



# Lions' Den **IMPACT REPORT**

August 2023

## IMAGING ENHANCEMENT CENTRE

Thanks to your support, the Imaging Enhancement Centre (IEC) has successfully launched at the Saint John Regional Hospital.

The 3D-printed models created in the IEC have been a resounding success, allowing surgeons to better understand complex anatomical structures – leading to better surgical outcomes – while also proving instrumental in educating patients and their families on treatment options. The 3D printers were installed on June 2, 2023, and the first patient model was printed for clinical use on June 15th, 2023. To date, 5 team members have been trained - allowing for schedule flexibility and enhanced service delivery – and 8 clinical models have been completed for 6 different physicians.

The addition of Artificial Intelligence (AI) in the IEC has significantly improved the speed and accuracy of diagnoses, reducing wait times and leading to prompt patient care management. Already, the AI-driven algorithm integrated into our medical imaging workflow has increased annual patient throughput by 20% since its implementation in March 2022.

The third phase of the rollout is augmented reality (AR) applications in the IEC. AR has revolutionized medical imaging by overlaying digital information onto real-world imagery, providing an enhanced visualization of patient-specific anatomical structures before and during surgical procedures, leading to improved surgical outcomes. AR will be initially piloted by our thoracic surgeons for pre-surgical planning.

The IEC has been enthusiastically met by healthcare professionals at our hospital, but most rewarding has been the impact on our patients. With the help of 3D printing, AI and soon-to-be AR, patients are experiencing improved patient-doctor relationships, are receiving quicker and more accurate diagnoses, better treatment planning and reduced overall treatment times. Overall, the IEC is leading to improved patient outcomes and quality of life.

### GRAND PRIZE WINNER

## IMAGING ENHANCEMENT CENTRE IMPACT



# 5

Team members trained on 3D printers

# 8

Patient models printed (as of August 1)

# 20%

Increase in annual patient throughput due to AI



I am thrilled to share the remarkable progress and success of the Imaging Enhancement Centre (IEC) in Medical Imaging at the SJRH, which has witnessed an unprecedented response from healthcare professionals, patients, and stakeholders since its recent rollout. Our visionary initiative to integrate cutting-edge technologies like 3D printing, artificial intelligence (AI), and augmented reality (AR) applications has proven to be a game-changer, elevating the standards of patient care, and revolutionizing the field of medical imaging and pre-surgical planning.

- Zach Kilburn, Regional Director of Medical Imaging



## ILLUMISITE TECHNOLOGY

Thanks to you, thoracic surgeons at the Saint John Regional Hospital recently completed a landmark procedure using technology acquired through Lions' Den.

In early 2023, Dr. Johnston and Dr. Russell preformed the very first fluoroscopic navigation bronchoscopy procedure in Canada using the Illumisite platform, a first-of-its kind achievement in Canadian medicine and a significant step forward for lung cancer care in New Brunswick.

Fluoroscopic navigation technology is a minimally invasive procedure that allows clinicians to access difficult-to-reach abnormal lung tissue with greater accuracy. It uses GPS-like technology to guide endoscopic tools, making it possible to reach areas not accessible with traditional bronchoscopy.

The Illumisite fluoroscopic navigation platform provides enhanced precision by providing surgeons with detailed, real-time imaging which provides a clear, digital roadmap to better locate and collect abnormal lung tissue, also known as nodules, for biopsies.

Illumisite functions by uploading information from a lung patient's CT scan and provides real-time imaging that factors in the difference between the static CT scan and the dynamic breathing lung. Illumisite corrects for CT-to-body discrepancies and enhances the visibility of the abnormal tissue. It also allows physicians to guide endoscopic tools or catheters in the pulmonary tract and to place radiosurgical and dye markers into soft lung tissue to guide thoracic surgery.

Overall, this state-of-the-art technology is impacting healthcare professionals and patients by allowing clinicians to access difficult-to-reach lung tissue with greater accuracy and providing patients with a quicker recovery.

As of the end of July, 9 procedures have been completed using the Illumisite platform. The thoracic surgery team plans to perform 4 fluoroscopy navigation bronchoscopies using Illumisite each month, with room to grow in the future.

## COMMUNITY CHOICE AWARD

ILLUMISITE  
TECHNOLOGY  
IMPACT



1st

Of-its kind  
achievement in Canada

9

Procedures completed  
(as of July 28)

4

Procedures to be  
performed  
monthly



It's a huge step forward in treatment of lung cancer patients, and with it being more minimally invasive, we can get the patient home faster and back to work faster or back to whatever quality of life they had previously.

- Dr. Crispin Russell, Thoracic Surgeon



## THE TANDEM MASS SPECTROMETER

Because of you, vulnerable patients will receive the best care possible when undergoing drug testing, using the Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS).

LC-MS/MS is considered the gold standard in drug testing, providing superior specificity and sensitivity for drug and drug metabolite identification compared to other methods. LC-MS/MS is a robust methodology that can accurately detect over a thousand drugs and drug metabolites in a single sample compared to immunoassay testing, which is limited to a handful of assays that can detect at most 20-30 different drugs/drug classes.

The LC-MS/MS was physically installed at the Saint John Regional Hospital in June, with software installation completed in July. To date, 3 clinicians have been trained, including a technologist, a lab supervisor, and a clinical specialist.

Currently, the LC-MS/MS is undergoing method optimization and validation. These steps are critical to ensure proper patient reporting and are standard for every lab instrument. As part of this process, clinicians perform various experiments, including injecting different drugs into the instrument to validate the results. Once every drug result has been validated, they will begin injecting "test" patient samples which may have multiple drugs present to validate these results. This is important to ensure the instrument can properly detect multiple drugs and can differentiate between two drugs with similar chemical structures. The team anticipates injecting over a thousand "test" samples before ever reporting a patient result, to ensure a high-level of accuracy. Method optimization and validation is expected to take up to 12 months.

Once operational, the LC-MS/MS will provide comprehensive, highly effective, and time-sensitive results which will allow clinicians to incorporate results quickly into decision-making. This will help prevent overdoses and deaths, improve patient safety and care, and reduce the time it takes to notify the Saint John Police Force and addictions community when tainted or contaminated drugs are detected.

TANDEM MASS SPECTROMETER  
IMPACT

3  
Clinicians trained  
to date

>1,000  
Drugs can be detected

Countless  
Vulnerable lives to be  
protected



Every four days, a New Brunswicker dies of a drug overdose. Every four days. We're a small, closely knit province. The pain of substance use disorder hurts each of us. Having the latest in tandem mass spectrometer technology at the Saint John Regional Hospital will help us save lives and improve health outcomes in our community.

-Dr. Duncan Webster, Infectious Diseases Consultant & Medical Microbiologist

