

# CDSC Dashboards Demo

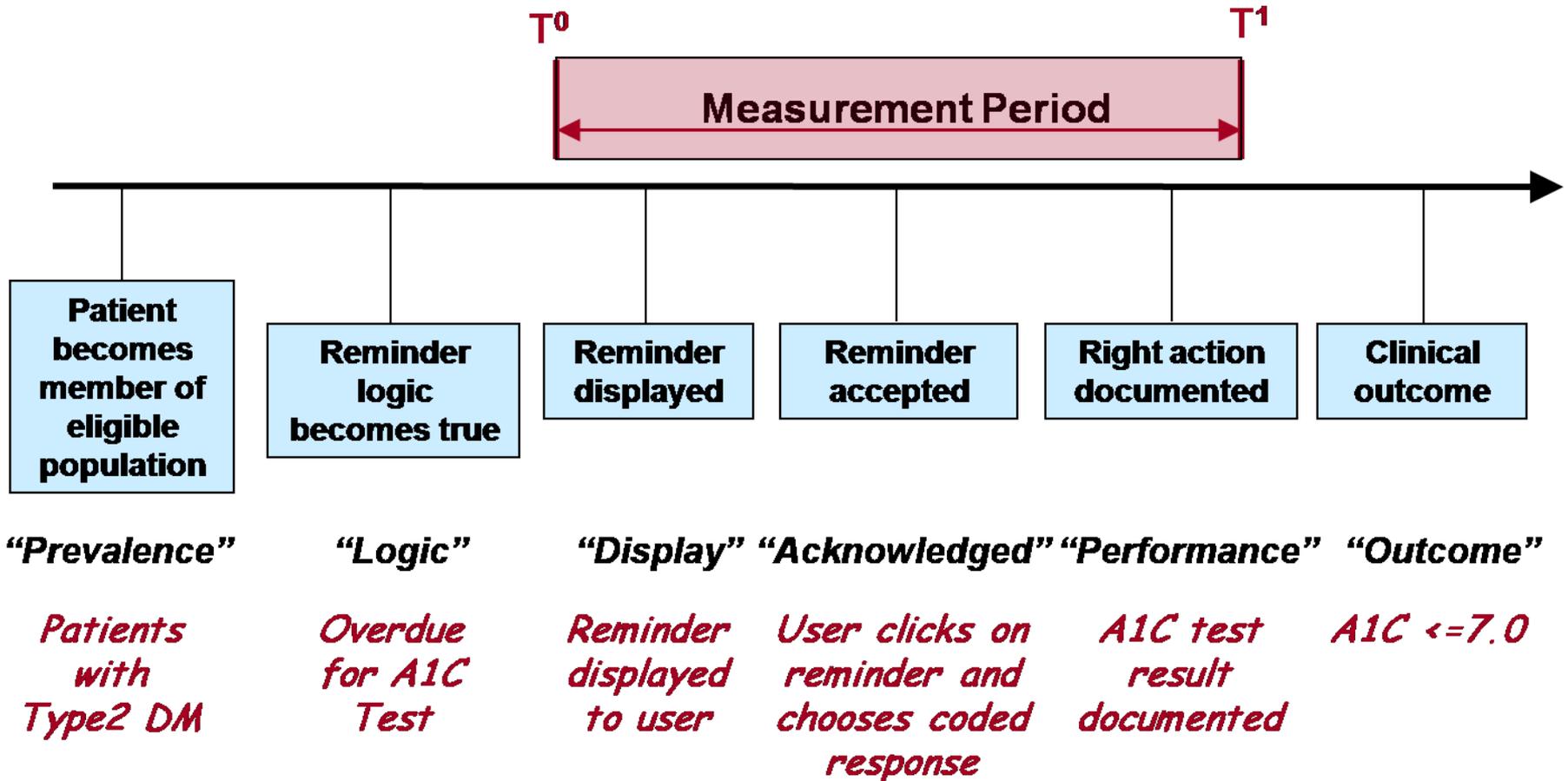
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Senior Corporate Manager  
Team Lead, Dashboards Team

## CDS Dashboards: Purpose

Dashboard will be developed to inform the end user as to his or her use of decision support and compliance with CDS recommendations, and provide feedback to the research team about CDS performance characteristics.

- Feedback data on CDS usage and compliance rates
- Summary of the user's performance for key metrics
- Comparison of the user's performance with other users or reference benchmarks

# Reminder Lifecycle



# Designing Decision Support Dashboards

- Two perspectives
  - Clinicians
  - CDS Designers
- What do they care about?

# Clinician view – “How am I doing?”

- **Clinician’s performance (clinical) for his/her patients**
  - **By condition (not by reminder)** – Diabetes, Hypertension, Coronary Artery Disease
  - Compared to peers
- **Contribution of CDS to clinical performance?**
  - Relevant if clinical performance poor
  - Compared to peers

# CDS Designer's view – “How well are the reminders working?”

- Response to CDS (by reminder)
  - Overall
  - Variability among users
- Breakdown of CDS Performance by patient group
  - PCP patients, patients with visits, other patients
- Effectiveness of CDS
  - Display (Counts)
  - Acknowledged (%)
  - Performance (Direct, Indirect)
  - Contribution to Clinical Performance
    - *Number Needed to Remind (NNTR)*

# Specifying Reminder Measures

## “Prevalence”

CDS Concept	Description	Count	Measure	Eye Exam
Prevalence	Clinically eligible population, a.k.a. the “denominator”	#patients eligible to be assessed by decision support logic	N/A	Patients with Type 2 Diabetes Mellitus

# Specifying Reminder Measures “Presentation”

CDS Concept	Description	Count	Measure	Eye Exam
Display	Presentation of the reminder to the user	#times reminder displayed to the user (for a specified time frame)	N/A	#times eye exam reminder displayed

# Specifying Reminder Measures

## “Acknowledged”

CDS Concept	Description	Count	Measure	Eye Exam
<b>Acknowledged</b>	User clicks on a reminder and chooses a response	#times user clicks on a reminder and chooses a response	= $\frac{\text{CDS Ackn.}}{\text{CDS displayed}}$	= #times reminder displayed AND acknowledged/ #times reminder displayed

# Specifying Reminder Measures

## “CDS Performance”

CDS Concept	Description	Count	Measure	Eye Exam
<b>CDS Performance</b>	<b>Of times CDS presented, how often the correct action was taken (directly or indirectly)</b>	<b>#times correct action taken AFTER CDS was presented</b>	<b>= CDS displayed AND correct action taken</b> <hr/> <b>CDS presented</b>	<b># times reminder displayed AND eye exam subsequently done / # times reminder displayed</b>

# Specifying Reminder Measures

## “Clinical Performance”

CDS Concept	Description	Count	Measure	Eye Exam
<b>Clinical performance</b>	<b>Patients get the “right” action, irrespective of CDS presentation and/or acknowledgement</b>	<b># eligible patients who get the correct action taken (during the measurement period)</b>	<b>= <math>\frac{\text{Clinical Performance}}{\text{Prevalence}}</math></b>	<b># patients with diabetes who have an up-to-date eye exam / #patients with Type 2 DM</b>

# Database Design

- Identify and load activity data for reminders – displays, acknowledgements
  - Roll up reminder activity at the provider-day level
- Define **performance** for each reminder in terms of data available to us
- Create new concepts (tables) for **measures** and associated **denominators**.
  - Reminders are mapped to measures (and to conditions)
- Keep things simple
  - Ignore timing
  - Use one-month measurement periods
  - Look for acknowledgement/performance within **30 days** of the reminder display

# Reminder Activity

- A Reminder has:
  - RuleID
  - MetricID (corresponds to measure)
  - DenomID (corresponds to denominator)
- We obtain Reminder Activity
  - For a measurement period (usually one month)
  - For the combination of a patient-provider
  - Count #displays, look for acknowledgement, look for performance
  - Store Acknowledgement coded response entries

# Clinical Performance (Total)

- We calculate overall performance (irrespective of reminders) – this requires a measure and a denominator.
  - For a specified measurement period, usually one month

# Clinical Performance (Provider)

- We also calculate performance at the PROVIDER level
  - For specified measurement period
  - For specified clinic
  - For specific reminder
  - Total displays (reminders and providers)
  - Total performance
  - Break down by reminder and performance
    - (4 combinations)

# Reminder Measures and Counts

- Finally, get detailed counts for each reminder
  - Time period
  - Metric
  - Reminder
  - Count
    - Patients, performance, displays (total and physicians), acknowledgement (total and physicians)
    - 2x2x2 – reminder, acknowledgement, performance
    - 2x2 – reminder, performance

# What this Means

- For each reminder, each patient in the Denominator falls into one of eight categories (2 x 2 x 2)
  - Display (y/n), Acknowledged (y/n), Performed (y/n)
  - We allow for the possibility that a reminder may be displayed and/or acknowledged and/or performed – in any order, multiple times.

# Dashboard: CAD and no aspirin

Report: CDS Dashboard - Reminder Designer View  
 Report Run For: EINBINDER,JONATHAN SETH,M.D.,M.P.H.

Today's Date: 01/25/2010  
 Reporting Period: From 1-09 thru 12-09.

## Multiple time period view

Condition: CAD  
 ReminderID: 164-CAD and no ASA  
 Measure: Patient has CAD and aspirin is on the med list

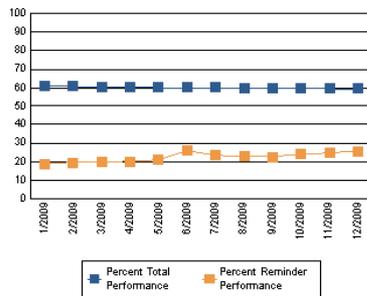
Reminder: Patient has CAD-equivalent on problem list and aspirin is not on the med list. Recommend aspirin.

Data: All users of LMR. From 1-09 thru 12-09.

Total Count Displays (across providers): 166,558  
 #Patient (months) with reminders displayed: 30,846  
 #Patient (months) w/ reminder and perf: 7,052  
 #Patient (months) w/ reminder and no perf: 23,794  
 #Reminders acknowledged: 280  
 #Reminders acknowledged and perf: 116  
 #Reminders acknowledged and no perf: 164

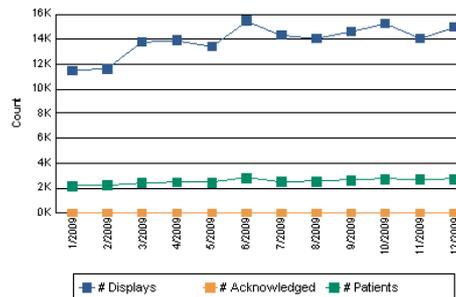
NNTR (Total): 23.62  
 NNTR (1X per month): 4.37

NNTR is number needed to remind. The denominator is the count where performance followed a reminder within 30 days of the end of the reporting period. The numerator is the cumulative count of all reminders per patient in each month(Total) or only counts a patient with a reminder once per month (1X per month).



Total Performance is the clinical performance for the measure across all LMR patients in the denominator for that period. The patient is counted in the numerator if the patient record shows compliance with the measure's numerator criteria within 30 days of the reporting period.

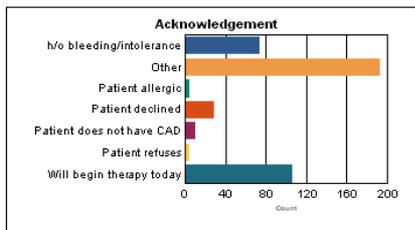
Reminder Performance is the performance for patients where a reminder was displayed to a physician during the reporting period. The denominator is reminders (one per provider / day). If the patient clinical data shows that the criteria for the measure is met within 30 days of the period then the performance is counted in the numerator.



# Displays is the count of displays for the reminder during the time period. Note that reminders are counted once per day for each physician such that multiple displays for the same provider on the same day are not counted but multiple providers are counted as separate.

# Acknowledged is the count of displayed reminders where there was an acknowledgement through the LMR reminder tool

# Patients is the total number of patients that reminders were displayed to. Note: When counting patients across months the concept of a "patient(month)" is needed to cover for duplicate patients that appear in more than one period.



# Dashboard: CAD and no aspirin

Report: CDS Dashboard - Reminder Designer View  
 Report Run For: EINBINDER, JONATHAN SETH, M.D., M.P.H.

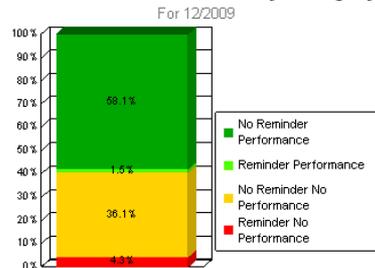
## Single Month View For Month: 12/2009

Condition: CAD  
 Measure: Patient has CAD and aspirin is on the med list

Reminder: Patient has CAD-equivalent on problem list and aspirin is not on the med list. Recommend aspirin.

Date Range: 12/2009

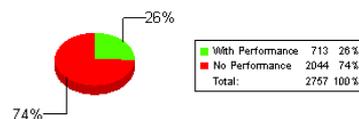
### Reminder Performance By Category



Total Acknowledged	17
NNTR - 1 X per month	3.87
NNTR - Total Reminders	20.96
Patients Where Reminder Displayed	2,757
Total Count Displays	14,944
Pts with Reminders & Perf	713
Pts with Reminders & no Perf	2,044
Pts with no reminders and no perf	17,262
Pts with no reminders and perf	27,763
Performing Total	28,476
N	47,782

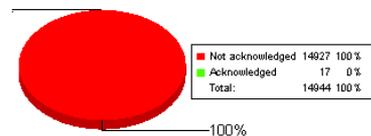
### Reminder Performance

For 12/2009



### Reminder Acknowledgement

For 12/2009

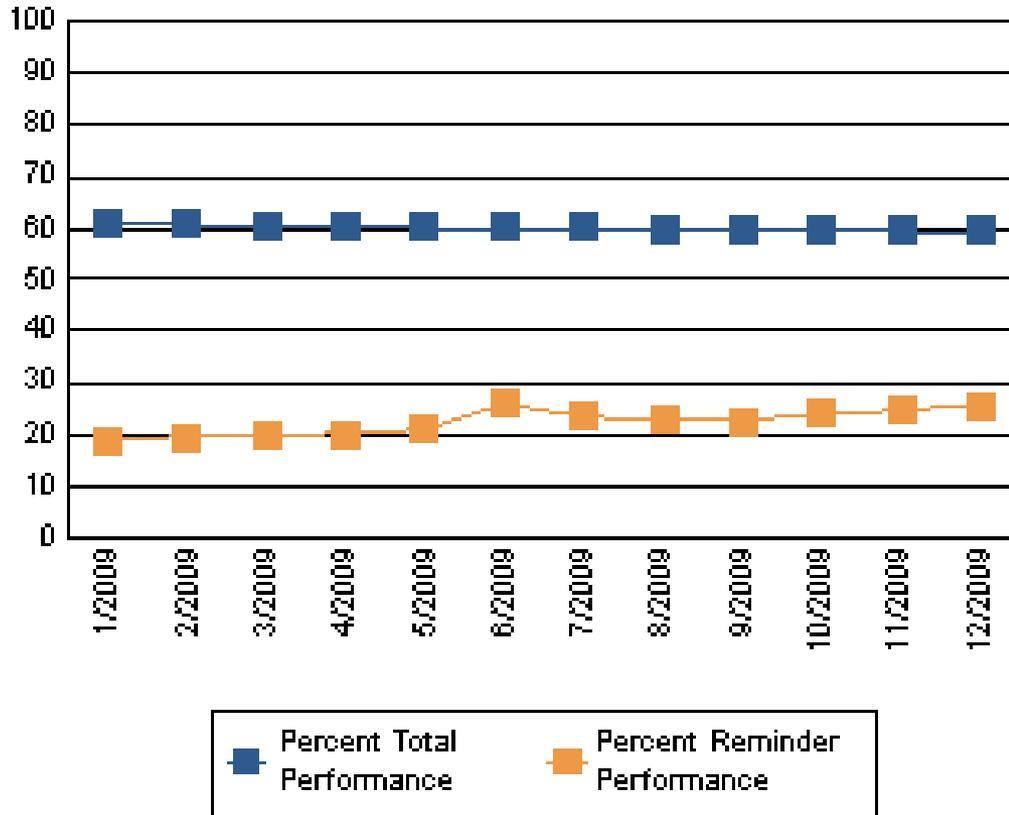


### Acknowledgement Performance

For 12/2009



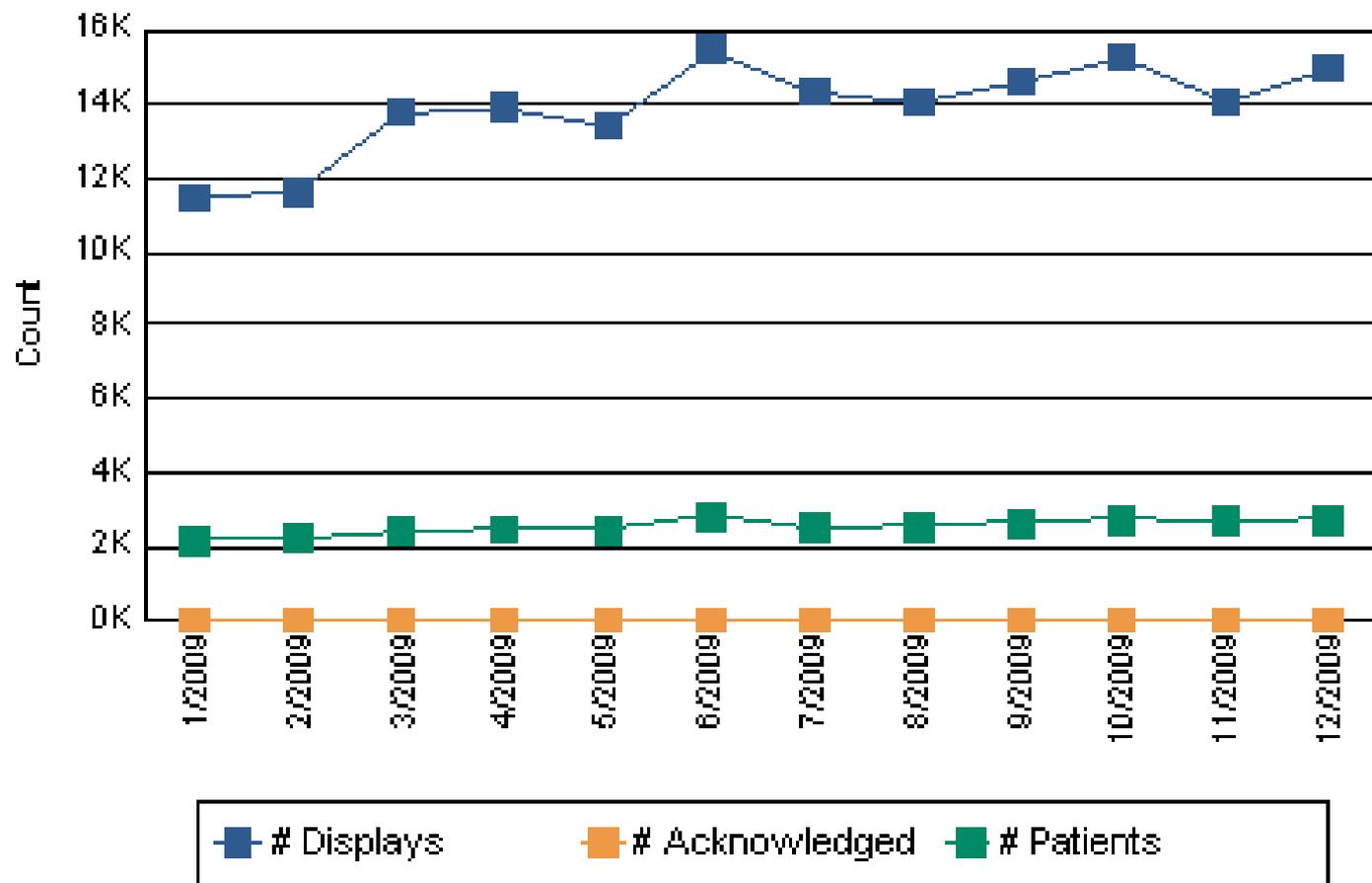
# Reminder: CAD and no aspirin



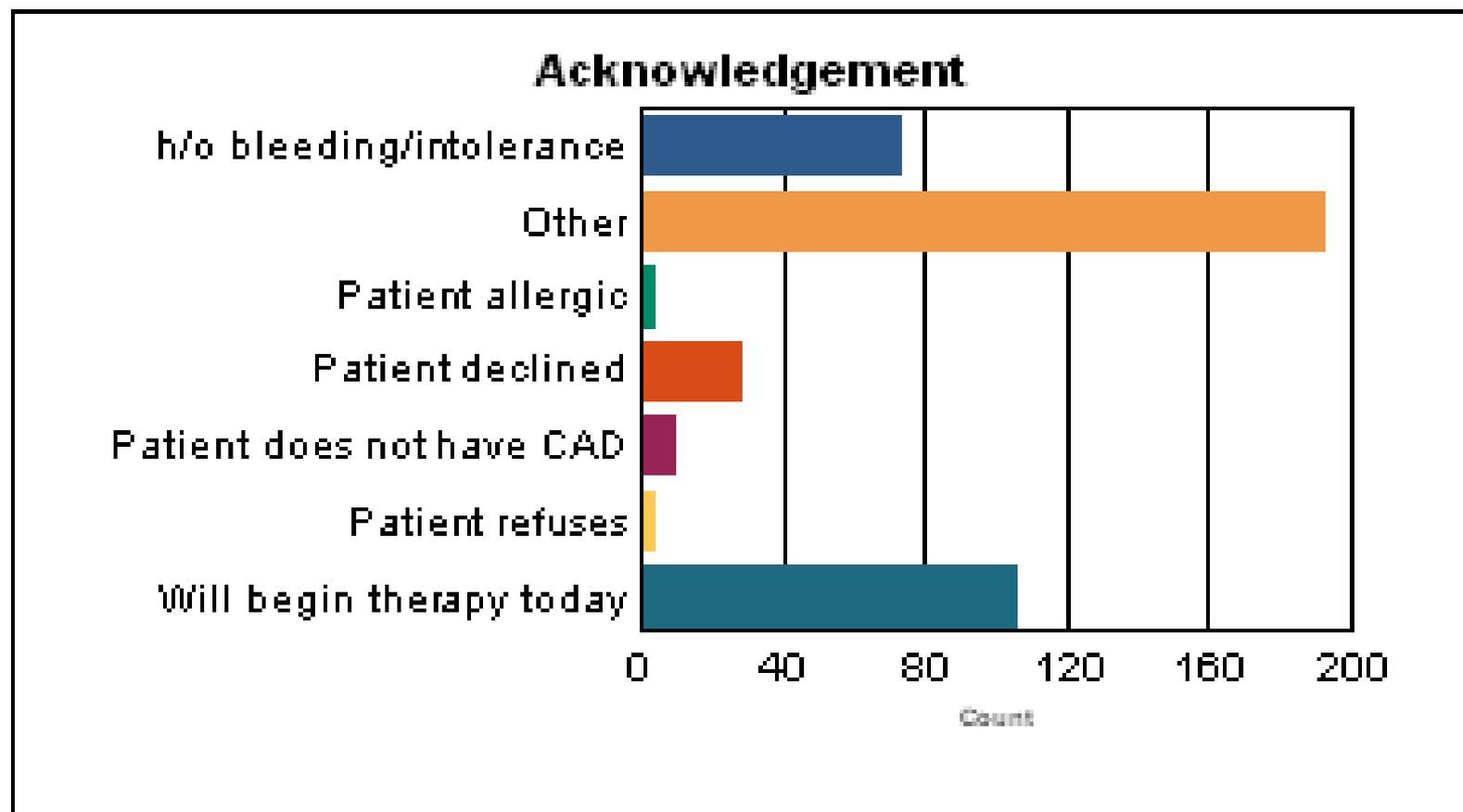
*%patients with CAD that have aspirin on the LMR Med List*

*%reminders with "performance" within subsequent 30 days*

# Reminder: CAD and no aspirin



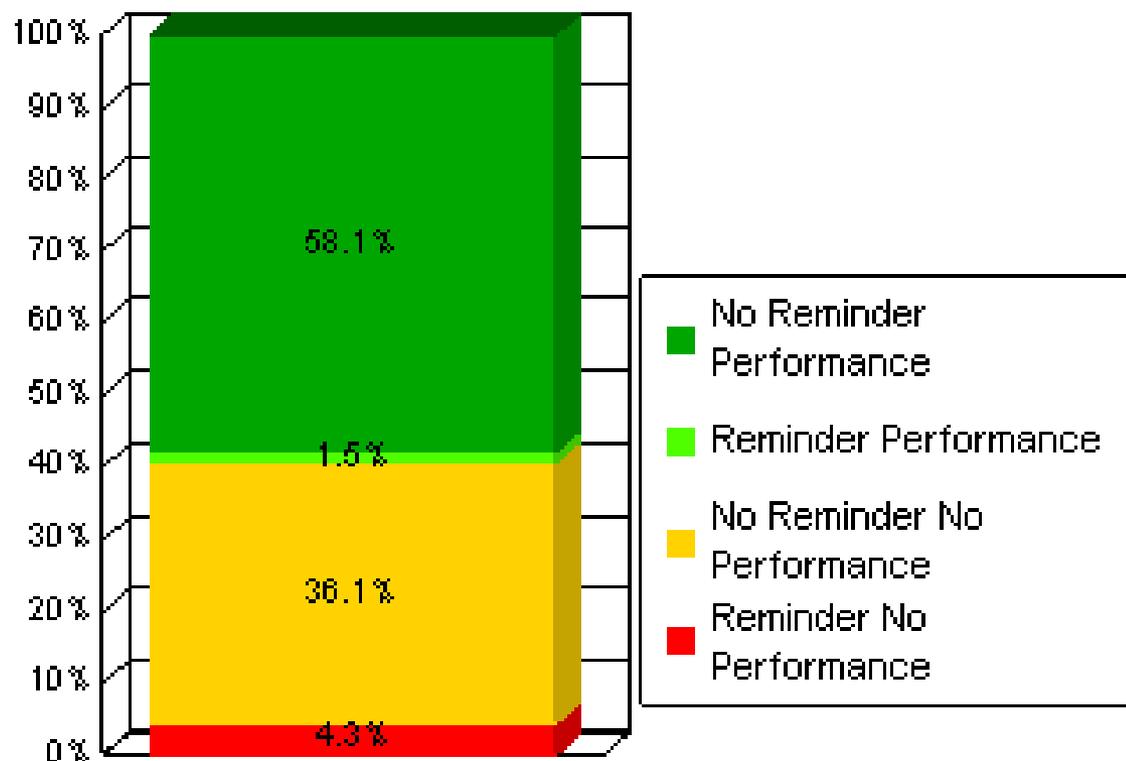
# Reminder: CAD and no aspirin (Coded acknowledgement responses)



# Reminder: CAD and no aspirin (Dec 2009)

## Reminder Performance By Category

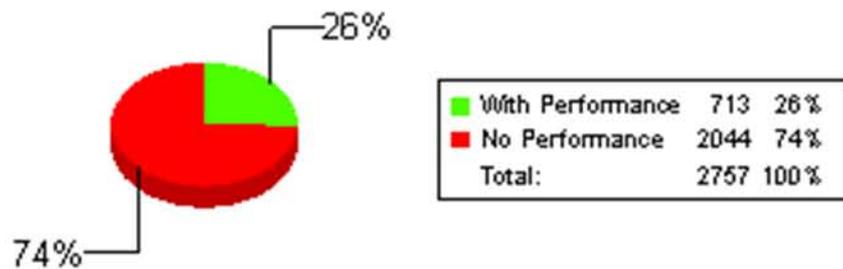
For 12/2009



# Reminder: CAD and no aspirin (Dec 2009)

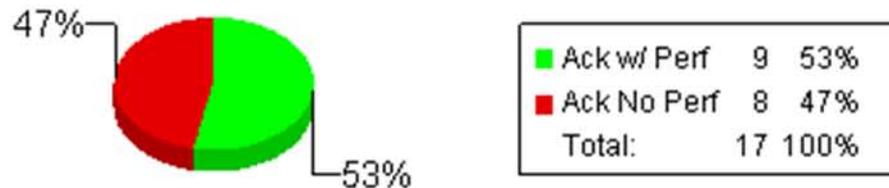
## Reminder Performance

For 12/2009



## Acknowledgement Performance

For 12/2009



# Reminder: CAD and no aspirin (Dec 2009)

NNTR is:

Total Acknowledged	17
NNTR - 1 X per month	3.87
NNTR - Total Reminders	20.96
Patients Where Reminder Displayed	2,757
Total Count Displays	14,944
Pts with Reminders & Perf	713
Pts with Reminders & no Perf	2,044
Pts with no reminders and no perf	17,262
Pts with no reminders and perf	27,763
Performing Total	28,476
N	47,782

**2757 patients**  
with reminder displayed

divided by **713 patients**  
who had reminder displayed  
and then had aspirin  
added to the Med List

**= 3.87**

(If look at total #reminder  
displays rather than #patients,  
then NNTR is **20.96**)

## CDS Dashboard - Provider View

Reporting period: 1/1/09 to 2/1/10

BIMA

LINDER,JEFFREY A.,M.D.,M.P.H.

# Clinician's Dashboard

Generated by: LINDER,JEFFREY A.,M.D.,M.P.H.

BIMA

BWH

Generated on: 01/27/2010

This report provides information on clinical performance measures and feedback on your response to LMR reminders. The patient population measured for performance is your current patient panel as defined in Report Central (see the My Panel report). Reminder performance is calculated relative to patients where you have been displayed a reminder during the reporting period.

Current performance rate is the performance on the clinical measure for the last measurement month.

Performance trend is a display of the performance value by month in a graph for the overall report time frame

Reminder Historical Performance shows the denominator (Times displayed) as total patients over the report time period where reminders have been shown to you in LMR for this measure. If the patient was in compliance of the measure within 30 days of the reminder then they appear in the numerator (Times performed). The same patient may appear across multiple months in the total.

Condition	Measure	Current Patients*	Number in Compliance**	Mv Rate	Mv Clinic Rate	Mv Performance Trend	Reminder for this measure	Times displayed	Times Performed
Diabetes	Diabetes with poor management, HbA1C completed in the past 3 months	2	0	0.0 %	0.9 %				
Diabetes	Diabetes, Foot exam completed in the past year	34	5	14.7 %	2.3 %				
Diabetes	Diabetes, HbA1C completed in the past 6 months	34	15	44.1 %	34.9 %				
							Diabetic overdue for HbA1C	378	220
							Diabetic almost due for HbA1C	252	182
Diabetes	Diabetes, MicroAlb completed in the past year	34	16	47.1 %	44.1 %				
							Diabetes overdue for Microalb/creat ratio	339	199
							Diabetes almost due for Microalb/creat ratio	274	195
Diabetes w Renal Failure	Diabetes, microalbumin/creatinine ratio >30 and on ACEI	14	12	85.7 %	71.2 %				
Diabetes w Renal Failure	Diabetes, microalbumin/creatinine ratio >30 and on ACEI, ARB	14	12	85.7 %	89.3 %				
Diabetes w Renal Failure	Diabetes, microalbumin/creatinine ratio >30 and on ARB	14	4	28.6 %	33.1 %				
Diabetes	Diabetes, Opthal exam completed in past year	34	0	0.0 %	3.0 %				
							Diabetic overdue for opthal exam	1,308	36
							Diabetic almost due for opthal exam	56	4

Generated by: LINDER,JEFFREY A.,M.D.,M.P.H. on 1/27/10

\* Based on Report Central panel definition

\*\* Based on evaluation during the last month as the reporting period

Reporting period: 01/01/2009 TO 02/01/2010

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## CDS Dashboard - Provider View

BIMA  
LINDER,JEFFREY A.,M.D.,M.P.H.

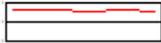
# Clinician's Dashboard

Generated by: LINDER,JEFFREY A.,M.D.,M.P.

BIMA

BWH

Generated on: 01/27/2010

<u>Condition</u>	<u>Measure</u>	<u>Current Patients*</u>	<u>Number in Compliance**</u>	<u>My Rate</u>	<u>My Clinic Rate</u>	<u>My Performance Trend</u>	<u>Reminder for this measure</u>	<u>Times displayed</u>	<u>Times Performed</u>
CAD	Patient has CAD and aspirin is on the med list	24	16	66.7 %	49.5 %				
Hypertension Screening	Patient has had a blood pressure reading in the past year	270	206	76.3 %	76.8 %				

<u>Measure</u>	<u>Current Patients</u>	<u># in compliance</u>	<u>My Rate</u>	<u>My clinic Rate</u>
Diabetes, HbA1C completed in the past 6 months	34	15	44.1 %	34.9 %

### My performance trend



<u>Reminder for this Measure</u>	<u>Times Displayed</u>	<u>Times Performed</u>
----------------------------------	------------------------	------------------------

Diabetic overdue for HbA1C	378	220
Diabetic almost due for HbA1C	252	182

# Lessons Learned (challenges)

- Reality was much more complex than the model
  - Grouping events – multiple sessions, providers per patient per day
- Lots of detective work to obtain and understand the data
  - Where are the acknowledgements? (And, where are the reminders?)
  - What is a “display?”
- Try to design with generalizability in mind
  - Simplify the design and measures. See what questions emerge when Consortium members see Version 1. But, try to design the database flexibly.
  - Led to a new model in our warehouse for representing **measures** and **denominators** – hope that we will be able to leverage for other projects.
- We don't know what to expect with regard to looking at reminders.
  - Exciting: new insights.
  - Makes design harder – don't know if it will be useful.

# Future Plans

- Complete development for Partners.
- Feedback from Consortium
  - Revisions to dashboards
- Evaluation
  - User surveys, usage data
- Publish specification to other Consortium members
- Design approach for implementation with other EMRs and at other sites