CDSC Services
Integration at UMDNJ in
the GE Centricity EMR

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AHRQ Technical Expert Panel
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Robert Wood Johnson Medical Group (RWJMG)

- Faculty practice of the UMDNJ Robert Wood Johnson Medical School
- Located in Central New Jersey
- 500 physicians; 300 ambulatory providers
- 16 clinical departments
- 42 distinct specialty practices
- 8 clinical institutes
- 20 affiliated hospitals
- 243,300 annual ambulatory visits in 2010
History of RWJMG
GE Centricity Implementation

- 1995 – Clinicalogic installed at NJMS – Newark, Department of Medicine
- 2000 – Logician implementation extended to all of UMDNJ (3 medical schools)
  - Implementation at RWJMG incomplete (5 practices)
- 2007 – RWJMG contracted independently with GE for hosted Centricity EMR
  - Rollout of EMR extended to entire RWJMG group (42 practices)
  - All practices implemented by 12/31/2010
- 2011 – successful achievement and attestation for ARRA Meaningful Use EHR incentive program
UMDNJ’s involvement with CDSC

- July, 2008 – invited to participate in CDSC in 3 areas:
  - Demonstration site for CDSC using the GE Centricity EMR.
  - Participation in the KTS (Knowledge Translation and Specification Team)
  - Participation in Content Governance Committee
- July, 2011 - CDSC vendor site collaboration begun as activity of Optional Year 2 of CDSC
Initial Expectations

- This would serve as an impetus to general adoption of clinical decision support throughout the RWJMG practice
- Formal knowledge life-cycle management
- CDSC would prompt the vendor to adopt a standardized approach to clinical decision support
- CDSC would prompt the vendor to build services integration into the Centricity EMR.
Challenges

- Social
- Technical
- Resource/Financial
- Legal
Challenges: Social

- Relatively new EMR implementation
- CDS not part of culture or expectation at UMDNJ
- History of practices operating independently – even within the EMR
- Varying expectations and receptivity to CDS
- Competing priorities – Meaningful Use
- Vendor vision
Challenges: Technical

- GE Centricity EMR is an old platform – CDS hasn’t changed much over the past decade
- Centricity relies on 3rd party add-ins for CDS
- Database does not use standard data vocabulary for many observations
- No built-in mechanism for transmitting data to an external service
- CDS is ad hoc without a standard structure for decision rules.
- CDS is not modular – decision logic is scattered throughout various components of the application.
Clinical Decision Support in the GE Centricity EMR

- Protocol reminders
  - Very general
  - Not actionable
- Rules attached to structured assessments
  - Uses third-party product
    - limits flexibility
    - idiosyncratic implementation
  - Recommendations are actionable
  - Must be maintained manually
- Custom forms
  - Most flexible
  - Non-modular - most difficult to maintain
  - Can be actionable
Example of protocols

Assessment/Plan: Walter S. Caldwell

Assessment
Status of Existing Problems
New Problems

Preventive Care Reminders
HEMOCULT or SIGMOID, FLU VAX, PNEUMOVAX, TD BOOSTER.

Plan
New Prescriptions/Refills
Updated Medication List

MEVACOR TAB 40MG (LOVASTATIN) 1 po qd
ATENOLOL TABS 25 MG (ATENOLOL) 1 po qd
PLAVIK 75 MG TABS (CLOPIDOGREL BISULFATE) 1 po qd

New Orders

Preventive Care Reminders
HEMOCULT or SIGMOID, FLU VAX, PNEUMOVAX, TD BOOSTER.
Example of CCC decision rule

ccc_Adlult_PSIA_Tx_def_Exec("Diabetes Mellitus^ICD-250^not^1,8^ACEcontra^The patient has diabetes and is currently not on an ACE-I or ARB. If the patient has coexisting hypertension or renal disease, consider starting an ACE-I or ARB as long as there are no contraindications. Click 'Yes' to add a medication; otherwise, click 'No'.^CCC-ACE-I^Would you like to document a contraindication to ACE-I/ARB ?^EF")"
CDS approach to Meaningful Use

**Registration & Clinical Staff**
- Language, race, ethnicity
- Active Medication List
- Active Allergy List
- Vital Signs
- Smoking history
- Immunization history

**Providers**
- Problem List
- Medication Reconciliation
- Documenting counseling
  - Smoking
  - Weight and nutrition.
- E-prescribing
- Computer order entry
- Completing patient instructions

Automatic or handled by EMR staff
- Provide patients with electronic copy of health information
- Provide electronic summary of care record
- Drug-formulary checks
- Drug-drug and drug-allergy interactions
- Decision support rule
- Exchange data with other providers
- HIPAA protection of health information
- Lab results in EMR as structured data
- Generate lists of patients for QI or research
Example of custom form

Medication-Allergy Review
Medications following this update:
MEVACOR TAB 40MG (LOVASTATIN) 1 po qd
NITROSTAT SUB 0.4MG (NITROGLYCERIN) 1 sl.prn c/p, max of 3 in 15 min

Removed Medications:

Update Medications

Medications reviewed by staff
Medications Reviewed by Provider
Include prior Medications in note

Current Medication Allergies:
PERCOCET (Critical)

Update Med Allergies

Med allergies reviewed by staff
Med allergies reviewed by provider

Return to MU Checklist

Form Rebuilt by Robert Wood Johnson Medical Group Clinical Content Team
**Vital Signs:**

- **Height:** 68 inches (04/05/2001)
- **Weight:** 240 lb (04/05/2001)
- **BMI:** 27.5 (10/19/2011)
- **Waist:** inches
- **Temp:** 98.6 (10/10/2001)
- **Respirations:** per min.
- **O2 Sat:**%
- **Pulse:** per min.
- **Pulse (Ortho):** per min.
- **Rhythm:**

**Previous Values**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Previous Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>74 cm</td>
</tr>
<tr>
<td>Weight</td>
<td>275 kg</td>
</tr>
<tr>
<td>Waist</td>
<td></td>
</tr>
<tr>
<td>Temp</td>
<td>98.6</td>
</tr>
</tbody>
</table>

**Additional Notes:**

- **Optimal body weight range:** 144 to 197 lb
- **Optimal BMI range:** 22 to 26 kg/m² based on age >65 yr.
- **Previous smoking status:** current
- **Tobacco use:** current every day smoker
- **Consulted to quit smoking:** yes
- **Patient was asked about pneumococcal vaccination:**
  - Date last recorded: 03/02/2010
- **Patient was asked about seasonal influenza vaccine:**
  - Date last recorded: 03/02/2010

**Comments:**

- **Body Mass Index (kg/m²):** 37
- **Body Surface Area (m²):** 2.21
- **Add BSA to chart:** Yes

**Load Serial Assessments Form:**

**Update Media Allergies**

**Update Directives**

**Update Prob List**

**Return to MU Checklist**

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close</td>
<td></td>
</tr>
</tbody>
</table>
The patient was given a follow-up plan for weight reduction.
Weight and Nutrition:

You are overweight based on your weight of 240 lb and your body mass index (BMI) of 37 kg/m². Your optimal BMI range is 22 to 29 kg/m² based on age ≥65 yr. Your optimal weight range is 144 to 197 lb. There are several resources available to help you lose weight. These include:

1) Weight Watchers: You can get more information at their web site: [www.weightwatchers.com](http://www.weightwatchers.com).

# Meaningful Use Checklist

## Provider Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Status</th>
<th>Details</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Problem List</td>
<td>Problem list has at least 1 entry.</td>
<td></td>
<td>Update Prob List</td>
</tr>
<tr>
<td>CPOE</td>
<td>No Rx written this update.</td>
<td></td>
<td>(Advisory Only)</td>
</tr>
<tr>
<td>E-prescribing</td>
<td>No Rx written this update.</td>
<td></td>
<td>(Advisory Only)</td>
</tr>
<tr>
<td>Med list reviewed by provider</td>
<td>Not reviewed this update.</td>
<td></td>
<td>Med-Allergy Review Form</td>
</tr>
<tr>
<td>Allergies reviewed by provider</td>
<td>Not reviewed this update.</td>
<td></td>
<td>Med-Allergy Review Form</td>
</tr>
<tr>
<td>Weight Advice</td>
<td>Patient overweight; wt. advice not given.</td>
<td></td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Smoking Advice</td>
<td>Smoker, not advised to quit.</td>
<td></td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Patient Instructions Printed</td>
<td>Patient instructions were printed.</td>
<td></td>
<td>Patient Instructions Form</td>
</tr>
</tbody>
</table>

## Clinical Staff Items

<table>
<thead>
<tr>
<th>Item</th>
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<tr>
<td>Active Medication List</td>
<td>Med list has at least 1 item.</td>
<td></td>
<td>Update Med List</td>
</tr>
<tr>
<td>Active Allergy List</td>
<td>Allergy list has at least 1 item.</td>
<td></td>
<td>Update Allergy List</td>
</tr>
<tr>
<td>Height</td>
<td>74 in</td>
<td>Height recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Weight</td>
<td>265 lb</td>
<td>Weight recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>BMI</td>
<td>34.15 kg/m²</td>
<td>BMI requires height and weight.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>mm Hg</td>
<td>Systolic BP not recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>mm Hg</td>
<td>Diastolic BP not recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Smoking status</td>
<td>Recorded: current</td>
<td></td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Pneumovax History</td>
<td>Pneumovax documented.</td>
<td></td>
<td>Adult Immunizations</td>
</tr>
<tr>
<td>Influenza Vaccine History</td>
<td>Flu vaccine documented.</td>
<td></td>
<td>Adult Immunizations</td>
</tr>
</tbody>
</table>

### Additional Actions
- Prev Form (Ctrl+PgUp)
- Next Form (Ctrl+PgDn)
- Close
### Meaningful Use Checklist

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<td>E-prescribing</td>
<td>No Rx written this update.</td>
<td>(Advisory Only)</td>
</tr>
<tr>
<td>Allergies reviewed by provider</td>
<td>Allergies reviewed this update.</td>
<td>Med-Allergy Review Form</td>
</tr>
<tr>
<td>Nutritional Advice</td>
<td>Patient underweight; nutrition advice given.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Smoking Advice</td>
<td>Smoker, advised to quit.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Patient Instructions Printed</td>
<td>Patient instructions were printed.</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Active Medication List</td>
<td>'No Known Meds' documented.</td>
<td>Update Med List</td>
</tr>
<tr>
<td>Active Allergy List</td>
<td>'NKA' documented this update.</td>
<td>Update Allergy List</td>
</tr>
<tr>
<td>Height: 65 in</td>
<td>Height recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Weight: 80 lb</td>
<td>Weight recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>BMI: 13.36 kg/m²</td>
<td>BMI requires height and weight.</td>
<td>(Automatically calculated)</td>
</tr>
<tr>
<td>Systolic BP: 110 mm Hg</td>
<td>Systolic BP recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Diastolic BP: 70 mm Hg</td>
<td>Diastolic BP recorded.</td>
<td>Vital Signs Form</td>
</tr>
<tr>
<td>Smoking status</td>
<td>Recorded: current</td>
<td>Vital Signs Form</td>
</tr>
</tbody>
</table>

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For more information, refer to the help documentation.
Technical approach

- Generation of CCD containing correct vocabulary encoding
- Use of 3rd party product – Qvera Interface Engine (QIE) to add correct encoding of terms and transmission to ECRS via web service.
- Use of QIE to receive advice from ECRS
- Encounter form to display advice and provide action mechanism.
Challenges: Resource/Financial

- Initially, vendor was not engaged – services integration delayed for 2 years
- Vendor (GE) is fully occupied with Meaningful Use
- Customer (UMDNJ) is fully occupied with Meaningful Use
- Unacceptable for research to delay production activities for business operations
Challenges: Legal

- UMDNJ Legal department understaffed – legal review takes a long time.
- UMDNJ has blanket objection to indemnity waivers.
Lessons Learned

- Early engagement between CDSC and vendor
- Identify a vendor champion who will own the project
- Close coordination with customer implementation team to plan implementation and avoid surprises
- Frequent meetings between vendor and customer team to move implementation forward
- Persuade vendors to
  - Adopt standardized vocabulary
  - Build in mechanisms to communicate with external decision support services
Follow-up on Initial Expectations

- Overestimated vendor enthusiasm for the project and commitment of resources
- Vendor embracing this new paradigm for decision support has not (yet) occurred.
- Project as stimulus for more formal and rigorous approach to decision support in my practice has been realized.