The Patient-Centered Medical Home in the Veterans Health Administration

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Background: The Veterans Health Administration (VHA) is the largest integrated US health system to implement the patient-centered medical home. The Patient Aligned Care Team (PACT) initiative (implemented 2010-2014) aims to achieve team-based care, improved access, and care management for more than 5 million primary care patients nationwide.

Objectives: To describe PACT and evaluate interim changes in PACT-related care processes.

Study Design: Data from the VHA Corporate Data Warehouse were obtained from April 2009 (pre-PACT) to September 2012. All patients assigned to a primary care provider (PCP) at all VHA facilities were included.

Methods: Nonparametric tests of trend across time points.

Results: VHA increased primary care staff levels from April 2010 to December 2011 (2.3 to 3.0 staff per PCP full-time equivalent). In-person PCP visit rates slightly decreased from April 2009 to April 2012 (53 to 43 per 100 patients per calendar quarter; $P<.01$), while in-person nurse encounter rates remained steady. Large increases were seen in phone encounters (2.7 to 28.8 per 100 patients per quarter; $P<.01$), enhanced personal health record use (3% to 13% of patients enrolled), and electronic messaging to providers (0.01% to 2.3% of patients per quarter). Post hospitalization follow-up improved (6.6% to 61% of VA hospital discharges), but home telemonitoring (0.8% to 1.4% of patients) and group visits (0.2 to 0.65 per 100 patients per quarter; $P<.01$) grew slowly.

Conclusions: Thirty months into PACT, primary care staff levels and phone and electronic encounters have greatly increased; other changes have been positive but slower.

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For author information and disclosures, see end of text.

The patient-centered medical home (PCMH) model is being implemented by a growing number of health organizations, with the goal of providing more comprehensive, coordinated, and patient-centered care. The major primary care medical societies have endorsed the PCMH as the desired model for primary care.[1] Large health systems and primary care practice collaboratives are implementing the PCMH model, and the Centers for Medicare & Medicaid Services is funding PCMH demonstration and innovation projects in diverse clinical sites.[2-5] Nonetheless, published evaluations of PCMH initiatives to date have been limited to single-practice or smaller groups of practices, and often focus on limited clinical conditions.[3,6-11]

In 2010, the Veterans Health Administration (VHA) became the largest integrated US health system to begin implementing the PCMH model at all primary care clinics throughout its nationwide system. The VHA delivers primary care to more than 5 million veterans in 16.4 million encounters annually—either at 160 large hospital-based primary care facilities, most of which are in urban areas, or 783 Community-Based Outpatient Clinics, many of which are in rural areas. Thus, VHA is facing the challenge of substantially redesigning major systems of care in an extremely large system across diverse clinical and community settings. In addition, veterans served by VHA typically have more chronic physical and mental illnesses, and are more socioeconomically vulnerable, than patients who receive care outside VHA.

The VHA's PCMH initiative, called Patient Aligned Care Teams (PACTs), builds upon foundations established in the 1990s, when VHA undertook a major transformation from loosely organized hospitals that provided mainly inpatient and specialty care into a regionally integrated system focused on outpatient primary care.[12] As part of that process, large numbers of primary care providers (PCPs) and nurses were hired by VHA, and several key elements of the PCMH model (as defined by the National Committee for Quality Assurance) were implemented, such as comprehensive electronic medical records and performance measurement and improvement programs (including programs addressing clinical outcome goals such as glycemic control and blood pressure control for patients with diabetes and cancer screening; Table 1). Since that time, VHA has demonstrated better clinical quality of care and outcomes in many areas than have been reported in other parts of the healthcare sector, including Medicare.[13]

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Take-Away Points

The Veterans' Health Administration (VHA) is the largest integrated health system to implement the patient-centered medical home (PCMH) to date. This initiative (implemented 2010-2014) aims to achieve team-based care, improved access, and care management for more than 5 million primary care patients nationwide. Interim changes in care processes include:

- Decreased rate of in-person primary care provider visits and increase in telephone and Internet care.
- No significant increase in shared medical appointments.
- Slight improvement in appointment access and continuity, which started at high levels.
- Improved but still suboptimal post hospitalization follow-up.

However, in the 2000s the level of primary care staffing and resources remained steady, despite steady increases in numbers of primary care patients.[14-16] In addition, VHA identified room for improvement in care continuity and coordination (eg, by decreasing the amount that VHA patients relied on providers not part of the Department of Veterans Affairs [VA] for acute care) and in patient-centeredness of care (eg, by providing care through telephone or electronic access when patients prefer it).[17] Thus, the PACT initiative aims to enhance comprehensive and coordinated care, improve patient experience, and further improve health outcomes by increasing and reorganizing primary care staffing, and introducing several PCMH components that were not already in place.

The PACT initiative began in April 2010, and full implementation is anticipated to continue through 2014. Patient Aligned Care Teams also include a concurrent plan (and budget) for nationwide evaluation, including quantitative and qualitative data collection and analysis. In this study, we describe the design of PACT and the extent of structural changes made by facilities in response to the PACT plan to date. Then, we present an interim nationwide evaluation of observed changes in patient care processes related to PACT goals.

PACT DESIGN AND STRUCTURAL CHANGES TO DATE

Continuity Through Team-Based Care

To enhance continuity, staff are organized into teamlets that provide care to an assigned panel of about 1200 patients.[18] A teamlet consists of 1 PCP, 1 registered nurse (RN) care manager, 1 licensed practical nurse (LPN) or medical assistant, and 1 administrative clerk. Teamlets are designed to optimize work flow by enabling each member to function at the top of their expertise. For example, PACT RNs are expected to manage care of patients with multiple chronic conditions through in-person and telephone encounters, and medical assistants are expected to provide preventive health screening. To facilitate communication and planning, teamlets are expected to hold regular huddles.[19] The PACT clinical pharmacists assigned to a set of teamlets also manage patients with poorly controlled chronic illnesses through independent patient encounters.

To establish the teamlet model, the VHA mandated that facilities provide 3.0 full-time equivalents (FTEs) of primary care support staff per full-time PCP by the end of 2011, with dedicated funding to facilities for this. From April 2010 to December 2011, primary care support staff increased from 10,501 FTEs to 13,742 FTEs (**Table 2**), corresponding to an increase from 2.3 FTEs to 3.0 FTEs support staff per PCP FTE nationwide. In addition, 76% of facilities reported holding daily teamlet huddles in July 2011 (up from 21% pre-PACT, Table 2).

Patient Access to Care

Patient Aligned Care Teams aim to improve patient access through 3 methods. First, facilities are instructed to enact advanced access scheduling,[20] including increased availability of same-day appointment slots. Second, facilities are asked to conduct more appointments via phone and by shared medical appointments. In response to this directive, 40% of facilities set aside hours during the clinical workday dedicated to scheduled phone visits by July 2011 (up from 14% pre-PACT; Table 2). It should also be noted that efforts were made to more accurately code and capture clinical encounters that occurred over the phone. Third, PACT aims to increase patient access to personal health data and providers via the Internet. This goal is accomplished through (1) an enhanced Internet-based personal health record (www.MyHealtheVet.gov), which allows patients to manage prescriptions and view test results and appointments; and (2) a secure messaging website, which allows patients to send electronic messages to their teamlet. To use either service, VA patients must complete an in-person registration and identity check. The PACT initiative directed each parent facility to add a personal health record/secure messaging coordinator, who encourages and facilitates patient and staff use of these technologies (Table 2).

Care Management and Coordination

The VHA hired 1271 primary care RN care managers between January 2010 and December 2011 (Table 2). The role of the RN care manager is envisioned to include chronic illness management, panel management of high-risk patients, and facilitation of patient care transitions. Among these

Table 1. Patient Centered Medical Home Elements in VHA Before PACT and in PACT Design

NCQA PCMH Element[a]	In Place Before PACT	In PACT Design
Continuous team-based care	• Patient assigned to personal PCP	• Patient assigned to teamlet of PCP plus linked primary care staff, who provide care with complementary and expanded roles • Regular teamlet huddles
Access	• Electronic access to basic personal health information in PHR	• Enhanced PHR, allowing access to personal prescriptions, appointments, and lab results • Ability to contact provider/staff via secure electronic message • Timely clinical advice by phone and increased scheduled encounters conducted by phone • Same-day appointments and advanced access scheduling • Group visits
Care management	• Nurse care managers assist providers in managing high-risk and chronically ill patients • Review and reconcile medications systematically • Electronic prescribing with patient-specific interaction and allergy checks	• Increased nurse care management capacity through increased staffing and expanded nurse care roles (including face-to-face visits with chronically ill patients and proactive panel management for high-risk patients)
Care coordination	• EHR tracks lab/imaging results, flags abnormal results • EHR tracks specialist referrals and allows information exchange with specialists	• Enhanced coordination of transitions between inpatient care, specialty care, and non-VA care to VA primary care
Population health management	• Comprehensive EHR with electronic prescribing, decision support • Comprehensive health assessment and screening protocols • Point-of-care EHR reminders for preventive and chronic care services	
Measure/improve performance	• Regular survey assessment of patient experiences • Comprehensive performance evaluation and quality improvement program	• Replace patient survey tool with CAHPS-PCMH[b]
Self-care support	• Self-management classes for chronic conditions • Healthy behavior change classes (eg, weight loss and tobacco cessation classes) • Primary Care-Mental Health Integration Program for primary care–based therapy of mental health conditions	• Health promotion/disease prevention leaders at each parent facility • Health behavior coordinators at each parent facility • Staff training in patient-centered communication and motivational interviewing

CAHPS indicates Consumer Assessment of Healthcare Providers and Systems; EHR, electronic health record; NCQA, National Committee for Quality Assurance; PACT, Patient Aligned Care Team; PCMH, patient-centered medical home; PCP, primary care provider; PHR, personal health record; VA, Department of Veterans Affairs; VHA, Veterans Health Administration.
[a]Based on National Committee for Quality Assurance PCMH 2011 standards.
[b]PCMH version of the Consumer Assessment of Healthcare Providers and Systems survey.

responsibilities, post hospitalization follow-up was chosen as an early focus. Some RN care managers are assigned to telehealth monitoring of patients with chronic conditions. Telehealth consoles transmit patients' health data (eg, blood glucose, blood pressure) from the patient's home over a phone or Internet connection to the VA. Telehealth nurses at the patient's home facility manage clinically relevant changes over the phone.

Also included in PACT is funding for a full-time health promotion/disease prevention specialist at each facility to oversee screening and counseling programs related to healthy behaviors, such as healthy eating and tobacco cessation. Health Behavior Coordinators (typically clinical psychologists or social workers) at each facility support this program by training clinical staff in evidence-based behavior change counseling techniques. Almost all facilities now have hired these 2 staff members (Table 2).[21]

Table 2. PACT-Designed Structural Changes in Primary Care Staffing, Scheduling, and Training Capacities[a]

PACT Component	Before PACT[b]	Interim PACT[c]
Continuity through team-based care		
Primary care support staff FTE[d]	10,501	13,742
Primary care support staff FTE per full-time PCP[e]	2.3	3.0
Daily teamlet huddles	21% of facilities[e]	76% of facilities
Patient access		
Personal health record/secure messaging coordinators	NA	Assigned/hired at about 99% of parent facilities
Dedicated clinician phone hours	14% of facilities	40% of facilities
Care management and coordination		
RN care managers[f]	3333	4604
Health promotion/disease prevention program leaders	NA	Assigned/hired at about 98% of parent facilities
Health behavior coordinators	NA	Assigned/hired at about 98% of parent facilities
Patient partnership		
Clinical staff training in patient-centered communication	NA	Local facilitators trained; goal for 2012 was 50% of primary care clinical staff trained
Patient advisory councils	18% of facilities	36% of facilities

FTE indicates full-time equivalent; NA, not applicable; PACT, Patient Aligned Care Team; PCP, primary care provider; RN, registered nurse.
[a]PACT implementation started in April 2010 and will continue through 2014. See Appendix B for detailed measure definitions.
[b]April 2010 for all except RN care managers in January 2010.
[c]December 2011 for all except RN care managers in May 2012.
[d]Includes RN care managers, licensed practical nurses/medical assistants, clerical assistants, and clinical pharmacists. These 2 items do not include data from 202 contract community-based outpatient clinics (CBOCs) (26% of 783 total Veterans Health Administration CBOCs).
[e]Facility data from American College of Physicians Medical Home Builder Practice Biopsy. Before PACT was October 2009 and interim PACT was July 2011.
[f]These staff are included in the total for primary care support staff FTE.

Providing accessible and broad care for mental health conditions and coordinating that care with other aspects of primary care are essential to providing comprehensive primary care in the VHA, as approximately 15% of veterans have a mental illness or substance use disorder.[22] The Primary Care-Mental Health Integration program, which began pre-PACT in 2007, provides primary care–based treatment of common mental health conditions (eg, depression) and risky health behaviors (eg, heavy alcohol use) by mental health clinicians partnering with and co-located with primary care staff. The Primary Care-Mental Health Integration program is already quite robust across the VHA, and its critical role in PACT is more fully described elsewhere.[21]

Patient Partnership

The PACT providers and clinical staff are being trained in patient-centered communication.[21] By the end of 2011, facilitators were trained at all VHA facilities, and the 2012 PACT plan was to train 50% of the primary care teamlet staff. In addition, 36% of facilities followed the PACT plan to form patient advisory councils in July 2011, an increase from 18% in October 2009.

EVALUATION METHODS

Design and Sampling

We used data from VHA Corporate Data Warehouse databases derived from VHA operational systems. All measures except appointment wait times were calculated from data on the total number of active patients assigned to a PCP in the relevant month or quarter. All primary care patients at all VHA facilities nationally were included, regardless of the status of PACT implementation at the facility. Point measures were assessed on the last day of each month starting in December 2009. For measures compiled on a quarterly basis, data were available starting with the April through June 2009 quarter for some measures and the October through December 2009 quarter for others (Appendix A).

We also used data from a national, facility-level survey based on the American College of Physicians (ACP) Medical Home Builder Practice Biopsy (ACP Biopsy). The ACP Biopsy assesses whether a practice has 127 PCMH components in place through yes/no items in 7 categories: patient-centered care and communication (ie, training

in communication techniques and provision of self-management support); access and scheduling (ie, flexible and non–face-to-face scheduling); use of technology (ie, e-prescribing); care coordination and transitions; organization of practice (ie, electronic records and teamwork); population management (ie, patient registries); and quality improvement. The survey was completed by ambulatory care directors at 850 facilities (out of 862 eligible) in October 2009 (pre-PACT) and by 846 facilities in July 2011 (interim PACT).

Measurement

We assessed changes in key patient care processes including in-person and telephone encounter rates across teamlet members, continuity of care with the patient's assigned PCP, appointment access, access to care through shared medical appointments and new technologies, and reach of RN care management. Details on measures are available in **Appendix B**. To assess overall progress toward PCMH implementation, we compared the total percentage of yes responses in each ACP Biopsy category at both time points.

Statistical Analysis

We used nonparametric tests of trend for the ranks of measures across all quarters or months measured. All *P* values were based on 2-sided tests. Full quarterly and monthly data are available in Appendix A. The average age and comorbidity level (Deyo score)[23] of the primary care population remained stable throughout the study period, so encounter rates were not adjusted for these attributes.

RESULTS

Interim Changes in Patient Care Processes

Continuity Through Team-Based Care. The overall rate of primary care encounters (in person or by phone) per 100 patients increased from 85 in April through June 2009 (corresponding to a rate of 3.4 encounters per patient per year) to 101 in April through June 2012 (corresponding to 4.0 encounters per patient per year; *P* for trend = .01). However, in-person encounter rates declined slightly over this time period (**Figure 1**). Among clinical staff, PCP visit rates declined slightly (53 to 43 visits per 100 patients per quarter; *P* for trend <.01), as did clinical pharmacist visits (2.6 to 2.4 visits; *P* < .01). Encounters with RNs and LPNs spiked each fall, but did not change significantly overall (*P* for trend RN = .39; *P* for trend LPN = .84). This pattern remained after encounters for flu shots were removed from the data.

As a measure of continuity, 80% of all PCP visits in October through December 2009 were with the patient's assigned PCP (of 2,376,003 total PCP visits), which increased to 83% in April through June 2012 (2,570,618 total PCP visits) (*P* for trend = .01; **Figure 2**).

Patient Access to Care. Patient requests for same-day appointments were accommodated 67% of the time in December 2009 and 73% in June 2012 (*P* for trend <.01, Figure 2A). The proportion of patients seen within 7 days of their desired appointment date rose from 85% to 90% during the same time period (*P* for trend <.01).

Phone encounter rates, although a minority of overall encounters, increased more than 10-fold from April through June 2009 to April through June 2012, increasing for each clinical staff group (*P* for trend <0.01 for each, **Figure 1B**). In-person shared medical appointments increased from 0.24 to 0.65 (*P* <.01) per 100 patients per quarter over the same time period (Figure 1A).

The number of patients registered for the enhanced personal health record increased from 152,416 (3% of 4,759,668 primary care patients) in December 2009 to 694,206 (13% of 5,163,531 primary care patients) in June 2012 (*P* for trend <.01; **Figure 2B**). Total secure messages from patients to primary care staff increased from 9852 in 2010 to 289,519 in 2011. Patients using secure messaging (sending at least 1 message to their primary care team) increased from 0.07 per 1000 primary care patients in October through December 2009 to 22.8 per 1000 patients in April through June 2012 (*P* for trend <.01).

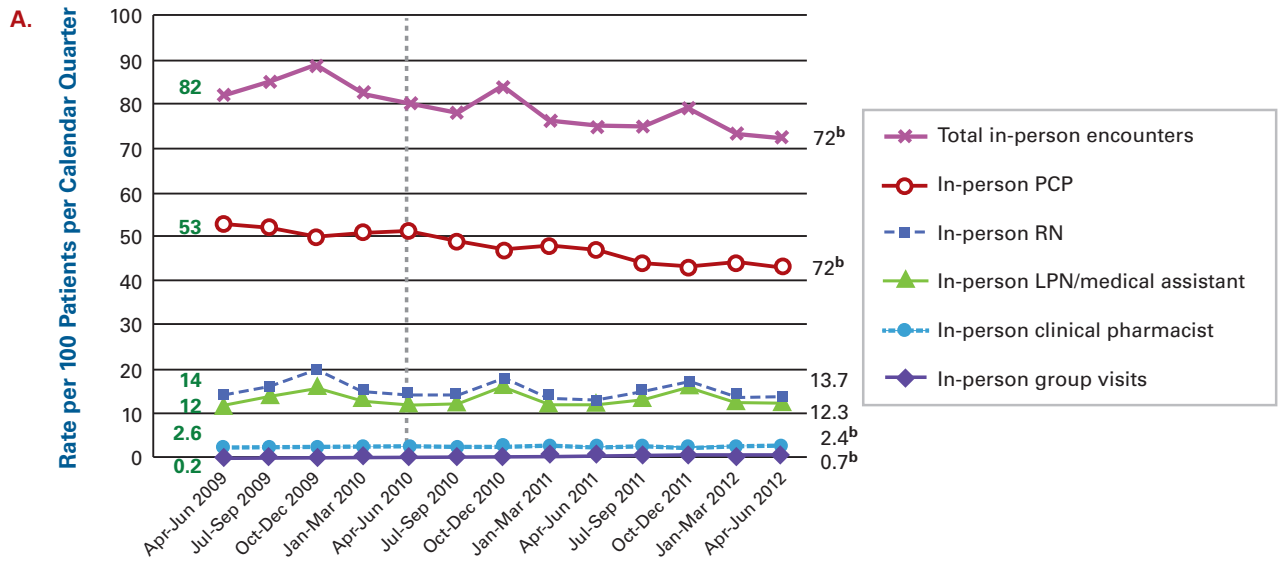
Care Management and Coordination. The number of patients using telehealth increased from 38,747 (0.8% of patients) in December 2009 to 70,486 (1.4% of patients) in June 2012 (*P* for trend <.01; Figure 2B). Patients evaluated by primary care clinicians within 48 hours of VHA hospital discharge increased from 6% of 46,195 discharges in December 2009 to 61% of 45,068 discharges in December 2011 (*P* for trend <.01).

Overall Progress Toward Implementation of PCMH Components. Facilities' average overall score on the ACP Biopsy increased from 69% yes in October 2009 to 80% yes in July 2011. Pre-PACT, categories with the highest average scores were organization of practice (72%), population management (75%), and quality improvement (86%) (**Figure 3**). Categories with the lowest initial scores were also those with the greatest improvement by 2011: patient-centered care/communication (56% to 68%) and access/scheduling (66% to 76%).

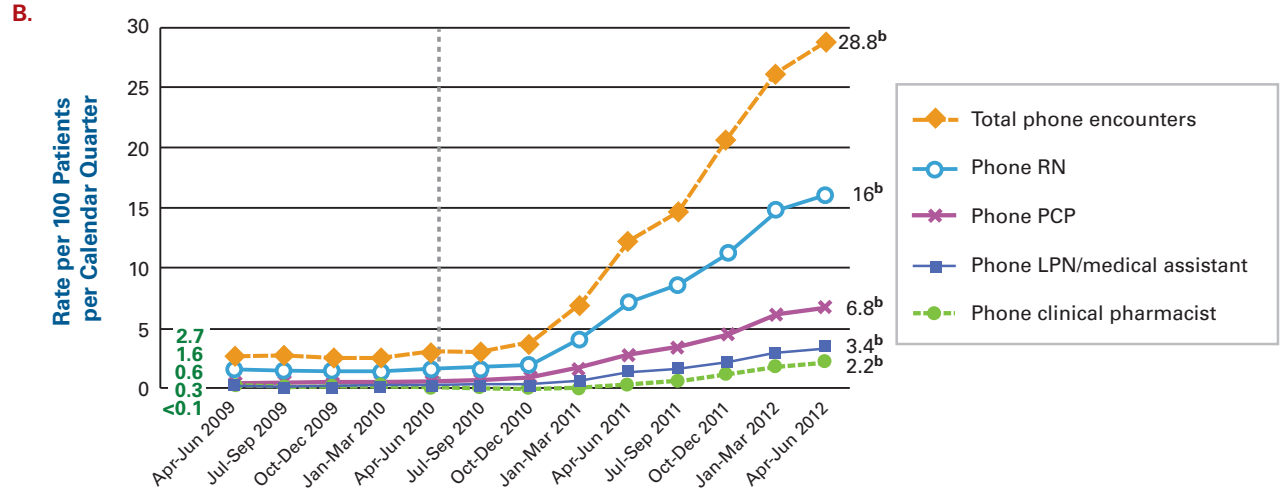
DISCUSSION

Over the first 30 months of PCMH implementation, VHA made extensive nationwide structural changes in

Figure 1. Trends in (A) In-Person Primary Care Encounters and (B) Phone Primary Care Encounters[a]



LPN indicates licensed practical nurse; RN, registered nurse; PCP, primary care provider.
[a]See Appendix A for full data and Appendix B for detailed measure definitions.
[b]*P* value for trend <.05.

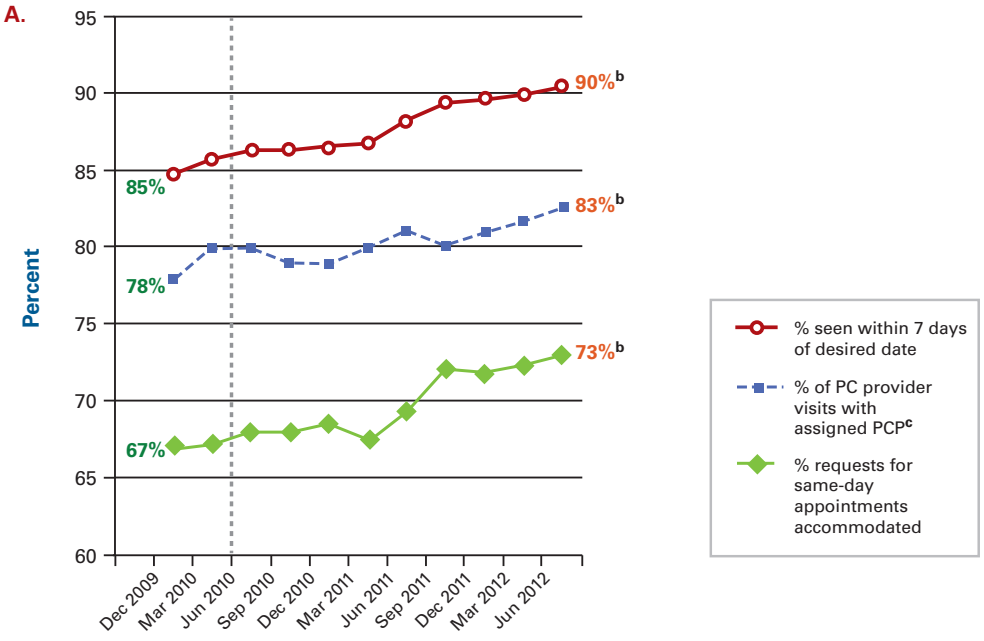


PC indicates primary care; PCP, primary care provider.
[a]See Appendix A for full data and Appendix B for detailed measure definitions.
[b]*P* value for trend <.05.

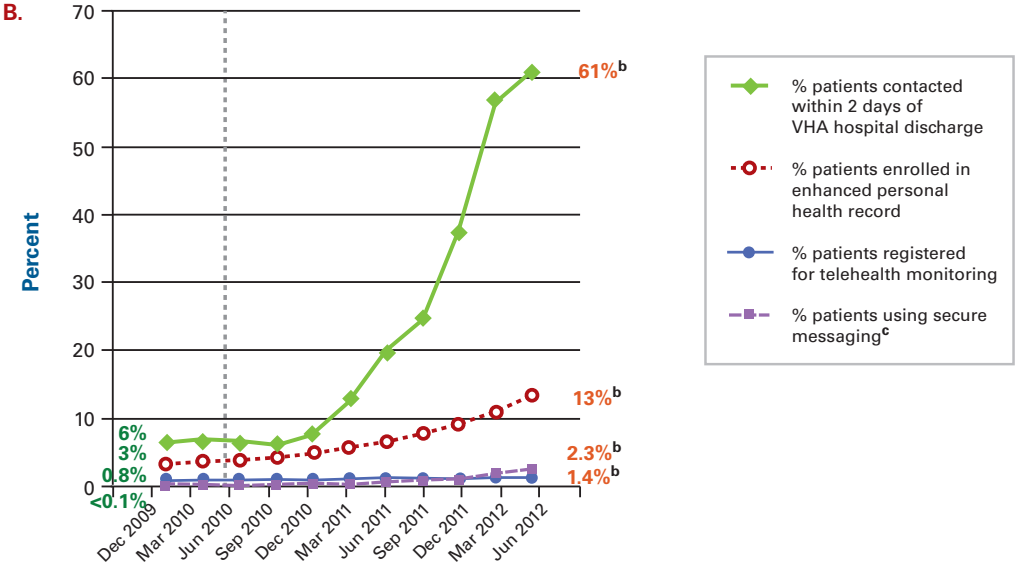
primary care staff levels and teamlet formation and capacity for telephone care, electronic access, care management, and healthy behavior promotion. The high scores noted on the ACP Biopsy pre-PACT reflect the investments made by VHA during the previous 15 years in comprehensive electronic health records, population management tools, and quality improvement programs. Larger increases on the ACP Biopsy related to patient-centered care, communication and access, and scheduling during the initial months of PACT correspond to the main components of the PACT initiative.

The VHA's landmark investment in PCMH implementation and evaluation will provide unprecedented opportunities to augment existing data on PCMH outcomes and implementation. Published evaluations of PCMH interventions in adult populations to date are focused on specific chronic diseases[3,6,9] or limited to between 1 and 36 primary care practices within a

Figure 2. Trends in (A) Appointment Access and Continuity and (B) Care Management and Electronic Access[a]

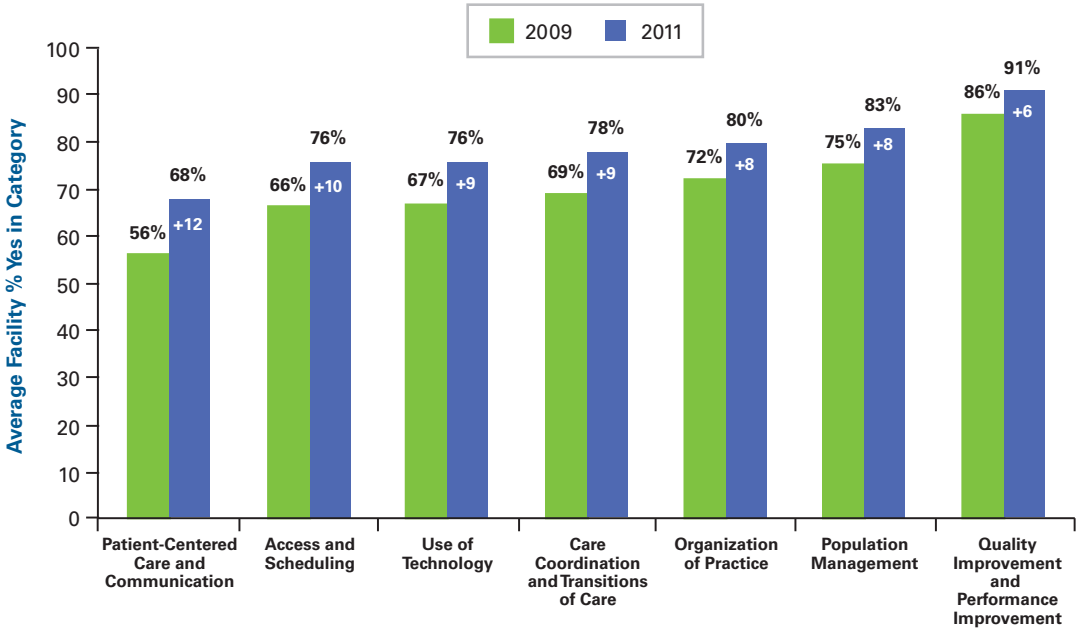


PC indicates primary care; PCP, primary care provider.
[a]See Appendix A for full data and Appendix B for detailed measure definitions.
[b]*P* value for trend <.05.
[c]Percentage of visits with assigned PCP was calculated by calendar quarter ending in the specified month (eg, the October-December 2009 quarter is labeled December 2009). All other statistics were calculated monthly for the stated month.



VHA indicates Veterans Health Administration.
[a]See Appendix A for full data and Appendix B for detailed measure definitions.
[b]*P* value for trend <.05.
[c]Percentage of patients who used secure messaging was calculated by calendar quarter ending in the specified month (eg, the October-December 2009 quarter is labeled December 2009). All other statistics were calculated monthly for the stated month.

Figure 3. Results of ACP Medical Home Builder Practice Biopsy Before PACT and Interim PACT



ACP indicates American College of Physicians; PACT, Patient Aligned Care Team; VHA, Veterans Health Administration.

larger system.[7,10,11] Two of the larger PCMH evaluations have focused on independent practices[3,10] without integrated administrative data.

Lessons Learned

At this point in PACT implementation, observed changes in patient care are mixed. In-person visits to PCPs have slightly decreased, while visits to nurses have stayed the same. However, phone encounters have increased dramatically, and patients' use of electronic access to personal health information and providers is steadily growing. Other alternate visit modes such as shared medical appointments are just getting off the ground. One aspect of care management that was an early focus, post hospitalization follow-up has significantly improved but is reaching over 60% of those eligible. Appointment access and PCP continuity have improved only slightly, but started out at relatively high rates.

These data show that the pace of implementation of a large program, with many changes in patient care attempted at once, is slow. Those patient care processes showing substantial change started to change around 6 months after the April 2010 PACT start date. One particularly time-intensive aspect of PACT has been hiring and training clinical staff. For example, although VHA hired 1271 primary care RNs over 2 years, the RN vacancy rate was still 7% as of May 2012. In addition, systematic methods for delivering new care processes are still under development. For example, to assist with post hospitalization follow-up, primary care patient databases are currently being modified to notify the teamlet when a patient is discharged, and tool kits are being disseminated to help make the delivery and documentation of follow-up more consistent. The cyclic nature of planning, doing, and analyzing are common to previous PCMH interventions, but carrying out these rapid-cycle improvements across such a large system may mean that changes in PACT-related processes cyclically accelerate and slow down over the next few years.

National and health system context may have affected the adoption of PACT elements. For example, concurrent with the economic recession and an influx of new veterans from Gulf region conflicts, patients enrolled in VHA primary care increased from 4,817,273 at the start of PACT in April 2010 to 5,163,531 in June 2012. This corresponds to an average increase of 2164 patients (or 1.8 teamlet panels) per parent facility. Thus, although facilities were attempting to increase the number of primary care staff per patient panel and patient access to appointments, increasing numbers of patients made this challenging. In addition, some facilities may have prioritized timely access for new patients over continuity with the same PCP for those patients. Finally, many VHA PCPs are part-time clinicians or trainees, which may limit the continuity attainable with an individual PCP which may limit the continuity attainable with an individual PCP, particularly for urgent appointments.

The ability to present data from nearly the entire healthcare system is a strength of this study and enhances VHA's ability to evaluate its PCMH program. However, this presentation also obscures variation in facility-level implementation of the PACT initiative. Reports from the field indicate that PACT rollout has not been uniform across facilities. Some sites are struggling to implement the basics of PACT, while others have fully functional PACT teamlets. Facility-level implementation is likely impacted by many local factors, including the supply of clinical staff, the presence of local clinician champions, previous primary care clinic organization, the demographics and health status of the local patients, and other pressing needs of the facility.

There are several limitations to these analyses. Although the ability to address a broad range of PCMH domains including staffing, processes of care, continuity, and access is a strength, we were unable in this study to examine individual PCMH domains in detail. The ACP Biopsy measures of implementation were based on reports submitted by the facilities and may be subject to reporting bias. All other measures were derived from data collected for patient care and administrative purposes. These data are routinely analyzed for accuracy, but are not validated by site visits or direct observations. Some of the data may have been influenced by more intensive data capture as PACT was implemented (in particular, phone encounter rates). Finally, some of the measures were exhibiting change prior to the initiative; thus, observed changes are not necessarily attributable solely to PACT. Because PACT has been rolled out in all VA clinics, there is no contemporaneous non-intervention control group.

Policy Implications

This report is the first step in a comprehensive assessment of the implementation and effects of the PACT initiative. The evaluation of the PACT initiative was planned and initiated concurrently with the planning and initiation of PACT itself. One strength of this approach is that real-time measures of PACT progress can be fed back to facilities. Future evaluation of the PACT initiative will examine any positive or unintended negative effects on patients' clinical outcomes, as well as changes in unplanned care such as emergency department visits and ambulatory care–sensitive hospitalizations, and changes in costs. In particular, the apparent shifts we observed in utilization from face-to-face visits to care provided by telephone and secure messaging could potentially be cost saving but must be evaluated in relation to costs for other services as well as any potential differences in clinical outcomes and patient satisfaction. The VHA is also placing high emphasis on evaluating patient experiences[24] and primary care staff experiences through PCMH-specific, systemwide patient and staff surveys, complemented by qualitative interviews and observation at selected VHA facilities. With these comprehensive data, VHA will have the unique ability to compare PCMH outcomes across a variety of practice settings, including hospital-based versus community clinics and academically affiliated training sites versus non–academically affiliated clinics. In particular, VHA will examine variability across facilities in implementation of PCMH elements, and facilitators and barriers to implementation. The ability to examine data at multiple levels (ie, patient, individual teamlet, facility, regional) will make these analyses a rich source of information about a wide variety of factors influencing PCMH.

Although some of VHA's experiences with PACT are unique to the VA system, overall experiences—including those with shifts to team-based care, attempts to improve patient access, and increased use of personal health record and telephone care—are highly relevant to other health systems. In VHA, PCMH is facilitated by an integrated electronic medical record system and centralized budgets not based on fee-for-service billing, which are also potential elements of developing Accountable Care Organizations.

In summary, VHA saw rapid progress in building PCMH infrastructure in the first 30 months of an extensive 4-year VHA PCMH implementation plan, and some interim changes in processes of patient care were observed. Currently, VHA is undertaking a comprehensive evaluation of the outcomes and implementation of its PCMH model, which will inform PCMH efforts nationwide.

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Appendix A. Full Monthly/Quarterly Data Used for Figures 1-3

■ **Figure 1A.** Trends in In-Person Primary Care Encounters[a]

Measure	Apr-Jun 2009	July-Sep 2009	Oct-Dec 2010	Jan-Mar 2010	Apr-Jun 2010	July-Sep 2010	Oct-Dec 2010	Jan-Mar 2011	Apr-Jun 2011	Jul-Sep 2011	Oct-Dec 2011	Jan-Mar 2012	Apr-Jun 2012	*P* for Trend
Total in-person encounters	82	85	89	82	80	78	84	76	75	75	79	73	72	.003
In-person PCP	53	52	50	51	51	49	47	48	47	44	43	44	43	.001
In-person RN	14	16	20	15	14	14	18	13	13	15	17	14	14	.393
In-person LPN/medical assistant	12	14	16	13	12	12	16	12	12	13	16	13	12	.839
In-person clinical pharmacist	2.6	2.6	2.4	2.5	2.5	2.4	2.3	2.4	2.4	2.3	2.3	2.4	2.4	.018
In-person shared medical appointments	0.24	0.24	0.20	0.31	0.39	0.39	0.37	0.41	0.47	0.49	0.53	0.62	0.65	.001

LPN indicates licensed practical nurse; RN, registered nurse; PCP, primary care provider.

[a]Units are encounters per 100 patients per calendar quarter. Sample denominator is all patients assigned nationwide to a Department of Veterans Affairs primary care provider in the given quarter.

■ **Figure 1B.** Trends in Phone Primary Care Encounters[a]

Measure	Apr-June 2009	July-Sept 2009	Oct-Dec 2010	Jan-Mar 2010	Apr-June 2010	July-Sept 2010	Oct-Dec 2010	Jan-Mar 2011	Apr-June 2011	Jul-Sept 2011	Oct-Dec 2011	Jan-Mar 2012	Apr-June 2012	*P* for Trend
Total phone encounters	2.7	2.7	2.5	2.6	3.0	3.0	3.7	6.8	12.2	14.6	20.5	26.3	28.8	.001
Phone PCP	0.56	0.58	0.55	0.59	0.67	0.75	0.96	1.70	2.82	3.41	4.53	6.2	6.8	.001
Phone RN	1.60	1.50	1.50	1.50	1.70	1.70	2.00	4.10	7.20	8.60	11.20	14.8	16	.001
Phone LPN/medical assistant	0.25	0.24	0.23	0.24	0.24	0.24	0.40	0.70	1.40	1.73	2.23	3	3.4	.002
Phone clinical pharmacist	0.04	0.00	0.10	0.10	0.10	0.10	0.10	0.13	0.46	0.63	1.30	1.7	2.2	.001

LPN indicates licensed practical nurse; RN, registered nurse; PCP, primary care provider.

[a]Units are encounters per 100 patients per calendar quarter. Sample denominator is all patients assigned nationwide to a Department of Veterans Affairs primary care provider in the given quarter.

■ **Figures 2A and 2B.** Trends in Appointment Access, Continuity, and Care Management, and Electronic Access: October 2009-November 2010

Measure	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010	Jul 2010	Aug 2010	Sep 2010	Oct 2010	Nov 2010
PCMM unique patients in that month	4,725,070	4,744,235	4,759,668	4,768,766	4,780,064	4,813,617	4,817,273	4,804,514	4,829,570	4,847,899	4,876,668	4,865,427	4,896,010	4,909,370
Patients using secure messaging,[a] %			0.007			0.011			0.013			0.021		
Patients enrolled in enhanced personal health record, %	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.0	4.1	4.3	4.5	4.6
PC provider visits with assigned PCP,[a] %			78			80			80			79		
Requests for same-day appointments accommodated, %	70	66	67	67	67	67	68	67	68	68	67	68	71	69
Patients seen within 7 days of desired date, %	87	84	85	85	86	86	86	86	86	86	86	86	88	87

Patients using telehealth monitoring, %	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.8	0.9	0.9	1.0	0.9	0.9
VHA admissions in month	47,451	43,126	46,195	44,458	43,049	50,753	48,869	46,446	47,779	48,198	47,691	46,485	46,859	44,305
Patients contacted within 2 days of VHA hospital discharge, %	6.61	6.59	6.32	6.66	6.6	6.81	6.47	6.24	6.61	5.94	6.5	6.21	6.88	7.17

PC indicates primary care; PCMM, primary care management module; PCP, primary care provider.

[$]ecure messaging and percentage of PC visits with assigned PCP were calculated by calendar quarter (3-month intervals) for the quarter ending in the stated month. All other measures were calculated monthly.

■ **Figures 2A and 2B.** Trends in Appointment Access, Continuity, and Care Management, and Electronic Access: December 2010-January 2012

Measure	Dec 2010	Jan 2011	Feb 2011	Mar 2011	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sep 2011	Oct 2011	Nov 2011	Dec 2011	Jan 2012
PCMM unique patients in that month	4,923,670	49,51,611	4,939,711	4,980,286	5,004,464	5,024,498	5,046,625	5,060,511	5,095,184	5,127,644	5,134,290	5,153,101	5,164,427	5,191,155
Patients using secure messaging,[a] %	0.069			0.220			0.400			0.640			0.975	
Patients enrolled in enhanced personal health record, %	4.8	5.1	5.3	5.6	5.9	6.3	6.6	6.9	7.3	7.6	8.1	8.6	9.0	9.5
PC provider visits with assigned PCP,[a] %	79.0			80.0			81.0			80.0			81.0	
Requests for same-day appointments accommodated, %	69	67	67	67	68	68	69	70	70	72	73	72	72	70.5
Patients seen within 7 days of desired date, %	86	86	86	87	88	88	88	88	88	89	90	89	90	89
Patients using telehealth monitoring, %	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.3	1.2	1.2	1.2	1.2

VHA admissions in month	46,086	45,003	42,913	50,208	47,676	47,702	47,908	46,455	49,126	46,776	44,867	43,587	45,249	44,518
Patients contacted within 2 days of VHA hospital discharge, %	7.49	8.31	10.27	12.72	16.47	18.15	19.86	20.22	21.31	24.78	30.57	34.45	37.68	42.9

PC indicates primary care; PCMM, primary care management module; PCP, primary care provider.

[a]Secure messaging and percentage of PC visits with assigned PCP were calculated by calendar quarter (3-month intervals) for the quarter ending in the stated month. All other measures were calculated monthly.

■ **Figures 2A and 2B.** Trends in Appointment Access, Continuity, and Care Management, and Electronic Access: February 2012-June 2012

Measure	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	*P* for Trend [a]
PCMM unique patients in that month	5,182,053	5,170,807	5,160,288	5,176,505	5,163,531	<.001
Patients using secure messaging,[b] %		1.69			2.28	.002
Patients enrolled in enhanced personal health record, %	10.2	11	11.9	12.6	13.4	<.001
PC provider visits with assigned PCP,[b] %		81.7			82.6	.009
Requests for same-day appointments accommodated, %	71.5	72.3	72	72.4	73	<.001
Patients seen within 7 days of desired date, %	89.8	90	90.3	90.2	90.4	<.001
Patients using telehealth monitoring, %	1.3	1.3	1.3	1.4	1.4	<.001
VHA admissions in month	43,841	48,053	44,915	47,593	45,068	.68
Patients contacted within 2 days of VHA hospital discharge, %	50.07	57.22	59.61	57.99	61.31	<.001

PC indicates primary care; PCMM, primary care management module; PCP, primary care provider.

[a]For time period from October 2009-June 2012.

[b]Secure messaging and percentage of PC visits with assigned PCP were calculated by calendar quarter (3-month intervals) for the quarter ending in the stated month. All other measures were calculated monthly.

Appendix B. Detailed Definitions for Measures and Measure Components

Measure	**Definition**
Total number of assigned primary care patients	Total number of unique[a] patients seen in VA primary care and currently assigned to a primary care provider panel as of the first day of the applicable month or quarter
Continuity through team-based care	
Primary care support staff FTE	FTEs of RNs, LPNs, medical assistants, clerical staff, and clinical pharmacists assigned to primary care[b]
Primary care support staff FTE per full-time PCP	Primary care support staff FTE divided by FTEs of PCPs providing direct patient care in primary care clinics[b]
Daily teamlet huddles	ACP Biopsy[c] question: "Does your practice schedule team meetings on a regular basis?"
Primary care in-person encounter rate	Total in-person encounters in primary care clinics completed by PCPs, nurses, medical assistants, or clinical pharmacists in the 3-month quarter, divided by total number of assigned primary care patients
Encounter rate with specific staff	Encounters in primary care clinics provided by PCPs (includes MD, DO, NP, PA), RNs, LPNs

	(includes medical assistants), or primary care clinical pharmacists, among total number of assigned primary care patients
Percentage of PCP visits with assigned PCP	Among total number of assigned primary care patients, the percentage of total in-person or phone encounters with any PCP in the quarter that were completed with the patient's assigned PCP
Patient access	
Dedicated clinical phone hours	ACP Biopsy question: "Does your practice schedule dedicated 'phone hours' when patients know that they can reach their clinician?"
Phone encounters	Encounters with any primary care clinical staff, including providers, RNs, LPNs, medical assistants, and clinical pharmacists
Desired date for appointment	The patient's desired date is entered into the scheduling database by the scheduling clerk; if the patient is an unscheduled walk-in, the desired date is assumed to be the same day
Requested same-day appointment accommodated	Among all primary care patients (including those who were assigned to a PCP and those

	who were not), the percentage of primary care appointments requested by the patient to be scheduled on the same day that were scheduled and completed on that same day by any PCP
Percentage of patients seen within 7 days of desired date	Among all primary care patients (including those who were assigned to a PCP and those who were not), the percentage of appointments scheduled and completed by any PCP within 7 days of the patient's desired date
Percentage of patients enrolled in enhanced personal health record	Percentage of total number of current assigned primary care patients who had at some point previously been "authenticated" (signed up in person with personal identification verification) to use the enhanced version (access to lab test results, prescription information, appointment information) of the personal health record (My Health*e*Vet) as of the last day of the month
Percentage of patients using secure messaging	Percentage of total number of assigned primary care patients sending 1 or more secure messages to primary care staff in the quarter specified

Group visit encounters	Shared medical appointments in primary care and primary care mental health integration clinics
Care management	
Percentage of patients using Telehealth monitoring	Percentage of total number of assigned primary care patients that were actively enrolled as of the last day of the month in RN case manager telehealth program
Percentage of patients contacted within 2 days of VHA hospital discharge	Percentage of discharges of assigned primary care patients from a VHA inpatient facility for whom face-to-face or telephone contact by PCP or RN was provided within 2 business days after discharge; discharges as a result of death and discharges where a patient was readmitted within 2 days of discharge were excluded
Patient partnership	
Patient advisory councils	ACP Biopsy question: "Does your practice have a patient advisory committee?"

ACP Biopsy indicates American College of Physicians Medical Home Builder Practice Biopsy; DO, doctor of osteopathy; FTE, full-time equivalent; LPN, licensed practical nurse; MD, doctor of medicine; NP, nurse practitioner; PA, physician assistant; PCP, primary care physician; RN, registered nurse; VA, Department of Veterans Affairs; VHA, Veterans Health Administration.

[a]A small number of patients were assigned to a PCP at more than 1 facility; these patients were counted only once in the total number of patients.

[b]The number of primary care support staff and ratio of support staff to PCP did not include data from contract community-based outpatient clinics (CBOCs) (the 26% of CBOCs that are run by non-VA management companies). All other measures included data from contract CBOCs.

[c]The ACP Biopsy was assessed at the facility level.