Albertans donated to the province's health foundations and auxiliaries.

In 2020, AHS employees gave more than **$9 million** to foundations, auxiliaries and the United Way through direct donations and fundraising activities.

More than **1,000** Albertans serve on foundation and auxiliary boards, playing a vital role in harnessing the generosity of Albertans for healthcare delivery throughout the province.

Geriatric Services provides resources for the aging at home and in the community

WRITTEN BY SHELLEY BOETTCHER

In 2016, an Alberta Health Services (AHS) team did a scan of rural regions across the province, looking at the programs and supports available for aging Albertans, particularly those with dementia.

In response to what they found—and what was missing—the Seniors Health Strategic Clinical Network helped to create the Primary Health Care Integrated Geriatric Services initiative.

The idea behind the initiative is to provide ongoing care and support for people with dementia, frailty and other age-related conditions. It helps ensure that people can stay living well in their own homes and communities for as long as possible. It also demonstrates a shift away from health system usage to community services, and highlights the need to further integrate services and build capacity at the community level.

In participating communities, a decrease in unplanned emergency room visits and decreased length of stay in acute care for those living with dementia was noted following the initiative's first year.

"Demographics are changing, not just within the province but across the globe. Populations are aging, birth rates are going down, and we are all living longer," says Sharon Hamlin, a Registered nurse and AHS Senior Practice Consultant. She is part of the team supporting the initiative.

"And as people are aging, they are also saying they want to stay living at home. They don't want to live out their last days in a facility. That's why this work is so important."

Funded by a $1.4-million Health Canada grant, AHS works with community groups to create support opportunities and programming for older Albertans with age-related healthcare concerns.

> As people age, they want to stay living at home

Examples developed include memory cafes (meeting places for people experiencing memory loss to socialize safely), as well as art, gardening, walking and music programs, and a community day support program.

With the receipt of grant funding in January 2020, the initiative has been able to support five communities in Alberta: Drumheller, Westlock, Innisfail, Three Hills and Stony Plain.

Other communities, including Lacombe, Olds and Sundre, were involved in the initiative's pilot phase.

Helen Lightfoot is a social worker and AHS Senior Practice Consultant with the initiative. She notes that the number of older Albertans is often higher—as much as 22 per cent—in rural communities than the number of older Albertans found in bigger urban centres.

"Yet the services within rural communities are drastically less than what you can access in a city, especially for people with dementia," Lightfoot says.

Every situation is slightly different, depending on the community's needs and what's available within that community, she adds. "These folks come together to say, 'What can we do with the resources that we have?'"

Some have a public library that can be used for in-person meetings, local educational events or learning opportunities and workshops. For others, that space may be a hockey arena.

"It's about using what's available," Lightfoot says. "And engaging people living with dementia and their carers in both provincial and local planning."

Because of the COVID-19 pandemic, much of the planned programming was put on hold and is only now rolling out.

Partners in the initiative involve many departments across AHS, including Home Care, Health Systems Knowledge and Evaluation, the Seniors Health Strategic Clinical Network, Seniors Outreach, Primary Care Networks, the Primary Health Care Integration Network, as well as the Alzheimer Society of Alberta and Northwest Territories, Family and Community Support Services, RCMP Victim Services, regional seniors' centres, municipal representatives and public libraries. ■

Bonnie Healy, a trained trauma nurse and member of the Blackfoot Confederacy, is a Principal Knowledge User and part of a group researching the experiences of Indigenous people in the emergency department.

Photo supplied

Addressing challenges faced by Indigenous people in the emergency department

WRITTEN BY GREG HARRIS

Researcher Bonnie Healy can cite numerous examples of racism that Indigenous people experience while they're accessing emergency department (ED) care, including several from her own personal history.

There was the time she was not believed in an ED when she said she had asthma. On another occasion, a nurse attempted to minimize what turned out to be a serious and rare genetic disorder in a young family member for whom Healy was advocating.

"As someone trained as a trauma nurse myself, I can understand how healthcare workers can become disconnected sometimes. It serves as a coping strategy," says Healy, a member of the Blackfoot Confederacy and Principal Knowledge User on the research project.

"But because you've practised disconnection, stereotypes can take over and you become annoyed with individuals presenting with minor ailments that could be managed by a family doctor or walk-in clinic—which easily translates as racism."

Researchers are examining the experiences of Indigenous people in the ED, with a goal of helping Alberta Health Services (AHS) improve care.

The Indigenous Wellness Core is a key partner, as is the Alberta First Nations Information Governance Centre; five other First Nations organizations are also involved.

Dr. Patrick McLane

Dr. Patrick McLane, Assistant Scientific Director for the Emergency Strategic Clinical Network and principal investigator on the project through the University of Alberta, says the group's work to date reinforces findings from other jurisdictions that show anti-Indigenous racism exists in healthcare and emergency departments.

"There are specific stereotypes at work in the ED, such as expectations around substance use or drug-seeking behaviour, as well as assumptions about parenting," McLane says. "Unfortunately, Indigenous people come to the emergency department with the expectation of discrimination."

Part of the problem is systemic; without ready access to primary care, Indigenous people are forced to use the emergency department when others may see a family physician.

Begun in 2018 with a grant from the Canadian Institutes of Health Research, the project to date has resulted in several publications, including most recently in the *Canadian Medical Association Journal*. In that paper, researchers found that First Nations visits to the ED were prioritized as less urgent.

McLane says the research is intended to create a foundation for improvement work, which includes direction from Indigenous organizations on areas where change is needed, as well as anti-racist simulation training specific to the emergency department.

Researchers used sharing circles as a way of eliciting the experiences of people. To date, 90 people have formally shared their perspective on the issue.

"When we talked to leaders and elders about how we were going to look at racism, we had to ensure it was led from Indigenous understanding and in Indigenous language," Healy says.

"If we only look at racism from a western understanding using English, we're going to miss it. How does one measure a dirty look? If something can't be measured, does it mean racism doesn't exist?"

McLane, who is based in Edmonton, says one aspect of the responses that moved him was that although Indigenous people expressed an expectation of discrimination, they had a lot of empathy for healthcare providers, as well.

"I was surprised by the level of empathy many patients had," he says. "If patients and healthcare providers can see one another as allies for health system change, it's an opening to a more respectful relationship and the beginning of better healthcare." ■

A healthier future together

Protecting our kids

We've created a fun, interactive game for children to defend themselves against COVID-19, as well as resources for parents to keep their families protected. It's all part of how AHS supports the personal wellness of Albertans on their path to a healthier tomorrow.

ahs.ca/vaccinekids

ahs.ca/covidzilla

Got COVID-19?

Check your symptoms, and get the latest self-care information and guidance through our online self-assessment tool.

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Giving Albertans the right tools today to help ensure a healthier tomorrow.

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