

**Radiology Driving Change
in Primary Care**

The Diagnostic Imaging Appropriateness (DI-APP) Project

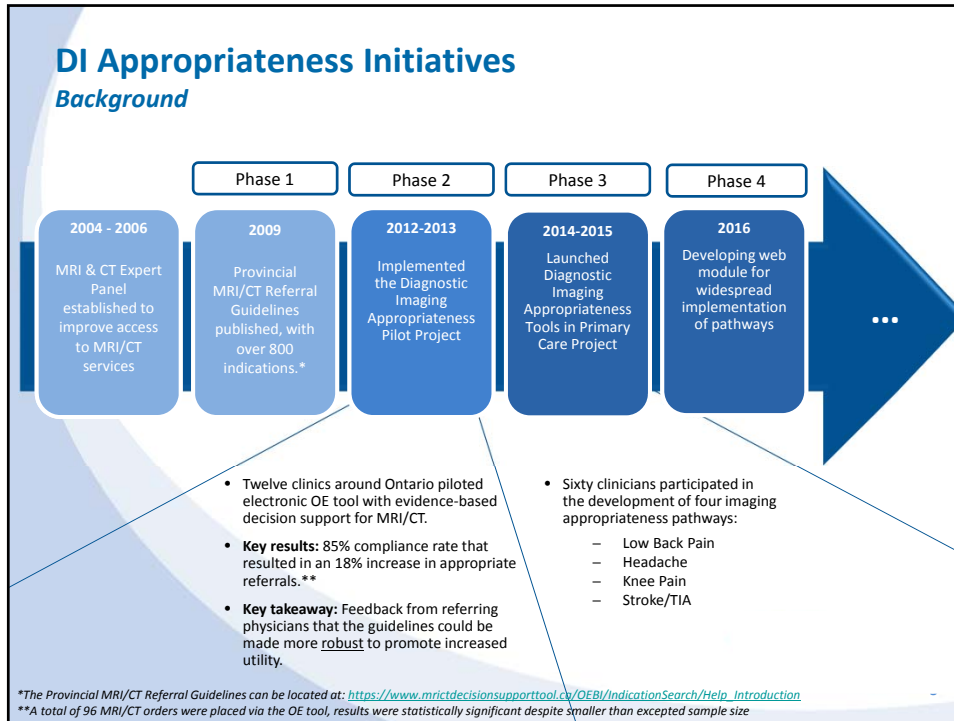
Radiological Society of North America
Annual Meeting 2016

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Presentation Outline

- Background
- Reasons for Action
- Project Approach
- Imaging Pathways
- Next Steps

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Reasons for Action

- **Variability** in images ordered for common clinical scenarios^{1,2} (e.g. right modality and when)
- **Uncertainty** about imaging resulting from rapid technological advances
- **Lack of integration** between community primary care providers and hospital-based imaging specialists
 - Opportunity to advance provincial primary care strategy: **Patients First: Action Plan for Health Care** by “delivering better coordinated and integrated care in the community, closer to home”³

1. In 2011 approximately 800 MRI/CT requisitions were collected across UHN, St. Joseph’s Healthcare Hamilton, Thunder Bay Regional Health Sciences Centre, St. Joseph’s Health Care London and the clinical indications were cross-referenced with the Ontario MRI/CT Referral Guidelines to assess variability with guidelines.

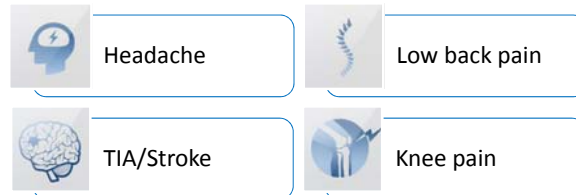
2. You, J. J., Purdy, I., Rothwell, D. M., Przybysz, R., Fang, J., & Laupacis, A. (2008). Indications for and results of outpatient computed tomography and magnetic resonance imaging in Ontario. Canadian Association of Radiologists Journal= Journal l’Association canadienne des radiologistes, 59(3), 135-143.

3. Patients First: Action Plan for Health Care, February 2015

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Approach

- Build **imaging pathways** that outline if, when and what imaging is needed for common primary care presentations of:

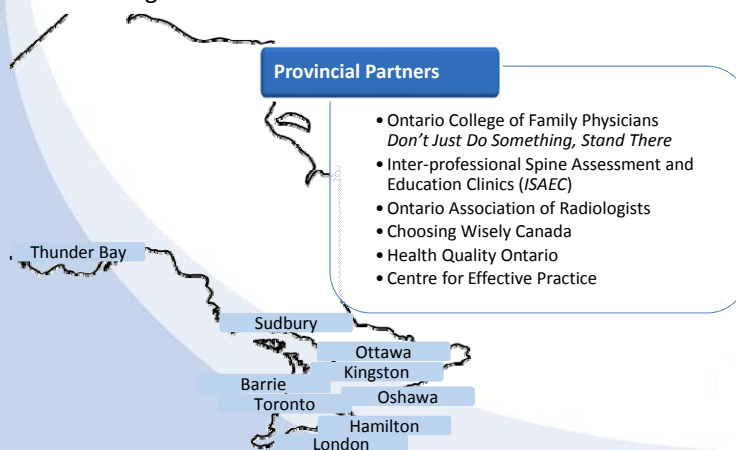


- Imaging pathways should be based on:
 - Best evidence
 - Clinical experience
 - Ontario population & resources
 - Preferred terminology
 - Primary care feedback

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Critical Partnerships

- Started as a radiology-focused initiative; quickly realized the flaw in an imaging-centered approach
- Partnered with primary care champions and representative organizations

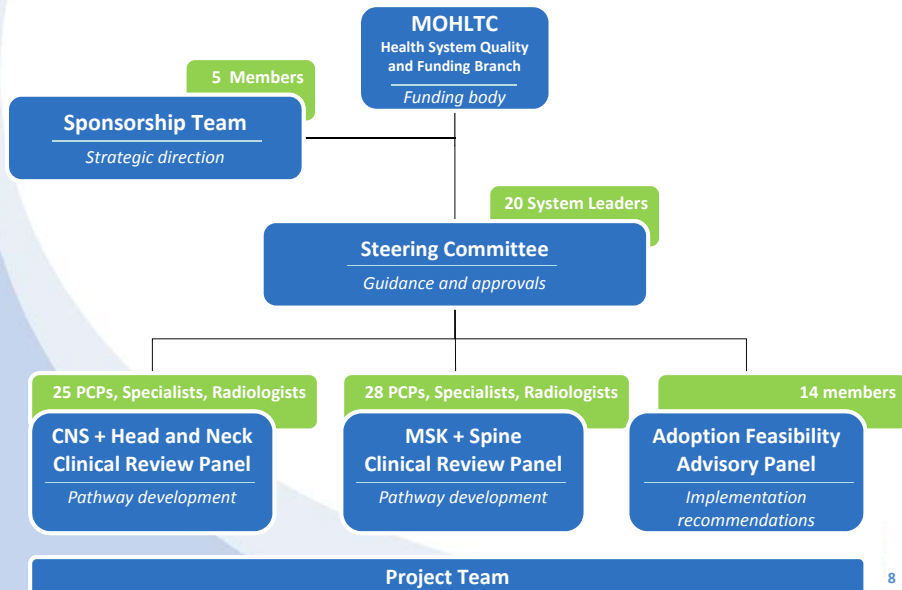


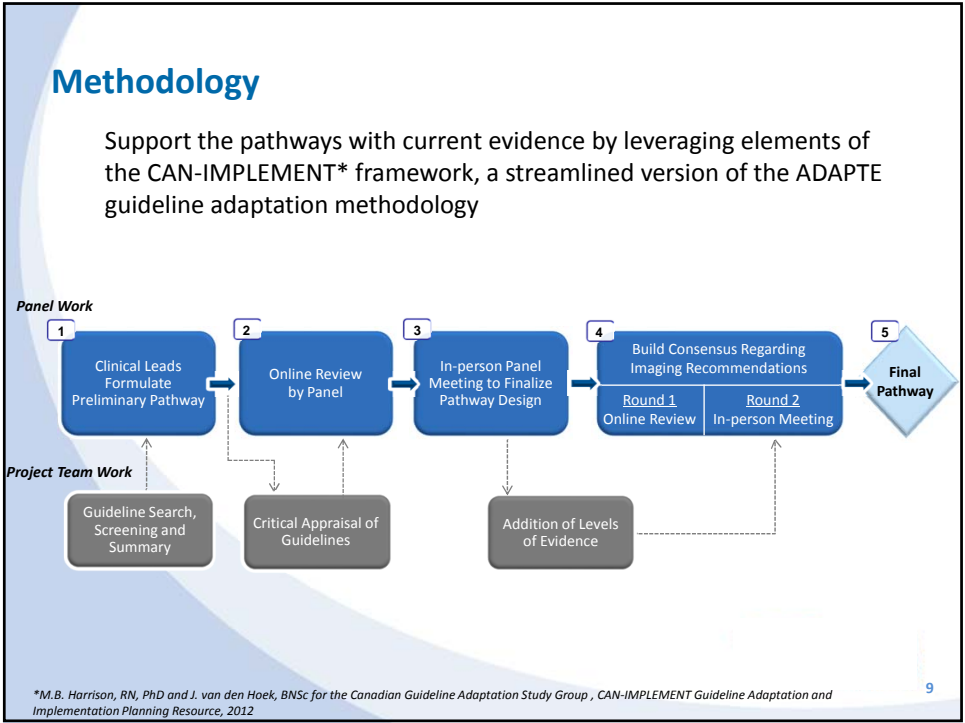
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HOW DID WE CREATE THE PATHWAYS?



Governance Structure





IMAGING PATHWAYS

The Joint Department of
MEDICAL IMAGING
Work for Health • Enable Your Future • Advance Your Practice

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Imaging Pathways

Headache

Indicated

MORE COMMON	Headache with red flags	Urgent imaging is usually indicated to rule out serious intracranial pathology
	Headaches with worrisome features	Consider neurology referral and/or imaging in patients with persisting or worsening symptoms
	Headache suspected to be of sinus origin	Imaging is not routinely indicated
	Chronic post-traumatic headache attributed to mild head injury	Imaging is not routinely indicated
LESS COMMON	Suspected cluster headache or other trigeminal autonomic cephalalgias (TACs)	Consider neurology referral and/or imaging in patients with recent onset cluster headache or other TACs
	Suspected giant cell arteritis/temporal arteritis	Imaging is not routinely indicated

Stroke/TIA

Imaging with ABCD2 score

In general, features associated with higher risk of TIA/Stroke include:

- Competing symptoms and significant deficits that are highly suggestive of TIA/Stroke
- High ABCD2 score
- Recent occurrence
- Long symptom duration

Compelling Symptoms that are Highly Suspicious of TIA or Stroke:

- Homonymous sensory loss, involving two contiguous body parts (face/arm or leg)
- Speech difficulty (mutar or expressive/receptive reading difficulty)
- Clear motoric or homonymous visual loss (either temporary or persistent)
- Sudden onset non-positional vertigo associated with other neurological deficits such as visual loss, diplopia, bilateral weakness, crossed sensory symptoms or incontinence

ABCD2 Risk Stratification Tool:

- Age ≥ 60 years = 1
- Blood pressure at presentation Systolic ≥ 140 or Diastolic ≥ 90 = 1
- Clinical features:
 - Unilateral weakness = 2
 - Speech disturbance; no weakness = 1
 - Other = 0
- Duration of symptoms in minutes:
 - ≤ 10 = 2
 - 10-59 = 1
 - ≥ 60 = 0

6-7 points: High Risk
4-5 points: Mod. Risk
0-3 points: Low Risk

Risk Stratification:

- 1A. Active/evolving stroke
- 1B. High risk of stroke recurrence following a recent TIA/Stroke event
- 1C. Moderate risk of stroke recurrence following a recent TIA/Stroke event
- 1D. Low risk of stroke recurrence following a recent TIA/Stroke event

Low back pain

Imaging

Imaging is not routinely indicated:

- Imaging is not routinely indicated for low back pain without red flags or other worrisome features.
- Imaging is not routinely indicated for low back pain with red flags.
- Imaging is not routinely indicated for low back pain with no red flags.
- Imaging is not routinely indicated for low back pain with no red flags.
- Imaging is not routinely indicated for low back pain with no red flags.
- Imaging is not routinely indicated for low back pain with no red flags.

Imaging is indicated:

- Imaging is indicated for low back pain with red flags.
- Imaging is indicated for low back pain with no red flags.
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Knee pain

X-Ray indicated

X-Ray indicated:

- Bony tenderness, or
- Decreased range of motion, or
- Soft tissue swelling, or
- Difficulty weight-bearing

Imaging not initially indicated:

- No History of Trauma/Injury
- Suspected: Pathological fracture or inflammatory arthritis or infection

Imaging not routinely indicated:

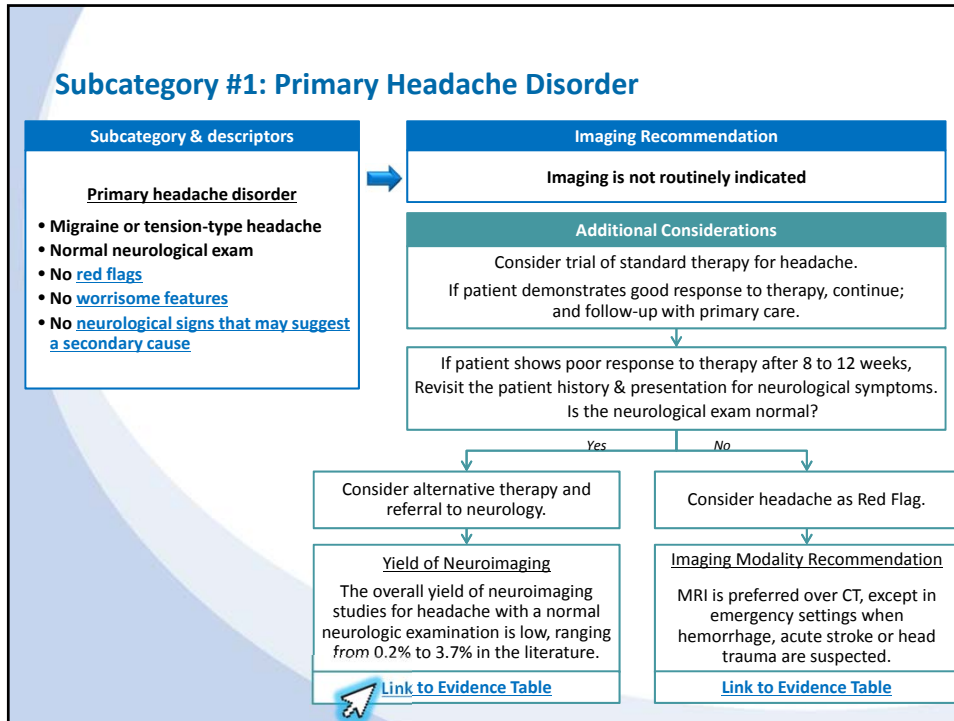
- Mild pain, manageable
- Known history

Consider X-ray (bilateral standing):

- Meniscus arrest
- Osteoarthritis
- Patellofemoral dysfunction
- Instability

Headache Imaging Pathway Summary

MORE COMMON	Primary headache disorder, normal neurological exam, no worrisome features	Imaging is not routinely indicated
	Headache with red flags	Urgent imaging is usually indicated to rule out serious intracranial pathology
	Headaches with worrisome features	Consider neurology referral and/or imaging in patients with persisting or worsening symptoms
	Headache suspected to be of sinus origin	Imaging is not routinely indicated
	Chronic post-traumatic headache attributed to mild head injury	Imaging is not routinely indicated
LESS COMMON	Suspected cluster headache or other trigeminal autonomic cephalalgias (TACs)	Consider neurology referral and/or imaging in patients with recent onset cluster headache or other TACs
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Evidence Table: Yield of Neuroimaging

Subcategory: Primary Headache Disorder

#	Study/ Guideline	Study Population	Yield Ratio	Link To Full Text
1	You et al 2011, Canada	623 patients receiving CT for headache, normal exam	2.1%	PDF
2	Clarke et al 2010, UK	530 patients receiving MRI/CT for headache, normal exam	Migraine: 1.2% Tension: 0.9%	PDF
3	Sempere et al 2004, Spain	1876 patients receiving MRI/CT for headache, normal exam	0.9% [CI 0.5-1.4]	PDF
4	Tsushima et al 2005, Japan	306 patients with normal exam chronic/ recurrent headache were examined with MRI	0.7%	PDF
5	Wang et al 2001, US	402 adult patients with chronic headache, received MRI, normal exam	3.7%	PDF
6	Jordan et al 2000, US	328 headache patients referred for MRI, normal exam	1.5%	PDF

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WHAT'S NEXT?

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Assessing Pathway Acceptance

Pathways were evaluated by primary care providers who did not participate in development (n=55)

92% agreed/strongly agreed that the pathway recommendations are relevant and applicable to their patient population




84% agreed/strongly agreed that the pathways could help facilitate communication with patients

70% agreed/strongly agreed that the pathways could help to change their practice

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Assessing Pathway Acceptance


What factors would help you and your primary care colleagues use these pathways? (n=59)

-  **83%** supported EMR integration
-  **79%** supported materials for patient education/conversations
-  **73%** supported endorsement by peers and professional bodies
-  **71%** supported integration with imaging referral forms
-  **60%** supported a mobile app


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Expanding Primary Care Tools for Imaging

The pathways are being developed as a mobile-friendly web module



The screenshot shows a mobile interface for a 'Headache Imaging Pathway'. At the top, there are navigation buttons for 'Back', 'Red Flags', 'Worrisome', and a settings gear. Below the title, there are two tabs: 'More Common' (selected) and 'Less Common'. Under the 'More Common Presentations' section, there is a list of four items, each with a right-pointing chevron:

- Primary headache disorder normal neurological exam, no worrisome features
- Headache with  red flags
- Headache with  worrisome features
- Headache suspected to be of sinus origin

Two detailed panels are shown on the right:

- Headache Suspected to be of Sinus Origin:** An orange box with a crossed-out imaging icon and the text: 'IMAGING RECOMMENDATION: Imaging is not routinely indicated.'
- Headache with Red Flags:** A red box with a brain icon and the text: 'IMAGING RECOMMENDATION: Urgent imaging is usually indicated to rule out serious intracranial pathology.'

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Contact Information

Jisla Mathews

Senior Business Analyst, Office of Strategy Management
The Joint Department of Medical Imaging

E-Mail: jisla.mathews@uhn.ca