



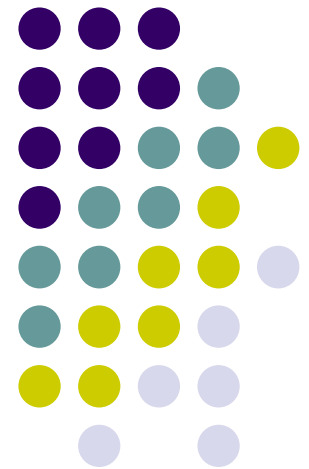
FACULTY OF  
MEDICINE | UNIVERSITY OF  
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# How to Incorporate Multi-criteria Decision Frameworks into Economic Evaluations and Decision Making

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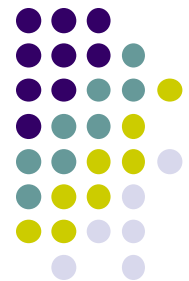
Deborah Marshall, PhD  
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IHE Methods Forum  
September 24, 2010



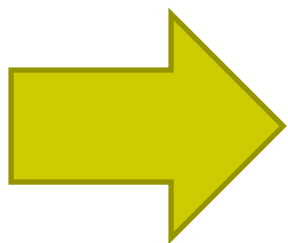
# Outline

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1. Motivation for considering multiple criteria in a decision framework
2. Alternative methods to consider:
  - a) Stated preferences using conjoint analysis
  - b) System level perspective in analysis of decision problems

**For technology evaluation to be useful for decision making, it should:**



- consider the patient perspective
- approach problems in the context of the health system for integrated care delivery

# Guidance for Industry

## Patient-Reported Outcome Measures: Use in Medical Product Development to Support



**The Future of Drug Safety: Promoting and Protecting the Health of the Public**

Committee on the Assessment of the US Drug Safety System, Alina Baciú, Kathleen Stratton, Sheila P. Burke, Editors

ISBN: 978-0-309-10304-6, 348 pages, 6 x 9, paperback (2007)

**4.5: The committee recommends that CDER develop and continually improve a systematic approach to risk-benefit analysis for use throughout the FDA in the preapproval and post-approval settings.**

# Guidance for Industry

THE FUTURE OF  
DRUG SAFETY

The Future of Drug Safety: Promoting and  
Protecting the Health of the Public

**Here's a radical health care idea: Put the patient first. André Picard, Globe and Mail, October 22, 2009.**

“Our current health system has been designed around the people who deliver the care. It is time to realign the values of the health system so that the patient is again made the centre of attention.”

**- *For Patients' Sake. Report of the Saskatchewan Ministry of Health.***



# **Strategy for Patient-Oriented Research**

A discussion paper for a 10-year plan to change health care  
using the levers of research  
February 2010

"In our culture, responsibility for personal health has been abdicated to the professionals. For reform to take place, the individual must become the focal point of a "system of health"."

With Every Breath I Take. Gary McPherson. 2000

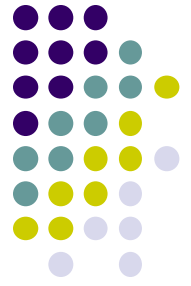


Establish measures for Alberta's health system.

14. Measures should be developed and monitored for each of three key areas: health status of Albertans; health care outcomes; and health system performance.



## 2a) Stated Preferences with Conjoint Analysis



- Recognition of patient choice as key factor in uptake; interventions more likely to be adopted if valued
- Structured, quantitative approach consistent with welfare and choice-based consumer theory
- Considers utility of multiple attributes (outcome and process factors) jointly
- Includes factors that may be important to patients but not captured in QALY utilities



Permits estimation of trade-offs between attributes, including risks, benefits and cost

# Example of Conjoint Analysis Choice Task



<b>Medicine Features</b>	<b>Medicine A</b>	<b>Medicine B</b>
Chance that the medicine will work well	Works well in 25% of patients	Works well in 100% of patients
If it works, how long it takes to work after you start taking the medicine	1 week	2 weeks
Way that you take the medicine	1 injection every 4 weeks at home	1 injection every week at home
How long the injection site is irritated after taking the medicine	30 minutes	3 hours
Chance of getting a serious infection	5/100 (5%)	No
Personal cost to you per month not covered by insurance	\$250	\$100
Which medicine would you choose if these were the only options available?	<input type="checkbox"/>	<input type="checkbox"/>

# ISPOR Task Force on Good Research Practice for Conjoint Analysis

REVIEW ARTICLE

Published 2010, 3 (6): 1-8  
1178-1653(10)00040001/54955/0

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## Conjoint Analysis Applications in Health – How are Studies being Designed and Reported?

An Update on Current Practice in the Published Literature between 2005 and 2008

Deborah Marshall,<sup>1,2</sup> John F.P. Bridges,<sup>3</sup> Brett Hauber,<sup>4</sup> Ruthanne Cameron,<sup>2</sup> Lauren Donnalley,<sup>3</sup> Ken Fyie<sup>1</sup> and F. Reed Johnson<sup>3</sup>

ISPOR Good Outcomes Research Practices for Conjoint Analysis Task Force

[Conjoint Analysis Use in Health Studies - A Checklist: FOR COMMENT](#)

Chair:

**John F. P. Bridges PhD** Assistant Professor, Department of Health Policy & Management Johns Hopkins Bloomberg School of Public Health

**Leadership Team:**

**A. Brett Hauber PhD** Senior Economist & Global Head, Health Preference Assessment, RTI Health Solutions, RTI International, Research Triangle Park, NC, USA

**Deborah Marshall PhD**, Canada Research Chair, Health Services and Systems Research & Associate Professor, Department of Community Health Sciences Faculty of Medicine, University of Calgary, Calgary, Alberta, Canada

**Andrew Lloyd DPhil**, Director, Oxford Outcomes, Oxford, UK

**Lisa A. Prosser PhD**, Research Associate Professor, Child Health Evaluation and Research Unit, Department of Pediatrics, University of Michigan, Ann Arbor, MI, USA

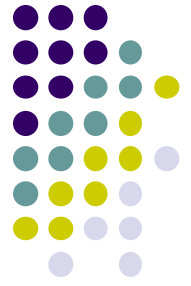
**Dean Regier PhD**, Research Associate, Hospital for Sick Children, Toronto, ON, Canada

**F. Reed Johnson PhD**, Distinguished Fellow and Principal Economist, Health Preference Assessment Group, RTI Health Solutions, RTI International, Research Triangle Park, NC, USA

**Josephine Mauskopf PhD**, Vice President, Health Economics, RTI Health Solutions, RTI International, Research Triangle Park, NC USA

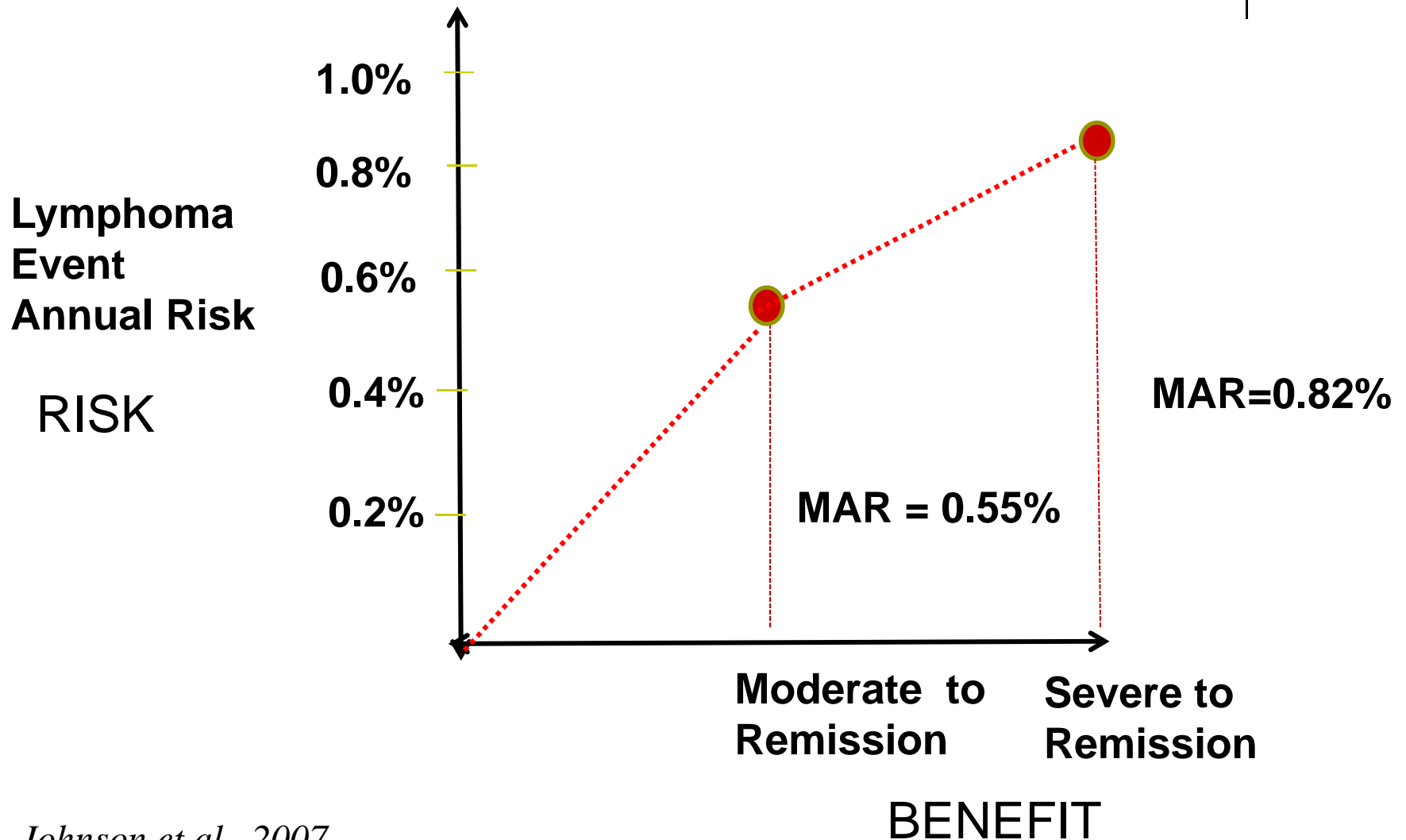
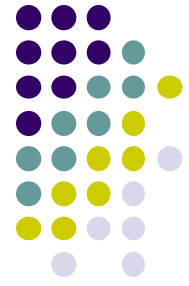
# Potential Applications of Stated Preferences in Decision Making

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1. Predict utilization of current and future services - in health setting that lacks true market
2. Willingness to pay – theoretically consistent measures of welfare gain (WTP) for use in CBA
3. Maximum acceptable risk (MAR) – to inform coverage decisions (listing and withdrawal)
4. Assess population health impact – population and subgroups with heterogeneous preferences; health and non-health utility in Net Health Benefit framework
5. Priority setting – resource allocation tradeoffs
6. Develop relative weights - for use in MCDA

# Benefit-Risk Trade off and Maximum Acceptable Risk (MAR) Crohn's Disease Re-approval



- Johnson et al., 2007

# A QALY is a QALY is a QALY

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QALY



QALY

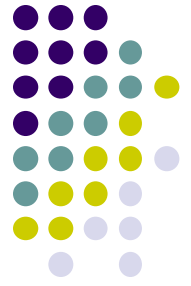


QALY

- Source: Cam Donaldson

# But in a Conjoint Analysis, we can tell the difference...

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Patient  
1



Patient  
2

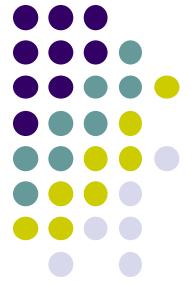


Patient  
3

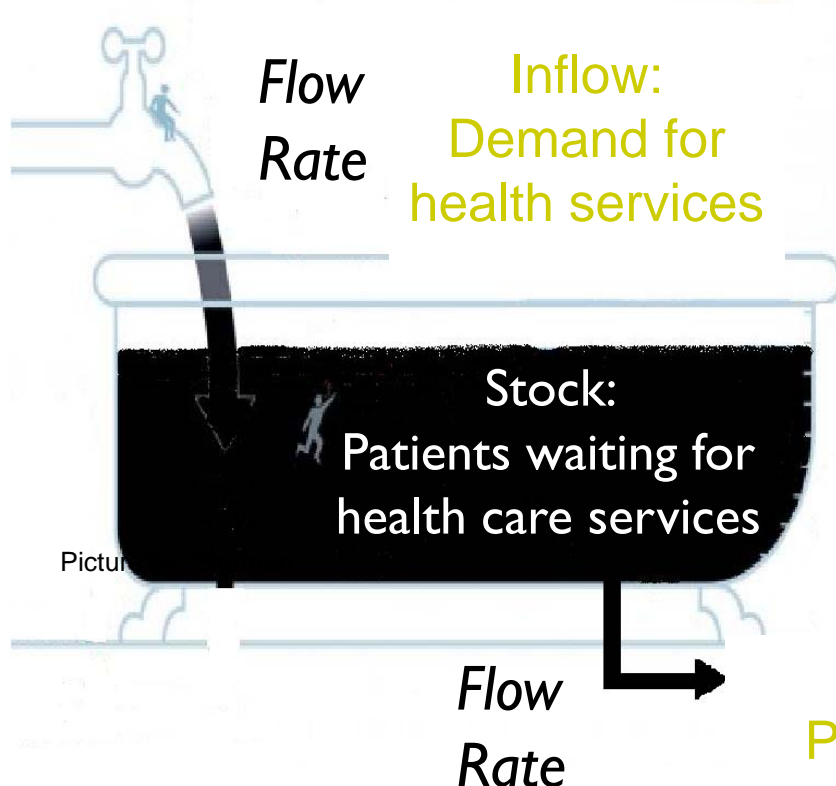


Patient  
4

## 2b) Beyond Markov: Modeling Health Care Interventions from a Systems Perspective

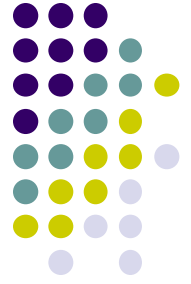


Health Care is a **System....** and it is **Dynamic**



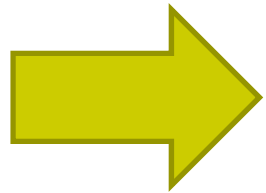
- Simulation method using differential equations to allow interactions and nonlinear behaviours in changing system
- Considers resource constraints by changing flow rate through feedback loops

Outflow:  
Patients who  
received health  
services



# Why System Dynamics Modelling?

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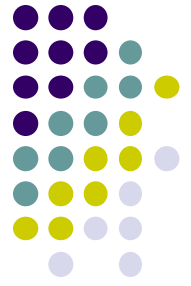


Need a sustainable solution that enables policy makers and service planners to balance access, effectiveness and efficiency.

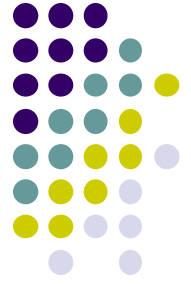
- Balance demand, supply & delivery of services
- Consider resource constraints and impact on flow of patients through the system (current demand and backlog)
  - Population-level care delivery
  - Capacity, patient flow, utilisation & wait times
  - Captures changes projected over time

# Directions for Health Care System Dynamics Research

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- Systems view is particularly relevant to health care
  - Strategy development
  - Resource planning
  - Analysis of health policy options
- SD modeling applications:
  - Matters of national policy (e.g. epidemics)
  - Interaction of delivery systems and diseased populations (e.g. emergency department)
- Examples: WHO polio vaccine policy decisions, CDC for flu decisions, emergency department operations

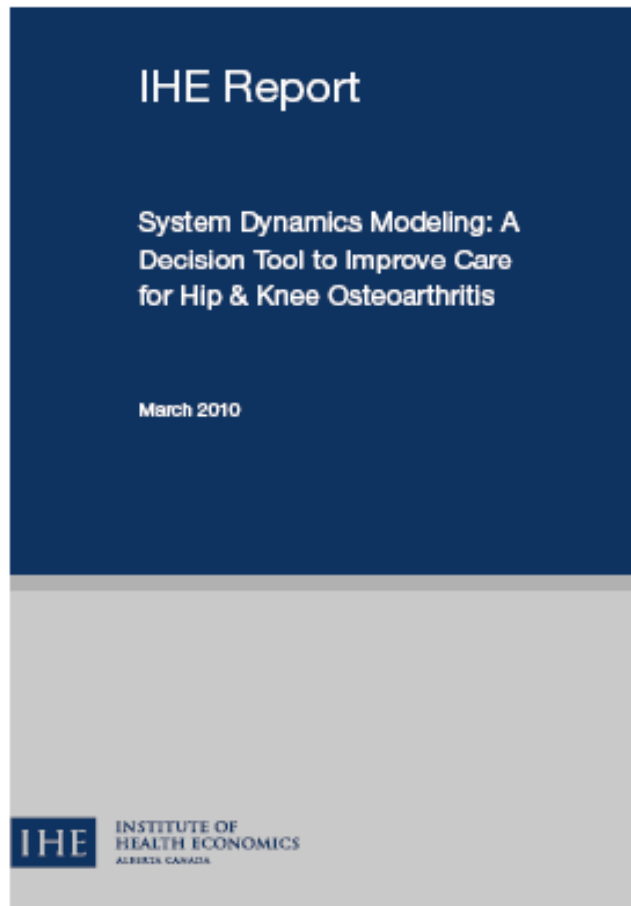
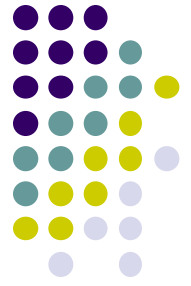


# Integrated Care Delivery

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- the right people
  - in the right order
  - in the right place
  - do the right thing, at the right time
  - to achieve the right outcome
- all with attention to the patient experience

# System Dynamics in Osteoarthritis (OA)



IHE Report

System Dynamics Modeling: A  
Decision Tool to Improve Care  
for Hip & Knee Osteoarthritis

March 2010

IHE INSTITUTE OF  
HEALTH ECONOMICS  
ALBERTA CANADA

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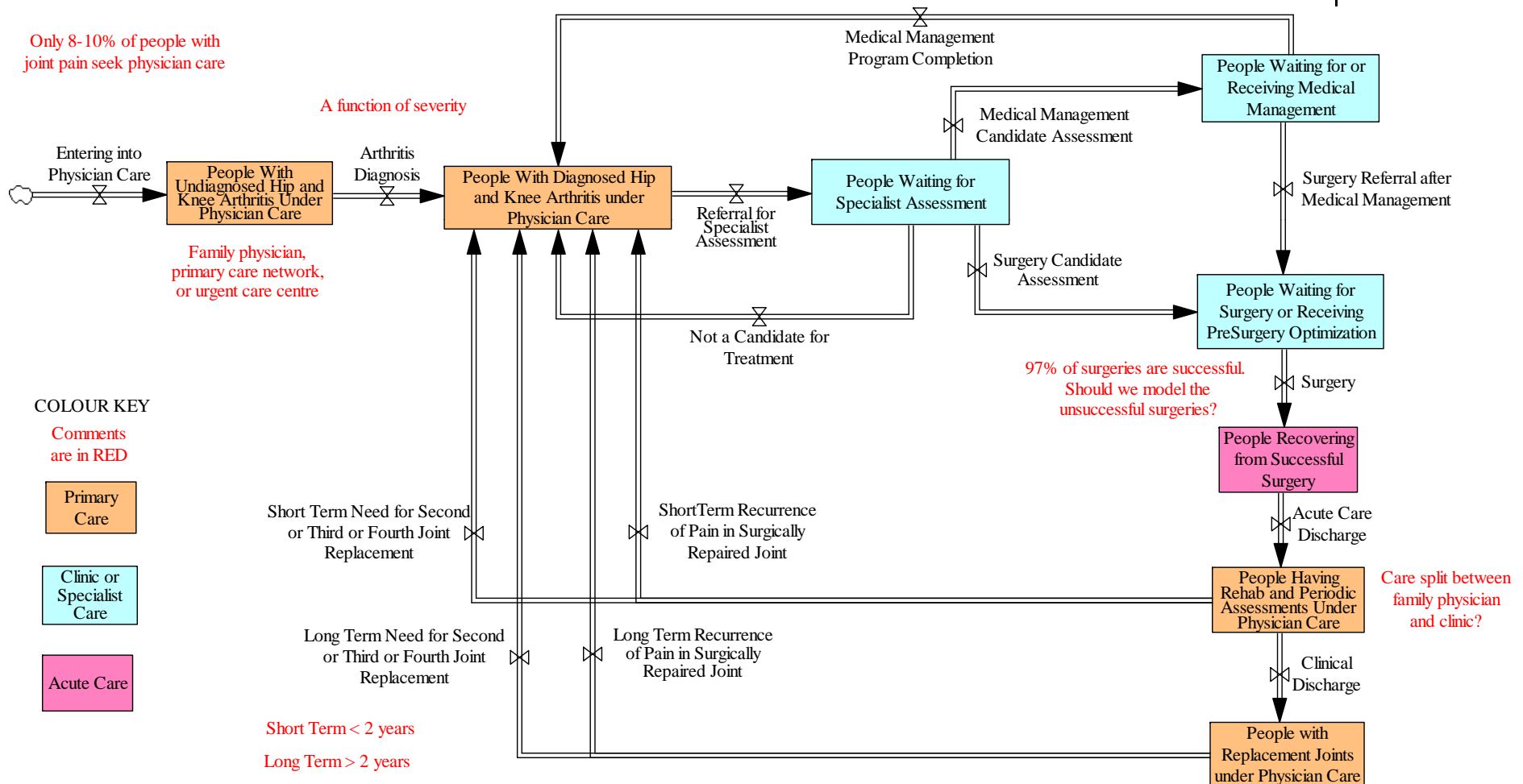
CIHR IRSC

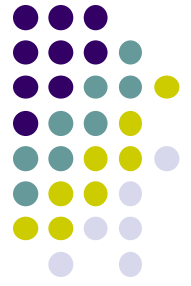
*How would quality of care change if an evidence-based clinical pathway for medical and surgical management of hip and knee OA were adopted province-wide?*

## Quality Matrix for Health

- Accessibility
- Acceptability
- Safety
- Effectiveness
- Appropriateness
- Efficiency

# System Dynamics Structure for Osteoarthritis Care and Treatment





# Summary and Conclusions

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1. Preferences (health and non-health) matter.
2. Preferences affect choices, uptake and adherence to health interventions.
3. Measurement of preferences is an important component of the health research agenda.
4. Evaluate health care from system perspective with a patient centric approach to:
  - Capture multiple outcomes (patient and process)
  - Consider interactions with the system
  - Achieve delivery of integrated care...that links users and producers

# Thank you!



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