Framing Effective Patient-Oriented Information Visualization for Patient-Physician Communication

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UMD/HCIL Health Data Visualization
Patient-Centered Cognitive Support of Physician Decision Making - SHARP
University of Maryland, College Park Campus
Ineffective communication
of complex issues with patients
(Challenges & Opportunities)
Healthcare-Associated Infection Public Reporting to Consumers

Top Hospitals 100%

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average for all Reporting Hospitals in the United States</td>
<td>95%</td>
</tr>
<tr>
<td>Average for Reporting Hospitals in Maryland</td>
<td>97%</td>
</tr>
<tr>
<td>JOHN HOPKINS BAYVIEW MEDICAL CENTER</td>
<td>99%</td>
</tr>
<tr>
<td>THE JOHN HOPKINS HOSPITAL</td>
<td>99%</td>
</tr>
</tbody>
</table>

Top Hospitals represents the top 10% of hospitals nationwide. Top hospitals achieved a 100% rate of patients who were given the right kind of antibiotic to help prevent infection.

Why is this important?
Surgical wound infections can be prevented. Medical research has shown that certain antibiotics for certain types of surgery, hospital staff should make sure patients got the antibiotic that works, higher numbers are better.

Map
Box Plot
Table

Show me a map with the central line associated bloodstream infection rates.
Show me a box plot summarizing the highest, lowest, and average central line associated bloodstream infection rates among all Washington hospitals.
Show me a detailed table listing all Washington hospitals and their central line associated bloodstream infection rates by ICU type (Added pdf: 107 KB).

Infections per 1,000 Lines Days
January 2009 - December 2009 NHSN data.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>United States Average</th>
<th>Maryland Average</th>
<th>Percentage for John Hopkins Bayview Medical Center</th>
<th>Percentage for Suburban Hospital</th>
<th>Percentage for the John Hopkins Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Cardiac/Thoracic ICU</td>
<td>91%</td>
<td>93%</td>
<td>93% of 364 patients</td>
<td>92% of 868 patients</td>
<td>99% of 995 patients</td>
</tr>
<tr>
<td>Adult Medical ICU</td>
<td>94%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Adult Med/Surg ICU</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Burns Unit</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Coronary Care Unit</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Long Term Acute Care Hospital</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Neonatal ICU</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Neurosurgical ICU</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Pediatric Cardiac/Thoracic ICU</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
<tr>
<td>Pediatric Med/Surg ICU</td>
<td>93%</td>
<td>97%</td>
<td>99% of 554 patients</td>
<td>94% of 632 patients</td>
<td>99% of 978 patients</td>
</tr>
</tbody>
</table>

* The percentage includes only patients whose history and condition indicate the treatment is appropriate. Talk to your health care provider if you have questions about this measure.

Data Last Updated: March 16, 2010
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Medical Information Visualization (MIV) - Roadmap

Perspective/Phase
- Discovery
- Establishing
- Connecting
- Exploring
- Examining
- Finding
- Establishment
- Validating
- Assuring
- Unifying
- Translation
- Linking
- Standardizing
- Governing

MIV-FW (Framework)
MIV-CM (Conceptual Model)
MIV-TK (Toolkit)
MIV-IC (Interactive Collaboration)
MIV-EV (Evaluation & Validation)
Consumer Healthcare Information Visualization Matrix

<table>
<thead>
<tr>
<th>Etiology/Risk Factor</th>
<th>Genetic Testing</th>
<th>Prevention</th>
<th>Symptoms</th>
<th>Diagnosis</th>
<th>Treatment</th>
<th>Side-effects/Risks</th>
<th>Rehabilitation/Homecare</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checklist Scorecard</td>
<td>Mind Map</td>
<td>Table</td>
<td>Pattern Matching</td>
<td>Bar Graph (vertical)</td>
<td>Line Graph</td>
<td>Decision Tree</td>
<td></td>
<td></td>
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</tbody>
</table>

- Task or Question
- Forage for Data
- Identify Visual Representation
- Cognitive Evaluation
- Communication Interpretation
- Decide and Act

- Forage for Data
- Decide and Act
- Communication Interpretation
- Cognitive Evaluation

- Checklist Scorecard
- Mind Map
- Table
- Pattern Matching
- Bar Graph (vertical)
- Line Graph
- Decision Tree
Medical Information Visualization – Interactive Collaboration (MIV-IC)

- Public web-site to collaborate on the design & development of patient-oriented MIV
- Public catalogue of patient-oriented MIV
- Catalogue of shared symbols
- Consumer friendly taxonomy
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