EMR Customization for Provider Workflow and Quality Improvement Initiatives

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Disclosure Statement

Relevant Financial Relationships

• I have no relevant financial relationships to disclose

Off-Label or Investigative Uses

• No off-label or investigative uses of medications or medical devices will be discussed in this presentation.
Course Objectives

A Case Study of EMR Implementation in a Behavioral Healthcare Organization

• Participants will learn about one community mental health center’s implementation of an electronic medical record (EMR).
• Participants will gain insight into the process and resources needed to adapt an EMR to clinical workflow and quality improvement interests.
Mental Health Center of Denver

• Private not-for-profit founded in 1989
• Serving 15,400 adults, children, and families
• Offer services in over 35 locations in Denver
• Community-based collaborative services
• Culturally respectful services

“Enriching Lives and Minds by Focusing on Strengths and Recovery”
Mental Health Center of Denver

We believe people can, and do, recover from mental illness.
Timeline

March 2003
EMR Implementation

December 2007
In-House EMR Development

April 2008
Medical Providers Dashboard

Winter 2009
Integration of Scheduling System and EMR

September 2010
Revision of Dashboard
MHCD’s Initial EMR Implementation

**Electronic Medical Record**
- Netsmart Technologies’ CMHC/MIS.
- Web-based system running on AIX platform.
- Highly customizable front-end electronic medical record (EMR) built on top of an established behavioral healthcare billing system.

**Implementation**
- Joint project between MHCD’s Information Technology and Quality Systems Departments.
- Both departments fed requirements to contract programmer.
- Initial rollout included documentation, billing, scheduling, and staff task list.
- Features released separately, not integrated.
- EMR is predominantly a data-input system.
Out-of-the-Box System Design

- Each provider type (adult outpatient, intensive case management, residential, medical, etc.) has its own set of menus.
- Process menus are organized by set of functions.
- No data are pushed out to providers.

Initial EMR set-up organized for data-input.
A Desire for an Improved Process

Issues

• Documentation time increased with use of computers.
• System navigation designed around function, not workflow.
• Increasing number of documents and multiple systems made look-up more difficult.
• With little in-house project management, the contract programming requirements were poorly thought out and rarely incorporated system-level design considerations.

Response

• New position: Quality Systems Analysis Manager.
  • Project manager with in-house development capabilities.
  • More in-house developers added over time.
• New applications:
  • EMR Viewer (integrating scanned documents with EMR)
  • Medical Providers Dashboard (single screen interface instead of menus)
Custom EMR Viewer

- System complexity is hidden from end-user.
- Lookup similar to paper chart organization.
- Easier to find documentation.

Organized in sections like paper chart

Empty categories are disabled to make finding documents easier
Medical Providers Dashboard

- Initial evaluation
- Office visits
- Chart review

Single point of entry

- Data “pushed” to providers
- Diagnosis
- Allergies
- Medications
- Last visit

Important data

Fund Source
- Goebel With Abc (4)
- Medicare B (301)
- Confirmed

Diagnosis
- Axis I Primary: 296.90, Mood Disorder NOS
- Axis II Secondary: 799.9, Diagnosis or Condition Deferred
- Axis II Primary: V62.89, Borderline Intellectual
- Axis IV: Economic problems, Legal system problems, Other psychosocial problems
- Axis V: GAF = 33, Impaired reality testing

Primary Care Provider
- Dr. J, Test PCP Clinic, (303) 888-8888

Allergies
- Hard work, Health food, Vegetables, Corn, Penicillin, Iodine, Fish, Eggs, Dairy Products, Dust, Thorazine, Shellfish, Iodine, Penicillin, Pollen, Peanuts, Latex

Phys Health Monitoring
- Most recent vitals: 03/19/2009, BMI: 27.32, BP: 120/80
- No Active Medications Found
Continuous Process Improvement

<table>
<thead>
<tr>
<th>Issue</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Too Much Data to Fit on Single Screen</td>
<td>Consumer-Related Tasks Overlooked</td>
</tr>
</tbody>
</table>

Response

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Redesigned Tabbed Interface Puts Most Important Data at Front</td>
<td>Staff Task List Parsed for Items Related to Current Consumer</td>
</tr>
</tbody>
</table>
Dashboard Revised

New Features

- Consumer-related tasks to accomplish at next visit.
- PCP information to promote integrated & coordinated care.
- Additional data (organized by tabs) pushed out to provider.
Treatment Outcomes

• Assessed every three months
• Consumer and provider views
• Creates dialog between clinician and consumer

Select which Recovery Instruments to display
- Consumer Recovery Measure (CRM)
- Recovery Markers Inventory (RMI)

CRM Details | RMI Details | Services & RNL

MHCD
Mental Health Center of Denver
Enriching Lives and Minds
Diagnosis

Considerations

- Stable Mental Health Diagnosis
- Session-based PCP Diagnosis
- State wanted more GAF variance
### Lab Results, Vitals, and Medications

#### Labs

<table>
<thead>
<tr>
<th>Lab</th>
<th>Result</th>
<th>Normals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilirubin, Total</td>
<td>0.6 mg/dL</td>
<td>0.1-1.2</td>
</tr>
<tr>
<td>Creatinine, Serum</td>
<td>0.89 mg/dL</td>
<td>0.76-1.27</td>
</tr>
<tr>
<td>TSH</td>
<td>1.206 uIU/mL</td>
<td>0.450-4.500</td>
</tr>
<tr>
<td>A/G Ratio</td>
<td>1.8</td>
<td>1.1-2.5</td>
</tr>
<tr>
<td>BUN/Creatinine Ratio</td>
<td>10</td>
<td>8-27</td>
</tr>
<tr>
<td>LDL Cholesterol Calc</td>
<td>103 mg/dL</td>
<td>0-99</td>
</tr>
<tr>
<td>Chloride, Serum</td>
<td>105 mmol/L</td>
<td>97-108</td>
</tr>
<tr>
<td>ALT (SGPT)</td>
<td>13 IU/L</td>
<td>0-55</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>131 mg/dL</td>
<td>0-149</td>
</tr>
<tr>
<td>Sodium, Serum</td>
<td>142 mmol/L</td>
<td>135-145</td>
</tr>
<tr>
<td>AST (SGOT)</td>
<td>16 IU/L</td>
<td>0-40</td>
</tr>
</tbody>
</table>

#### Allergies

- **Allergy:** No Known Allergies
- **Reaction:**

#### Vitals

- **Metabolic Syndrome**

#### Medications

- **Active medications:**
  - Ativan, Dose: 1 mg, TAB, PO (1)ea TID - 1 mg, TAB, PO (1)ea PRN-QD
  - Trazodone, Dose: 50 mg, TAB, PO (1)ea QN
  - Multiple Vitamins, TAB, PO (1)ea QAM

#### Old version

- Notification when new lab results available.
- Information displayed on document level.

#### New version

- Data pushed to dashboard.
- Graphs showing longitudinal trends available.
Metabolic Syndrome Tracking

Four Graphs
- Vitals and BMI
- Lipid Panel
- Serum Glucose
- Prolactin

Live Data
- Vitals at nursing check-in
- Lab data from HL7 import

Select which Vitals elements to display
- Systolic Blood Pressure (mmHg)
- Diastolic Blood Pressure (mmHg)
- Body Mass Index
Scheduling Integration

- Better supports provider workflow.
- Reduces data entry errors.
Conclusions

Significant Change

• EMR adoption involves significant process change.
• Not all efficiencies are immediately realized.

Resources Required

• Vendor-supplied solutions unlikely to match a given workflow.
• In-house development capabilities can make customizations fit better.

Continuous Improvement

• An iterative process takes advantage of lessons learned.
• EMR can be leveraged to support other change initiatives.
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