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**Title:** Patient Portals in the Safety Net: Optimization

**Author:** California Health Care Foundation

**Context for Use:** This paper documents the lessons learned by a group of safety net clinics in patient portal optimization.

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# Patient Portals in the Safety Net

## Phase 3: Optimization

### Patient Portal Series

A patient portal is an online tool that gives patients direct access to their electronically stored health information. It can streamline administrative functions and increase communication between patients and their care team. In launching their patient portals, health centers follow a path similar to the introduction of many other technologies:



This paper is the third in a series — organized by the phases of assessment and planning, implementation, and optimization, which are illustrated above — that documents the experiences, lessons learned, and tools used by three community health centers in their participation in the Patient Portal Initiative (PPI):

- Open Door Community Health Centers (Open Door), Humboldt and Del Norte Counties, California
- Shasta Community Health Center (Shasta), Redding, California
- West County Health Centers (West County), Sonoma County, California

These papers and the tools gathered on the initiative's website ([www.chcf.org/patient-portals](http://www.chcf.org/patient-portals)) are intended to serve as a resource for other safety-net providers to use and tailor to their specific needs. The experiences of the PPI grantees provide context and guidance for planning, launching, and optimizing a patient portal in a safety-net environment.

### Introduction

As grantees moved through the initial implementation phase and integrated the use of the patient portal into their daily operations, the initiative's learning community discussions turned to explorations of expanding services offered, increasing awareness and depth of usage of the portal among current users, marketing to future users, meeting meaningful use objectives and other standards, and using the patient portal for quality improvement and care innovations. Together with an emerging market for mobile health care applications, patient portals are changing the way health care is delivered.

### Enrollment to Usage: Techniques to Increase Traffic

Examining enrollment and usage data, as well as results from patient and staff surveys, helped the PPI grantees develop strategies aimed at increasing depth of usage. As of September 2012, patient portal enrollment at each of the grantees' health centers was on the rise, as illustrated in Figures 1, 2, and 3. Yet, grantees sought to foster more active users.

"We must take a value orientation," noted Shasta CIO Charles Kitzman. "You can enroll as many patients as you want, but if they don't use it, what's the point?"

LESSONS FROM THE FIELD

West County also was not as concerned with broader adoption as it was with increasing active use of the portal by patients already enrolled.

Open Door examined ways to make the portal more useful and personalized to patients during the initial portal visit with the intent of creating a strong value proposition that would keep users coming back.

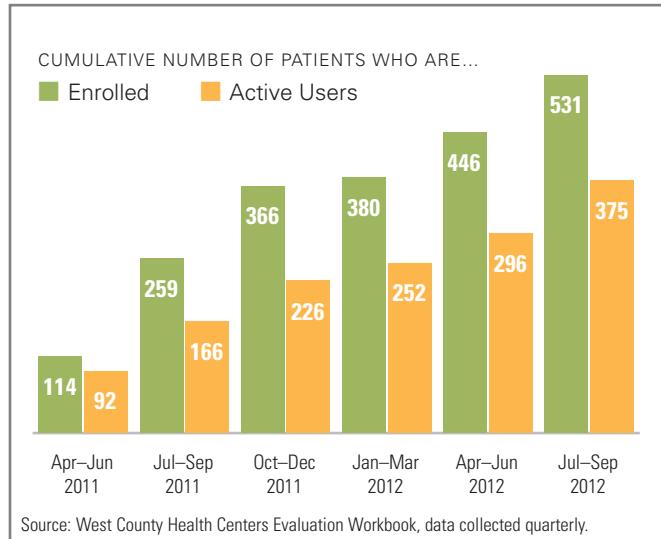
### Reinforcing Gains

One place to start the patient portal optimization process is to focus on reinforcing portal use with current users.

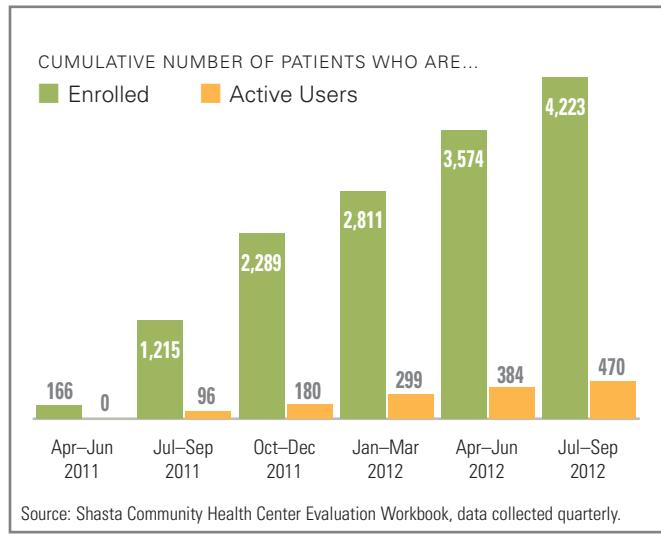
For example, Shasta found that of the active users queried, most tended to use only a narrow set of features and services. “What we found was that ‘super users’ found ruts and stayed in them,” said Kitzman. “They didn’t know all that the portal allowed them to do. As an organization, we need to go back and think about how to make the full benefit of the portal known.” One tactic under consideration is using commercially available software to make educational videos about the portal’s full range of uses.

Shasta’s Kitzman advises health centers to constantly “mind the gap” between patient portal enrollees and active users. Each day, Shasta’s care teams scan a report that lists their patients and appointment times. This report is leveraged in the pre-visit planning process to determine if a patient is: a) signed up and using the portal, b) signed up and not using the portal, or c) not signed up. This information allows the clinical teams to tailor their messages based on the status. For example, “It’s great you’re using the portal; please look for your Encounter Summary there tomorrow morning,” “Why haven’t you tried the portal yet? We’d love to hear from you,” or “Have you heard about our patient portal? Here are some of the convenient things you might like about it.”

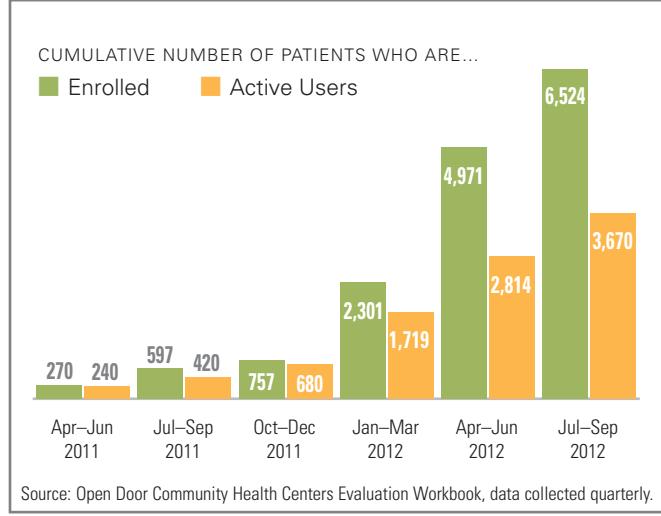
**Figure 1. West County, Patient Enrollment vs. Active Users**



**Figure 2. Shasta, Patient Enrollment vs. Active Users**



**Figure 3. Open Door, Patient Enrollment vs. Active Users**



While their reports show that 40- to 60-year-olds are the super users, Shasta CEO Dean Germano warned, “You’ve got to reach out to people where they’re at, on many levels. Each time we make some assumptions about who uses our portal and how they’re using it, we’ve been proven wrong.” According to Germano, a health center’s approach to patient outreach should not be one-size-fits-all.

A patient’s initial visit to the patient portal can be critical. Health centers should pay attention to this first impression and how to make the portal immediately valuable to the patient.

Open Door examined their process for patient enrollment and realized that they could make a better first impression by making slight modifications. Their portal’s functionality requires that the primary care provider releases, or publishes, a patient’s health information to the portal. At first, Open Door’s enrollment process involved multiple steps: First, the patient was enrolled. Next, the patient would have to sign into the portal and email their provider. Then, the provider would publish the patient’s medical information. Now, medical assistants (MAs) notify the provider when patients enroll so that the first time patients log in, they see their personalized health information. Open Door believes this approach has encouraged repeat use of the portal by patients.

Open Door also strives to ensure that all staff are involved in promotion of the portal. “We push the ‘touchstones’ concept and try to have everyone at every step of the patient visit mention the portal,” said Tammy Flint, Open Door’s service administrator and portal project manager. “This means the front office, MAs, RNs, providers, lab techs... everyone.”

## Employing Creative Marketing

Another approach taken by the PPI grantees to increase portal usage was to evaluate the marketing and outreach efforts first employed at the portal’s launch and, using patient feedback, to tailor the message as well as the means of delivering it.

For example, Shasta determined that “portal” was not a particularly engaging term. Instead, they began a rebranding campaign — “Shasta Health Connect” — to replace the ambiguous term “portal.” Shasta found that this campaign also translated well into the community at large, raising the profile of the health center by demonstrating their commitment to up-to-date technology.

Market segmentation is another tactic employed by Shasta. In this case, patients are segmented by identifying those whose treatment plans may benefit from frequent portal communication. For example, as part of their chronic care management team, Shasta includes staff patient educators, who use the portal to stay engaged with patients and reinforce patients’ self-management goals.

West County is implementing the Patient Activation Measure (PAM), a screening tool for measuring patient engagement, and is considering its use to stratify their patients into groups based on their likelihood of using the portal. The PAM uses a Likert-type scale to measure patient activation; if a patient’s activation level is low, that patient is less likely to use the portal.

Finally, catching patients at a “pain point” can be an effective way to communicate the value of portal services. For example, while Shasta patients are on hold with the call center, they hear a message about making appointment requests through the portal.

## Expanding Service Offerings

After the core features of the patient portal had been successfully deployed — appointment request, medication refill request, lab results display, messaging to doctors/care team — the PPI grantees explored expansion of their portal’s set of services and ways to simplify administration.

- Dr. Jason Cunningham, medical director at West County, offered a “Visit Agenda” to his patients through the portal. Here, patients can fill out a questionnaire titled “What I Would Like to Discuss at My Next Office Visit.” The questionnaire responses are then imported into the progress note of the next office visit.
- Shasta is exploring ways for patients to complete their annual history update on the portal, which would streamline the intake process at the time of the visit.
- Shasta also is exploring ways for the patient to complete the narrative section of the “History of Present Illness” in the clinical note and make that available in the patient’s chart.
- All grantees are interested in offering patient- and condition-specific information through the portal, such as nutrition and exercise information for obese children.
- Open Door is preparing for the release of a new version of their portal that is available in Spanish. The health center is working through the implications on staff to have a Spanish email message; for example, is there a way to route the message to a Spanish-speaking/-reading staff member who is available to receive the message?
- Open Door also is exploring a new form of health assessment to be delivered through the portal.

## Promoting Long-Term Sustainability

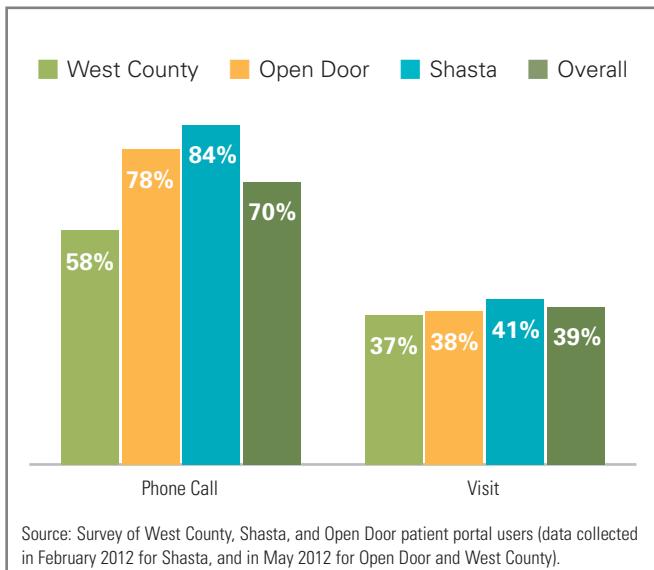
Patient portal interactions are not billable encounters. Many may ask: If the portal eliminates a visit, what is the impact on revenue? In the absence of direct funding to support the portal, PPI grantees noted that use of the portal increases provider efficiency, allows the provider to see the most critical patients, and creates a cycle of sustainability. Using the portal for routine communications — and, in many cases, routing those communications to other members of the care team — can free up providers’ time for patients with more complex problems.

For example, Mary Szecsey, West County’s executive director, noted, “We have plenty of demand! The portal helps us open up capacity for patients who truly need a face-to-face visit. The patient engagement piece is an added bonus.”

Published studies have indicated that patient portals can improve efficiency by improving patient flow.<sup>1</sup> In the patient surveys administered across all three PPI grantee sites, patients were asked whether or not the portal saved them a visit to the health center in the past six months.

As seen in Figure 4, overall, 70% of patients reported that

**Figure 4. Patients Reporting that Patient Portal Saved a Call or Visit to Health Center, 2012**



the portal saved them a call to the health center, and 39% of patients reported that the portal saved them a visit. These findings are consistent with those of published studies. Although self-reported by patients and not derived from site use data, these findings suggest that the patient portals are reducing unnecessary patient calls and visits to the PPI grantee health centers.

## The Portal's Role in Meaningful Use and Patient-Centered Medical Home

Health centers around the country and across California are focused on meeting federal “meaningful use” objectives and patient-center medical home standards. Patient portals play a big role in these programs aimed at increasing efficiency and improving patient care.

### Meaningful Use

Patient portals are playing an increasingly important role in meeting meaningful use objectives — the set of requirements defined by the Centers for Medicare and Medicaid Services (CMS) Incentive Programs that governs the use of electronic health records (EHRs) and allows eligible providers and hospitals to earn incentive payments by meeting specific criteria. For some health centers, these meaningful use incentive payments served as the initial motivation for patient portal implementation.<sup>2</sup>

CMS has defined three stages of meaningful use, each with a number of measures that providers must meet. In Stage 1, two measures in particular lend themselves to fulfillment through the use of a patient portal:

- **Core Measure #12.** Provide patients with an electronic copy of their health information (including diagnostic test results, problem list, medication lists, and medication allergies) upon request.<sup>3</sup>
- **Menu Set Measure #5.** Provide patients with timely electronic access to their health information (including lab results, problem list, medication lists, and medication allergies) within four business days

of the information being available to the eligible provider.<sup>4</sup>

While the media could be any electronic format, such as a CD or USB flash drive, and eligible providers are given between three (Core Measure #12) and four (Menu Set Measure #5) business days to comply with a patient’s request, a portal or personal health record (PHR) is the most efficient way of providing this information.

Shasta found a way to meet Core Measure #13 — provide clinical summaries for patients for each office visit — through their portal.<sup>5</sup> They discovered that the “Encounter Summary” can be connected to the portal and used as an effective, paperless delivery mechanism for enrolled patients.

Stage 2 meaningful use objectives emphasize data sharing, patient engagement, and decision support to improve clinical quality measures. Accordingly, the Stage 2 measure for electronic access to information specifically prescribes the use of a portal or PHR and replaces Stage 1 Core Measures #5 and #12.

**Core Measure #7.** Provide patients the ability to view online, download, and transmit their health information within four business days of the information being available to the eligible provider.<sup>6</sup>

To meet Stage 2 Core Measure #7, 50% of a provider’s patients must be provided timely online access (i.e., patient provided with the website address of the portal and given a login and password), and at least 5% of all unique patients (or their authorized representatives) view, download, or transmit their health information to a third party.<sup>7</sup> In addition, providers are required to make available a far greater number of health data elements online. These include medication history, allergy history, vital signs (e.g., height, weight, blood pressure, body mass index, growth charts), smoking status, care plans (including goals and instructions), and any known care

team members.<sup>8</sup> Following this trajectory, it is anticipated that Stage 3 objectives will require a deeper and broader penetration and use of patient portals.

### Patient-Centered Medical Home

A patient-centered medical home (PCMH) facilitates partnerships between individual patients and their personal physicians, and when appropriate, the patient's family. Care is facilitated by registries, information technology, health information exchange, and other means to assure that patients get the indicated care when and where they need and want it, and in a culturally and linguistically appropriate manner.

Early studies show that the PCMH care delivery model has helped improve clinical and organizational performance, leading to a broad range of stakeholders calling for its adoption.<sup>9</sup> At the heart of the PCMH model is a commitment to patient engagement. PPI grantees recognized that their patient portals were part of a larger effort to strengthen the connection between providers and patients.

For example, Shasta noted that their patient educator, a key member of their PCMH team, sees the portal becoming an essential communication and outreach tool for patient engagement.

For West County, the entire agency is focused on patient engagement; it is a strategic initiative to develop an organizational culture that makes patient engagement central to their work. A continual focus is to work with staff on developing their understanding of patient engagement. West County advocates direct patient engagement through establishing an advisory council and developing "listening posts." The patient portal is an important kind of listening post for West County and their patients.

PPI grantees are on the pathway to formal recognition as patient-centered medical homes. The National Committee for Quality Assurance (NCQA), for example, is a private, independent nonprofit health care quality oversight organization that has developed a set of standards for practices seeking to obtain recognition as a medical home.<sup>10</sup> Three levels of recognition are available, depending on the depth of performance against six PCMH standards, and many of these standards are closely aligned with the CMS EHR meaningful use incentive programs. Similar to the Stage 1 meaningful use objectives and measures, NCQA PCMH standards, elements, and factors do not specifically require the use of a patient portal to meet Level 1 recognition, however, as health centers seek higher levels of recognition the patient portal will be a necessary tool.

For example, PCMH Standard 1, Enhance Access and Continuity, has six elements, or components, that define ways in which a practice can enhance access and continuity. Element 1D describes six "factors," or ways in which practices can provide electronic access to information and care requests:

1. Electronic copy of health information within three days to more than 50% of patients who request it (correlates with meaningful use Core Measure #12)
2. Electronic access to current health information within four days to at least 10% of patients (correlates with meaningful use Menu Measure #5)
3. Clinical summaries provided for more than 50% of office visits within three days (correlates with meaningful use Core Measure #13)
4. Two-way communication
5. Request for appointments or prescription refills
6. Request for referrals or test results

While it is possible to address these factors through a secure messaging system, NCQA experts agree that providing electronic access without a patient portal (particularly for factors one through three) is very difficult.<sup>11</sup>

## Patient Portals and Quality Improvement: Optimizing Design and Interactivity

Patient portals also are valuable tools for quality improvement. Both caregivers and patients understand that portals and PHRs can bridge the gap in communication that can develop between visits, resulting in more cohesive treatment plans, better compliance, and a stronger health partnership between patient and provider.

A 2003 survey of about 1,200 online respondents conducted by the Foundation for Accountability (FACCT) for the Markle Foundation's Connecting for Health initiative sheds light on patients' motivations for having their health information online:

- 71% felt it would help to clarify their doctor's instructions
- 65% felt it would help prevent medical mistakes
- 60% felt it would change the way they managed their health
- 54% felt it would improve the quality of care

Integrated PHRs help patients become more active participants in their care, opening up new strategies and tactics for self-management, chronic care management, preventive health, and interactive disease- or condition-specific interventions through mobile applications. This is where the real promise lies in using personal health technologies. The following examples highlight the potential impact of these technologies as health centers harness the power of the portal to improve health status and clinical outcomes.

## Disease Prevention

Clinical preventive services, which include screening tests, immunizations, counseling, and preventive medications, are highly effective at extending and improving the quality of life.<sup>12</sup> Yet Americans are suffering from a "prevention gap," receiving only half of recommended care.<sup>13</sup> Patients may lack knowledge about needed services, have limited motivation to receive services, or face logistical challenges to receiving services. Clinicians may fail to address needed services due to oversight, lack of time, and competing demands. To a large extent, the typical system for delivering preventive care is reactive, relying on patients to schedule wellness visits and on clinicians to recognize when preventive care is due.

One proposed solution is to harness the power of PHRs.<sup>14</sup> The well-designed presentation of patient information through a portal or PHR can give patients evidence-based information about what preventive service is recommended — tailored to their individual risk factors (e.g., age, gender, comorbidities, prior testing, family history, health behaviors) and presented in an understandable language and format.

Unfortunately, most of the portals and PHRs available today are not interactive preventive health records, or IPHRs, defined as a highly advanced, patient-centered, evidence-based patient portal focused on prevention.<sup>15</sup> Nonetheless, many offer the potential to transmit reminders from the EHR or a population health management system/chronic disease management system through the portal. The research team from the Virginia Ambulatory Care Outcomes Research Network offers the following comparison of functionality enhancements to make portals more interactive and patient-centric (see Table 1 on page 8).

**Table 1. Functionality Comparison of Basic Electronic Record (EHR) or Personal Health Record (PHR) to an Interactive Preventive Health Record (IPHR)**

	EHR- OR PHR-BASED PORTAL	IPHR-BASED PORTAL
Content	<ul style="list-style-type: none"> <li>• Displayed in clinical language</li> <li>• Stored and displayed as entered into the system</li> <li>• Generic, varying only by age and gender</li> <li>• Similar for all users nationally</li> </ul>	<ul style="list-style-type: none"> <li>• Displayed in patient/lay language</li> <li>• Interpreted and the system explains its meaning</li> <li>• Individually tailored to important user characteristics</li> <li>• Tailored to local resources and support</li> </ul>
Design	<ul style="list-style-type: none"> <li>• Primarily informed by the vendor</li> <li>• No significant consideration of practice workflow and needs</li> </ul>	<ul style="list-style-type: none"> <li>• Primarily informed by the user</li> <li>• Consideration given to integrate into practice workflow and needs</li> </ul>
Functions	<ul style="list-style-type: none"> <li>• May require users to trigger actions (e.g., overdue care reminders)</li> </ul>	<ul style="list-style-type: none"> <li>• Automated, requiring minimal practice action to provide patients' information</li> </ul>
Recommendations	<ul style="list-style-type: none"> <li>• Individually determined and maintained by practices</li> <li>• Made with little or no supporting material</li> </ul>	<ul style="list-style-type: none"> <li>• Centrally determined and maintained based on national evidence-based guidelines</li> <li>• Tools, resources, educational material, decision aids, and logistical support are provided to patients to help them take action</li> </ul>

Source: Virginia Ambulatory Care Outcomes Research Network.

## Innovations in Personal Health Technology

Development of applications to collect and share data about specific conditions or for specific populations of patients has proliferated in recent years. Sponsored by foundations and governmental agencies such as the Agency for Healthcare Research and Quality (AHRQ), these types of interactive applications have begun to change the perception and purpose of portals and PHRs.

Project HealthDesign is a national program designed to spark innovation in personal health technology. Sponsored by the Robert Wood Johnson Foundation, the program views PHRs as springboards for action and improved decision making, not just repositories of information useful to clinicians.

“What we found is,” said Dr. Chris Gibbons, a member of the project’s National Advisory Committee, “there are other types of information that patients think important that traditionally and historically clinicians have not necessarily considered as important. Project HealthDesign helped [clinicians] to broaden the perspective on the types of information, the types of data that could conceivably

be important and that should go into a personal health record, and also pushed the envelope on the types of platforms and tools, and devices to use to collect this information.”<sup>16</sup>

Gibbons also points to the project’s focus on observations of daily living (ODLs) as a key innovation. ODLs are cues that people attend to in the course of their everyday lives that inform them about their health.<sup>17</sup> Examples of ODLs include sleep patterns, exercise behavior, nutritional intake, attitudes and moods, alertness at work or in class, and environmental features, such as clutter in the living or working space. By folding ODLs into the health care mix, patients across the socioeconomic spectrum can enrich the quality of their care.

“We had underserved populations; we had low-income populations,” noted Gibbons. “We had elders, seniors, who many think are not online in any way.”<sup>18</sup> More information about ODLs, specific applications developed for Project HealthDesign, and current projects is available at [www.projecthealthdesign.org/about](http://www.projecthealthdesign.org/about).

## **Summary**

After health centers move beyond offering the basic functions and services of a patient portal, attention turns to both broadening and deepening the portal's use. An emphasis on active use rather than mass enrollment characterizes this phase, although enrollment continues to be an important activity.

Lessons learned from patient feedback obtained through patient advisory groups and surveys can be used to tailor the portal to make it more useful and compelling for patients and care teams. Meeting meaningful use requirements as well as PCMH recognition standards elevates the importance and priority of patient portal deployment and optimization within an organization with many competing priorities. Moving forward, health centers and their patients would be well served by efforts to influence vendors to design portals that are interactive, provide patient-specific reminders and education, and strengthen patient engagement.

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## **ABOUT THE FOUNDATION**

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## ENDNOTES

1. Seth Emont, “Measuring the Impact of Patient Portals: What the Literature Tells Us,” California HealthCare Foundation, May 2011, [www.chcf.org](http://www.chcf.org).
2. The Medicare and Medicaid EHR Incentive Programs provide financial incentives for the “meaningful use” of certified EHR technology to improve patient care. To receive an EHR incentive payment, providers have to show that they are “meaningfully using” their EHRs by meeting thresholds for a number of objectives. CMS has established the objectives for “meaningful use” that eligible professionals, eligible hospitals, and critical access hospitals must meet in order to receive an incentive payment. Source: [www.cms.gov](http://www.cms.gov).
3. Centers for Medicare & Medicaid Services, EHR Incentive Program, “Eligible Professional Meaningful Use Core Measures Measure 1 of 15,” CalHIPSO, [www.calhipso.org](http://www.calhipso.org) (page 19).
4. Centers for Medicare & Medicaid Services, EHR Incentive Program, “Eligible Professional Meaningful Use Core Measures Measure 1 of 15,” CalHIPSO, [www.calhipso.org](http://www.calhipso.org) (page 33).
5. Centers for Medicare & Medicaid Services, EHR Incentive Program, “Eligible Professional Meaningful Use Core Measures Measure 1 of 15,” CalHIPSO, [www.calhipso.org](http://www.calhipso.org) (page 21).
6. Centers for Medicare & Medicaid Services, EHR Incentive Program, “Stage 2 Eligible Professional Meaningful Use Core Measures Measure 7 of 17,” [www.cms.gov](http://www.cms.gov) (page 1).
7. Centers for Medicare & Medicaid Services, EHR Incentive Program, “Stage 2 Eligible Professional Meaningful Use Core Measures Measure 7 of 17,” [www.cms.gov](http://www.cms.gov) (page 2).
8. Centers for Medicare & Medicaid Services, EHR Incentive Program, “Stage 2 Eligible Professional Meaningful Use Core Measures Measure 7 of 17,” [www.cms.gov](http://www.cms.gov) (page 3).
9. Diane Rittenhouse and Stephen Shortell, “The Patient-Centered Medical Home: Will It Stand the Test of Health Reform?” *Journal of American Medical Association* 301, No. 19 (2009): 2038–2040, doi:10.1001/jama.2009.691.
10. National Clinical Quality Association, “2011 PCMH Standards and Guidelines,” [www.ncqa.org](http://www.ncqa.org).
11. William Tulloch, NCQA director of government recognition initiatives, communication during a California Primary Care Association (CPCA)-sponsored webinar, “Preparing for NCQA Submission,” part of the CPCA Lunch and Learn Series, February 21, 2013.
12. Elizabeth McGlynn et al., “The Quality of Health Care Delivered to Adults in the United States,” *New England Journal of Medicine* 348, no. 26 (June 26, 2003): 2635–2645, doi:10.1056/NEJMsa022615.
13. Ibid.
14. Alex Krist et al., “An Interactive Preventive Care Record: A Handbook for Using Patient-Centered Personal Health Records to Promote Prevention,” (Rockville, MD: Agency for Healthcare Research and Quality, 2012) (AHRQ Publication No. 12-0051-EF, prepared by Virginia Commonwealth University, Department of Family Medicine, Virginia Ambulatory Care Outcomes Research Network [ACORN], under Grant No. R18 HS 017046).
15. Ibid.
16. Wendy Swanberg, “Functional Innovation and Knowledge Innovation — Two Key Contributions of Project HealthDesign,” Project HealthDesign Blog, November 14, 2012, [www.projecthealthdesign.typepad.com](http://www.projecthealthdesign.typepad.com).
17. Robert Wood Johnson Foundation, “Health in Everyday Living,” Project HealthDesign E-Primer #3 (2008), [www.projecthealthdesign.org](http://www.projecthealthdesign.org).
18. Swanberg, “Functional Innovation and Knowledge Innovation.”