

# CDSC Services Integration at UMDNJ in the GE Centricity EMR

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AHRQ Technical Expert Panel  
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GE Healthcare



THE ROBERT WOOD JOHNSON  
MEDICAL GROUP

Robert Wood Johnson Medical School





# 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 3<sup>rd</sup> 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** Assess or Update Problems

Status of Existing Problems New Problems  additional workup planned

▲▼

▲▼

**Preventive Care Reminders**  include preventive care reminders in note

HEMOCCULT or SIGMOID, FLU VAX, PNEUMOVAX, TD BOOSTER. ▲▼

**Plan** Enter Medications Enter Orders

**New Prescriptions/Refills** Updated Medication List

▲▼

MEVACOR TAB 40MG (LOVASTATIN) 1 po qd  
ATENOLOL TABS 25 MG (ATENOLOL) 1 po qd  
PLAVIX 75 MG TABS (CLOPIDOGREL BISULFATE) 1 po QD  
▲▼

**New Orders** ▲▼

▲▼

Disp

Prev Form (Ctrl)

**Preventive Care Reminders**  include preventive care reminders in note

HEMOCCULT or SIGMOID, FLU VAX, PNEUMOVAX, TD BOOSTER. ▲▼



# Example of CCC decision rule

CPOE A&P-CCC: Sarah S. Oberheim

A&P 1-2   A&P 3-4   A&P 5-6   A&P 7-8   A&P 9-10   A&P 11-12

Select Specialty

Assessment # 1   Select problem; enter assessment, orders, and meds; then click 'Commit Assessment'  

**Centricity**

 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'.

Assessment # 2  

```
ccc_Adult_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

Med-Allergy Review: Walter S. Caldwell

Medications    Current Medications

### 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

[Prev Form \(Ctrl+PgUp\)](#)    [Next Form \(Ctrl+PgDn\)](#)    [Close](#)



**Vital Signs-2-CCC: Walter S. Caldwell**

Vital Signs | Pain/Fatigue | Vision/Hearing | Resp/Card | Menstrual Hx | POC Labs

**Vital Signs:** Chief Complaint (Reason for Visit):

VS View  Standard  Metric  VS Entered By =>

Standard	Previous Values	Metric	Previous Values
Height: <input type="text" value="68"/> inches	<input type="text" value="74"/> (04/05/2001)	Height: <input type="text"/> cm	<input type="text"/>
Weight: <input type="text" value="240"/> lb <input type="text"/> oz <input type="text" value="240"/> lb	<input type="text" value="275"/> (10/19/2011)	Weight: <input type="text"/> kg	<input type="text"/>
Pt. refused wt: <input type="checkbox"/> BMI not applicable: <input type="checkbox"/>			
Waist: <input type="text"/> inches	<input type="text"/>	Waist: <input type="text"/> cm	<input type="text"/>
Temp: <input type="text"/> deg. F.	<input type="text" value="98.6"/> (10/10/2001)	Temp: <input type="text"/> deg. C.	<input type="text"/>
Temp Site: <input type="text"/>	<input type="text" value="oral"/> (04/05/2001)		

Resp:  per min.  (10/10/2001) BP sitting:  /  Site:   (10/19/2011)

O2 Sat:  %  (10/15/2001) BP supine:  /  Site:

Pulse:  per min.  (10/19/2011) BP stand:  /  Site:

Pulse (Ortho)  per min.

Rhythm:

Ht conversion table | Cal %

Body Mass Index (kg/m2):  Body Surface Area (m2):   Add BSA to chart

The patient was given a follow-up plan for weight reduction.

Optimal body weight range: 144 to 197 lb. Optimal BMI range: 22 to 29 kg/m2 based on age >65 yr.

Previous smoking status: current (on 10/19/2011)

Tobacco use:

Year started:

cigarettes Amt:  packs/day

cigars Amt:  # per week

smokeless/chewing Amt:  per day

Counseled to quit/cut down:  yes  no

Comments:

This patient is over age 50. Please document most recent influenza vaccine.

Patient asked about previous influenza vaccine:

Date last recorded:

This patient is over age 65. Please document most recent pneumovax.

Patient was asked about pneumococcal vaccination:

Date last recorded:

HPI | ACV | PMH | FH-SH | Risk Factors | ROS | VS | PE | Problems | CPOE A/P | Instructions/Plan

Prev Form (Ctrl+PgUp) | Next Form (Ctrl+PgDn)



Height: 68 inches 74 (04/05/2001)

Weight: 240 lb 240 lb 275 (10/19/2011)

Pt. refused wt:  BMI not applicable:

Waist:  inches

Temp:  deg. F. 98.6 (10/10/2001)

Temp Site:  oral (04/05/2001)

Resp:  per min. 14 (10/10/2001) BP sitting:

O2 Sat:  % 95 (10/15/2001) BP supine:

Pulse:  per min. 78 (10/19/2011) BP stand:

Pulse (Ortho)  per min.

Rhythm:

Ht conversion table

Body Mass Index (kg/m2): 37

The patient was given a follow-up plan for weight reduction.

Optimal body weight range: 144 to 197 lb.

```
OBSNOW("BMI CLASSIF")<>"T" AND (((OBSNOW("BMI")>=30) and (patient._ageinmonths
>= 780)) or ((OBSNOW("BMI")>=25) and ((patient._ageinmonths < 780) and
(patient._ageinmonths > 216))))
```



Print Preview

100 Two Page Pg: 1

**Weight and Nutrition:**  
You are overweight based on your weight of 240 lb and your body mass index (BMI) of 37 kg/m<sup>2</sup>. Your optimal BMI range is 22 to 29 kg/m<sup>2</sup> 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).
- 2) Aim for a Healthy Weight page at the National Heart, Lung and Blood Institute: [http://www.nhlbi.nih.gov/health/public/heart/obesity/lose\\_wt/index.htm](http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/index.htm)

## Meaningful Use Checklist

### Provider Items

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

### Clinical Staff Items

Active Medication List	Med list has at least 1 item	Update Med List
Active Allergy List	Allergy list has at least 1 item.	Update Allergy List
Height: 74 in	Height recorded.	Vital Signs Form
Weight: 265 lb	Weight recorded.	Vital Signs Form
BMI: 34.15 kg/m2	BMI requires height and weight.	(Automatically calculated)
Systolic BP	Systolic BP not recorded.	Vital Signs Form
Diastolic BP	Diastolic BP not recorded.	Vital Signs Form
Smoking status	Recorded: current	Vital Signs Form
Pneumovax History	Pneumovax documented.	Adult Immunizations
Influenza Vaccine History	Flu vaccine documented.	Adult Immunizations

Prev Form (Ctrl+PgUp)

Next Form (Ctrl+PgDn)

Close

## Meaningful Use Checklist

### Provider Items

Active Problem List	Problem list has at least 1 entry.	Update Prob List
CPOE	No Rx written this update.	(Advisory Only)
E-prescribing	No Rx written this update.	(Advisory Only)
Allergies reviewed by provider	Allergies reviewed this update.	Med-Allergy Review Form
Nutritional Advice	Patient underweight; nutrition advice given.	Vital Signs Form
Smoking Advice	Smoker, advised to quit.	Vital Signs Form
Patient Instructions Printed	Patient instructions were printed.	Patient Instructions Form

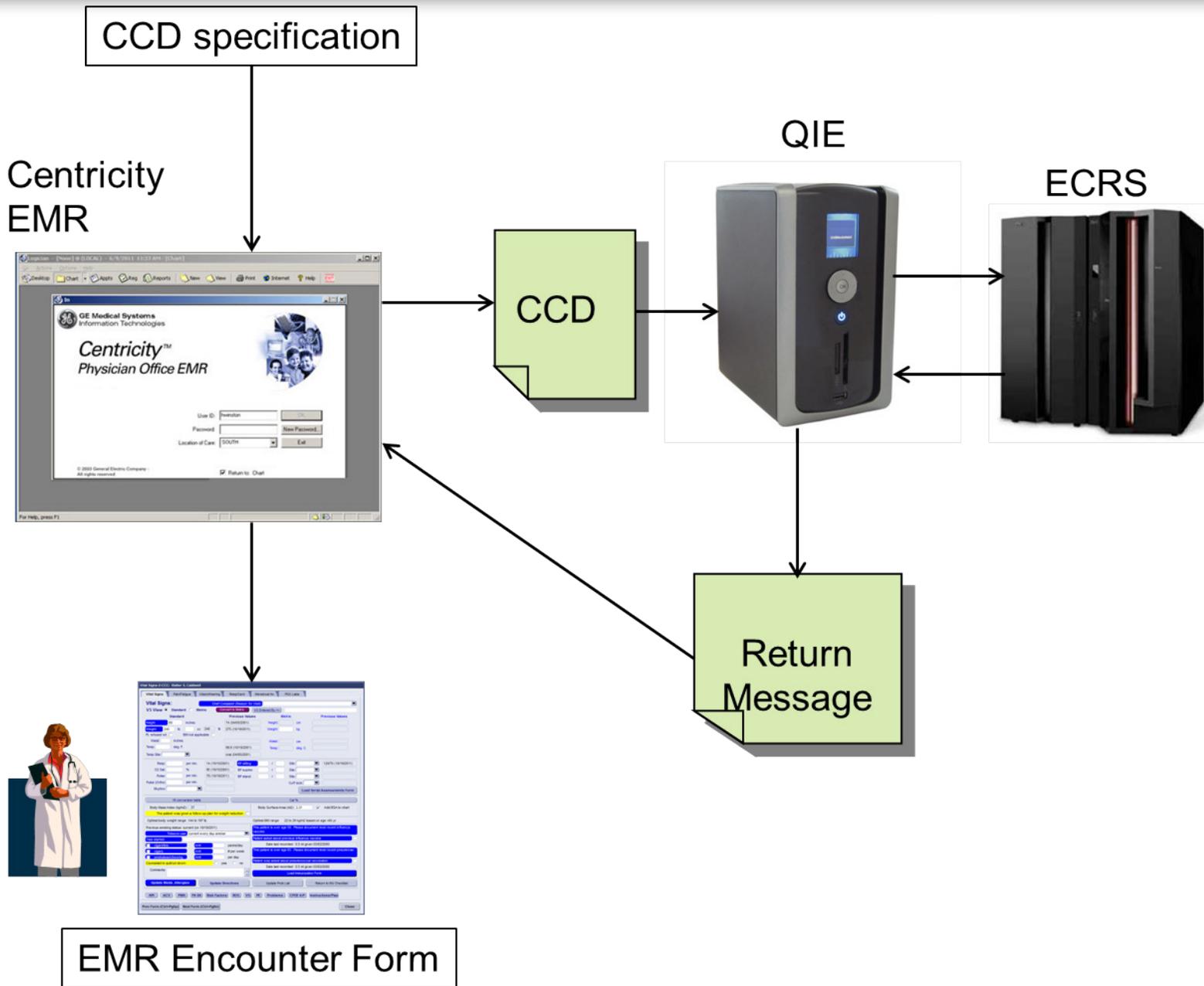
### Clinical Staff Items

Active Medication List	'No Known Meds' documented.	Update Med List
Active Allergy List	'NKA' documented this update.	Update Allergy List
Height: 65 in	Height recorded.	Vital Signs Form
Weight: 80 lb	Weight recorded.	Vital Signs Form
BMI: 13.36 kg/m2	BMI requires height and weight.	(Automatically calculated)
Systolic BP 110 mm Hg	Systolic BP recorded.	Vital Signs Form
Diastolic BP 70 mm Hg	Diastolic BP recorded.	Vital Signs Form
Smoking status	Recorded: current	Vital Signs Form



# Technical approach

- Generation of CCD containing correct vocabulary encoding
- Use of 3<sup>rd</sup> 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.