Creating a Learning Health System

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McGill Professor of Health Innovation

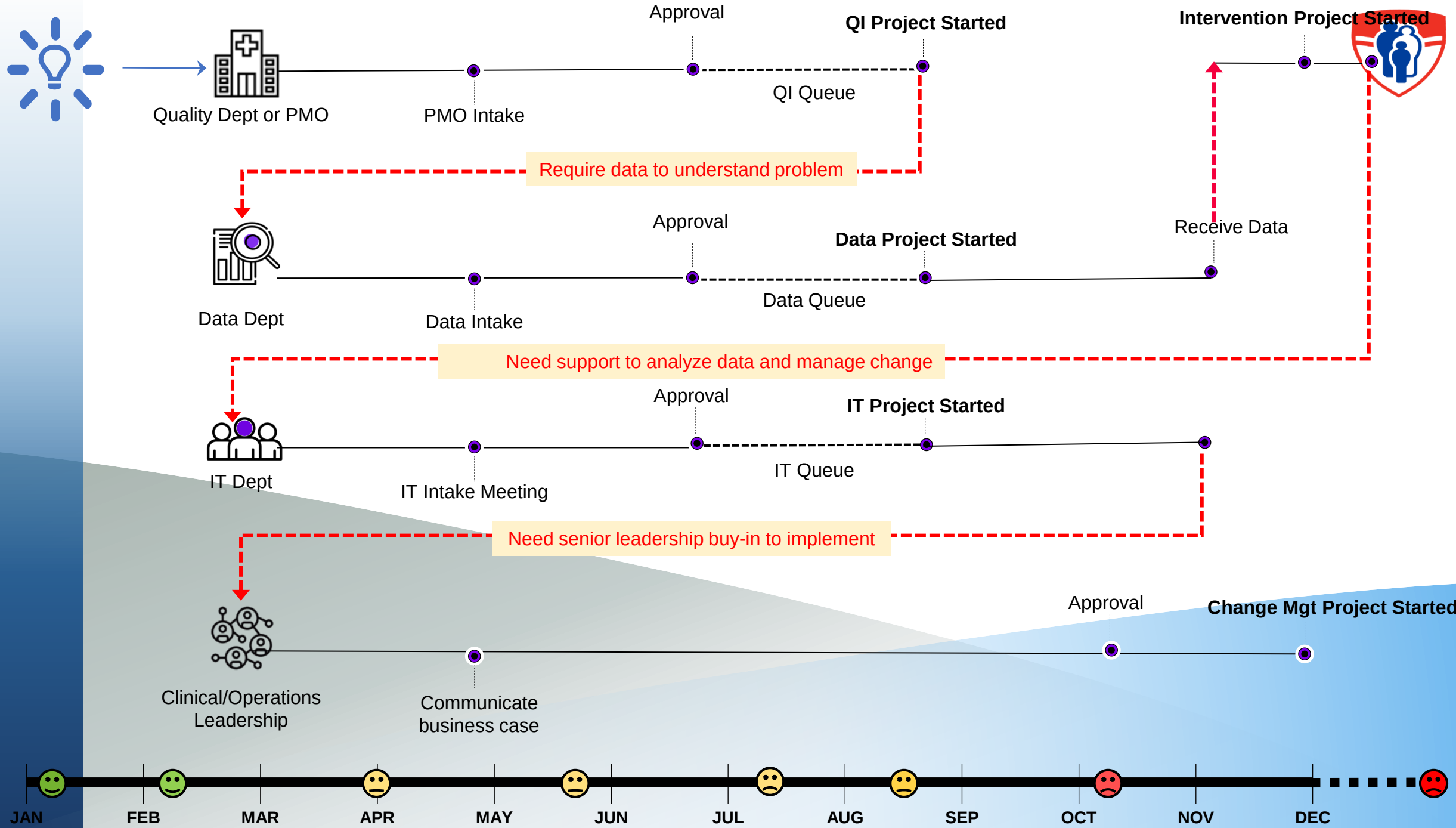
2006 Data Analytics Project

Evaluation of PCR-based MRSA screening program

Test: Nasal and Rectal swab

2100 patients avoiding unnecessary testing per year

Saved: 1.5M per year


Approval
QI Project Started
Intervention Project Started
Quality Dept or PMO
PMO Intake
QI Queue
Require data to understand problem
Approval
Data Project Started
Receive Data
Data Dept
Data Intake
Data Queue
Need support to analyze data and manage change
Approval
IT Project Started
IT Dept
IT Intake Meeting
IT Queue
Need senior leadership buy-in to implement
Approval
Change Mgt Project Started
Clinical/Operations Leadership
Communicate business case
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

“If only I had data”

THE PARADOX OF HEALTHCARE DATA

MASSIVE AMOUNTS GENERATED

30%

Of all data generates is for health

ALMOST ALL IS UNUSED

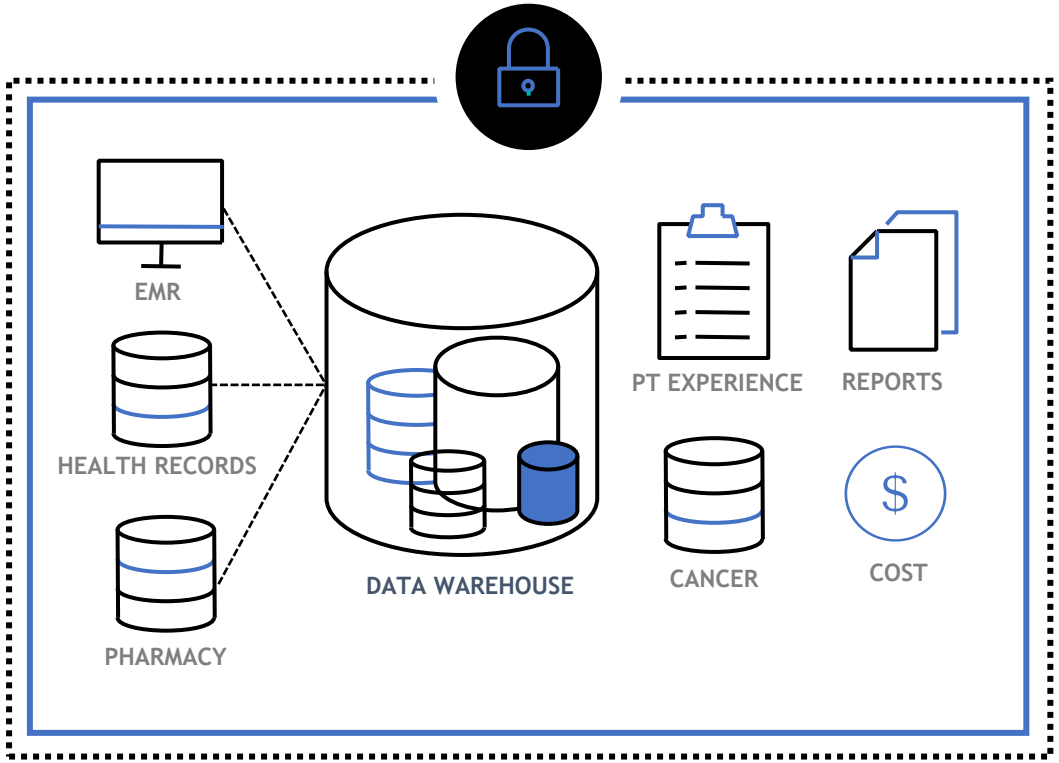
<5%

Of Health data is used in making decisions

30% Of leaders state their data are insufficiently accurate to base decisions

Healthcare Data Challenges

- Competing demands
- Lack of technical knowledge
- Privacy
- No budget
- Clinician resistance
- Executive resistance
- Inaccuracy of data
- Inability to obtain results in real time



Could we address these **barriers**?

Yes, through the creation of **a learning health system**, focused on achieving healthcare's triple aim

Learning Health System

LHS
OUTCOMES

Health systems in which ‘knowledge generation processes’ are embedded in daily practice to improve individual and population health

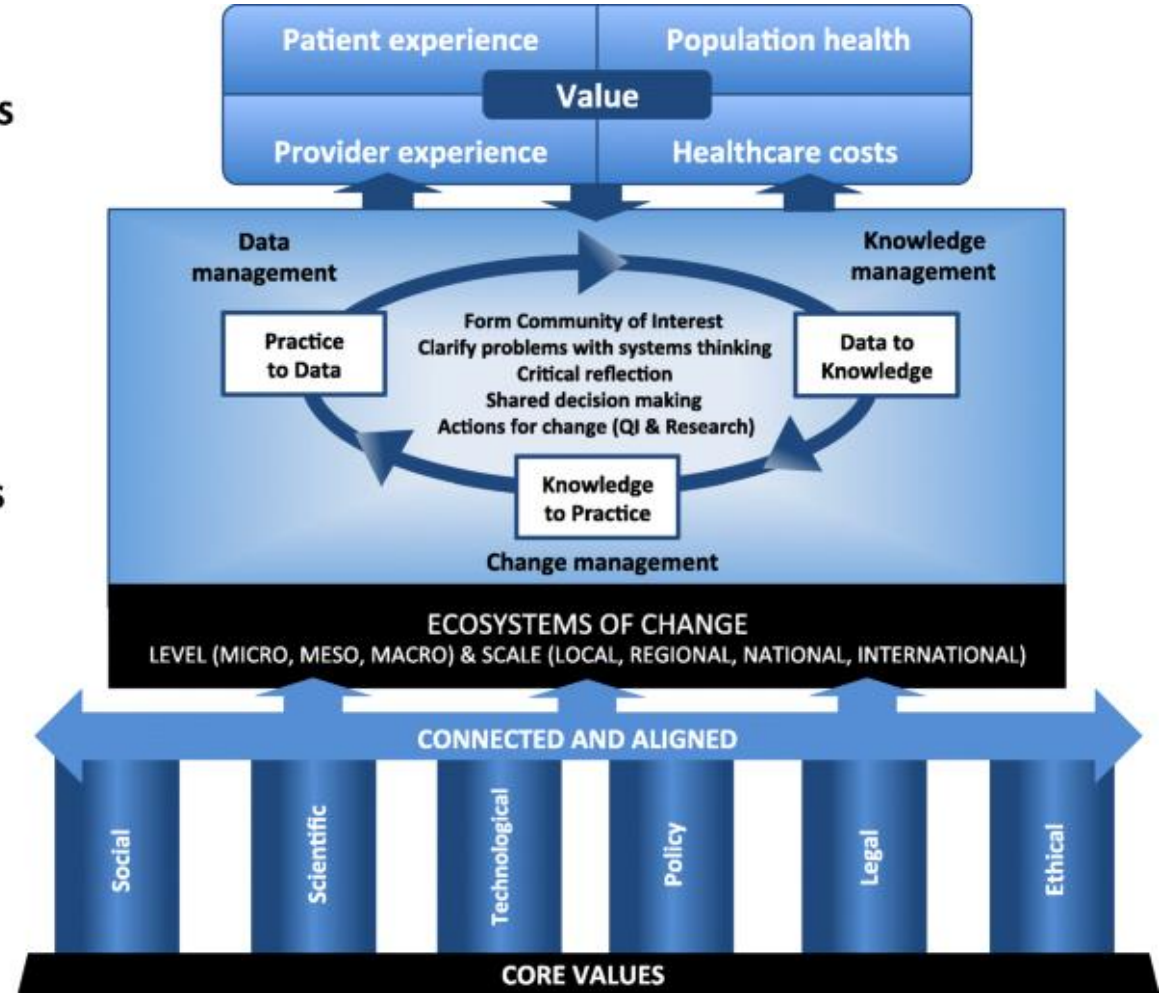
LHS
PILLARS

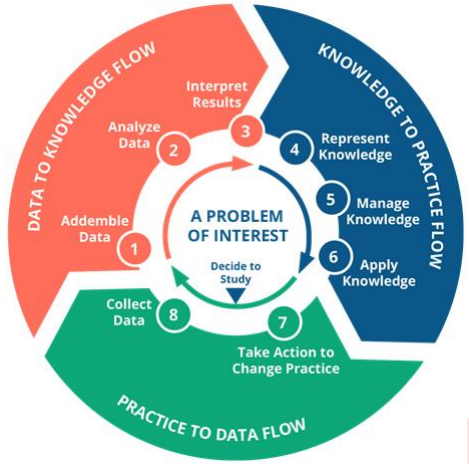
Learning Health System

LHS OUTCOMES

LHS PROCESSES

LHS PILLARS





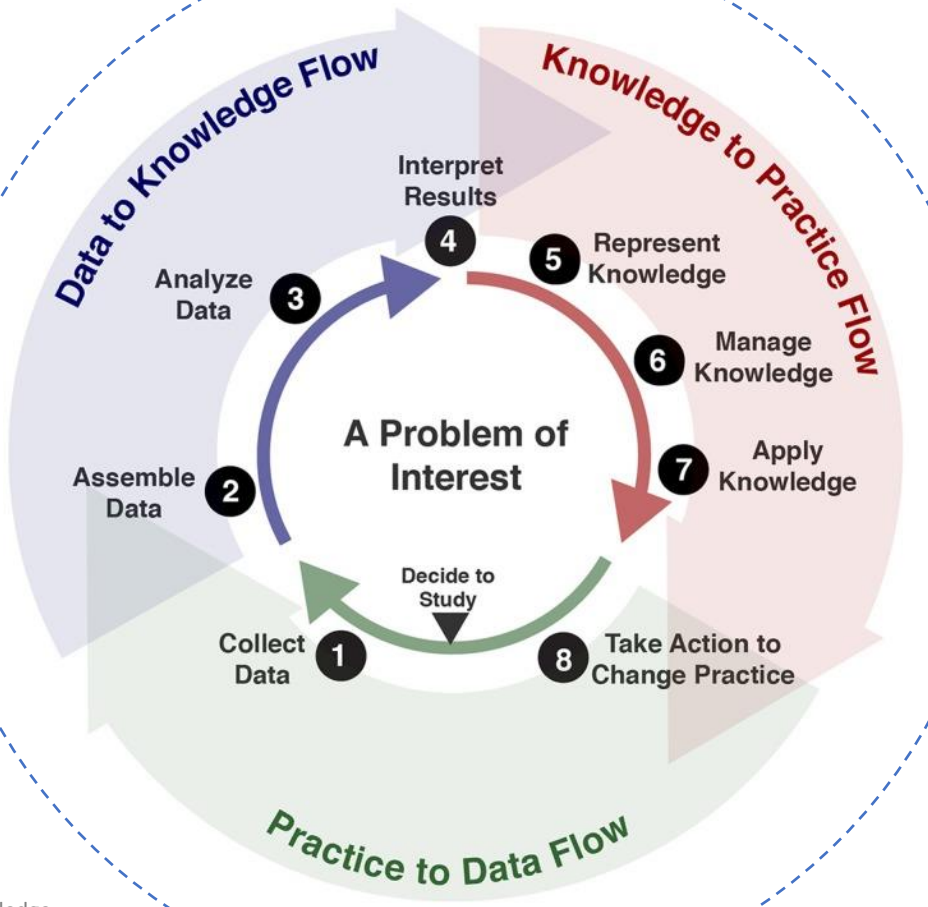
Improving Healthcare Quality

3 INGREDIENTS:

DATA

KNOWLEDGE

ACTION

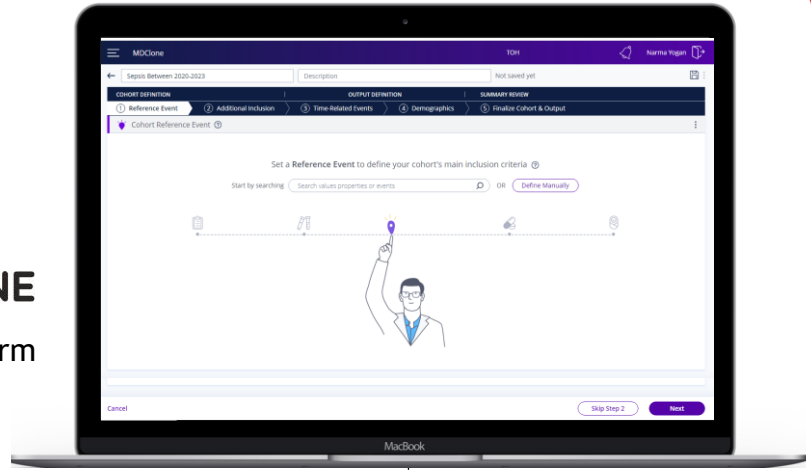


A. J. Flynn, C. P. Friedman, P. Boisvert, Z. Landis-Lewis, and C. Lagoze, "The Knowledge Object Reference Ontology (KORO): A formalism to support management and sharing of computable biomedical knowledge for learning health systems," Wiley Online Library, 2018. [Online]. Available: **https://pubmed.ncbi.nlm.nih.gov/31245583/**

My Journey to building a Learning Health System

The Ottawa Hospital | L'Hôpital d'Ottawa

Launched
MDCLONE
ADAMS Platform



Pre-Electronic Medical Record

Deployed EMR 1.0

Built Data Warehouse

Assembled Analytics Department

Developed Business Intelligence Strategy

Deployed Data Access Tools

Piloted Learning Health System

1995 CARE DIGITIZATION

2004 DATA DEMOCRATIZATION

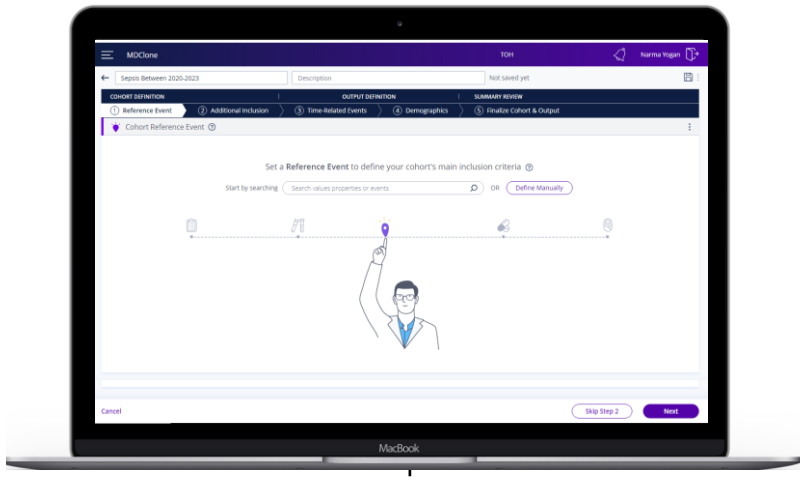
2010 DATA LITERACY & USE

2020 IMPROVED LEARNING

Accelerating Data Democratization & Use

	Traditional Methods	MDCLONE
Clinician-friendly interface requires no coding or database knowledge	✗	✓
Data is validated and organized in the way that care happens	✗	✓
Can iterate on study design and view data in real-time	✗	✓
Can share data with collaborators while maintaining patient privacy	✗	✓

Success with MDClone



200+ Users

33 Service Lines

1000+ Data files downloaded

20+ Years of Data from many sources

80+ QI & Research Projects

8 Academic & Hospital Collaborations

Launched
MDCLONE
ADAMS Platform

50 users

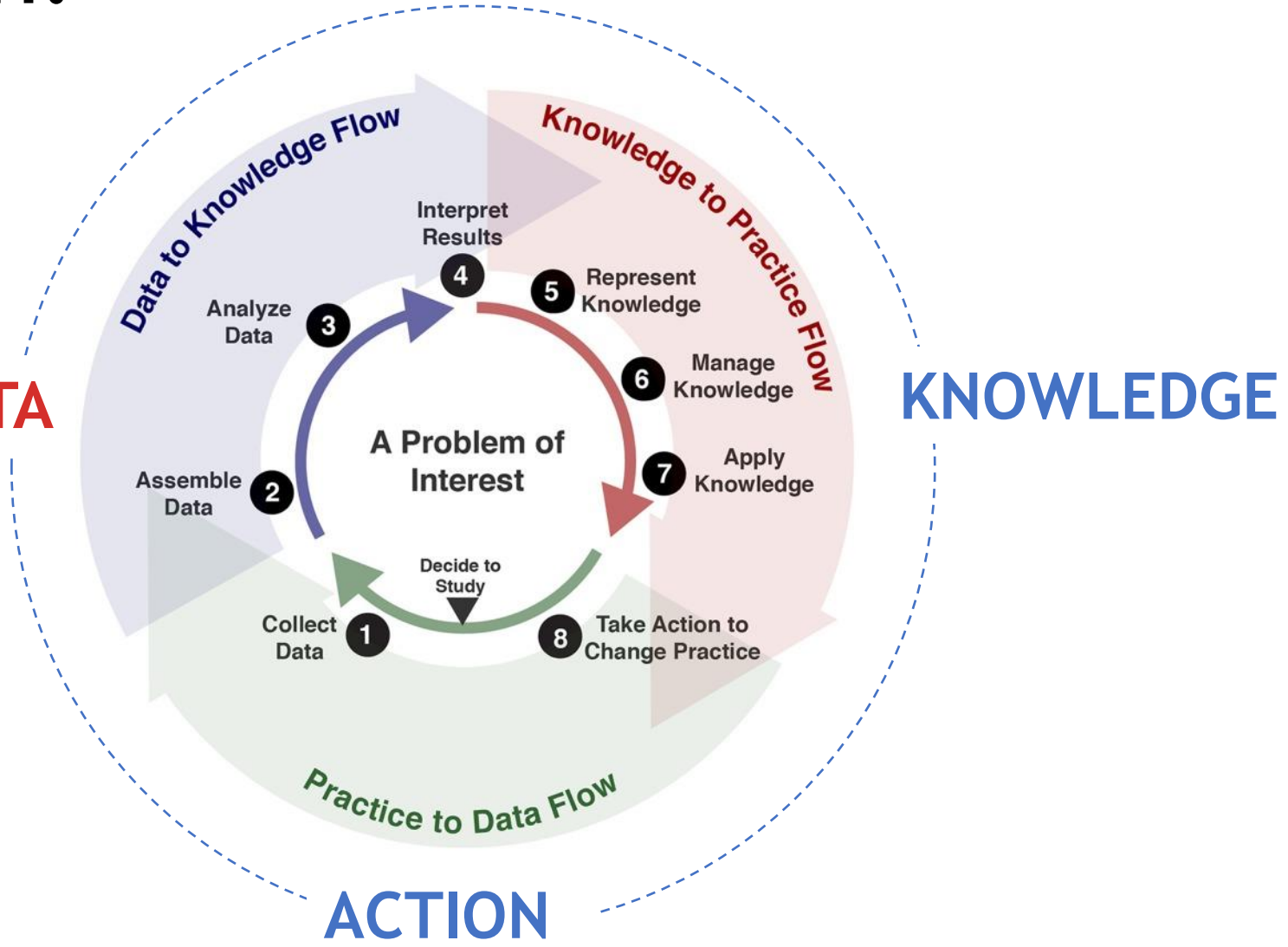
180 Users

2020 2021 2022 2023

Is Data Enough?

MDCLONE **ADAMS Platform:**

1. Data Structure
2. Workflow Design
3. Synthetic Data on-the-fly

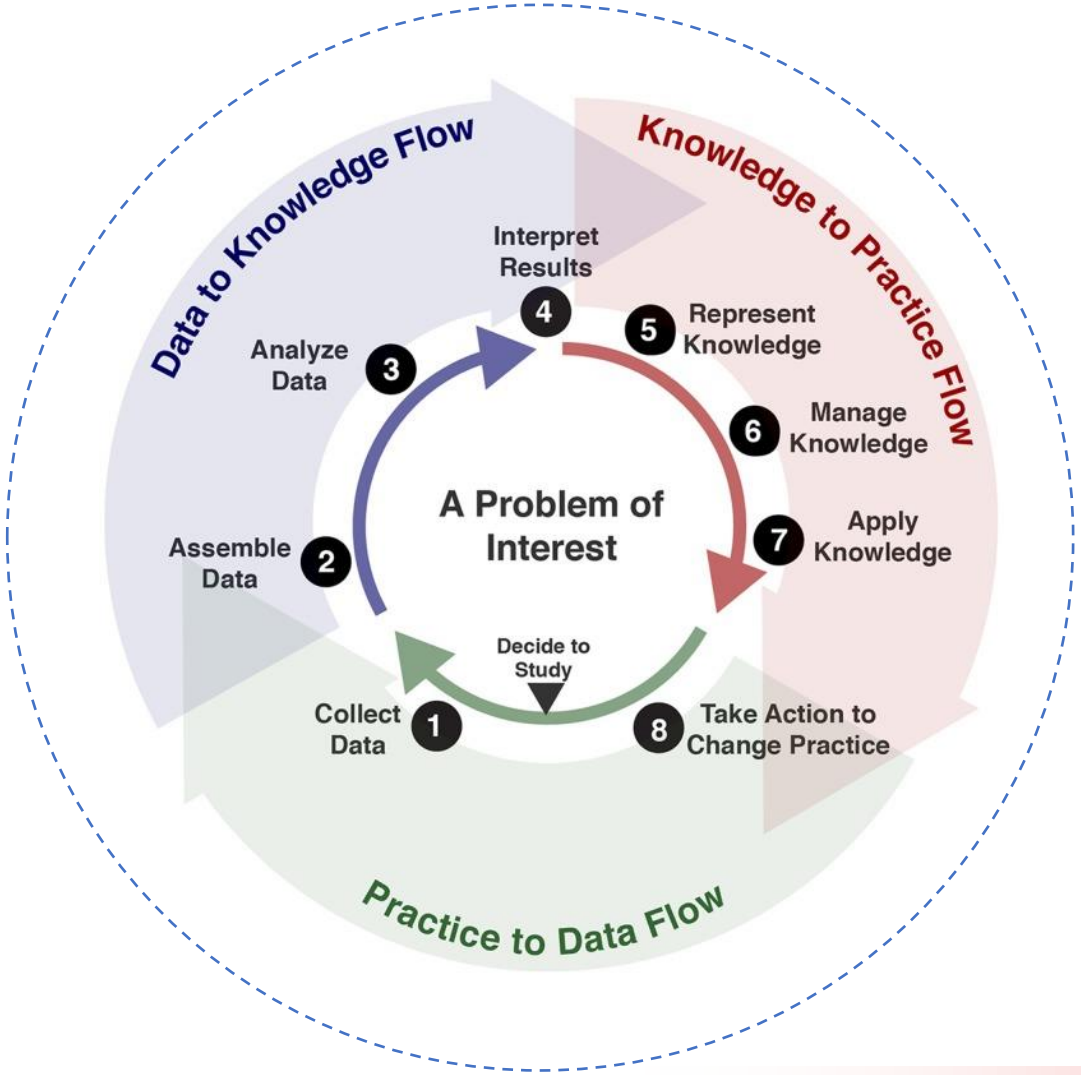


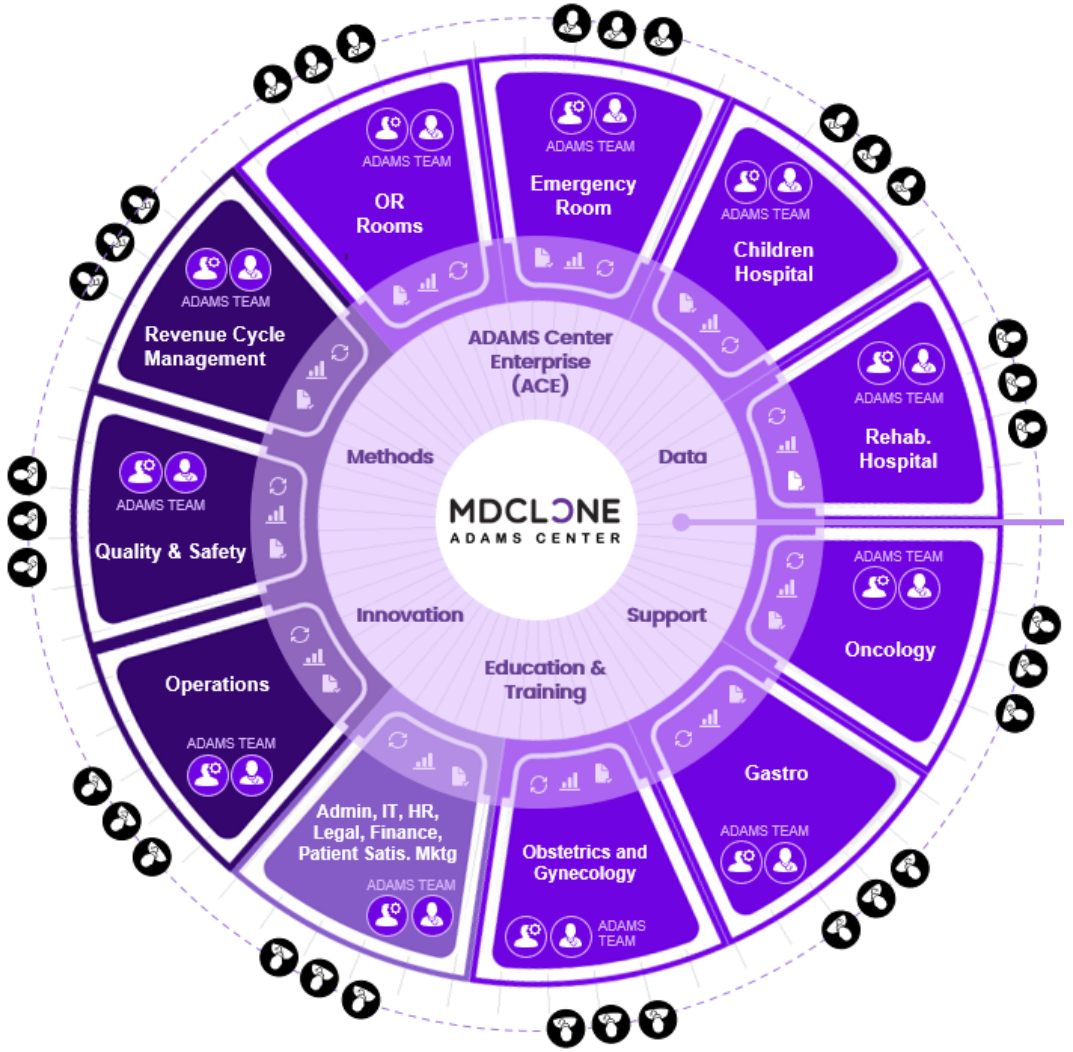
Creating impact from data requires
more than a technology platform

Sheba Medical Center

- Largest hospital in XXX
- Deployed MDClone in XXX
- Innovation Partner of the Ottawa Hospital
- Other important facts?

Sheba's Learning Health System





What is an ADAMS Center?

Creating **culture change** and supporting **continuous learning** to achieve **high-value**, **patient-centered** and **data-driven** healthcare

- Establish a hub of **performance improvement** to support and prioritize activity
- **Engage clinical staff** to ask and answer clinical, operational and financial questions
- **Generate actionable information** from the data we collect
- **Validate and measure impact** on patient health and health system operations

Learning Health System *in Action*

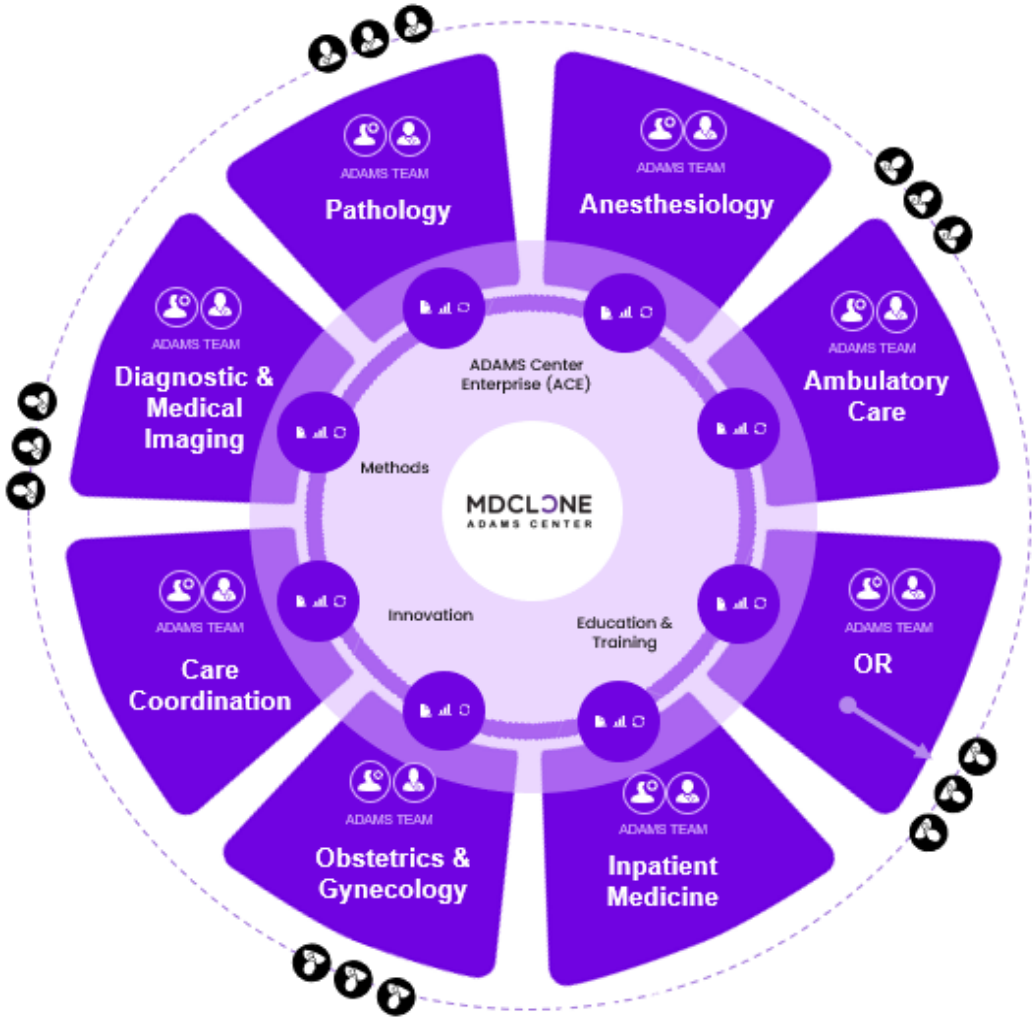
40+ PROJECTS IN 7 MONTHS:

1. **Infectious Diseases** – Are we following guidelines for duration of antibiotic mng. in uncomplicated bacteremia?
2. **ER** – Length of in-hospital observation **for anticoagulated Patients Following Minor Head Trauma**?
3. **Gynecologic Oncology** – Anticoagulant Therapy in Patients with Ovarian Cancer
4. **Operations Room** - **Sugammadex** use for reverse neuro-muscular block
5. **Oncology** – What is causing the bottlenecks in Oncology Centre patient flow?
6. **Blood Bank** – Are we following guidelines for blood products utilization (CRYO)?
7. **Blood Bank** – Are we following guide for blood products utilization (PLT)?
8. **Gastro** – What is causing the bottleneck in patient flow at the Gastro unit and the effect of sedation protocol?
9. **Operations Room** – Is there better use of Topical hemostatics in OR?
10. **Gynecologic Oncology** – What is the infection rate post-hysterectomy?
11. **Diabetic Foot Clinic** – Evaluate the key outcomes measures in the diabetic foot clinic
12. **Operations & Methods** – Define and analyze data for key Operations & Methods department projects
13. **Nursing** – Evaluate the palliative care coordinator follow-up for dying patients
14. **Infectious Diseases** – Monitor of Clostridium cohorts
15. **ER** – Establishing Guidance for Lumbar Puncture Usage in the ER for Diagnosing Headaches and Fevers
16. **Pediatric** – Implementing Evidence-Based Administration of IVIG in Pediatrics
17. **Oncology** – Characterising the care approach to dying patients
18. **Pediatric Hemato-Oncology** – Central Line-Associated Complications in Pediatric Patients
19. **General Surgery** – Assessment of the scope of activity in favor of reorganizing the department
20. **General Surgery** – Monitoring of colon surgeries complications
21. **Respiratory Institute** – Time to diagnosis from referral to respiratory institute with suspected lung disease
22. **Respiratory Institute** – Impact of BAL testing on non-immunized patients' treatment outcomes
23. **Internal Ward** – Improving clinical treatment in internal medicine wards
24. **Gynecologic Oncology** – Improved information extraction for cancer patients using NLP models
25. **Oncology** – Identifying bottlenecks in the oncology facility
26. **Oncology** – Creation of a NLP-based treatment recommendation list
27. **Nursing management** – Assessing clinical workload for patient distribution in emergency departments
28. **Gynecology** – Professional exposure meetings for residents
29. **Biobank** – Completing clinical information for biobank patients
30. **Rheumatology** – Establishing a Rheumatology Patient Registry
31. **Rheumatology** – Tracking patients treated with JAK inhibitors
32. **Rheumatology** – Defining the activity of the Rheumatology unit
33. **Gynecology** – Monitoring of pulmonary maturation after administration of Celstone
34. **Operating room** – Reducing the number of painful patients in the recovery unit (over 5)
35. **Operating room** – A re-evaluation of the percentage of operating room patients with skin injuries
36. **Breast Cancer Surveillance Clinic** – Identified follow-up registry for patients of the institute
37. **Respiratory Institute** – Mapping nurses' activities at the institute
38. **Nursing** – Nursing staff suturing an incision in the emergency room
39. **Nursing** – Giving a local block by a nurse to a patient with a femoral neck fracture
40. **Nursing** – Record control quality improvement (Currently done manually)
41. **Pediatrics** – Children's burn hospitalizations: intelligent planning
42. **Psychiatry** – Reducing spontaneous death in psychiatry ward
43. **Internal Ward** – Detection of BBB drugs that affect PGP (difficulty obtaining community data)
44. **Internal Ward** – DVT prevention in Parkinson's patients

Pilot: Building an **Learning Health System**

At The Ottawa Hospital we challenged ourselves to build **an ADAMS Centre** in 90 days, with 9 projects

9 Projects in 90 Days



1. Impact of multi-pronged approach to **reduce inappropriate use of Pregabalin** during the peri-op period
2. Define the business case for **automatically substituting Provist in patients allergic** to iodinated contrast media and needing urgent imaging
3. Evaluate use and **impact Carbetocin in patients undergoing C-section**
4. Impact of multi-pronged approach to reduce **overuse of urine cultures, urinalysis and antibiotics**
5. Describe the clinical and financial opportunities created by implementing three different models for **providing routine ambulatory care laboratory testing**
6. Evaluate use and **impact of Tranexamic acid in surgical patients**
7. Describe demographic and clinical characteristics of high versus low **frailty groups**, using the CIHI-HFRM
8. Identify the health conditions accounting for the majority of in-patient **hospital care costs** as a surrogate marker of disease burden
9. Evaluate the **value of CT scan of the head in anticoagulated patients** with head injury, and compare to findings in Sheba Medical Centre

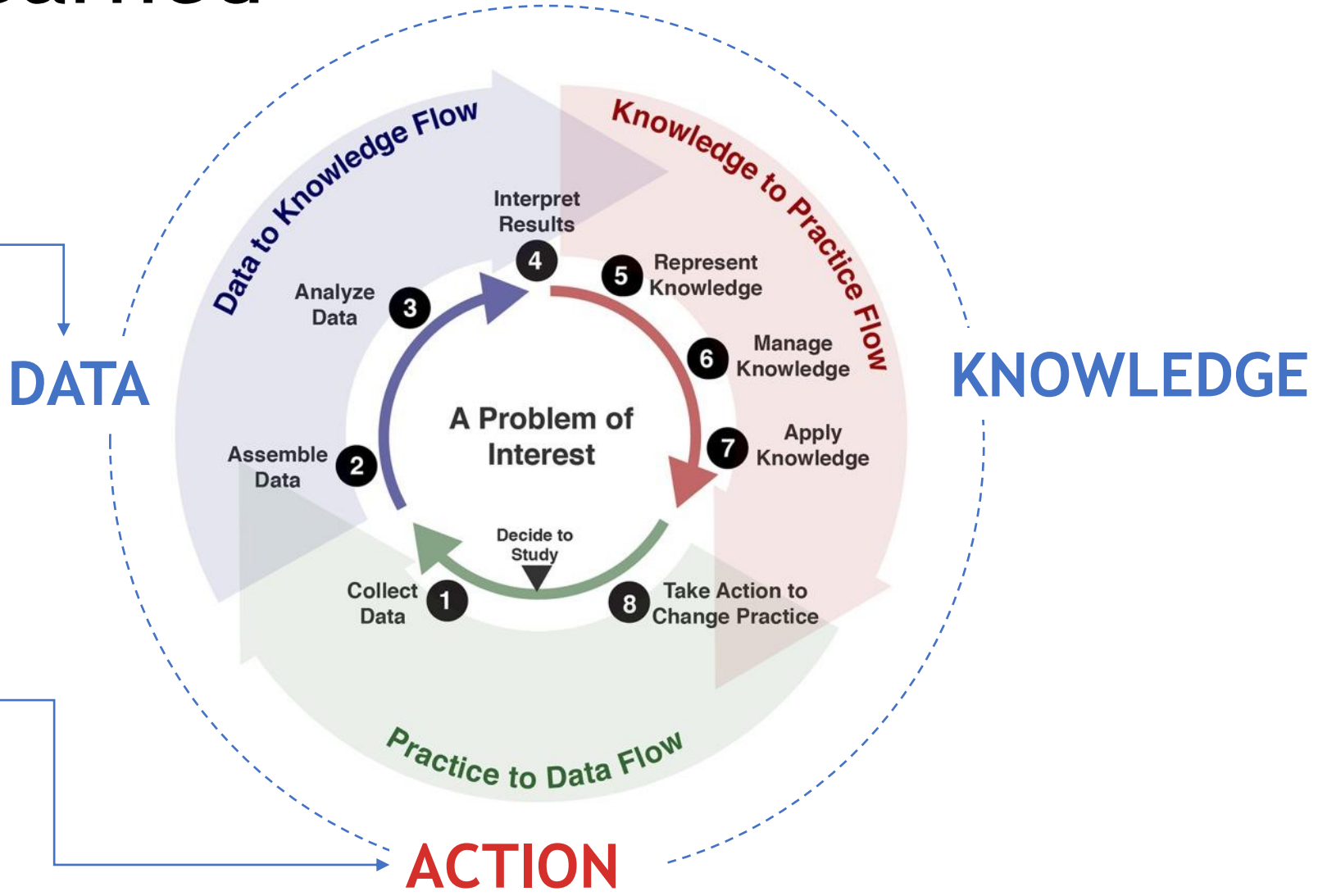
What We Learned

MDCLONE ADAMS Platform:

1. Data Structure
2. Workflow Design
3. Synthetic Data on-the-fly

MDCLONE ADAMS Centre:

1. Embedding Enablers within Operations
2. Workflow design includes visibility on actions
3. Ability to share progress



What’s Next?

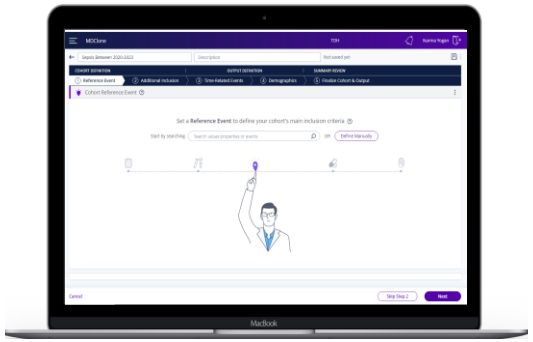
Building a Learning Health System via MDClone’s
ADAMS Centre at MUHC

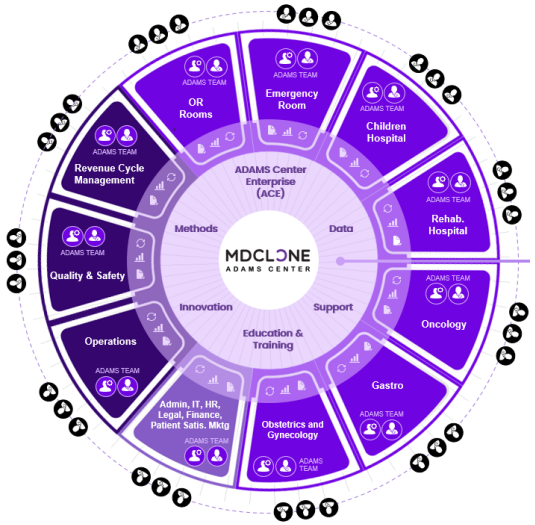
McGill University Health Centre

- New Role - Director, Innovation, Transformation, and Clinical Performance MUHC & McGill Professor of Health Innovation
- Other important facts?

McGill University Health Centre

Our 1 Year Plan





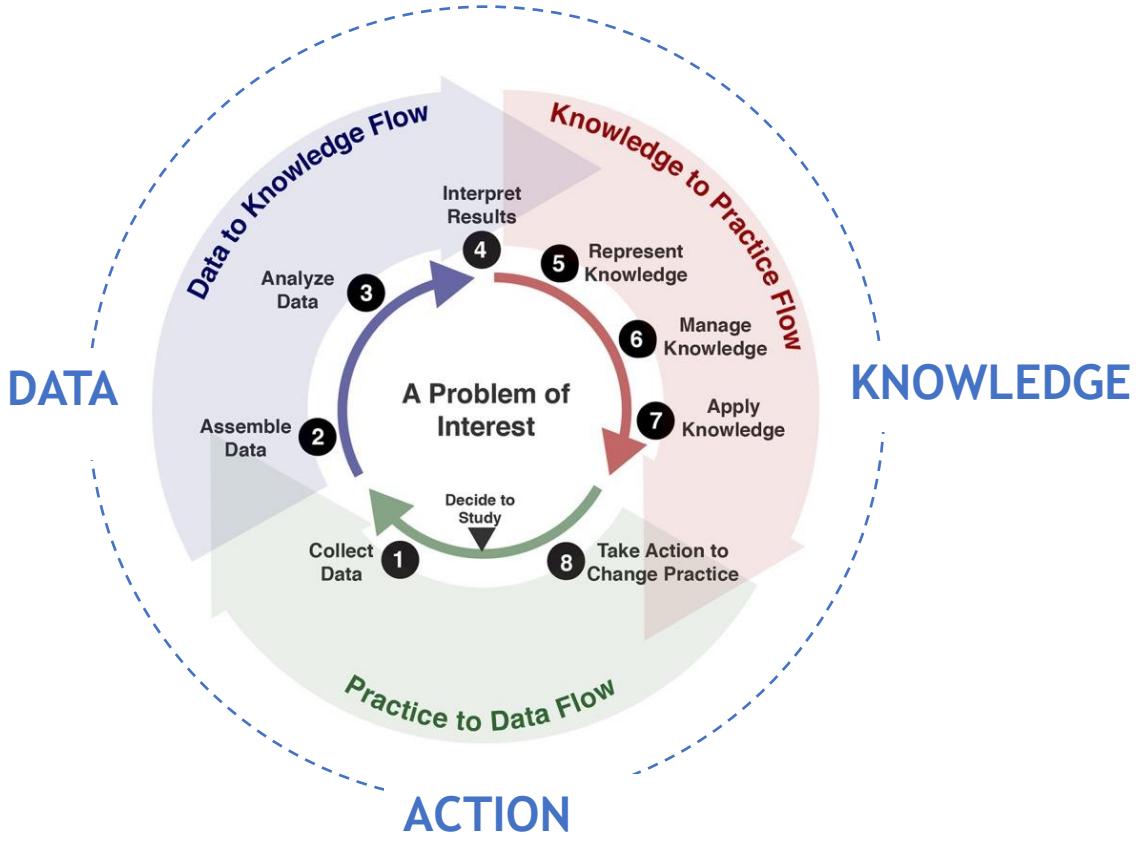
Implement the **MDClone ADAMS Platform** to enabling access to data for all MUHC patients

Create an **MDClone ADAMS Center**, a proven approach to create a learning health system

Become a **national center of excellence** in healthcare analytics and data-driven transformation

Takeaways

1. Speed to Data
2. Speed to Understanding
3. Alignment with health system goals
4. Promoting Disciplined Action



Questions?