Ontario Health
Cancer Care Ontario

Provincial Diagnostic Imaging Expert Panel

Mandate #1 Report:

Recommendations to Sustain Diagnostic Imaging Services During the COVID-19 Pandemic

September 11, 2020

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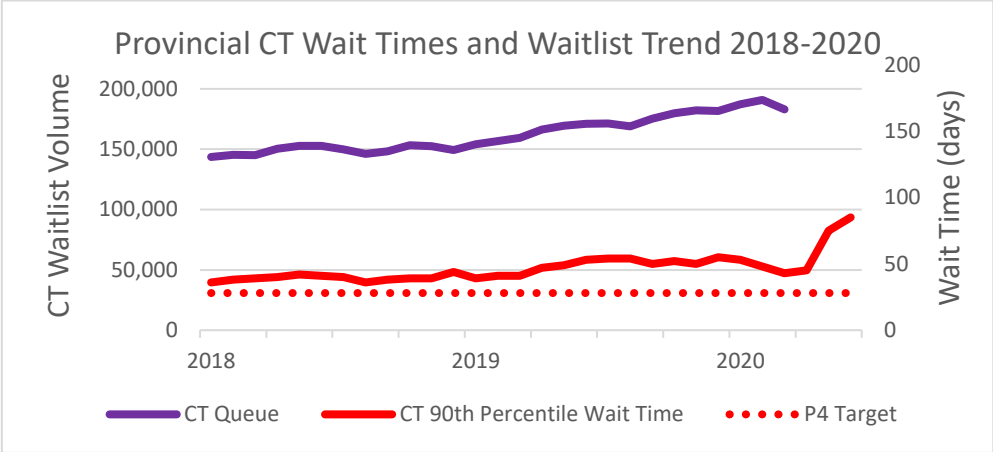
Contents

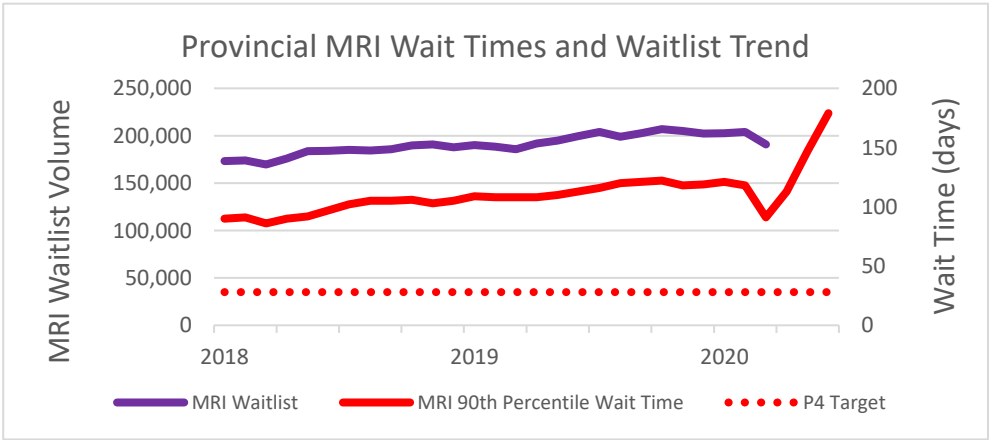
1. Executive Brief

The Ministry of Health (Ministry) has requested Access to Care, a division of Ontario Health (Cancer Care Ontario) to form a Provincial Diagnostic Imaging (DI) Expert Panel (Panel) in order to make recommendations on addressing issues affecting current and future delivery of DI services. This first report delivers immediate recommendations and strategies to recover and improve DI services throughout the COVID-19 pandemic, with subsequent reports looking to address broader issues affecting DI quality and access.

Various DI technologies are used to support the diagnosis, treatment, screening and follow-up of illnesses and injuries. Timely access to imaging services is crucial for health practitioners to accurately and efficiently diagnose medical conditions, enabling prompt care decisions and interventions. Prior to the COVID-19 pandemic, MRI and CT capacity was unable to meet demand in Ontario resulting in wait times well in excess of the provincial wait times targets. Figure 1 illustrates the rising DI provincial waitlist over time which has led to excessive wait times.

Figure 1: MRI & CT Waitlist and Wait Time Trends
Source: Wait Time Information System, Access to Care at Ontario Health





In order to protect healthcare human resources from the rapid spread of the COVID-19 virus and to ensure sufficient capacity in the hospitals to treat COVID-19 patients, the Ministry issued Directive #2 on March 19th, 2020. The Directive advised Hospitals to temporarily reduce and postpone the provision of elective procedures. The result was a large decrease in performed DI cases. Ongoing reductions in efficiencies and patient throughput necessitated by new cleaning and social distancing requirements further exacerbated this evolving issue. Patient throughput efficiencies deteriorated by 50% between March and April, but have since recovered to 75% of the pre-Covid rates as of June. Given the negative impact of the pandemic on the provision of DI, the gap between capacity and demand is even greater, resulting in significantly increased MRI and CT waitlists and higher wait times. These waitlist increases are estimated to have added ~120,000 MRI (58% growth) and 180,000 CT (93% growth) patients to the waitlist when compared to the pre-pandemic levels as of July 1, 2020. The rapid waitlist growth has and will continue to significantly impact access particularly for non-urgent patients. Significant changes are needed to avoid a provincial DI access crisis.

The Panel, consisting of patient and family advisors, radiologists, surgeons, cardiologists, emergency room physicians, hospital administrators, technologists, regional leadership, cancer imaging leadership, cancer screening leadership, digital health and multiple branches of the Ministry developed and validated 14 key and implementable recommendations in this initial report to address the extended DI waitlist and wait times. Priority objectives outlined in this report include: mitigating the impacts to lost efficiency, improving appropriateness, leveraging existing capacity, and assessing data opportunities.

The Panel strongly advises that provincial implementation of strategies that align with the provided recommendations are key to resolving growing provincial waitlist and wait times.

Of note, some recommendations in this report are addressed to **health service providers**, a term that refers to hospitals and independent health facilities.

A consolidated list of the 14 recommendations is found below:

R1: The Panel recommends that health service providers use the ethical framework outlined in Ontario Health's *A Measured Approach to Planning for Surgeries and Procedures During the COVID-19 Pandemic* to guide the recovery of DI services during the COVID-19 Pandemic.
R2: Concerns about COVID-19 risk should not prevent patients from accessing needed procedures. The Panel recommends that health service providers collaborate with their regional partners on a communication strategy to inform patients and referring physicians on the measures being taken to provide a timely, safe examination. A key consideration for health service providers is to ensure alignment with all Ministry updates and communications regarding the COVID-19 pandemic.

R3: The Panel recommends that health service providers consider any block booking strategies that could improve efficiencies, in alignment with Infection Prevention and Control Canada (IPAC) policies/advice. Block Booking can also reduce the need and time spent changing coils in MRI. Further examples include block bookings for all knees, ankles, other extremities.
R4: The Panel recommends that health service providers should consider processes that would improve schedule accuracy and reduce idle time. This could include reviewing local schedule and scan time data for accuracy, and the application of schedule optimization technology, where available.
R5: The Panel recommends chief radiologists or their delegates should assess whether their imaging protocols can be optimized, and leverage best practices such as rapid protocols to meet their community demand and case mix.
R6: The Panel recommends that chief radiologists or their delegates, where possible, should work with their teams to consider a review of their previously booked musculoskeletal and spine scans with an aim to reduce scans for low back pain and knee and hip osteoarthritis, which are not indicated as best practices based on evidence, clinical pathways, and Choosing Wisely criteria. Health Service Providers should develop a communication strategy to inform patients of the rationale for any changes made to previously booked examinations.
R7: The Panel recommends that regions and health service providers immediately adopt quality and evidenced-based requisitions and/or appropriateness checklists (examples found in Appendix D) for new MSK, spine and emergency patients to ensure consistency with evidence and Choosing Wisely criteria. To support implementation, health service providers should implement processes to enable consultations between primary care physicians and radiologists.
R8: To decrease the overall time spent by patients in DI departments, the Panel recommends chief radiologists or their delegates consider whether oral and/or I.V. contrast utilization can be reduced for indications where it is of low value.
R9: Where health service providers have available capacity and waitlist growth, the Panel recommends they should receive additional MRI and CT operating hour funding to perform the maximum volume of quality-based scans during the pandemic. Planning considerations include current case-mix and complexity, and the availability of expertise for interpretation.
R10: The Panel recommends health service providers with capital equipment constraints collaborate with regional partners to assess the need to temporarily redistribute outpatients and associated volume funds to

nearby health service providers with capacity. Where available, Independent Health Facilities, mobile scanners and research scanners should also be explored for capacity.
R11: The Panel recommends a provincially-coordinated Diagnostic Imaging Wait Times communication strategy be developed and implemented across each of the five Regions. The communication strategy will inform physicians and patients of alternate MRI and CT service locations with corresponding wait times within their respective and neighbouring Regions.
R12: In order to meet immediate needs the Panel recommends that health service providers, where possible, modify their pre-COVID 19 operating schedules and expand the service provision of outpatient diagnostic CT and MRI examinations to meet the current increased demand. This restructuring will include expanded operating hours during the week and / or during the weekend. The expansion will also likely require the strategic recruitment of additional MRI and CT technologists, receptionists and radiologists to support increased operating hours.
R13: In health service providers where there is a shortage of radiologists and as a consequence prolonged Report Turnaround Times (based on the provincial benchmark* of 4 days for MRI, 4 days for paediatric CT and 5 days for adult CT), the Panel recommends these locations receive funding to support technology and connectivity for remote coverage by other health service providers. *Benchmarks can be found in the Diagnostic Imaging Efficiency Performance Dashboard
R14: The Panel recommends health service providers should assess current technologist workflow in order to reassign tasks that could be completed by alternate staff, thereby maximizing technologists' time for clinical tasks.

2. Introduction

Background

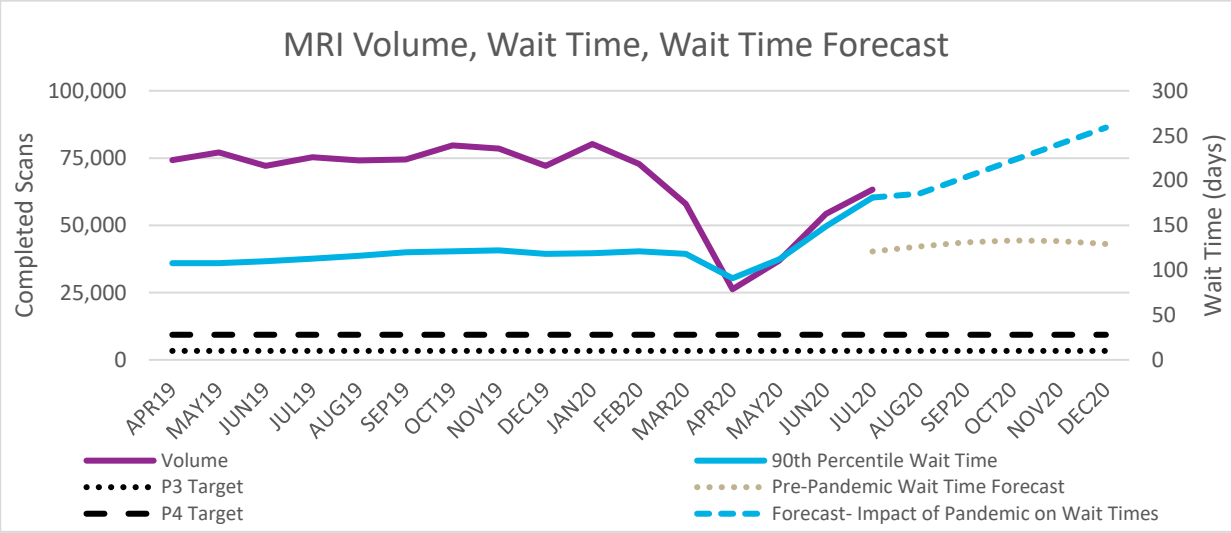
Diagnostic Imaging (DI) uses various technologies to support the diagnosis, treatment and follow-up of illness. Timely access is crucial to help doctors accurately diagnose, treat diseases, and to reduce patient anxiety. Access to DI services is one of the key mandates for Access to Care, a division of Ontario Health (Cancer Care Ontario), on behalf of the Ministry of Health (Ministry).

ATC works in partnership with the Ministry to improve patients' access to healthcare services and reduce wait times in Ontario. By providing high-quality information products and services, ATC helps manage performance and ensure accountability within healthcare organizations. ATC supports the province's wait time reduction strategies by advising the government on the use of information to improve access to healthcare and by developing and deploying new information solutions.[1]

Prior to the COVID-19 pandemic, MRI and CT capacity was unable to meet demand in Ontario and wait times were increasing. Figures 2, 3, 4 and 5 highlight the impact of the pandemic on adult and paediatric wait times; given the negative impact of the pandemic on the provision of DI, the gap between capacity and demand is even greater. The ongoing commitment to timely access to DI services remains a key priority, and as a result, it is important that the Ministry and service providers be prepared to address these pressures.

Figure 2: MRI Wait Time Trend

Source: Wait Time Information System, Access to Care at Ontario Health



[1] Access to Care. (2018). Retrieved from Access to Care Public Website: https://www.accesstocare.on.ca

Figure 3: CT Wait Time Trend

Source: Wait Time Information System, Access to Care at Ontario Health

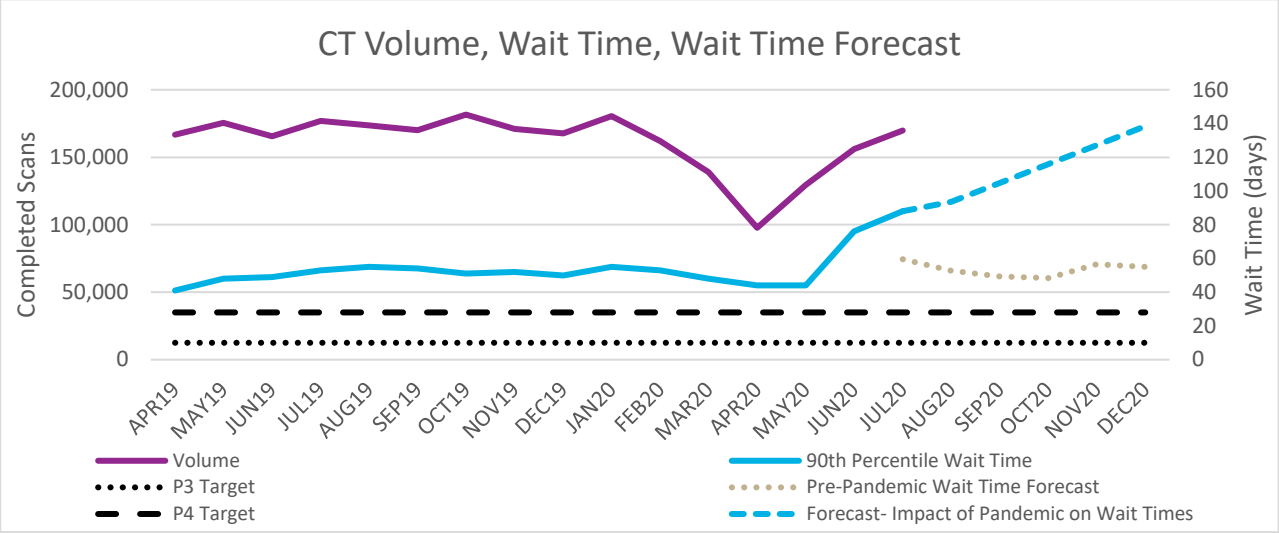


Figure 4: Provincial paediatric MRI volume reduction has led to significant increase (55%) in overall wait times since March 2020

Source: Wait Time Information System, Access to Care at Ontario Health

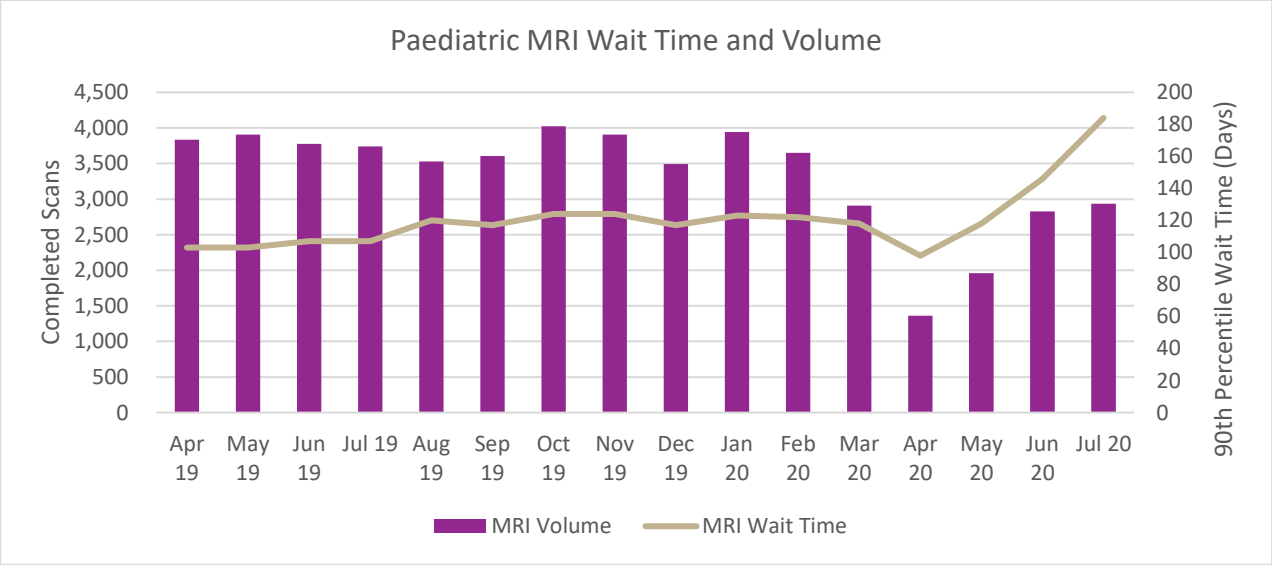
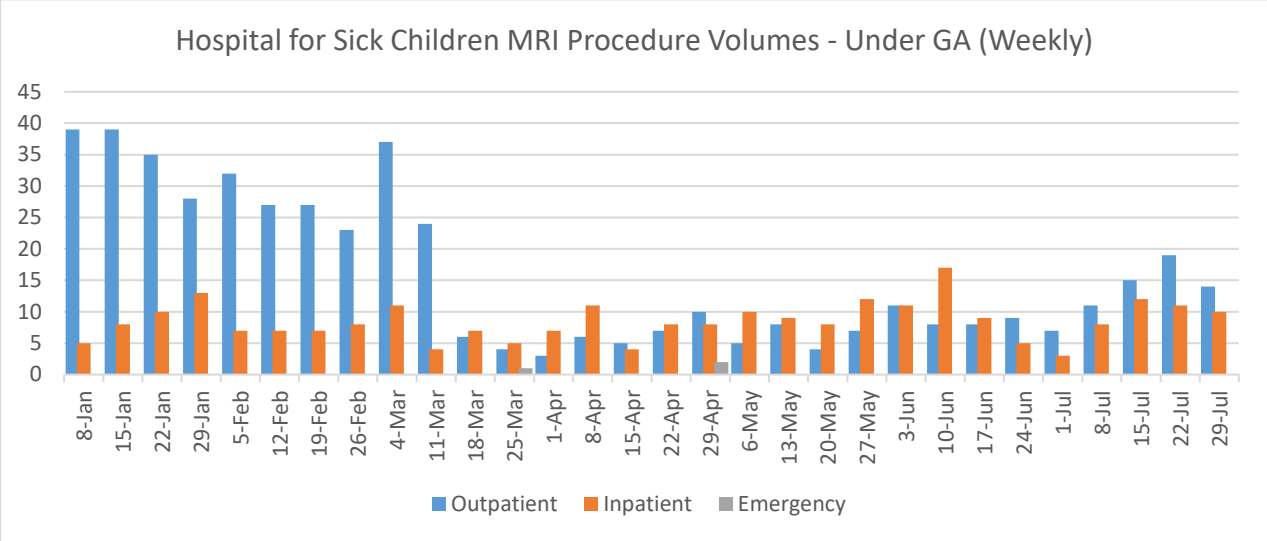


Figure 5: Volume of paediatric MRIs with general anaesthesia was reduced by up to 90% during the peak pandemic period, at the Hospital for Sick Children

Source: Wait Time Information System, Access to Care at Ontario Health



Purpose of the Diagnostic Imaging Expert Panel and This Report

The Ministry requested that ATC form a Provincial DI Expert Panel (Panel) to make recommendations on addressing issues affecting current and future delivery of DI services. The terms of reference for the Panel are included as Appendix A.

Table 1: DI Expert Panel Deliverables

COVID-19 pandemic objectives covered in this immediate report	Broader objectives to be addressed in near term reports
• Leverage existing capacity • Mitigate impacts to efficiency loss • Reduce inappropriate scanning • Identify need for COVID-19 data collection	• Develop a capacity plan to align with current and future demand • Identify and disseminate best practices to improve efficiency • Identify and disseminate opportunities to improve safety • Develop a DI data strategy • Develop performance management strategies for quality improvement and access targets • Identify alternative models of service delivery • Identify opportunities to expand from MRI/CT focus to other diagnostic and therapeutic areas (interventional radiology, theranostics)

The purpose of this first report is to help address the most urgent system priorities; to provide advice on strategies to sustain DI services throughout the COVID-19 pandemic with a focus on CT and MRI. This report will also build on the previous work of the ATC DI Advisory Committee (a long-standing advisory group that is part of the ATC governance structure) and Ontario Health (Cancer Care Ontario). Examples include the ATC COVID-19 Tip Sheet and Ontario Health (Cancer Care Ontario) COVID-19 Tip Sheet #11 for Cancer Programs

that were recently provided to hospitals.[2] Subsequent reports will be provided in the near term to address broader objectives, and to follow-up on previous expert Panel reports from 2005[3] and 2006[4].

The COVID-19 pandemic is a rapidly evolving and complex healthcare situation. This report, which provides practical recommendations to help sustain the system, is not intended to replace or supersede Ministry directives, Public Health Ontario directives, or hospital infection prevention and control practices. Modified approaches at the facility level may be required to address varying local conditions and circumstances.

Methods Used to Gather Information

The Panel used a number of methods to inform its deliberations and recommendations for this immediate report, including review of relevant literature and documents, best practices, advice, and clinical evidence provided by experts and patients. A full list of references is provided in the final section of this report.

The Wait Time Information System (WTIS)[5] was the main source of data used to monitor the impact of the pandemic on access and efficiency of DI services. Data from the WTIS was used to model the impact of the pandemic related to the MRI and CT waitlists. These results were then used to estimate the additional operating hours required to return waitlists to pre-pandemic levels. Model parameters, assumptions and limitations were validated by the ATC DI Advisory Committee.[6]

In June 2020, a survey was sent to the 85 Ontario facilities that have MRI and/or CT scanners, requesting information on their scanner capacity, ability to perform additional operating hours, and obstacles to increasing operating levels. 100% of facilities responded to the surveys, and the survey questions are included as Appendix B.

[2] Practical Tips for MRI and CT Recovery (2020-08-10). Toronto, Ontario: Access to Care (Ontario Health) Cancer Imaging – Considerations for CT and MRI Services during Recovery (2020-06-18). Toronto, Ontario: Ontario Health (Cancer Care Ontario)
[3] Keller, A. (2005). MRI and CT Expert Panel (Phase 1 Report). Toronto, Ontario: Cancer Care Ontario
[4] Keller, A. (2006). MRI and CT Expert Panel (Phase 2 Report). Toronto, Ontario: Cancer Care Ontario
[5] Wait Time Information System (2020). Toronto, Ontario: Access to Care at Cancer Care Ontario (Ontario Health).
[6] Access to Care (June 2020). ATC DI Advisory Committee Meeting Materials. Toronto, Ontario, Access to Care at Cancer Care Ontario (Ontario Health).

Overview of the Report

This first report of the DI Expert Panel begins with an assessment of the impact of the COVID-19 pandemic on access to DI services.

The data assessment is followed by separate sections for each of the Mandate #1 deliverables from the Panel's Terms of Reference:

- Mitigate Impacts to Efficiency loss
- Reduce inappropriateness scanning
- Leverage Existing Capacity
- Assess need for COVID-19 Data Opportunities

The final section presents the consolidated list of recommendations, references and acknowledgements

Of note, some recommendations in this report are addressed to **health service providers**, a term that refers to hospitals and independent health facilities.

Ethical Framework

The Panel follows an ethical framework, focusing on providing equitable access, prioritizing patients according to clinical urgency, using a disease-agnostic approach, and using a systems approach to coordination and sharing of scarce resources and access across the province, by leveraging various hospitals' capacity.

All members put their institution and personal interests aside in order to provide system-level advice on how DI could be sustained during the COVID-19 pandemic.

All members reviewed the Ontario Health conflict of interest policy, included in the Panel's Terms of Reference, and no conflicts of interest were identified for the current members.[7]

R1: The Panel recommends that health service providers use the ethical framework outlined in Ontario Health's *A Measured Approach to Planning for Surgeries and Procedures During the COVID-19 Pandemic*[8] to guide the recovery of DI services during the COVID-19 Pandemic.

[7] Ontario Health (2020). Conflict of Interest Policy. Toronto, Ontario: Cancer Care Ontario (Ontario Health).
[8] Ontario Health. (2020). A Measured Approach to Planning for Surgeries and Procedures During the COVID-19 Pandemic. Retrieved from: https://www.ontariohealth.ca/sites/ontariohealth/files/2020-06/A%20Measured%20Approach%20to%20Planning%20for%20Surgeries%20and%20Procedures%20During%20the%20COVID-19%20Pandemic.pdf

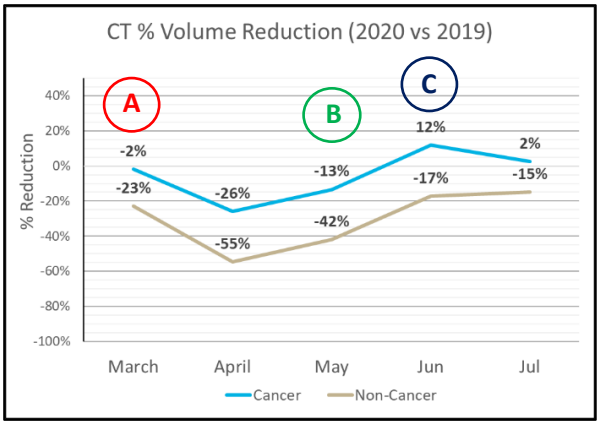
3. Impact of the COVID-19 Pandemic on Access to DI Services

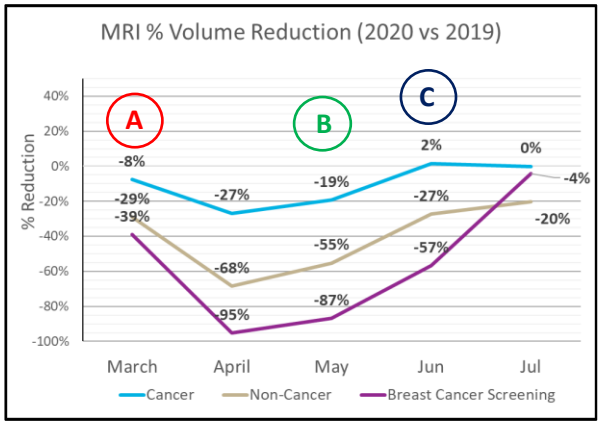
The Ministry issued Directive #2 on March 19th, 2020 in order to protect healthcare resources and workers from the rapid spread of the COVID-19 virus[9]. Hospitals were advised to temporarily reduce and postpone the provision of elective procedures. The result was a large decrease in performed DI cases (Figure 6 and 7).

Figure 6: CT Volume Reduction

Figure 7: MRI Volume Reduction

Source: Wait Time Information System, Access to Care at Ontario Health



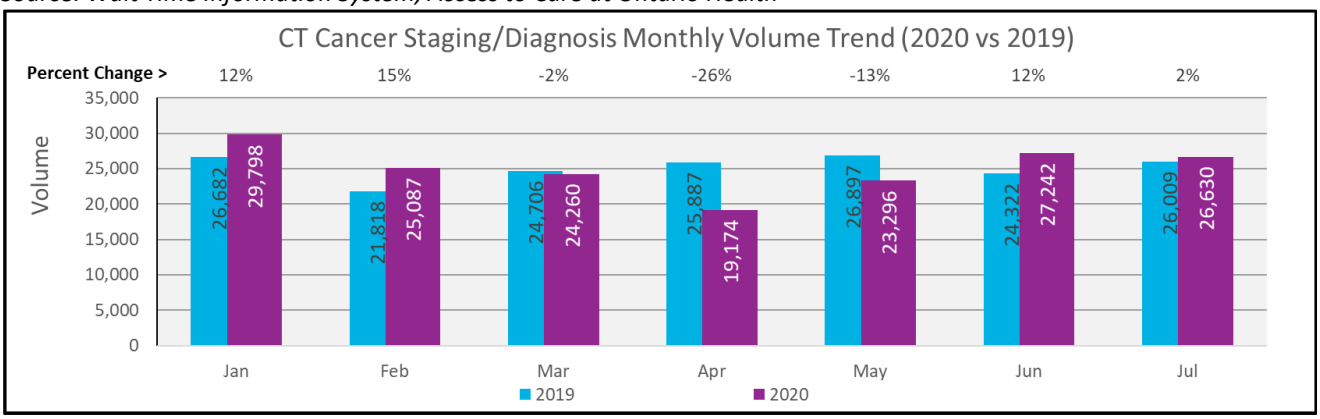


A Directive #2 **B End of Directive #2** **C Ontario Health DI Resumption of Service Guidelines**

As hospitals reduced elective services, volume for MRI and CT services was reduced by up to 67% during the peak pandemic period. As of July 2020, cancer imaging services are resuming normal volumes but the majority of DI (non-cancer imaging) continues to operate at reduced volume levels (Figures 8, 9, 10 and 11).

Figure 8: CT cancer imaging volume has returned to normal levels as of June 2020

Source: Wait Time Information System, Access to Care at Ontario Health



[9] Williams, D. (2020). COVID-19 Directive #2 for Healthcare Providers. Toronto, Ontario: Ministry of Health

Figure 9: CT non-cancer imaging volume remains slightly below normal levels as of July 2020

Source: Wait Time Information System, Access to Care at Ontario Health

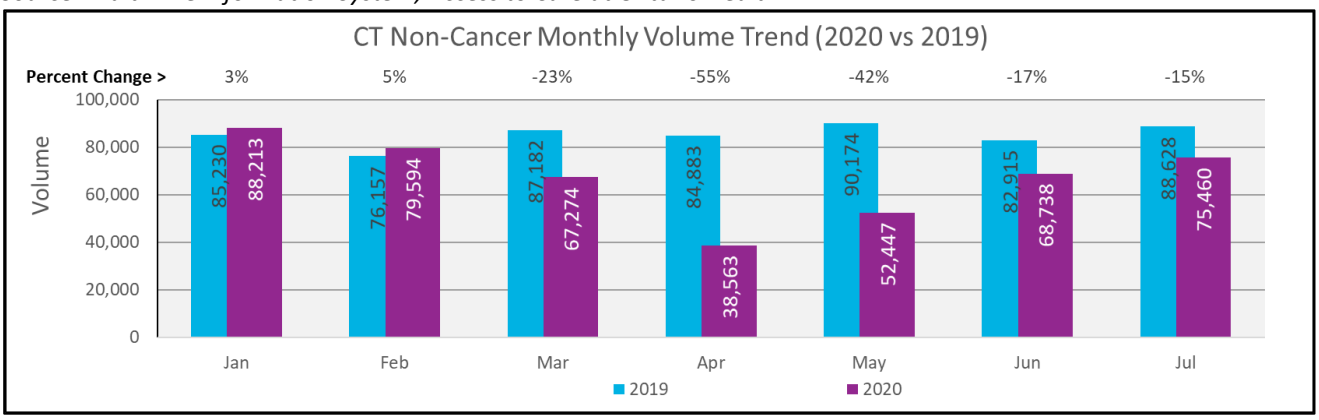


Figure 10: MRI cancer imaging volumes have returned to normal levels as of June 2020

Source: Wait Time Information System, Access to Care at Ontario Health

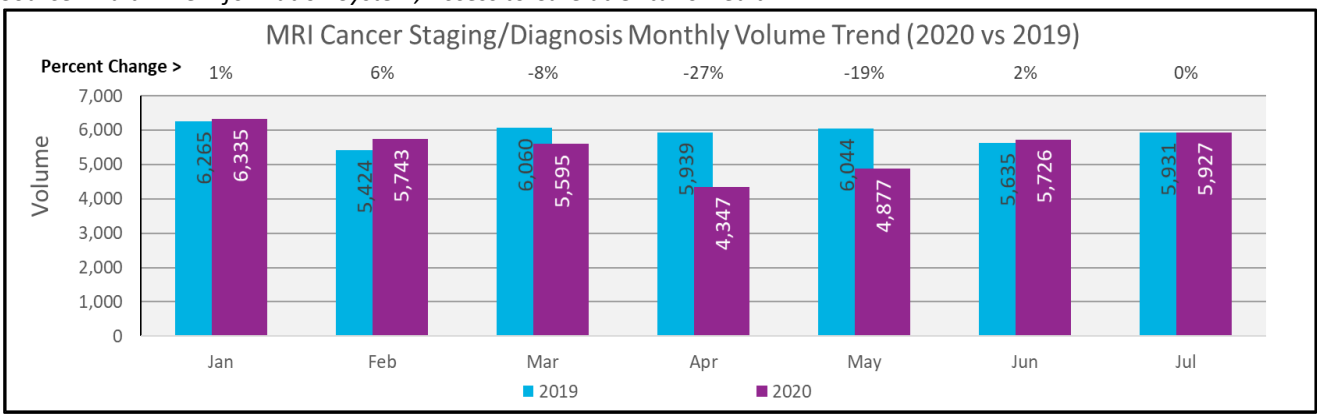
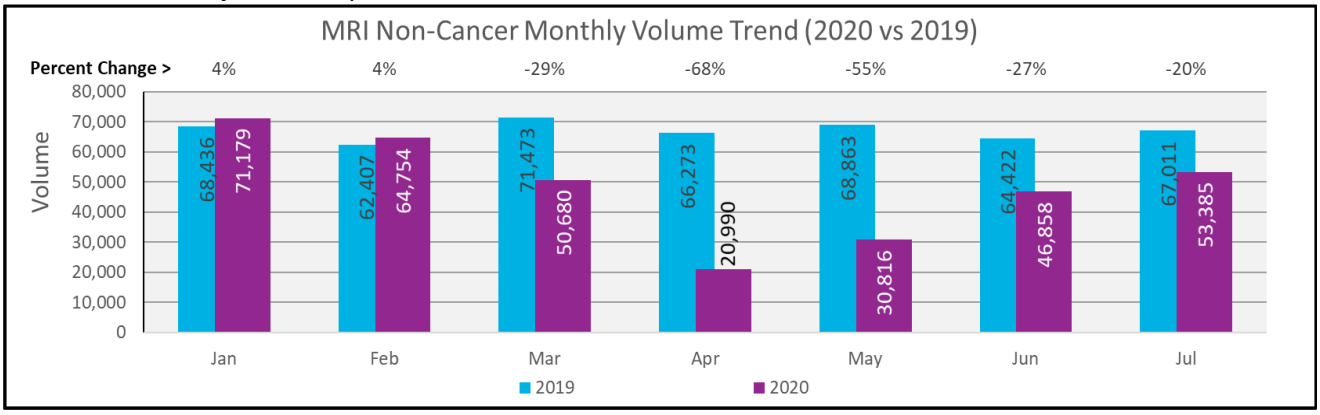


Figure 11: MRI non-cancer imaging volumes remain well-below normal levels as of July 2020

Source: Wait Time Information System, Access to Care at Ontario Health



As the performed volume of MRI and CT services decreased, the wait lists for services are estimated to have grown up to 58% and 93% respectively, March- July 2020 (Figure 12 and 13).[10]

Figure 12

Source: Wait Time Information System, Access to Care at Ontario Health

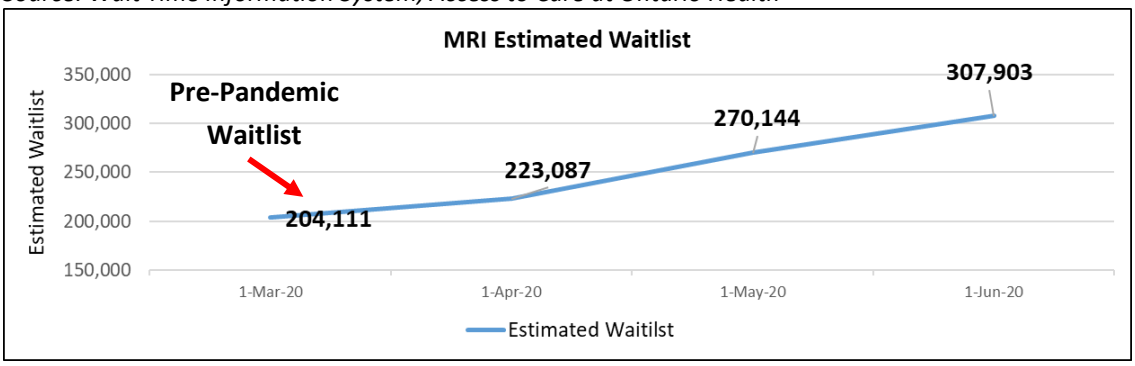
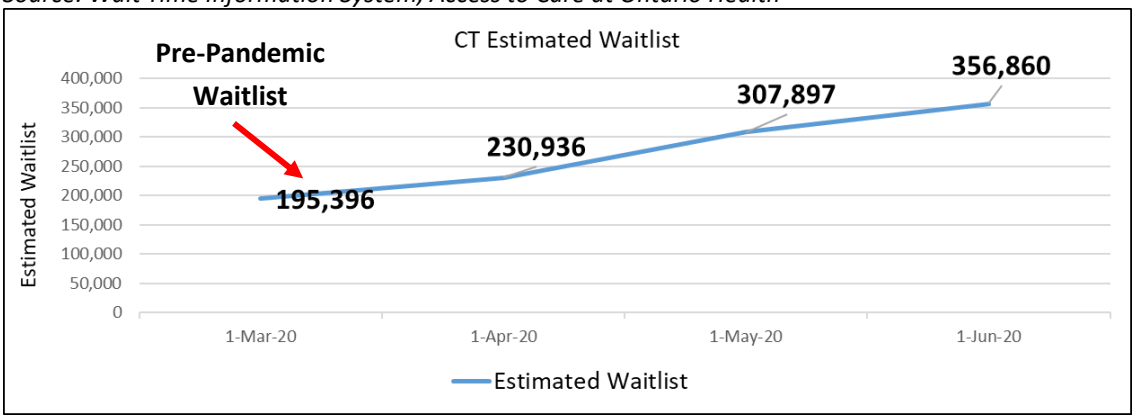


Figure 13

Source: Wait Time Information System, Access to Care at Ontario Health



The waitlist is disproportionally skewed towards Priority Level 4 (non-urgent) patients, for which health service providers have historically struggled to meet the provincial access targets. Wait times for this cohort of patients were deteriorating prior to the pandemic as facilities prioritized emergency patients, inpatients, and cancer patients. There continues to be a growing gap between the non-urgent demand and non-urgent provincial capacity which will be further compounded by the COVID-19 pandemic.

In addition to the extended patient waitlist and subsequent rising wait times, there is an increased level of workplace stress[11]. Radiologists reported a very high burnout rate prior to the pandemic, and the increased

[10] Access to Care (June 2020). ATC DI Advisory Committee Meeting Presentation. Toronto, Ontario, Access to Care at Cancer Care Ontario (Ontario Health).

stressor may lead to acute traumatic stress disorder, and ultimately post traumatic stress syndrome[11]. Individual and hospital administrative strategies need to be implemented to help support all staff members' mental health during the pandemic.

4. Mitigate Impacts to Efficiency

The efficiency of DI operations has been reduced since the beginning of the COVID-19 pandemic. In particular, the number of patients that health service providers are able to scan per operating hour has decreased (Table 2).

Table 2

Ontario Outpatients Per Operating Hour	**June 2019**	**Jan 2020**	**Feb 2020**	**March 2020**	**April 2020**	**May 2020**	**June 2020**
MRI Patients per Operating Hour (OP)	**1.5**	**1.6**	**1.6**	1.2	0.7	0.9	1.2
CT Patients per Operating Hour (OP)	**2.8**	**2.9**	**2.9**	2.2	1.4	1.8	2.3

**Operating Hours are self-reported by facilities*

A lower rate of patients per operating hour means that DI departments are unable to scan the same volume of patients in same amount of time now compared to pre-pandemic. For example, 1.6 MRI patients per operating hour would have allowed an 8-hour shift to perform almost 400 scans in January 2020 (1.6 patients per hour X 8 hour shift X 30 days). In June 2020 (post pandemic peak), 1.2 MRI patients per operating hour means the same shift only would have performed about 300 scans (1.2 patients per hour X 8 hour shift X 30 days).

WTIS data shows small changes in efficiencies have significant impacts on total performed provincial volumes. Some immediate strategies are available to support health service providers in mitigating this trend, including **patient communications**, **adjustments to scheduling, and rapid protocol adoption.**

Patient Communications

Patients have conflicting fears of delayed imaging procedures and of contracting COVID-19 during imaging appointments. These fears may lead to an inability to schedule patients, and an increased rate of patient no-shows. As a result, unplanned scanner idle time has increased during the pandemic, which is detrimental to

[11]Restauri, N. & Sheridan, A. (2020). Burnout and Posttraumatic Stress Disorder in the Coronavirus Disease 2019 (COVID-19) Pandemic: Intersection, Impact and Interventions. *Journal of the American College of Radiology*, 17(7), 921-926.

efficient scheduling and throughput. There is an opportunity to reduce this effect through improved communications regarding the safe, effective navigation of the health system.

R2: Concerns about COVID-19 risk should not prevent patients from accessing needed procedures. The Panel recommends that health service providers collaborate with their regional partners on a communication strategy to inform patients and referring physicians on the measures being taken to provide a timely, safe examination.

A key consideration for health service providers is to ensure alignment with all Ministry updates and communications regarding the COVID-19 pandemic.

Block Booking

Changing of coils between patients can add additional time which leads to decreased patient throughput.

R3: The Panel recommends that health service providers consider any block booking strategies that could improve efficiencies, in alignment with Infection Prevention and Control Canada (IPAC) policies/advice. Block Booking can also reduce the need and time spent changing coils in MRI. Further examples include block bookings for all knees, ankles, other extremities.

Scheduling Accuracy

Health service provider feedback and data from the WTIS indicate that scheduling inaccuracy significantly impacts capacity. Scheduling inaccuracy results when the estimated scan time is different than the actual scan time, leading to idle scanner time. This idle time represents lost capacity that could be used to scan other patients. In the context of COVID19, idle time results in reduced hospital capacity to manage the growing waitlist for MRI and CT services. While schedule optimization may be possible for some health service providers, a longer term strategy is needed, and the next phase of Panel deliberations will consider the requirements for a pan-provincial plan, including components related to supportive technology and expertise.

R4: The Panel recommends that health service providers should consider processes that would improve schedule accuracy and reduce idle time. This could include reviewing local schedule and scan time data for accuracy, and the application of schedule optimization technology, where available.

Protocol Efficiencies

Prior to COVID-19, ATC engaged health service providers to assess opportunities for schedule optimization.[12] MRI imaging parameters for similar indications differ among health service providers due to local protocol preferences and historic practices. Some current protocols may be unnecessarily time-consuming, contributing to lower efficiencies.

As an example, among 11 Ontario health service providers (HSPs), MRI knee scan protocols had a slice thickness, which affects scan duration, ranging from 0.9 to 4mm. The result is that knee scans for one HSP cumulatively take many hours more per month compared to another HSP. The results of this engagement are available in Appendix C.

Adopting more efficient protocols has been shown to increase capacity.[13] As an example, the Toronto Central LHIN/Region partnered with the Joint Department of Medical Imaging in Toronto to roll out rapid protocols over multiple hospitals. The roll-out required hospitals to assess their current protocols and clinical referral indications, with an aim to reduce image acquisition time through new rapid protocols that maintained image quality. Initial results showed a significant savings in operating hours that could be used to scan more patients.

The types of rapid protocols developed, as well as possible time savings, will vary for health service providers based on community needs and case mix. There are immediate benefits that could be realized through local assessment of protocols, but the next phase of Panel deliberations will also review the need for pan-provincial standardization and sharing of protocol information. The utility of rapid protocols requires sufficient clinical information, a well defined clinical question, validation in a series of well defined clinical disorders, and adoption/acceptance by clinicians and radiologists.

R5: The Panel recommends chief radiologists or their delegates should assess whether their imaging protocols can be optimized, and leverage best practices such as rapid protocols to meet their community demand and case mix.

Technology Replacement

Varying levels of scanner technology (age, strength, software, hardware, add-on components) impacts scanning times. Similar scans on different equipment can have dramatically different scan times. Older scanners and equipment are more prone to breakdown resulting in unplanned downtime and loss of

[12] Access to Care (2019). Schedule Optimization Presentation to Ministry of Health. Toronto, Ontario: Ontario Health. Institution engagement covered Thunder Bay, Stratford, Bluewater, Woodstock, St. Joseph Healthcare London, St. Michael's Hospital, Timmins & District, Windsor Ouellette, CHEO, Halton and Lakeridge.

[13] Joint Department of Medical Imaging (2018). MRI P4 Strategy, MR-Rapid Protocols Development. Toronto, Ontario.

operational hours. In the absence of equipment updates, operating hours are lost that could be used to scan more patients. This issue has immediate implications, but requires time and planning to address. Technology replacement will be assessed in the next phase of DI Expert Panel deliberations (Mandate #2).

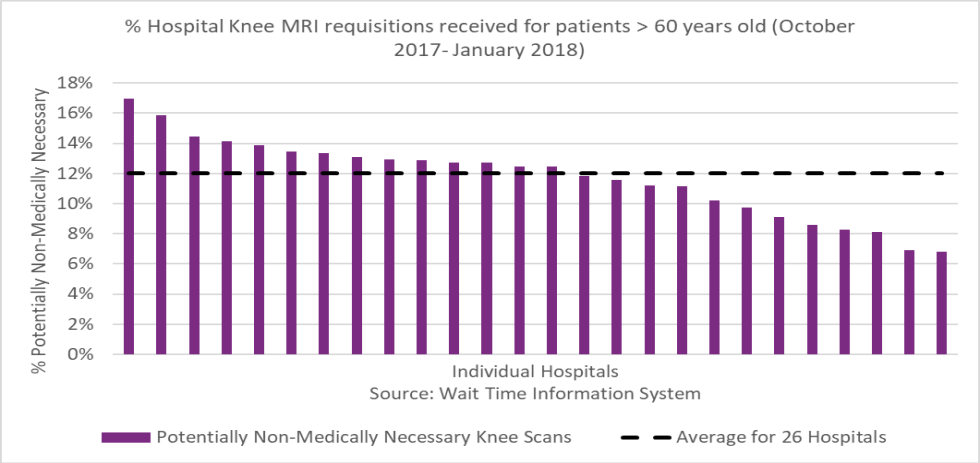
5. Diagnostic Imaging Overuse

Previous expert Panel reports from the Ministry and CCO (Ontario Health) were released between 2005 and 2010 and provided recommendations to improve access to MRI and CT services in a timely and evidence-based manner.[14]

A survey of available clinical and research literature indicates non-medically necessary MRI scans comprise 20% – 40% of the most common MRI scans such as knee and lumbar-spine.[15] In the context of COVID-19, overuse of technology contributes to a growing backlog of requisitions, and delays the recovery of the system following the pandemic. Overuse of DI is defined as the application of DI services when the results are unlikely to inform treatment decisions, and are potential contributors to increased utilization.

Available data shows there is wide variability among hospitals in the proportion of MRI knee requisitions received for patients aged 60 year or more, where the yield (or contribution to patient management) of the imaging is often limited**.**

Figure 14: MRI Knee Requisitions for Patients Aged 60 Years or More
Source: Wait Time Information System, Access to Care at Ontario Health



[14] Panel, M. a. (2010). Improving Timely Access to Quality MRI. Toronto: Cancer Care Ontario.
[15] Schultz, S. &. (2015). Has the Interprofessional Spine Assessment Education Clinic (ISAEC) had an impact on physician test ordering for low back pain? Toronto: Institute for Clinical Evaluative Sciences.

Instances of MRI and CT utilization should be based on comprehensive documentation of clinical indication and/or evidence-based best practice alignment. There is currently no established standardized method to determine the proportion of demand for services that is medically necessary. The inability to monitor the use of services impedes the Ministry's ability to identify future funding and capacity requirements, and, adds costs to the system.[16] In particular, MSK and Spine requisitions have been identified by the Canadian Association of Radiologists and Choosing Wisely as areas of potential concern for overuse of MRI technology.[17,18] Overuse of MRI for non-high risk breast cancer patients has also been cited as a concern by the Ontario Health Technology Assessment Council.[19]

R6: The Panel recommends that chief radiologists or their delegates, where possible, should work with their teams to consider a review of their previously booked MSK and spine scans with an aim to reduce scans for low back pain, and knee and hip osteoarthritis, which are not indicated as best practices based on evidence, clinical pathways, and Choosing Wisely criteria.

Health Service Providers should develop a communication strategy to inform patients of the rationale for any changes that are made to previously booked examinations.

R7: The Panel recommends that regions and health service providers immediately adopt quality and evidenced-based requisitions and/or appropriateness checklists (examples found in Appendix D) for new MSK, spine and emergency patients to ensure consistency with evidence and Choosing Wisely criteria. To support implementation, health service providers should implement processes to enable consultations between primary care physicians and radiologists.

Reassessing the Need for Oral and I.V. Contrast

The use of contrast with CT imaging is well-supported for many indications. However, contrast over-utilization has the potential to reduce patient throughput. Clinical guidelines are available to identify

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[16] Access to Care (2018). MRI Appropriateness Discussion Paper. Toronto, Ontario: Access to Care at Ontario Health.
[17] CAR Imaging Referral Guidelines. (2012). Retrieved from Canadian Association of Radiologists: https://car.ca/wp-content/uploads/Musculoskeletal-system.pdf
[18] Choosing Wisely Criteria. (2020). Retried from https://choosingwiselycanada.org/
[19] Health Quality Ontario. Magnetic resonance imaging as an adjunct to mammography for breast cancer screening in women at less than high risk for breast cancer: a health technology assessment. Ont Health Technol Assess Ser [Internet]. 2016 November;16(20):1-30. Available from: http://www.hqontario.ca/evidence-to-improve-care/journal-ontario-health-technology-assessment-series

situations where contrast adds little value. In some instances, it is possible to avoid using contrast and still achieve the required images.[20,21]

As an example, multiple publications argue against the use of oral contrast in evaluating acute non-traumatic abdominal pain.[22] A number of hospitals have implemented or are in the process of shifting to avoid CT imaging with oral contrast except where clinically indicated.

R8: To decrease the overall time spent by patients in DI departments, the Panel recommends chief radiologists or their delegates consider whether oral and/or I.V. contrast utilization can be reduced for indications where it is of low value.

6. Leverage Existing Capacity

Operating Hours

Based on current data, the Panel estimates 239,120 additional MRI and CT operating hours are required to return waitlists to pre-pandemic levels as of July 1 (See Table 3). For MRI, this represents an approximate 24% increase in operating hours compared to pre-pandemic levels. Similarly, for CT, this represents an approximate 18% increase in operating hours.[23] The tables below provide high-level assessments of the waitlist impact for each region, but the Panel recognizes further consideration is needed to identify complexities within local and regional waitlists, including but not limited to paediatrics, cardiology and neurology. The next phase of Panel deliberations will review the need to identify resource requirements specifically for these groups.

Table 3: Operating Hours Required to Return the MRI and CT Waitlists to Pre-Pandemic Levels:

Diagnostic Imaging Modality	March 1 2020 Waitlist	Estimated Waitlist Growth by 1 July 2020	Estimated % Waitlist Growth	Additional Scanner Hours Needed to Return Waitlist on March 1, 2020	Additional Monthly Hours Needed (goal = 12 months)	Additional Monthly Hours Potentially Available for Outpatients
MRI	207,270	119,476	58%	136,524	11,377	17,615
CT	195,396	182,428	93%	102,596	8,550	30,077
Total	**402,666**	301,904		239,120	19,927	**47,692**

[20] America College of Radiology. (2019). ACR Appropriateness Criteria. Retrieved from American College of Radiology: https://acsearch.acr.org/list

[21] Learning Community for Improvement in Radiology (2020). Retrieved from https://docs.google.com/presentation/d/1b9liJngJfKhL2JF1ayN8u3mRVp2xMYYl/edit#slide=id.p1

[22] Joint Department of Medical Imaging (2020). Retrieved from https://docs.google.com/presentation/d/1ui2Wexq1Ctqr0Nc68ASDkDMrByMr5x_1/present?ueb=true&slide=id.p7

[23] Access to Care (2020). Waitlist Impact Assessment Presentation. Toronto, Ontario: Cancer Care Ontario (Ontario Health).

Additional MRI Operating Hours Needed to Return to March 2020 Waitlist, by Region Based on self-reported information from facilities							
Region	March 1, 2020 Waitlist	Estimated Waitlist Growth by July 1, 2020	Estimated % Waitlist Growth	Patients Per Operating Hour (May 2020)	Additional Scanner Operating Hours Needed to Return Waitlist on March 1, 2020	Additional Monthly Hours Needed (goal = 12 months)	Additional Monthly Hours Potentially Available for Outpatients*
West	56,261	34,761	62%	0.83	41,881	3,490.1	3,842
Central	55,261	32,855	59%	0.92	35,712	2,976.0	3,099
Toronto	52,434	15,147	29%	0.75	20,196	1,683.0	5,179
East	33,491	28,588	85%	0.91	31,415	2,618.0	4,627
North	9,823	8,125	83%	1.11	7,320	610.0	868
Total	**207,270**	119,476			136,524	11,377	**17,615**
***Validated by Hospitals**							

Additional CT Operating Hours Needed to Return to March 2020 Waitlist, by Region Based on self-reported information from facilities							
Region	March 1, 2020 Waitlist	Estimated Waitlist Growth by July 1, 2020	Estimated % Waitlist Growth	Patients Per Operating Hour (May 2020)	Additional Scanner Operating Hours Needed to Return Waitlist on March 1, 2020	Additional Monthly Hours Needed (goal = 12 months)	Additional Monthly Hours Potentially Available for Outpatients*
West	45,211	52,560	116%	1.66	31,663	2,639	5,793
Central	32,673	45,751	140%	1.82	25,138	2,095	6,606
Toronto	64,178	28,381	44%	1.96	14,480	1,207	8,313
East	42,510	43,735	103%	1.8	24,297	2,025	6,475
North	10,824	12,001	111%	1.71	7,018	585	2,890
Total	**195,396**	182,428			102,596	8,550	**30,077**
***Validated by Hospitals**							

R9: Where health service providers have available capacity and waitlist growth, the Panel recommends they should receive additional MRI and CT operating hour funding to perform the maximum volume of quality-based scans during the pandemic.

Planning considerations include current case-mix and complexity, and the availability of expertise for interpretation.

Addressing Funding Methodology

The current MRI/CT funding methodology is over 10 years old and is applied uniformly among hospitals regardless of case complexity, geographic catchment area, technology and patient population. The Office of the Auditor General has already identified a need to review of the funding methodology for MRI and CT services.[24] To attempt to meet demand, many hospitals self-fund additional operating hours beyond those supplied by Ministry funding. In the context of COVID-19, recovery of the system will span multiple years and require a sustainable funding framework. Funding methodology will be assessed in the next phase of DI Expert Panel deliberations (Mandate #2).

MRI and CT Scanners

There are 85 Diagnostic Imaging (MRI and/or CT) health service providers across Ontario[25]. Based on data from the WTIS and direct engagement of all MRI and CT sites in Ontario, the majority of health service providers were not operating their scanners 24 hours per day prior to the pandemic. This means most locations could increase their operating hours given sufficient human resources, personal protective equipment, and funding.

Sixteen health service providers, however, have capital equipment constraints regarding MRI and CT services. Approximately 15% of scanners are scheduled for patients 18+ average hours per day, which does not include urgent scanning performed outside of scheduled hours. These facilities will be unable to significantly increase operating hours, particularly for CT operations where up to half of scanner capacity is reserved for unscheduled emergency patients.

Timely reduction of the waitlist growth which accumulated during the first wave of COVID-19 cannot be accomplished within the current model of care delivery.

R10: The Panel recommends health service providers with capital equipment constraints collaborate with regional partners to assess the need to temporarily redistribute outpatients and associated volume funds to nearby health service providers with capacity. Where available, Independent Health Facilities, mobile scanners and research scanners should also be explored for capacity.[26]

R11: The Panel recommends a provincially-coordinated Diagnostic Imaging Wait Times communication strategy be developed and implemented across each of the five Regions. The communication strategy will

[24] Office of the Auditor General of Ontario (2018). Annual Report to the Legislative Assembly of Ontario- Cancer Treatment Services. Retrieved from http://www.auditor.on.ca/en/content/annualreports/arbyyear/ar2018.html
[25] Access to Care (2019). Inventory of MRI and CT Scanners in Ontario. Toronto, Ontario: Ontario Health.
[26] Listing of Independent Health Facilities (2020). Toronto, Ontario: Ministry of Health. Retrieved from: http://www.health.gov.on.ca/en/public/programs/ihf/facilities.aspx

inform physicians and patients of alternate MRI and CT service locations with corresponding wait times within their respective and neighbouring Regions.

Health Human Resources

Despite available capacity on existing scanners and potential for the Ministry to fund additional operating hours, the health human resources required to operationalize this capacity may not be available. To accomplish the significant proposed increase in operating hours, facilities will need to establish additional shifts of technologists and receptionists and ensure sufficient radiologist capacity for protocoling and interpretation of reports. **There is a long standing shortage of health human resources (CT, MRI, and US medical radiation technologists) and, in some regions equipment (CT, MRI) in Ontario. This requires a longer term strategy to meet the needs of the Ontario population.** Health human resources planning for DI will be reviewed in the next phase of DI Expert Panel deliberations, including a focus on training colleges to match intake to needs (Mandate #2).

R12: In order to meet immediate needs the Panel recommends that health service providers, where possible, modify their pre-COVID 19 operating schedules and expand the service provision of outpatient diagnostic CT and MRI examinations to meet the current increased demand. This restructuring will include expanded operating hours during the week and / or during the weekend. The expansion will also likely require the strategic recruitment of additional MRI and CT technologists, receptionists and radiologists to support increased operating hours.

R13: In health service providers where there is a shortage of radiologists and as a consequence prolonged Report Turnaround Times (based on the provincial benchmark* of 4 days for MRI, 4 days for paediatric CT and 5 days for adult CT), the Panel recommends these locations receive funding to support technology and connectivity for remote coverage.

***Benchmarks can be found in the Diagnostic Imaging Efficiency Performance Dashboard**

R14: The Panel recommends health service providers should assess current technologist workflow in order to reassign tasks that could be completed by alternate staff, thereby maximizing technologists' time for clinical tasks.

7. Identify Need for COVID-19 Data Collection

The WTIS was designed and remains effective to monitor and report on wait times and efficiencies, using broad reporting categories for MRI and CT services. The Ministry relies heavily on Self-Reporting Initiative (SRI) and WTIS data when making resource allocation decisions. Hence it remains imperative that all institutions report data (wait times, and DI efficiency) into the WTIS and SRI (actual hours performed) as accurately as possible.

However, sufficient data is not available to monitor and improve evidence-based, standardized care for DI services. More granular data, such as body-part specific (knee and lumbar-spine) reporting, and, where feasible, imaging intent (e.g., diagnosis, follow-up), is needed in order to assess compliance with Choosing Wisely Criteria, improve appropriateness, and optimize system capacity.[27,28] The next phase of DI Expert Panel deliberations (Mandate #2) will assess and explore all currently available data to support system improvement, including billing and administrative data, with an aim to provide advice on a provincial data strategy to enable the required level of reporting.

[27] Petruik, C., & Drobot, A. (2015). The eReferral Evaluation Final Report. Retrieved from www.albertanetcare.ca/documents/eReferral-Evaluation-Final-Report.pdf

[28] Macgregor, D., Parker, S., Macmillan, S., Blais, I., Wong, E., Robertson, C., & Bruce-Barrett, C. (2009). Innovation in Managing the Referral Process at a Canadian Pediatric Hospital. Healthcare Quarterly, 12(3), 72-79. Retrieved from HealthCare Quarterly

8. Consolidated List of Recommendations

R1: The Panel recommends that health service providers use the ethical framework outlined in Ontario Health's *A Measured Approach to Planning for Surgeries and Procedures During the COVID-19 Pandemic* to guide the recovery of DI services during the COVID-19 Pandemic.
R2: Concerns about COVID-19 risk should not prevent patients from accessing needed procedures. The Panel recommends that health service providers collaborate with their regional partners on a communication strategy to inform patients and referring physicians on the measures being taken to provide a timely, safe examination. A key consideration for health service providers is to ensure alignment with all Ministry updates and communications regarding the COVID-19 pandemic.
R3: The Panel recommends that health service providers consider any block booking strategies that could improve efficiencies, in alignment with Infection Prevention and Control Canada (IPAC) policies/advice. Block Booking can also reduce the need and time spent changing coils in MRI. Further examples include block bookings for all knees, ankles, other extremities.
R4: The Panel recommends that health service providers should consider processes that would improve schedule accuracy and reduce idle time. This could include reviewing local schedule and scan time data for accuracy, and the application of schedule optimization technology, where available.
R5: The Panel recommends chief radiologists or their delegates should assess whether their imaging protocols can be optimized, and leverage best practices such as rapid protocols to meet their community demand and case mix.
R6: The Panel recommends that chief radiologists or their delegates, where possible, should work with their teams to consider a review of their previously booked MSK and spine scans with an aim to reduce scans for low back pain and knee and hip osteoarthritis, which are not indicated as best practices based on evidence, clinical pathways, and Choosing Wisely criteria. Health Service Providers should develop a communication strategy to inform patients of the rationale for any changes that are made to previously booked examinations.
R7: The Panel recommends that regions and health service providers immediately adopt quality and evidenced-based requisitions and/or appropriateness checklists (examples found in Appendix D) for new MSK, spine and emergency patients to ensure consistency with evidence and Choosing Wisely criteria. To support implementation, health service providers should implement processes to enable consultations between primary care physicians and radiologists.

R8: To decrease the overall time spent by patients in DI departments, the Panel recommends chief radiologists or their delegates consider whether oral and/or I.V. contrast utilization can be reduced for indications where it is of low value.
R9: Where health service providers have available capacity and waitlist growth, the Panel recommends they should receive additional MRI and CT operating hour funding to perform the maximum volume of quality-based scans during the pandemic. Planning considerations include current case-mix and complexity, and the availability of expertise for interpretation.
R10: The Panel recommends health service providers with capital equipment constraints collaborate with regional partners to assess the need to temporarily redistribute outpatients and associated volume funds to nearby health service providers with capacity. Where available, Independent Health Facilities, mobile scanners and research scanners should also be explored for capacity.
R11: The Panel recommends a provincially-coordinated Diagnostic Imaging Wait Times communication strategy be developed and implemented across each of the five Regions. The communication strategy will inform physicians and patients of alternate MRI and CT service locations with corresponding wait times within their respective and neighbouring Regions.
R12: In order to meet immediate needs the Panel recommends that health service providers, where possible, modify their pre-COVID 19 operating schedules and expand the service provision of outpatient diagnostic CT and MRI examinations to meet the current increased demand. This restructuring will include expanded operating hours during the week and / or during the weekend. The expansion will also likely require the strategic recruitment of additional MRI and CT technologists, receptionists and radiologists to support increased operating hours.
R13: In health service providers where there is a shortage of radiologists and as a consequence prolonged Report Turnaround Times (based on the provincial benchmark* of 4 days for MRI, 4 days for paediatric CT and 5 days for adult CT), the Panel recommends these locations receive funding to support technology and connectivity for remote coverage. *Benchmarks can be found in the Diagnostic Imaging Efficiency Performance Dashboard
R14: The Panel recommends health service providers should assess current technologist workflow in order to reassign tasks that could be completed by alternate staff, thereby maximizing technologists' time for clinical tasks.

9. Next Steps

Dissemination

Regarding Mandate #1, to provide an immediate report on recommendations to sustain the system during the COVID-19 pandemic, the Panel will partner with the Ministry on a dissemination and implementation strategy to make this information available to the healthcare community.

Follow-Up

Where relevant, the Panel will leverage subsequent reports to follow-up on recommendations from the Mandate #1 report.

Mandate #2

The Panel will reconvene as soon as possible to begin planning and deliberating on the issues presented within Mandate #2.

10. Acknowledgements

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https://www.researchgate.net/publication/26318151_Innovation_in_Managing_the_Referral_Process_at_a_Canadian_Pediatric_Hospital

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Appendix A: DI Expert Panel Terms of Reference – July 2020

Purpose

The Ministry of Health (Ministry) has requested Access to Care (ATC) at Ontario Health to form a Provincial Diagnostic Imaging (DI) Expert Panel (Panel), in order to make recommendations on how to address issues affecting current and future delivery of DI services.

The purpose of this document is to provide a framework for the establishment of the Panel, with an aim to guide the following aspects:

- Mandate
- Principles
- Leadership
- Membership
- Meeting administration
- Roles and accountabilities

Background

Various DI technologies are used to support the diagnosis, treatment and follow-up of illnesses and injuries. Timely access to imaging services is crucial for health practitioners to accurately and efficiently diagnose medical conditions, enabling prompt care decisions and interventions. A secondary outcome of timely access is the reduction of patient anxiety, which is an important component of patient centred care. Access to DI services is one of the key mandates for ATC, on behalf of the Ministry.

Prior to the COVID-19 pandemic, MRI and CT capacity was unable to meet demand in Ontario and wait times were increasing beyond benchmarks. In response to the COVID-19 pandemic and the Chief Medical Officer of Health's Directive #2 issued in March 2020, Ontario's hospitals reduced non-emergent surgeries/procedures to preserve hospital capacity to care for patients with COVID-19. Given the impact of these necessary measures on the provision of DI services and the reliance surgery has on imaging, the pressure on DI services will be even greater once DI and surgical operations fully resume. As a result, it is important that the Ministry and service providers be prepared to effectively address this matter.

Cancer Care Ontario (CCO) at Ontario Health provided DI Expert Panel Reports to the Ministry in 2005 and 2006, with recommendations to improve DI services. Over the last 15 years, the Ministry acted on a number of these recommendations to improve access to magnetic resonance imaging (MRI) and computed tomography (CT), including the development of performance benchmarks and public reporting of wait times. There continue to be opportunities to improve access to DI services, as a sustainable solution to lengthy wait times has not yet been achieved. Several examples include underlying resource issues (capital, operating funding and human resources), coupled with lack of standardized care and supporting technology. A full list of previous recommendations is available as Appendix A.

Mandate

The mandate of the Panel will be to inform, guide and advise the Ministry on strategies to improve DI access. An initial report is needed immediately to provide advice on strategies to sustain DI services throughout the current pandemic. Subsequent reports are needed to provide advice on other near-term objectives (See Table 2).

Table 2: DI Expert Panel Deliverables

Deliverable 1: COVID-19 Pandemic Report	Deliverable 2: Broader Objectives and Related Reports
• Leverage existing capacity • Mitigate impacts to efficiency loss • Reduce inappropriate scanning • Identify need for COVID-19 data collection	• Develop a capacity plan to align with current and future demand • Identify and disseminate best practices to improve efficiency • Identify and disseminate opportunities to improve safety • Develop a DI data strategy • Develop performance management strategies for quality improvement and access targets • Identify alternative models of service delivery • Identify opportunities to expand from MRI/CT focus to other diagnostic and therapeutic areas (interventional radiology, theranostics)

Guiding Principles

The 2020 Expert Panel will be guided by the following principles:

- The Panel will follow an ethical framework, focusing on providing equitable access, prioritizing patients according to clinical urgency, using a disease-agnostic approach, and using a systems approach to coordination and sharing of scarce resources and access across the province, leveraging various hospital capacity
- Priority is to improve access to DI services and meet established performance targets
- Advice should be practical for hospitals to understand and implement
- Recommendations are supported by evidence and data
- Where data does not exist, recommendations are based upon the best judgement and experience of the Panel
- Build upon previous DI Advisory Committee and DI Expert Panel work
- Align with priorities outlined in the ATC System Plan, the 2018 Auditor General DI report, and the Provincial Digital Health Strategy
- Recommendations must be fiscally sustainable
- Additional data workload on hospitals should be avoided where possible

- Align with accepted quality dimensions of care

Leadership

The Panel will be co-chaired by Dr. Julian Dorbranowski, ATC DI Clinical Lead, and Ryan Wood, Group Manager for the ATC DI Information Program. The co-chairs' main roles will be to:

- Validate the purpose and agenda for the Panel meetings
- Guide discussions and decisions of the Panel meetings
- Provide clinical expertise, networking, and leadership
- Ensure a quorum is available for meetings to be effectively conducted
- Confirm that guiding principles are met
- Establish sub-committee groups to address certain issues as needed
- Contact members who do not complete the follow-up action items in a timely manner
- Record and review meeting attendance to ensure adequate representation

Membership

The co-chairs will identify and solicit membership to ensure cross-sectoral representation, with an aim to provide sufficient expertise and knowledge to accomplish the Panel's stated objectives. Being a member of the DI Expert Panel represents a commitment of time and expertise. The Panel will have membership from radiologists, technologists, hospitals and regions, with support from Ontario Health and the Ministry.

Active participation is required and members will be required to complete follow-up action items as required (e.g. forms, surveys and input) in a timely manner.

Members are expected to review materials (agenda, presentation, supporting documents) sent in advance of the meeting.

Members will notify the chair in advance of absence or illness and identify a standing delegate and appropriate decision-making authority to attend where possible. The standing delegate should have the appropriate background and/or decision making-authority.

Should a member choose to resign from the Panel, they should inform the chair at least 30 days in advance of the next meeting, where possible. A recommendation for a replacement should also be provided for the chair's consideration.

Proposed Membership List (Subject to Evolving Requirements)

Sector	Membership
Co-chairs	• Dr. Julian Dobranowski, Program Head, Clinical Program, Clinical Lead, DI Information Program • Ryan Wood, Group Manager, Diagnostic Imaging Information Program, Access to Care
Radiologists	• Representation from various relevant disciplines/practices, including mixture of disease and modality experts (CT, MRI, Ultrasound, Musculoskeletal, Neurological, Oncology, Cardiac, Interventional Radiology) • Dr. Sriharsha Athreya, Interventional Radiology, Niagara Health • Dr. Heidi Schmidt, Cardiothoracic Imaging, Mount Sinai • Dr. Ania Kielar, Abdominal Imaging, University Health Network • Dr. Narinder Paul, Cardiothoracic Imaging, London Health Sciences Centre • Dr. Manohar Shroff, Paediatric Imaging, Hospital for Sick Children • Dr. Ben Fine, Digital Strategy, Trillium Health Partners • Dr. Deljit Dhanoa, Interventional Radiology, Windsor Regional Hospital • Dr. Richard Aviv, Neuroradiology, The Ottawa Hospital • Dr. Jonathan Boekhoud, Nuclear Medicine, Thunder Bay Health Sciences Centre • Dr. Karen Finlay, Musculoskeletal Imaging, Hamilton Health Sciences Centre • Ultrasound (TBD)
External Advisors	• Dr. Derek Emery, Neuroradiology, Appropriateness, University of Alberta
Orthopaedic Specialists	• St. Michael's Hospital (TBD)
Primary Care	• Dr. Jennifer Everson, Ontario Health (West)
Neurology Specialists	• Hospital for Sick Children (TBD)
Cardiology	• Dr. Tej Sheth, McMaster University
Surgical Oncology	• Dr. Frances Wright, Sunnybrook Health Sciences Centre
Emergency Medicine	• Dr. Rafi Setrak, Niagara Health System
Hospital Administration	• Paul Cornacchione, University Health Network, • Tyler Speck, Health Sciences North • Jerry Plastino, St Joseph's Health Care London
Technologists	• Brian Ho • Mei Skinner
Patient Advisors	• Lauri Petz • Ann Rawson
Regional Leadership	• Brian Bailey, West Region • Sue Wojdylo, East Region
Supportive Roles	
ATC Program	• Steve Scott, Director, Access to Care • Diane O'Grady, Senior Business Analyst, DI Information Program

Ontario Health	• Deanna Langer, Cancer Imaging, Cancer Care Ontario Business Unit • Katerina Podolak, Cancer Screening, Cancer Care Ontario Business Unit
Ministry of Health	• Heather MacDermid, Provincial Programs Branch • Zain Mujtaba, Provincial Programs Branch • George Clarke, Independent Health Facilities • Silas Ng, Digital Health Program • Stephanie Ackers, Health Human Resources

Meeting Frequency and Administration

- Initially, meetings will be held twice per month and then be adjusted to match the pace of work. Sub-committees may meet more frequently as needed.
- Meetings will be no longer than two hours and will take place via video or teleconference to adhere to social distancing guidance.
- Meeting materials will be distributed via email to members in advance of the scheduled meeting.
- Meeting minutes and action items will be distributed via email to members approximately one week after the meeting.

Voting & Decision Making

The Panel co-chairs will endeavor to achieve consensus for Panel recommendations.

- Where consensus is not achieved, a quorum will be necessary to proceed with recommendations (50% +1).
- If a quorum cannot be achieved, the chair may elect to seek advice from the executive sponsors.
- Voting results will be recorded for all voting members.

Confidentiality

The materials and content prepared for and discussed within this committee are intended solely for the Panel members and may contain confidential and/or privileged information. Given the nature of some of the content discussed during these meetings, the use, disclosure, dissemination, copying, or storage of committee materials or content for purposes outside of this committee, is strictly prohibited unless prior written approval from the chair has been received.

Governance

Governance of this project will be facilitated through the ATC DI Advisory Committee and the evolving Ontario Health governance model.

Roles and Responsibilities

Key Activities	Responsible	Accountable	Consulted	Informed
Review and Approve Terms of Reference	Co-chairs	Director ATC Manager Ministry Implementation Unit	DI Advisory Committee	VP Analytics and Informatics (A&I)
OH Executive Team Engagement	Director ATC	Director ATC	Manager Ministry Implementation Unit	DI Advisory Committee

			Co-chairs	
MOH Executive Engagement	Manager Ministry Implementation Unit	Manager Ministry Implementation Unit	Director ATC Co-chairs	DI Advisory Committee
Recruit Expert Panel members	ATC DI Team	Co-chairs	DI Advisory Committee Director ATC Manager Ministry Implementation unit	VP A&I
Health System Analysis and Assessment	ATC DI Team Ministry Implementation Unit Lead	Co-chairs	ATC Director Manager Ministry Implementation Unit	DI Advisory Committee
Identify priority areas	Expert Panel Members	Co-chairs	Director ATC Manager Ministry Implementation Unit DI Advisory Committee	VP A&I
Coordinate sub-working groups for priority areas	ATC DI Team	Co-chairs	Director ATC Manager Ministry Implementation Unit DI Advisory Committee	VP A&I
Draft MRI & CT recommendations	ATC DI Team	Co-chairs	Director ATC Manager Ministry Implementation Unit DI Advisory Committee	VP A&I

Previous Recommendations from 2005 and 2006 DI Expert Panels	
Implemented	**Previous Recommendations Not Yet Addressed**
• Performance benchmarks developed and implemented for MRI and CT wait times and efficiencies • Public reporting of MRI and CT Wait Times • DI Asset Management whereby biennial audits of provincial MRI and CT scanner inventory at facilities have been conducted and data provided to the Ministry	• Standardize utilization of scanners across hospitals • Provide standards on level of technology required to meet a hospital's level of care • Improve appropriate use of DI services • Standardize protocols used to acquire images • Make electronic ordering and wait time information available to physicians at point-of-care

• Targeted additional MRI funding for high priority areas ($34M over four years)	• Implement a DI human resource strategy • Review the funding methodology for MRI and CT • Adopt an overarching provincial approach to DI services

Terms of Reference - CONFLICT OF INTEREST POLICY

This *Conflict of Interest Policy* (**Policy**) is intended to provide guidance to you so that actual, potential or perceived Conflicts of Interest (**COIs**) are recognized and either avoided or dealt with through appropriate disclosure and management. Early disclosure of a COI is key to its successful resolution.

What is a Conflict of Interest?

"Conflict of Interest" (COI) refers to situations in which your occupational, financial or other personal or private interests (including those related to a family member) may impair, influence, or create the appearance of impairing or influencing your ability to objectively exercise your duties to OH. Conflicts of Interest may be actual, potential or perceived.

Disclosure

You must make full, timely and ongoing disclosure of any situation which places or may have the result of placing you in a COI in relation to the exercise of your duties and responsibilities to Ontario Health.

Procedure for Disclosure and Management of COIs

A. Prior to the performance of the Activities in connection with the OH Program, you must complete a declaration (form attached) and submit it to the designated OH Program Representative.

B. The Ontario Health Program Representative will review the content of the declaration and determine whether an actual, potential or perceived COI exists.

C. In cases where an actual, potential or perceived COI is disclosed by you, the Ontario Health Program Representative will forward the declaration to Ontario Health's Legal Department for review and consultation. Ontario Health's Legal Department will review the declaration and provide the OH Program Representative with suggestions on how to appropriately manage the COI.

General Principles on Interactions with the Pharmaceutical Industry

In cases where you interact with the pharmaceutical industry, you are expected to comply with the *Canadian Medical Association's Guidelines for Physicians in Interactions with Industry* and the *Rx&D Code of Ethical Practices*.

Appendix B: Institution Capacity Survey

Access to Care - Diagnostic Imaging Information Program

CT and MRI Operating Hours Validation and Available Capacity Assessment

June 2020

Ontario Health
Cancer Care Ontario

The Ministry of Health and Ontario Health (Access To Care) are working to identify the resources required to address the CT and MRI wait list growth which resulted from the reduction of elective procedures during the peak of the COVID-19 Pandemic.

We are asking hospitals to confirm the accuracy of operating hours submitted to the WTIS and to advise ATC whether additional operating hours could be added to existing scanners, if funding were available. To achieve this, we require every facility to submit information regarding their January 2020 operating hours and ability to add operating hours.

This will be a multiphase approach which will involve further focused engagements and collaboration with hospitals and Independent Health Facilities to identify and examine challenges in capturing operating hours and understand available capacity.

Please complete this form by July 7, 2020 and upload your MS Excel file to your hospital's folder on the ATC Information Site.

Refer to the definitions and examples of capacity limitations, provided in this document, to guide the completion of this very valuable work.

If you have any questions or concerns related to this requirement please refer to the provided FAQ or email ATC@cancercare.on.ca
Link: Frequently Asked Questions

List the individuals who will complete this form or provide input.
Please collaborate with DI supervisors, managers, directors or other individuals involved in scheduling to complete this request.

Name	Role Title	Office Email

If there are insufficient rows, enter further information into open comment box in Step 5

Definition:
For the purpose of this investigation, use the definition which follows to complete the form

Operating hours that could reasonably be added
Hours in the day not currently allocated for use and which could be leveraged to scan additional outpatients.
As it cannot be assumed that all sites and scanners have the ability to scan 24/7, this assessment is evaluating only reasonably available operating hours (available capacity). These are outpatient hours which could be added to the existing schedule after accommodating for internal and external limitations other than funding. Use the provided Examples of Limitations to establish reasonably available operating hours for each of your scanners.

Estimate operating hours that could reasonably be added for outpatients and enter into the chart below. To estimate these hours, identify unused hours from a regular schedule which your facility will return to once pandemic guidance to reduce elective exams has been lifted.

These hours are to be submitted as average hours per day for weekdays and weekends and for each individual scanner.

Refer to the examples of limitations to determine how many hours could reasonably be added. Funding is not considered a limitation in this

Link: Examples of Limitations

Note: If a scanner is already scheduled 21 or more hours daily during weekdays or weekends, enter N/A into the appropriate cell. If a scanner is scheduled less than 21 hours but is unable to increase hours due to limitations, enter the number 0 into the appropriate cell.

Facility Number	123	Facility	Example Facility					
Site Number	4567	Site Name	Example Site					
		Modality	MRI	MRI	CT	CT		
		Scanner ID	MR1	MR2	CT1	CT2		
Enter estimated operating hours that could reasonably be added (Average hours per day)		Weekday						
		Weekend						

It is understood that not all scanners have the capacity to scan 24/7. Please list the reasons or limitations why this is not possible for your facility.

These may or may not be included in the examples of limitations provided. If the limitation stems from a funding constraint, please do not include.

Link: Examples of Limitations

Note: If all scanners currently run or could be run 24/7, simply indicate N/A.

Example	*Facility only has 4 radiologists and has a limited capacity in ability to report scans.*
Reason: 1	
2	
3	
4	
5	

If there are insufficient rows, enter further information into open comment box in Step 5

Examples of Limitations to Increasing Operating Hours

Use this criteria to help you identify the available operating hours that could potentially be added to the weekday or weekend schedule.
When identifying available operating hours, use the included limitations to help define how many hours could reasonably be added. Do not accommodate for the excluded limitations.
The value must be calculated in average operating hours per day and be specific to scanner, weekday and weekend.

Included Limitations

Criteria	Definition	Explanation
Planned Downtime	Hours reserved for scanner maintenance	Scanner maintenance is a necessary task that must be completed to keep scanners functioning. These hours cannot be used to scan outpatients
Staff break time	Hours where the scanner is left unscheduled to accommodate for mandatory staff breaks	Staff breaks are approximately 1 hour per 8 hour shift. It is deemed unreasonable to hire technologists solely to cover these hours. Therefore staff break time is considered an appropriate limitation
Scan room preparation and clean up	Hours used to either prepare a scan room before a procedure or clean-up after a procedure. This includes time required to clean the air after an airborne isolation case. Time to allow for appropriate social distancing between patients is included under this definition	Scan room preparation and clean up are necessary tasks which are part of the process of scanning patients. Not allocating appropriate time to prepare or clean a room poses a risk to patient safety. These hours in between patients cannot be leveraged to scan outpatients and are considered an appropriate limitation
Radiologists/ reporting limitations	A defined number of radiologists are limited to the amount of cases they are able to read within a given timeframe	Operating hours and subsequent cases scanned should not be increased past a point where they cannot be reported within a reasonable timeframe. This may pose a risk to patient safety and is considered an appropriate limitation

Excluded Limitations

Criteria	Definition	Explanation
Funding	The sum of the base and incremental funding provided by the Ministry of Health for CT and MRI operating hours	The purpose of this investigation is to simply identify and quantify where available hours exist in Ontario. Funding is not considered a limitation for this assessment
Demand	The number of MRI and CT orders received within the reporting month	The purpose of this investigation is to identify and quantify where available hours exist in Ontario. Low demand is not considered a limitation for this assessment
Standby time	Time for which there is no planned use, but which can be leveraged to scan urgent (P1) cases if the need arises. No dedicated staff would be scheduled to be onsite during this time. Staff who are responsible to scan urgent (P1) cases during this time would either be on-call or staff shared between another modality such as radiography (x-ray)	During standby time the scanner is expected to be dormant and unoccupied for the majority of the time. If additional operating hours were added during this time, the expectation is that urgent cases would be accommodated similar to during regular operating hours
Urgent (ED, P1 and P2) Time	Time allocated to urgent cases indicated by P1 and P2 priorities. These can be patients from the emergency department or inpatients	Demand for urgent time is independent of overall operating hours. The expectation is that urgent time is already accommodated during regular operating hours and will not need to be increased if additional operating hours are added

Quality assurance time	Hours used to perform quality assurance (QA) procedures	QA procedures are conducted to identify scanner issues and ensure patient and technologist safety. They are considered necessary tasks to keep a scanner functioning safely and effectively. These hours cannot be used to scan outpatients and are considered an appropriate limitation	**Staff/Human Resources Currently Available**	The number of technologists and support staff who are currently hired and contribute to the CT and MRI workflow	Funding is not considered a limitation in this assessment. The implication is if staff are required to be hired or part-time hours increased in order to accommodate additional operating hours, this would be covered by additional funding. This is not considered a limitation. Please refer to the included limitation 'ability to hire new staff/technologists' if there are concerns around availability of hireable staff or technologists in your geographical area
Development time	Hours used to develop protocols (such as new MRI sequences) or conduct other similar quality improvement tasks	Development time is meant with the intention of quality improvement and requires the scanner or scan room to be in use. A patient cannot be in the scanner at the same time and therefore these hours cannot be used to scan outpatients. This is considered an appropriate limitation	**Patient demographic**	Combined features which contribute to the overall picture or structure of a patient population in an area. Factors such as age, mobility and diagnosis all contribute to this overall picture	In this assessment, capacity is purely identified in terms of time (hours per day) and not throughput. Therefore patient demographics are not considered a limiting factor
Staff meetings/ development/ education time	Hours where a scanner is left unscheduled in order to allow staff to attend meetings, development activities or education time	Compared to operating hours, this time composes only a small percentage. These few hours would not contribute much to additional operating hours and are therefore considered negligible. This time is considered an appropriate limitation	**Case complexity**	The availability and percentage of complex MRI and CT examinations scanned at a site. Complexity is defined by factors such as scan duration, use of contrast, included interventional procedures and more	In this assessment, capacity is purely identified in terms of time (hours per day) and not throughput. Therefore case complexity is not considered a limiting factor

Equipment limitation	Due to lifespan limitations, older scanners may not be capable of scanning non-stop 24/7	Scanners must not be made to function past their physical capabilities or limitations. This inability to increase operational hours past a certain point is considered an appropriate limitation
Ability to hire new staff/ technologists	Depending on supply and demand in an area, it may not be possible to hire technologists or support staff to facilitate additional operating hours	An inability to hire additional technologists or support staff is an external factor which a facility cannot control. This is considered an appropriate limitation if known
Quantity of Scanners	The number of functional CT and MRI scanners currently owned by the facility	This assessment is evaluating available operating hours on existing scanners. The number of scanners a facility owns directly influences how many operating hours can be added. Do not factor in hours from scanners that are planned to be or are in the process of being installed but are not yet functional If there are plans to install net new scanners in the near future, please inform ATC@cancercare.on.ca

Appendix C: Institution Variation in Protocols

Based on ATC engagement of select facilities in 2019

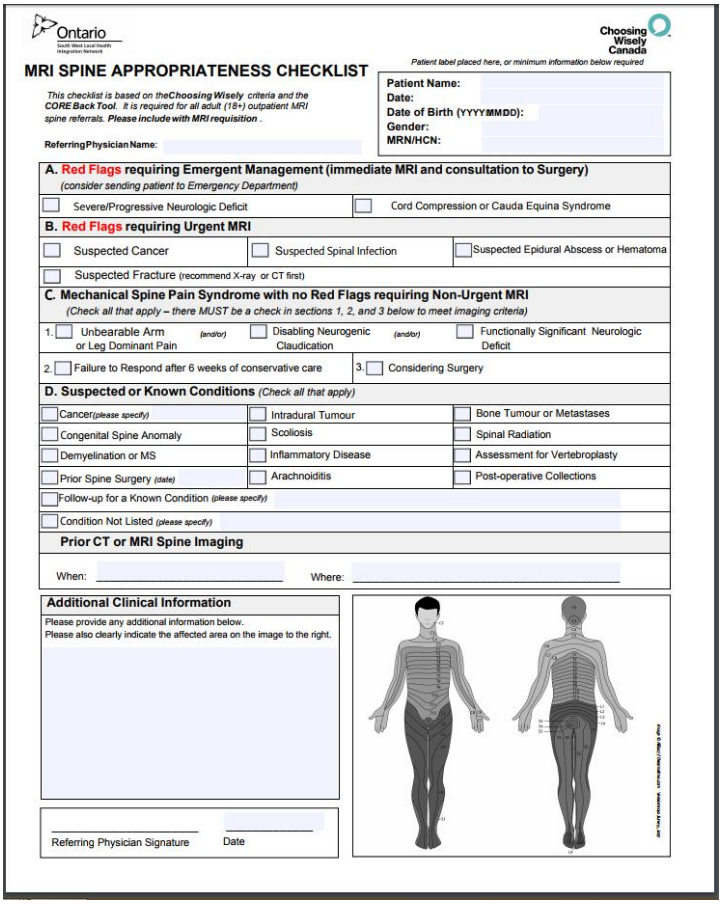
Hospital	System	Scanner Year	Strength	MRI Knee		MRI L Spine		MRI Hip	
				Booking time (mins)	Protocol (mins)	Booking time(mins)	Protocol (mins)	Booking time (mins)	Protocol (mins)
Paediatric	Siemens	2014	3.0T	20/30	17:00	20/30	10:00	30	13:00
	General Electric	2006	1.5T						
Acute/Teaching	Siemens x 2	2012	1.5T	30	18:27	30	17:44	30	16:00
	Siemens	2012	3.0T						
Acute/Teaching	Siemens x 2	2012	3.0T	15	7:45	30	13:30	30	15:00
	Phillips x 2	2016	1.5T						
Community	Siemens	2011	1.5T	30	11:05	30	9:54	30	15:43
Community	Siemens	2017	1.5T	30.0	18:25	30	23:17	45	17:17
Acute/Teaching	Siemens	2011	1.5T	30	13:36	30	11:04	30	15:28
	Siemens	2009	3.0T						
Acute/Teaching	Siemens	2005	1.5T	30/45	20:00	30	12:00	30	12:00
	Siemens	2013	1.5T						
	Phillips	2008	3.0T						
Booking/ Protocol Range				15-45	7:45 to 20	20-30	9:45 to 23:17	30-45	12 to 17:17

Appendix D: Sample Appropriateness Checklist

Mandatory Appropriateness Checklist:

(Courtesy of Ontario Health (West) Region)

https://www.swpca.ca/



Ontario
South West Local Health Integration Network

Choosing Wisely Canada

MRI SPINE APPROPRIATENESS CHECKLIST

Patient label placed here, or minimum information below required

*This checklist is based on the **Choosing Wisely** criteria and the **CORE Back Tool**. It is required for all adult (18+) outpatient MRI spine referrals. **Please include with MRI requisition** .*

Patient Name:
Date:
Date of Birth (YYYYMMDD):
Gender:
MRN/HCN:

Referring Physician Name:

A. Red Flags requiring Emergent Management (immediate MRI and consultation to Surgery)
(consider sending patient to Emergency Department)

- ☐ Severe/Progressive Neurologic Deficit
- ☐ Cord Compression or Cauda Equina Syndrome

B. Red Flags requiring Urgent MRI

- ☐ Suspected Cancer
- ☐ Suspected Spinal Infection
- ☐ Suspected Epidural Abscess or Hematoma
- ☐ Suspected Fracture (recommend X-ray or CT first)

C. Mechanical Spine Pain Syndrome with no Red Flags requiring Non-Urgent MRI
(Check all that apply – there MUST be a check in sections 1, 2, and 3 below to meet imaging criteria)

1. ☐ Unbearable Arm or Leg Dominant Pain *(and/or)* ☐ Disabling Neurogenic Claudication *(and/or)* ☐ Functionally Significant Neurologic Deficit
2. ☐ Failure to Respond after 6 weeks of conservative care
3. ☐ Considering Surgery

D. Suspected or Known Conditions *(Check all that apply)*

- ☐ Cancer *(please specify)*
- ☐ Intradural Tumour
- ☐ Bone Tumour or Metastases
- ☐ Congenital Spine Anomaly
- ☐ Scoliosis
- ☐ Spinal Radiation
- ☐ Demyelination or MS
- ☐ Inflammatory Disease
- ☐ Assessment for Vertebroplasty
- ☐ Prior Spine Surgery *(date)*
- ☐ Arachnoiditis
- ☐ Post-operative Collections
- ☐ Follow-up for a Known Condition *(please specify)*
- ☐ Condition Not Listed *(please specify)*

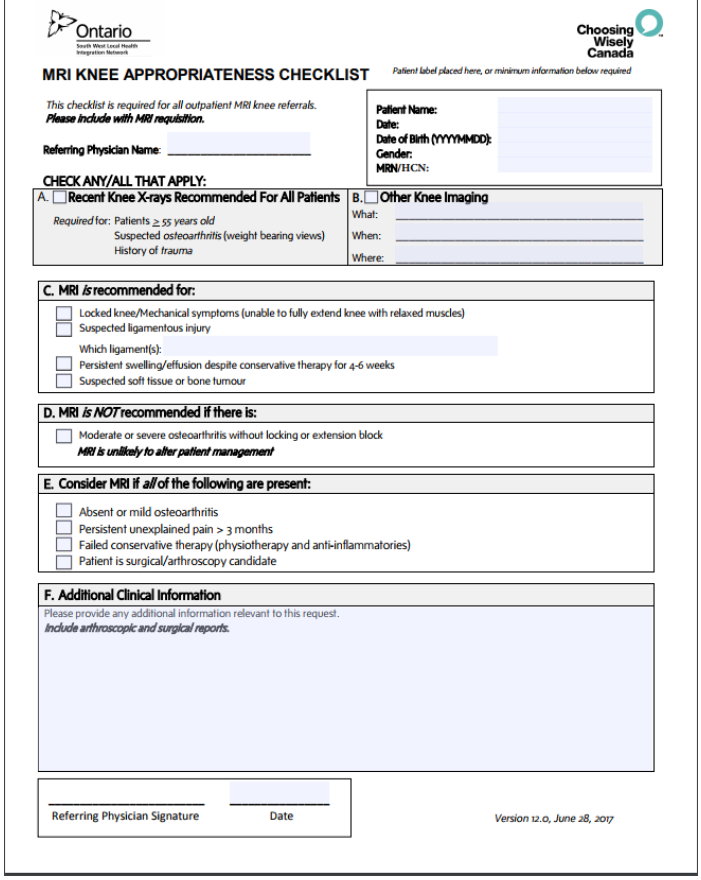
Prior CT or MRI Spine Imaging

When: _____ Where: _____

Additional Clinical Information

Please provide any additional information below.
Please also clearly indicate the affected area on the image to the right.

Referring Physician Signature _____ Date _____



Ontario
South West Local Health Integration Network

Choosing Wisely Canada

MRI KNEE APPROPRIATENESS CHECKLIST

Patient label placed here, or minimum information below required

This checklist is required for all outpatient MRI knee referrals.
Please include with MRI requisition.

Patient Name:
Date:
Date of Birth (YYYYMMDD):
Gender:
MRN/HCN:

Referring Physician Name: _____

CHECK ANY/ALL THAT APPLY:

A. ☐ Recent Knee X-rays Recommended For All Patients
Required for: Patients ≥ 55 years old
Suspected *osteoarthritis* (weight bearing views)
History of *trauma*

B. ☐ Other Knee Imaging
What: _____
When: _____
Where: _____

C. MRI *is* recommended for:

- ☐ Locked knee/Mechanical symptoms (unable to fully extend knee with relaxed muscles)
- ☐ Suspected ligamentous injury
  Which ligament(s):
- ☐ Persistent swelling/effusion despite conservative therapy for 4-6 weeks
- ☐ Suspected soft tissue or bone tumour

D. MRI *is NOT* recommended if there is:

- ☐ Moderate or severe osteoarthritis without locking or extension block
  MRI is unlikely to alter patient management

E. Consider MRI if *all* of the following are present:

- ☐ Absent or mild osteoarthritis
- ☐ Persistent unexplained pain > 3 months
- ☐ Failed conservative therapy (physiotherapy and anti-inflammatories)
- ☐ Patient is surgical/arthroscopy candidate

F. Additional Clinical Information

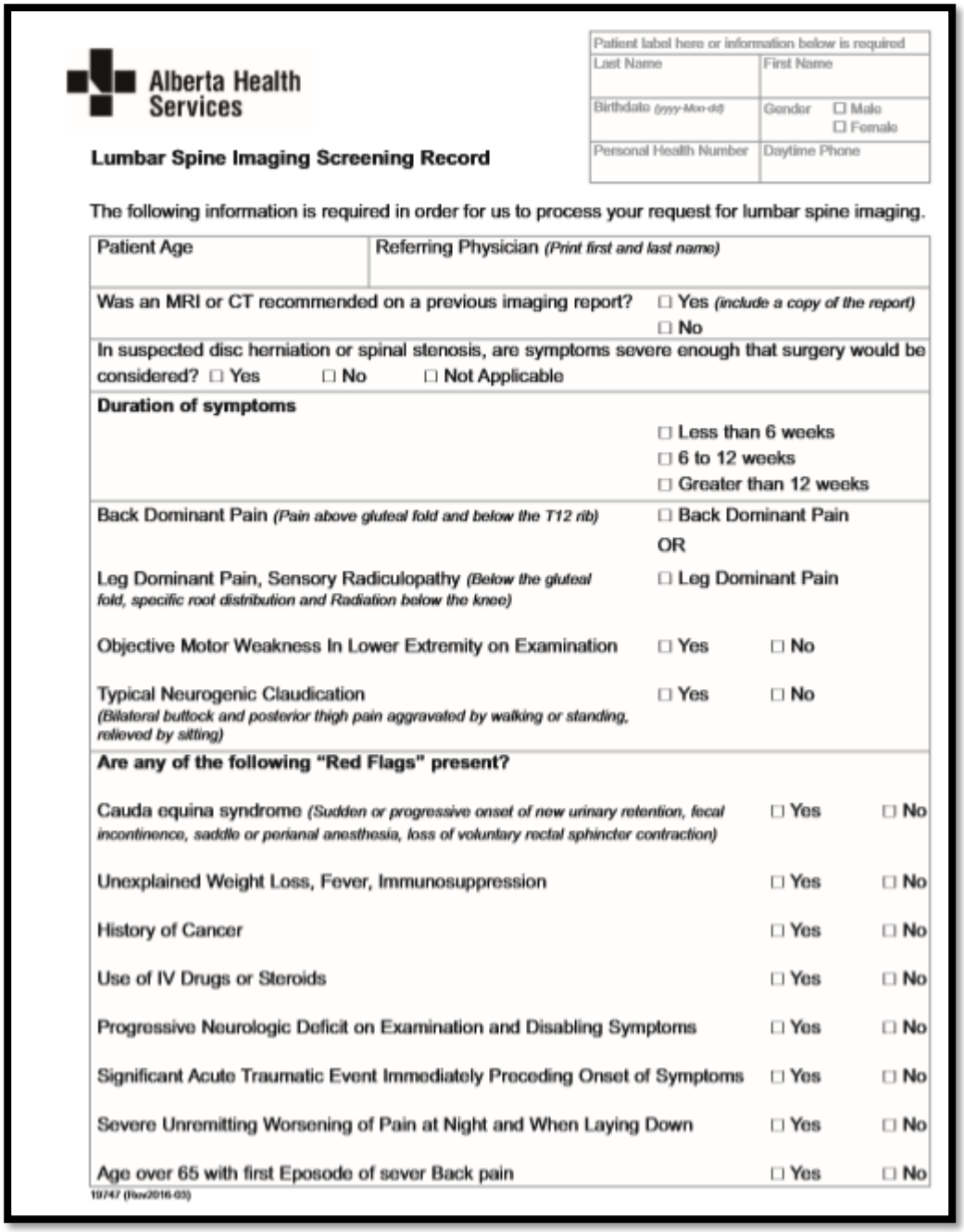
Please provide any additional information relevant to this request.
Include arthroscopic and surgical reports.

Referring Physician Signature _____ Date _____

Version 12.0, June 28, 2017

Lumbar Spine Imaging Screening Form

(Courtesy of Alberta Health)



Alberta Health Services

Lumbar Spine Imaging Screening Record

Patient label here or information below is required	
Last Name	First Name
Birthdate (yyyy-Mxx-dd)	Gender ☐ Male ☐ Female
Personal Health Number	Daytime Phone

The following information is required in order for us to process your request for lumbar spine imaging.

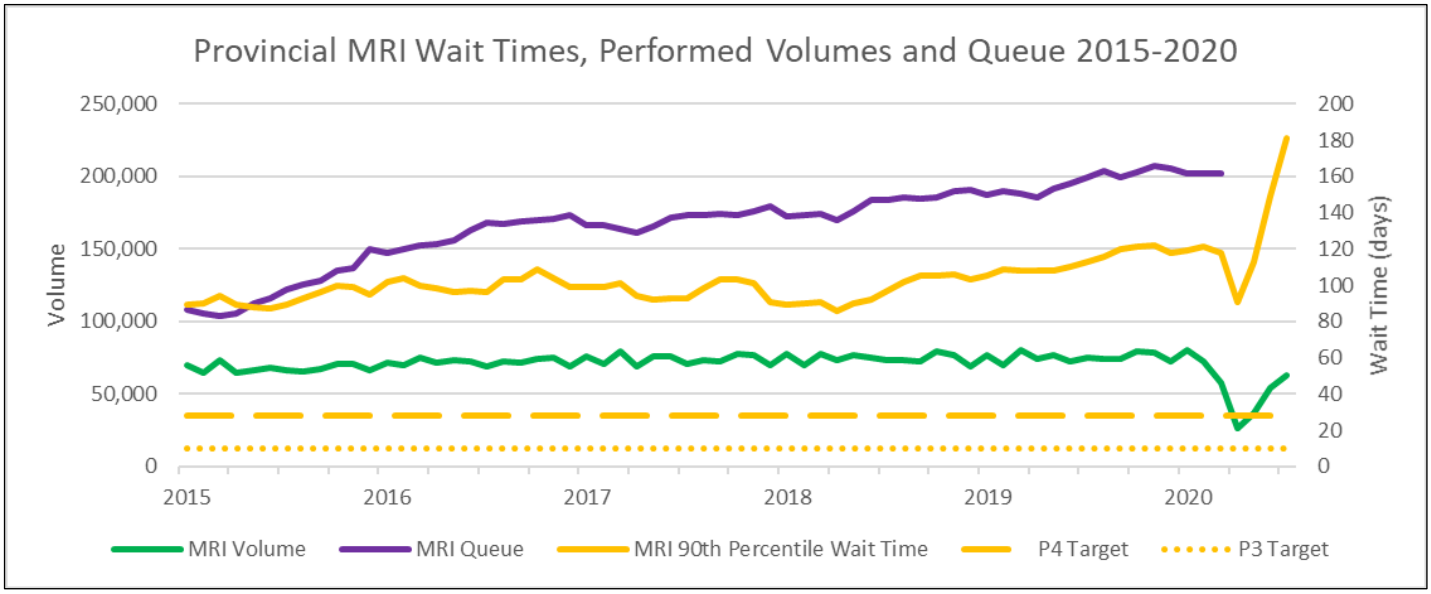
Patient Age	Referring Physician *(Print first and last name)*
Was an MRI or CT recommended on a previous imaging report?	☐ Yes *(include a copy of the report)* ☐ No
In suspected disc herniation or spinal stenosis, are symptoms severe enough that surgery would be considered? ☐ Yes ☐ No ☐ Not Applicable	
Duration of symptoms	☐ Less than 6 weeks ☐ 6 to 12 weeks ☐ Greater than 12 weeks
Back Dominant Pain *(Pain above gluteal fold and below the T12 rib)*	☐ Back Dominant Pain
OR	
Leg Dominant Pain, Sensory Radiculopathy *(Below the gluteal fold, specific root distribution and Radiation below the knee)*	☐ Leg Dominant Pain
Objective Motor Weakness In Lower Extremity on Examination	☐ Yes ☐ No
Typical Neurogenic Claudication *(Bilateral buttock and posterior thigh pain aggravated by walking or standing, relieved by sitting)*	☐ Yes ☐ No
Are any of the following "Red Flags" present?	
Cauda equina syndrome *(Sudden or progressive onset of new urinary retention, fecal incontinence, saddle or perianal anesthesia, loss of voluntary rectal sphincter contraction)*	☐ Yes ☐ No
Unexplained Weight Loss, Fever, Immunosuppression	☐ Yes ☐ No
History of Cancer	☐ Yes ☐ No
Use of IV Drugs or Steroids	☐ Yes ☐ No
Progressive Neurologic Deficit on Examination and Disabling Symptoms	☐ Yes ☐ No
Significant Acute Traumatic Event Immediately Preceding Onset of Symptoms	☐ Yes ☐ No
Severe Unremitting Worsening of Pain at Night and When Laying Down	☐ Yes ☐ No
Age over 65 with first Eposode of sever Back pain	☐ Yes ☐ No

19747 (Rev2016-03)

Appendix E: Supplemental Wait Time Data

MRI Wait Times are increasing to historical highs following the first peak of the pandemic

Source: Wait Time Information System, Access to Care at Ontario Health



CT Wait Times are increasing to historical highs following the first peak of the pandemic

Source: Wait Time Information System, Access to Care at Ontario Health