Smart Forms

An Informatics Architecture for Documentation-based Clinical Decision Support

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What Are the HPM Initiatives?

1. Investing in quality and utilization infrastructure
   - Information systems
   - Other resources

2. Enhancing patient safety by reducing medication errors system-wide

3. Enhancing uniform high quality by measuring performance to benchmark for select inpatient and outpatient conditions

4. Expanding disease management programs by supporting activities for certain patients with chronic illnesses

5. Improving cost effectiveness through managing utilization trends and analysis of variance
The Future: Shared Data, Knowledge Logic, Maintaining Custom Presentation Layer

Future clinical applications will take advantage of shared repositories of enterprise data, knowledge, and logic, in a services-oriented architecture.
Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change

*Barriers potentially addressed by implementation of Smart Forms.

CDS Integrated into the Clinical Workflow

- Alerts & Reminders
- Therapeutic Guidance
- Assessment, Risk Stratification, Therapeutic Response
- Follow-up/Monitoring (Quality Dashboard)

Smart Forms
What is a Smart Form?

- Clinical documentation-based
- Actively engage user during workflow
- Organize relevant data
- Request new data
- Integrate decision support, ordering, patient education, and documentation
CAD/DM Smart Form

**Smart View:** Data Display

**Smart Documentation:**

Assessment and recommendations generated from rules engine

- Lipids
- Anti-platelet therapy
- Blood pressure
- Glucose control
- Microalbuminuria
- Immunizations
- Smoking
- Weight
- Eye and foot examinations

**Smart Assessment, Orders, and Plan**

- No recent LDL measurement
- Patient is on anti-platelet therapy
- Blood Pressure is above goal (avg. over last 2 visits 130/80, goal < 130/80)
- Patient is due for Pneumovax (older than 65, no record of prior vaccination)
- Patient is due for Influenza Vaccine (high risk medical condition)
- Patient may be Current Smoker, not thinking of quitting. Last counseled on 10/10/06.
- Patient is overweight or obese (BMI 27.1 on 10/31/06, goal < 25)
**CAD/DM Smart Form**

**Rules**

If patient has DM then goal BP < 130/80

If the average of the blood pressure at the last 2 visits (in the last year) is above goal then return..
CAD/DM Smart Form

**Medication Orders**

75 yo man with CAD, DM, and elevated CK. He is not happy with any of his medications. I just saw him 3 months ago.

**Lab Orders**

- Diabetes mellitus type 1
- Coronary artery disease

**Referrals**

- Onychomycosis
- Elevated creatine phosphokinase

**Handouts/Education**

- Print "Control High Blood Pressure"
- Print DASH diet instructions
- Print exercise "prescription"
CAD Quality Dashboard

Red, yellow, and green indicators show adherence with targets

<table>
<thead>
<tr>
<th>Measure</th>
<th>My Value (N)</th>
<th>Clinic Average (N)</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE Inhibitor/ARB Management: % of patients on ACE inhibitor/angiotensin-receptor blocker</td>
<td>52% (55)</td>
<td>59% (1039)</td>
<td>&gt; 78%</td>
</tr>
<tr>
<td>BMI Documentation: % of patients with BMI documented</td>
<td>22% (23)</td>
<td>45% (839)</td>
<td>&gt; 76%</td>
</tr>
<tr>
<td>Smoking Status Documentation: % of patients with smoking status documented</td>
<td>18% (19)</td>
<td>32% (597)</td>
<td>&gt; 87%</td>
</tr>
<tr>
<td>Anti-platelet Management: % of patients on anti-platelet</td>
<td>81% (95)</td>
<td>75% (1473)</td>
<td>&gt; 94%</td>
</tr>
<tr>
<td>Beta-blocker Management: % of patients on beta-blocker</td>
<td>63% (72)</td>
<td>75% (1392)</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>Hypertension Control: % of patients on hypertension medication</td>
<td>27% (28)</td>
<td>50% (929)</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>Lipids</td>
<td>75% (79)</td>
<td>72% (1352)</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>0% (0)</td>
<td>0% (0)</td>
<td>1% (14)</td>
<td>&gt; 47%</td>
</tr>
</tbody>
</table>

Zero defect care:  
- Aspirin  
- Beta-blockers  
- Blood pressure  
- Lipids

Targets are 90th percentile for HEDIS or for Partners providers
Quality Dashboards ↔ Smart Forms

Smart Forms and Quality Dashboards work together to improve quality.

Smart Forms capture structured information that informs Quality Dashboards.

Quality Dashboards allow clinicians to “drill-down” from a population view to individual patient Smart Forms to address quality deficiencies.

Same data feeds Quality Dashboards and Smart Forms.
# CAD/DM Smart Form Pilot Results

<table>
<thead>
<tr>
<th>Deficiency Addressed When Present at Index Visit</th>
<th>Pre-intervention Visit</th>
<th>Smart Form Visit</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to date blood pressure result (within 12 months) documented in vital signs</td>
<td>43/133 (32.3%)</td>
<td>14/15 (93.3%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Smoking status documented in health maintenance or problem list</td>
<td>21/339 (6.2%)</td>
<td>11/46 (23.9%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Up to date A1c result (within 12 months)</td>
<td>24/226 (10.6%)</td>
<td>5/28 (17.9%)</td>
<td>0.34</td>
</tr>
<tr>
<td>Antiplatelet prescribed or contraindication documented</td>
<td>10/309 (3.2%)</td>
<td>13/42 (31.0%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Beta-blocker prescribed or contraindication documented</td>
<td>1/24 (4.2%)</td>
<td>2/3 (66.7%)</td>
<td>0.03</td>
</tr>
<tr>
<td>Up to date blood pressure result (within 12 months) documented in vital signs</td>
<td>43/133 (32.3%)</td>
<td>14/15 (93.3%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Change in diabetic therapy if A1c &gt; 7.0</td>
<td>44/413 (10.7%)</td>
<td>14/83 (16.9%)</td>
<td>0.11</td>
</tr>
<tr>
<td>% deficiencies addressed</td>
<td>7.9%</td>
<td>13.6%</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

60% of users felt that the Smart Form helped them comply better with guidelines and helped them improve the quality of patient care.
Research Summary to Date

• CAD/Diabetes SF
  - Improves documentation of coded data when used
    - Blood pressure, smoking status
  - Sometimes changes clinical management
  - Is believed to improve care by PCPs
  - Major issue is integration into workflow

• ARI SF
  - Decreased antibiotic use by 5% in RCT
  - Has now been used on over 6000 patients
  - 28 “power users”
Conclusions based upon Research Findings

• When used the SF improves the capture of structured data
• Positive changes in clinician behavior
• May impact on clinical inertia
• Big issue currently is fitting into physicians’ varied workflow requirements
• By incorporating decision support into clinical workflow, SF has the potential to improve care for patients with chronic conditions
Thank you!
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