Data Rich or Data Overload

Supporting a learning health system

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Data
Information
Knowledge
Action
Value
The Vision

Characteristics of a Learning Health Care System

Science and Informatics

Real-time access to knowledge—A learning health care system continuously and reliably captures, curates, and delivers the best available evidence to guide, support, tailor, and improve clinical decision making and care safety and quality.

Digital capture of the care experience—A learning health care system captures the care experience on digital platforms for real-time generation and application of knowledge for care improvement.

Patient-Clinician Partnerships

Engaged, empowered patients—A learning health care system is anchored on patient needs and perspectives and promotes the inclusion of patients, families, and other caregivers as vital members of the continuously learning care team.

Incentives

Incentives aligned for value—in a learning health care system, incentives are actively aligned to encourage continuous improvement, identify and reduce waste, and reward high-value care.

Full transparency—A learning health care system systematically monitors the safety, quality, processes, prices, costs, and outcomes of care, and makes information available for care improvement and informed choices and decisions by clinicians, patients, and their families.

Culture

Leadership-instilled culture of learning—A learning health care system is stewarded by leadership committed to a culture of teamwork, collaboration, and adaptability in support of continuous learning as a core aim.

Supportive system competencies—In a learning health care system, complex care operations and processes are refined through ongoing team training and skill building, systems analysis and information development, and the feedback loops for continuous learning and system improvement.
Health System Data Ecosystem

- **Payer Data**: Paid Claims, Eligibility
- **Administrative data**: Charges, Cost, Payments
- **Quality measurement, Benchmarking**
- **EMR**: Structured (vitals, labs, orders)
- **EMR**: Unstructured clinical notes
- **Genomics, proteomics**
- **Patient generated data**
- **Pharmacy data**
- **Patient Satisfaction**

Complexity Levels:
- **Low Complexity**
- **Moderate Complexity**
- **Highest Complexity**
Multi-Mission Case Study:
Leveraging Clinical Documentation for Central Line Associated Bloodstream Infection Surveillance and Clinical Research
EUH Device Utilization Ratio
(central line days/patient days)

EUH Fiscal Year 2011

Line Days/Patient Days

FYTD Avg
Tools to support clinical workflow ensured accurate data capture.

**PowerChart (EMR):** Workflow reports and front-end validation.

### Report Output - Central Line Report by Unit

<table>
<thead>
<tr>
<th>Unit</th>
<th>Patient Name</th>
<th>Account Number</th>
<th>Age</th>
<th>Room</th>
<th>Attending</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML4</td>
<td>TESTPATIENT, FROGONE</td>
<td>245</td>
<td>51</td>
<td>4001</td>
<td>BROWN, FRANK WAYNE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #1: Multilumen central catheter</td>
<td></td>
<td></td>
<td></td>
<td>#1 Dwell: 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #2: Dialysis/pheresis catheter, non-tunneled</td>
<td></td>
<td></td>
<td></td>
<td>#2 Dwell: 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #3:</td>
<td></td>
<td></td>
<td></td>
<td>#3 Dwell: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #4:</td>
<td></td>
<td></td>
<td></td>
<td>#4 Dwell: 0</td>
<td></td>
</tr>
<tr>
<td>ML4</td>
<td>TESTPATIENT, FROGTWO</td>
<td>246</td>
<td>43</td>
<td>4002</td>
<td>BROWN, FRANK WAYNE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #1: Implanted VAD (port)</td>
<td></td>
<td></td>
<td></td>
<td>#1 Dwell: 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #2: PICC</td>
<td></td>
<td></td>
<td></td>
<td>#2 Dwell: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #3:</td>
<td></td>
<td></td>
<td></td>
<td>#3 Dwell: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device #4:</td>
<td></td>
<td></td>
<td></td>
<td>#4 Dwell: 0</td>
<td></td>
</tr>
</tbody>
</table>
Creating reports is only the first step
Data Validation Protocol

- Expect multiple cycles to refine report
- Develop error tracking process and set acceptable error rate
- Intervene if needed: education, form or workflow redesign, etc.
- Share report and error rates with staff-audit and feedback
Outcomes

• Clinical research uses
  – 18,000 patient database on central line use
    • 18-month, Dual Center crossover study of a Novel Device (Biofilm analysis)
    • Proposed modification to surveillance definitions (neutropenia, multiple devices)
  – Scalable to other device tracking (Foley, Vent)

• Research innovation
  – Validated Innovative use of EMR for “e-Measures”
    • NHSN/CDC engagement to align EMR design with surveillance needs

• Quality reporting
  – Electronic tracking of CLABSI denominator and CVC usage

• Clinical care
  – Workflow tools benefited the staff
Future work

• (CLA)BSI
  – Definition modifications
  – Infection rates by device type, location,
  – Midline catheters

• Antimicrobial Utilization and Resistance (AU, AR)
  – vendor neutral specifications
  – develop feedback loops supporting stewardship
  – electronic clinical quality measure proposals for NQF
  – Link AU measurement to a quality outcome (C Diff rates)

• Balance measures
  – Gauge the impact of new sepsis initiatives on AU/AR
Multi-mission Case Study
The Value Dashboard
Value Dashboard Goals

• Support Health Services Research
• Integrate cost accounting data with quality & efficiency data
• Make data as transparent as feasible to engage clinicians & teams
  – Focus attention on the “value equation”
  – Drive standardization and value generation through clinical & administrative partnership
### Value Scorecard Metrics

- Metrics computed monthly at the encounter level
- UHC data two months in arrears

<table>
<thead>
<tr>
<th>Source</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDW</td>
<td># Encounters, length of stay, mortality, readmissions, days until discharge summary</td>
</tr>
<tr>
<td>UHC - CDB</td>
<td>Target mortality, mortality index, PSIs, HACs</td>
</tr>
<tr>
<td>Cost accounting system</td>
<td>Target LOS, LOS index; Total cost, best payment estimate, total contribution, costs by category (labor, supplies, devices, etc.)</td>
</tr>
</tbody>
</table>
Average Hospital Charges to Insurance

$89,104

MS-DRG 470—Major Joint Replacement or Reattachment of Lower Extremity without MCC

Average Hospitalization (Commercial Insurer Payment to Hospital)

$26,696

Why is the charge so much higher than the hospital's cost?
As part of the negotiating process between payers and providers, hospitals tend to charge much more for a procedure, knowing that the eventual payment will be whittled down as members of the insurance plan receive a discount.

Average Hospital Input Cost

$15,397

Why are hospitalization costs higher than input costs?
Hospitals lean on payments from commercial insurers—which tend to be above a hospital's input costs—to balance out payments from public payers like Medicare and Medicaid, which tend to be below hospital input costs and often unprofitable.

Average Hospital Direct Cost

$10,778

Average Hospital Indirect Cost

$4,619
Data Governance
Questions?