Starting University Clinical Careers Efficiently, Scholarly, and Successfully

Mining EPIC for Scholarship

DuWayne Willett, M.D.
Chief Medical Informatics Officer
Professor of Internal Medicine
Learning Health System Informatics: Nervous System Analogy*

Brain: Data Analysis, Algorithms
Brain: Data Storage

Research

Research Informs Practice

Practice Informs Research

Clinical Practice

Motor/Effect Arm: Delivery of Research Insights at the Point of Care

Sensory Arm: Instrumenting the EHR for Data Collection

*h/t: Ethan Halm
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Research

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Practice Informs Research

Sensory Arm: Instrumenting the EHR for Data Collection

LIBRARY OF COMPUTABLE PHENOTYPES

Definition | Purpose | Metadata | Validation results | Data features | Implementation experience

>250 Diagnosis groupers
>100 Disease Registries
“Sensory Neurons”
Getting data out of Epic

- Creating new data collection tools
  - Patient-reported outcomes
  - Clinic staff data collection:
    - Flowsheets
    - Custom result components
  - SmartForms
Electronic Data Capture: Levels of Data in Epic

- Physician
  - PCP; Care Team
  - Encounter Provider; Attending Provider; Treatment Team
  - Authorizing Provider; Ordering Provider

- Patient
  - Problem List

- Encounter
  - Encounter Diagnosis
  - Order-Associated Diagnosis

- Diagnosis
Core patient data for patient care and patient safety – and analytics

<table>
<thead>
<tr>
<th>Core Patient Data</th>
<th>Consistent place to store once in the patient’s medical record, with shared re-use</th>
</tr>
</thead>
<tbody>
<tr>
<td>What <em>Medications</em> are you on?</td>
<td>Medication List</td>
</tr>
<tr>
<td>What medication <em>Allergies</em> do you have?</td>
<td>Allergy List</td>
</tr>
<tr>
<td>What <em>Medical Conditions</em> do you have?</td>
<td>Active Problem List</td>
</tr>
<tr>
<td>What <em>Surgeries</em> have you had done?</td>
<td>Surgical Case Log; Surgical History</td>
</tr>
<tr>
<td>Do you have any permanently <em>Implanted devices</em>?</td>
<td>Implants</td>
</tr>
<tr>
<td>Do you have any temporary <em>lines or catheters</em> in?</td>
<td>“LDA” Line-Drains-Airways</td>
</tr>
<tr>
<td>What <em>Immunizations</em> have you received?</td>
<td>Immunizations</td>
</tr>
</tbody>
</table>

Key principles for efficient and effective use of data:
1. **Enter once**, as soon in workflow as known (upstream), in a consistent place; **Re-use multiple times** (downstream)
2. Data quality aphorism: **“What gets used, gets better”**
Centrality of Problem List
Custom data capture: Condition-specific form
Patient-Reported Outcome (PRO) MyChart Questionnaire
“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
EDW Architecture at UT Southwestern
Ad hoc queries about Registry patients can be performed interactively in SlicerDicer.
Various criteria are available for slicing the data interactively. The tan folders contain additional criteria.
Congenital Heart Disease Registry Dashboard, using SlicerDicer
“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)
Types of clinical decision support (CDS) tools

**General tools**
- Patient lists
- Storyboard
- Navigators
- Print group Reports
- Workflow Engine Rules
- Work List
- Best Practice Advisories
- Health Maintenance
- Scoring Systems
- Active Guidelines and Info button

**Documentation tools**
- Smartforms
- Flowsheets
- Required Documentation

**Ordering tools**
- Preference lists
- Smartsets/Ordersets
- Alternatives
- Medication Warnings
Predictive modeling within Epic
Next-level Epic: Care Paths as Disease State Diagrams
Sepsis Transitions between Risk States
Agile Process for delivering EHR features

Plan

Collaborate

Deliver

Daily Review

Feedback

Deliverable

Agile Project Management: Iteration
Additional Information and Resources

1. UTSW Health System Informatics
   - CMIO Team
   - Deputy CMIOs
   - Department/Divisional Medical Informatics Officers

2. Clinical Informatics Center
   - Chris Lehmann, MD
   - M.S. Program
   - Clinical Informatics Fellowship
   - CTSA Grant
Your CMIO team

CMIO

Mujeeb Basit

Associate CMIO

Duwayne Willett

Associate CMIO

Ling Chu

CMIO

Additional Deputy CMIOs:

• Waddah Arafat (Cancer Informatics)
• Jyoti Balani (Pathology Informatics)
• Trent Bryson (Anesthesiology and Peri-op Informatics)
• Joe Ji (Surgical Informatics)
• Sam McDonald (Emergency Medicine Informatics)
• Yee Ng (Imaging Informatics)

Deputy CMIO

Richard Medford

Associate CMIO

Michael Burton
Department/Division Clinical Informatics Officers

Arturo Dominguez  Prayag Mehta  Tolu Bakare  Jonathan Cheng  Jyoti Balani  Ashley Agan  Collin Vas
Stephanie Jones  Katherine Raspovic  Neelima Kale  Kenneth Westover  Jennifer Grant  Brett Whittemore  Eric Zeikus
Shivani Patel  Marisara Dieppa  Waddah Arafat  Emilia Thomas  Trushil Shah  Bekir Tanriover  Roopa Vemulapalli
Department/Division Clinical Informatics Officers

Aslan Turer  Kim Styrvoky  Abby Lau  Jessica Voit  Satyam Nayak  Namirah Jamshed  Angela Orlino
Lesley Davila  John Clark  Nashila AbdulRahim  Isabel Esparza  James Mitlyng  Jason Newman  Susan Matulevicius

Alternates:
Ellen Araj  Jakub Furmaga  Joshua Kern
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!

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DuWayne.Willett@UTSouthwestern.edu