Implementation of the Patient-Centered Medical Home in the Veterans Health Administration: Associations with Patient Satisfaction, Quality of Care, Staff Burnout and Hospital and Emergency Department Use

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HSR&D Cyberseminar

June 2, 2015

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Overview

- PACT National Evaluation overview
- Why create another measure?
- Review of PACT Implementation Progress Index (PI^2) development
- Question and answer session

The Patient-Centered Medical Home: A Model Endorsed by Major Primary Care Groups

- Why PCMH?
  - Potential mechanism to control costs
  - Improve quality, especially for those with chronic, complex conditions
  - Decrease burnout, attract doctors to primary care

- To date the evidence for this model is mixed, but promising (for large integrated health systems)

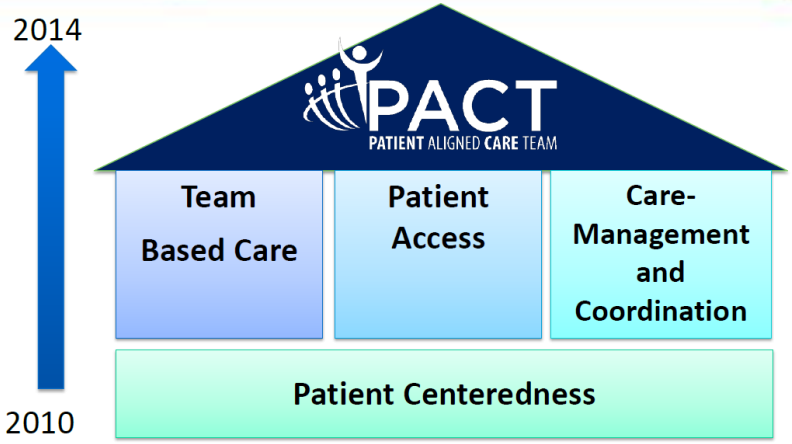
Reid, Larson *JAMA*. 2012;308(1):83
Nielson, 2014, https://www.pcpcc.org/

Patient-Centered Medical Home Model

- PCMH elements
  - Team based care
  - Enhance access to care
  - Care management (coordinated & comprehensive)
  - Systems based approach to improving quality and safety
  - Sustained partnership with patients
- How these models are being implemented differs across systems
  - All **major** health plans, FQHC and VHA have PCMH models

Jackson, *Annals of Internal Medicine*, 2013, 158 (3)
Rittenhouse, *JGIM,* 2010; 25(6): 593
Bitton, *JGIM,* 2013; 25(6): 584

VHA Primary Care Practice Redesign



Areas of focus

- Team based care
- Expanded access
- Continuity

Electronic tools

- Secure messaging
- Referral management (specialty care); electronic consultation

Population health tools (e.g., identification of high risk patients)

Increased primary care support staff

- from 2.3 per FTE to 3.0 per FTE primary care provider
- >1,000 RN case managers hired since 2010

Training initiatives for PACT

Team-Based Care

Other Team Members
Clinical Pharmacy Specialist ± 3 panels
Social Work: ± 2 panels
Trainees

Integrated Behavioral Health
Psychologist ± 3 panels
Social Worker ± 5 panels
Care Manager ± 5 panels
Psychiatrist ± 10 panels

Team:
Assigned to 1 panel (±1200 patients)
Provider: 1 FTE
RN Care Manager: 1 FTE
Clinical Associate (LPN, Med Asst): **1 FTE**
Clerk: 1 FTE

Patient

Caregiver

PACT
PATIENT ALIGNED CARE TEAM

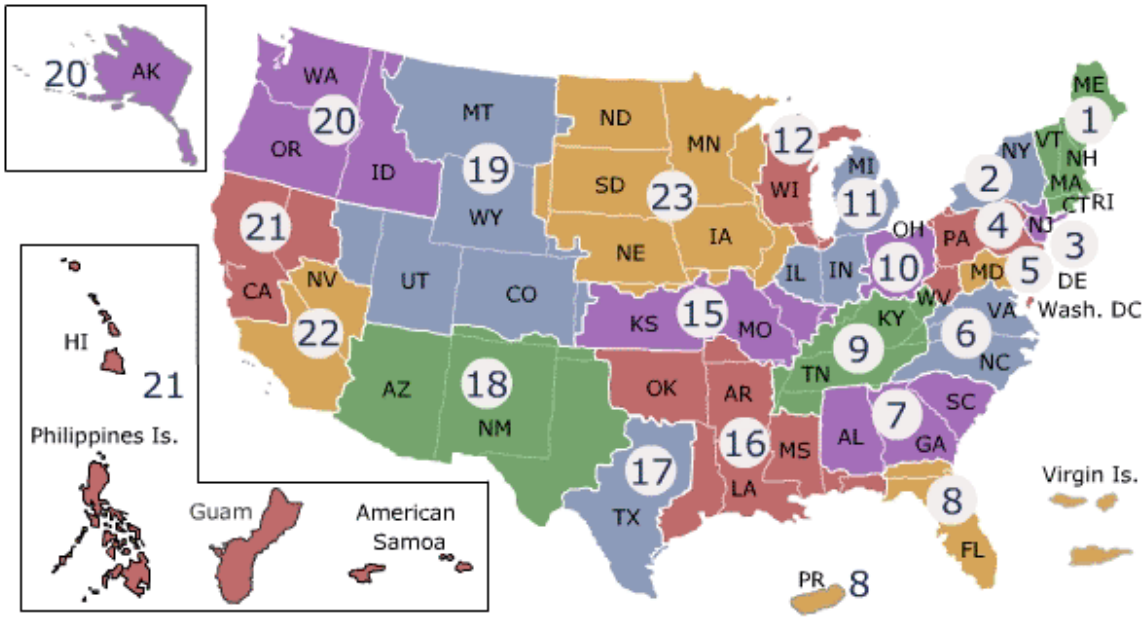
Poll Question #1

- Are you currently a PACT team member in primary care?
  - Yes
  - No

Poll Question #2

- If YES, what is your main role
  - Manager/clinic administrator
  - Provider (MD or NP)
  - RN care manager
  - LPN/MA
  - Administrative clerk

VHA Implemented PCMH Model Simultaneously Across a National System of Over 900 Primary Care Clinics



- Capitated payment system to fund care for populations of patients
- 22 regional networks
- Salaried medical staff

- Over 5 million primary care patients
- 16.4 million primary care encounters annually
- Significant investment in new staff and training for the Patient Aligned Care Team (PACT) initiative

PACT Expectations

Better Care
- Better access
- More coordinated care
- Better Continuity

More Satisfaction
- Better patient satisfaction
- Better staff satisfaction
- Less staff burnout

Improved Overall Health
- Lower admission rates
- Fewer Emergency Room visits

Lower Cost
- Ultimately cost-neutral or + ROI

National Demonstration Labs created to assess how PACT has been implemented and whether these goals have been achieved.

Challenges and Solutions for the National Evaluation

- No controls (implemented everywhere starting April 2010)
  - Interrupted time series analyses
  - Look for variation among sites in extent of implementation
- For some key measures, no baseline
  - Look for variation among sites in extent of implementation
- Many key changes for PACT are team care processes
  - Develop and field national survey

Challenges to Measuring Implementation for the National Evaluation

- No gold standard for measuring PCMH implementation
  - NCQA is the most commonly used
- VHA already had in place many PCMH features
  - Patient assigned to a primary care provider
  - Universal Electronic Medical Record
  - Well developed performance and quality improvement system
  - Panel management tools, e.g. disease registries
  - National programs for care coordination (e.g. CCHT, HBPC)
  - Integrated mental health services

Study Objectives

1. Create an index that measures the extent of PCMH implementation in VHA
   a. Utilize existing patient, provider and administrative data
   b. Reflect processes & attributes that are essential to effective primary care
2. Describe variation in implementation across clinic sites
3. Examine the relationship between the implementation index and key associations: patient satisfaction, staff burnout, clinical quality, and health care use

Nelson et al, *JAMA Internal Medicine,* 2014

Study Design & Data Sources

Observational Cohort Study in 2012

Data Sources

- Patient surveys
- PACT Primary Care Personnel survey
- Corporate Data Warehouse (CDW)

Patient Survey: Consumer Assessment of Health Plans – Patient-Centered Medical Home (CAHPS-PCMH)

- Previously validated patient survey
- Scales have acceptable internal consistency reliability estimates (Cronbach α)
  - Access (0.74)
  - Comprehensiveness (0.68)
  - Self-management support (0.62)
  - Patient-centered care and communication (0.91)
  - Shared decision making (0.61)
- Data collected between 6/1/2012 – 12/31/2012
- n= 75,101 Veterans

Scholle, *Medical Care*, 2012

PACT Personnel Survey

- Developed for the national PACT evaluation
- Data collected from 5/21/2012- 6/29/2012
- Target population: All VHA primary care personnel
  - Included 4 occupations in the PACT teams
  - n= 5,404 primary care staff, 22% response rate
- Delegation, staffing, team functioning

Helfrich, *JGIM*, 2014

Corporate Data Warehouse (CDW)

- Demographic, clinical characteristics, and health services use
- FY 2012
- All patients who were enrolled in primary care and assigned to a PCP (n=5,653,616 Veterans)
- Used to determine Elixhauser Co-morbidity score

Elixhauser, *Medical Care*,1998

Map Data Items to PCMH Model and Goals of PACT

PACT GOALS	Domains	Source of data	# of items
Accessible, continuous and coordinated care	Access	Patient surveys; CDW	11
	Continuity of care		3
	Coordination of care		8
Team-based care	Delegation, staffing, team functioning, working to top of competency	Provider survey	18
Patient-centered care	Comprehensiveness	Patient surveys	3
	Self-management support		2
	Patient-centered care and communication		6
	Shared decision making		2
Total			53

Patient surveys = CAHPS-PCMH

Access, Continuity, and Care Coordination

PI² Domains	Example Item
Access 11 items	...how often did you get an appointment as soon as you needed? *Enhanced access: proportion of telephone clinics (%)*
Continuity of Care 3 items	How long have you been going to this provider? *Proportion of visits to assigned PC provider*
Care Coordination 7 items	…did the provider…seem informed and up-to-date about the care you got from specialists? *% of patients contacted 2 days after hospital discharge*

CAPHS-PCMH; *CDW data*

Patient-Centered Care Domain
14 Items From CAHPS-PCMH Survey

PI² Domains	Example Items
Comprehensiveness	Did you and anyone in this provider's office talk about things in your life that worry you or cause you stress?
Self-Management Support	Did anyone in this provider's office talk with you about specific goals for your health?
Patient-Centered Care and Communication	How often did this provider explain things in a way that was easy to understand?
Shared Decision Making	When you talked about starting... a prescription medicine, did this provider ask you what you thought was best for you?

Team-Based Care Domain
18 Items From Provider Survey

PI² Domains	Example Items
Delegation	PCP relies on RN care manager for tasks including gathering patient preventive services, responding to prescription refills
Team functioning	Time spent in team huddles
Staffing	% reporting recommended staffing ratio

Construction of PACT Implementation Progress Index (PI^2)

- Composite scores were constructed for the 8 core PACT domains
  - mean of the standardized values for each variable
  - variables were standardized using national mean/SD
- Site-level rankings generated for each domain
  - Top and bottom quartiles used for cutoffs

Construction of PACT Implementation Progress Index (PI^2)

- PI^2 score calculated for each clinic:

  PI^2 score = (# of domains in the top quartile) – (# of domains in the bottom quartile)

- Ranges from +8 to -8:

Number of sites by 2012 overall PI^2 score				
Low				High
-7 to -5	-4 to -2	-1 to +1	+2 to +4	+5 to +8
87	190	346	213	77

PI^2 Scores In Following Years Use 2012 Values as a Benchmark

- Standardize individual items by 2012 means/SDs
- Categorize domain scores by 2012 quartile thresholds
- Method makes 2012 and 2013 domain and overall scores comparable

Key Associations – Patient Satisfaction

- Patient satisfaction:

  Rating of provider "Using any number from 0 to 10, where 0 is the worst provider possible and 10 is the best provider possible, what number would you use to rate this provider?"

- Overall health care rating from SHEP as a test of convergent validity

Key Associations – Staff Burnout

- Maslach Burnout Inventory Emotional Exhaustion Subscale (MBI-EE) (0 – 6 range)
  - Burnout if MBI-EE >=2.2
- Single-item burnout measure: "Overall, based on your definition of burnout, how would you rate your level of burnout," with 5 response options
  - burnout 3+
  - "I am definitely burning out and have one or more symptoms of burnout, such as physical and emotional exhaustion."

Maslach, *J Org Behavior,* 1981

Key Associations – Health Care Use

- All-cause hospitalizations
- Emergency Department + Urgent care visits
- Ambulatory care sensitive condition (ACSC) hospitalizations
  - May be most avoidable through provision of effective primary care
  - based on Agency for Health Care Research and Quality (AHRQ) Prevention Quality Indicators
  - standardized protocols using ICD-9 diagnosis and CPT procedure codes from inpatient VA records

http://www.qualityindicators.ahrq.gov/

Key Associations – Clinical Quality

- % of patients meeting 48 clinical quality indicators
- Chronic disease management, behavioral health screening and prevention services
- Oversample of prevalent chronic conditions
- External Peer Review Program (EPRP) audit program
  - manual abstraction of electronic health records
  - high inter-rater reliability (kappa = 0.9)
- Veterans who have used care in the past 2 years with at least one primary care visit in FY 2012

Goulet, *Medical Care*, 2007

Statistical Analysis

- To test internal consistency reliability, we calculated the Cronbach's alpha for all items in each domain and all 53 items that comprise the total scale.
- Non-parametric test of trend for difference in patient satisfaction, staff burnout and clinical quality by PI^2 scores, adjusting for multiple comparisons.
- Random fixed effects model to account for all 48 clinical quality measures.

Cuzick, *Stat Med,* 1985
Benhamini, *Ann Stat,* 2001

Statistical Analysis

- Use of emergency department and total hospitalizations by PI^2, adjusting for age, CBOCs, co-morbidity.
- Interrupted time-series models: ACSC hospitalizations and all-cause hospitalizations from 2003 – 2012 for each clinic, stratified by age < > 65 years:
  - Adjusted for mean patient characteristics and co-morbidity, unemployment rate; seasonal variation; linear time trend.
  - Difference between the observed rate of admissions and the predicted rate of admissions that would have occurred had PACT not been implemented.

Hebert, *Health affairs*, 2014

Site Characteristics by More Effective and Less Effective Implementation of PACT (2012)

	Clinic level National Average	More Effective Implementation PI^2 score +5 to +8	Less Effective Implementation PI^2 score -8 to -5
# Patients, mean	5917	2893	5467*
CBOC, %	83.0%	94.7%	89.0%
Age, mean	64.4	65.1	63.6*
Female, %	5.4%	6.2%	5.9%
Co-morbidity score	0.76	0.77	0.76

*$p<0.05$

Sites with Higher PI^2 Score Had Higher Patient Satisfaction

PI^2 scores	Number of clinics		Provider rating from CAHPS-PCMH, Mean (SD)		Overall health care rating, SHEP
	2012	2013	2012	2013	2012
5 to 8	77	70	9.33	9.24	8.62
2 to 4	213	224	9.02	8.94	8.49
-1 to 1	346	406	8.67	8.63	8.32
-4 to -2	190	160	8.23	8.19	8.15
-8 to -5	87	63	7.53	7.74	7.87
			$p<0.001$	$p<0.001$	$P < 0.001$

p values are a test for trend

Sites with Higher PI^2 Score Had Lower Staff Burnout

PI^2 scores	Number of clinics		Single item burnout measure, % burnt out		Maslach Burnout inventory, EES
	2012	2013	2012	2013	
5 to 8	77	70	37	34	2.29
2 to 4	213	224	36	34	2.47
-1 to 1	346	406	36	37	2.56
-4 to -2	190	160	37	41	2.62
-8 to -5	87	63	37	44	2.80
			p=0.58	p=0.01	P=0.016

p values are a test for trend

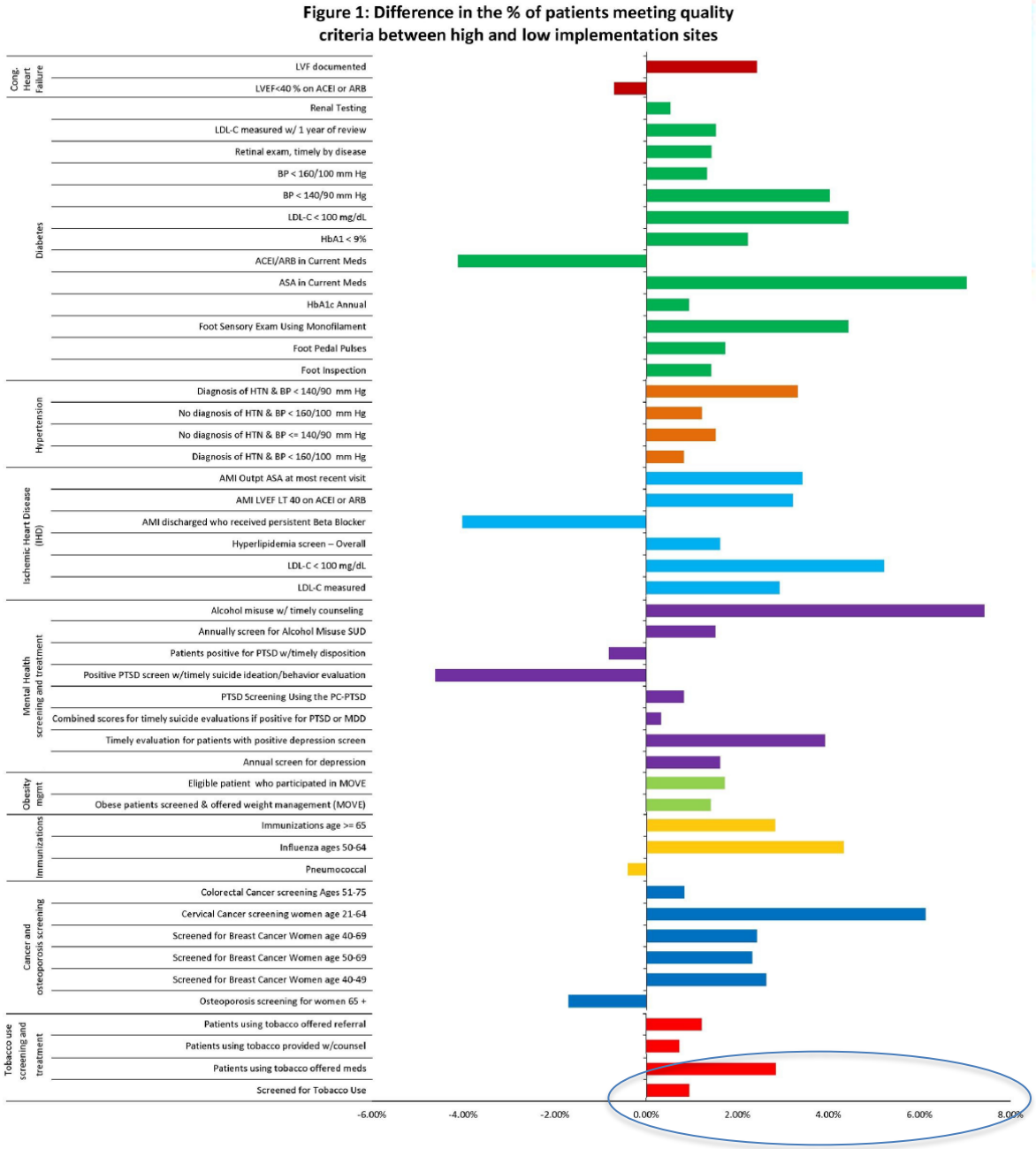
Examples of Clinical Quality Indicators by 2012 PI²: % of Veterans Who Meet Quality Criteria

Patient cohort		PI² Score High				Low
Diabetes	**n**	**5 to 8**	**2 to 4**	**-1 to 1**	**-4 to -2**	**-7 to -5**
Aspirin in current meds	49,811	81.1%	79.3%	79.3%	74.4%	74.1%
Hypertension						
Diagnosis of HTN & BP < 140/90 mm Hg	107,033	80.2%	79.4%	79.1%	77.9%	76.9%
Prevention and Screening						
Alcohol misuse w/ timely counseling	8,957	86.8%	79.4%	80.7%	78.4%	79.4%
Cervical cancer screening women age 21-64	29,302	92.8%	91.8%	91.6%	91.6%	86.7%

Higher Implementation Sites had Higher Clinical Quality

48 clinical quality indicators

- Significantly higher ($p<0.05$) for 19/48 by high vs. low PI^2 in 2012; 17/48 in 2013
- Random effects model: significant increase in average outcomes for facilities with higher PI^2 scores as compared to facilities with lower PI^2 scores ($p<0.001$).



Sites with Higher PI^2 Score Had Lower Emergency Department and Urgent Care Use

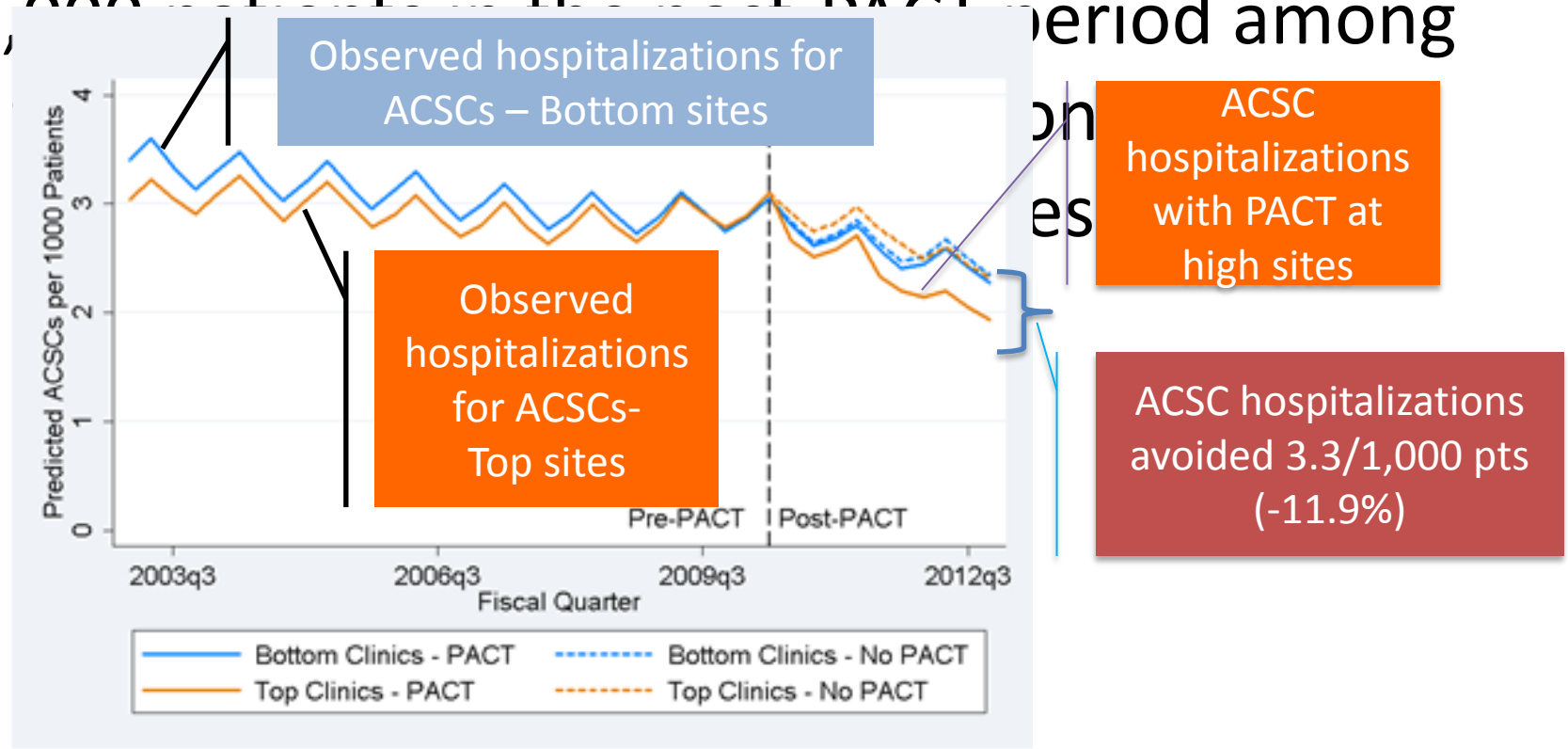
PI^2 scores	Number of clinics		Number of emergency department (ED+UC) encounters per 1000 patients*		Number of hospitalizations per 1000 patients*	
	2012	2013	2012	2013	2012	2013
5 to 8	77	70	208	205	72	79
2 to 4	213	224	221	314	75	99
-1 to 1	346	406	304	262	92	78
-4 to -2	190	160	287	231	80	68
-8 to -5	87	63	235	222	71	70
			$p<0.001$	$p=0.091$	$p=0.12$	$p=0.14$

p values – test for trend;

**adjusted for age, co-morbidity and Community Based Outpatient Clinic (CBOC)*

High Implementation Sites Avoided More ACSC Hospitalizations, Veterans < 65 Years

Under 65: 3.3 ACSCs admissions avoided per 1,000 patients in the post-PACT period among



Sites with Higher PI² Score Had Lower ACSC in 2012, but Increases in 2013

PI² scores	Predicted with PACT	Predicted without PACT	Absolute Difference (%)	Predicted with PACT	Predicted without PACT	Absolute Difference (%)
	2012			2013		
Quarterly Admissions For ACSC Per 1,000 Patients						
	Patients under 65 years					
+5 to +8	2.22	2.52	-0.3 (-11.9%)	1.75	1.70	0.05 (2.9%)
-7 to -5	2.53	2.68	-0.15 (-5.6%)	2.25	2.32	-0.07 (-3.0%)
	Patients over 65 years					
+5 to +8	3.63	3.89	-0.26 (-6.7%)	2.42	1.97	0.45 (22.8%)
-7 to -5	4.42	4.47	-0.05 (-1.1%)	3.42	3.44	-0.02 (-0.6%)

Similar Trends Noted for All-Cause Hospitalizations

PI[2] scores	Predicted with PACT	Predicted without PACT	Absolute Difference (%)	Predicted with PACT	Predicted without PACT	Absolute Difference (%)
	2012			2013		
Quarterly Hospital Admission Per 1,000 Patients						
	Patients under 65 years					
+5 to +8	25.3	26.2	-0.9 (-3.4%)	22.03	21.79	0.24 (1.1%)
-7 to -5	24.9	24.5	0.4 (1.6%)	23.09	22.64	0.45 (2.0%)
	Patients over 65 years					
+5 to +8	21.3	21.9	-0.6 (-2.7%)	15.51	14.92	0.59 (4.0%)
-7 to -5	23.1	22.3	0.8 (3.6%)	20.17	19.46	0.71 (3.6%)

2013 Items with Greatest Gain

Domain	Item	Source	2012	2013	% Change
Access	% of patients using secure messaging	CDW	3.5%	6.0%	74.1%
Team-Based Care	% staffed to 3.0 ratio	Personnel Survey (Yes, No)	50.6%	61.9%	22.3%
Coordination	% HR Patients enrolled in CCHT	CDW	8.1%	9.6%	18.3%
Access	% telephone encounters	CDW	35.7%	40.2%	12.6%
Team-Based Care	Degree of team delegation: evaluating patients	Personnel Survey (1 = Not at all to 4 = A great deal)	2.61	2.75	5.0%

2013 Items with Greatest Decline

Domain	Item	Source	2012	2013	% Change
Access	% Same day appointments	CDW	71.6%	68.9%	-3.7%
Team-Based Care	Degree of team delegation: completing forms	Personnel Survey (1 = Not at all to 4 = A great deal)	2.28	2.22	-2.6%
Coordination	% patients having specialist appt	CAHPS (Yes, No)	66.6%	65.3%	-2.0%
Access	Phone question answered same day	CAHPS (1 = Never to 4 = Always)	3.18	3.16	-0.7%
Shared Decision Making	Discuss reasons not to take a med	CAHPS (1 = Not at all to 4 = A lot)	3.12	3.11	-0.5%

LIMITATIONS

- Several domain scores rely on self-report
- Primary care personnel survey had a low response rate
- Results may only apply to large integrated health systems with electronic health records and a robust quality improvement system
- Cross-sectional analyses did not permit assessing change over time
- Medicare data not included in health care use

CONCLUSIONS

- Higher implementation clinics as measured by PI^2 had:
  - higher patient satisfaction;
  - lower staff burnout;
  - higher proportion of Veterans meeting criteria on multiple measures of quality;
  - initial modestly lower rates of hospital admission for ACSCs.
- Including patient report may be an important feature of measuring PCMH and should be considered by other health systems.

ACKNOWLEDGEMENTS

- Gordon Schectman, Primary Care Operations
- Richard Stark, Primary Care Services
- Stephan Fihn, Director, Director, PACT Demonstration Laboratory Initiative
- Paul Hebert, Christian Helfrich, Chuan-Fen Liu, Leslie Taylor, Edwin Wong
- Idamay Curtis, Administrative Director, PACT Demonstration Laboratory Initiative
- Analysts: Philip Sylling, Chip Harvey, Sophie Lo, Hail Sun, Susan Hernandez, Joe Simonetti, Emily Dolan