The Evolution of Patient Portals and Mobile Applications in Healthcare

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October 2014
About the Author

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ABSTRACT

Much has been written about the changing paradigm in healthcare. Common themes have emerged as drivers of the new model. These include transparency, accountable care, achieving the “triple aim” (increasing patient satisfaction, improving population health outcomes and lowering overall cost), patient-centered approaches to care along with engagement, and building a culture of safety. Regulatory and payment reforms support patient engagement strategies. All of these values and regulations shape and define the new data-driven integrated care systems that are emerging to meet these new directions and challenges.

A critical feature of these new systems are the digitization of information and the adoption of an electronic health record that define standardized clinical pathways and document all care that is delivered. Involving patients and their caregivers more fundamentally in their care is universally acknowledged as critical to achieving the triple aim goals, and one of the foundations on which the new meaningful use standards are built. Involved patients adhere to treatment regimens, and engage in wellness activities in pursuit of improved health. Re-admissions are reduced, overall costs of treatment are lower, and patients are more satisfied with their overall treatment experience.

The missing link becomes the availability of an easy to use patient portal, through which patients can access their own health information, communicate with their clinicians and receive advice and information on managing their conditions and pursuit of wellness. Mobile tools and approved applications may be offered to engage patients and their caregivers in support of these goals. Adopting agile solutions, based on existing EHRs will be critical for hospitals and ambulatory operations, in order to realize the promise that these systems can deliver.

This paper expands on these themes and offers some suggestions for positive directions that hospitals can follow as they transition and change their systems.

The organization of healthcare institutions and fee for service medicine has resisted change, essentially since the introduction of Medicare in the late 1960s. A healthcare cost crisis has been the steady state of the healthcare industry in the US since that time, making the US per capita healthcare cost the highest of any industrialized country; leading the world as a percentage of gross domestic product (GDP). Currently at seventeen percent, it is estimated that health spending will grow to nearly twenty percent of GDP by 2020.[DP1] [DP1] There is also universal recognition, that despite US per capita spending, health status measures,
including longevity, are not commensurate with resources expended. Countries with health systems that out-
perform the US are also under pressure to derive greater value for the resources devoted to their health care
systems. Aging populations and increased longevity, coupled with chronic health problems, have become a
global challenge.²

In the US, recent developments including resource constraints, major recession, and the passing of the
Affordable Care Act (ACA), have combined to create new cost pressures and opportunities for Healthcare. A
number of key elements of the ACA were designed to foster transition to a new paradigm of care with the
promise of more efficiency and effectiveness, including transparency, patient centered care, value-based
purchasing and data-driven care. These ACA elements are seen as critical in changing the way care is
delivered in the US.³

As a consequence of the cost structure, health premium spending by US businesses for their employees has
significantly contributed to reduced global competitiveness. In addition, the ACA has opened the market to
previously uninsured individuals. Creating more affordable health insurance has accelerated the trend
towards high-deductible policies. These policies increase the limits of first dollar consumer spending, along
with co-pays for individuals and families. High-deductible policies are becoming the norm in the US; creating
additional cost-burdens as private spend on healthcare significantly increases. A similar pressure to control
premiums offered through state insurance exchanges, partly in response to increased coverage mandates in
the ACA, has also driven the growth of these plans. Recent studies confirm that, in addition to the largest
spend, the US leads in the most out-of-pocket and private healthcare spending, by a large margin.²

The ACA created financial incentives (and penalties) to promote disease prevention, care coordination and
value, not volume of services delivered. The legislation also fosters the pervasive use and integration of IT
(Meaningful Use), designed specifically to reduce medical errors and promote patient-centered outcomes.

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Traditional models of care feature top down, physician driven, fee for service, episodic and fragmented care,
documented through discrete paper records. Accountable care models promoted by the ACA include the use
of multidisciplinary teams within more integrated delivery systems, significant patient and family engagement,
and multiple points of access, including mobile applications. [DP2]These are supported by a real-time
electronic health record, (EHR). Other new models of care and innovative financing approaches include
Accountable Care Organizations (ACOs), bundled payments, primary care and patient-centered medical
homes, along with financial sanctions for avoidable medical events.

While it’s acknowledged that change towards this new paradigm will be a multi-year effort, those providers who
are more able to embrace and affect successful milestones along the way, will be well-positioned to deliver
superior care, better compete, and retain patients and their families as loyal care recipients of their institutions and systems. \[DP3\]

**Providers who are more able to embrace and affect successful milestones along the way, will be well-positioned to deliver superior care, better compete, and retain patients and their families as loyal care recipients of their institutions and systems.** \[DP4\]

Widespread adoption of information technology is regarded as a principal pathway to improving healthcare and achieving the Institute of Medicine’s six aims for redesigning care, (safe, effective, patient-centered, timely, efficient, and equitable health care). Key among methods identified in promoting these aims are the provision of patient tools, allowing them to be more active participants in their own care and foster a continuous healing relationship between clinicians and patients. Creating a platform for communication and input within a patient portal is of vital importance to these aims.\(^5\)

While there has been a relatively rapid and increased adoption of the EHR in the US, spurred, in part by governmental incentives for both institutions and free-standing physicians, there has not been a commensurate growth in access to consumer health data. Consumers increasingly want to access their own information and become more involved in their own care. More than forty percent of US consumers surveyed in 2013 would be willing to switch physicians to gain on-line access to electronic medical records. In fact, more than half of those surveyed have already taken ownership in one form or other of their own care by self-tracking their own personal health records.\(^4\)

**More than forty percent of US consumers surveyed in 2013 would be willing to switch physicians to gain on-line access to electronic medical records.**

— Accenture 2013

A recent survey of knowledge, attitudes and practices around digital health and personal health information (PHI) revealed that a majority of consumers in the US (4 out of 5) believed that they should have full access to their medical records. While only 1 out of 3 physicians surveyed ascribed to this belief, nearly a third of consumers in the US already have full access to their records, and this trend is rapidly increasing.\(^4\)

Involving patients and their caregivers more fundamentally in their care is universally acknowledged as critical to achieving the triple aim goals, an Institute for Healthcare Improvement initiative, which embodies the substance of accountable, effective care, and one of the foundations on which the new meaningful use standards are built. **The Triple Aim Goals are designed to improve the experience of care (including quality and satisfaction); improve the health of populations; and reduce the per capita cost of care.**\(^7\)

Involved patients adhere to treatment regimens, and engage in wellness activities in pursuit of improved health. Re-admissions are reduced, overall costs of treatment are lower, and patients are more satisfied with
their overall treatment experience. “...giving people access to their medical records can induce them to take better care of themselves, deepen their understanding of both prevention and cure, and make them more motivated to participate in treatment programs”.

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—John Glaser, Ph.D., CEO, Siemens Healthcare

The implications for healthcare providers are clear. As consumers become more reliant on technology, there is an emerging role for the EHR to provide a patient portal that can be an effective channel for two-way communication, and offer patients increased access to their own protected health information (PHI), along with input to key decisions about their health and wellness. Significantly, when patients with serious chronic illness were asked to balance concerns about the confidentiality of their medical information with the ability to freely access their data, more than half of people surveyed thought that the ability to get their records online outweighed the risks.

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— Accenture 2014 Patient Engagement Survey

Significantly, the growth of EHRs and use of digital health tools by providers has not been matched with comparable access to consumer appropriate tools. Patients may have limited, or no access to their own records or information may be shared on an inconsistent basis between them and their care team. This has created a digital divide between clinicians and consumers, just at the point where increased engagement is needed to produce better health outcomes and lower costs; for both the Healthcare System and individual consumers.

One solution being advocated is the construction of a companion EHR that can be utilized by both the patient and his or her clinicians in the promotion of increased engagement and better outcomes. “In this context, an EHR is a collection of health information that has been gathered by and is managed by an enterprise—typically a doctor’s office, a hospital, or an integrated system. In contrast, a patient health record (PHR) is meant to address the health information needs of the individual patient or consumer. In addition to the provider-centric recording of the patient’s interaction with the health care system, a PHR would include information, entered by the patient, about daily symptoms, over-the-counter medicines taken, personal exercise programs, special diets, or data from home monitoring devices. By combining personal health information with knowledge about diseases and their treatment, a PHR system can provide tools to help patients become more active participants in their own health care.”
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- IHI: Triple Aim Initiative

The implementation of stage 2 Meaningful Use mandates, which specify digital access to the patient’s medical records, sets the stage for the transition of the EHR, from a clinical repository to a platform for a PHR to promote increased engagement and shared decision making for clinicians and consumers. When patients are engaged and part of the record keeping process, there are clear benefits, including more involvement in care and better outcomes.¹¹

A broader approach is emerging in many organizations, recognizing that they have to support the pervasive use of health care information and balance consumer issues with the overall priorities of their healthcare IT efforts. Twenty-eight percent of those responding to a 2013 HIMSS Leadership survey indicated they were focused on implementing systems related to Meaningful Use, while another forty percent were consumed with integration of existing systems and maintenance, as well as the growth of data warehouses and business intelligence systems.⁹ Focusing on all the ways that patients may become engaged in their care has been shown to be useful in helping them to be more intelligent consumers. Indeed, many of the lessons learned have been drawn from the retail consumer experience. How many times do we rely on access to real-time information or purchases that are designed to create a convenient and effective experience? Contrast this with many systems in healthcare. I can track my package, but not my care results. I can make a reservation at thousands of restaurants, but not at my physician’s office. This functionality, along with more significant pathways to increased involvement in care will make patients more sticky and loyal and produce better outcomes.

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Innovative hospital-based projects can be quite simple in their approach to providing an initial set of functional tools to healthcare consumers. In addition to offering digital maps and way-finding tools, hospitals have included directories, appointment scheduling, and healthcare dictionaries where personal conditions are explained and additional information may be obtained.⁹ Successfully done, this will also provide differentiation for providers in an increasingly competitive marketplace.

A relevant example of an effective initiative implemented in Meaningful Use stage 1, is the clinical care documentation (CCD) summary provided at the end of each office visit. Patients have a documented lack of retention for information imparted during a visit. It is estimated that patients forget a significant portion of what they hear in the doctor’s office.¹⁵ Having a care summary in your hand at the end of the visit, with clear follow-up instructions can represent an invaluable step in a patient and their caregiver’s ability to comply with their treatment regimen. While it may be too early to adequately measure the effect of the after visit summary, it
clearly represents an important step in recognizing and meeting the communication needs of patients across the continuum of care.

As providers progress through Stage 2 of meaningful use, hospitals will need to focus on what technologies will be used in complying and fostering increased information sharing and engagement. Many hospitals are relying on portals that are either part of their EHR, or creating functionality through extensions of their EHR. An example of an effective approach is New York-Presbyterian’s award-winning patient portal, MyNYP.org, which was built through a joint development model, expanding on the organization’s existing electronic health record system. This enabled the portal to be deployed quickly, and resulted in significant, measurable improvements in patient satisfaction and engagement. The implementation of MyNYP.org lead to a 43 percent increase in appointments scheduled using the portal, and a lowering of the no-show rate from 20 percent to 12 percent in the six months following its deployment. The portal is also able to push customized educational material along with personalized reminders, based on pending medical needs, e.g.-immunizations. It is also able to collect and store individual communication preferences from patients, allowing for further improvements in its future ability to effectively communicate with patients and their caregivers.\(^9\)

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—Accenture

As one of the largest integrated healthcare systems in the US, Kaiser Permanente (KP) came out early around the organizing principle of the use of an enterprise-wide EHR to drive consistency and excellence across its network. Significant, early investments around 2002 were matched with a vision that put the patient at the center of primary care as the hub of the experience. This essentially created a patient home, with clinicians serving as facilitators on service options, clinical efficacy and cost considerations.

\textbf{KP internet and mobile apps offer instant and real-time access to medical records for clinicians, patients and authorized family members}\[^{DP11}\]. Records are connected across the treatment continuum, and the site is integrated with finance and insurance systems; thus giving a continuity to the patient’s experience. A patient portal allows patient access to most of their clinical records. It also has a suite of mobile applications and functionality, including secure communication with physicians, scheduling appointments, prescription refills, viewing of health and drug information, as well as customized feedback on ways to improve their health and manage health benefits.

\textbf{Kaiser Permanente’s internet and mobile apps offer instant and real-time access to medical records for clinicians, patients and authorized family members}\[^{DP12}\].

There are documented benefits of using this approach. Patients report that the access allows them to manage their healthcare effectively and is a convenient way to interact with the healthcare team. Secure messaging has also reduced the number of office visits, without compromising care. \textbf{Positive impact has been}
documented with the Healthcare Effectiveness Data and Information Set (HEDIS) measures[DP13]. The growing numbers of active users now represent 63 percent of KP’s eligible membership. Based on this success, KP plans on extending its programs into the homes of patients with demonstrated proficiency, so that self-management can potentially include virtual visits through telemedicine, as well as the collection of biometric data from real-time monitoring devices that will allow better, more cost-effective care.

A number of principles emerge as hospitals and systems begin to design approaches to engage patients with the use of technology. Health IT designs must be user-centric, starting with the needs and desires of patients and their families. While the range of technologies and features are large and quite varied, (See Figure 1 below), Health care tools utilized for patient engagement must be connected to other integrated systems and the patient’s overall experience.

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Less often mentioned than the IOM’s six aims for redesigning care, (Safe, effective, patient-centered, timely, efficient, and equitable health care), are the IOM’s ten design rules: care based on continuous healing relationships; customization based on patients’ needs and values; the patient as the source of control; shared knowledge and the free flow of information; evidence-based decision making; safety as a system property; the need for transparency; anticipation of needs; continuous decrease in waste; and cooperation among clinicians. Embedding these design principles in any technology which can be adapted to a hospital’s existing system will better insure the adoption of the technology by the patient, and help to create a patient-centered approach within IT. Key principles include: the PHR should be lifelong and comprehensive, accessible from anyplace at any time, provide health management tools that assist patients in understanding the information, along with recommendations for care, be private and secure, and allow patients to control who has access to the information.

A recent meta-analysis of the use of mobile health technologies to improve health care services cited benefits from SMS reminders, but indicated that given a lack of widespread adoption, further trials were needed to firmly establish the benefits of optimizing care through mobile interventions and enhanced communication. There are numerous examples of successes from organizations who are implementing strategies around patient engagement. Two examples cited were:

- The improvement of patient engagement, satisfaction and care through mobile engagement at Children’s Medical Center Dallas, (CMCD). This collaborative project teamed CMCD with the office of the National Coordinator for Health Information Technology (ONC) on a pilot PHR initiative, promoting consumer-mediated exchange by placing control of the medical record in the hands of the patient.
Reduction of Patient No-shows at Geisenger Health system. To reduce the burden of missed appointments, Geisenger implemented a platform to do text messaging and selected appointment reminders.12

There is growing recognition that patient engagement is critical to healthcare’s mission of treating and maximizing wellness among the patient populations for which they care. Keeping patients loyal to a hospital, physician practice or system will be vital to future financial viability and also contribute to the continuity of care; providing consistency, potential savings and maximizing positive outcomes. Adapting to a more consumer-oriented approach to care requires institutions to re-think the tools and technologies employed to engage and involve patients in their treatment throughout the time they’ll be in care. Patient’s expectations are shifting. No longer satisfied to receive fragmented, episodic care, patients now expect superior service, enhanced communication and coordinated efforts towards promoting their wellness, preventing disease and receiving outstanding treatment, when necessary. 12

Developing mobile health and engagement tools can be an important part of a coordinated effort to allow healthcare providers to be more responsive and effective in the way that they engage and treat patients. As technologies improve, the barriers to adopting these tools will decrease, allowing smaller institutions and healthcare providers to reap the benefits and offer the same advantages to their patients. 11

**Mobile health and engagement tools can be an important part of a coordinated effort to allow healthcare providers to be more responsive and effective**

—California Healthcare Foundation

All these tools, including the use of mobile health applications, telemedicine, personal health records, e-visits, and self-care technologies to manage chronic conditions will be part of efforts to better connect patients with their healthcare team. Clearly, what will work for some will not be universally accepted or deemed practical. However, initial assumptions about generational constraints or a lack of accessibility to mobile devices have not proven to be long-lived. Rates of smart phone ownership across all demographics are growing rapidly and tech adoption over 65 is robust.17 Mobile devices are quickly making a difference on how people manage their health. The baby boomers may become the test group to establish what the face of mobile engagement will look like over the next ten years. They will clearly be interacting with the healthcare system, have disposable income and have a track record of having changed attitudes and practices in their lifetimes.

**Smart phone ownership across all demographics is growing rapidly and tech adoption over 65 is robust. The baby boomers may become the test group to establish what the face of mobile engagement will look like.**

—Deloitte

Patients must take an active role in managing their own care, as tools facilitate this, and a body of evidence as to which technologies and applications prove most efficacious, these practices will dramatically change how
care is delivered. Those who embrace the concepts early will be doing a service both to their patients and themselves.¹³

**Figure 1: Technologies and Supported Features⁵**

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<thead>
<tr>
<th>Web-based tools and applications</th>
<th>Patient portals and EHRs</th>
<th>Social networking</th>
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<td>Providing secure and controlled access to data or analytics</td>
<td>Eliciting data and information</td>
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<td>Storing and integrating data</td>
<td>Supporting transactions</td>
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<td>Shared decision making</td>
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<td>Mobile phone through SMS</td>
<td>Managing care</td>
<td>Behavioral interventions</td>
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<td>Tablets and kiosks</td>
<td>Providing point-of-care access to Web based tools</td>
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<td>Telephone/ IVR</td>
<td>Managing care</td>
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<td>Video (live and prerecorded)</td>
<td>TeleHealth (eVisits)</td>
<td>Providing access to information</td>
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<td>Remote sensing technologies</td>
<td>TeleHealth</td>
<td>Managing care</td>
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<td>Registries</td>
<td>Storing, integrating and aggregating data</td>
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<td>EHRs</td>
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Figure 2: Demographic Trends in Smart Phone Adoption

Among 45+ demographic, smart phone adoption is expected to increase steadily and reach the level of the under 45 demographic by 2020.\(^\text{17}\)

![Smartphone penetration in developed countries as of May-June 2013](image)

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