Optimizing CT Utilization for Lung Screening Pilot Population

Declaration of Conflict of Interest

- The Joint Department of Medical Imaging (JDMI) at the University Heath Network (UHN) received financial support from Cancer Care Ontario, a government agency now part of Ontario Health, in the form of one-time funding for this pilot project

- No other relationships with commercial interests exist

Authors & Contributors

Authors

- Mackenzie Crawford, Senior Project Analyst, Office of Strategy Management, JDMI
- Jisla Mathews, Manager of the Office of Strategy Management, JDMI
- Jenny Catton, Director of Diagnostic Performance, JDMI
- Maria DiDanieli, Screening Navigator, UHN High Risk Lung Screening Program, JDMI
- Shannon Olinoski, Screening Clerk, UHN High Risk Lung Screening Program, JDMI
- Raquel Gaspar, Clerical Supervisor, JDMI
- Talya Wolff, Manager of Patient Services and Experience, JDMI
- Janet Pereira-Ross, CT Supervisor, JDMI
- Jean Nash, Manager of Medical Imaging for Toronto General Hospital, JDMI

Key Contributors

- Catherine Wang, VP, Clinical, UHN
- Cancer Care Ontario (now Ontario Health)

Background

- Lung cancer is the leading cause of cancer death for people in Ontario; more people die from lung cancer than from breast, colon and prostate cancers combined[1]

- In September 2018, University Health Network (UHN) was selected as a pilot site to implement a Lung Screening program for people at high risk of getting lung cancer

- The pilot aimed to assess the feasibility of screening individuals at high risk for lung cancer using low-dose computed tomography (LDCT)

Source: https://www.uhn.ca/JDMI/Labs_Tests/CT_Scan

High Risk Lung Cancer Screening Program Overview

- Pilot processes were designed and trialed between September 2018 and January 2019 and officially launched in February 2019

- The program is delivered by the Screening Clerk and Navigator. As part of the program, all eligible patients receive an in-person screening appointment that consists of 3 key components:
  1. Pre-scan discussion on the benefits and risks of screening & consent
  2. LDCT scan
  3. Smoking cessation counselling session

Role	Key Responsibilities for the Program
Screening Navigator	• Conducts risk assessment with patients to determine eligibility for the program • Leads pre-scan discussion and smoking cessation counselling • Guides patient through next steps based on results of the LDCT scan(s)
Screening Clerk	• Performs scheduling and registration activities • Guides patients on the day of their scan

Development of the Group Pre-Scan Model

- **Purpose:** Optimize the delivery of activities on the day of the patients scan while ensuring patient satisfaction
- The patient journey was process mapped, trialed and timed with mock participants to ensure consistent flow
- 10-min buffer was built into the workflow to account for any unanticipated delays

Example of LDCT scan workflow for two groups of patients

	Start Time	End Time	Travel & Change Time	LDCT Scan	Travel & Change Time	Smoking Cessation	Wait Time
Group 1	12:30 PM	12:40 PM					
	12:40 PM	12:50 PM					
	12:50 PM	1:00 PM	P01				P02, P03, P04, P05
	1:00 PM	1:10 PM	P02	P01		P04	P03, P05
	1:10 PM	1:20 PM	P03	P02	P01	P05	P04
	1:20 PM	1:30 PM	P04	P03	P02	P01	P05
	1:30 PM	1:40 PM	P05	P04	P03	P02	
	1:40 PM	1:50 PM		P05	P04	P03	
	1:50 PM	2:00 PM		**Buffer**	P05		
Group 2	2:00 PM	2:10 PM					
	2:10 PM	2:20 PM					
	2:20 PM	2:30 PM	P01				P02, P03, P04, P05
	2:30 PM	2:40 PM	P02	P01		P04	P03, P05
	2:40 PM	2:50 PM	P03	P02	P01	P05	P04
	2:50 PM	3:00 PM	P04	P03	P02	P01	P05
	3:00 PM	3:10 PM	P05	P04	P03	P02	
	3:10 PM	3:20 PM		P05	P04	P03	
	3:20 PM	3:30 PM		**Buffer**	P05		

Maximum Patient Wait Time

Patient	Wait Time
P01	0
P02	10
P03	20
P04	20
P05	30
Maximum	**30**

Overview of Group Pre-Scan Model

The following activities occur on the day of the patients scan

#	Activity	Duration (for each patient)
1	Patients arrive in groups of five and start their journey by registering with the Screening Clerk	5 min
2	Once registered, patients are guided to their pre-scan and, as a group, receive a presentation of the benefits and harms of screening	15-20 min
3	Each patient has a private conversation with the Screening Navigator to decide whether or not to proceed with the LDCT scan	5 min
4	If the patient provides consent, they are guided to the CT scanner by the Screening Clerk	5 min
5	Each patient receives a CT scan	10 min
6	Interested patients that currently smoke return to the pre-scan room to complete a smoking cessation counselling session with the Navigator	15-20 min
	Total	55-65 min

Initial Results (Feb 2019 - Mar 2020)

- **478** LDCT scans completed using this model at UHN

- **25%** increase in patients scanned per hour through use of group pre-scan (5 patients per hour vs. 4 patients per hour) [2]

- **50%** increase in number of patients seen per day through use of group pre-scan (10 vs. 15 patients)

Cumulative Volume of LDCT Scans Performed
(Feb 2019 - Mar 2020)

Volume of LDCT Scans Performed vs. Date:
- Feb-19: 4
- Mar-19: 17
- Apr-19: 49
- May-19: 83
- Jun-19: 122
- Jul-19: 155
- Aug-19: 178
- Sep-19: 216
- Oct-19: 282
- Nov-19: 328
- Dec-19: 362
- Jan-20: 416
- Feb-20: 450
- Mar-20: 478

Challenges, Benefits & Learnings
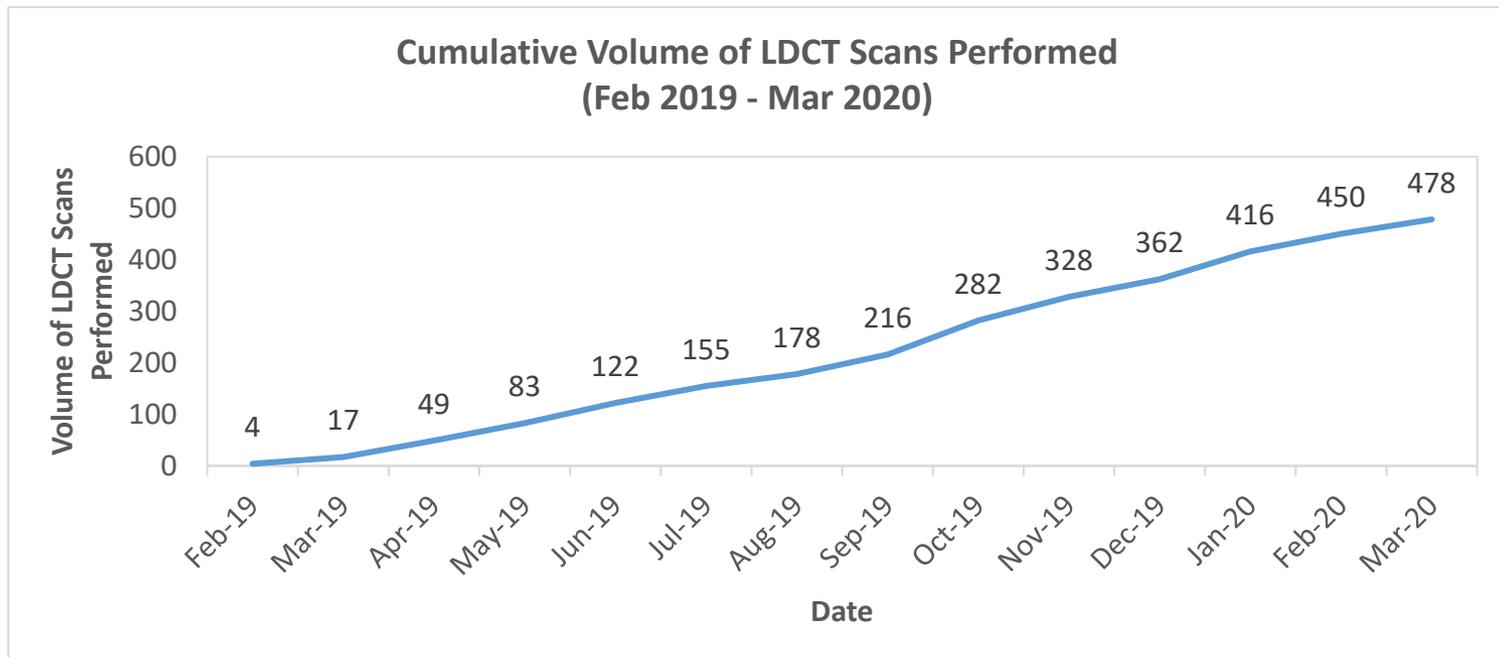
Challenges

- Impact of late arrivals or no-shows on delaying the process

- Group pre-scan model may not work if:

  - A patient requires language aides (e.g., language line, interpreters, or family)

  - Patients are not comfortable learning about the benefits and risks of screening in a group setting

Benefits

- This model optimizes CT scanner utilization by ensuring minimal wait time for each patient and minimal scanner downtime in between patients

- The model also enables CT technologists to provide dedicated focus to screening participants

Opportunity for Learnings

- The group pre-scan model could inform delivery of care for other screening programs that require coordinated pre-scan activities or educational components that can be shared in a group setting

Next Steps

- The results from the UHN High Risk Lung Screening Program and other pilot projects will be used to inform recommendations for provincial deployment of a lung screening program