

National Web-Based Teleconference on Using Health IT for Chronic Disease Management

June 21st, 2011

Moderator:
Angela Lavanderos
**Agency for Healthcare Research and
Quality**

Presenters:
James Friction
Helene Kopal
Randall Cebul





HealthPartners

Research Foundation

The Use of Electronic Health Records to Improve the Quality and Safety of Dental Care for Medically Complex Patients

Dr. James Friction

Senior Researcher, HealthPartners Research Foundation

Professor, University of Minnesota

I do not have any relevant financial relationships with any commercial interests to disclose.



AHRQ
Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov

Acknowledgements

The Authors wishes to acknowledge appreciation for the contributions of the following co-investigators in this study:

Brad Rindal, DDS
Thomas Flottemesch, PhD
Merry Jo Thoele, RDH, MPH
Chris Enstad, BS
Paul Jorgenson BS

William Rush, PhD
Gabriela Vazquez, PhD
Emily Durand, RDH
Nelson Rhodus, DDS, MS
Charles Huntley

The many patients and dental providers who participated

This research was supported by AHRQ R18 HS017270

Recent Publication:

Fricton J, Rindal B, Rush W, Flottemesch T, Enstad C, Vazquez G, Thoele MJ, Durand E, Rhodus N. eHealth Records to Improve Use of Practice Guidelines for Medically Compromised Patients. Journal of American Dental Association (2011, accepted)



The Burden of Chronic Illness

- There is a high prevalence and cost for patients with chronic medical conditions including diabetes, obstructive pulmonary disease, depression, and congestive heart failure in the U.S.
- From a dental perspective, these patients are at increased risk for periodontal disease, dental caries, orofacial pain, and complications during or after dental treatment.
- Both U.S. Surgeon General's 2000 *Report on Oral Health in America* and the 1995 Institute of Medicine *Report on Dentistry* calls for more links between Dentistry and Medicine and the need to better train dentists in caring for patients with chronic medical conditions.

Impact of Chronic Illness on Dental Care

There is a need for dentists to recognize and follow evidence-based guidelines while caring for patients with these conditions to improve safety and quality of care

To support this effort, organizations such as the American Academy of Oral Medicine have developed clinical guidelines

Despite the availability of current guidelines, the use of this information at the point of care has been low, not because dentists are disinterested, but rather due to the difficulty of translating guidelines into practical changes in clinical protocol.



Emergence of Health Information Technology (HIT)

HIT through clinician decision support (CDS) tools can improve the quality and safety of medical and dental care through several strategies including:

1. Enhancing communication between clinicians and patients.
2. Facilitating the exchange of health information between and among the teams of health care providers and with patients.
3. Improving access to personalized and evidence based guidelines that match the specific characteristics of the patient
4. Activating patients and clinicians through reminders, alerts, and point of care introduction of appropriate information



Comparative Effectiveness Study of Different Approaches to CDS

Research Question: Can CDS through electronic dental records (EDR) or with patients through personal health records (PHRs) activate dental providers toward the use of care guidelines, change provider and patient behavior, and improve the outcomes of care?

Design: Prospective group randomized trial comparing two methods of CDS compared to a usual care control group

Two Interventions;

- Direct provider alert in the EDR with point-of-care access to personalized evidenced based recommendations
- Direct Patient Alert through PHR e-mail or postal letter to review with the dental provider the personalized evidenced based recommendations

Population

Patients

10,890 patients from HealthPartners with one or more of the following medical conditions out of a total of 59,147 dental patients (18.4%) identified by electronic medical record including:

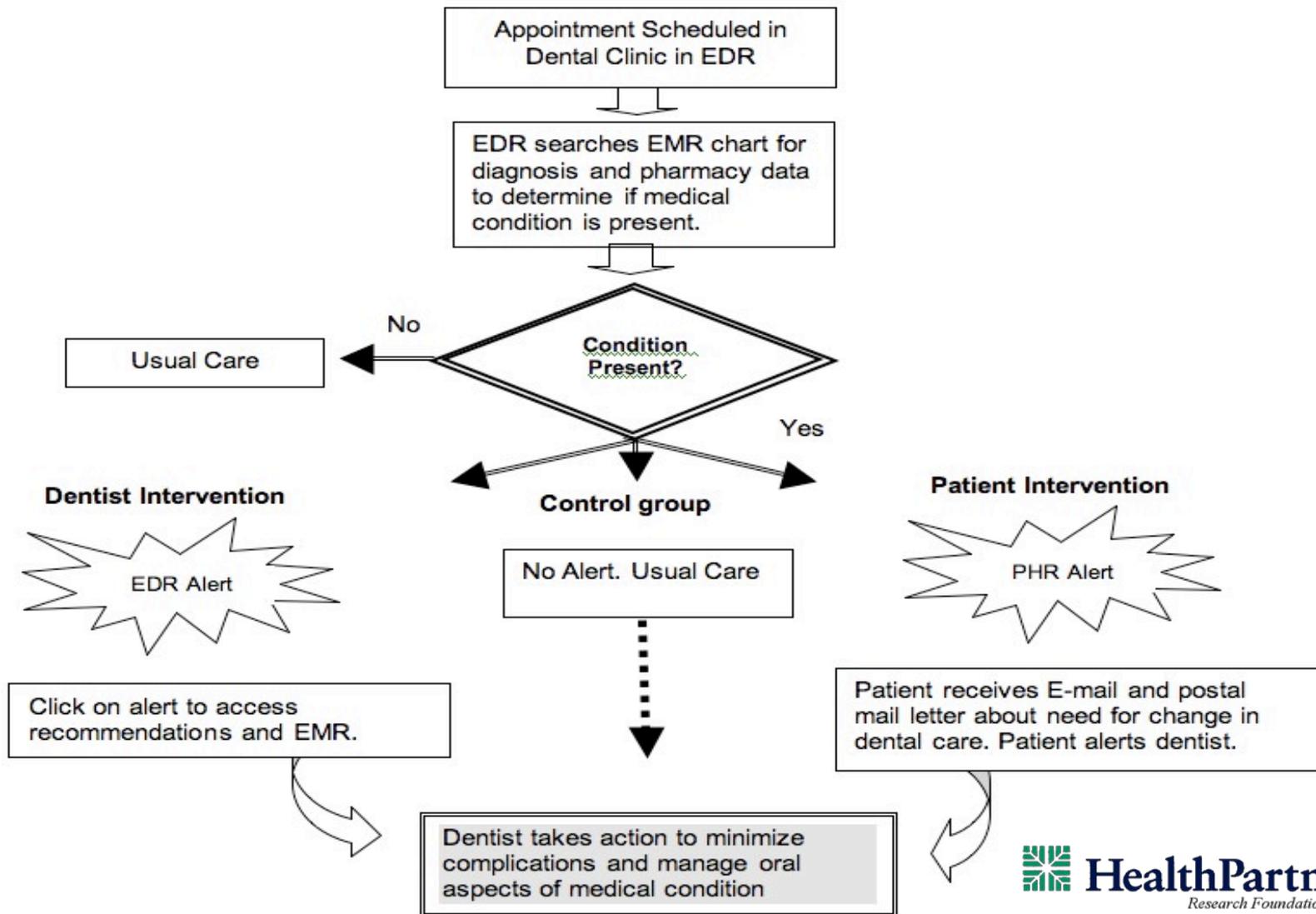
- Diabetes Mellitus
- Xerostomia (Dry Mouth) from Medications
- Chronic Obstructive Pulmonary Disease (COPD)
- Congestive Heart Failure (CHF)

Dental Providers

The 15 clinics with 102 Dental providers of the HP dental group were randomly assigned to the 2 experimental groups and the usual care group. 62 were dental hygienists and 40 Dentists.



Study Protocol



The eDent System Environment

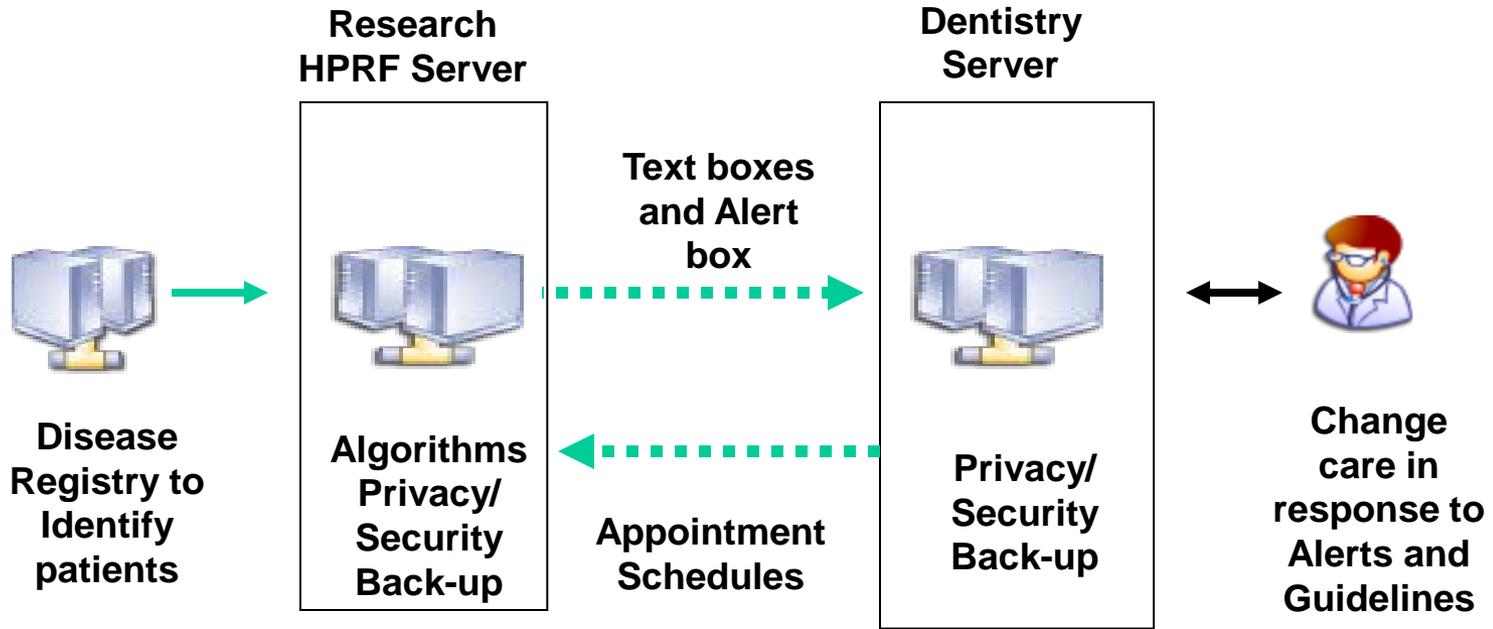


Table 1. Medical conditions targeted due to associated health risks that can be improved with use of clinical guidelines by dental providers

Medical condition	Estimated adult prevalence	Intervention for dentist and patients to reduce risk of problems	Goal of intervention
Diabetes	7%	<ul style="list-style-type: none"> • Review diabetes treatment and status at visit. Maintain adequate dietary and fluid intake and prevent postsurgical infection • Daily oral hygiene and visits every 6 months • Monitor oral hygiene status 	<ul style="list-style-type: none"> • Reduce periodontal, caries, and oral infection risk
Xerostomia	10%, with 24% in >65 years of age	<ul style="list-style-type: none"> • Review saliva production at each visit • Prescription for saliva substitute/fluoride at each visit • Daily oral hygiene and visits every 6 months 	<ul style="list-style-type: none"> • Reduce periodontal, caries, and oral infection risk
Congestive heart failure	2%-3%	<ul style="list-style-type: none"> • Measures to reduce cardiac strain while receiving dental care (e.g., short visits, upright position, less stress) • Daily oral hygiene and visits every 6 months 	<ul style="list-style-type: none"> • Reduce risk of cardiac problems at dental visit • Reduce periodontal, caries, oral infection risk
Chronic obstructive pulmonary disease (COPD)	4%-5%	<ul style="list-style-type: none"> • Review history of concurrent heart disease • Avoid use of barbiturates, narcotics, and <u>anticholinergics</u> • Short visit, upright position, avoid use of rubber dam • Avoid nitrous oxide-oxygen inhalation sedation with severe COPD and emphysema • Daily oral hygiene and visits every 6 months • Improved oral hygiene self-care 	<ul style="list-style-type: none"> • Reduce risk of compromised air flow and pneumonia • Reduce periodontal, caries, and oral infection risk



Sample of CDS screen shots

The screenshot shows a software window titled "GSD Groups" with a menu bar (File, Edit, View, Transactions, Reports, Marketing, Accounts, Configure, Window, Help) and a toolbar. The "Patients" section is active, displaying a form with fields for patient details. A red circle highlights the "Medical Alert" checkbox, which is checked. A tooltip above it says "Click medical link for care recommendations." A red arrow points from this tooltip to a red circle around a medical icon (a cross) in the top toolbar.

The screenshot shows a webpage from HealthPartners Dental Clinics. The header includes the logo and the text "HEALTH PARTNERS DENTAL GROUP PERSONALIZED CARE RECOMMENDATIONS FOR PATIENTS WITH CHRONIC CONDITIONS". The main content is under the heading "PROVIDER INFORMATION".

According to electronic medical data [redacted], birthdate [redacted], may have following medical condition(s) that require special care during the dental visit:

- [XEROSTOMIA](#)

Please review the patient assessment steps and treatment recommendations prior to initiating dental care, follow them to prevent problems, and document that you have reviewed and completed them in a clinical note or SOAP note as part of the chart. The blue indicates a link to more detailed information about the conditions and dental care. To return to this page use your computer's back button.

Assess patient:

- Assess history and current status of medications and identified conditions.
- Ask patient about recent medical evaluations, obtain and review medical records to determine status of condition, and/or obtain consult if needed.
- Conduct a quick assessment for oral or systemic signs of an uncontrolled medical condition(s) and determine need for action or further evaluation before dental treatment.
- Be aware of adverse events from medication use
- Assess oral hygiene compliance and the presence of oral infections

XEROSTOMIA RECOMMENDATIONS

See Xerostomia & Dental Care Links below for more information

Recommendations for Dentists

1. Allow patient to drink, sip water and liquids at dental visit
2. Recommend that patient avoid alcohol, tobacco, coffee and tea (caffeine) prior to visit
3. Recommend regular oral hygiene visits (1 per 6 months) to patient
4. Document in EDR:
 - o health history (xerostomia, Sjögren's) and medications review
 - o oral hygiene assessment: classify plaque and calculus as light, moderate or heavy in hygiene



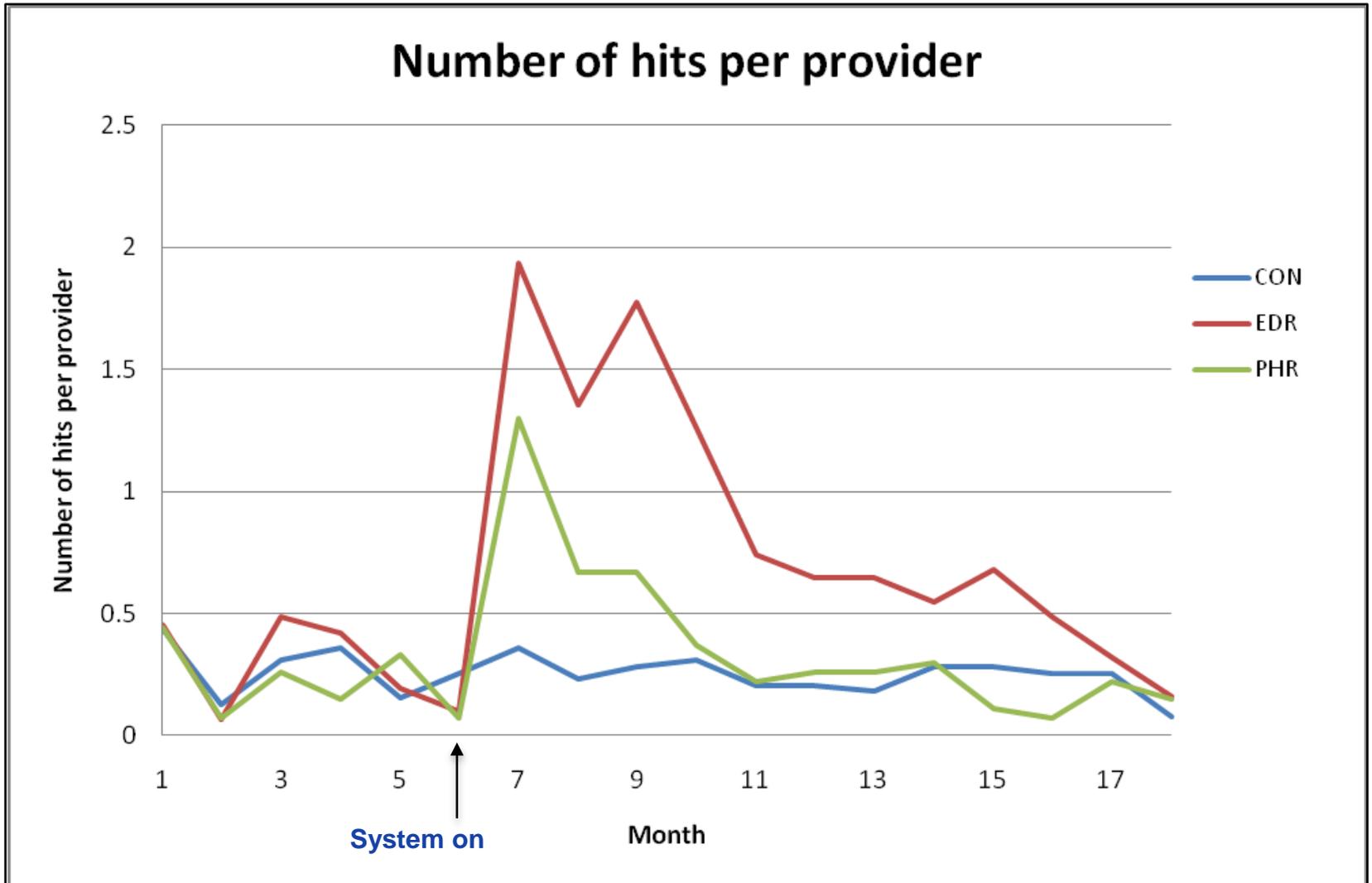
Table 2. Characteristics of the study population in each group (n=10,890 out of 59,147)(18.4% of dental patients were included)

Characteristic	Provider activation	Patient activation	Usual care
Clinics	5	5	5
Providers*	31	33	38
Types of providers (%)			
Dentist	13 (42%)	13 (39%)	14 (37%)
Hygienist	18 (58%)	20 (61%)	24 (63%)
Number of patients seen with condition (%) during the 18-month study period			
Any	3,536 (18%)	2,979 (16%)	4,375 (20%)
Diabetes mellitus	1,444 (8%)	1,271 (7%)	1,727 (8%)
Xerostomia	2,256 (12%)	1,872 (10%)	2,800 (13%)
Chronic obstructive pulmonary disease	466 (2%)	383 (2%)	635 (3%)
Congestive heart failure	258 (1%)	200 (1%)	396 (2%)

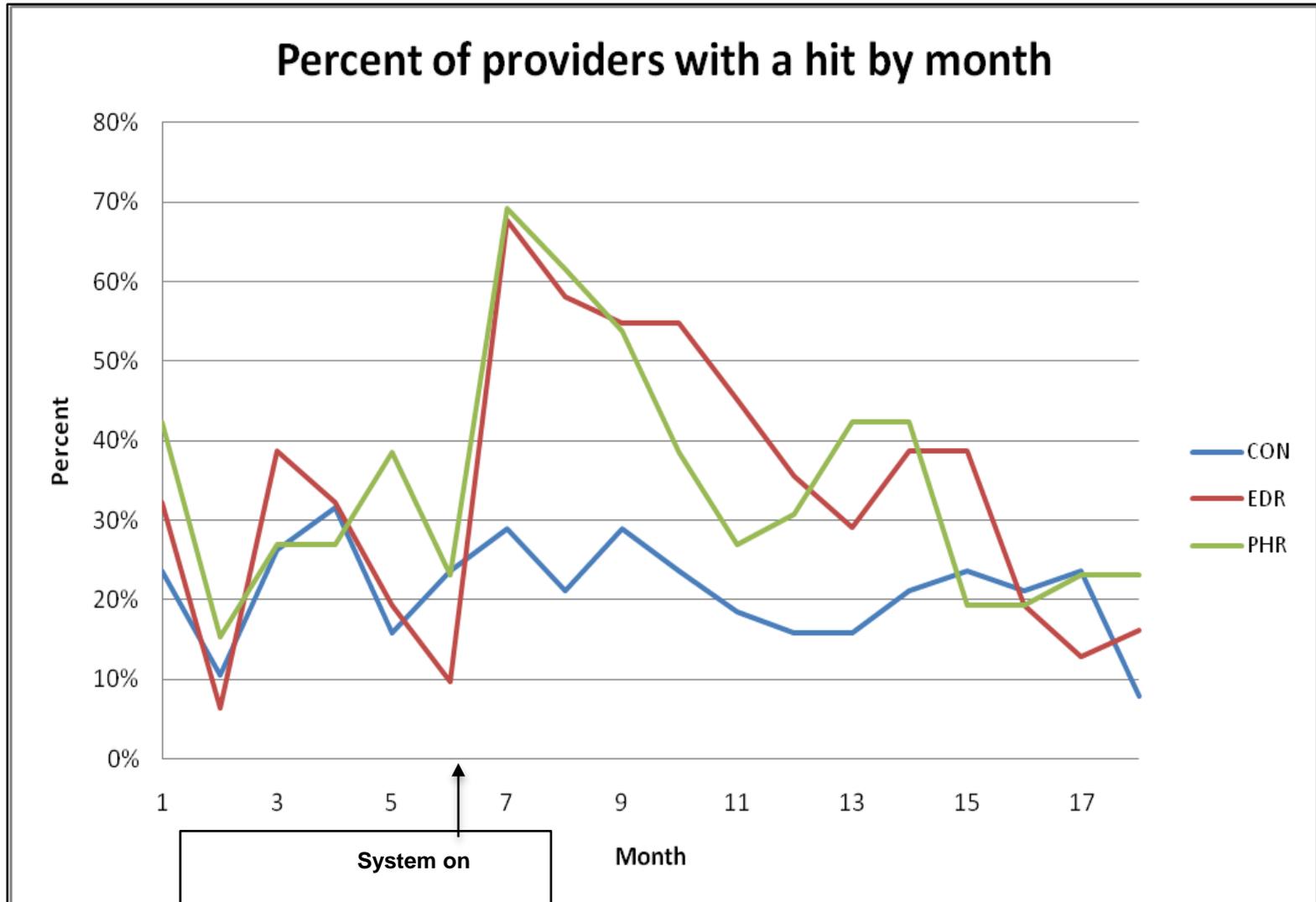
* One provider served during the intervention in both the Patient Activation and usual care groups

** Patients were counted multiple times when seen at different dental clinics

Results



Results



Conclusions

- Reminders in the EDR directly targeting dental providers and in PHRs directly targeting patients are both more effective at encouraging the use of care guidelines than reminders targeting patients.
- Both types of reminder alerts have a generalizable effect of increasing the rate at which providers reference guidelines and identify chronic medical conditions for all patients compared to usual care.
- The rate at which hits on guidelines occurs decreases after 12 months of use.
- To date, the value of providing an easily, accessible record of relevant patient health information and subsequent care guidelines at the point of care is demonstrated.

Future Directions

- Further data analysis is occurring to determine change in provider behavior and patient outcomes regarding complications and cost of care.
- There is a need to integrate the CDS with health information exchange organization to allowing transferability of CDS software to any clinic inside or outside of HealthPartners
- Further research is needed to determine how to sustain the results over time.
- Similar CDS is being developed for cancer tracking, weight management, implanted device tracking, and chronic back pain care

CDS and the Management of Hypertension in a Community Health Center

Helene Kopal, MPA, MPH
Primary Care
Development Corporation

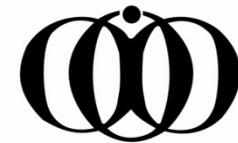
June 21, 2011

I do not have any relevant financial relationships with any commercial interests to disclose.

Our Team



PRIMARY CARE
DEVELOPMENT
CORPORATION



OPEN DOOR
FAMILY MEDICAL CENTERS

New York University



Columbia University
MAILMAN SCHOOL
OF PUBLIC HEALTH



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov

Study Aims

1. Test whether EMR with CDS and performance feedback is more effective in improving hypertension care than EMR alone.
2. Assess the implementation process and delineate factors that influence the adoption of the EMR supported QI intervention.

Conceptual Framework

Design Factors

Individual Factors

Organizational Factors

Team Factors

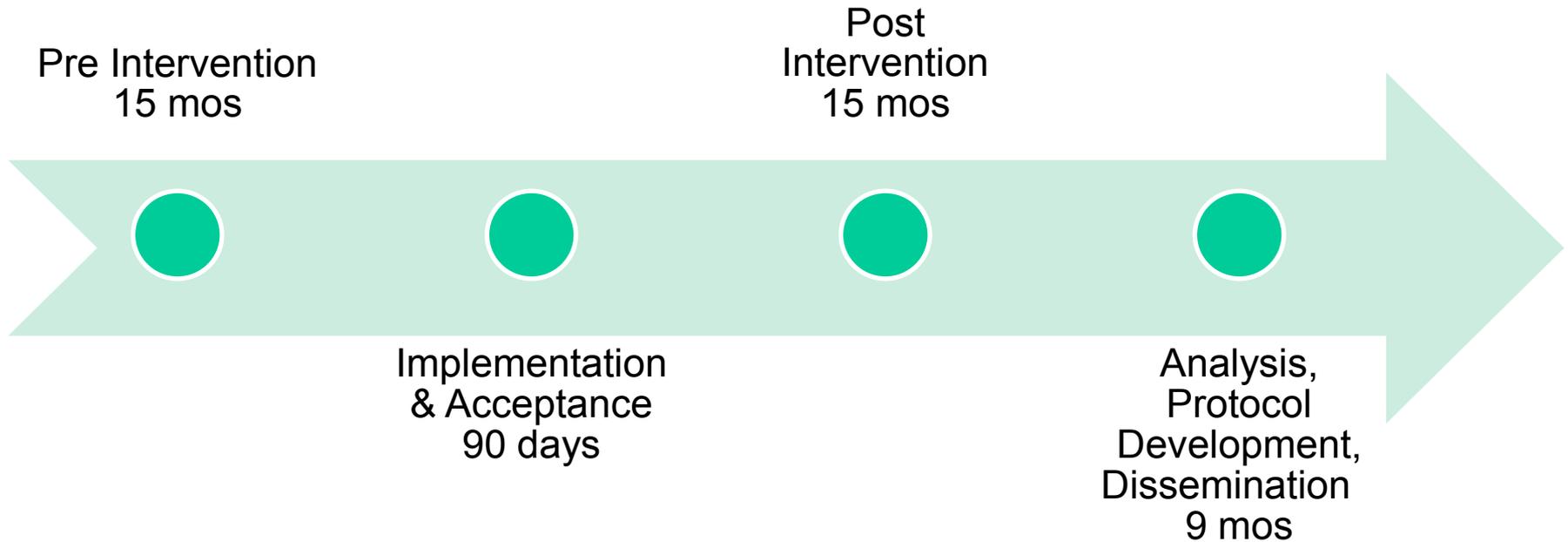


Usefulness and Usability of CDS



Compliance with HTN Guidelines

Project Timeline



HTN Template & Vital Sign Alert

testLabcorp, Self, 37 Y, F Sel Info Hub

55 park lane
 Franklin, MA 01234
 H:508-882-1111
 DOB:12/26/1971

Allergies
 Billing Alert

Wt: 162 lbs.
 Appt(L): 01/28/09
 PCP: AAA,
 Indian (includes Hindi & Tamil)
 Language: Tamil
 Translator: Yes

Ins: Self Pay
 Acc Bal: \$20.00
 Guar: Self
 Gr Bal: \$20.00
 Ren: Willis MD,

CLICK TO EDIT

SECURE NOTES

ADV DIRECT

SF Rel Bulleted Encounters 01/28/2009

Address: 55 park lane, Franklin, MA-01234
Encounter Date: 01/28/2009 **Provider:** Mt Kisco Advocate

Subjective:

Chief Complaint(s):

HPI: **Hypertension**

Med compliance misses frequently. Med side effects dizziness. Diet and exercise: runs, does treadmill. Cardiac symptoms: none.

Current Medication:

Medical History:

- asthma
- Hypertension

Allergies/Intolerance:

ROS:

Objective:

Vitals: Staff Name and title: pf, Pain scale (0-10) 0, BP 150/90 left arm, **210/76 right arm**

Past Results:

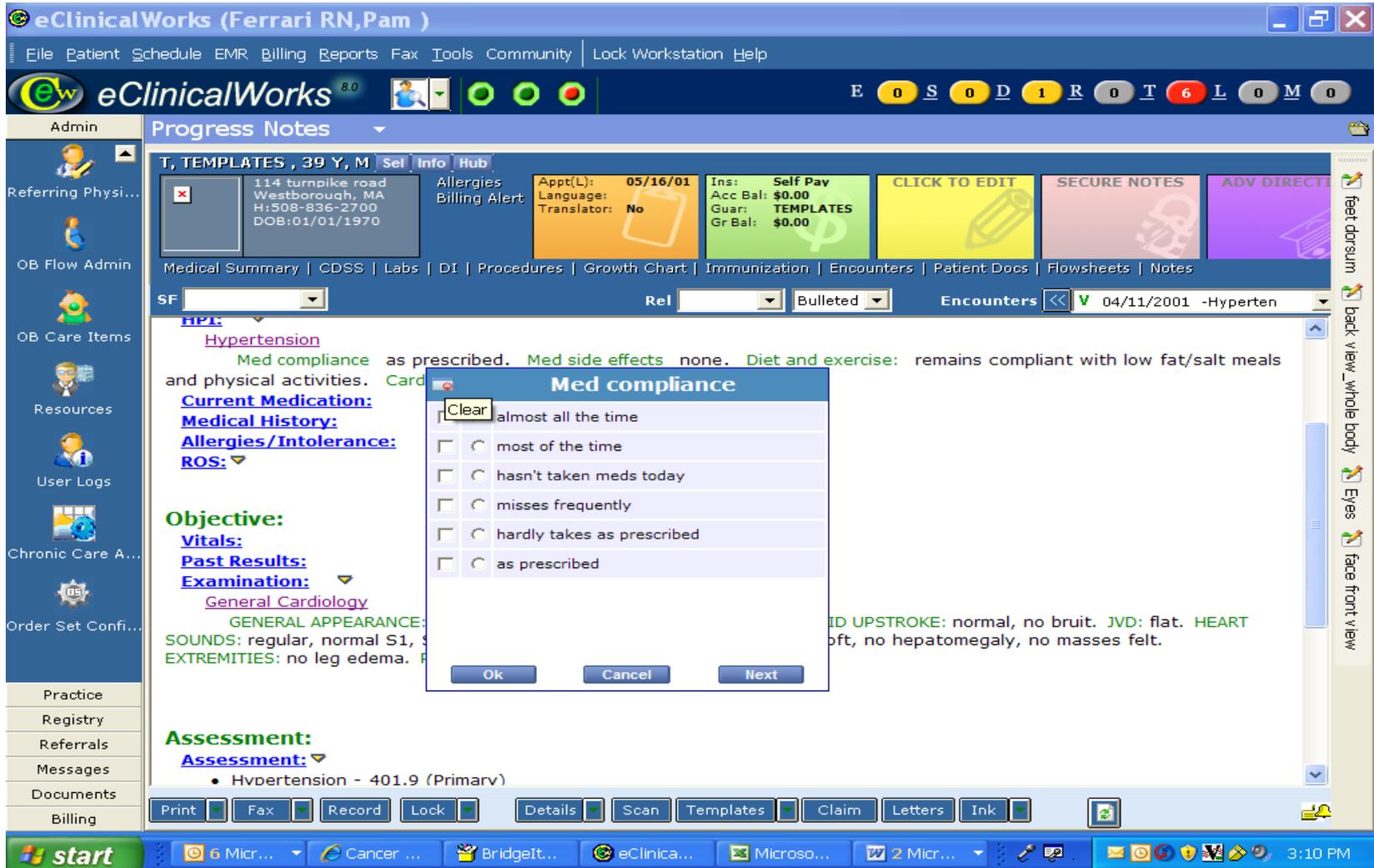
Examination: **General Cardiology**

GENERAL APPEARANCE: pleasant, NAD, HEENT: unremarkable, CAROTID/UPSTROKE: normal, no bruit, JVD: flat, HEART

Print Fax Record Lock Details Scan Templates Claim Letters Ink

feet dorsum
 back view _whole body
 Eyes
 face front view

Assessing Patient Adherence



eClinicalWorks (Ferrari RN,Pam)
 File Patient Schedule EMR Billing Reports Fax Tools Community Lock Workstation Help

Progress Notes | T, TEMPLATES, 39 Y, M | Sel Info Hub

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

Allergies Billing Alert Appt(L): 05/16/01
 Language: Translator: No
 Ins: Self Pay
 Acc Bal: \$0.00
 Guar: TEMPLATES
 Gr Bal: \$0.00

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

SF Rel Bulleted Encounters 04/11/2001 -Hyperten

HPT: Hypertension
 Med compliance as prescribed. Med side effects none. Diet and exercise: remains compliant with low fat/salt meals and physical activities.

Objective:
 Vitals:
 Past Results:
 Examination:
 General Cardiology
 GENERAL APPEARANCE:
 SOUNDS: regular, normal S1,
 EXTREMITIES: no leg edema.

Assessment:
 Assessment:
 • Hvpertension - 401.9 (Primary)

Med compliance
 almost all the time
 most of the time
 hasn't taken meds today
 misses frequently
 hardly takes as prescribed
 as prescribed

Print Fax Record Lock Details Scan Templates Claim Letters Ink

start 6 Micr... Cancer ... BridgeIt... eClinica... Microso... 2 Micr... 3:10 PM

Hypertension Order Set

Order Sets

Labs				Diagnostic Imaging			
<input type="checkbox"/>	Description	Date	Status	<input type="checkbox"/>	Description	Date	Status
<input type="checkbox"/>	-CBC With Differential/Platelet	-	Other Actions <input type="button" value="Save"/>	<input type="checkbox"/>	* ECG without ECW interface	-	Other Actions <input type="button" value="Save"/>
<input type="checkbox"/>	-Lipid Panel	07/16/2007	Other Actions <input type="button" value="Save"/>	<input type="checkbox"/>	* ECG with ECW Welch Allyn interface	-	Other Actions <input type="button" value="Save"/>
<input type="checkbox"/>	-CMET Comp. Metabolic Panel (14)	-	Other Actions <input type="button" value="Save"/>	<input type="checkbox"/>	* ECG with Midmark interface	-	Other Actions <input type="button" value="Save"/>

Procedures

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

Immunizations

<input type="checkbox"/>	Name	Dose	Date	Status
<input type="checkbox"/>	FLU VACCINE (Adult)	0.5 ml	-	Other Actions <input type="button" value="Save"/>
<input type="checkbox"/>	Pneumovax 23 (Adult)	0.5 ml	-	Other Actions <input type="button" value="Save"/>

Smart Forms

<input type="checkbox"/>	Name
<input checked="" type="checkbox"/>	BMI
<input checked="" type="checkbox"/>	Tobacco Control

Appointments

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

Referrals

--

Physician Education

PDF
WEB REFERENCE

Patient Education

PDF	<input type="button" value="Order"/>
WEB REFERENCE	<input type="button" value="Order"/>

Reminders

eClinicalWorks (Ferrari RN, Pam)

File Patient Schedule EMR Billing Reports Fax Tools Community Lock Workstation Help

eClinicalWorks 8.0

E 0 S 0 D 1 R 0 T 6 L 0 M 0

Admin Progress Notes

Practice

testLabco

Medical Su

SF

Patient E (http://h

Proced

Immun

- FLU
- Pne

Diagno

Lab Re

Next A

4W, S

Billing I

Visit C

Proced

- 800
- 800
- 930
- 906
- 904
- 90732 Pneumovax 23 (Adult).

Registry

Referrals

Messages

Documents

Billing

Print Fax Record Lock Details Scan Templates Claim Letters Ink

start 2 M... 3 I... 2 A... 2 W... Micro... eClini... Hype... 4:41 PM

CDSS Alerts

CDSS - Clinical Decision Support System Show All Alerts

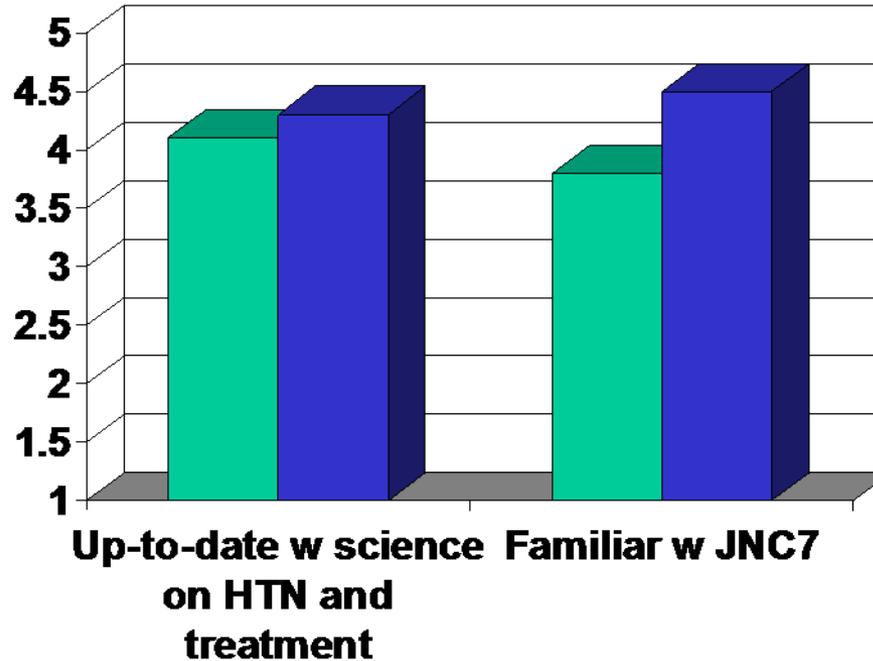
Measure Name	Fq	Status	Orders
Alcohol use screening	12 M	NON-COMPLIANT	Audit-C Other Actions
Breast cancer screening	24 M	NON-COMPLIANT	OD-Screening Mammogram
Cholesterol screen (genl pop)	60 M	NON-COMPLIANT	-Lipid Panel Other Actions
Depression screening	12 M	NON-COMPLIANT	PHQ2 Other Actions
Patients see assigned PCG	12 M	NON-COMPLIANT	Patients see assigned PCG
Sexual history taken	12 M	NON-COMPLIANT	Sexual History Other Actions
BP control in HTN (140/90)	12 M	SNOOZED	Hypertension - Control
Body Mass Index	24 M	COMPLIANT	BMI Other Actions
Influenza vaccine (over 50)	6 M	COMPLIANT	zzzINFLUEN; Other Actions
Pneumococcal vaccine	60 M	COMPLIANT	Pneumovax 23 (Adult) Ordered
Smoking cessation intervention	12 M	COMPLIANT	Smoking Cessation
Smoking status	12 M	COMPLIANT	Tobacco Control Other Actions

Treatment Billing

Provider Performance Reports

Provider	1	2	3	4	5
Total # Hypertensive Patients	36	60	12	21	43
% DM BP Controlled <130/80	9.00%	30.00%	25.00%	10.00%	50.00%
Hypertension no DM Well Controlled <140/90	55.00%	52.60%	36.40%	70.00%	50.00%
# of patients Order Sets Used	0	19	1	4	8
% of patients with order Set Used	0.00%	31.67%	8.33%	19.05%	18.60%

Attitudes: HTN and JNC7 Guidelines

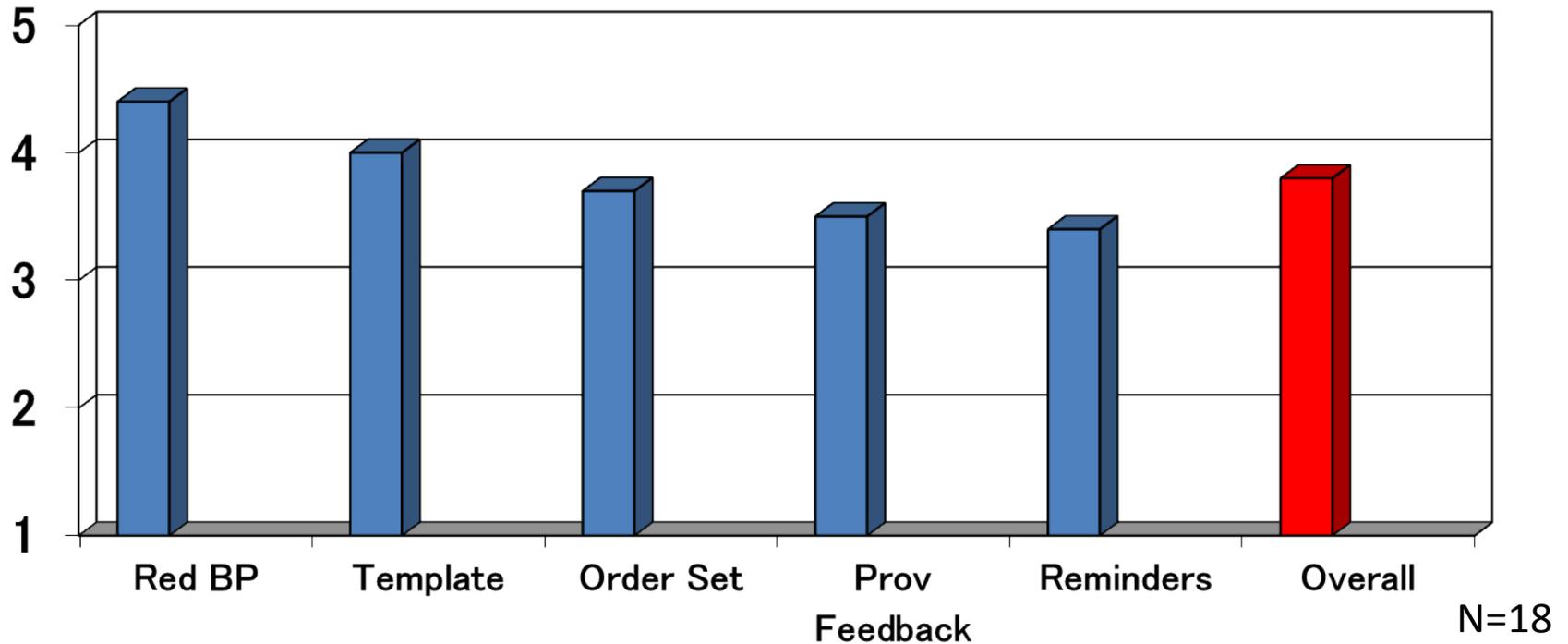


N=11

Mean ± S.D.		
Baseline	Follow-up	P (paired t-test)
4.1 ± .54	4.3 ± .65	.17
3.8 ± .60	4.5 ± .52	.01*

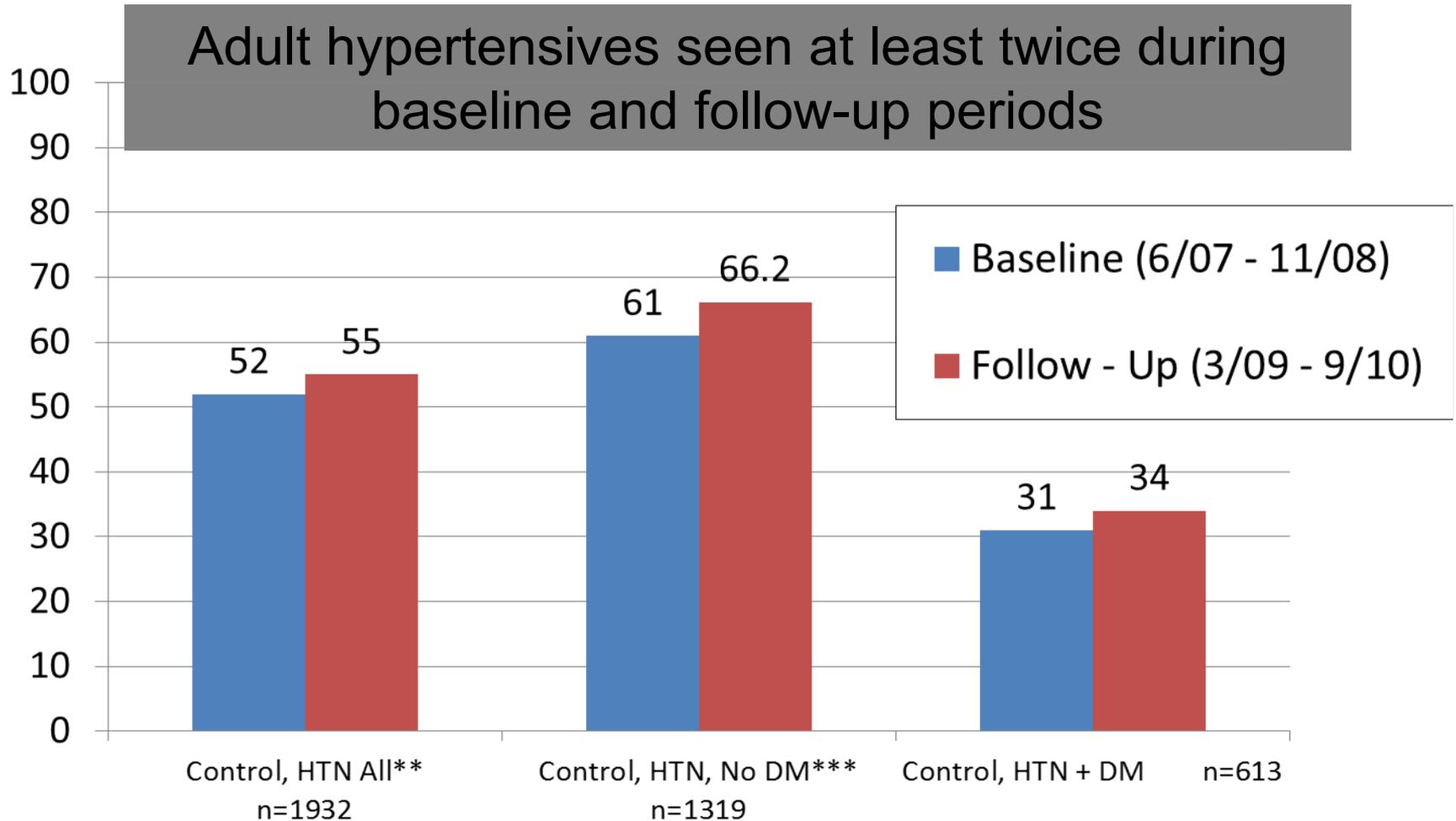
Source: Provider Surveys March 2008 and March 2010

Satisfaction with CDS Components



Source: Provider Surveys March 2010

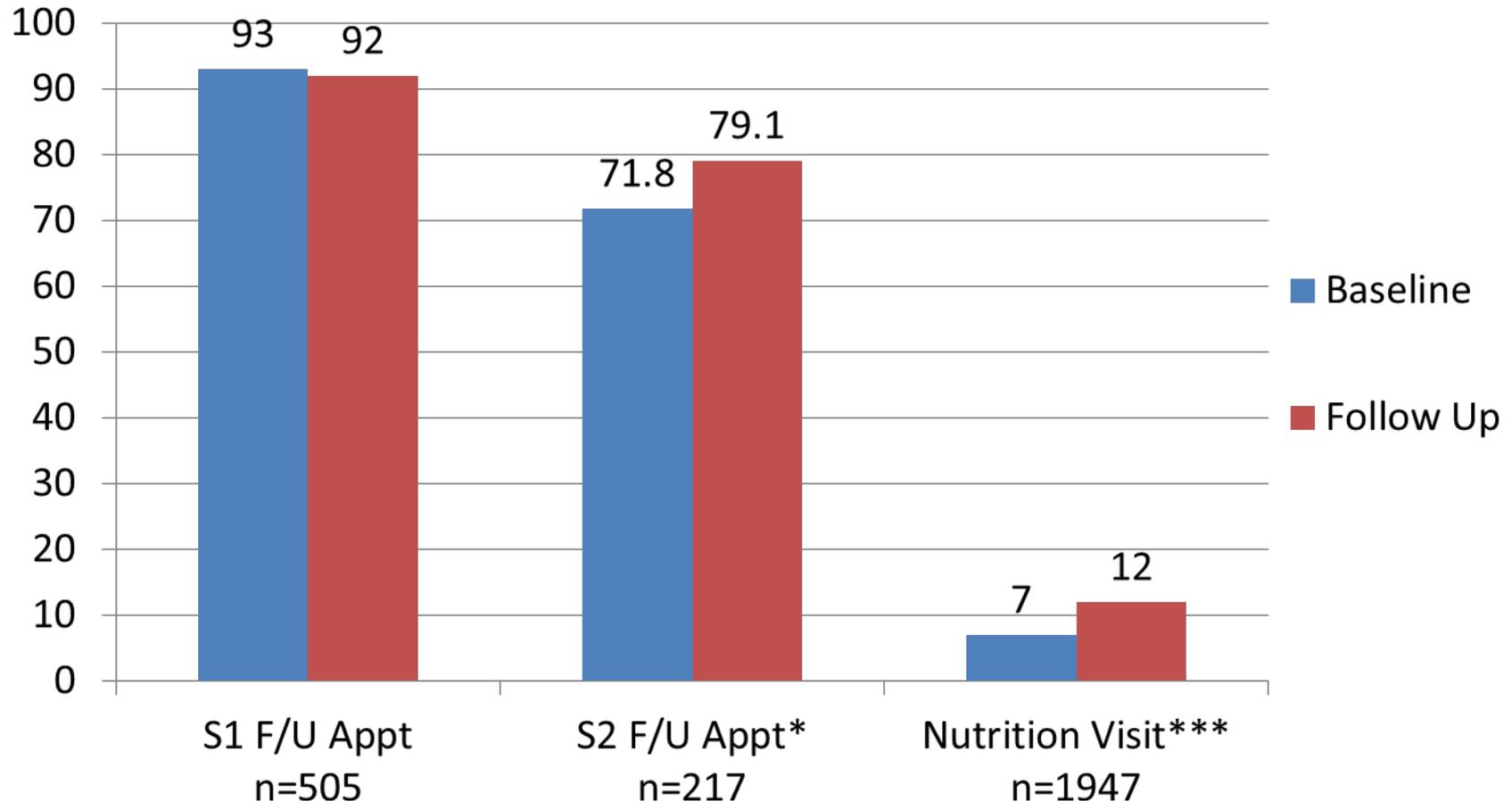
Primary Outcomes: HTN Control



Source: Open Door EMR

Process of Care: Follow Up Appts

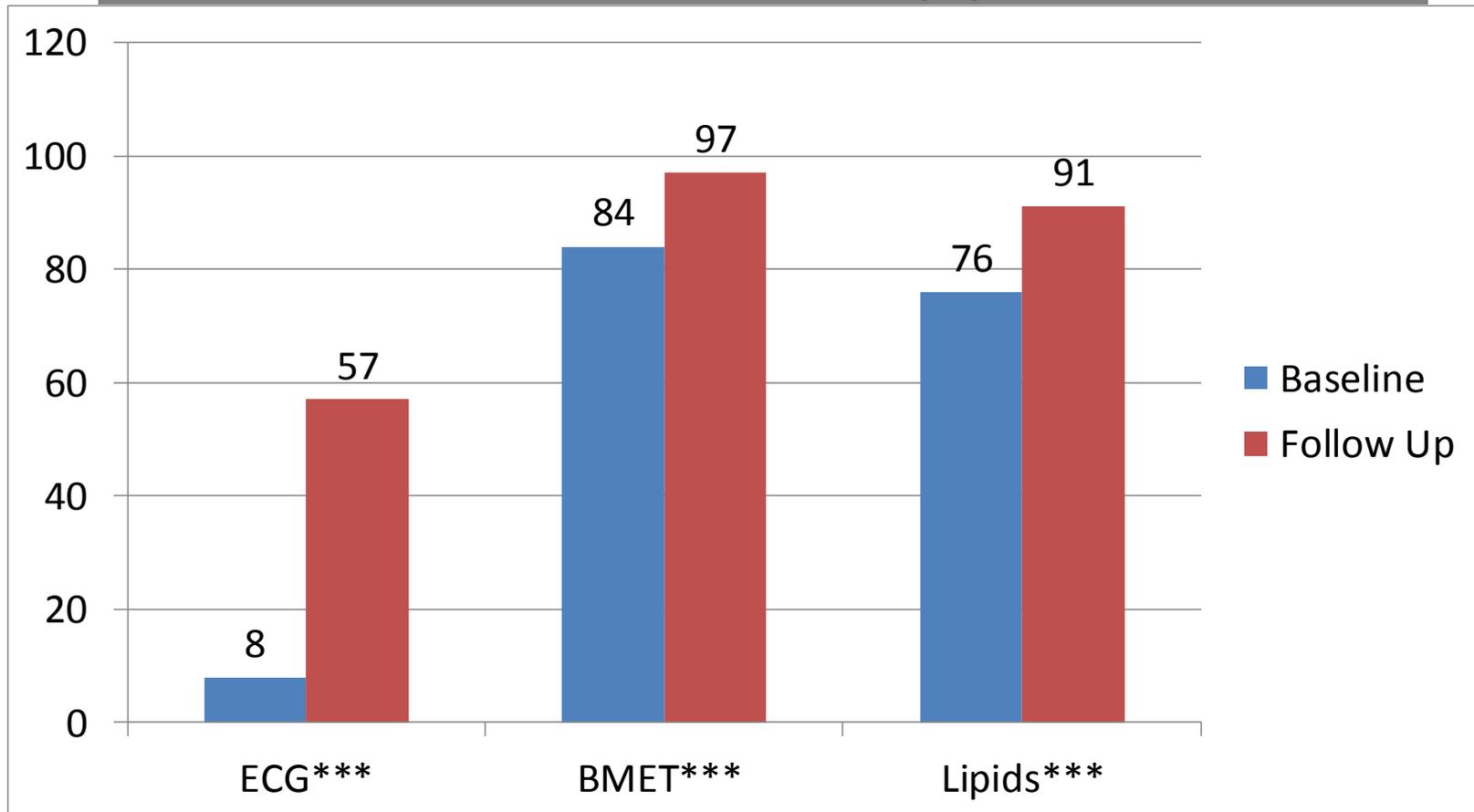
Adult hypertensives seen at least twice during baseline and follow-up periods



Source: Open Door EMR

Process of Care: Lab Tests

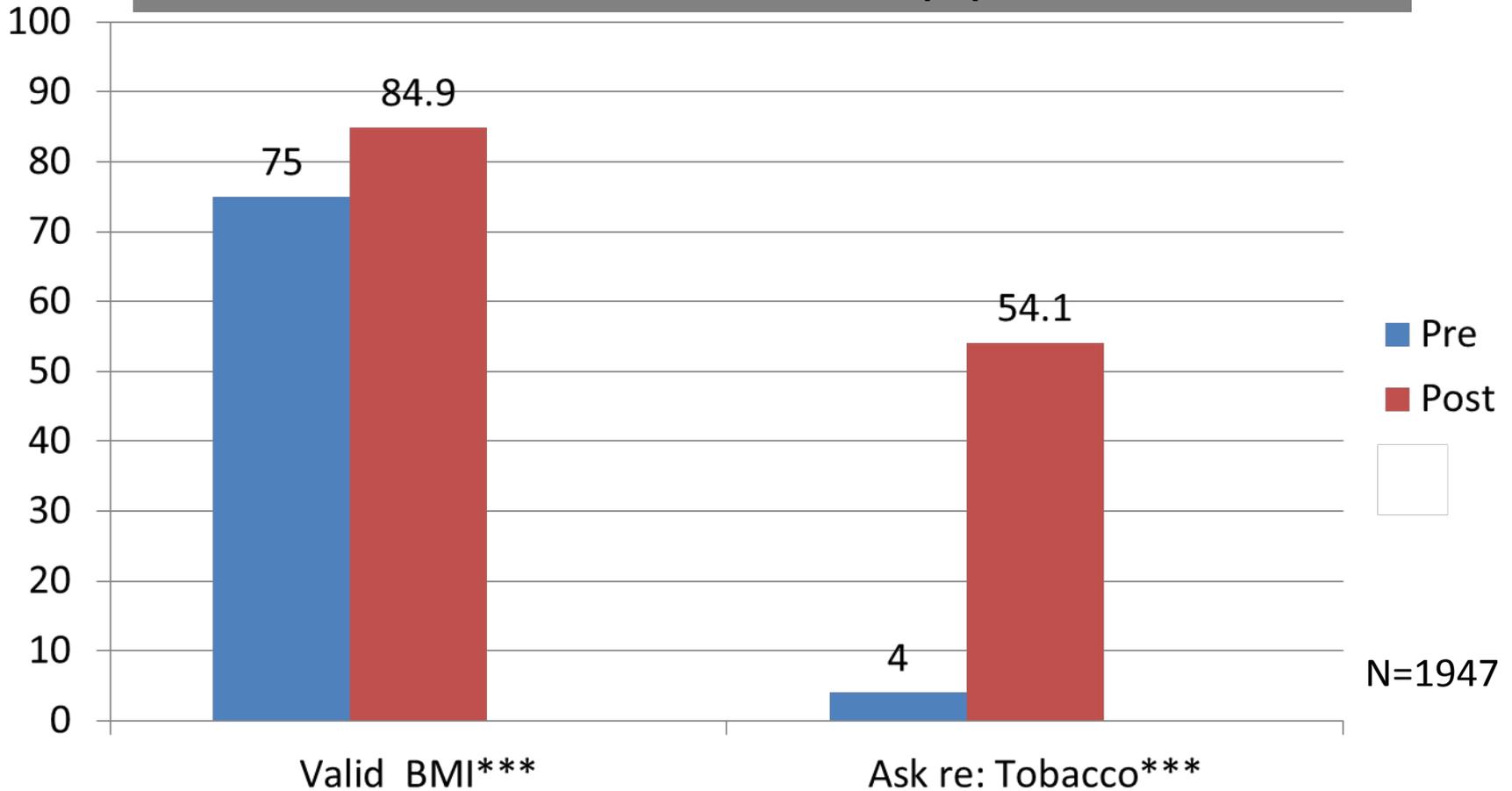
Adult hypertensives seen at least twice during baseline and follow-up periods



Source: Open Door EMR

Process of Care: Lifestyle

Adult hypertensives seen at least twice during baseline and follow-up periods



Qualitative Findings



“ I like to be validated in what I do. . . since [hypertensives] are not my typical patient . . . The little hint for the labs, the immunizations, and the appointments are pros”

“. . . There are many different pieces to this sort of package that we’re implementing here and it’s just all these things together plus paying more attention to hypertension”

“ the process we went through forced me to do it in a much more methodical way. . . On this project, I took a lot more input from other people and got a lot better buy-in. . . Also the teaching was more thorough and certainly documented better”



“ I find [the template] awkward to ask questions in the way they’re formatted there and it takes me more time”

“. . . CDS sometimes interferes with workflow; if I’m busy, the questions can be too long. If the patient has multiple problems, [it asks for] too many details. . .”

“. . . The implementation probably was a little bit too specific and maybe was a little overdrawn”

Critical Success Factors

- ✓ Culture of Quality Improvement, Learning, and Change
- ✓ Multi-faceted intervention
 - something for everyone
 - flexibility
 - creates heightened awareness to HTN
- ✓ Fit with workflow
- ✓ System stability and reliability

Questions?

This project was funded by grant number R18 HS17167 from the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services. The opinions expressed in this document are those of the authors and do not reflect the official position of AHRQ or the U.S. Department of Health and Human Services.

Using Health IT for Chronic Disease Management – A Cluster Trial followed by Region-wide Applications

Randall D. Cebul, MD
Case Western Reserve University
at MetroHealth Medical Center
Cleveland
rdc@case.edu

Supported by AHRQ Grant R01 HS15123 and
The Robert Wood Johnson Foundation

I do not have any relevant financial relationships with any commercial interests to disclose.



Objectives of Presentation

- To describe how an AHRQ-funded trial (AHRQ: “DIG-IT”) led to a region-wide EMR-catalyzed quality improvement program in chronic disease (RWJF: “Better Health *Greater Cleveland*”)
 - To describe how EMRs were used to design the DIG-IT trial and provide decision support for diabetes
 - To summarize DIG-IT results and lessons learned
 - To describe how EMRs are used in *Better Health* to publicly report and improve region-wide care and outcomes for diabetes, hypertension, and heart failure
 - To describe the EMR quality difference in the context of the regional collaborative.



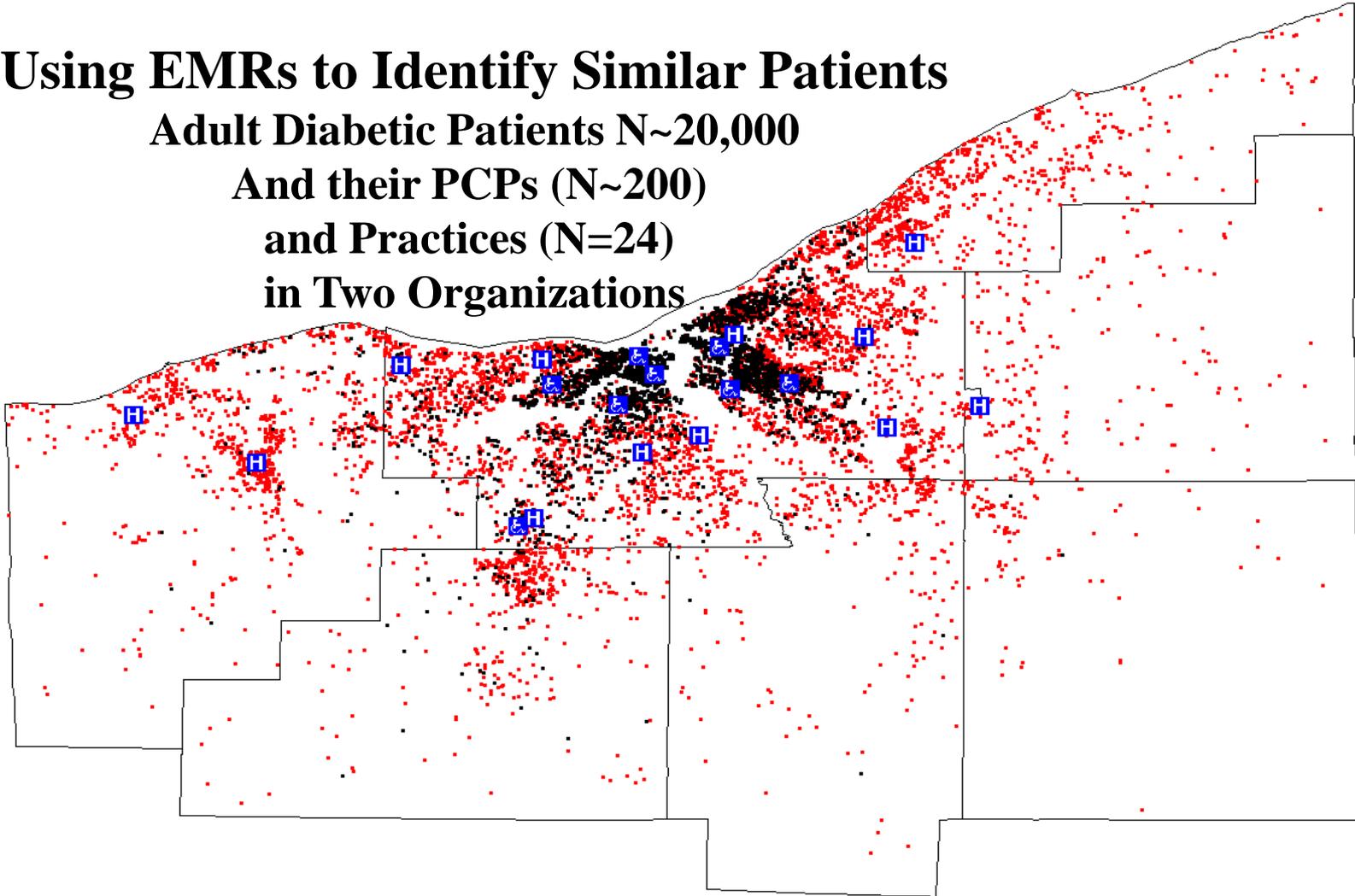
Goals of AHRQ DIG-IT Trial: 2005-08

- To determine the effect of an EMR-based Clinical Decision Support (CDS) system on care and outcomes in adult diabetes in two health care systems
 - Care (5 ADA measures)
 - Outcomes (5 measures)
 - Cluster Randomized Trial (CRT)
- To compare CDS to usual care:
 - By insurance
 - Among established vs new-to-system patients



Study Design: Identifying Patients

Using EMRs to Identify Similar Patients
Adult Diabetic Patients N~20,000
And their PCPs (N~200)
and Practices (N=24)
in Two Organizations



Study Design: Identifying Practice Characteristics to Balance Groups Before R

Baseline variation in achieving standards of diabetes care

-30 practices in Greater Cleveland

www.betterhealthcleveland.org

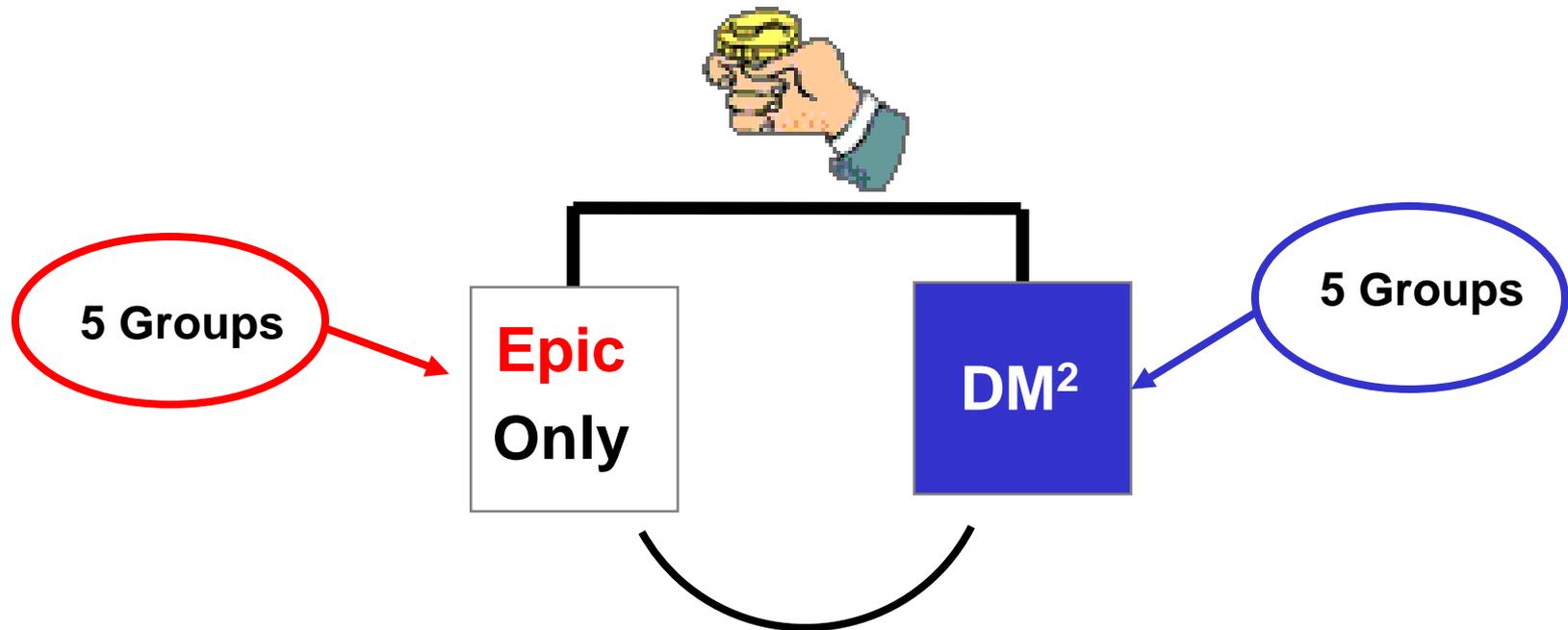
Practice Name and System	Summary Outcome Standard (%)	Good Blood Sugar Control (%)	Good Blood Pressure Control (%)	Cholesterol in Good Control (%)	Weight in Good Control (%)	Not Smoking (%)
REGION - ALL 30 EMR PRACTICES	38	68	49	83	31	83
Avon Medical Facility	KP 26	54	46	87	17	82
Beachwood Family Health Ctr	CC 41	67	48	77	35	91
Bedford Medical Center	KP 43	66	56	88	35	86
Broadway Health Center	MH 25	62	35	80	32	66
Brooklyn Medical Group	MH 31	66	48	74	28	75
Buckeye Health Center	MH 30	69	41	84	30	72
Chagrin Falls Family Health Ctr	CC 40	73	49	78	29	88
Chapel Hill Medical Center	KP 40	75	54	86	16	86
Cleveland Clinic - Main Campus	CC 40	67	48	84	35	83
Cleveland Heights Medical Ctr	KP 35	60	37	87	39	83
Fairlawn Medical Center	KP 37	68	47	85	14	89
Independence Fam. Health Ctr	CC 42	72	55	81	28	88
J. Glen Smith Health Center	MH 27	57	48	79	24	63
Lakewood Family Health Center	CC 31	66	48	83	33	68
Lakewood Medical Center	KP 27	53	45	87	18	81
Lee-Harvard Health Center	MH 30	70	37	89	28	80
MHMC - Faculty/Residents	MH 32	67	47	87	29	68
MHMC - Family Practice	MH 28	63	46	79	27	68
MHMC - Internal Medicine	MH 39	71	53	84	30	77
Parma Medical Center	KP 39	63	53	86	31	85
Solon Family Health Center	CC 45	73	55	82	33	92
Strongsville Family Health Ctr	CC 36	70	46	74	31	89
Strongsville Medical Center	KP 45	72	55	85	32	88
Strongsville Medical Group	MH 36	70	50	81	26	78
Thomas F. McCafferty Health Ctr	MH 34	67	48	78	32	75
Twinsburg Medical Center	KP 38	64	53	86	28	87
West Park Medical Group	MH 26	74	41	77	21	76
Westlake Family Health Center	CC 40	74	49	78	31	88
Willoughby Hills Family Health Ctr	CC 44	73	57	81	30	86
Willoughby Medical Center	KP 49	69	57	87	40	86
REGION - ALL 30 EMR PRACTICES	38	68	49	83	31	83

Baseline Characteristics of Practices after Balancing

Variable	Group A	Group B	ICC	P-Value
# of Practices	5	5		
# of Pts	2281	2025		
% A-A	48.7	49.1	<0.001	0.830
% Smoker	25.2	22.6	0.001	0.049
Ave Syst BP	136.1	136.2	<0.001	0.859
% A1c>9	18.7	16.9	0.001	0.138
% on Insulin	18.5	19.6	<0.001	0.392
Slope A1c	-0.66	-0.57	<0.001	0.228



10 Practices Assigned Randomly to CDS for Diabetes Mellitus (DM²) or to Usual *Epic* Care



2 Clusters of
10 Practices
~100 PCPs
~8000 Patients

EMR-Based CDS Intervention

- Illustrative components:
 - Filtered Alerts/linked orders
 - Weekly performance feedback



Encounter-based Alerts: Filtered to Minimize FPs

BestPractice Alerts (View Only)

▼ Consider prescribing ACE inhibitor or ARB (Microalbumin 30 or higher)

(Last MICROALB=34 on 3/3/2005)

(Last CR=1.3 on 7/31/2001)

(Last K=4.3 on 5/8/2001)

{Links to Automated Order Set}

What do we know about this patient?

- She has diabetes and is visiting her PCP
- Her kidneys are leaking protein.
- She has no other contraindications (K, Cr)
- She is not on an ACE inhibitor or ARB and has no documented allergies to them.
- There are several alternative drugs/doses

Comparative Performance Reports: Weekly

Epic Hyperspace - WP INTERNAL MEDICINE - MetroHealth Production - PETER (M... Results, Overdue Results

Desktop Action Patient Care Scheduling HIM Billing Reg/ADT Referrals Reports Tools Admin Help

Back Forward Home Schedule In Basket Review Encounter Tel Enc Refill Patient Lists References Print Log Out

Home Workbench Workspaces

Activities Diabetes Report Close

Diabetes Report

How are My Diabetic Patients Doing? (PCP=)

[Click to View Diabetics at My Site](#)

	# of DM Patients	Female, %	Age, mean (range)	Race, % Caucasian	A1c, mean (range)	LDL, mean (range)	BP, mean (range)	BMI, median (range)
MY Diabetic Patients	101	46	60 (32-89)	81	7.1 (5-11)	114 (27-244)	135 (88-199)	34 (20-73)
All MHS Adult Diabetics	6211	63	58 (18-97)	39	7.5 (4-18)	115 (4-391)	136 (66-258)	33 (13-91)

Percent of Diabetics Meeting ADA Criteria

Criteria	MY Diabetic Patients (%)	All MHS Adult Diabetics (%)
A1c ≤ 7.0	60	52
LDL ≤ 100.0	39	41
Non-Smoker	79	74
Proteinuria & on ACE/ARB	79	86
Eye Visit Within 1 Year	21	30
Systolic BP ≤ 130	45	45

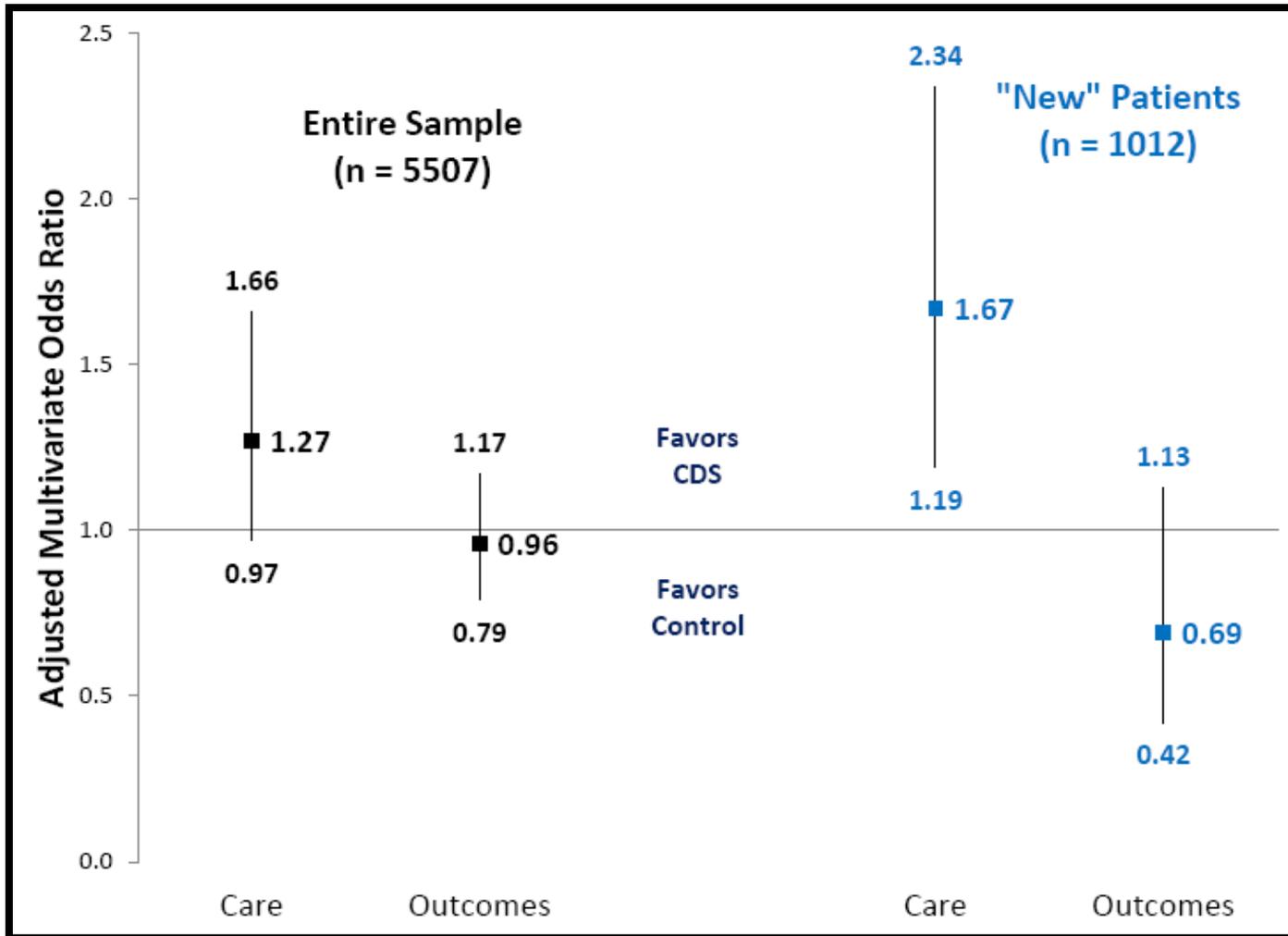
Workspace hotkey list

Exit Workspace

Start GroupWise - Mailbox Mail From: "Peter J. D..." DIG-IT Meeting Agen... Epic Hyperspace - WP INT... Microsoft PowerPoint ... 9:38 AM Research and Quality Health Care • www.ahrq.gov

“My panel” vs. Comparator

CDS > Control for Care but not Outcomes; Effect Larger for New Patients



Lessons Learned

- In a CRT, it is difficult to control other organizational interests in order to maintain CRT study integrity
 - Two system study ->> One system study
 - Tethered PHR in system #2 (additive to CDS) could not be confined to study sites
- Conventional CDS is a tool for *providers*
 - Effect is greater for care than outcomes (which require patient engagement as well)
 - Providers overwhelmingly desired to maintain CDS, now for 3 years after trial ended
- Cross-institutional studies require *trust*
 - “Trust trumps technology”



Building on Our DIG-IT Experience

- To region-wide EMR-catalyzed collaborative in QI for chronic conditions
 - New conditions (DM + HBP + HF)
- Twice-yearly records-based public reporting
 - Not using insurance claims
- Sharing best practices in EMR adoption and Meaningful Use
 - Learning Collaborative Summits
 - Practice Coaching

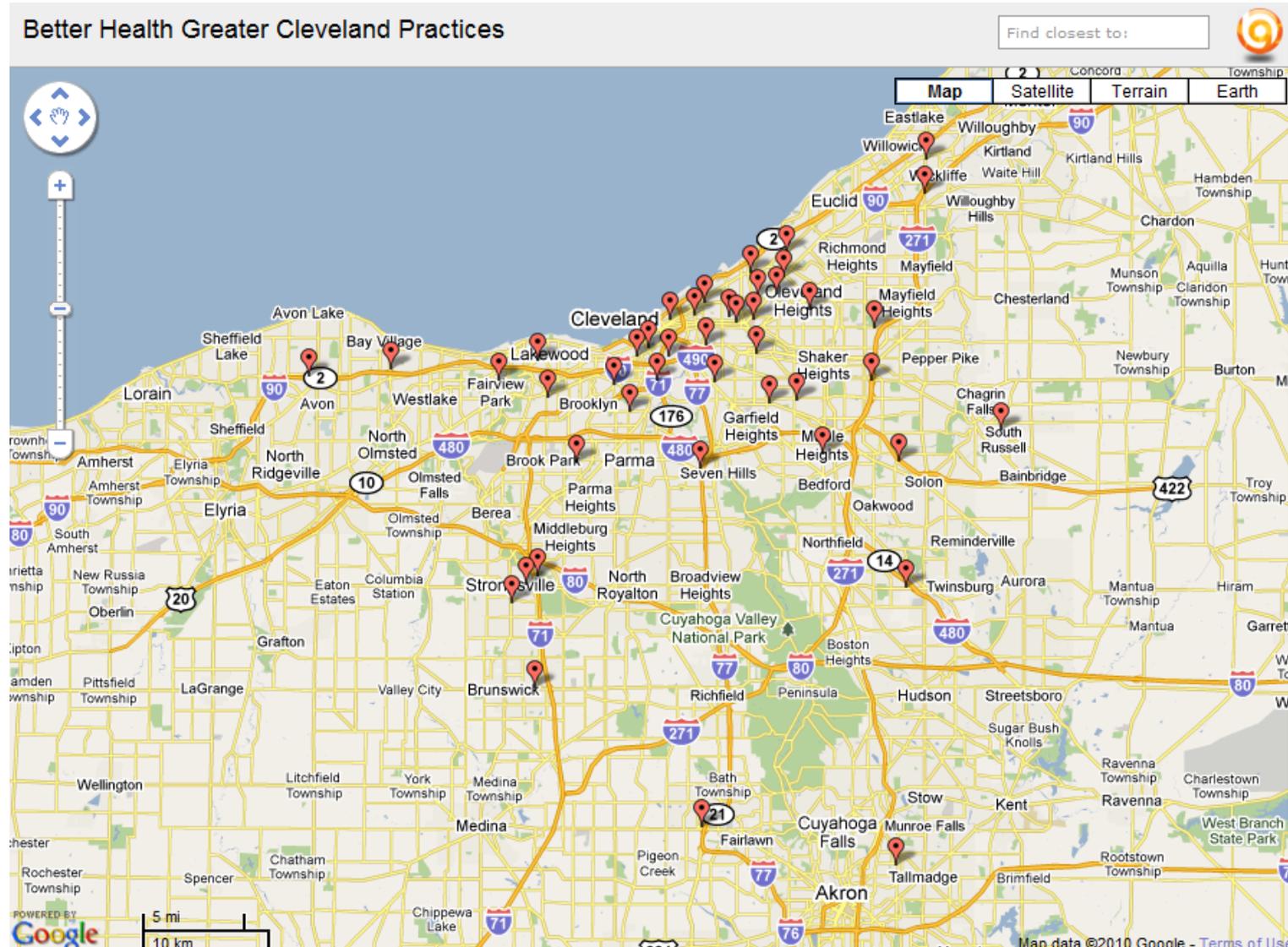


Part of a National Network

Aligning Forces for Quality Communities Supported by the Robert Wood Johnson Foundation



Partner Practices in the Region



Diversity in Partners (2010)

TABLE 1. CHARACTERISTICS OF PATIENTS INCLUDED IN THIS REPORT

	Diabetes		High Blood Pressure		Heart Failure	
# of Patients	28,997		108,608		5,251	
# of Primary Care Practices	48 (8 health systems)		48 (8 health systems)		34 (3 health systems)	
	Better Health Population	Range of Values Across Sites	Better Health Population	Range of Values Across Sites	Better Health Population	Range of Values Across Sites
Insurance (%)						
Medicare	35.0	0 – 48	43.2	0 – 61	72.5	18 – 85
Commercial	43.3	0 – 74	41.4	0 – 78	19.2	2 – 40
Medicaid	8.9	0 – 39	6.3	0 – 37	5.2	0 – 34
Uninsured	12.8	0 – 100	9.1	0 – 100	3.1	0 – 21
Medicaid + Uninsured	21.7	0 – 100	15.4	0 – 100	8.3	0 – 49
Race/Ethnicity (%)						
White	52.6	2 – 96	60.8	2 – 98	64.6	3 – 97
African-American	39.6	1 – 97	34.5	0 – 97	32.0	0 – 97
Hispanic	4.6	0 – 64	2.2	0 – 54	1.9	0 – 46
Other	3.2	1 – 64	2.5	0 – 52	1.5	0 – 27
Non-White	47.4	4 – 98	39.2	2 – 98	35.4	3 – 97
Preferred Language (%)						
English	95.9	35 – 100	97.1	42 – 100	96.2	53 – 100
Spanish	2.2	0 – 57	1.1	0 – 51	1.2	0 – 48
Other Languages	1.9	0 – 63	1.8	0 – 57	2.6	0 – 30
Average Age	57.7	50 – 62	62.0	50 – 69	70.7	57 – 76
% Female	53.7	35 – 75	57.4	32 – 79	50.2	27 – 70
Median Household Income (\$)	41,200	25,500 – 68,000	44,300	25,300 – 71,200	43,100	25,000 – 69,000
High School Graduation Rate (%)	79.6	64 – 90	81.7	66 – 92	80.9	65 – 91
Average Body Mass Index	34.1	29 – 36	31.7	28 – 35	Not reported.	
% Not Smoking	79.7	42 – 92	82.0	31 – 92		

Learning Collaborative Summit March 5, 2010



“Be part of this picture!”

Sharing the experience of new adoption



Individual & Composite Standards

TABLE 2. BETTER HEALTH'S INDIVIDUAL AND COMPOSITE STANDARDS FOR DIABETES

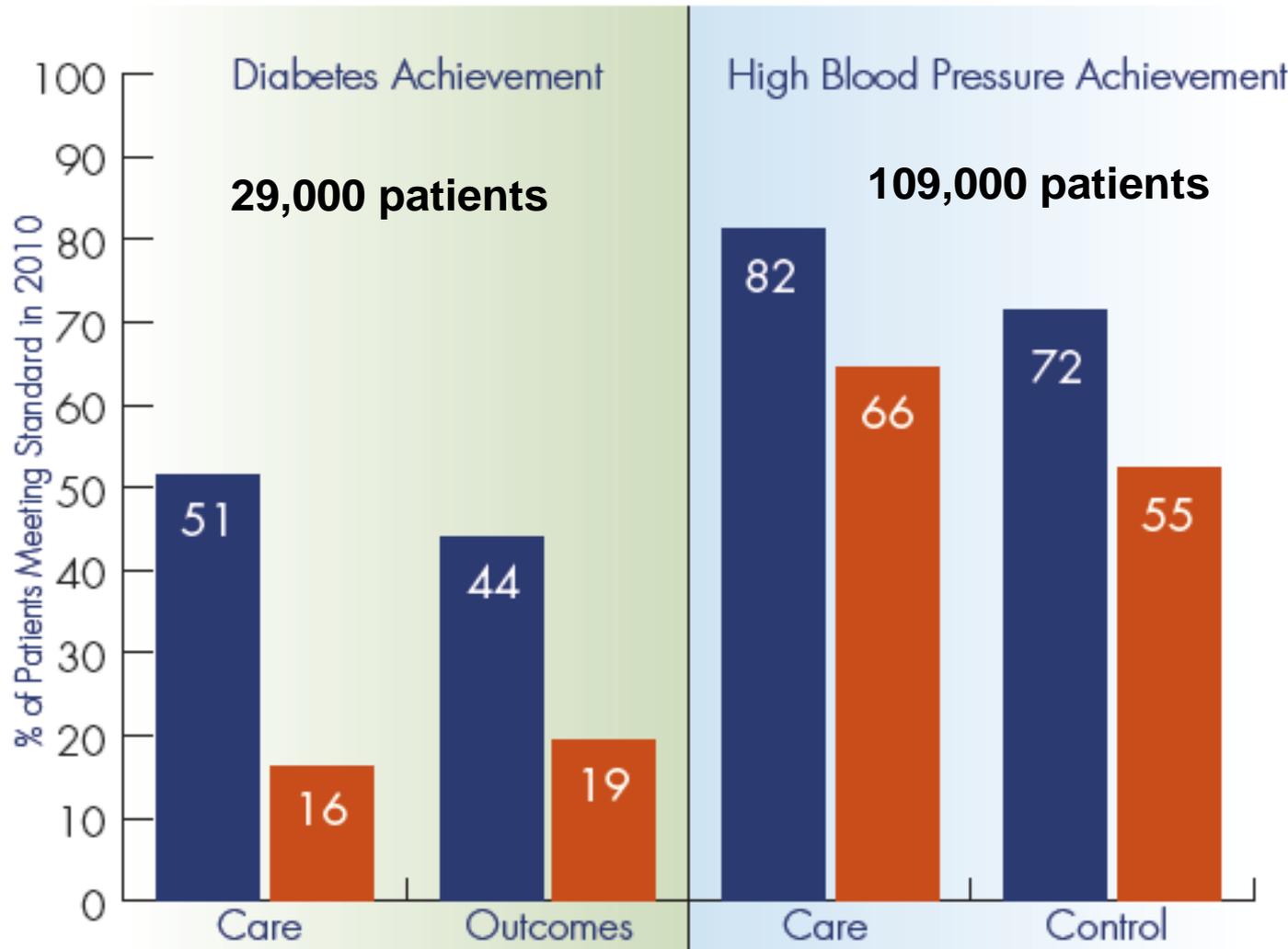
Care 4 standards for good routine care	Outcomes 5 standards of good control
<p>Blood Sugar Control Test done</p> <p>Screening for or Treatment of Kidney Problems</p> <p>Annual Eye Examination</p> <p>Pneumonia Vaccine given</p>	<p>Blood Sugar Controlled (Hemoglobin A1c < 8%)</p> <p>Blood Pressure Controlled (BP < 140/80)</p> <p>LDL ("Bad") Cholesterol < 100 or Statin Prescription</p> <p>Weight Controlled (Body Mass Index < 30)</p> <p>Documented Non-Smoker</p>

TABLE 3. BETTER HEALTH'S INDIVIDUAL AND COMPOSITE STANDARDS FOR HEART FAILURE

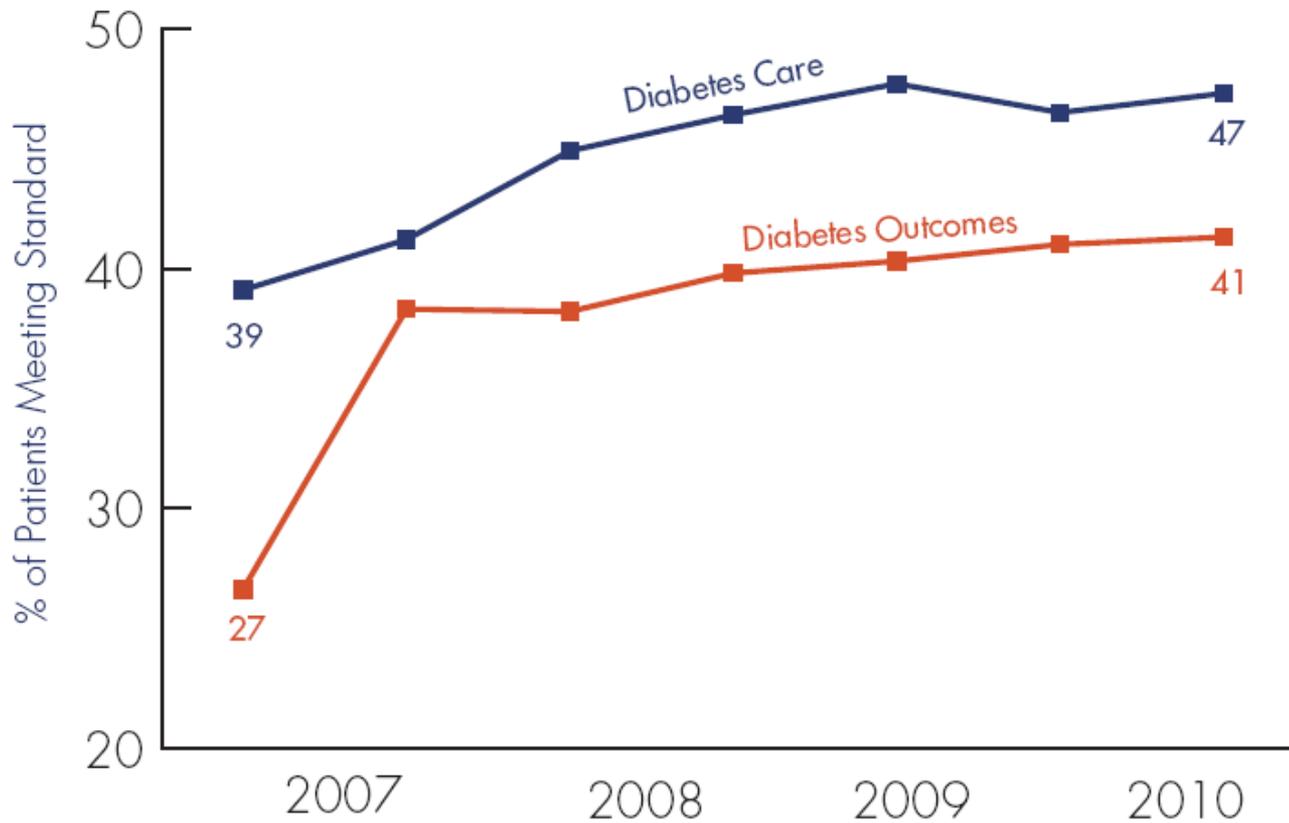
Evaluation Standards 4 Standards of Good Assessment	Treatment Standards 2 Types of Evidence-Based Medications
<p>Heart Function Test Done (*Echo* to see how well the heart is pumping)</p> <p>Blood Test Done Each Year (Basic Metabolic Panel to check blood chemistry)</p> <p>Weight Checked Regularly (Look for fluid retention to monitor heart function)</p> <p>Blood Pressure Checked Regularly (High Blood Pressure can signal serious heart problems)</p>	<p>ACE/ARB Medication (Improves heart and kidney function and lowers blood pressure)</p> <p>Beta-Blocker Treatment (Blocks stress hormones, which make the heart work harder)</p>
<p>Evaluation Composite: Percent of patients who meet all 4 standards</p>	<p>Treatment Composite: Percent of patients with moderate or severe heart failure who received at least one of the medications</p>



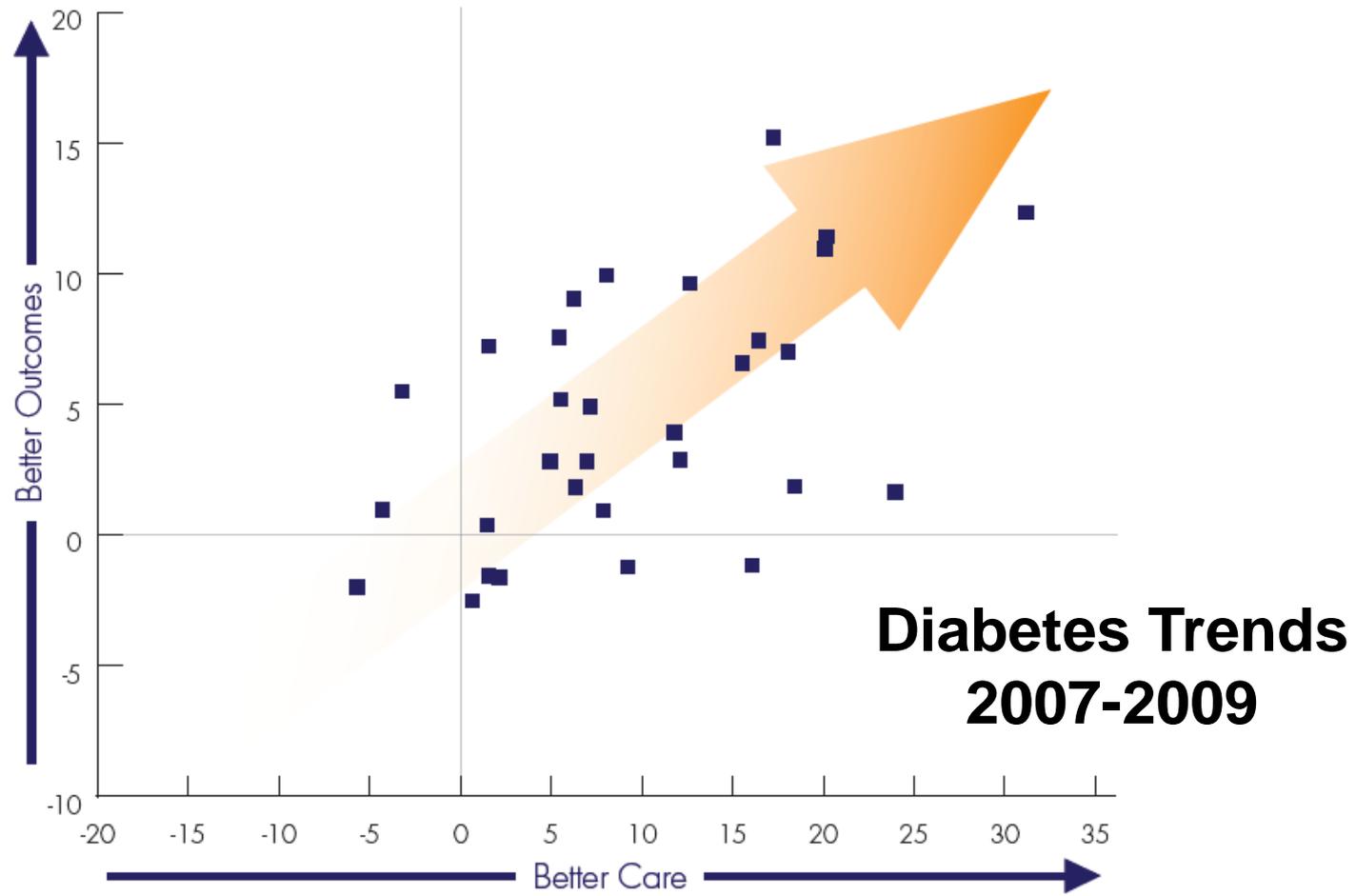
EMR vs Paper Achievement: 2010



Regional Improvement in DM: Care>Outcomes



Better Care, Better Outcomes



**Do practices using EMRs do better,
improve faster, for all patients?**



Presentation for Academy Health meeting 6-13-11

Quality of Care and Electronic Medical Records: Implications of Increased Adoption and Meaningful Use.

RD Cebul^{1,4}, TE Love^{1,4}, AK Jain^{2,4}, CJ Hebert^{3,4}

MetroHealth Medical Center at Case Western Reserve University¹, Cleveland Clinic², Kaiser Permanente Ohio³,
Better Health *Greater* Cleveland⁴

Supported in part by the Robert Wood Johnson Foundation

Better Health *Greater* Cleveland
An Alliance for Improved Health Care



EMR Effects on Quality and Cost

- Incentives for EMR adoption anticipate a quality-related ROI
- Data are mixed re: both QI and cost savings of EMRs
 - Positive results (eg, Group Health, Geisinger) did not have paper-based comparators
 - Widely cited negative studies use inadequate and dated survey data
- Data are scarce re: EMR adoption among “priority primary care providers”
 - For whom EMR adoption is supported by HIT Regional Extension Centers (RECs)

Objectives

- To compare achievement and trends in care and outcomes of EMR- and paper-based practices for adult patients with diabetes
 - Overall, and stratified by insurance type
 - For Composite standards for Care and Outcomes as well as individual metrics

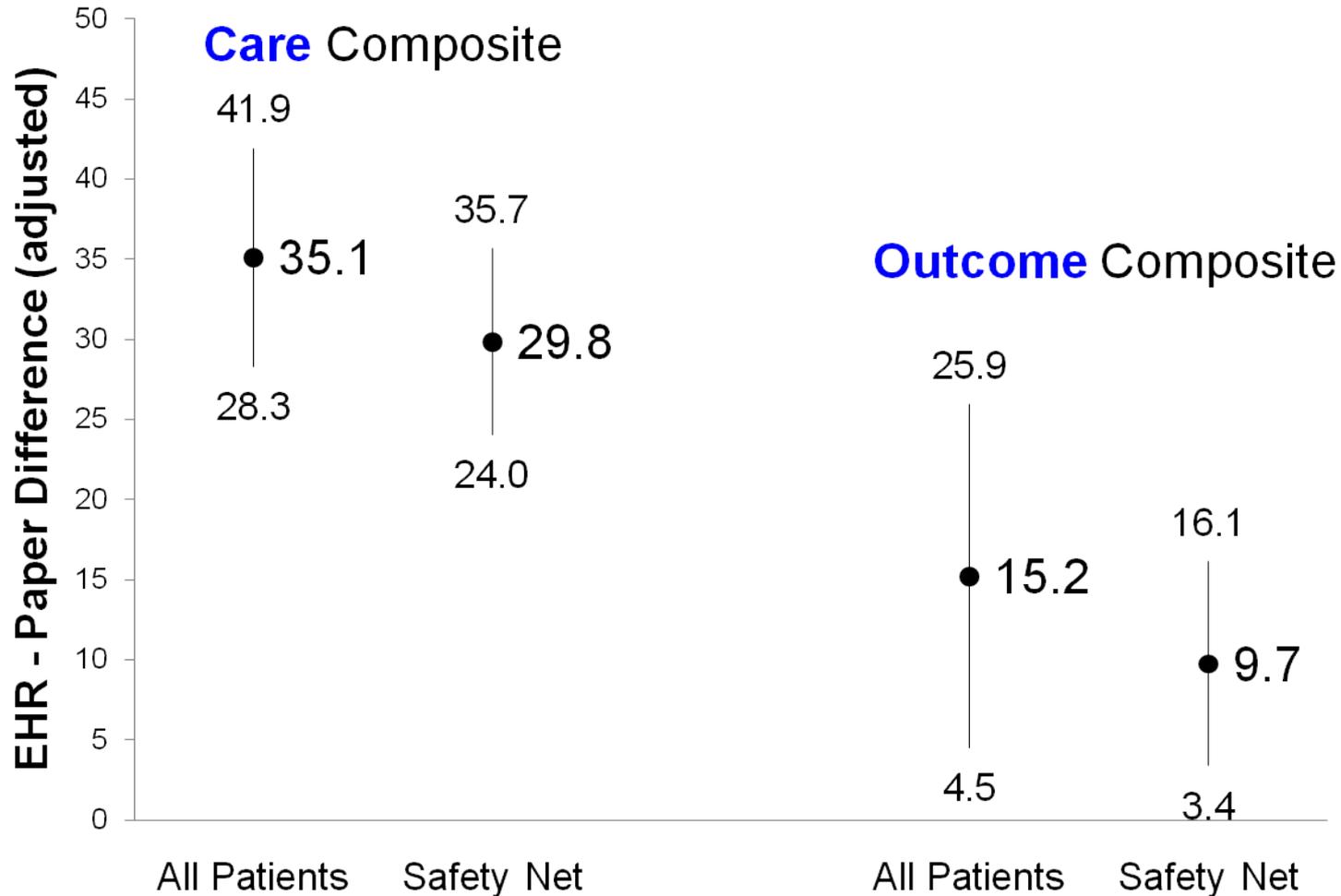
Methods

- **Setting:** Cuyahoga County/Cleveland
- **Subjects:**
 - For *Achievement* (2009-10):
 - 27,207 diabetic patients (18-75 years old, ≥ 2 visits)
 - 569 PCPs in 46 practices of 7 HC systems
 - For *Trends in Achievement* (2007-2010)
 - ~26,000 patients; 36 sites reporting all periods

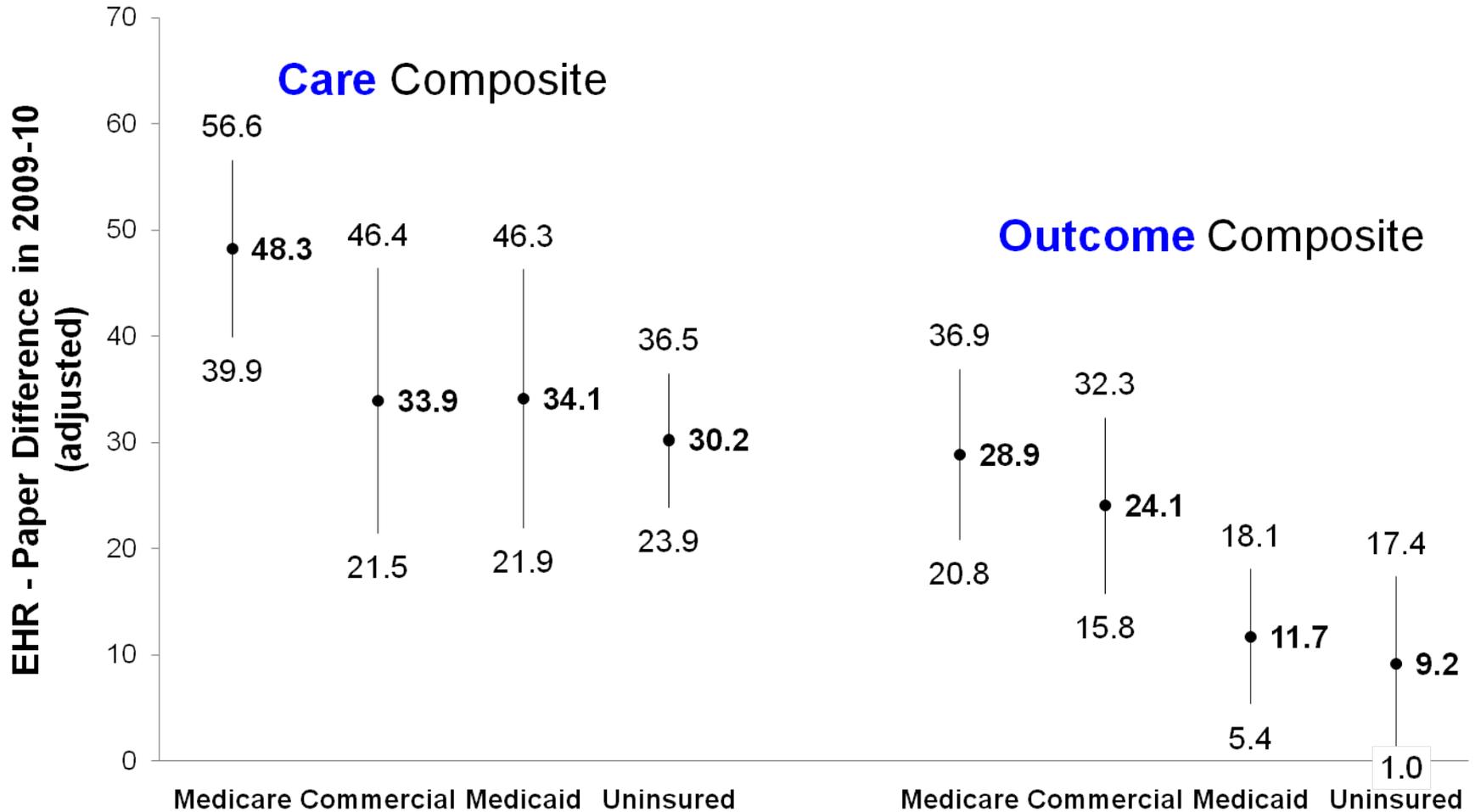
Methods

- **Dependent Variables:**
 - % of patients meeting composite standards for Care (4 stds: measured as all-or-none) and Outcomes (5 stds: measured as ≥ 4)
- **Analyses:**
 - **Weighted GEE within insurance strata (Medicare, commercial, Medicaid, uninsured) to estimate the differences in percentages of EMR vs. paper-based systems meeting standards**
 - Adjusting for age, sex, race/ethnicity, income, education, and language preference, accounting for clustering
 - Trend models include baseline value as a covariate, omit language preference
 - **Secondary analysis restricted to safety net practices only: more likely to consist of Priority Primary Care Providers**

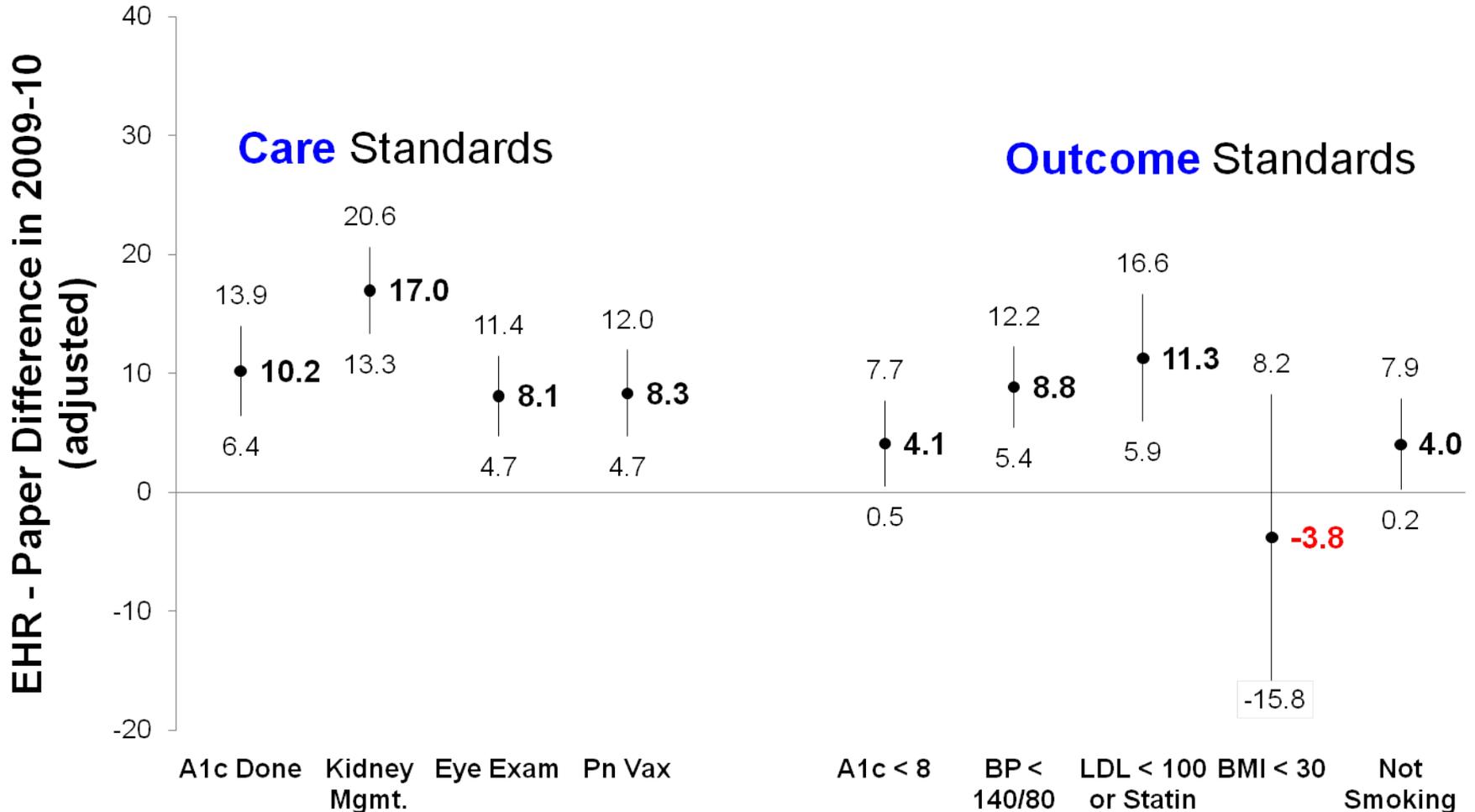
EMR Effect is Large, Larger in Care than Outcomes, and Similar in SNP Sample



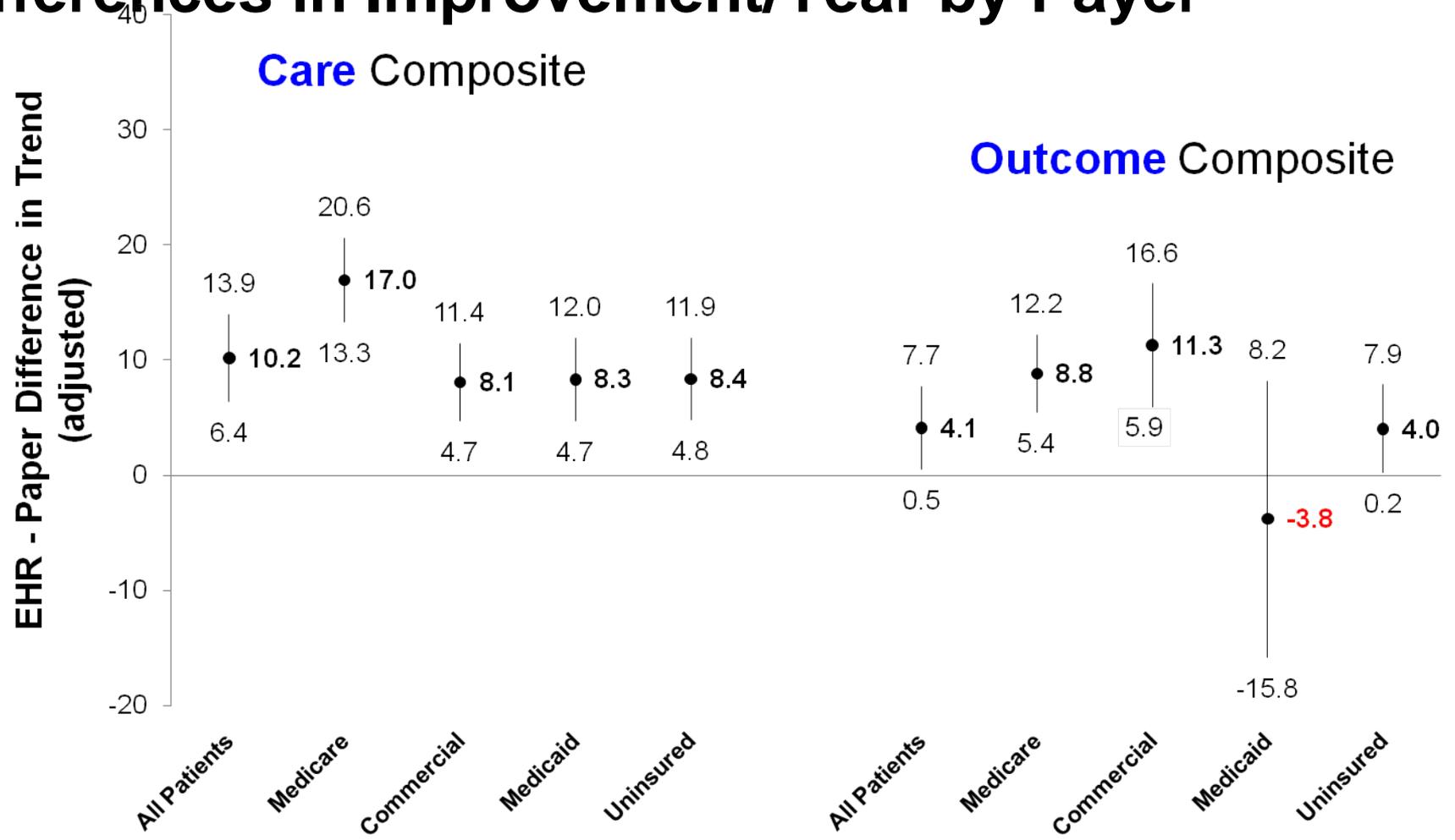
Patients in EMR Sites Achieve Better Across All Payers (2009-10)



EMR Sites Achieve Better on 8 of 9 Quality Standards



EMR Sites Also *Improve* Faster: Differences in Improvement/Year by Payer



Summary

- EMRs were associated with:
 - Better achievement
 - Faster improvement
 - Across payers
 - Across all care standards and most outcome standards
 - For adults with diabetes
 - In the context of a Regional Health Improvement Collaborative

Comments

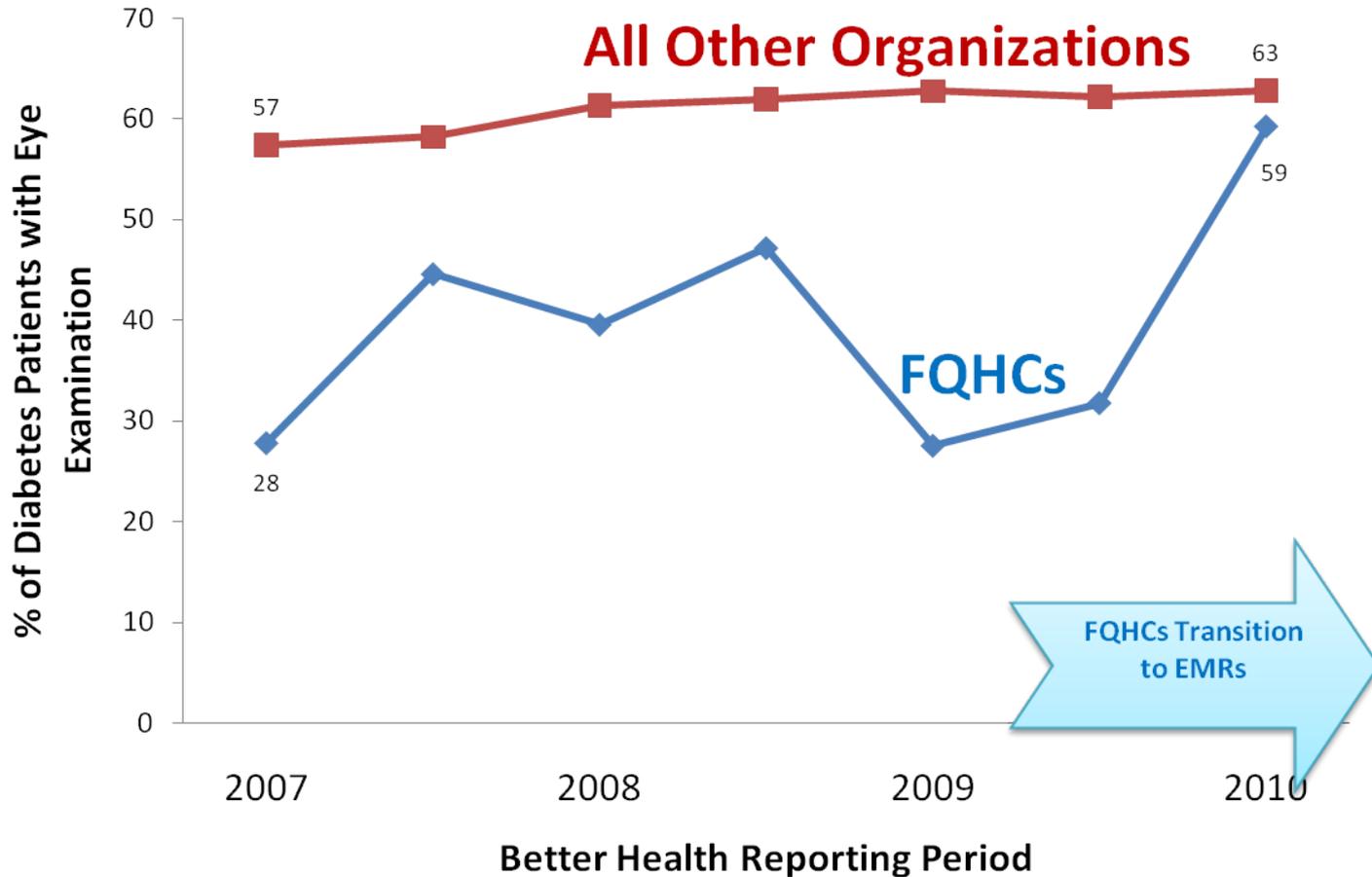
1. This report raises cause for optimism that incentives for EMR adoption and Meaningful Use, at least in the context of a Regional Health Improvement Collaborative, can improve quality.
2. This investigation does not:
 - Address cost reductions
 - Demonstrate year-over-year *changes* in the same organizations After EMRs have been adopted and used meaningfully

What we're Learning

- Providers, Employers and Health Plans recognize the value of EMRs
- Practice-based measurement and reporting is granular, timely, actionable
 - Focusing on high achievement and improvement can engage even disadvantaged practices
 - “Share ideas, compete on execution”
 - Stratifying results by SES is supported by practices, so far
- Trust Still Trumps Technology



Accelerating Improvement, Reducing Disparities In Diabetic Eye Exams



Thank you

[www. Betterhealthcleveland.org](http://www.Betterhealthcleveland.org)



Table 1. Medical conditions targeted due to associated health risks that can be improved with use of clinical guidelines by dental providers

Medical Condition	Estimated Adult Prevalence	Intervention for dentist and patients to reduce risk of problems	Goal of Intervention
Diabetes	7%	<ul style="list-style-type: none"> Review diabetes treatment and status at visit Daily oral hygiene and visits every 6 months <ul style="list-style-type: none"> Monitor oral hygiene status 	<ul style="list-style-type: none"> Reduce periodontal, caries, and oral infection risk
Xerostomia	10%, with 24% in >65 years of age	<ul style="list-style-type: none"> Review saliva production at each visit Prescription for saliva substitute/fluoride at each visit Daily oral hygiene and visits every six months 	<ul style="list-style-type: none"> Reduce periodontal, caries, and oral infection risk
Congestive Heart Failure	2%-3%	<ul style="list-style-type: none"> Measures to reduce cardiac strain while receiving dental care (e.g., short visits, upright position, less stress) Daily oral hygiene and visits every six months 	<ul style="list-style-type: none"> Reduce risk of cardiac problems at dental visit Reduce periodontal, caries, and oral infection risk
Chronic Obstructive pulmonary disease (COPD)	4%-5%	<ul style="list-style-type: none"> Review history of concurrent heart disease Avoid use of barbiturates, narcotics, and anticholinergics Avoid nitrous oxide-oxygen inhalation sedation with severe COPD and emphysema Daily oral hygiene and visits every six months <ul style="list-style-type: none"> Improved oral hygiene self-care 	<ul style="list-style-type: none"> Reduce risk of compromised air flow and pneumonia Reduce periodontal, caries, and oral infection risk

Table 2. Characteristics of the study population in each group (n=10,890 out of 59,147)(18.4% of dental patients were included)

Characteristic	Provider Activation	Patient Activation	Usual Care
Clinics	5	5	5
Providers*	31	33	38
Types of Providers (%)			
Dentist	13 (42%)	13 (39%)	14 (37%)
Hygienist	18 (58%)	20 (61%)	24 (63%)
Number of patients seen with condition (%) during the 18-month study period			
Any	3,536 (18%)	2,979 (16%)	4,375 (20%)
Diabetes mellitus	1,444 (8%)	1,271 (7%)	1,727 (8%)
Xerostomia	2,256 (12%)	1,872 (10%)	2,800 (13%)
COPD	466 (2%)	383 (2%)	635 (3%)
Congestive Heart Failure	258 (1%)	200 (1%)	396 (2%)

*one provider served during the intervention in both the patient activation and usual care groups

**Patients were counted multiple times when seen at different dental clinics.

Table 1. Characteristics of Patients Included in this Report

	Diabetes		High Blood Pressure		Heart Failure	
# of Patients	28,997		108,608		5,251	
# of Primary Care Practices	48 (8 health systems)		48 (8 health centers)		34 (3 health systems)	
	Better Health Population	Range of Values Across Sites	Better Health Population	Range of Values Across Sites	Better Health Population	Range of Values Across Sites
Insurance (%)						
Medicare	35.0	0-48	43.2	0-61	72.5	18-85
Commercial	43.3	0-74	41.4	0-78	19.2	2-40
Medicaid	8.9	0-39	6.3	0-37	5.2	0-34
Uninsured	12.8	0-100	9.1	0-100	3.1	0-21
Medicaid +Uninsured	21.7	0-100	15.4	0-100	8.3	0-49
Race/Ethnicity (%)						
White	52.6%	2-96	60.8	2-98	64.6	3-97
African American	39.6%	1-97	34.5	0-97	32.0	0-97
Hispanic	4.6	0-64	2.2	0-54	1.9	0-46
Other	3.2%	1-64	2.5	0-52	1.5	0-27
Non-white	47.4%	4-98	39.2	2-98	3.4	3-97
Preferred Language (%)						
English	95.9	35-100	97.1	42-100	96.2	53-100
Spanish	2.2	0-57	1.1	0-51	1.2	0-48
Other Languages	1.9	0-63	1.8	0-57	2.6	0-30
Average Age	57.7	50-62	62.0	50-69	70.7	57-76
% Female	53.7	35-75	57.4	32-79	50.2	27-70
Median Household Income (\$)	41,200	25,500-68,000	44,300	25,300-71,200	43,100	25,000-69,000
High School Graduation Rate (%)	79.6	64-90	81.7	66-92	80.9	65-91
Average Body Mass Index	34.1	29-36	31.7	38-35	Not reported	Not reported
% Not Smoking	79.7	42-92	82.0	31-92	Not reported	Not Reported

Table 2. Better Health’s Individual and Composite Standards for Diabetes

Care 4 standards for good routine care	Outcomes 5 standards of good control
<ul style="list-style-type: none"> • Blood Sugar Control Test done • Screening for or Treatment of Kidney Problems <ul style="list-style-type: none"> • Annual Eye Examination • Pneumonia Vaccine Given 	<ul style="list-style-type: none"> • Blood Sugar Controlled (Hemoglobin A1c<8%) <ul style="list-style-type: none"> • Blood Pressure Controlled (BP< 140/80) • LDL (“Bad”) Cholesterol < 100 or statin prescription • Weight Controlled (Body Mass Index <30) <ul style="list-style-type: none"> • Documented Non-Smoker

Table 3. Better Health’s Individual and Composite Standards for Heart Failure

Evaluation Standards 4 Standards of Good Assessment	Treatment Standards 2 Types of Evidence-Based Medications
<ul style="list-style-type: none"> • Heart Function Test done (“Echo” to see how well the heart is pumping) • Blood Test done each year (Basic Metabolic Panel to check blood chemistry) • Weight Checked Regularly (Look for fluid retention to monitor heart function) • Blood Pressure checked regularly (High Blood pressure can signal serious heart problems) 	<ul style="list-style-type: none"> • ACE/ARB Medication (Improves heart and kidney function and lowers blood pressure) <ul style="list-style-type: none"> • Beta-Blocker Treatment (Blocks stress hormones, which make the heart work harder)
<p>Evaluation Composite: Percent of patients meet all 4 standards</p>	<p>Treatment Composite: Percent of patients with moderate or severe heart failure who received at least one of the medications</p>