

# Design Thinking Applied to Unmet Needs in Axial Spondyloarthritis: A Novel Model of Care to Address Diagnostic Delay

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## BACKGROUND AND PURPOSE

Design thinking is an iterative interdisciplinary approach to solving complex problems used in various industry sectors. It involves five phases: **“needfinding”** to understand the problem; **“ideation”** to generate multiple possible solutions; **“prototyping”** to build the best solution; **“testing”** to obtain feedback of the solution and lastly, **“implementing”** of the refined solution to assess change and determine scalability. See Figure 1. The problem: symptoms of inflammatory back pain can be difficult to differentiate from mechanical back pain amongst primary care providers, causing delay in diagnosis of axial Spondyloarthritis (axSpA). The solution: a novel model of care to promote early identification and diagnosis of axSpA. The purpose of this project is to apply design thinking principles to the development, evaluation and implementation of early screening of inflammatory back pain patients from primary care settings.

Figure 1: Design Thinking

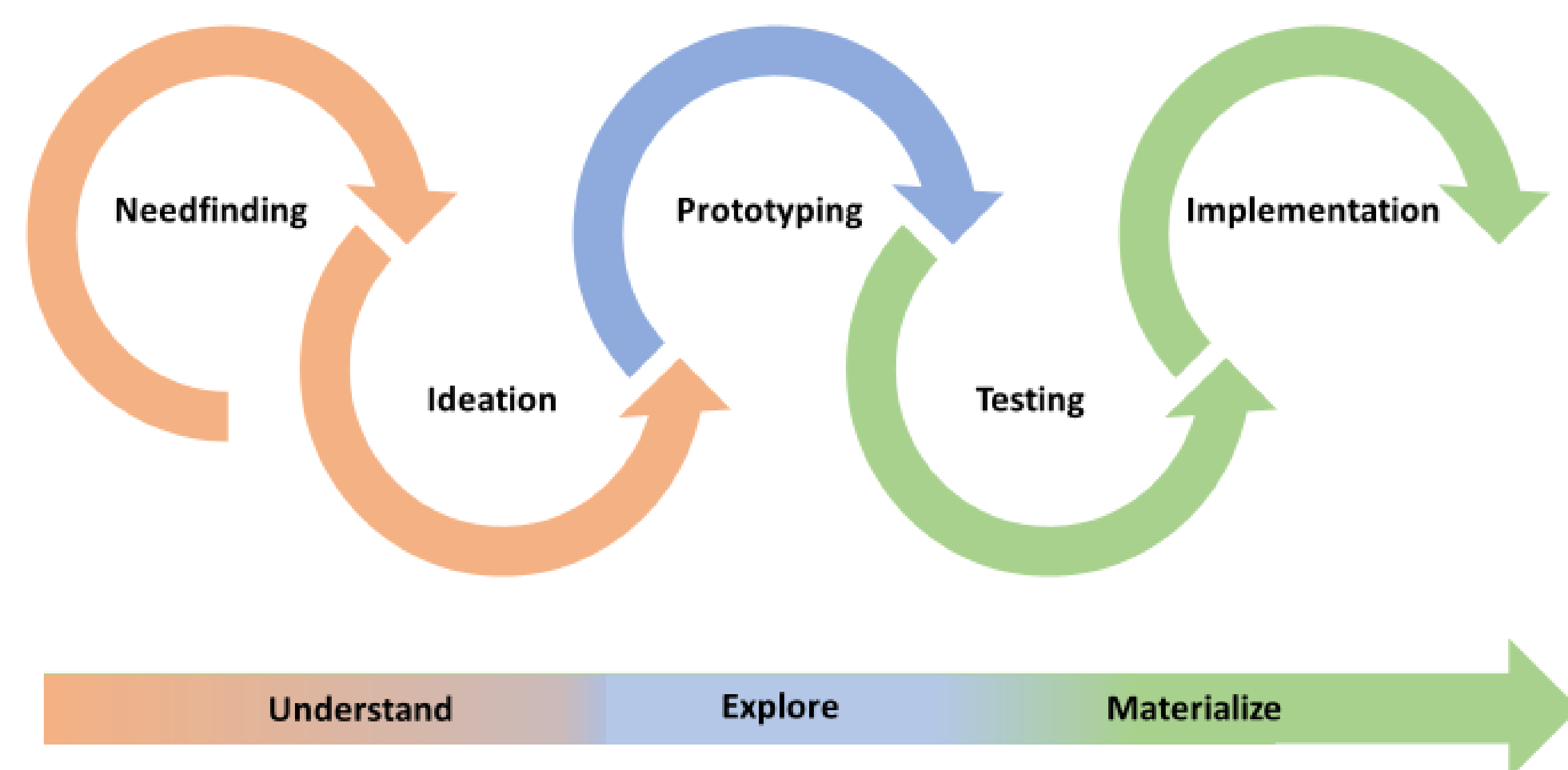


Figure adapted from <https://www.apartacorp.com/design-thinking-process-and-principles/>

## METHODS

The design thinking approach to address diagnostic delay in axSpA was applied to the Spondylitis Program at the Toronto Western Hospital, University Health Network, Toronto, Canada. See Table 1.

Table 1: Design Thinking Applied to Diagnostic Delay in Axial Spondyloarthritis

Design Thinking Process	Diagnostic Delay in Axial Spondyloarthritis at Toronto Western Hospital, UHN, Canada
Need Finding	Literature review: <ul style="list-style-type: none"> <li><b>Clinical impact</b> (outcomes of early management, consequences of diagnostic delay)</li> <li><b>Health Services</b> (human health resources, access to care)</li> </ul>
Ideation	Literature review: <ul style="list-style-type: none"> <li>Review <b>existing models of care</b></li> <li>Inventory of available <b>clinical and administrative resources</b></li> <li>Use of <b>extended scope healthcare providers</b></li> </ul>
Prototyping	Development of a <b>novel interprofessional model of care to screen patients with undifferentiated backpain</b> by advanced practice physiotherapists and rheumatologists
Testing	Grant acquisition to <b>pilot and evaluate</b> above model
Implementation	Collaborative model integrating primary care – <b>proven effective within Toronto Western Hospital catchment</b> . Scalability to be assessed through forthcoming <b>provincial pilot</b> .

## RESULTS

### Needfinding

Diagnostic delay is **multifactorial**

#### CLINICAL:

- Prevalence of nonspecific back pain
- Slow disease progression
- Lack of specific biomarkers
- Diagnostic algorithms poorly defined
- Low awareness by PCPs

#### HEALTH SERVICES:

- Health system gaps between rheumatology supply and demand
- Access to care challenges (wait times and geography)

### Ideation

- Improved clinical outcomes with **early detection and initiation of evidence-based treatment**
- Emergence of **models within primary care addressing undifferentiated back pain**
- Use of **non-physician healthcare providers**

### Prototyping

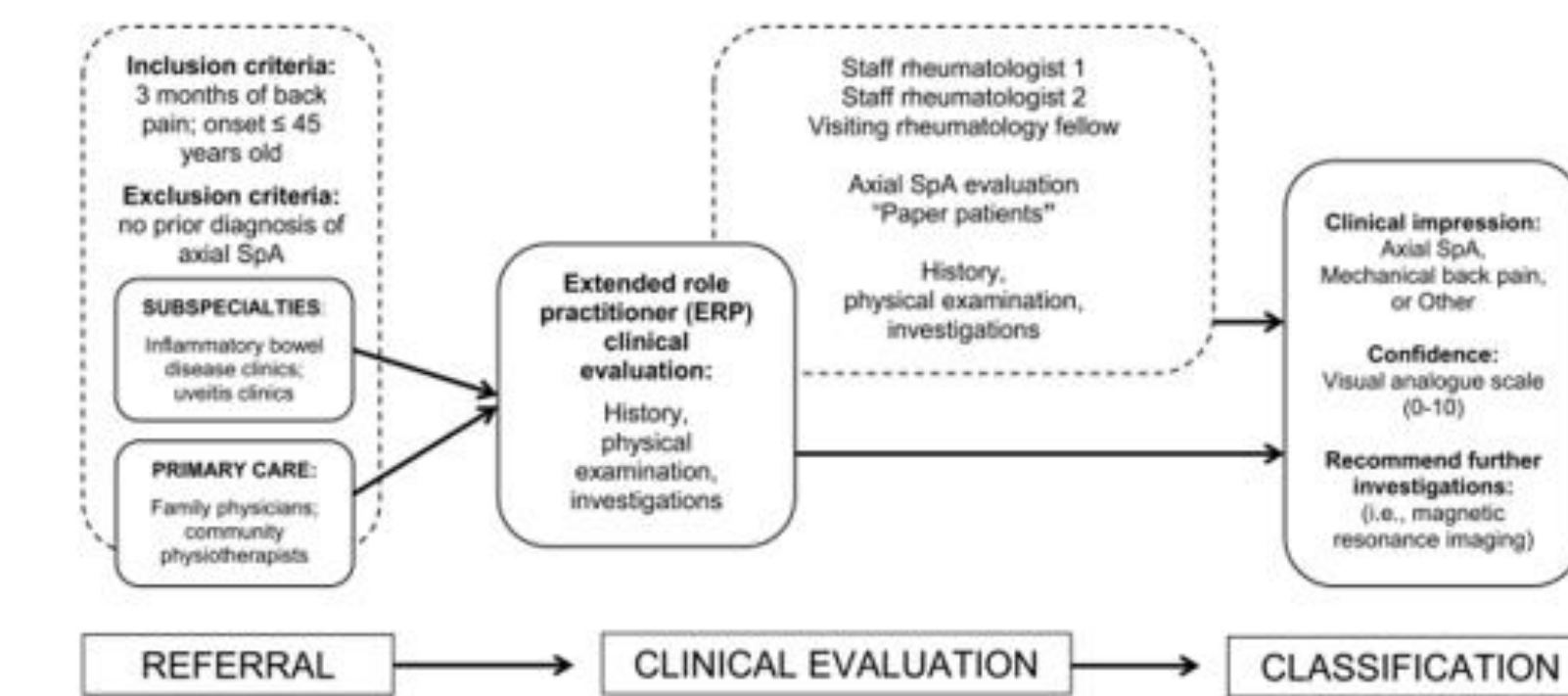


Figure 3. Screening process for patients referred to the Toronto Western Hospital Spondylitis Screening Clinic for the evaluation of possible axial spondyloarthritis. SpA: spondyloarthritis.



Table 3. Interobserver agreement for clinical impression extended role practitioner (ERP) and rheumatologist (n = 37).

Clinical Impression	Percentage Agreement	Cohen's κ (95% CI)	PABAK
ERP and Rheumatologist consensus	75.5	0.50 (0.26-0.73)	0.51
ERP and Rheum 1	79.7	0.57 (0.35-0.79)	0.59
ERP and Rheum 2	77.7	0.50 (0.33-0.77)	0.55
ERP and Follow	71.2	0.41 (0.17-0.67)	0.42
Rheum 1 and Rheum 2	76.8	0.55 (0.35-0.75)	0.54
Rheum 1 and Follow	79.7	0.58 (0.37-0.8)	0.59
Rheum 2 and Follow	74.1	0.49 (0.26-0.71)	0.48

PABAK: prevalence-adjusted, bias-adjusted κ.

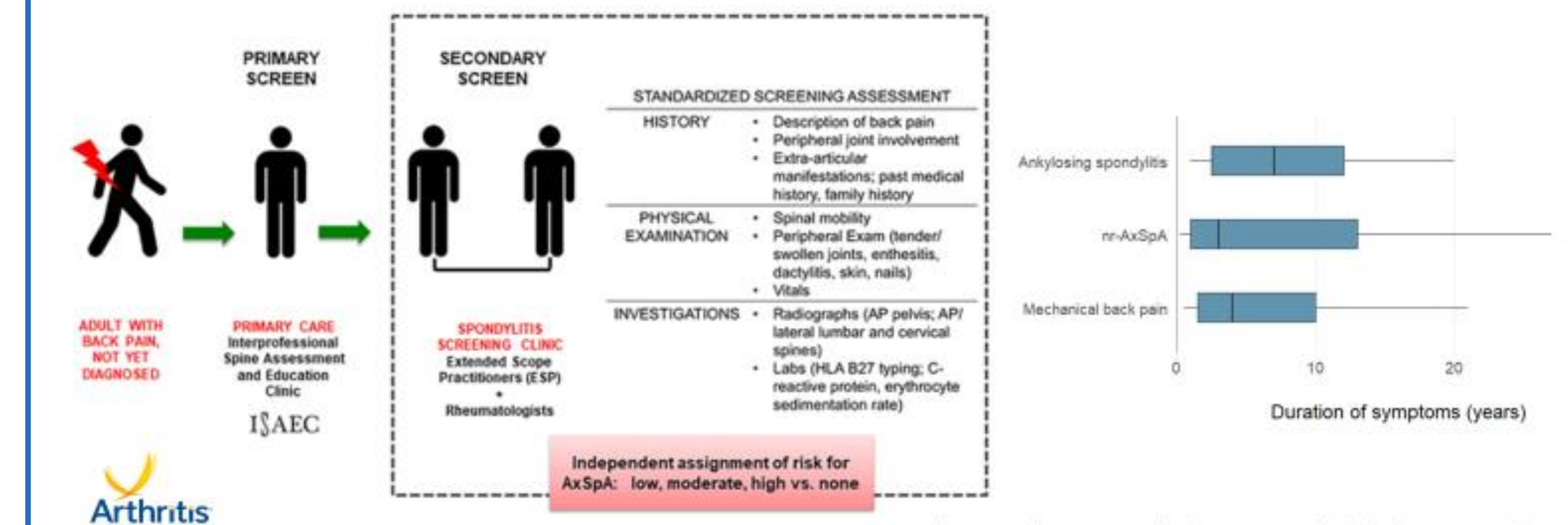
Table 4. Interobserver agreement for MRI recommendation extended role practitioner (ERP) and rheumatologist (n = 57).

MRI Recommendation	Percentage Agreement	Cohen's κ (95% CI)	PABAK
ERP and Rheum consensus	71.3	0.43 (0.2-0.66)	0.42
ERP and Rheum 1	75	0.48 (0.25-0.72)	0.50
ERP and Rheum 2	64.2	0.32 (0.1-0.55)	0.28
ERP and Follow	64.7	0.31 (0.1-0.55)	0.29
Rheum 1 and Rheum 2	63.7	0.29 (0.06-0.53)	0.27
Rheum 1 and Follow	62.9	0.27 (0.02-0.52)	0.26
Rheum 2 and Follow	74	0.47 (0.24-0.71)	0.48

PABAK: prevalence-adjusted, bias-adjusted κ; MRI: magnetic resonance imaging.

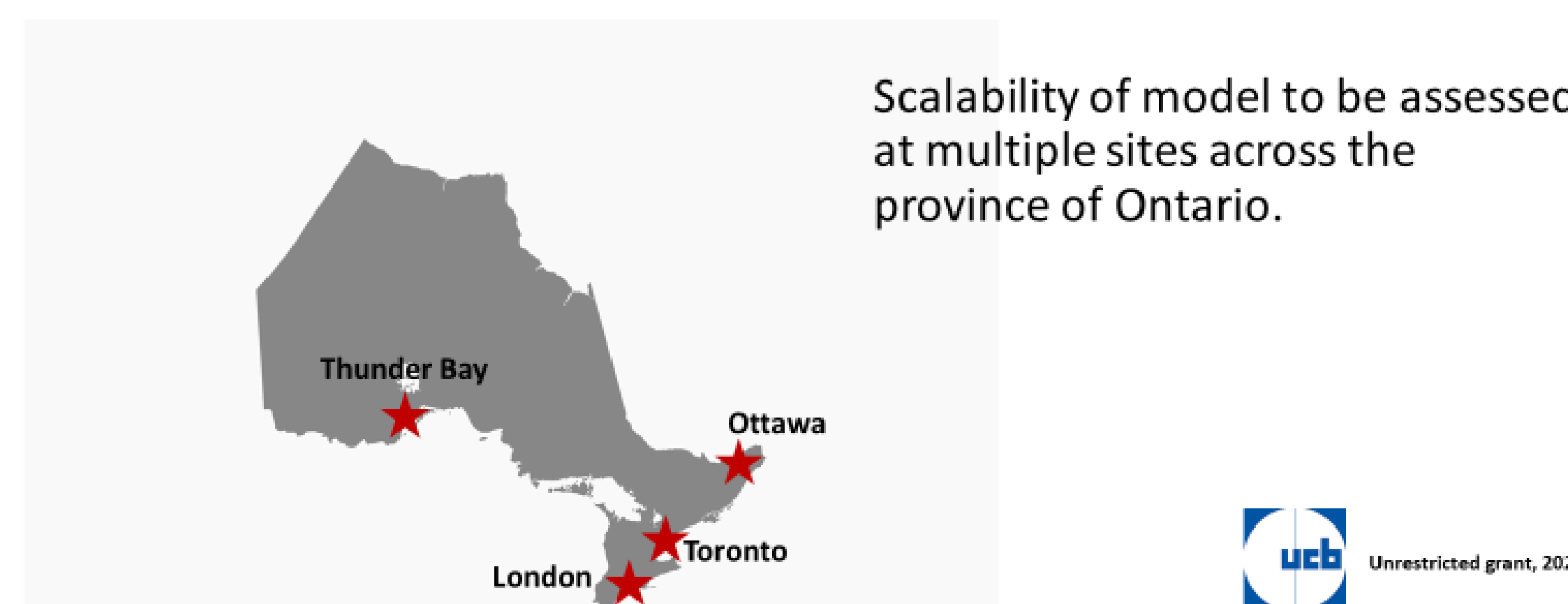
Passalent L, Hawke C, Lawson DO, et al. J Rheumatol 2020;47:524-30.

### Testing



Passalent L, Sundararajan K, et al. Arthritis Care Res (Hoboken). 2022 Jun;74(6):997-1005.

### Implementation



Scalability of model to be assessed at multiple sites across the province of Ontario.



#### System Impact

- Determine the impact of the model of care on rheumatologist **referral wait times**.
- Determine the **relative costs** associated with the model of care.

#### Care Delivery

- Determine the impact of the model of care on **time to diagnosis**.
- Determine disease **severity at diagnosis** through the model of care.
- Determine the **performance of the ERP within the model of care** (sensitivity, specificity, positive/negative predictive value).

#### Care Experience

- Determine **patient and stakeholder satisfaction** with the model of care.

#### Context

- Understand local **contextual facilitators and challenges** to implementing model of care.

## CONCLUSIONS

The application of a design thinking approach to diagnostic delay in axSpA has generated a novel and effective model to detect patients with axSpA, facilitate early identification and initiate appropriate management. A similar approach may be considered in other areas of axSpA care where there are unmet needs awaiting creative solutions.

## KEY REFERENCES

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