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The Ontario Provincial MRI Process Improvement Project Phase 3: Sustaining Continuous Improvement and Accountability for Better Access to Medical Imaging

By: The Joint Department of Medical Imaging
Toronto, Ontario, Canada
On behalf of Ontario's Ministry of Health and Long-Term Care

MRI Process Improvement

From **March 2013 to October 2013**, on behalf of **Ontario's Ministry of Health and Long-Term Care (MOHLTC)**, a pilot project was launched to:

- *Create and standardize MRI indicators*
- *Standardize MRI data capture and reporting for 57 Ontario hospitals*
- *Develop a data quality framework to monitor adherence to guidelines*
- *Make available Ontario-wide MRI operational data*

How we approached this task, and what we learned from it is the basis of our presentation.

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Agenda

1. Background
   - Wait times in Ontario
2. Problem Statement
3. Proposed Solution
4. Methodology
5. Outcomes

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Background: Who are we?

- The MRI Process Improvement Project Phase 3 (MRI PIP3) was implemented by the **Office of Strategy Management (OSM)** within the Joint Department of Medical Imaging (JDMI) at the University Health Network in Toronto, Canada.

- The OSM is a team of professionals with combined experience in project management, process improvement methodologies, and healthcare management.

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MRI wait times in Ontario

Current MRI wait times in Canada's province of Ontario are 75 days. The target is 28 days.

> Wait time = The number of days it takes to complete the exam for nine out of 10 patients

A multi phase process improvement initiative on behalf of **Ontario's Ministry of Health and Long-Term Care (MOHLTC)**, was implemented to help increase MRI capacity and efficiency across the province called the **MRI Process Improvement Project (MRI PIP).**

MRI PIP engaged 57 hospitals across Ontario over 4 years using Lean Six Sigma, an evidence based structured approach to process improvement.

Results (previously presented at RSNA 2012) indicate:

- 20,000 additional patients per year province-wide were scanned following the project, with no additional resources
- 80% of sites decreased their wait times
- 78% of sites increased their average monthly volumes
- 80% of sites increased their patients scanned per operating hour

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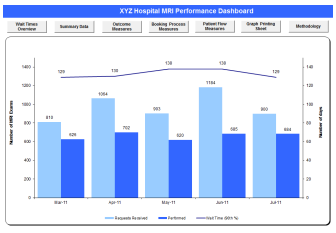
Source: http://www.ontariowaittimes.com/ Oct 25, 2014.

Problem Statement

The MRI Process Improvement Project provided most sites with an **excel-based dashboard** to monitor a number of high-level and process-level measures.



Sample single site dashboard

Problem Statement: Standardized MRI data is not easily available for the MOHLTC in order to make timely, value based decisions regarding access to care.

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Proposed Solution

Phase 3: Sustaining the Gains

An opportunity existed to implement a single **province-wide** performance management tool containing standardized MRI indicators from all hospitals, in order to sustain continuous improvement.

A pilot was proposed to test the viability of this concept.

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Potential Benefits

Support for Hospitals

- By standardizing indicators, measurement techniques and targets across the province, sites will be able to benchmark themselves against peer sites and work towards similar targets.

Better understanding for the Province

- This information will also help the MOHLTC and the Local Health Integration Networks (LHIN) assess provincial challenges, opportunities and best practices.
- MRI PIP3 will collect site specific data, calculates operational measures and makes the results available provincially.
- MRI PIP3 will allow for future planning decisions to be value focused and evidence based.

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Phase 3 Goals, Objectives & Deliverables

Goals	Objectives	Deliverables
1. Track indicators that align to hospital, LHIN and MOHLTC strategic priorities 2. Enable evidence-based decision-making when facing capacity and demand challenges across the province 3. Improve transparency and accountability of Ontario's MRI resources 4. Enable sites to continuously improve	*A. Create and standardize MRI indicators* *B. Standardize MRI data capture and reporting* *C. Develop a data quality framework to monitor site's adherence to the reporting guidelines* *D. Make available Ontario-wide MRI operational data*	1. Identification of key performance indicators, including definitions and reporting standards 2. Creation of a data submission and reporting tools and processes, including a data quality plan and escalation procedures 3. Implementation of a working model of the dashboard reporting tool 4. Completion of at least one round of reporting (including associated training) 5. Handover dashboard tool and reporting process to provincial agency for long term management
Project Tracking Measures	• Percentage of sites submitting MRI data on a monthly basis • Percentage of sites reporting complete and accurate data in a timely manner	

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Methodology

The work structure of the project included the following:

1. Stakeholder engagement
2. Indicator development
3. Benchmarking
4. Hospital Engagement
5. Data Collection
6. Privacy
7. Data Quality
8. Dashboard Creation

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Methodology

1) Engage key stakeholders

MRI PIP3 leveraged the experience of healthcare professionals from various healthcare organizations to advise throughout the project via a monthly **Advisory Committee.** This group's feedback was essential for the success of the project.

- All project indicators, hospital engagement strategies, data quality and compliance standards, and dashboard structure were reviewed and approved by this team.
- They provided great feedback and suggestions, allowing the project team to refine their approach early on and to avoid pitfalls.

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Advisory Committee Roles

Roles shown were engaged early in the project as part of the Advisory Committee. All participation was voluntary.

Members included:

- Project team members
- Hospital representation
- Process experts
- Overall subject matter experts
- Ministry and LHIN experts

	Advisory Role
Project Representation	Project Sponsor
	Project Manager
Hospital Representation	Academic Hospital Representation
	Large Community Hospital Representation
	Small/Rural Community Hospital Representation
Process Representation	MRI Process Lead
	Radiologist Lead
	Clerical Process Lead
	Information Technology System Lead
Subject Matter Experts	Provincial Information Program (CCO/ATC) Lead
	Provincial Diagnostic Imaging Lead (confirmed)
	MRI PIP Coach
MOHLTC and LHIN Representation	Implementation Branch
	Health Quality Branch
	LHIN Liaison Branch
	LHIN Representative

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Project Steps: Indicators

2) Identify indicators

Based on their previous experience, and with the input of the Advisory Committee, the following indicators were identified to be included in the provincial dashboard. Indicators were grouped into 4 categories, based on what they were trying to measure.

Wait Time	Demand	Performed	Efficiency
• Wait Times (OP/IP/EP) • Booking Turnaround Time (OP) • Wait List (OP) • Report Turnaround Time (OP/IP/EP)	• Demand (OP) • Demand per Operating Hour (OP)	• Volume (OP) • Volume (IP/EP) • No Show Rate (OP/IP/EP)	• Patients per Operating Hour (OP) • Schedule Utilization (OP) • Actual Operating Hour Utilization (OP) • Urgent Time Utilization (IP) • Room Turnaround Time (OP/IP/EP)

OP=outpatient, IP=inpatient, EP=Emergency patient

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Wait Time Indicators

The below indicators focus on wait times throughout the MRI process:

Indicator	Definition	Purpose
Wait Times	Days between requisition received and scan performed (90th Percentile)	Determine how long patients have waited for their MRI exam
Booking Turnaround Time	Average days between requisition received and appointment booked	Determine the average number of days patients wait to receive an appointment
Wait List	Total count of requisitions received, waiting to be performed	Determine the number of patients waiting for their MRI exam
Report Turnaround Time	Days between scan date and report verified date (90th percentile)	Determine the number of days patients wait for MRI reports/results

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Demand Indicators

The below indicators allow us to understand the demand for MRI services provincially:

Indicator	Definition	Purpose
Demand	Count of requisitions received	Determine the number of requisitions received to provide insight into the needs of the system
Demand per Operating Hour	Number of requisitions received per MRI operating hour	Determine the demand for MRI scans relative to available operating hours

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Performed Indicators

The below indicators allow us to understand the volume of MRI services provided provincially:

Indicator	Definition	Purpose
Volume	Count of patients scanned	Determine the number of patients scanned to provide insight into the capacity of the system
No Shows	Percentage of patients that do not arrive for their scans	Determine the percentage of patients that miss their appointments, potentially decreasing scanner utilization

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Efficiency Indicators

The below indicators provide insights into the operations and operational capacity of MRI services across the province:

Indicator	Definition	Purpose
Patients per Operating Hour	Number of patients scanned per MRI operating hour	Determine the rate at which patients are scanned in order to understand efficiencies
Schedule Utilization	Percentage of MRI time booked in schedule to scan patients	Determine the proportion of MRI time booked for scanning patients to monitor how well the schedule is being filled
Actual Operating Hour Utilization	Percentage of MRI time actually used to scan patients	Determine the proportion of MRI time actually used to scan patients to monitor and identify areas for improving scanner utilization
Urgent Time Utilization	Percentage of urgent time actually used to scan urgent patients	Determine the proportion of urgent time actually used to scan urgent patients to monitor and identify areas for improving scanner utilization
Room Turnaround Time	Average time between the patient exiting the scan room and the next patient entering	Determine the amount of time the scan room is empty between patients

Methodology: Benchmarking

3) Identify benchmarks

Initially, the Advisory Committee agreed that setting provincial benchmarks was appropriate for indicators that were within hospital control, and that directly impacted patient access.

However, upon further consideration the Advisory Committee decided to wait until more data was collected to in order to determine benchmarks.

This would allow hospitals to review their internal processes first, as well as focus on data quality prior to the MOHLTC setting provincial benchmarks.

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Methodology: Hospital Engagement

4) Engage hospitals

- The initial invitation to participate in the project was launched by the MOHLTC via the LHINs in March 2013.
- Key educational components of the hospital engagement are shown below:

1. Identify hospital team
2. Training
3. Project status reporting
4. Preparing for data submission
5. Ensuring patient privacy

- As many hospitals had previously participated in MRI PIP1 and 2 they were familiar with the indicators and data required for the project.

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Methodology: Training

Training: Teleconferences were the key method of knowledge transfer for the project. The below sessions were offered:

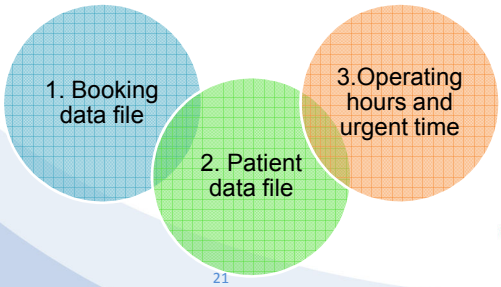
Intro to MRI PIP	Data Submission and Go Live readiness	Reporting and Data Quality Management	Using the MRI PIP Dashboard
Objectives: • Review data required for submission • Purpose of data • Hospital resources required	Objectives: • Review data fields and definitions • Navigate through booking data file, patient data file, operating hours data file	Objectives: • MRI PIP3 reporting process • Data quality escalation procedures • Navigate through the data quality tool	Objectives: • Navigating through the dashboard • Understanding the dashboard user guide

Methodology: Data Collection

5) Data submission templates

Data submission templates were submitted by each hospital to the project team on a monthly basis, starting in June 2013. These templates outlined the data fields required.

For some sites it was a challenge to pull this data due to system or process constraints. Each site was assigned a project team member to work alongside them to assist with any project or data related questions.



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Methodology: Privacy

6) Patient Privacy

- Ensuring **patient health information (PHI)** was handled with the utmost care and in compliance with Provincial legislation was a top priority.
- To address privacy and security risks the following action plan was followed:

Privacy Action Plan

- Conducted a Privacy Impact Assessment (PIA)
- Engaged third-party to validate PIA findings
- Consulted with UHN Legal services team to create robust Data Sharing Agreements (DSA)
- DSA signed between all hospital sites and UHN *(May 2013)*

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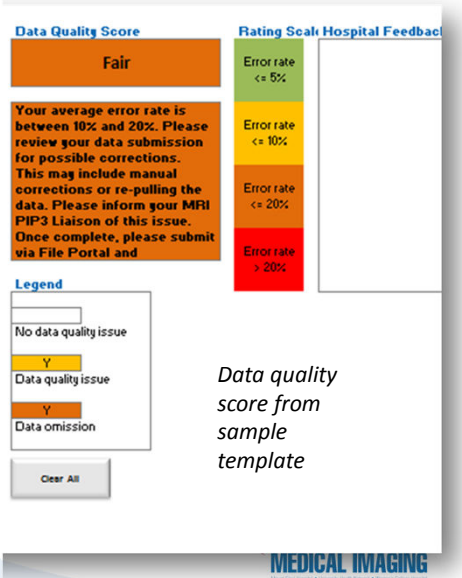
Methodology: Data Quality

7) Data Quality

- All sites were required to conduct a data quality check using the data quality tool embedded in each submission template prior to submission.
- Sites received a **Data Quality Score** upon the input of raw data:
  - **Excellent**
  - **Good**
  - **Fair**
  - **Poor**
- The Data Quality Score enabled sites and the project team to identify data gaps and develop an action plan for improvement.



Data quality score from sample template

Methodology: Dashboard Development

8) Dashboard

An Excel dashboard was created internally by the project team, using VBA. The following design options were proposed to the Advisory Committee. The first option was chosen due to the request for transparency from the Committee.

Single Dashboard	• Displays data from all hospitals and LHINs • Fully transparent
Separate Dashboards	• Separate dashboards created for the MOHLTC, each LHIN, and hospital • Reduced transparency; hospitals may not be able to see other hospital's performance, or outside of their own LHIN
Hybrid Dashboards	• Two dashboards, one for the MOHLTC and one for LHINs/hospitals • MOHLTC dashboard may be more strategic, while the LHINs/hospital dashboard can be designed to be more operational

Dashboard Overview

The completed dashboard provides users with the following options:

- **Provincial Overview**: Allows the user to display Ontario level data
- **Compare between LHINs**: Displays LHIN level datasets
- **Compare within LHIN**: Displays the data for all hospitals within a LHIN
- **Compare Between Peers:** Display hospitals within a specific peer grouping *(i.e. Acute/Teaching, Complex Community, Large Community, Medium Community, Small community, Specialty Children)*
- **View Historical Trends**: Review the data for a single hospital
- **Custom Compare:** A custom option that allows the user to select the hospitals and indicators to display

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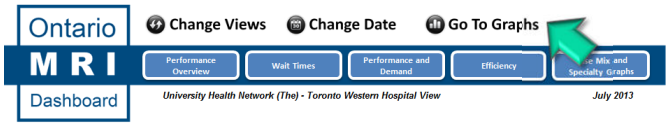
Example

In order to see Booking Turnaround Time, first you would click on View Historical Trends, and then Wait Times:



		Aug 2012	Sep 2012	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013
Wait Times - Overall	90th Percentile Days	151	153	127	117	118	100	74	33	34	35	39	49
Wait Times - Priority 2	90th Percentile Days	4	5	5	5	3	4	5	4	5	5	4	6
Wait Times - Priority 3	90th Percentile Days	44	52	48	50	44	44	24	24	28	30	36	47
Wait Times - Priority 4	90th Percentile Days	186	243	185	212	149	110	97	62	65	47	57	85
Booking Turnaround Time	Monthly Average Days	3.69	5.98	3.24	2.68	6.06	5.61	3.35	2.33	3.50	3.90	3.16	3.33
Wait List - Overall	Monthly Appointments	N/A	N/A	N/A	N/A	N/A	3440	3276	3186	3425	3478	3726	3673
Report Turnaround Time	90th Percentile Days	8.00	7.00	9.00	5.00	6.00	6.00	7.00	9.00	4.00	4.00	5.00	9.00

If you would like to see the data in graph format, click Go To Graphs.

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Outcomes

As a result of the work begun in March 2013, the first validation dashboard was distributed to hospitals on September 6, 2013.

Initial feedback from hospitals:

- Positive feedback overall
- Some data files resubmitted
- Concerns about patient complexity raised

To provide additional context around performance, sites recommended additional complexity measures be added to the dashboard. The following indicators were developed and added to provide a better understanding of performance across sites:

Percentage of IP/EP Cases	Percentage of inpatients and emergency patients of total patient volume
Percentage of High Priority Cases	Percentage of high priority cases (high priority defined as P1, P2, and P3s) of total patient volume
Scans Greater Than One Hour	Percentage of scans lasting greater than one hour
Percentage of 3D Post-Processing Cases	Percentage of patients requiring 3D Post-Processing
Percentage of Contrast Cases	Percentage of patients requiring contrast

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Survey Feedback

A survey was distributed to all MRI PIP3 liaisons on September 23, 2013, to solicit additional feedback regarding the dashboard. The following 3 questions were posed:

Are there any other indicators that you feel should be incorporated into the dashboard?

- Is there a way to capture patients that were called in from a waiting list for cancellations? This would help when trying to understand the no show rate.
- Unplanned downtime should be captured as a separate entity, not included in total operating hours.
- Is there a way to account for exam difficulty? We do the exams that most sites are unable to or won't

Are there any other ways that we can present the data (time periods, graphs) that you think might be helpful?

- As this is so new, it looks great thus far.
- Not at this time.

Is there any other information to help provide context that could be displayed on the dashboard?

- Pediatrics remain a challenge for sites and reduce P4 access. Can we identify sites that must provide this service?
- Can we somehow indicate general anesthetic time?
- There should be somewhere to include unplanned downtime.
- It would be nice to know the funded hours for each site, and the number of magnets they have.
- Number of FTEs per shift would be interesting to know.

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October 2013 Dashboard

A second iteration of the dashboard was distributed to the Ministry, LHIN CEOs, Advisory Committee, and all hospital stakeholders in October 2013. At this point the team had achieved the following outcomes, and the project was ready to be transferred to Cancer Care Ontario for operationalization.

Successful Outcomes:

1. Inclusion of all required indicators in the dashboard (as agreed upon by key stakeholders) to enable performance management at hospital, LHIN and MOHLTC levels.
2. Recruitment of all MRI facilities in Ontario receiving incremental MRI wait time funding to participate in the project.
3. Creation of a working model of the dashboard and the successful implementation and use for one reporting cycle prior to hand-off.
4. Completion of transfer for long-term operational use by the end of September 2013 to Cancer Care Ontario.
5. Submission of complete data by hospital sites for two iterations of the dashboard (data captured from May 2012 to August 2013).
6. Submission of data by hospital sites aligning with the data quality process established by the project.

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Key MRI PIP3 Success Factors

Advisory Committee

- Motivated, engaged committee members supported project team throughout the engagement
- Insights of members provided valuable feedback and course correction

Hospital Engagement

- 11 training sessions conducted, with over 100 participants for each session
- Almost 100% data submission compliance
- Hospitals enthusiastic to see overall data picture

Project Team

- Team able to leverage previous PIP experience
- Dedicated project contacts resulted in successful engagement with hospital teams

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Lessons Learned

Tight Timelines

- Only 6 months separated the initial hospital engagements in March 2013, from the first dashboard distribution in September 2013.
- Hospital feedback indicated that they would have preferred more time to review their data collection processes and work processes prior to submitting data provincially for analysis.

Data Quality

- Despite the data quality tool embedded within the templates, there were still challenges with data quality.
- Over time, we expect as hospital staff become more familiar with the indicators that there will be increased data validation and review prior to submission.

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Conclusion

MRI PIP3 **successfully standardized MRI indicators** that align to hospital, LHIN, and MOHLTC strategic priorities, allowing for evidence based planning decisions in the future.

The **dashboard will empower hospitals to continue improving**, in order to sustain the gains from phases 1 and 2 of MRI PIP.

Cancer Care Ontario assumed operations of the dashboard in October 2013 and continues to distribute it on a monthly basis.

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Contact Information

For more information, please contact Tanya Spiegelberg, Project Manager for the Joint Department of Medical Imaging at tanya.spiegelberg@uhn.ca

Thank you for your interest in the Ontario Provincial MRI Process Improvement Project, Phase 3!

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