Starting University Clinical Careers Efficiently, Scholarly, and Successfully

Mining Epic for Scholarship

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Professor of Internal Medicine

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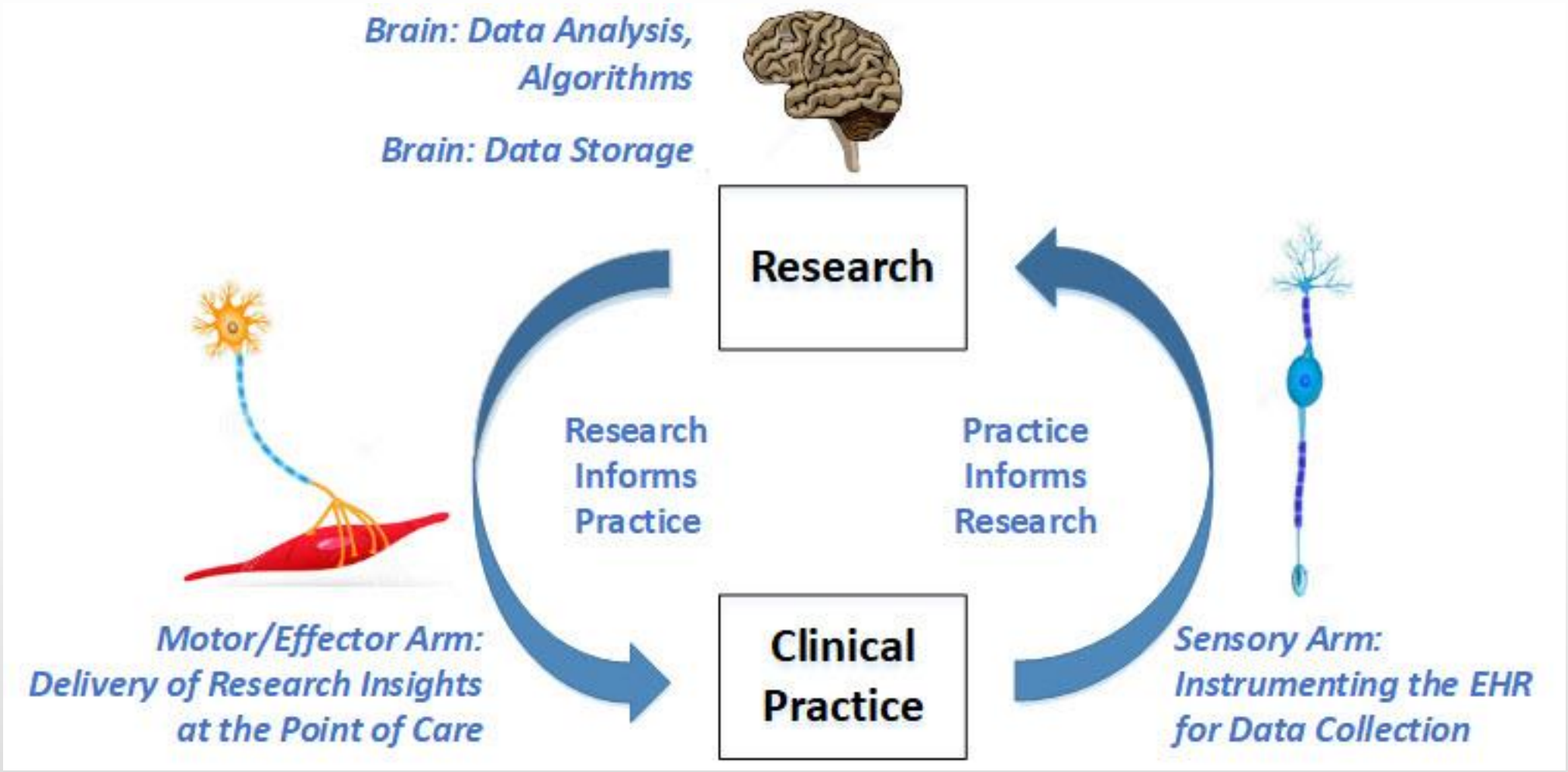
Learning Health System Informatics: Nervous System Analogy*



*h/t: Ethan Halm

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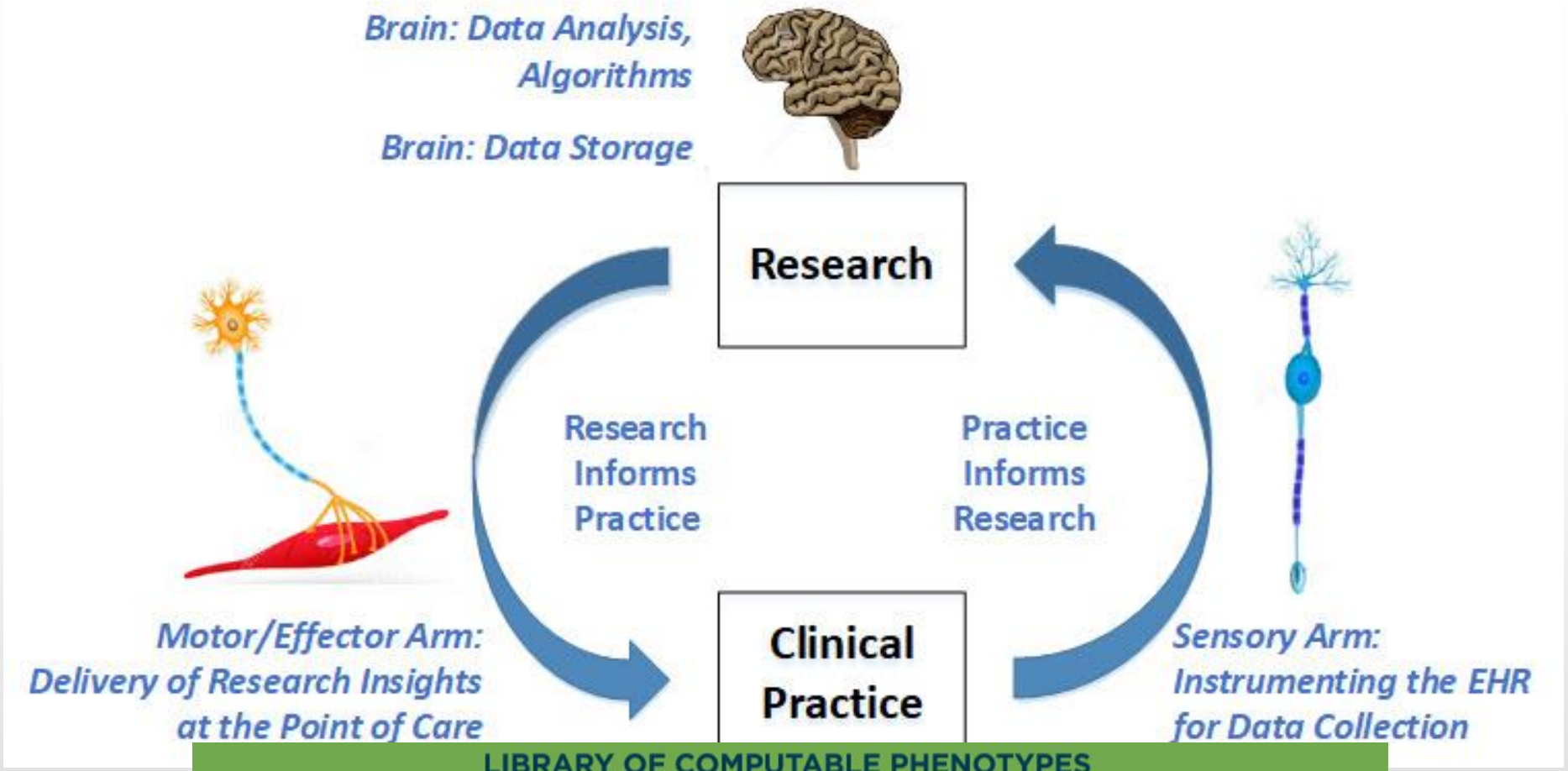
Learning Health System Informatics: Nervous System Analogy



>250 Diagnosis groupers

>100 Disease Registries

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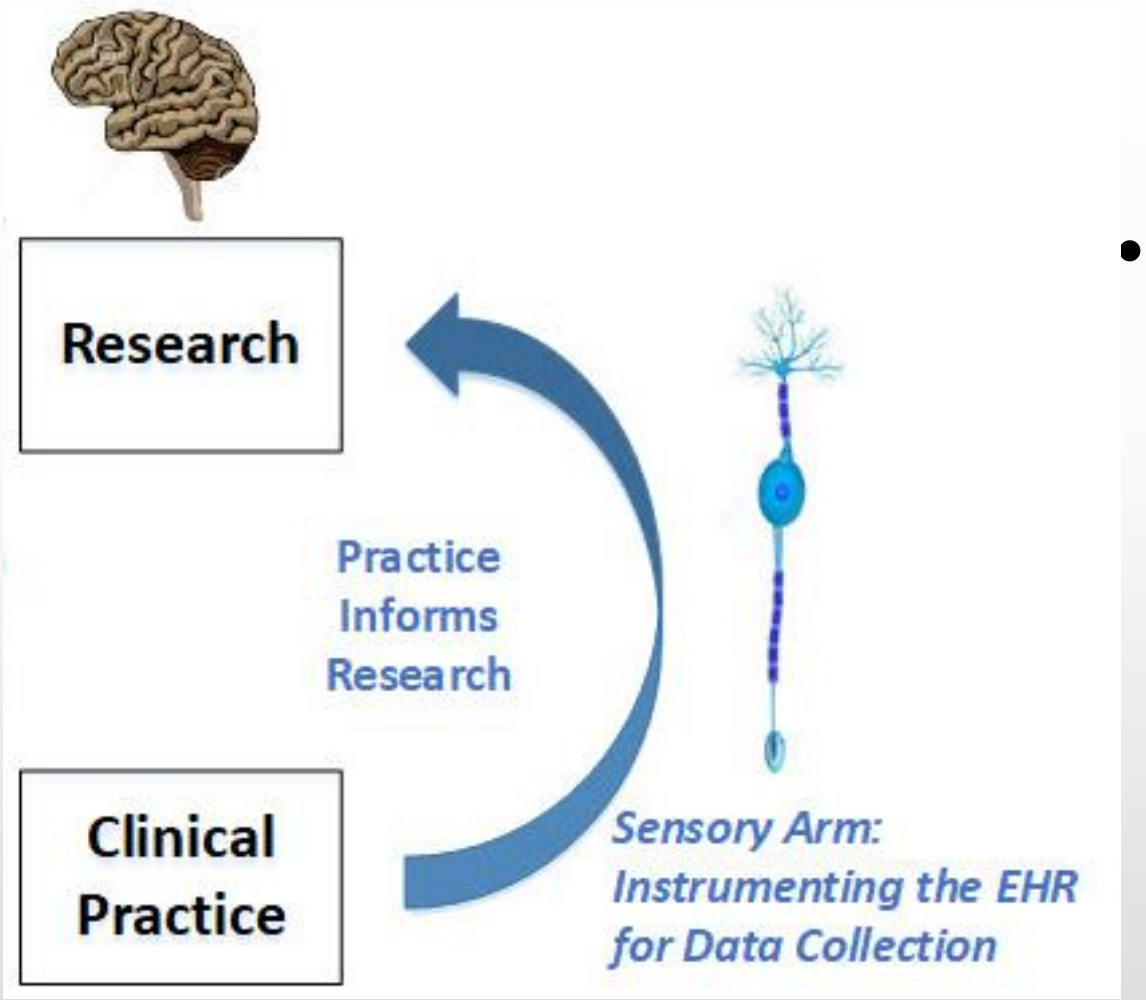
"Sensory Neurons" Getting Data Out of Epic



- Creating new data collection tools
  - Patient-reported outcomes
  - Clinic staff data collection:
    - Flowsheets
    - Custom result components
  - SmartForms

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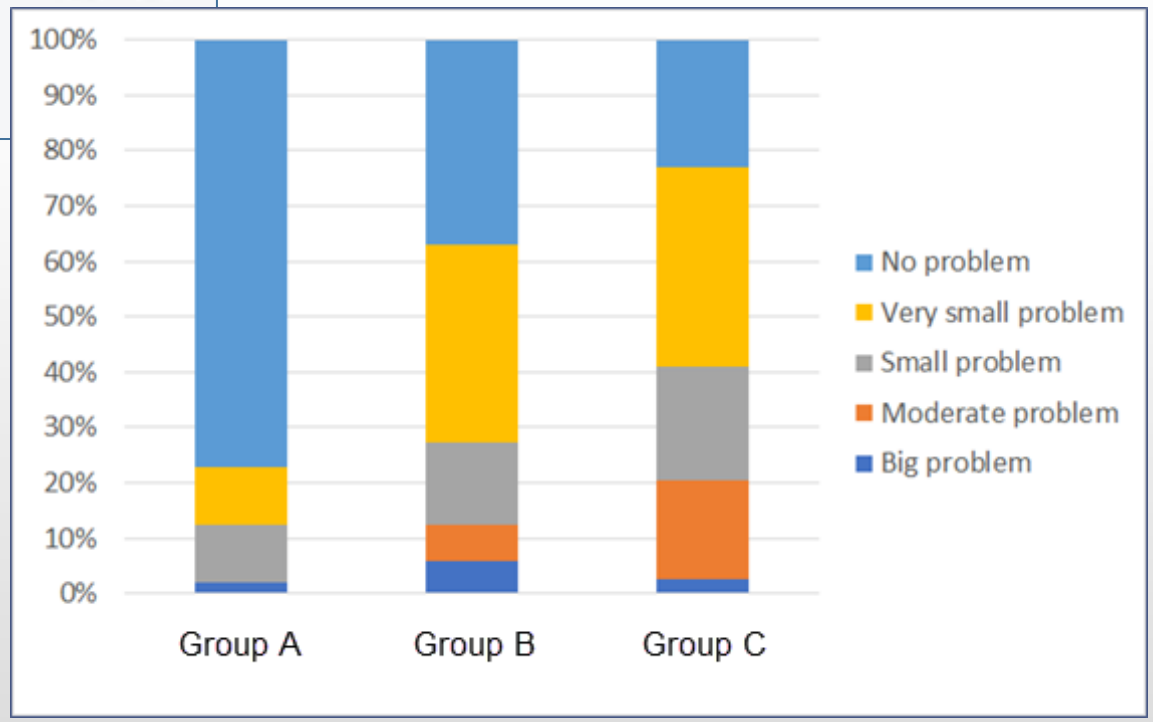
Patient-Reported Outcome (PRO) MyChart Questionnaire

Urology Prostate Cancer EPIC (The Expanded Prostate Cancer Index Comp…

Please answer the following questions and click the **Continue** button.

How big a problem, if any, has dripping or leaking urine been for you during the past 4 weeks?

No problem | Very small problem | Small problem | Moderate problem | Big problem



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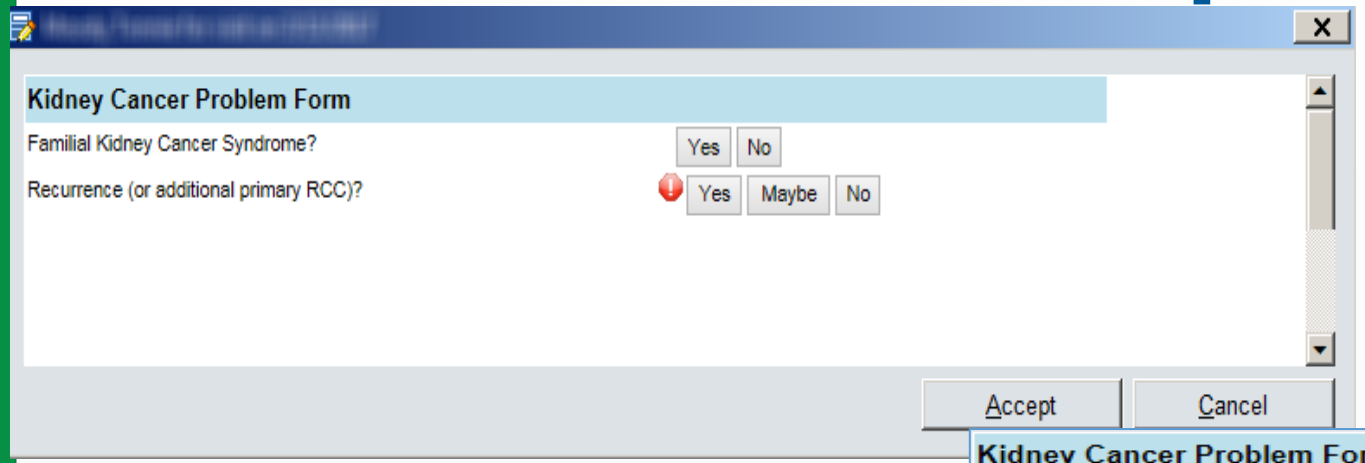
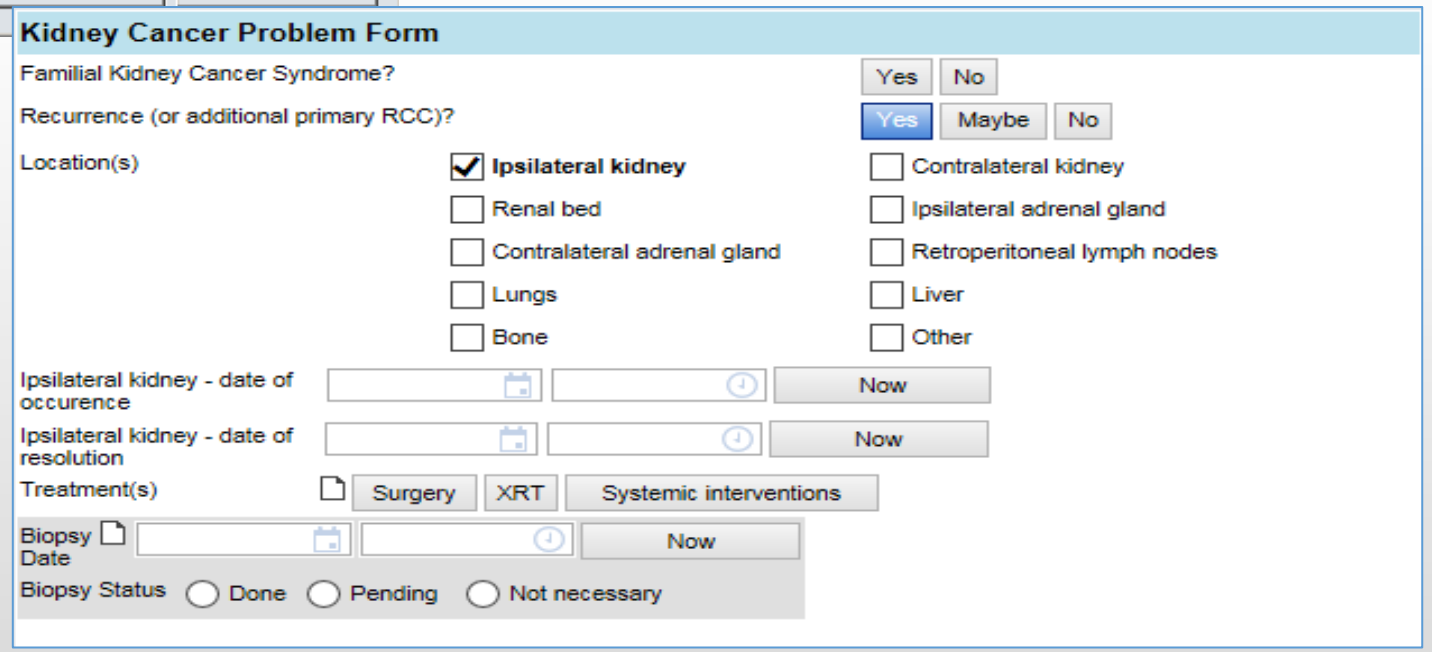
Custom Data Capture: Condition-Specific Form





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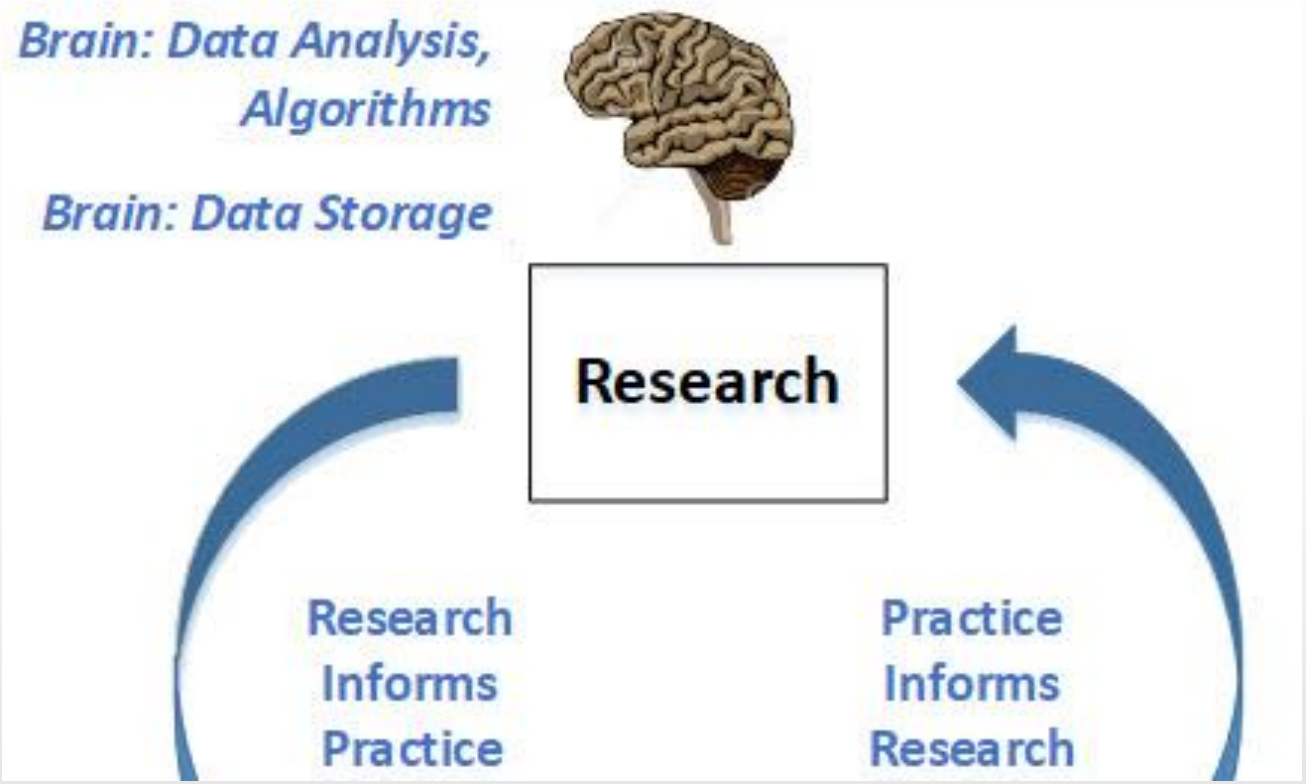
"Brain": Data Storage and Analysis



- Data Analysis, Algorithms:
  - Data Querying and Extracts
  - Statistical Analysis
  - Predictive Model Development:
    - Statistics methods
    - Machine Learning, AI
- Data Storage
  - Data Warehousing
  - Study Databases

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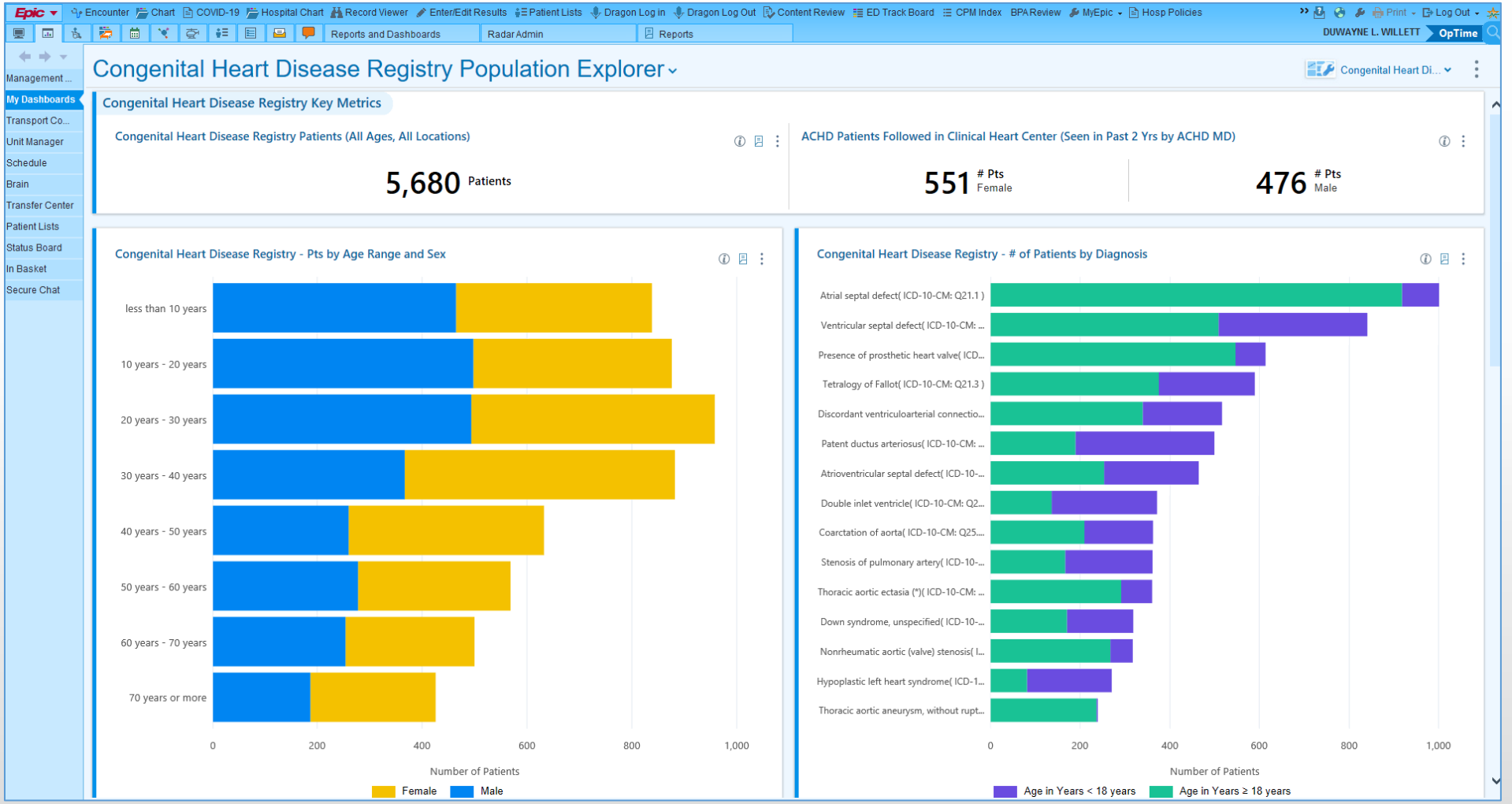
Congenital Heart Disease Registry Dashboard Using SlicerDicer



OMOP Data Contents and Processing
(covering UTSW's 23 years on Epic)

Automated nightly updates of full EHR data into the OMOP common data model (CDM), on Epic's "Caboodle" data platform

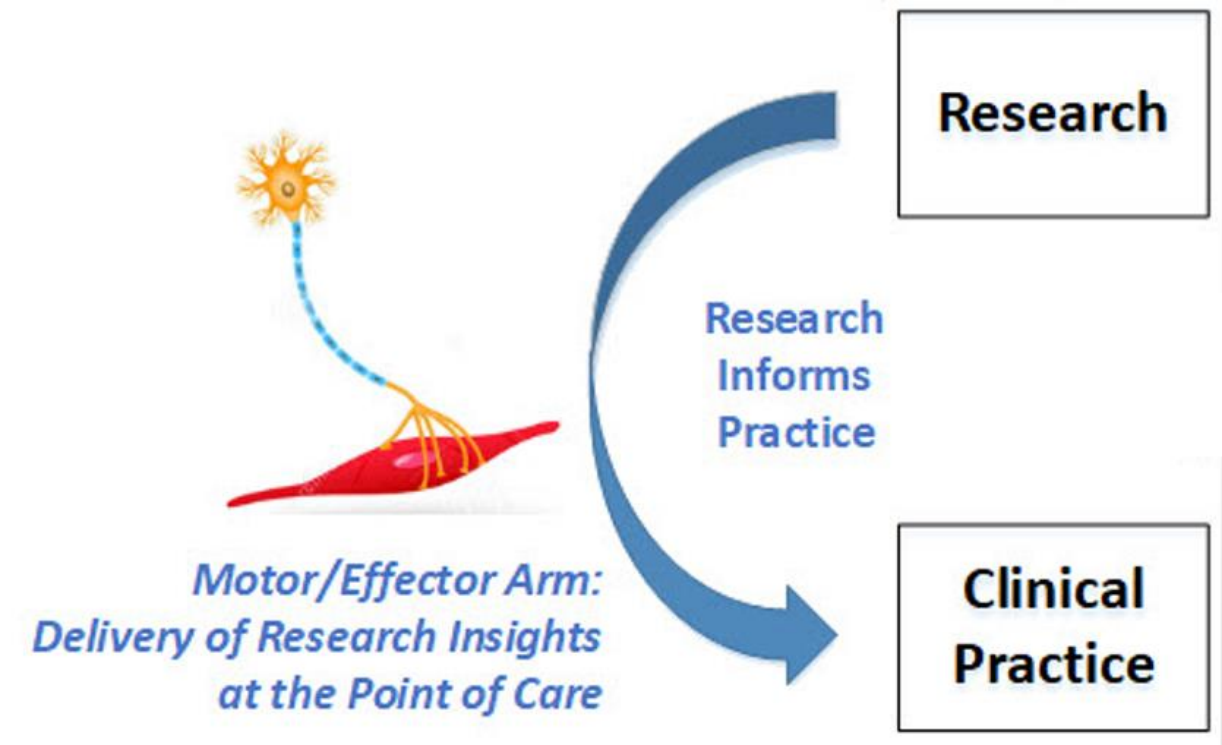
OMOP Clinical Tables

Table Name	Source(s)	Row Count	Processing
CONDITION_ OCCURRENCE	Encounter/Billing Dx; Problem List; PMHx	257,480,105	41m
DEATH	Patients; Hospital D/C	48,158	2m
DEVICE_EXPOSURE	Flowsheets (O2 delivery method)	1,507,381	11m
DRUG_EXPOSURE	Med Orders (Rx); Med Administrations	122,522,468	1h 16m
MEASUREMENT	Lab Values; Flowsheets (vitals)	461,974,391	2h 17m
NOTE	Clinical Notes (full text)	97,620,869	16m
OBSERVATION	Social Hx (smoking); "History of" Dx's	61,100,656	15m
OBSERVATION_PERIOD	Encounters	8,572,555	5m
PERSON	Patients	6,992,588	2m
PROCEDURE_ OCCURRENCE	Billed procedures; Surgical procedures	15,417,422	4m
VISIT_DETAIL	Hospital ADT Events	2,313,167	<1m
VISIT_ OCCURRENCE	Encounters	57,537,103	17m

OMOP Health System & Vocabulary Tables

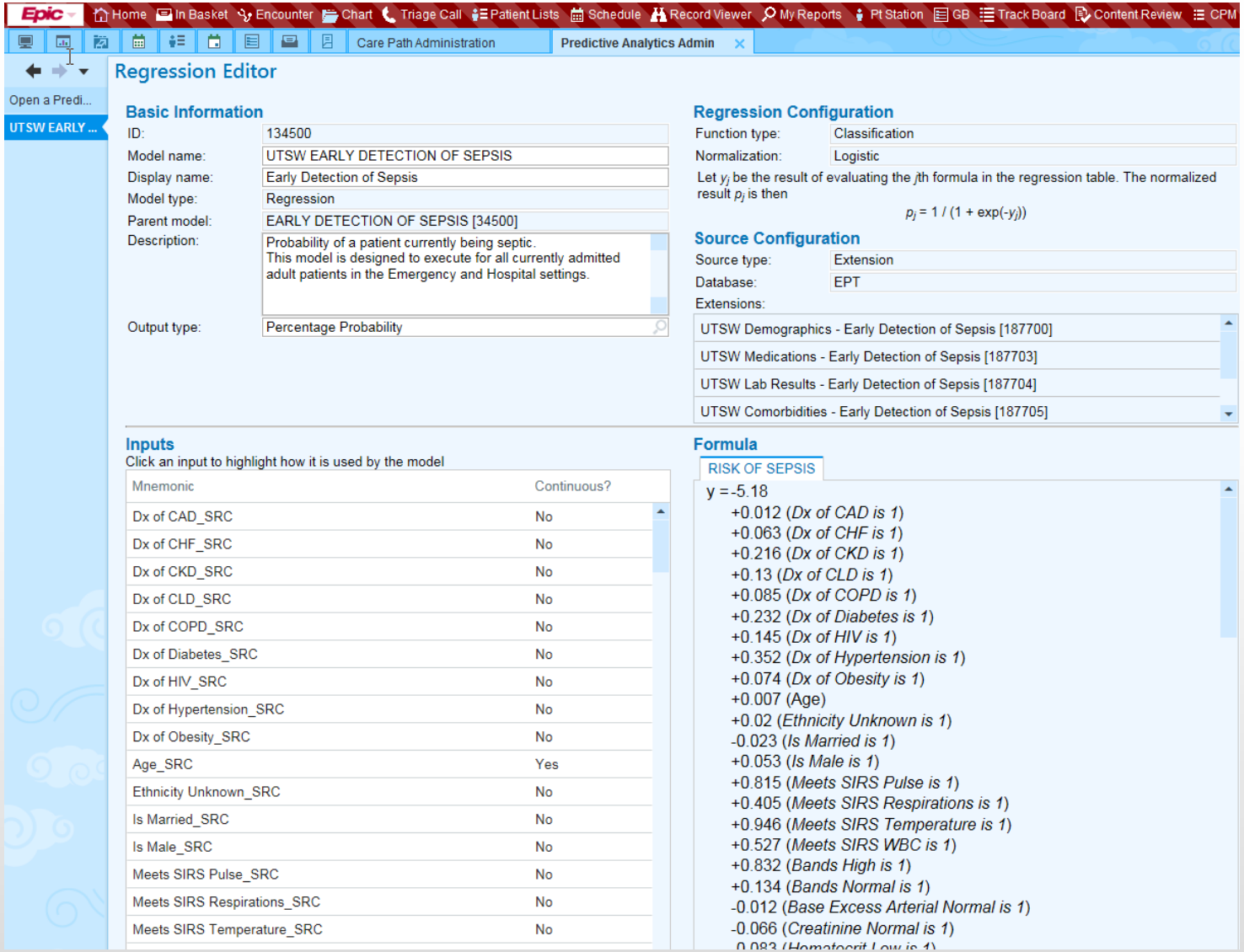
Type	Table Name	Row Count
Health System	CARE_SITE	2,985
Health System	LOCATION	6,993,892
Health System	PROVIDER	367,181
Vocabulary	CONCEPT	9,110,551
Vocabulary	CONCEPT_ANCESTOR	81,501,898
Vocabulary	CONCEPT_CLASS	417
Vocabulary	CONCEPT_RELATIONSHIP	59,919,626
Vocabulary	CONCEPT_SYNONYM	3,791,481
Vocabulary	DOMAIN	50
Vocabulary	DRUG_STRENGTH	2,976,841
Vocabulary	RELATIONSHIP	690
Vocabulary	SOURCE_TO_CONCEPT_MAP	509
Vocabulary	VOCABULARY	121

"Motor Neurons" Injecting Knowledge/Interventions Into Epic



- Clinical decision support:
  - BPAs, order sets, etc.
- Data Link
- Predictive models within Epic
- "Care paths"
  - powerful new tool (motor and sensory)

Predictive Modeling Within Epic



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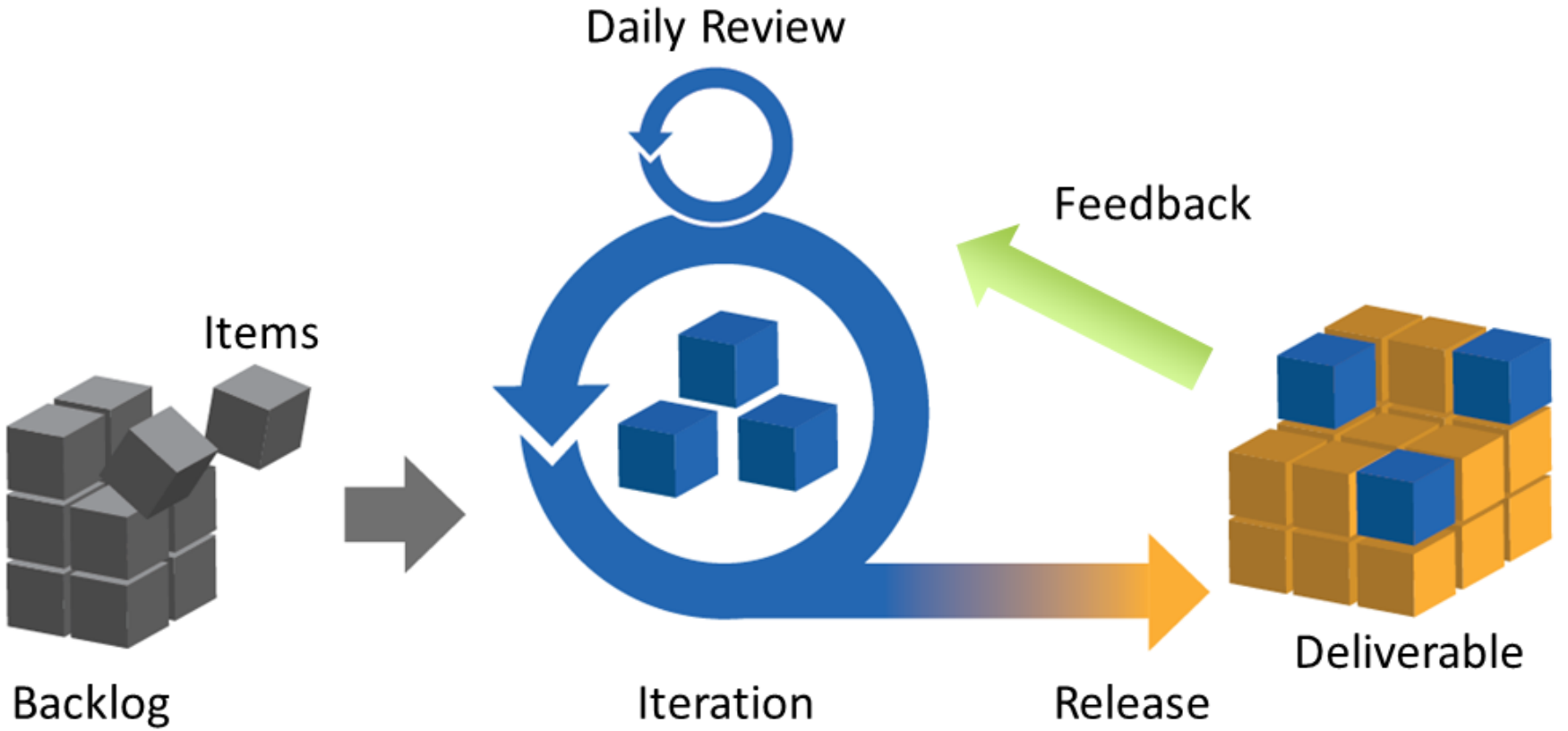
Agile Process for Delivering EHR Features



Agile Project Management: Iteration

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Additional Information and Resources

1. UTSW Health System Informatics
   - CMIO Team
   - Deputy CMIOs
   - Department/Divisional Medical Informatics Officers
2. Clinical Informatics Center
   - M.S. Program
   - Clinical Informatics Fellowship
   - CTSA Grant
   - Informatics Coordinating Office

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Your Health Informatics Team

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Associate CMIO

Mujeeb Basit

Associate CMIO

Ling Chu

Assistant CMIO

Sam McDonald

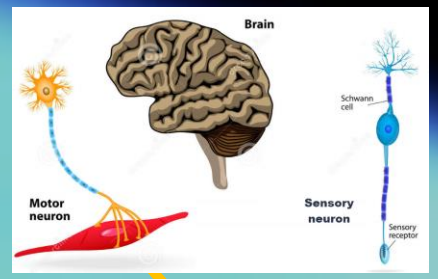
CHIO

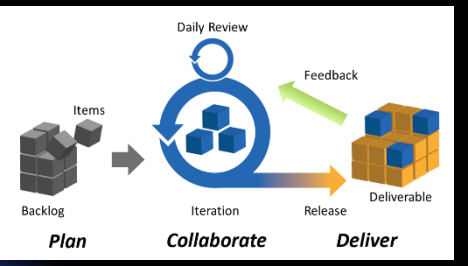
Duwayne Willett

Deputy CMIOs:

- **Waddah Arafat**
  Cancer Informatics
- **Jyoti Balani**
  Pathology Informatics
- **Trent Bryson**
  Anesthesiology and Peri-op Informatics
- **Joe Ji**
  Surgical Informatics
- **Suhani Goyal**
  Hospital Medicine Informatics
- **Justin Rousseau**
  Neuroscience Informatics
- **Rob Turer**
  Cogito Analytics

Mining EPIC for Scholarship
Summary of Key Points





- EHR can play a role in the Learning Healthcare System
- "Sensory neurons" – getting data out of EHR for analysis
- "Motor neurons" – putting data/interventions into practice
- Making it happen: Agile feature development; informatics support

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Questions? Email me!

SUCCESS

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