

The Human Factor of Clinical Decision Support

Implementing Behavior Change as we
Implement the Tools

What is CDS (Clinical Decision Support)

"Clinical decision support (CDS) provides clinicians, staff, patients or other individuals with knowledge and person-specific information, intelligently filtered or presented at appropriate times, to enhance health and health care." AMIA, A Roadmap for National Action on Clinical Decision Support, June 13, 2006.

The Value of CDS

- ❑ EMRs, P4P, Healthcare IT, every stakeholder in the healthcare industry is going to be affected by this technology.
 - ❑ Clinical decision Support (CDS) tools are the critical piece required to generate the required return on investment.
 - ❑ Without CDS EMR systems are not much more than fancy PDAs. Recent studies have shown that up to 80% of the potential benefit of deploying an EMR system will come from CDS capabilities. CDS capabilities, even in the absence of EMRs have been shown to **reduce hospitalizations by 20%**.
-

Goal and Aims of CDS

- To bring relevant knowledge to bear on the health care and well being of a patient or a population of patients.
- 1. To make data about the patient easier to access or more apparent to a provider.
- 2. To foster optimal problem solving, decision making and action by a provider

"Clinical Decision Support-The Road Ahead"

edited by Robert Greenes

Types of CDSS

- Pop up's in the EMR-
 - Example out of range vital signs
 - Templates
 - Structured data collection
 - Order sets
 - Recommend treatment of specific conditions
 - Alerts
 - Based on preventive guidelines and medical history
-

Red Font Identifies Elevated Blood Pressure

The image shows a software dialog box titled "vitals" with a blue header bar and a close button (X) in the top right corner. The dialog is used for entering vital signs. On the left, there is a label "BP(mm Hg)" above an empty text input field. Below the input field is a numeric keypad with buttons for digits 1-5, 6-0, a decimal point, a "C" key, a "/" key, and a "Bkspc" key. To the right of the input field is a right-pointing arrow button. Further right are "Delete" and "Default" buttons. A large white display area on the right shows the blood pressure reading "186/83" in red font. At the bottom of the dialog are four buttons: "< Prev", "Next >", "Apply", and "Cancel".

vitals [X]

BP(mm Hg)

[Input Field]

[Numeric Keypad: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, ., C, /, Bkspc]

[>]

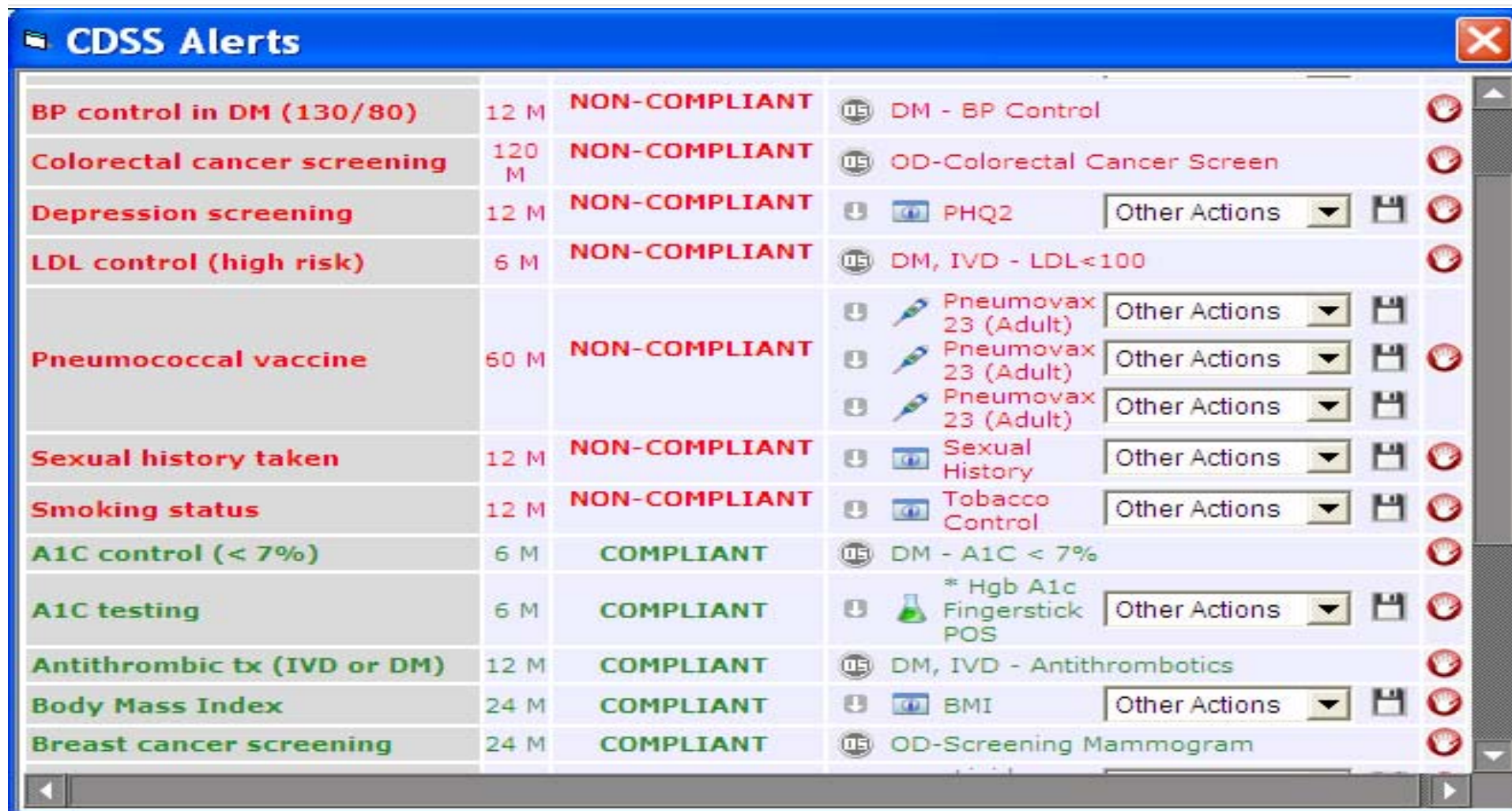
[Delete] [Default]

186/83

[< Prev] [Next >] [Apply] [Cancel]

Alerts

Based on preventive guidelines and medical history



Alert Name	Frequency	Compliance Status	Details
BP control in DM (130/80)	12 M	NON-COMPLIANT	DM - BP Control
Colorectal cancer screening	120 M	NON-COMPLIANT	OD-Colorectal Cancer Screen
Depression screening	12 M	NON-COMPLIANT	PHQ2
LDL control (high risk)	6 M	NON-COMPLIANT	DM, IVD - LDL<100
Pneumococcal vaccine	60 M	NON-COMPLIANT	Pneumovax 23 (Adult)
Sexual history taken	12 M	NON-COMPLIANT	Sexual History
Smoking status	12 M	NON-COMPLIANT	Tobacco Control
A1C control (< 7%)	6 M	COMPLIANT	DM - A1C < 7%
A1C testing	6 M	COMPLIANT	* Hgb A1c Fingerstick POS
Antithrombic tx (IVD or DM)	12 M	COMPLIANT	DM, IVD - Antithrombotics
Body Mass Index	24 M	COMPLIANT	BMI
Breast cancer screening	24 M	COMPLIANT	OD-Screening Mammogram

Templates

Structured data collection

The screenshot displays a medical software interface for a patient named T, TEMPLATES, 39 Y, M. The patient's address is 114 turnpike road, Westborough, MA, with phone number 508-836-2700 and DOB 01/01/1970. The interface includes a navigation bar with options like Medical Summary, CDSS, Labs, and Encounters. A 'Self management Goal' dialog box is open, showing a date field and a list of goal categories: Dietary Modifications, Exercise, Stress Reduction, Weight Loss, Stress reduction, and Medication Compliance. The bottom of the screen features a toolbar with buttons for Print, Fax, Record, Lock, Details, Scan, Templates, Claim, Letters, and Ink.

T, TEMPLATES , 39 Y, M Sel Info Hub

114 turnpike road
Westborough, MA
H:508-836-2700
DOB:01/01/1970

Allergies
Billing Alert

Wt: 47.0 lbs lbs.
Appt(L): 05/16/01
Language:
Translator: No

Ins: Self Pay
Acc Bal: \$0.00
Guar: TEMPLATES
Gr Bal: \$0.00

CLICK TO EDIT

SECURE NOTES

ADV DIRECT

Medical Summary | CDSS | Labs | DI | Procedures | Growth Chart | Immunization | Encounters | Patient Docs | Flowsheets | Notes

SF [dropdown] Rel [dropdown] Bulleted [dropdown] Encounters << 01/01/2001 DW -Diabetes [dropdown]

Subjective:
Chief Complaint(s):
• -Diabetes and Hypertension follow-up
HPI:
Diabetes/CVH
Control Current . Smoking Status -. Retinal Eye Exam Date of Exam . Home Glucose Monitoring -. Medication Compliance -. Diet Counseling -. Exercise -. Self management Goal date .
Current Medication:
Medical History:
Allergies/Intolerance:
ROS:

Objective:
Vitals:
Past Results:
Examination:
General Examination
Foot Exam Date -.

Assessment:

Self management Goal

date [dropdown]

New SM Goal set

Dietary Modifications

Exercise

Stress Reduction

Weight Loss

Stress reduction

Medication Compliance

Prev Ok Cancel

Print Fax Record Lock Details Scan Templates Claim Letters Ink

Test dorsum
back view
whole body
Eyes
face front view

Order Sets

Order Sets _ □ ✕

ORDER SET: OD-Gyn/Annual New Update Delete **MEASURE:** 720-CE **QUICK ORDER SET:** NO

DIAGNOSES (TRIGGER): ★ PRACTICE ADMINISTRATOR

DIAGNOSES (LINKED):

Rx Browse

Name	Strength	Take	Frequency	Duration	Refills	Route	Formulation	Dispense	Delete

Labs Browse **Diagnostic Imaging** Browse **Procedures** Browse

Description	Delete	Description	Delete	Description	Delete
• -Pap smear, conventional slide	✕	• Mammogram Screening	✕	• MAMMOGRAM, SCREENING	✕
• -Chlamydia/GC, DNA Probe	✕			• Clinical Breast Exam	✕
• -Chlamydia/GC Amplification urine	✕				
• -Pap, ThinPrep, with reflex HPV (only if abnormal)	✕				

Immunizations Browse **Smart Forms** Add

Name	Dose	Delete	Name	Delete
• FLU VACCINE (Adult)	0.5 ml	✕	• Audit-C	✕
• Pneumovax 23 (Adult)	0.5 ml	✕	• BMI	✕
			• PHQ2	✕
			• Sexual History	✕
			• Tobacco Control	✕

Appointments Add Follow-Up **Referrals** Add

Provider Buy in

- Good ideas are not adopted automatically. They must be driven into practice with courageous patience.

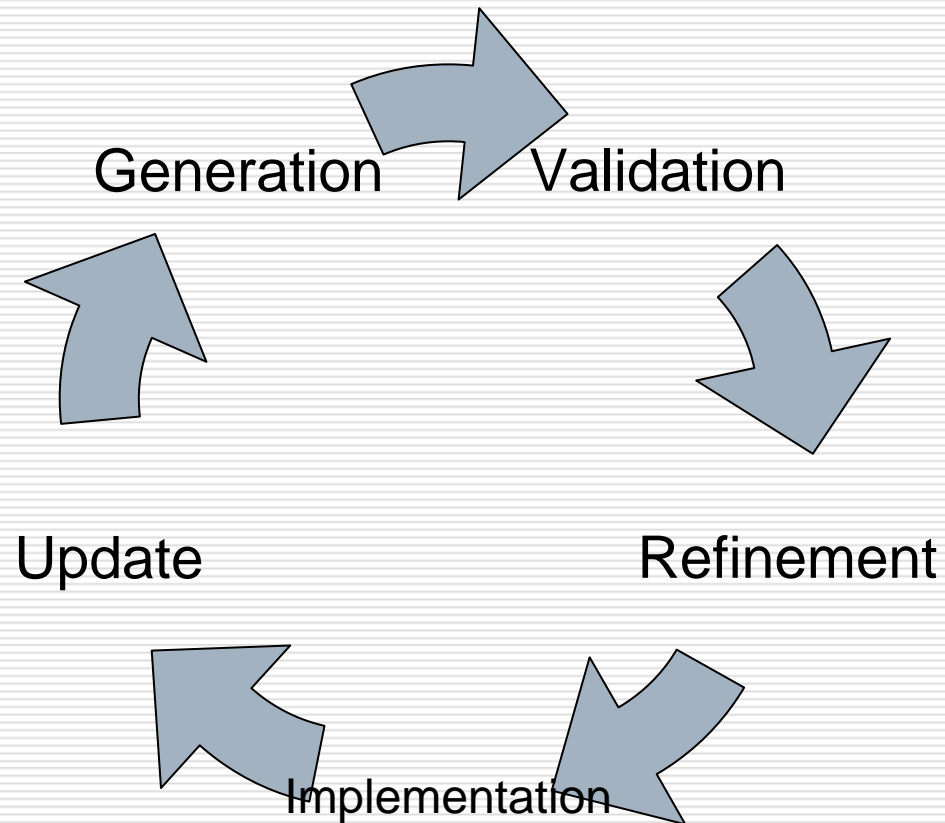
- Hyman Rickover

US (Polish-born) admiral (1900 - 1986)

Why is there resistance

- I don't think I need it
 - Who's standards are these any way?
 - Who's job is self management?
 - It will slow me down.
 - You keep changing things.
-

Life Cycle of CDSS



Tips for Provider buy in

- ❑ Choose CDSS that is relevant to your practice. Diabetes, Hypertension, cancer screening, immunizations.
 - ❑ Do not structure every thing and when you do ask providers what language they want to use and incorporate that for ownership.
 - ❑ Beware of POP up fatigue.
-

Successful implementation strategies

- ❑ Have a sub group of respected providers that develop the standards and CDSS.
 - ❑ Teach every one their role from MD to MA and everyone in between.
 - ❑ Give very specific instructions on use.
 - ❑ Give feed back on use regularly.
 - ❑ Give feed back on outcomes regularly.
-

The Importance of Provider Panel Integrity

Quality Measure Reports

Run Date 06/11/2009 ...

Measure Dictionary Quality Measures

Measure Name (101-OI)Patients see assigned

Reporting Interval Annually

Reporting End Date 06/11/2009 ...

Reporting Begin Date 06/11/2008 ...

Exclusions

Submit Clear

Cross Tabs Facility PCP PCG Insurance Race/Ethnicity Refine

Numerator:
Number of patients in denominator who have seen their assigned PCG at least once in the last 12 months up to and including the last day of the reporting period

Denominator:
Number of unique patients who were seen in the reporting period, who are not being seen for the first time in the health center

PCG	Numerator	Denominator	Percentage
Pozzuoli, Monica	688	713	96.49%
Rajan, Anil	330	345	95.65%
Meyer, Patricia	1222	1336	91.47%
Shaffer, Bruce	13	13	100.00%
Puthiyamadam, Mary Rose	1402	1674	83.75%
Gerson, Debra	1275	1531	83.28%
Moysak, Jane	726	731	99.32%
LaBrunda OD, Patricia	5	5	100.00%
Flynn, Jayne	76	101	75.25%
Morgan, Sarah	947	1091	86.80%
Anderson, Claudette	734	939	78.17%
Rai, Samantha	398	445	89.44%
Caterinicchio MD, Benedict	31	46	67.39%
Wu, Daren	696	813	85.61%
Dillon, Robin	467	489	95.50%

Examples of CDSS that have improved care

- Diabetes A1c screening lab alerts
 - Provider Panels reports
 - Hypertension EKG Order sets
 - Self management templates
structured data
 - Asthma Action Plans. Structured data
templates.
-

Improving A1c screening for diabetic patients

Quality Measure Reports

Run Date 06/11/2009 ...

Measure Dictionary Quality Measures

Measure Name (359-CM)A1C testing

Reporting Interval Quarterly

Reporting End Date 06/11/2009 ...

Reporting Begin Date 03/11/2009 ...

Exclusions

Submit Clear

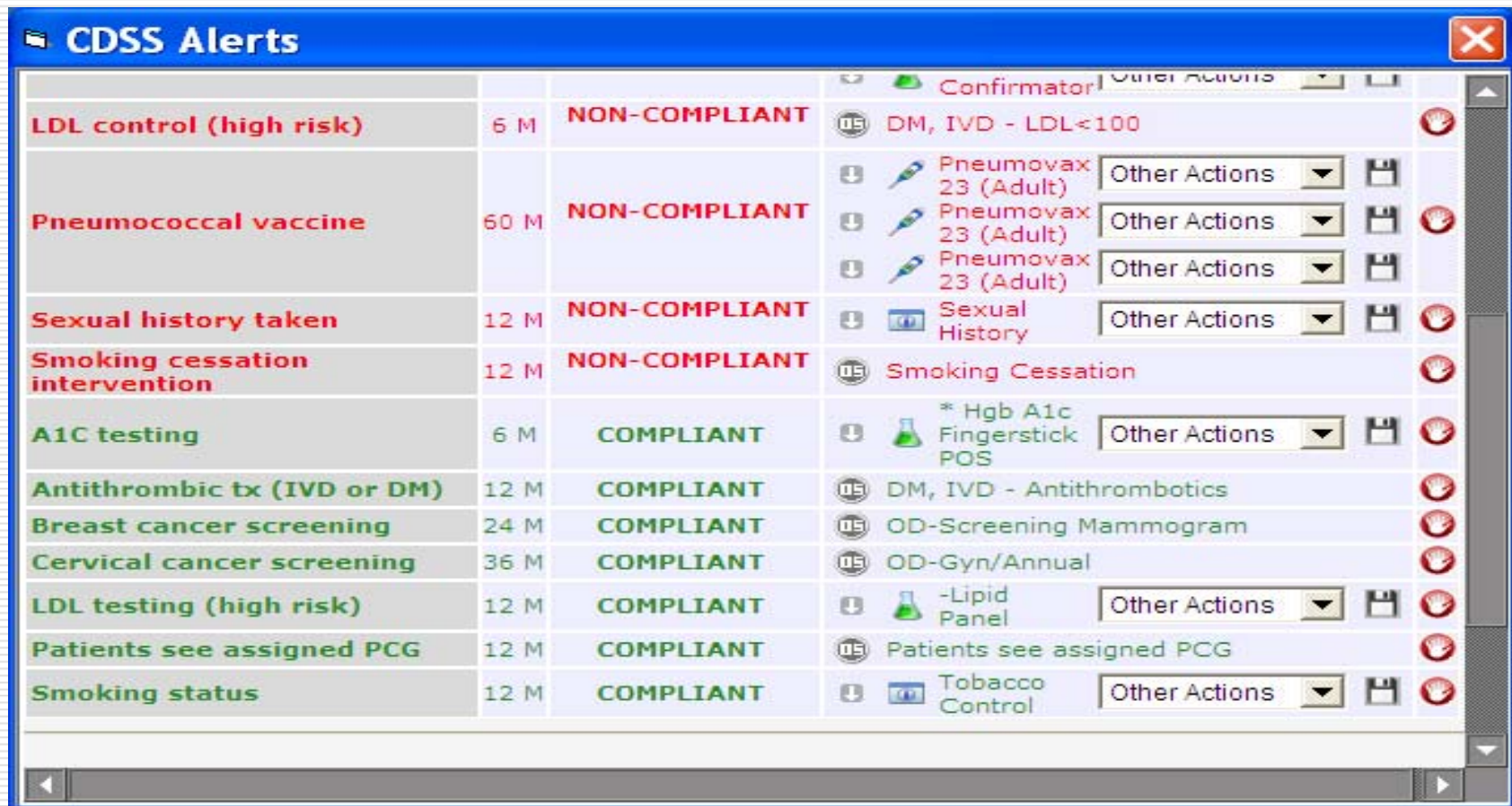
Cross Tabs Facility PCP PCG Insurance Race/Ethnicity Refine

Numerator:
Number of patients in denominator who had one or more HbA1c test results recorded during the past 6 months up to and including the last day of the reporting period

Denominator:
Number of unique patients seen in the reporting period, 18-75 years of age, with diabetes

Numerator	Denominator	Percentage
738	843	87.54

The CDSS Alerts remind Providers to get an A1c



Alert Name	Frequency	Status	Action
LDL control (high risk)	6 M	NON-COMPLIANT	Confirmator DM, IVD - LDL<100
Pneumococcal vaccine	60 M	NON-COMPLIANT	Pneumovax 23 (Adult)
Sexual history taken	12 M	NON-COMPLIANT	Sexual History
Smoking cessation intervention	12 M	NON-COMPLIANT	Smoking Cessation
A1C testing	6 M	COMPLIANT	* Hgb A1c Fingerstick POS
Antithrombic tx (IVD or DM)	12 M	COMPLIANT	DM, IVD - Antithrombotics
Breast cancer screening	24 M	COMPLIANT	OD-Screening Mammogram
Cervical cancer screening	36 M	COMPLIANT	OD-Gyn/Annual
LDL testing (high risk)	12 M	COMPLIANT	-Lipid Panel
Patients see assigned PCG	12 M	COMPLIANT	Patients see assigned PCG
Smoking status	12 M	COMPLIANT	Tobacco Control

Order Sets tell Provider when the last A1c was

Order Sets

Search for Order Sets

ORDER SET: DM - A1C < 7% Select All Order MEASURE: 361 QUICK ORDER SET: NO

DIAGNOSES (TRIGGER): ⊕
DIAGNOSES (LINKED): ⊕

MESSAGE
 Diabetes Prevention and Management 1. Clinical Care Priorities: The ABC's of Diabetes Measure Frequency of Monitoring Goal A1C Every 3/6 months < 7% Blood Pressure Every visit < 130/80 Cholesterol (LDL) Annually < 100 mg/dL Smoking status Every visit Prevention and cessation 2. What Providers Can Do - Promote physical activity, healthy food choices, and weight loss in persons at risk for developing diabetes. - Screen for diabetes and pre-diabetes in adults with hypertension, hyperlipidemia, and those >=45 years of age who are overweight. - Prevent diabetes-associated complications by monitoring and controlling the ABC'S of diabetes (hemoglobin A1C, Blood pressure, Cholesterol, Smoking status). Source: City Health Information: Diabetes Prevention and Management. New York City Department of Health and Mental Hygiene.

Rx Order

<input type="checkbox"/>	Name	Strength	Take	Frequency	Duration	Refills	Route	Formulation	Dispense	Date	Status
<input type="checkbox"/>											

Labs Order **Diagnostic Imaging** Order

<input type="checkbox"/>	Description	Date	Status	<input type="checkbox"/>	Description	Date	Status
<input type="checkbox"/>	* Hgb A1c Fingerstick POS	03/03/2009	Other Actions ⌵ 📄				
<input type="checkbox"/>	-LFT Hepatic Function Panel (7)	-	Other Actions ⌵ 📄				
<input type="checkbox"/>	-BMET- Basic Metabolic Panel (8)	-	Other Actions ⌵ 📄				
<input type="checkbox"/>	- Microalbumin:Creatinine Ratio, Random Urine	-	Other Actions ⌵ 📄				

Procedures Order

<input type="checkbox"/>	Description	Date	Status
<input type="checkbox"/>			

Provider/Site Feed Back Reports

Quality Measure Reports

Run Date 06/11/2009 ...

Measure Dictionary Quality Measures

Measure Name (359-CM)A1C testing

Reporting Interval Half Yearly

Reporting End Date 06/11/2009 ...

Reporting Begin Date 12/11/2008 ...

Exclusions

Submit Clear

Cross Tabs Facility PCP PCG Insurance Race/Ethnicity Refine

Numerator:
Number of patients in denominator who had one or more HbA1c test results recorded during the past 6 months up to and including the last day of the reporting period

Denominator:
Number of unique patients seen in the reporting period, 18-75 years of age, with diabetes

Facility	Numerator	Denominator	Percentage
Mt Kisco Open Door	118	137	86.13%
Unknown	38	77	49.35%
Port Chester Open Door	285	347	82.13%
Ossining Open Door	235	267	88.01%
Sleepy Hollow Open Door	117	136	86.03%

Self management template increased compliance with documentation of goals,

The screenshot displays a medical software interface for a patient named T, TEMPLATES, 39 Y, M. The patient's address is 114 turnpike road, Westborough, MA, with phone number 508-836-2700 and date of birth 01/01/1970. The interface includes various tabs and buttons for patient management, such as 'Allergies', 'Billing Alert', 'Wt: 47.0 lbs lbs.', 'Ins: Self Pay', 'CLICK TO EDIT', 'SECURE NOTES', and 'ADV DIRECTI'. The main content area shows the 'Subjective' section with 'Chief Complaint(s): Self management' and 'HPI: Self-Management'. The 'Current Medication' section lists 'Medication Compliance', 'Diet', 'Exercise', and 'Goal Self Management: --'. A 'Goal' dialog box is open, showing a date field and a list of goal categories: Exercise, Weight Loss, Stress Reduction, Dietary Modifications, Medication Compliance, and Follow Medical Regimen. The interface also includes a 'Plan' section and a bottom toolbar with buttons for Print, Fax, Record, Lock, Details, Scan, Templates, Claim, Letters, and Ink.

T, TEMPLATES , 39 Y, M Sel Info Hub

114 turnpike road
Westborough, MA
H:508-836-2700
DOB:01/01/1970

Allergies
Billing Alert

Wt: 47.0 lbs lbs.
Appt(L): 05/16/01
Language:
Translator: No

Ins: Self Pay
Acc Bal: \$0.00
Guar: TEMPLATES
Gr Bal: \$0.00

CLICK TO EDIT

SECURE NOTES

ADV DIRECTI

Medical Summary | CDSS | Labs | DI | Procedures | Growth Chart | Immunization | Encounters | Patient Docs | Flowsheets | Notes

SF Rel Bulleted Encounters 01/01/2001 -Self man

Subjective:
Chief Complaint(s):
• Self management
HPI:
Self-Management
Medication Compliance - . Diet - . Exercise - . Goal Self Management: --.

Current Medication:
Medical History:
Allergies/Intolerance:
ROS:

Objective:
Vitals:
Past Results:
Examination:

Assessment:
Assessment:

Plan:

Date
New SM Goal Set
 Exercise
 Weight Loss
 Stress Reduction
 Dietary Modifications
 Medication Compliance
 Follow Medical Regimen
Prev Ok Cancel

Print Fax Record Lock Details Scan Templates Claim Letters Ink

Hypertension order set increased the number of patients with ECG.

eClinicalWorks (Ferrari RN.Pam)

Order Sets

Labs

Description	Delete
* Urine Dip Stick	<input type="button" value="Delete"/>
-Urinalysis, Complete	<input type="button" value="Delete"/>
-CBC With Differential/Platelet	<input type="button" value="Delete"/>
-Lipid Panel	<input type="button" value="Delete"/>
-CMET Comp. Metabolic Panel (14)	<input type="button" value="Delete"/>

Diagnostic Imaging

Description	Delete
* ECG without ECW interface	<input type="button" value="Delete"/>
* ECG with ECW Welch Allyn interface	<input type="button" value="Delete"/>
* ECG with Midmark interface	<input type="button" value="Delete"/>

Procedures

Description	Delete
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Immunizations

Name	Dose	Delete
FLU VACCINE (Adult)	0.5 ml	<input type="button" value="Delete"/>
Pneumovax 23 (Adult)	0.5 ml	<input type="button" value="Delete"/>

Smart Forms

Name	Delete
BMI	<input type="button" value="Delete"/>
Tobacco Control	<input type="button" value="Delete"/>

Appointments

In:	Follow-Up	Delete
In:	4W for uncontrolled Stage 1	<input type="button" value="Delete"/>
In:	2W for uncontrolled Stage 2	<input type="button" value="Delete"/>
In:	3M for controlled blood pressure	<input type="button" value="Delete"/>
In:	schedule with Patient Advocate	<input type="button" value="Delete"/>
In:	schedule with Nutritionist	<input type="button" value="Delete"/>

Referrals

Physician Education

Patient Education

PDF

WEB REFERENCE

JNC-7 Guideline ("summary" - 50+ pages)

What is Hypertension - Spanish

Billings: Dillon, Robin 467 489 95.50%

Windows Taskbar: 5:54 PM

Asthma Template Documents both Underlying Severity and Current Control

The screenshot displays a medical software interface for a patient named T. TEMPLATES, 39 Y, M. The patient's information includes address (114 turnpike road, Westborough, MA), phone (508-836-2700), and date of birth (01/01/1970). The interface is split into two panes. The left pane shows patient details and a list of chief complaints, with 'Asthma Assessment' selected. The right pane shows the 'Current Asthma Control' form, which includes sections for 'Chief Complaint(s)', 'HPI', 'Self-Management', 'Current Medication', 'Medical History', 'Allergies/Intolerance', 'ROS', 'Objective', 'Vitals', and 'Past Results'. The 'Current Asthma Control' section has three radio buttons: 'Well Controlled.', 'Not Well Controlled.', and 'Very Poorly Controlled.'. A 'Current Asthma Control' dialog box is open, showing the same three options. The bottom of the interface features a toolbar with buttons for Print, Fax, Record, Lock, Details, Scan, Templates, Claim, Letters, and Ink.

Patient Information:
T, TEMPLATES, 39 Y, M
114 turnpike road, Westborough, MA
H: 508-836-2700
DOB: 01/01/1970
Allergies: Billing Alert
Wt: 47.0 lbs lbs. Ins: Self Pay
App(L): 05/16/01 Acc Bal: \$0.00
Language: Guan: TEMPLATES
Translator: No Gr Bal: \$0.00

Chief Complaint(s):
• Asthma Assessment

HPI:
Asthma
Asthma Severity before treatment Underlying Asthma -. Current Asthma Control Asthma Control: -. # Acute and or ER Visits in past 6 months: Total . Asthma Action Plan Date of last update.

Self-Management:
Medication Compliance patient reports -. Diet patient reports -. Exercise Patient r

Current Medication:

Medical History:

Allergies/Intolerance:

ROS:

Objective:

Vitals:

Past Results:

Assessment:
Assessment: ▾
Please assess for Underlying Severity Intermittent or Persistent Asthma

Current Asthma Control

Asthma Control:

Well Controlled.

Not Well Controlled.

Very Poorly Controlled.

Prev Ok Cancel Next

Using data to improve care

- ❑ List all diabetic patients who's last A1c was >9 and call them to come in for Diabetes Education.
 - ❑ List all patients without an Asthma Action Plan and invite them to an Asthma Night
 - ❑ List all Hypertensive patients who said that they were not watching their diet and invite them to a presentation on the dash Diet.
-

Should all data be structured?

- Documenting using structured data takes time.
 - Documenting using structured data can sound generic.
 - Free text tells a better story.
 - Only Structure data you are going to actually use!
-