

Running head: PCMH PROPOSAL

PCMH Proposal

Monica Forss, RN  
Kary Mason, RN  
Constance Nichols, MD  
Michael Rittenhouse, RN  
Michelle Smith, PMP

Northwestern University

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## PCMH Proposal

### Executive Summary

In an effort to explore unique and innovative means of patient care, the Northwestern University Feinberg School of Medicine Department of Family and Community Medicine is seeking further information in the development of a Patient Centered Medical Home (PCMH). Considering the opportunity offered by the client we developed nine objectives as the focus of this project. The focus and scope of this proposal is to examine the methods and benefits to leveraging information technology to achieve these principles. The objectives are listed in section III.

In this document, we will provide background information as to what constitutes a PCMH and explore innovative methods for delivery of care maximizing the use of Information Technology (IT) solutions. This will include an exploration of Electronic Medical Records (EMR), Electronic Health Records (EHR), Patient Portals and other computer based systems to aide in practice management.

Further, we will explore the metrics needed to meet the standards for Meaningful Use and legal regulations or constraints such as those in the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health act (HITECH) of the American Recovery and Reinvestment Act (ARRA). This will include a rationale to explain and support the recommendation to structure the practice to meet the guidelines set forth by the National Committee for Quality Assurance (NCQA) for the PCMH.

Additionally we will provide data to support the return on investment (ROI) one can expect through the development of a robust PCMH. This will include staffing model recommendations and support staff needs.

Our recommendations will include a range of options and an identified best option based on our research and experience. The clinic may, of course, choose among the range of options, or perhaps implement the suggestions in a stepwise fashion. These options are available with our stepwise objective centered approach.

Please see the Definitions in Appendix 1 for terms used throughout the proposal.

### Opportunity

Northwestern University Feinberg School of Medicine, Department of Family and Community Medicine is in the process of drafting a proposal to start a new clinic (Patient Centered Medical Home). Essential ingredients to creating this clinic include: innovative ways for providing patient care taking into account the estimated workforce shortages. The department is interested in the project of opening a PCMH, focusing on innovative methods for delivering care seeking recommendations for:

- Implementing an EMR system
- Patient Portal
- Adhering to Meaningful Use Guidelines
- Create a ROI for each recommendation
- Address any legal issues pertaining to your recommendations

### Objectives of the PCMH

Based on the opportunity we developed nine objectives that when met, will use innovative methods for delivering care in the PCMH. These objectives are detailed below.

1. Patients receive the right care at the right time and at the right place in a safe manner with high quality.
2. Develop a model for the Patient Centered Medical Home that meets all the Joint Principles of the PCMH.
3. Implement the selected innovative technology solution(s) within the defined clinic that are interoperable, integrated and scalable.
4. Provide enhanced access through improved methods of communication leveraging cutting edge technologies for communication between the provider and the patient.
5. Implemented technology meets all HIPAA, HITECH, and Illinois state legislations and/or regulations.
6. NCQA certification and Meaningful Use of the technology chosen and implemented.
7. Create and maintain a healthy work environment for employees that emphasizes teamwork and collaboration while keeping employee burnout and emotional exhaustion at a minimum in light of estimated workforce shortages.
8. Measure the effectiveness of user training and technology use by the staff through metrics obtained by performing surveys and audits at scheduled time intervals. Improvement plans would be developed when metrics fall below acceptable levels.
9. Determine appropriate financial evaluation for the technology selection for the PCMH.

## Considerations for the PCMH and Technology

### *Joint Principles and Models for the PCMH*

The Patient Centered Medical Home is not a new concept. It has been evolving and in recent years has become an innovative practice model to support “Whole-Patient” care. This model began in the 1960s as a means for managing chronically ill pediatric patients. Over time this practice model evolved aided by the managed care models set forth by payers, incorporating a model of care for adults; however adoption has remained fragmented and incomplete. Patients often do not receive the screenings and treatments recommended for preventive or disease specific care.

The current model of the PCMH has come about through cooperation of various pediatric and adult care organizations. Organizations include the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), the American Academy of Pediatrics (AAP), and the American Osteopathic Associations (AOA). These organizations worked together to develop and define the Joint Principles of the Patient Centered Medical Home. This effort further evolved through the formation of the Patient-Centered Primary Care Collaboration (PCPCC) and establishment of NCQA guidelines for recognition as a PCMH.

The Joint Principles of the PCMH are what make the care stand apart from the often fragmented and illness driven model that exists in most medical practices. The Joint Principles, as defined by the AAFP, ACP, AAP, and AOA are as follows:

- Personal physician
- Physician directed medical care
- Whole person
- Care is coordinated and/or integrated

- Quality and safety
- Enhanced
- Payment

Please reference Appendix 2 for a further definition of each of these principles.

The PCMH is finding growing support from payer organizations and large national employers. The PCPCC was initially formed when several large employers approached the ACP and AAFP seeking means to improve their employees' healthcare experience and in effect, improve the costs and efficiency of healthcare. From there, this organization has grown and includes employers, health insurance companies, trade and professional groups, academic groups and health quality improvement associations (PCPCC, 2010). This group provides resources and funding for practices interested in becoming a PCMH. At present, the PCPCC is the supporter of demonstrations and pilot programs nationally, managing 27 such pilots. They are also working publically in the Medicare-Medicaid Advanced Primary Care Demonstration. These pilots are helping to demonstrate the value and need for the PCMH and helping to establish means for reimbursement to support the PCMH model.

#### *Provider Considerations*

What exactly, in practice is a Patient Centered Medical Home? One simple answer does not exist as it can be different things to different practices. The levels of technology can also vary. The most basic PCMH is run in similar fashion to a standard practice but with improved workflows and paper systems for patient tracking, flexible scheduling and primary care provider functions. There is not a large difference between this and the "traditional" medical practice.

Another model uses increasing technology to improve patient care and access. An EHR functions not only for record keeping but also providing reminders to providers about



preventative care measures and disease specific care. These practices may also include open access scheduling and even a Patient Portal.

The most elaborate PCMH functions at the level of “concierge” medicine, where a patient has ready and easy access to a physician via phone, email, or even a virtual E-Visit. The technology is cutting edge with use of a fully integrated EHR and Patient Portal, allowing easy patient interface to their Personal Health Record (PHR). The technology is further leveraged to provide easy prompts to both the patient and the provider for general preventive health and wellness measures but also disease and patient specific goals. Each patient has a personal healthcare plan developed with the patient, instead of for the patient.

The Institute for the Ideal Medical Home (IIMH, 2010) provides a plethora of information and guidance for setting up the PCMH. Their simple user guide instructs practitioners in methods to “move their patients to the web” and offers simple to follow guides and You Tube videos to demonstrate the principles of improved patient centered practice management.

Another resource in planning the clinic is to utilize the Institute for Healthcare Improvement website and their various resources for safe, effective, accessible, cost effective primary care practice (IHI, 2009).

The American Academy of Family Medicine and their journal, Family Practice Management, provide a large number of resources in planning the integrated functioning of a technology savvy PCMH. There are resources for patients, care teams, patient self-management and quality measures. These can be found at <http://www.aafp.org>.

Skilled staff teams support the patient and provider with education and resources. Patients are engaged in their medical care. Providers have the ability to spend more time caring for their patients as the technology streamlines workflows and provides accurate, timely information to

the provider and patient. The technology supports alternative communication and visit strategies which are being reimbursed by more insurance plans. Providers are no longer forced to see patients in 15-minute blocks and hurry through paperwork, ordering and documentation. Visits are now set for 30-minutes or more and the technology provides the capacity to review documentation and patient paperwork instantly and automatically. Utilizing documents which patients prepare prior to the visit also makes the visit more focused and addresses concerns of the patient, another opportunity for engaging patients in their care.

This model is the future of healthcare. As patients begin to grasp the idea of being a healthcare consumer, not simply a “patient”, wanting more control over their care, they will begin to demand more of their healthcare experience.

#### *Patient Considerations*

The patient experience, that of patient centeredness, is critical to the success of the PCMH. In designing the clinic, patient desires must weigh equally with those of the clinicians. The question to be considered is what do patients want out of their primary care experience?

On the Ideal Medical Practice website (<http://www.idealmedicalpractice.org/>) Dr. Pamela Wible offers her “radical“ approach to primary care. Although her approach in Eugene, Oregon may be a bit too “backwoods” for urban Chicago, the principles she utilizes to develop “ideal community practices” may be ones to utilize as the PCMH is organized. Her seven steps to a successful community clinic are:

1. Have a town hall meeting. Invite everyone. And by all means bring your physician! Need help? Tap into established infrastructure. Maybe a charismatic pastor or a know-everyone neighbor will help rally the community.

2. Dream BIG. Think healthcare utopia. Encourage "supersensory" detail. What would it look, taste, smell, sound like to walk into an ideal medical clinic?

3. Encourage written and verbal feedback. Provide lots of paper, pencils, pens, even crayons. Allow liberal time for reflection, contemplation, and sharing.

4. Compile testimony. Challenge yourselves to fulfill as much of your community vision as possible.

5. Network and strategize. Need inexpensive office space? Interested in handmade flannel gowns? Want volunteers to help disabled patients get to appointments? Ask the community. When we all work together our dreams come to life.

6. Find your physician. Frustrated physicians are everywhere. Sixty percent have considered dropping out of medicine. Invite docs off the treadmill and into a community clinic or better yet—design a new model together!

7. Celebrate. Don't forget the opening day party. Invite the media! Show the world what communities can do if they dare to dream together (Wible, 2010).

Utilizing some of these strategies as you begin to set up the PCMH would give contact, integration and interaction with the patient community before having the initial patient encounter. If successful this model of introduction can be used as the PCMH is expanded to other communities.

Once the clinic is established, patient engagement is the cornerstone of an effective PCMH. The PCPCC has outlined five steps in a patient family engagement framework. This framework, found in Appendix 3, will be a useful tool in engaging the patients in their PCMH.

*Information Technology in the PCMH*

A key element to the success of the PCMH and the focus of this consultation is IT. Critical Information systems required include EHRs, PHR and health information exchange (HIE). Dr. Mitch Morris of Deloitte Consulting describes the importance of IT in the medical home stating the PCMH is “bringing together all the different resources in the community to advance the wellness of an individual and the community.” Simplified, it is much like a wheel with the physician and patient in the center and the spokes representing communication to other needed resources such as laboratories, radiology centers, or specialists (Anderson, 2009). The systems used hold everything together with the goal to use technology to support patient care and education, communication of critical patient information for the clinical team as well as patient-physician communications and performance measures (Nace, Crawford, & Marchibroda, 2009).

Before dissecting the objective of IT in the PCMH, a clear distinction needs to be made between EMR and EHR. In the PCMH, the need is for the EHR. The difference being the EMR focuses on demographic information, clinical notes, and e-prescribing. The EHR includes patient registries, web-portals, patient-centered health record, decision-support as well as interoperability capabilities to interface with HIE’s. The EHR provides a broader range of functionality necessary to maintain the communications required between patient and provider in the PCMH model. Adoption of EMR’s is occurring at a more rapid pace (approximately 43.9 %) while EHR adoption is only 6.3 %. Adoption rates in other countries have been found to be much higher, providing evidence that the barrier is not technical (Nace & Steidl, 2010).

In the physician’s office, communication is the most critical aspect for the patient and the clinical team. It begins with initial contact requesting a visit and continues as long as the patient maintains a relationship with that practice or PCMH. This concept is known as connected

communication. Connected communication, achieved through use of Patient Portals, social networking and HIE's, closes the "collaboration gap" between physicians and their patients and has often been compared to online banking or online reservations (Kibbe, 2008; Nace, et al., 2009).

Another concept of the PCMH that can be addressed with IT solutions is "added value." Added value comes in the form of improved communication and cost saving. Added value communication is achieved through real time electronic communications that supports collaboration and coordination of services as well as eliminating duplication of tests and procedures that are documented and tracked in the EHR. Cost savings also result from the ability for social networking with the patients. An example is the case of a patient with chronic illness that may have some early warning signs of an exacerbation. Through rapid communication and response from the provider, early treatment can be initiated reducing cost resulting from a hospital admission (Kibbe, 2008).

The third area to consider when implementing technical solutions in the PCMH is performance measures. The performance measures put forth by Center for Medicaid and Medicare Services (CMS) in the 2010 Physician Quality Reporting Initiative Group Practice Reporting Option Disease Modules and Preventative Care Measures (CMS, 2010b) and included in the Meaningful Use requirements (CMS, 2010a) must be part of any EHR selected by the practice.

Although there are guidelines and parameters defining the necessary requirements for IT in the PCMH, there are hindrances slowing the development of the fully connected PCMH, including cost constraints and fully integrated software.

### *Service Models and Functionality*

When considering EHR service models available to the PCMH, the first step is determining which EHR model best meets the needs of the clinic. Factors that play a role in the decision making include financial support and IT staff support. There are two basic models available today: Client-Server and Software-as-a Service (SaaS) which includes ASP and Cloud computing.

The local “Client-Server” is an ownership model in which hardware and software are owned by the client. The client generally provides hardware maintenance and the vendor may provide software service through a service contract.

The second model is the hosted solution, also known as SaaS or the “rent” model. This is subdivided into the traditional Application Service Provider (ASP) and Cloud computing. An ASP is a business that provides computer-based services to customers over a network. Software offered using an ASP model is also sometimes called On-demand SaaS while the newer model is called cloud-based SaaS or “multi-tenant model”.

Cloud computing is Web-based processing, whereby shared resources, software, and information are provided to computers and other devices (such as smartphones) on demand over the Internet. Cloud computing is a natural evolution of the widespread adoption of virtualization, Service-oriented architecture and utility computing (Wikipedia, 2010a). Each of these models of service has benefits and drawbacks that are examined at length in Appendix 4. (Nace & Steidl, 2010)

With an understanding of the PCMH concept and importance information technology plays in the PCMH, there are EHR functionality considerations requiring evaluation. The Patient-Centered Primary Care Collaborative has identified necessary functionality referred to as the

“Ten Characteristics of Patient Centered Health IT Support for Clinicians.” Below is a summation of the ten characteristics:

1. Collection of standard, accurate and essential data elements
2. Ability to integrate data from disparate systems
3. Support of care coordination activity
4. Support medication reconciliation
5. Registry or community view that supports the capture and ability to respond to population health needs
6. Incorporation of community resources
7. Support collection, storage, measurement, and reporting of process, outcomes, and quality at an individual level as well as population level
8. Decision support that engages the care team to ensure continuity
9. Support providers in risk satisfaction
10. Support patient self-management through access and communication (Kuhn 2010)

EHR functionality is critical to making the PCMH operate efficiently and with a minimum number of staff. The objective of streamlining operations while reducing costs and providing optimal healthcare calls for an open mind when evaluating IT options. There are over 20 vendors claiming to meet EHR needs; therefore attention must be focused on the true capacities and interoperability of the system. Some vendors claim they can meet all the needs requested but require the purchase of several modules and interfaces (which drive up costs) while other systems provide seamless integration.

It is important to keep in mind future plans such as growth of the current practice and participation in HIE's and Regional Health Information Organizations (RHIO). To ensure these

needs are addressed, the selection team should question the demonstrable past and present functionality, experience with an HIE and future plans to meet these needs (Nace & Steidl, 2010).

Other solutions are offered through organizations such as IdealMedicalPractices.org. This group is a combination of healthcare organizations and individual providers who are pooling resources to overcome the financial burden of technology in the PCMH. They share new technologies in an effort to “improve clinical operations at minimal cost.” (Nace, et al., 2009) The Regional Extension Centers (REC) set up as a result of the HITECH legislation also offer assistance to primary care groups seeking an electronic record system. The local REC is the Chicago Health Information Technology Regional Extension Center ([www.chitrec.org](http://www.chitrec.org)).

#### *PHR and Patient Connections to the PCMH*

PHRs are another important component when considering an EHR. Patient engagement is at the core of decision making and health promotion in the PCMH and the PHR supports these goals. There are many PHRs available to patients today both integrated in EHRs and stand-alones. Some charge a fee while others are free of charge. One of the major issues is the bi-directional interfacing of the patient’s PHR and the practice’s EHR. Dr. Charles Eaton, MD from Brown University sums it up as follows:

“The self-management components of a PHR, such as tracking weight and blood pressure, can play a vital role for both groups of patients,” and “We believe that without the patient at the center of it all, you’re still going to have overutilization of services, patients not invested in their care, and poorer outcomes.” (Anderson, 2009)

With the advancement of technology there are inexpensive means of implementing the electronic tools necessary to support the PCMH. Smart cards and cell phones are common



among consumers and have the technology to support much of the communications that is needed for the PCMH. Cells phones have the ability to be used for verbal communications as well as through text such as with automated medication reminders as well as support graphics and video (Nace, et al., 2009).

Moving to the IT rich PCMH model benefits both the provider and the patient and meets the objective of connected communication/engagement of patients. Evidence has demonstrated improved patient engagement improves quality and outcomes for the provider and reduced cost to payers and patients. Sharing information contained in the medical record has allowed patients to identify errors thereby reducing risk or potential harm. This data sharing also gives improved opportunity to identify behavioral risks and may alter the patient's success in self-managing their healthcare.

#### *Successes in the PCMH*

To meet the objective of connecting the patient and provider the need for information technology is a common factor among PCMH. Many IT solutions have been utilized. Organizations have made IT decisions based on integration with a larger health system, financially beneficial partnerships or personal preference of the practice.

Examples of success with an integrated vendor include Geisinger Health who has installed a large well known vendor, Epic (Joshi, 2010). The University of Missouri has partnered with Cerner while other institutions have opted for small less well known vendors. It is important to determine the solution that best meets the needs of the practice taking into account functionality required to ensure the objective of the practice.

In "Meaningful Connections" published by the PCPCC, a number of practicing PCMHs provided insight to their use of IT in their success (Nace, et al., 2009). As a follow up to this, we

contacted several of the organizations to determine the level of use of IT in areas such as the use of a Patient Portal, EMR and overall success of the PCMH. Please see Appendix 5.

The most successful responses were reflected by the groups that utilized both an EMR and Patient Portal. This does not necessarily indicate that having an EMR and Patient Portal will ensure success; however it does show that these measures do aid in processes. As noted in the responses, there does not appear to be a “perfect” IT solution. Due diligence will be needed in the evaluation and selection of an IT solution to best support the success of the PCMH.

#### *Patient Concerns and Feedback*

In a study conducted by California HealthCare Foundation, United Hospital Fund, Kaiser Permanente and the Group Health Community Foundation in 2008, they set out to determine the role of information in technology in the PCMH. Concentration was placed on organizations that were in the process of replacing paper-based records and had a diverse patient mix. One area of focus was the patient accessibility to the systems. Specific areas that were evaluated included EHR's, web based PHR's, online scheduling and email communications between provider and patient. Study results demonstrated the desire for patients to be more connected to their providers with approximately three-quarters expressing the desire to access their medical record, laboratory results and electronic scheduling. There was also a strong interest in the ability to have email communications with the provider. Of those patients surveyed in this study only 6% to 10% had access they desired and approximately one quarter indicated they would be willing to pay additional to have the capability. A small percent of patients in the survey had access and satisfaction scores were found to be higher in these groups (Seidman & Eytan, 2008).

Patient-Centered Health Information Technology (PCHIT) is a term used to refer electronic tools that patient and providers use to improve communications and coordinate care. PCHIT

give patients the ability to have greater control of their health while providing cost saving and quality improvement. Some of the functionality desired by patients qualifies as PCHIT. In addition to functionality mentioned, consideration should be given to laboratory results, decision support tools and prescription refills. All these elements have an impact on the patient and have meaning for the diagnosis or treatment plan. Patient access to and engagement with these items is what differentiates them as being patient-centered (Nace, et al., 2009). An example of a patient-centered benefit is the ability to print a summary of the physician visit. The visit summary will provide reminders to the patient regarding what was discussed and any instructions given during the appointment. Since it has been proven that patients will not be able to recall 40% to 80 % of what was discussed during a visit, a printed summary will aid in patient compliance as well (Kessels, 2003).

Another study conducted with patients from Geisinger Health System was conducted to understand patient perceptions regarding EHR's and Web-based communication as means of communication with their providers. The survey was completed using an online survey of patients who are registered users of MyChart (EHR application). Patients that utilized the application were questioned on the accuracy and completeness of the information in their EHR. The study concluded that the system was easy to use and accuracy was rated between 65% and 85%. Little concern was raised regarding confidentiality of their information. While providers preferred communicating with patients via telephone, patients preferred method of communication was e-mail (Hassol et al., 2004).

Another critical PCHIT that should be given consideration is the Patient Portal. Communication has proven to be the key ingredient in the PCMH. The Patient Portal provides the communication gateway between the patient and provider.

*Patient Portal*

A Patient Portal is an online tool that allows the patient to interact and communicate with their physician and/or hospital or healthcare institution. Typically these browsers are Internet based and are either stand-alone, embedded into other existing portals usually associated with the hospital or healthcare institution, or are a component of an existing electronic medical record system. Most Patient Portals allow the patient to interact with their health information and are typically accessible from anywhere Internet access is available. In this regard, patients are able to view and access lab values, radiology reports, and other pertinent medical information as needed without the limitations surrounding physician office or clinic interaction and its associated human interaction and elements. Patient Portals prove advantageous to patients and healthcare institutions alike as they overall increase efficiencies for both parties. From a patient perspective, they provide an avenue whereby health-related activities can be completed from the comfort of their home, at time of need, in a more time efficient manner. Some of these activities include prescription refills, scheduling of appointments or tests, and the ability to ask and receive answers to basic questions through messaging without the time consuming requirements surrounding a physical office or clinic visit. From an institutional perspective, they too reap the benefits of efficiency through the automated capabilities of auto scheduling and task oriented functions previously requiring human resources to complete. Unfortunately, there are some limitations to the value of the Patient Portal, specifically related to their individuality by institution. Consequently, if patients seek care at more than one institution, they will be faced with the dilemma of a specific portal access by facility, thus the confusion and complexities of multiple sites in attempting to garner a comprehensive medical picture. Through continued

efforts toward the development of healthcare data standards and the advancement of personal health records, the industry should see improvement in this arena.

Although an available technology since the early 1990s, the use and implementation of Patient Portals has been slow in coming. This is partially related to the slow progression of EMR implementations within the healthcare industry but the strict security regulations surrounding HIPAA and healthcare data transmission has certainly played a role. Utilization of secure access ports such as SSL are valuable tools in meeting these criteria; however institutional concerns surrounding data breaches and their subsequent repercussions lead to a very conservative approach by most healthcare entities. HITECH legislation incentive dollars and associated Meaningful Use criteria has resulted in an acceleration of EMR implementations and clinical information system development, likely resulting in the downstream effects of increased Patient Portal implementation and use as well (Wikipedia, 2010b).

Establishing a community-based clinic founded on the principles of a PCMH, Northwestern University Feinberg School of Medicine, Department of Family and Community Medicine should seek the virtue of a Patient Portal as a fundamental component to the communication cascade and interactive tool surrounding their defined patient base. Seeking to expand their client base from the defined affluent society of their initial efforts into the indigent population of an expanded geographical sphere, the department is looking to the Patient Portal as an outreach tool, which will allow support of the increased volume while maintaining a limited resource base. In this regard, the Patient Portal will be utilized as a supplemental tool to the typical physical interaction of patient-provider, thus serving as an interactive tool for not only communication but also defined patient-specific interventions and assessments via telemedicine.

Recognizing the immaturity of the Patient Portal as a means to serve this role, an innovative approach to portal use and configuration will be explored.

Initial efforts surrounding the consideration of a Patient Portal as a fundamental interventional tool associated with the clinic-based PCMH should encompass an assessment of the defined population's access, use, and acceptance of internet-based informational streams, particularly as it relates to healthcare. In first looking at Internet use as a whole, we find a great disparity amongst the varying age groups particularly when it comes to regular use as an informational tool. While 92% of adults in the age group of 18 to 29 uses the Internet on a regular basis, a noted incremental drop occurs as age advances, culminating in the lowest rating of 37% for those adults above the age of 65. In contrast, 75% of adult households own or have access to a home computer and use it at least occasionally for Internet access (Bennett & Glasgow, 2009).

Although the majority of households have or have access to a home computer which is utilized for at least occasional internet access, this use becomes limited in the aged population, a potentially significant implication to the use of a Patient Portal given the exponentially increased health needs of this population. Further exploring internet use among varying socioeconomic classes, of note is the fact that 77.5% of White and English speaking Hispanic populations use the internet regularly while only 56% of African Americans and 32% of Spanish speaking Hispanics do the same (Bennett & Glasgow, 2009). Finally, educational preparation and subsequent socioeconomic status is directly correlated to internet use as 93% of regular internet users are college graduates while only 63% of high school graduates and 38% of those lacking a high school diploma are internet users at all (Bennett & Glasgow, 2009). Based on these facts, summarily Internet use among white college graduates on a routine basis is fairly consistent with

degraded use as educational preparation and heritage become factors, culminating in rare and inconsistent use among non-whites lacking a high school diploma. Consequently, project objectives will be challenging, as the projected use of Patient Portal will eventually encompass all levels of the socioeconomic sphere. In this regard, a scalable approach will be desired.

Having explored the usage statistics surrounding simply the use of the Internet, we will now explore the informational context and rationale for Internet use. As noted above, the use of the internet is inherently dependent upon socioeconomic factors; however recent statistics indicate a 10% rise in internet use over the last three years among adult populations over the age of 65 with anticipated further growth related to the maturity of the technology savvy baby boomer generation. As we explore the uses of the internet associated with this age group, we find that 94% of the time it is allied with email usage while 66% of the time pursuing healthcare related information is the driving force. Furthermore, 66% is related to product research, 60% accessing governmental sites, 47% in the purchase of products, 41% surrounding travel reservations and planning, 26% associated with religious material, and finally, 20% in conducting services related to banking (Cresci, Yarandi, & Morrell, 2010). Overall, the use of the internet for email purposes by those older than 65 currently exceeds that of younger populations by 5%, thus communication avenues are key factors in the driving forces behind its use among these individuals.

With a firm understanding of internet usage statistics and associated rationale for current use, we must now explore the value and patient perceptions of this avenue as an acceptable means and tool for healthcare related transactions between clinician and patient. Again, we find a great deal of variability and disparity of perceptions as we move through the continuum of socioeconomic spheres. In evaluating patients' considerations surrounding the use of the Internet as a valuable tool for dissemination and obtaining of healthcare related information, we find a

direct correlation as to their perception of computers and the Internet as a whole and their acceptance of its value as an essential or beneficial tool for healthcare information. In this regard, those who are regular Internet users find the use of the Internet for healthcare data of value to supplement the historical clinician-patient interaction. Individuals who are rare users of the internet tend to artificially inflate the power and influence of this technology. They fear inaccuracies will lead to devastating consequences and repercussions, thus making them reluctant to willingly use and accept its value for healthcare purposes (Rogers & Mead, 2004).

We again see the impact the socioeconomic divide creates in utilizing this tool within healthcare. As we expound this evaluation to include telemedicine, we find that most patients are confident and accepting of the use of the Internet for monitoring purposes; however the value and confidence in using this avenue for healthcare information exchange is low. In other words, patients are confident in static data exchanges surrounding monitoring activities over the Internet, but they are reluctant to accept information exchanges through the same means. Dedicated efforts toward training of patients in the use of the internet for telemedicine and healthcare information substantially increases participation and use with a marked 30% improvement in use and participation when training is provided (Santamore & Homko, 2008).

Further supporting our efforts in evaluating the use and implementation of a Patient Portal associated with a clinic-based EHR, a review of implementation strategies and uses of such tools within the healthcare industry is warranted. In a recent research study evaluating the patient participation in using a specified Patient Portal for healthcare data transmission and communication, similar statistics and results were obtained surrounding Internet access and use as a whole. In this study, of 241 participants, 90% were of Caucasian ethnicity, 83% were 40 years old or older, 64% held college degrees with 35% of those holding advanced degrees



(Leveille et al., 2009). Overall, patients utilized the portal consistently for reviewing hard data (lab values, x-ray results, etc.) while informational gathering and clinician interaction forums were inconsistent. Additionally, of those participating in the study and utilizing the Patient Portal, on following physician visits, they reported a 10% higher incident of their physician providing them specific individualized information related to their health promotion and/or prevention than a control group who did not use the portal. Inversely, the control group noted a higher incident of medication changes vs. the study participants while all other aspects surrounding the visit remained similar in nature between the two groups. Of note is the fact that sustained use of the Patient Portal past the initial follow up visit drastically diminished with no statistical difference noted between the two groups (Leveille, et al., 2009). With limited research data in this field, one must ponder the rationale for the diminished returns of use. Is this associated with the lack of perceived value past the initial curiosity or was the portal lacking essential elements that would lead to further interaction? Overall, one must question the reasons for such diminished returns.

Finally, given the vast popularity of social networks, consideration of the value of Web 2.0 as an acceptable interactive platform for healthcare data should be addressed. Overall, age once again is a factor as it relates to use and participation. In this regard, of those who use the internet, 66% between the ages of 18 to 29 reports using social network sites with this exponentially dropping off as one marches across the age gradient. This is apparent as one sees use cut in half for those age 30 to 49, further degrading to 11% for those 50 to 64 and 7% for those 65 and older (Barton, 2010). In evaluating the appealing factors surrounding social network utilization and participation, two fundamental principles float to the top: the ability to define other users with whom the patient chooses to share their information or data and the

unilateral ability of the user to configure the data displays in a manner pleasing and commensurate with their needs. In this regard, the portal must be designed and specific to the user's needs and choices and not based on support of research or institutional demands. Leveraging the principles of Web 2.0, Patient Portals need to reduce attrition of use through the advancement of patient-specific messaging surrounding patient condition, course and interventions, push reminders for appointments and pertinent events, adding the value of user designated forums for sharing and discussing health-related information (Bennett & Glasgow, 2009). Subsequently, the utilization of Patient Portals provides the ability to reach more covered lives at a controllable or reduced cost, a driving force behind the objective of the project.

Based on these solid research principles, the configuration and implementation of a Patient Portal should focus attention to the considerations outlined in the recommendations.

#### *Regulatory Considerations*

This section takes a brief look at the legal and regulatory environment that affects the PCMH. These laws and regulations should be considered when developing policies and procedures for the PCMH. During vendor selection the PCMH should ensure that the vendor meets HIPAA requirements as it relates to electronic data interchange, security, privacy, and limiting access and sharing of certain medical information as required by Illinois state law. The Fraud & Abuse laws will need to be reviewed to ensure policies implemented by the PCMH avoid violation of these laws. Finally, a compliance program will need to be established.

#### *HIPAA*

Privacy and confidentiality of medical information is a major concern for CIS and is a key issue to address for successful deployment of such systems (Duncavage et al., 2007). The HIPAA Security Rule requires healthcare organizations to implement security protections at the

physical, technical, and administrative levels in order to monitor and document access to identifiable health information (Duncavage, et al., 2007). The HITECH Act adds the responsibility for notification of breaches of information security by the provider to the affected patients (ARRA). Information security includes the processes and mechanisms used to control the disclosure of information. It is the protection of computer-based information from unauthorized destruction, modifications, or disclosure (Kurtz, 2003). The privacy rule of HIPAA provides patients the right to access their medical records, request corrections to their medical records, and request a log of disclosures of their personal health information (Duncavage, et al., 2007). Privacy issues can be classified into the following seven categories: consent, transparency, control over the record, collection limitation, data security, accuracy and identifiers (Ray & Wimalasiri, 2006). Consent refers to the opt-out or opt-in option for the patient, allowing them to either choose to allow their personal information to be collected and shared or choose not to have their personal information collected and shared. Transparency refers to who will have access to the system and disclosure of how the system works. Control over the record is allowing certain parts of the record to be visible based on either user-id or user function. Collection Limitation refers to the ability to restrict particular pieces of information from being collected or viewed. Data Security for the patient's medical record includes both within the system (only those with proper access can view and modify the record) and where the data is stored (the physical database is in a secure environment). Accuracy allows the user to access, verify and modify the information that is contained in their record if needed. Identifiers refer to the employer identifier that is required to submit electronic claims. We assume the PCMH will have the appropriate identifier. The patient also needs to be assured that their personal information is confidential. Confidentiality is the understanding that medical information will only be disclosed

to authorized users at specific times of need. It entails holding sensitive data in a secure environment limited to an appropriate set of authorized individuals or organizations (Kurtz, 2003).

With the PCMH there are additional considerations that need further discussion such as e-mail, giving patients access to the Patient Portal, and allowing family members to view the portal. With the use of Patient Portals, patients may choose to use e-mail to communicate with the PCMH for questions, follow-up or refill requests. The PCMH can choose to use either e-mail or secure messaging. If e-mails are used, then any e-mail to patients from physicians must include a confidentiality notice (Barnhart, Lausen, Smith, & Lopp, 2010). If the PCMH chooses to use secure messaging, the e-mail would simply notify the patient that a secure message is waiting for them in the Patient Portal. The secure messaging is void of any patient information and would not need a confidentiality notice (Kurtz, 2003). Another issue the PCMH will face is how to give patients access to the Patient Portal. The IT staff need to obtain a signed waiver form from patients, verify their identity, and set them up with a password (for access to the Patient Portal) (Gamble, 2009). A process will need to be developed by the PCMH to establish how access will be granted and how patients are verified. Finally, another area to consider would be allowing the patient to provide family members access to their medical information. It is the patient's right to control disclosure of his or her medical information (Kurtz, 2003). But, the PCMH will need to establish a policy for family member access. When reviewing Patient Portal vendors there are some that enable patients to provide family members with authorized access to their private medical information (P. Kuhn, 2008).

The PCMH will be coordinating care for the patients with other providers and facilities. This coordination will often require sharing the patient's medical information with outside parties.

HIPAA also addresses how Personal Health Information (PHI) can be shared with others. Based on the HIPAA Privacy Rule there are six ways that allow an organization to use or disclose PHI. Three of those six ways are for Treatment, Payment, and Healthcare operations (HHS, 2006). As long as the providers and hospitals are treating the patient, PHI can be shared. The PCMH falls under this definition. In Section 164.506 it states that PHI can be disclosed to a covered entity (HHS, 2006). Covered Entity is defined by HIPAA as a health plan, a healthcare clearinghouse, or a healthcare provider who transmits any health information in electronic form (HHS, 2006). The healthcare providers and team that is providing healthcare to the patient falls under the third covered entity definition. Because the PHI for the patient will be stored electronically for the PCMH, Section 164.530 (C)(1) requires technical safeguards to protect the privacy of PHI (HHS, 2006). The PCMH will house the patient's medical records and is required by HIPAA to protect the data. Any transmission of PHI to and from other covered entities must be secure. The current HIPAA legislation is broad and general in its definitions, which allows the PCMH to be implemented without any required changes to HIPAA or risk of violation as related to privacy and security. HIPAA allows for the transmissions and use of healthcare data from the PCMH to the other providers and covered entities providing care. The patient should be made aware of all transmissions of their healthcare data even though it is not required by HIPAA.

Additional consideration should be given to the Illinois HIPAA law. Illinois state laws are more stringent than Federal law pertaining to certain types of information disclosure. In particular Illinois privacy laws are stricter when disclosing information related to HIV test information, genetic information, mental health records, and alcoholism or drug abuse information (ICHIP, 2009). As the PCMH coordinates care and shares medical records, care should be taken to ensure this information is disclosed only when allowed or required by law.

### *Data Stewardship*

The question of data ownership of who owns the patient medical record causes much heated debate. Does the patient own the data, does the payer own the data, or does the provider own the data. In the traditional paper medical record, the provider rendering the service was considered the “owner” of the patient medical record. The provider could only claim ownership to the portion of the medical record they contributed to. The patient can legally claim ownership of the entire medical record (Veronesi, 1999). For the PCMH who will be implementing an EHR and Patient Portal additional consideration needs to be given to the vendor. The contract with the vendor will need to clearly define ownership of the data residing with the PCMH. The contract should also address how the PCMH will obtain and transition their data whether the PCMH is replacing a vendor or the vendor is acquired (Briggs, 2002).

Data stewardship should be addressed as part of the PCMH. According to the American Medical Informatics Association (AMIA) data stewardship is defined as encompassing the responsibilities and accountabilities associated with managing, collecting, viewing, storing, sharing, disclosing, or otherwise making use of personal health information (AMIA, 2007). The PCMH must be stewards for the data which they have access. The PCMH will have responsibilities to ensure the patient data is delivered to the appropriate covered entities in a timely manner, that data is not used for personal gain, that security measures are in place and followed, and that the patient data is not sold for financial gain without patient consent. Many patients have concerns of their healthcare data falling into the wrong hands or being sold for a profit. The PCMH will need to be a data steward and help to ensure the protection of the patient’s healthcare data. The PCMH will be whom the patient trusts, and by keeping the patient’s healthcare data private, secure, and available the PCMH will be able to provide the

continuity of care and secure transition between healthcare settings that is required for a successful PCMH.

### *Fraud and Abuse*

Fraud and Abuse address five key legal issues: Civil False Claims Act, Criminal False Claims Act, Anti-Kickback Law, Stark Law, and Obstruction of Justice. For the PCMH only the Anti-Kickback Law and Stark Law apply. The Anti-Kickback law makes it illegal to knowingly or willfully offer payment to induce another to refer patients for services paid for by a federal healthcare program (OIG, 1999). The Stark Law prohibits physicians from referring Medicare patients for certain designated health services (DHS) to an entity with which the physician or a member of the physician's immediate family has a financial relationship – unless an exception applies (CMS, 2010b). The PCMH will be in a unique position to influence the patient on what services they should receive and where they should receive diagnostic and specialty services. The PCMH will need to be aware of these laws to ensure referrals are not in violation.

### *Compliance Programs*

Compliance programs will need to be established for the PCMH. There are seven elements to create an effective compliance program for physician offices:

- Conduct internal monitoring and auditing
- Implementing compliance and practice standards
- Designation of a compliance officer or contact
- Conducting appropriate training and education
- Responding appropriately to detected offenses and developing corrective actions
- Developing open lines of communication
- Enforcing disciplinary standards through well-publicized guidelines (Brown, 2000)

Currently compliance programs in physician offices are voluntary. It is not reasonable to expect every physician office to create compliance programs, it is highly recommended that policies are created to ensure compliance and address violations as they occur. The number of regulations, laws, and new legislation that must be complied with is massive and having this type of program helps to ensure compliance.

#### *NCQA Recognition*

In exploring the options in a PCMH and the areas that are important, it has become apparent that there is a growing trend, as in many areas of healthcare, for certification or other forms of recognition. In the private medical practice, the NCQA is the leading organization in the establishment of a recognition system for evaluation of a PCMH. The NCQA is an organization that provides voluntary assessment and recognition of a clinicians and medical practices.

Recognition by the NCQA is becoming more vital as insurance companies, consumer groups and governmental payers are looking for metrics to show a provider is delivering quality, cost-effective and clinically effective care. Practices recognized as having met NCQA standards are able to effectively demonstrate this clinical quality.

In the PCMH, the NCQA certification has become a pivotal precursor to many of the current pilots and initiatives in payment and funding of a PCMH. As mentioned previously, there are a number of pilots and demonstrations currently underway and with further expansion, prospective payment, on a per patient member, can be achieved. The NCQA recognition process focuses on nine key aspects of physician practice:

- Access and Communication
- Patient Tracking and Registry Functions
- Care Management



- Patient Self-Management Support
- Electronic Prescribing
- Test Tracking
- Referral Tracking
- Performance Reporting and Improvement
- Advanced Electronic Communications

These metrics contain ten “must pass” elements. These elements are:

1. Written standards for patient access and patient communication
2. Uses data to show it meets its standards for patient access and communication
3. Uses paper or electronic-based charting tools to organize clinical information
4. Uses data to identify important diagnoses and conditions in practice
5. Adopts and implements evidence-based guidelines for three conditions
6. Actively supports patient self-management
7. Tracks tests and identifies abnormal results systematically
8. Tracks referrals using paper-based or electronic system
9. Measures clinical and/or service performance by physician or across the practice
10. Reports performance across the practice or by physician (NCQA, 2010)

Within these metrics, there are point values assigned which correlate to level of certification.

The lowest level is Level I, advancing to Level III. While the initial goal is to set the practice to achieve Level I within 12 months, the ultimate goal should be to attain Level III. As explained within the EHR and Patient Portal areas, these metrics can easily be measured, quantified, and demonstrated through the use of a robust clinical IT solution. Please see Appendix 6 for more detailed information to the metrics and scoring systems.

*Meaningful Use and the PCMH*

Meaningful Use is the term used by the HITECH Act portion of the ARRA to describe the criteria under which an eligible provider, hospital or critical access hospital may receive government funding for their use of electronic health records. It is not simply the use of electronic health records, but using them to reach five specific healthcare goals:

- To improve the quality, safety, and efficiency of care while reducing disparities
- To engage patients and families in their care
- To promote public and population health
- To improve care coordination
- To promote the privacy and security of EHRs (CMS, 2010a)

In the context of the EHR incentive programs, “demonstrating Meaningful Use” is key to receiving incentive payments. The criterion for Stage 1 Meaningful Use, summarized in Appendix 7, consists of 25 objectives for eligible providers and 23 for hospitals to use in reporting their "Meaningful Use" of EHRs. There are 15 core objectives required of eligible providers, 14 for hospitals and a set of "menu" objectives that eligible providers and hospitals may choose to reach. This approach ensures use of the most basic elements of an EHR in a "meaningful way" which addresses the five goals but provides multiple paths to reach the first stage of Meaningful Use (CMS, 2010a).

Meaningful Use criteria should play a significant role in the selection of an information system (encompassing EHRs, Patient Portal and PHRs) for the clinic. The clinic should work in conjunction with the local Regional Extension Center (REC) known as the Chicago Health Information Technology Regional Extension Center (CHITREC). This Federally sponsored entity will assist in choosing an EHR that will meet Meaningful Use guidelines now and in the

future (CHITREC, 2010). Utilizing the provisions of the various stages of Meaningful Use will allow the clinic to participate fully in the reimbursement available under the HITECH Act portion of the ARRA. This reimbursement totals as much as \$44,000 per eligible physician (CMS, 2010a).

Reimbursement schemas are based on two sets of rules, one for Medicare and one for Medicaid. Since the initial target population of the clinic is not predicted to be heavily dependent on Medicaid, the better option is to choose the Medicare reimbursement route. It will be necessary to have all three stages of the Meaningful Use criteria implemented by 2015 to avoid the give back penalty of the Meaningful Use expectation. Fortunately, many of the Stage 1 criteria are met by almost any “certified” EHR (by the ONC certified certification bodies) as shown by a recent survey (Hogan & Kissam, 2010).

Ensuring the chosen information system is certified will allow the clinic to easily satisfy the criteria for Meaningful Use and will maximize reimbursement. This will guarantee receiving ARRA funds and prevent loss of reimbursement in the future. The clinic must be mindful of Meaningful Use, use “certification” as a guideline, but maintain vigilance in conforming with Meaningful Use criteria in the future.

#### *Financial Evaluation*

Calculating ROI is difficult and it is important that an organization develop a method to financially evaluate IT purchases. An organization should be able to tie back their buying decisions to the organization’s strategic plans and business objectives (Gillespie, 2002).

There is no one-size-fits-all method of measuring value because each organization has its own business objectives. One of the benefits of calculating an ROI is that it helps to quantify goals, which allows organizations to avoid extra functions and added cost as the project develops

(G. Baldwin, 2000). Both tangible and intangible benefits and costs need to be included in the ROI analysis and they should be delineated from each other. Even though many organizations lack a full-blown ROI analysis, organizations around the country are tallying gains in productivity, reductions in paper and printing expenditures, and increases in revenue (Sandrick, 1998). The industry has apparently reached the “tipping point” at which the expected benefits of these systems have exceeded their anticipated costs and risks. In some circles, the decision to purchase an EMR is considered to be a “no-brainer”. However, there is a large gap between popular concepts of EMR value and the evidence available to support estimates of the amount of that value (Thompson & Fleming, 2008).

As the PCMH considers which financial evaluation method is appropriate, they should consider that most financial ROI analyses for IT installations are incomplete because they do not reflect the values of patients and healthcare professionals affected by the system. From the patient perspective, the ROI is measured in safer and more efficient care, leading to better outcomes and better health. For healthcare professionals ROI may be measured in terms of ease of use, total expended effort, and satisfaction with the results achieved (Frisse, 2006). This section will briefly discuss financial evaluation options available to the PCMH taking into account tangible and intangible benefits and costs. Challenges with calculating each method will briefly be discussed and a recommendation is available in the Recommendations section.

#### *Cost-Benefit Analysis*

The Cost-Benefit analysis is an analysis in which incremental costs and effects are computed and all benefits and costs are measured in dollars. Cost would consist of the amount of money an organization has to spend to implement a new technology. Benefits are generally considered the amount of money saved by implementing the technology (Stone, 2005). Because the PMCH

currently has no monthly spending, measuring benefits will be challenging. Potential ways to calculate benefit would be to look at average paper costs for copying, staff wages to pull records, and charges that would normally be incurred for transcription. Once the total costs and total benefits are calculated in dollars, the benefits-to-cost-ratio would be calculated by dividing benefits by costs (Benefits/Costs). A predefined range for acceptable ratios could be calculated by the PCMH prior to the calculations.

### *Hard & Soft ROI*

Hard ROI and Soft ROI is another financial evaluation method where an organization calculates savings and costs that are tangible and savings and costs that are intangible to determine an ROI analysis. Hard ROI analysis would include reduced transcription costs, reduced personnel costs and expanded revenue (Gary Baldwin, 2009). For the PCMH to calculate reduced transcription costs and expanded revenues, industry standards or averages will have to be applied. Since the PCMH will only be hiring the staff they need to support the implementation model they choose it will be difficult to see a savings in reduced personnel costs. Another potential cost savings would be reduced number of no-shows if the PCMH implements an automated reminder system. If the automated call reminder system is not part of the original go-live there may be hard costs savings there. There is the potential for increased revenue through higher E&M service levels by using IT, but again there will be no baseline for the PCMH to compare to. Also with the new service model of the PCMH this increase in charges may be difficult to demonstrate whether it is the delivery model, the technology, or some combination of both. Soft ROI costs and benefits would include improved patient safety, more direct care time, enhanced clinical communication, competitive edge, lawsuit avoidance, and clinician recruitment (Gary Baldwin, 2009). Except for lawsuit avoidance all of these benefits

are not only benefits the PCMH will see with the implementation of IT, but also with the delivery model that have chosen. The Hard ROI and Soft ROI analysis will be difficult to calculate for the PCMH that is starting from the ground up.

### *Identified Metrics*

The Identified Metrics financial evaluation method compares costs/savings at certain time points looking to gain efficiencies over time when compared to baseline values. Identified Metrics involved four steps (Greenwalt & Riney, 2007):

1. Identifying benefits and metrics prior to project funding or approval
2. Determining baseline measurements
3. Performing a benefits opportunity analysis
4. Performing a post-implementation benefits audit

The first step requires the PCMH identify the key benefits it expects to achieve from implementing the new solution and which metrics best determine whether the project has achieved its goal. For the PCMH this can include not only measures based on the use of EHR and Patient Portals, but also measures based on the benefits or goals of the PCMH such as decreased ER visits. Once the PCMH has identified the benefits and metrics, a baseline for each metric should be established. The PCMH can baseline publically available data for the population it serves or look at data six to 12 months after go-live to set the baseline. Next is performing the benefits opportunity analysis. Once the PCMH knows what it wants to improve, realistic goals about how much improvement can be made need to be established. To determine the opportunity for achieving any benefit the PCMH could use the following: use national standards or benchmarks, review published studies by similar organizations, evaluate the methods to obtain these results, and balance the information above with the PCMH culture and

capability (Greenwalt & Riney, 2007). Finally, perform a post-implementation benefits audit where the PCMH will measure their progress against the plan and learn from the differences.

While this method is considered a financial evaluation method, it can easily be used to track and monitor the progress of the PCMH to meet its goals and objectives for improvements in patient safety, quality, and satisfaction. Because PCMH does not have established baseline data, it would be recommended that this method be implemented approximately 12 months post-go-live. This method can easily be adapted to patient measures, quality measures, financial measures, and employee satisfaction measures.

#### *Patient Portal – Increased patient payments and increased staff efficiency*

Patient Portals have the ability to increase patient payments through automatic bill pay and make more efficient use of staff when taking patient calls and registering patients. There is a significant savings from staff scheduling appointments as this can be done through the Patient Portal. Duke currently collects \$900,000 a month through the portal bill pay system and that is with only 20% of their patients using the portal. Another tangible savings is staff taking phone calls and requests for end of year summaries for upcoming flexible healthcare plan deductions – the portal now gives patient access to this information and frees up staff time for other work (Lawrence, 2009). This financial evaluation method does not give an overall view of the ROI, but could be used by the PCMH to justify the purchase and implementation of the Patient Portal.

#### *ROI Analysis using weighted measures*

ROI Analysis using weighted measures is a financial evaluation method that evaluates 14 specific measures of cost and benefit that organizations can use to tailor an ROI analysis. The method takes specific tangible costs (acquisition of hardware, software, training, license fees) and intangible costs (higher labor costs, reduced confidentiality and security of the patient's

record). The PCMH would then assign a weight to each cost and rates the probability that the cost will occur. The weight factor is multiplied by the probability to obtain a value rating score. The scores would be calculated two ways for the PCMH – one for implementing IT and one for implementing a paper system. The process is repeated for the benefits (Sandrick, 1998). This method would be time consuming and require agreement from the management team on the weight factor and the probability. Since the PCMH will most likely implement IT there is not much benefit for this method.

## Recommendations

### *Summary of Recommendations*

Objective 1: Patients receive the right care at the right time and at the right place in a safe manner with high quality. Recommendation: Implement a technologically advanced Patient Centered Medical Home.

Objective 2: Develop a model for the Patient Centered Medical Home and meet all the Joint Principles of the PCMH. Recommendation: Organize the clinic around the Joint Principles of the PCMH leveraging all available sources of information and assistance.

Objective 3: Implement the selected innovative technology solution(s) within the defined clinic that are interoperable, integrated and scalable. Recommendation: The recommendation is to purchase an integrated multifunctional software package from a vendor that is delivered as a multi-tenant SaaS.

Objective 4: Provide enhanced access through improved methods of communication leveraging cutting edge technologies for communication between the provider and the patient. Recommendation: Build a hybrid portal which embeds various functional and data streams, presented in a logical distribution cascade. The clinic and patient alike should realize significant



improvements in patient care while both noting value added cost models which have the potential to decrease overall expenses associated with care.

Objective 5: Implemented technology meets all HIPAA, HITECH, and Illinois state legislations and/or regulations. Recommendation: Utilize the resources of the Chicago REC and the Medical School compliance department to help to assure compliance with all requirements.

Objective 6: NCQA certification and Meaningful Use of the technology chosen and implemented. Recommendation: Obtain a consultation with the Chicago REC and NCQA to make sure chosen technology fulfills all requirements.

Objective 7: Create and maintain a healthy work environment for employees that emphasizes teamwork and collaboration while keeping employee burnout and emotional exhaustion at a minimum in light of estimated workforce shortages. Recommendation: Utilize the concepts of the patient centered medical home to make the clinic a desirable workplace utilizing technology to empower all staff to have an impact in patient care.

Objective 8: Measure the effectiveness of user training and technology use by the staff through metrics obtained by performing surveys and audits at scheduled time intervals. Improvement plans would be developed when metrics fall below acceptable levels. Recommendation: Identify five to six key activities to use the Plan-Do-Check-Act (PDCA) method for evaluation; incorporating the key activities of the Patient Portal and the EMR in the evaluation process. One key activity should be evaluated at a time. The team performing the PDCA could be different for each key activity and the survey can be created for each key activity. While the PDCA method can be quite time consuming, it is recommended of to keep the scope and time commitment limited.

Objective 9: Determine appropriate financial evaluation for the technology selection for the PCMH. Recommendation: Use the Hard and Soft ROI calculations including the Patient Portal increased payments (Hard) and staff efficiencies (Soft).

### *Detailed Recommendations*

#### *Objective 1*

Objective 1 is for patients to receive the right care at the right time and at the right place in a safe manner with high quality. One of the primary goals of a PCMH is to improve the patient experience and outcomes. In the most direct focus, this can be drilled down to providing the right care, at the right time and in the right place in a safe manner with high quality. The PCMH is uniquely positioned to this.

Examining the first objective, to provide the right care, can be accomplished and enhanced through the PCMH model. With the designation of a primary provider and 30-minute appointment times, the provider becomes familiar not only with the patient's medical condition but also their care style preference. Does this patient need very specific written instructions for post-appointment care? What learning style works best when teaching this patient? Is the patient easily forthcoming with complaints or does the provider need to "drag" the information out? In a setting where the associate is seen by rapidly changing providers and with little consistency, these subtle cues that could improve care can be lost.

This use of a robust Patient Portal provides the ability for a patient to have more direct and timely access to a provider for routine care, questions and clarifications. This link between patient and provider in a cooperative environment encourages the patient to become a more active participant in their care plan.

The PCMH also reinforces the right care in the use of well-state or disease specific care pathways. Our recommendation would be the use of a robust EHR and Patient Portal to aid in this. The EHR can prompt the provider at visits to any diagnostic or treatment plan updates at the recommended interval. Through the Patient Portal, reminders can also be set to alert the patient through email or SMS of pending appointments or the need to schedule follow up. These actions meet the second goal of providing care at the right time. The system will provide automated reminders to both the patient and provider with a follow-up if a patient falls outside recommended guidelines. This can be managed via an integrated EHR/Patient Portal System.

The right time, right place is supported also by the availability of same day appointments. One only has to listen to the radio or watch TV and be inundated by adds for Urgent Care clinics and Walk-in clinics at pharmacies. These ads promote convenience over continuity of care. This fragmentation of care leads to over-prescribing of medications, repeat diagnostics, or missed signs of an ongoing, more complex medical condition. With the ability for patient to readily access their provider, who knows them, visits to these clinics can be decreased.

### *Objective 2*

Objective 2 is to develop a model for the PCMH that will meet all the joint principles of the PCMH. The Joint Principles of the PCMH include (American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians, & American Osteopathic Association, 2008):

- Personal physician
- Physician directed medical care
- Whole person
- Care is coordinated and/or integrated

- Quality and safety
- Enhanced Access
- Payment

These principles are critical to patients receiving "exactly what they want and need exactly when and how they want and need it". For the clinic there are many choices to be made in how to model the clinic (Moore & Wasson, 2006; Schall, Sevin, & Wasson, 2009).

There are many methods for setting up a clinic but some of the most successful organizations meeting the goals utilize the findings of the ideal medical practice and the IHI (Wible, 2010) (IHI, 2009). We would encourage all the members of the practice to review the information on these sites that ranges from papers, lectures and even YouTube videos. The sites help the providers understand how to use the tools of the ideal medical practice to make the PCMH successful (Baker, Crowe, & Lewis, 2009; Sevin, Moore, Shepherd, Jacobs, & Hupke, 2009; Simmons, Baker, Schaefer, Miller, & Anders, 2009; Wasson & Baker, 2009; Wasson & Bartels, 2009).

Joint Principle: Personal physician. Each clinic patient should have an identified primary care physician. This insures continuity of care, which has been shown to improve patient care (Moore, Wasson, Johnson, & Zettek, 2006; Sevin, et al., 2009). Each physician should have enough time to spend with their patients, a priority of both physicians and patients.

Depending on the size of the clinic, this model can be set up as several physicians functioning in parallel or physician and PA teams, ensuring that the patient sees someone who knows them and is familiar with their history. The one physician model is referred to as a micro practice. This model is scalable and can be expanded within a site and to multiple sites without diminution of the care model (Moore, et al., 2006).

Joint Principle: Physician directed medical care. The physician and the patient form the core of the care team. Other members of the team include nursing personnel, care assistants, patient educators and coaches and social services. This team can exist entirely within the clinic or leverage existing external services through agreements to ensure patient access to existing community services-social agencies, gyms and other health facilities, support groups and care facilities (Wasson & Baker, 2009).

The primary physician knows the patient better than any other care provider and takes the responsibility for coordinating care across the spectrum of patient need (Wasson, Johnson, Benjamin, Phillips, & MacKenzie, 2006). This involves having agreements with specialists and coordinating the clinic team to meet the patients' needs wherever they occur (Reid et al., 2009).

Joint Principle: Whole person. The whole person approach guides the care of the patient, leveraging technology using sites such as the How's Your Health questionnaire (<http://www.howsyourhealth.com/>) prior to the visits to help the provider appreciate what the patient feels is most urgent and to facilitate the care of the patient. The focus of the clinic is the patient, the entire person, not just the disease entities that the person may suffer from or the labels the healthcare system has given them. The whole person orientation allows the physician to know the patient, their family, their socioeconomic issues, life style choices and how best to help the patient craft an ongoing wellness program to self manage their healthcare (Simmons, et al., 2009).

Joint Principle: Care is coordinated and/or integrated. The physician also functions as the care coordinator, ensuring timely visits with specialists, appropriate information transmission to consultants and validating the patient's understanding of the results from consultations.

Coordinating care involves forming relationships with specialty providers (Appendix 8) outpatient labs, x-ray facilities, surgical centers and hospitals.

Good information flow between the PCMH and the other facilities, especially if there is a hospital admission, is one focus of the PCMH and the information choices made need to be cognizant of this desired level of interoperability.

**Joint Principle: Quality and safety.** The quality and safety of patient care are paramount to any medical care. An advantage of the PCMH is the knowledge of the patient that helps to limit errors due to lack of knowledge of even simple things such as current medications, allergies and previous care. Communication between patient and provider through the portal, e-visits and in person visits ensures good communication and accuracy of information exchange. Empowering the patient to evaluate their record and make sure that the information is correct and that all their concerns are met improves the quality of the care, the quality of the visits and the safety of the care rendered (Moore & Wasson, 2007) (Reid, et al., 2009). Utilization of an EHR with good CDS and risk management components will assist the physician in maintaining the quality parameters for management of chronic disease, health screening and important items such as routine vaccinations (O'Malley, Grossman, Cohen, Kemper, & Pham, 2010).

**Joint Principle: Enhanced access.** Enhanced access is an absolute necessity for the clinic to be successful and to provide the patient experience that is the hallmark of the PCMH (Tantau, 2009). The concept of Open Access or doing today's work today is well documented in the literature and a source of great patient satisfaction, staff satisfaction and allows decreased clerical staff by removing the need to keep advanced scheduling (Bundy, Randolph, Murray, Anderson, & Margolis, 2005) Patients with easier access to care visit the Emergency Department less frequently (Rust et al., 2008). Enhanced access also includes email access to physician, utilizing

a Patient Portal or a secure email system and even 24/7 phone access. Patient education is important to explain how to utilize the various forms of access to and communication with the clinic.

Joint Principle: Payment. Payment is always an issue. We recommend the hybrid retainer model with insurance payments, utilizing a streamlined billing process negotiated with all local insurers prior to the opening of the practice. The retainer fees will give the clinic an immediate source of revenue, while utilizing insurance will give patients the security of knowing their care will be covered. Negotiating streamlined interactions with local insurers will result in less staff time spent on billing and less staffing requirements for “back end” personnel.

Various new health payment schemas including the bundled health payment make the PCMH an ideal model to optimize patient care and keep spending within limits. Utilizing the bundled health payment model, clinic visits are the preferred option to limit other expensive visits such as Emergency Departments and various outside providers. Insurance companies will now pay for some e-visits and have always paid for office visits. Streamlined methods of dealing with insurance companies can be negotiated up front in some settings, but is a source of great pain in the primary care setting.

Some practices eschew the insurance system in favor of a physician retainer model (often referred to as concierge medicine) with payments ranging from as low as \$29 per month to \$20,000 per year. These models give the patients the access they want and the attention they crave. Many of these practices limit the size of the patient panel but income is stable or better than the standard practice and the hassle of dealing with multiple insurers and their requirements is eliminated. There are also hybrid models which use the retainer system for enhanced access,

but will take insurance payments for routine visits and treatment (Alexander, Kurlander, & Wynia, 2005).

The PCMH should plan for future expansion into underserved areas. The PCMH is not limited to the well insured or affluent population. The Clinica Campensia in Denver and Health South in South Carolina have both demonstrated that the PCMH works well in the underserved population and the tools and skills shared with patients allows better self care of the chronic medical problems more prevalent in these populations (Sevin, et al., 2009; Wasson, et al., 2006). The intimate knowledge of patient and situation engendered by the PCMH allows the entire care team to work with the patient wherever they are on the self-management capacity to improve their knowledge and ability to care for their own well-being (Wasson, et al., 2006). This relationship with the patient also allows anticipatory management of issues such as transportation child care, time off from work, and social services interactions that may be needed more frequently in the underserved, lower socioeconomic level patient population.

### *Objective 3*

Objective 3 is to implement the selected innovative technology solution(s) within the defined clinic that are interoperable, integrated and scalable. Reviewing the known facts, the objective is to develop a PCMH maximizing the use of IT to create a clinic which optimizes communications. Based on review of the technical advantages and limitations (Appendix 4) along with the applications deemed as required in a PCMH, Multi-tenant SaaS is preferable to a Client-Server based platform. Although the differences are compared in Appendix 4, some key advantages include: decreased upfront costs, timely installation, user focus, strong vendor presence, web based applications, instantaneous releases and improved communication with external vendors and specialists. Each of these key factors may be determinates in establishing a



fully integrated and connected PCMH. In selecting the vendor of choice in providing the cloud-based SaaS platform software, consideration should be given to the following key areas required to support the PCMH:

- Registries
- PHRs
- Care Transitions
- Telehealth
- Decision Support
- Reporting Performance Measures
- Team approach to Care
- Patient Portal
- Registration
- Call Management
- Billing
- Interfaces

Strong consideration should be given to a comprehensive software package built on a single database foundation, thus optimizing data integration across the continuum of care within the PCMH. Extreme caution should be taken in selecting systems in which integration is accomplished through interface transactions, usually indicating a compartmentalized approach to software development. This inherently will be problematic moving forward as independent code sets associated with each segregated component create barriers in utilizing and transmitting data based on identified needs. To meet the specific needs of the PCMH we recommend the purchase of a comprehensive integrated packaged EHR from a single vendor. Although EHRs on the

market today are not fully developed to support the PCMH, there is enough functionality to provide appropriate support. In this case, the critical question is to ensure the vendor of choice is working toward development of the missing or weaker components to meet the full needs of the PCMH. Appendix 9 contains a table as a guide to functionality vital to supporting a PCMH.

#### *Objective 4*

Objective 4 is to provide enhanced access through improved methods of communication leveraging cutting edge technologies for communication between the provider and the patient. A key component associated with the PCMH encompasses care coordination and/or integration of a patient's healthcare across the continuum, providing a comprehensive means of evaluating a patient's course, a role that can be greatly enhanced through the implementation and use of a Patient Portal. Leveraging the power and accessibility of the internet through an open-source, configurable patient browser, the Patient Portal becomes the focal point for data management within the confines of a PCMH.

In utilizing a browser-based access tool such as the Patient Portal, organizations are typically able to circumvent the complexities and limitations associated with platform-specific server/client or thin client access tools associated with the clinical information system used or organizational platform design. This advantage serves a dual role in the ability to integrate data across organizational platforms as well as enhances the ability of the patient in utilizing various desktop operating systems and hardware configurations as their system of choice.

Focusing on the organizational advantages first, the open-source HTML formatting associated with most browser tools allows for easy integration of data across platforms, supporting data streams from the various institutions the patient might engage surrounding their

care. Although system-to-system integration is difficult if not impossible, the Patient Portal can serve as an integration point bringing disparate data streams into a single-view access tool.

Moving from an organizational structure to the patient desktop, variability is inevitable as users utilize a plethora of hardware, software, security tools and operating systems, not to mention the conglomeration of various versions that come into play. Further complicating this cascade of obstacles are the numerous and varied browsers available on the market today which might be utilized as the Internet access tool of choice. Accordingly, an organization will seek to mitigate these obstacles, further supporting the value of a browser-based Patient Portal for data integration, specific to its overall open-source nature surrounding integration.

With these principles in mind, consideration should be given to the development of a hybrid Patient Portal, circumventing the limitations inherent in an off-the-shelf, system-specific browser one might purchase in conjunction with an EHR purchase or as a stand-alone product purchase. An “off the shelf” portal may be the preferred choice if technical support for the PCMH is limited, but may decrease the flexibility and “platform neutral-ness” of the portal. It is essential that any pre-built portal be as platform neutral as possible. Browsers associated with defined EHRs characteristically are built in support of the data streams and code sets established within their corresponding foundation system, thus their flexibility in design and presentation will have some limitations. This could become problematic as one attempts to incorporate data streams from other institutions and disparate systems. Additionally, maturity of use will bring desires for hybrid data models specific to the population they serve, not to mention the value intrinsic in allowing end-user flexibility in manipulating data streams based on preference. Although evaluation of existing portal products is warranted, this level of functionality and flexibility typically requires a hybrid developmental approach.

From a foundation conceptual design, the Patient Portal supporting the PCMH should be able to operate and function across various defined platforms. Again, the open-source nature of the portal enhances these capabilities from an organizational system standpoint; however challenges might ensue as the desktop OS comes into play. In this regard, functionality validation against Windows and Mac OS is a must, with consideration given to the more exclusive and limited use OS systems of Linux, Apple iOS and Android. Developmentally, caution must be given in limiting browser functionality to a defined desktop OS, both from a type and version standpoint, as use and interaction will be symbolic of the patient's abilities to obtain successful access and function at time of need, from device at hand. This will particularly come into play as efforts are made to migrate the PCMH from its initial affluent patient base to one of a more indigent socioeconomic status. Lacking the resources to maintain or possess state-of-the-art technology, economically challenged populations will likely be relegated to the use of dated equipment and software from various means. Finally, allowing the patient to utilize their browser of choice is a must. While IE dominates the marketplace, the incremental increase in use of Safari, Mozilla, and other browsers should be considered. In this manner, software and versioning flexibility should be a cornerstone to browser development.

Having addressed the infrastructure components of the Patient Portal, a logical developmental progression will now focus our attention on security, user access and authentication. Needless to say, a conversation surrounding security and healthcare data would be remiss without placing HIPAA at the forefront of our discussion. With attention on the portal, our concerns will not reside with data storage as the browser in its simplest form is strictly a window to data. Our efforts will focus on the standards surrounding data transmission and user authentication. Data transmission between systems will be accomplished through defined HL7

transaction standards, utilizing a VPN isolation tunnel between source system and the defined storage database. The storage database will reside within the confines of the clinic network utilizing a robust antivirus tool and intrusion monitoring software, further protecting the network through a stringent firewall with defined port access. Internet access via Patient Portal will be secured through a SSL connection. User authentication will be provided through hardware token technology. In this regard, users will be provided a hardware token device (key fob, necklace, etc.) in which a migrating access ID will be provided, rotating on a defined time parameter. This access ID will be used in conjunction with their previously established user ID and password, resulting in access to the Patient Portal and their associated medical data. Moving forward, we believe this will provide the greatest stability in password and access management.

As we discuss user authentication and Patient Portal access, we would like to expound on the provided recommendation and offer a possible alternative consideration. Incrementally, one of the biggest challenges ongoing surrounds the issue of password management and support. Users typically struggle with maintenance of passwords, compounded further when password expiration, as required by HIPAA, must be addressed. Based on these facts, consideration should be given to stabilize these processes, thus utilizing the most static access tool available. From this perspective, upfront efforts toward detailed education followed by online informational reminders, the use of token authentication would provide the greatest level of stable user authentication possible since the user ID and password remain static while a migrating access ID is visible provided to the user. Overall, we feel this provides the most stable user authentication providing a high level of security while keeping ongoing associated costs low. Despite best efforts with upfront education, we must recognize the fact that a certain level of complexity is involved with this access method. A defined support model will be required in order to address

the untoward affects that might occur. If concerns arise related to these complexities, the use of smart card authentication could be an alternate consideration. In utilizing smart card technology, user ID and password are encoded into the card at time of deployment, thus allowing clinic staff to provide detailed instructions as to the setting of the password as well as the required password change which will be required in a set time frame, usually 90 days. Additionally, patients would have to be provided a bar code scanner, which would have to be engaged in an established PC base, hopefully within the home environment. Although smart card technology might provide an easier access tool initially, overall costs would be higher related to the required equipment surrounding scanning technology; it would limit accessibility to the defined device due to the associated scanner, and require management of a changing password structure within defined time parameters as required by HIPAA. Inversely, token authentication would have some additional complexities upfront related to training, this would be controlled through the confines of the clinic during their initial visit. Additionally, it would provide a high level authentication tool with a migrating access ID, thus user ID and password can remain static over time, ultimately reducing ongoing support requirements. Finally, it would allow accessibility from anywhere Internet access is capable, allowing a greater level of accessibility to the user as they would not be limited to a specific device. No additional equipment is required outside the access ID device (Key fob, etc.), thus overall costs would be lower than smart card technology. In closing this thought, we again would recommend token authentication due to its overall positive affects regarding management and cost; however smart card technology is a consideration if simplicity is the driving factor moving forward.

Having addressed infrastructure and user authentication, we will briefly discuss organizational design of the Patient Portal, followed by a more detailed discussion of

functionality and data streams. Conceptually, we will seek to keep each layer of the portal simplistic and intuitive in nature, allowing easy capture of the designed intent for the page. This will enhance the user's ability to easily manipulate through the various informational and data elements provided no matter what their level of expertise and knowledge of browser functionality might be. Links or menu selects will navigate the user to the specific information or data indicated, with limited or no blending or complexities of information. This will be the approach as we maneuver through the elements of the Patient Portal. Additionally, the portal will be organized in a tabular format with each tab accessible and defined from within the organizational banner. See Appendix 10 for Patient Portal example.

Breaking this down further, the first tab will welcome the patient to the initial layer of the portal, designed specifically for what is called the informational layer. Here, a banner will identify them to the foundation clinic, announcing its name and associations. Limited menu items will provide the user quick function items such as "Help", "Log Out", and "Contact Us" access, maintaining an administrative nature to their functionality. Utilizing a push technology for appointment notification, devised from the scheduling software utilized by the clinic, then provide appointment reminders to the patient, outlining their upcoming scheduled appointments. In this regard, functionality considerations of the scheduling software package should be thoroughly evaluated, seeking to select a product that provides embedded notification software and database management. The notification package should have a multimedia component, allowing notification reminder distribution through a varied array of media options including portal, email, and phone. Utilizing these options, notifications will be provided accordingly. From here, the remainder of the page will be used predominantly as a navigational tool. Conceptually, the left side of the portal page will provide access links to defined data elements of

the portal, listing such items as “Allergies”, “Medications”, “Laboratory Values”, and “Radiology Values” to name a few. Additionally, navigational links will quickly connect the patient with administrative functions of appointment scheduling, associated patient registration, and medication refills. These links will quickly navigate the patient to the portal tabs where they will be active in the functionality requested. Finally, this page will offer various health promotion ideas and information designed to assist the patient with engaging in a healthy lifestyle.

The second tab will be dedicated to communication. Again, a banner will open up the location with the same ingrained administrative menu selections of “Log Out”, “Contact Us”, and “Help”. User identification will follow, keeping to the forefront the individual authenticated to the Patient Portal. Appointment reminders will be transparent across tabs, providing quick reference points from no matter what location the patient might be navigating. With the primary focus of this tab dedicated to communication, the patient will be able to schedule appointments through the clinics primary scheduling tool, as well as complete basic registration information, thus building efficiency into the patient’s ability to schedule key tests and appointments while completing necessary administrative elements supporting these tasks. From here, the right side of the display will leverage the advantages of Web 2.0 and social networking, thus allow for free flow discussion and exchange of information specific to healthcare. Users will be free to share information as they deem appropriate, eliciting the feedback and input from a conglomeration of others who might offer expertise regarding the topic at hand. It will provide an open forum discussion thread in which users will be able to utilize privacy settings in which they can control the amount and type of information accessible, and by whom. In this regard, the patient will define “Users” who will be able to view and provide input into the various discussion threads the



provider is engaged, with an option to open these discussions to all users who have access to the clinic portal or more specifically, those who are active within the portal database. Subsequently, through the privacy settings, the patient will be able to define various level of data access for the authorized users. For example, the PCMH might offer an open forum discussion thread to all the identified users; however limit an additional thread to those assigned through the privacy settings. In this way, the PCMH can communicate with a plethora of users on various topics but limit others to family members only if chosen. Additionally, these privacy settings can be defined to accommodate access to PHI as one determines appropriate. Finally, on the left side of this page, the user will find an email component, allowing communication with clinicians from the clinic in seeking specific information related to their healthcare needs. This will be a two-way communication tool, allowing clinicians the ability to seek additional information and follow up from the patient as well.

Progressive in nature, the use of social networking is controversial as the concerns surrounding PHI privacy and security, as it applies to HIPAA have created some apprehension about its use. The proliferation and adoption of social networking, engrained in youth but gaining momentum across generations, has impacts of which cannot be ignored. Leveraging the collective wisdom of the network, users seek guidance in many aspects of their lives, garnering the benefits of the communal life experiences and knowledge base in defining a more logical decision, no matter what the content. In this regard, leveraging the advantages of Web 2.0 and social network should be a cornerstone of the development efforts. Providing security setting features in the portal, the user will be able to unilaterally define what information will be accessible and by whom. In this regard, the patient fully controls the access parameters

surrounding their information and PHI, thus meeting the defined security standards of HIPAA while at the same time gaining the benefits of social networking and Web 2.0.

The third tab as with the other tabs will open to the previously defined banner and patient identification monikers previously noted. Again, scheduled appointments will be visible with the ability to navigate back to the appointment scheduler should changes, adjustments, or cancelations be warranted. In looking specifically at the content of this tab, it will focus on patient data. Here is where the patient will access patient information specific to their health history and current state. Additionally, based on the privacy settings established within the second tab, patients can define additional users who will have access to this page as well as be able to define what data they have access to. In this regard, it will allow users to configure this page to allow defined users to see information on their behalf. Consequently, should they not have available technology from their home, they would be able to define others who might serve as their proxy in providing them vital information related to their health history and other health needs. An additional functional component of this tab will allow the patient to request medication renewals as well as ask specific questions related to medications should they choose to use this vehicle instead of the embedded email capabilities of tab two. In this regard, medication specific clinic replies originating from this tab will be posted back to this location as well as within the email stream of tab two, thus allowing the patient the ability to review these responses from either location.

In summation, the Patient Portal is a key communication and administrative tool, allowing free flow of information and communications between patients and supporting clinic staff at time of need. We recommend building a hybrid portal which embeds various functional and data streams, presented in a logical distribution cascade, the clinic and patient alike should realize

significant improvements in patient care while both noting value added cost models which have the potential to decrease overall expenses associated with care.

#### *Objective 5*

Objective 5 is that the implemented technology meets all HIPAA, HITECH, and Illinois state legislations and/or regulations. The PCMH needs to ensure that the software selected for the EHR and Patient Portal meets HIPPA requirements and once implemented allows the PCMH to meet HITECH's Meaningful Use guidelines. It is recommended that the PCMH use the core set of Meaningful Use guidelines to establish a minimum set of requirements that a certified vendor is expected to meet. Some of the Meaningful Use guidelines will be addressed with the delivery model chosen. Please refer to Appendix 11. By meeting the HITECH Meaningful Use guidelines the providers will be eligible to receive higher reimbursement and ARRA funds.

While not required by HIPAA or HITECH, it is also recommended that the PMCH develop a compliance program. As discussed previously in the proposal, there are seven elements for an effective compliance program: conduct internal monitoring and auditing, implementing compliance and practice standards, designation of a compliance officer or contact, conducting appropriate training and education, responding appropriately to detected offense and developing corrective actions, developing open lines of communication, and enforcing disciplinary standards through well-publicized guidelines (Brown, 2000). While the compliance program is not required, it is recommended due to the delivery model being chosen. With the PCMH managing the transition and coordination of patients to different care settings and providers, there is risk for violations of the Fraud & Abuse laws and HIPAA. Having a compliance program will help to catch violations early, allow for corrective action to be taken, and policies to be developed or updated to help prevent future violations. It is not reasonable to expect the compliance program

to be fully functional by the time the PCMH goes live. It is reasonable for the PCMH to have identified a compliance officer and developed a high-level plan for implementing the compliance program prior to the go-live date. While a detailed plan for a compliance program is out of scope for this proposal, we feel its development is important. First, the current healthcare environment is rapidly changing; many of the upcoming changes will be due to changes in laws and regulations. These laws and regulations may have a direct impact on how technology is used and implemented within the PCMH. Having a compliance program will ensure the PCMH is proactive and allow time for responding to the changes prior to mandated deadlines. Second, with the implementation of the EHR and Patient Portal the transferring of patient medical information will be a norm for the PCMH, it will be key for the PCMH to ensure that audits and validation processes are in place to ensure the PCMH is meeting all laws and regulations, in particular HIPAA. Finally, with a new delivery model there will be unforeseen challenges and situations that have not been encountered before. By having the compliance program established, the PCMH will be prepared with procedures and policies already developed, allowing the PCMH to show good faith in the activities they participate in and allowing the PMCH to have reference points should a difficult situation arise.

#### *Objective 6*

Objective 6 is for the PCMH to gain NCQA certification and ensure Meaningful Use of the technology chosen and implemented. As discussed earlier, NCQA recognition is recommended at Level I within 12 months of practice implementation. The use of IT can be very successful for establishing, measuring and demonstrating the data needed to be presented for the recognition process. The mandatory core measures and the IT solutions to fulfill them are found in Appendix 12.

The criteria for Meaningful Use were elicited in the Final Rule issued in July 2010. Only certified EHRs that meet Stage 1 criteria with a roadmap to Stage 2 and Stage 3 criteria should be considered. It would be imprudent to choose an EMR that does not satisfy, at a minimum, Stage 1 criteria. (Department of Health and Human Services & Centers for Medicare and Medicaid Services, 2010) We recommend that the clinic seek consultation with the local Regional Extension Center—the Chicago Health Information Technology Regional Extension Center which offers the following services to primary care providers: education and training, Meaningful Use gap analysis, needs assessment/RFP development, product evaluation/ selection consultation and procurement, workflow analysis and redesign, data conversion (including preload and interface development), patient engagement/education, reporting strategy, clinical decision support content and design, post-implementation assessment and optimization, and E-prescribing implementation (CHITREC, 2010). Utilizing this resource will help assure the selection of a certified EHR that meets the Meaningful Use criteria.

#### *Objective 7*

Objective 7 is to create and maintain a healthy work environment for employees that emphasizes teamwork and collaboration while keeping employee burnout and emotional exhaustion at a minimum in light of estimated workforce shortages. Patient satisfaction leads to employee satisfaction. Physicians who participate in an ideal PCMH find that the increased time with patients at a time that the patient chooses results in less stressful visits, better quality and increased quantity of information and better patient care (Cooley, McAllister, Sherrieb, & Kuhlthau, 2009). Staff that have fewer patients in the office per day have a greater knowledge of the patients and their situations. The care team takes great satisfaction in the value placed on their role in ensuring patients manage their healthcare successfully (Sevin, et al., 2009).

Fewer angry people yields a less stressful work environment. Thirty minute visits and less turnover of patients lends itself to a less hectic environment. A personal knowledge of the patients who “belong” to the office makes the office environment more familiar and less confrontational. The personal satisfaction derived from participating in good patient care is not frequently quantified but has been shown to be much improved in the PCMH over the standard office and Open Access enhances the satisfaction of employees even further (Kennedy & Hsu, 2003).

The PCMH, though an ideal practice model, can have its difficulties. As the clinic is being “built” from the ground up, the entire staff needs to be educated about the PCMH model. The care team needs to understand the complexities of this model of care so that it can be embraced quickly and efficiently (Nutting et al., 2009).

#### *Objective 8*

Objective 8 is to measure the effectiveness of user training and technology use by the staff through metrics obtained by performing surveys and audits at scheduled time intervals. Improvement plans would be developed when metrics fall below acceptable levels. We recommend the PCMH implement software solutions that will positively impact both the healthcare providers and the patients. It is not enough to simply train the users and expect immediate adoption and on-going success. Successful software implementations require a continuous cycle of Plan-Do-Check-Act (PDCA). The PDCA cycle is a four-step model for carrying out change. The model is used for continuous improvement when starting a new project, developing a new process, product, or service, defining a repetitive work process, or implementing any change (Tague, 2004). The implementation of the IT and the PCMH delivery model meet the criteria above. By implementing the PDCA cycle the PCMH will be able to

identify issues early, respond by developing action plans, and correcting the issues or bad behaviors before they become the norm. Potential benefits of identifying issues early are the removal of bottlenecks, improved training to better educate users, engaged employees as they see their concerns being addressed, and higher adoption rates for IT.

We recommend identifying five to six key activities to use the PDCA method to evaluate; these key activities should include both the Patient Portal and the EHR. One key activity should be evaluated at a time. The team performing the PDCA could be different with each key activity and the survey can be created for each key activity. While the PDCA method can be quite time consuming, it is recommended to keep the scope and time commitment limited. The main purpose is to identify bottlenecks and workflow processes that are inefficient. If each provider is struggling to know when a lab result is available for review, it is likely a training issue or a workflow issue. If each user that is trained on the system takes four months to become efficient users, there is likely a flaw in the delivery or quality of the training. If patients are not requesting refills through the Patient Portal is it because the patient doesn't know they have that ability or is it because the provider is not checking the work queue. The PDCA is not meant to identify issues with the software, but meant to look for inefficiencies and develop improvement plans that the PCMH can implement to increase the value of the IT. By leveraging the PDCA cycle and engaging users, the PCMH can speed the adoption process and use the technology to improve patient care and satisfaction.

#### *Objective 9*

Objective 9 is to determine appropriate financial evaluation for the technology selection for the PCMH. We recommend the PCMH use the Hard and Soft ROI calculations including the Patient Portal increased payments (Hard) and staff efficiencies (Soft). While any of the

calculations would be sufficient, this method is relatively straight forward. With the inclusion of the Soft ROI the PCMH is taking into account the intangibles such as increases in quality, efficiency, safety of care delivery, and provider satisfaction with the system including ease of use and effort expended. The ROI should be calculated for each vendor the PCMH is considering, the higher the ROI, the higher the return on each dollar that is being invested. Appendix 13 has an example worksheet that can be used to assist in calculating the ROI. Using a worksheet to calculate the ROI it will be easy to adjust the calculation for added functionality or other software purchases.

The Hard ROI costs and benefits will be relatively straight-forward to calculate as they are easily definable – they are tangible, meaning they have a value that can be calculated or identified. Tangible benefits and costs would include items such as increased reimbursement, software and license fees, or reduction in transcriptions costs. The Soft ROI costs and benefits will be more challenging to calculate as they are intangible – these costs and benefits are hard to define and even harder to identify a concrete value. Intangible benefits would be increased patient satisfaction, safer and more efficient care, or physician time savings. Calculating each type of ROI is further detailed below. Since the Hard ROI calculations are relatively objective it is recommended that more weight be assigned to this value than the Soft ROI when making a vendor selection. Soft ROI is best used to ensure required functionality exists in the system being chosen. The Soft ROI could also be used to eliminate vendors whose software does not meet the objectives of the PCMH. Calculating the ROI, while time consuming, will help to provide justification for the products chosen. The ROI could also be used to determine whether to include the purchase of an automated appointment reminder system or whether to purchase a Patient Portal with automated bill pay. Please refer to Appendix 13 for example worksheets that the



PCMH can use to assist in the process. When using the included worksheets, please note they are not meant to be all-inclusive, they are provided to be a guide to assist the PMCH with the ROI process.

The easiest dollar amount to define for the Hard ROI calculation is the costs and investment. The costs and investment would be any dollars that are spent on training, equipment, software, license fees, implementation charges, etc. Any cost that the PCMH needs to make a payment for and is related to the implementation of the software should be included. When considering license fees and maintenance cost a decision will need to be made for what time period the ROI is being calculated. If the time period is greater than a year, recurring license fees and hardware maintenance fees should also be included. Each vendor will have different costs; therefore costs will need to be recalculated for each vendor. Other items that should be considered are software purchases for automated reminder systems and costs for the implementation of the Patient Portal. Patient Portal costs may include training for the patients, help desk support, development, and interface costs. When calculating the ROI, costs for the Patient Portal and the EMR should be totaled to evaluate the cost of the entire system. It is possible that different combinations could lead to a different decision.

For the PCMH calculating the payback on the technology investment will be mainly calculated from anticipated savings from not using a paper system. The worksheet in Appendix 13 contains standard savings seen by other providers by eliminating paper systems and increasing Evaluation and Management (E&M) charges through more complete documentation. Benefits need to also be considered for the Patient Portal, including increased efficiencies in scheduling appointments and higher fee collection due to allowing the patient to pay on-line (if that is a feature available).

The most difficult values to identify are the intangible costs. Intangible costs would include decreased efficiencies while the staff learns how to use the software, increased non-patient clinical time, or unrealistic patient communication expectations. When evaluating each vendor, a pre-defined checklist should be developed to help evaluate the software. The potential intangible costs should be identified and ranked in order of importance. For costs, order of importance would be the cost the PCMH most wants to avoid. When evaluating each vendor, the checklist would be updated with a probability (0-5) indicating the likelihood this software will incur this costs. On the scale, zero would indicate no probability (indicating the cost would not occur) and five would indicate 100% probability (indicating that the cost would occur). The PCMH would then compare intangible costs between vendors. The number of intangible costs should be limited to a workable list; otherwise making comparisons among vendors will become time consuming and cumbersome.

Identifying the intangible benefits will be an exercise in defining what the PCMH hopes the EHR and Patient Portal deliver. Intangible benefits could include increased patient satisfaction, safer care, improved medication administration, or increased communication with the vendor. Similar to the intangible costs, a checklist should be developed to help evaluate the software. The potential intangible benefits should be identified and ranked in order of importance. Similar to the intangible costs, when evaluating each vendor the checklist would be updated with a probability (0-5) indicating the likelihood this software will provide the desired benefit. The scale is the same as previously defined. When making the final vendor selection, the PCMH should compare the intangible benefits for each vendor. As the list of intangible benefits can grow quite large, it will be imperative that the PCMH develop a workable number of benefits.

## Summary

The technologically advanced PCMH is the optimal strategy for the new Family Medicine Clinic. Utilizing the strategies outlined in the consultation and specific recommendations for each objective, the goals for the clinic can be met in a patient-centered and cost effective manner.

Our recommendations include a range of options and an identified best recommendation based on our research and experience. We also have a suggested list of resources and web information that will assist in guiding the development of the PCMH. Educating all participating staff in the concepts of the PCMH prior to the first patient contact will be critical to the success of the clinic. Utilizing web based training through the IHI and Ideal Medical Home and the PCPCC will defray expense of some of the education. Consultation with the Chicago Health Information Technology Regional Extension Center will give the clinic the advantage of working with professionals who know the details of Meaningful Use and reimbursement and the certified technology available for the PCMH.

The resources available from the AAFP may be used for pursuing NCQA recognition. Many of these items overlap with Meaningful Use making the achievement of NCQA a reasonable goal for the clinic.

If possible we would recommend that the clinic implement all of our recommendations as they establish their PCMH. The clinic may, of course, choose an alternative among the range of options in each recommendation, or perhaps choose to implement the recommendations in a stepwise fashion. We feel that the objectives based focus allows the PCMH flexibility in mapping their course.

We appreciate the opportunity to have worked with the Northwestern University Feinberg School of Medicine, Department of Family and Community Medicine. We hope our recommendations are of assistance as you pursue the goal of a technologically enabled Patient Centered Medical Home.

## Appendix 1 – Definitions

AAFP - American Academy of Family Physicians  
AAP - American Academy of Pediatrics  
ACP - American College of Physicians  
AMIA – American Medical Informatics Association  
AOA - American Osteopathic Associations  
ARRA-American Recovery and Reinvestment Act  
ASP – Application Service Provider  
CIS - Clinical Information Systems  
CMS – Centers for Medicaid and Medicare Services  
CHITREC - Chicago Health Information Technology Regional Extension Center  
DHS - designated health services  
E&M – Evaluation and Management Service Levels  
EHR-electronic health record  
EMR-electronic medical record  
HIE - Health Information Exchange  
HIPAA - Health Insurance Portability and Accountability Act  
HITECH-Health Information Technology for Clinical and Economic Health Act  
IT - Information Technology  
NCQA-National Committee for Quality Assurance  
PCHIT - Patient-Centered Health Information Technology  
PCMH – Patient Centered Medical Home  
PCPCC-Patient-Centered Primary Care Collaborative  
PDCA - Plan-Do-Check-Act  
PHI - Protect Health Information  
PHR – Personal Health Record  
REC - Regional Extension Centers  
RHIO – Regional Health Information Organization  
ROI – Return on Investment  
SaaS – Software-as-a-Service  
SSL - Secure Socket Layer

## Appendix 2 – Joint Principles of the PCMH

The Joint Principles, as defined the AAFP, ACP, AAP, and AOA are as follows:

Personal physician - each patient has an ongoing relationship with a personal physician trained to provide first contact, continuous and comprehensive care.

Physician directed medical practice – the personal physician leads a team of individuals at the practice level who collectively take responsibility for the ongoing care of patients.

Whole person orientation – the personal physician is responsible for providing for all the patient’s healthcare needs or taking responsibility for appropriately arranging care with other qualified professionals. This includes care for all stages of life; acute care; chronic care; preventive services; and end of life care.

Care is coordinated and/or integrated across all elements of the complex healthcare system (e.g., subspecialty care, hospitals, home health agencies, nursing homes) and the patient’s community (e.g., family, public and private community-based services). 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 in a culturally and linguistically appropriate manner.

Quality and safety are hallmarks of the medical home:

- Practices advocate for their patients to support the attainment of optimal, patient-centered outcomes that are defined by a care planning process driven by a compassionate, robust partnership between physicians, patients, and the patient’s family
- Evidence-based medicine and clinical decision-support tools guide decision making

- Physicians in the practice accept accountability for continuous quality improvement through voluntary engagement in performance measurement and improvement
- Patients actively participate in decision-making and feedback is sought to ensure patients' expectations are being met
- Information technology is utilized appropriately to support optimal patient care, performance measurement, patient education, and enhanced communication
- Practices go through a voluntary recognition process by an appropriate non-governmental entity to demonstrate that they have the capabilities to provide patient centered services

Enhanced access to care is available through systems such as open scheduling, expanded hours and new options for communication between patients, their personal physician, and practice staff.

Payment appropriately recognizes the added value provided to patients who have a patient-centered medical home. The payment structure should be based on the following framework:

- It should reflect the value of physician and non-physician staff patient-centered care management work that falls outside of the face-to-face visit
- It should pay for services associated with coordination of care both within a given practice and between consultants, ancillary providers, and community resources
- It should support adoption and use of health information technology for quality improvement
- It should support provision of enhanced communication access such as secure e-mail and telephone consultation

- It should recognize the value of physician work associated with remote monitoring of clinical data using technology
- It should allow for separate fee-for-service payments for face-to-face visits.  
(Payments for care management services that fall outside of the face-to-face visit, as described above, should not result in a reduction in the payments for face-to-face visits)
- It should recognize case mix differences in the patient population being treated within the practice
- It should allow physicians to share in savings from reduced hospitalizations associated with physician-guided care management in the office setting
- It should allow for additional payments for achieving measurable and continuous quality improvements.

Source: (PCPCC, 2007)



## Appendix 3 - Patient Family Engagement Framework

PCPCC Patient/Family Engagement Framework	Considerations
<p>1. Foundations for Effective Engagement</p> <ul style="list-style-type: none"> <li>a. Mutual goal and expectation setting</li> <li>b. Mutual progress feedback</li> <li>c. Patient-provider relationship development</li> <li>d. Availability and use of appropriate healthcare setting (includes selection of primary care provider vs. emergency department, advanced access techniques such as e-mail and Web portals, etc.)</li> </ul>	<p>Engagement starts with the patient's goals. Healing and health maintenance are, by their nature, goal-oriented processes; yet not all patients with a given condition have the same goals. Discussion, clarification and understanding of goals create the foundation for a long-term successful relationship between patient and provider. At the same time, establishing mutual expectations, and a process for reviewing progress against expectations, forms the basis for shared accountability through assessing effectiveness of the joint interventions intended to achieve those goals.</p>
<p>2. Accurate and complete information flow between patient and provider</p> <ul style="list-style-type: none"> <li>a. Medical history and current medication list</li> <li>b. Behavioral risk factors</li> <li>c. Current issues and concerns (including psychosocial)</li> <li>d. Review and communication of care coordination issues</li> </ul>	<p>A good patient history and up-to-date medication information are often taken for granted. However, practices that begin sharing access to electronic medical records with their patients often find that doing so uncovers a variety of simple errors that might otherwise have gone undiscovered. Other areas of opportunity include more effective identification of behavioral risks such as substance abuse and depression, as well as non-medical issues (e.g., family, economic or work stress) that may have a significant impact on the patient's ability to manage health status and treatment regimen.</p>
<p>3. Patient activation for self-management</p> <ul style="list-style-type: none"> <li>a. Patient knowledge of key health targets and actual values (e.g., blood pressure, cholesterol, etc.)</li> <li>b. Healthy lifestyle attributes (eating, drinking, smoking, exercise)</li> <li>c. Adherence to therapeutic regimen (broadly defined) and other chronic disease self-management behaviors</li> <li>d. Patient knowledge of and participation in appropriate wellness and/or disease management programs available in the community or workplace</li> </ul>	<p>There are many dimensions to self-management, and a wide variety of strategies for increasing patient activation to improve it. The most effective are generally based on an understanding that patients can have differing long-term goals and will be starting from different stages of readiness. They include motivational interview techniques to identify goals, determine readiness and identify specific objectives and interventions with which the patient has a reasonable probability of success.</p>
<p>4. Shared decision making</p> <ul style="list-style-type: none"> <li>a. Provider understanding of patient goals and preferences</li> <li>b. Patient knowledge of options, risks and benefits</li> <li>c. Patient participation in decision process</li> </ul>	<p>This is an area where recent research has shown significant opportunities to improve knowledge on both sides. Physicians frequently do not understand patient goals and preferences, and patients are often under-informed about basic facts relative to their condition and treatment options. Creating the conditions for effective shared decision-making requires an interactive process to remedy these critical information gaps.</p>
<p>5. Family engagement and activation</p> <ul style="list-style-type: none"> <li>a. Congruent goal setting</li> <li>b. Family member present at visit for dependent patient</li> <li>c. Family members are active participants in care process for dependent patient</li> <li>d. Family as support network for patient self-management (including non-dependents)</li> </ul>	<p>Family engagement and activation is critical in the case of dependent patients who are not fully able to care for themselves. It can also be important as a support network for any patient with a chronic condition or a desire to effect a behavioral change.</p>

Source: (Steidl, Adams, Storey, Koss, & Nace, 2010)

## Appendix 4 – Service Models

Attribute	Client-Server	ASP Hosted	Multi-Tenant, SaaS
Location of application and data	On dedicated servers that are owned by and reside within the practice. This can lead to increased requirements for local maintenance, support and technical expertise.	On dedicated servers that are owned by the hosting company, and located outside the practice. This can lead to concerns about ownership of the actual data, which are resolved through appropriate contract language.	On shared servers that are owned by the hosting company, and located outside the practice. This can lead to concerns about ownership of the actual data, which are resolved through appropriate contract language.
Up-front costs	Can be significant, since start-up requires the purchase of both server and software. In addition, PC's in some form for individual practitioners will also be required.	Typically much less since there is no purchase of server or software involved. However, PCs in some form will still be required for individual practitioners and a reliable Internet connection must be obtained.	Typically much less since there is no purchase of server or software involved. However, PCs in some form will still be required for individual practitioners and a reliable Internet connection must be obtained.
Start-up time	Generally longer, although some vendors have made efforts to streamline their installation and start-up processes. Length and difficulty of start-up depends on the skill of the supporting IT personnel.	Generally faster than local client-server solutions; however, ASP may still require significant configuration of the dedicated servers.	Rapid installation with primary focus on adoption and training towards "comfortable use" rather than technical deployment.
Time to "comfortable use"	Tends to depend on individual vendor support and practice factors that are not directly related to the type of application chosen.	Tends to depend on individual vendor support and practice factors that are not directly related to the type of application chosen.	Tends to depend on individual vendor support and practice factors that are not directly related to the type of application chosen.
IT expertise required	Some internal expertise or contract support is required on an ongoing basis since everything resides in the practice.	Minimal since the vendor is maintaining the servers and software.	Minimal since the vendor is maintaining the servers and software.
License model	Up-front purchase and ongoing maintenance of a software package, sometimes with modular options.	Monthly fee for those functions and features that are used.	Monthly fee for those functions and features that are used.
Accessibility	May or may not be accessible via the Internet depending on the individual application.	Applications accessible either via a web browser or other virtual software application.	Web-native applications designed from the ground up to be Internet accessible.

Attribute	Client-Server	ASP Hosted	Multi-Tenant, SaaS
Data sharing across practices (e.g., primary care with specialists)	Typically more challenging from a technical perspective. Not generally possible across vendor platforms. Also keep in mind that there are many other challenges to data sharing once the technical issues are overcome (privacy, process, etc.).	Slightly easier technically, but still not generally possible across different vendor platforms. Also keep in mind that there are many other challenges to data sharing once the technical issues are overcome (privacy, process, etc.).	Significantly easier since one connection can be leveraged across all users. Also keep in mind that there are many other challenges to data sharing once the technical issues are overcome (privacy, process, etc.).
Customizability	Typically high, although varies by vendor and requires knowledge and resources.	Varies, but often less than client-server solutions.	Typically allows for configuration of the solution to the practice but limits specific customization.
Software updates	Major updates usually must be purchased and installed. More flexibility, but also more effort and cost for the practice.	Typically handled by the vendor, but new releases may be delayed based on vendor capacity. Less cost and hassle for the practice, but also limited flexibility on timing of updates.	As new releases are available they are instantly and automatically available to all users. Less cost and hassle for the practice, but also limited flexibility on timing of updates.
Networking across multiple locations within a single practice	Generally more difficult and dependent on the individual application.	Generally easier but still highly dependent on the individual application.	Native connectivity already exists as all users leverage a single platform.
Internet requirements	None when used within the office	Broadband connection	Broadband connection

Source: (Nace & Steidl, 2010)

Appendix 5 – PCMH Testimonials

Practice Type	EMR Used	Patient Portal Used	Comments
Family Medicine	Yes	No	We use a vendor enterprise as our EMR. With the next upgrade we will have patient portal access. Of note my practice has been recognized as a level III NCQA medical home using reports generated by the EMR in conjunction with the analytics adjunct program.
Family Medicine	Yes	Yes	Our practice uses a Vendor EHR since our inception in 2001. We use a robust vendor patient portal, which is fully integrated into the EHR with secure messaging, e-prescribing, patient portal, etc. Our practice remains far ahead of the vast majority of current PCMH initiatives because we fundamentally changed the model, whereas current initiatives are really tweaking. What we need is true transformation, not tweaking although there is something to be said for incremental improvement. We transformed by starting over, from scratch, in 2001 and have been doing so since well before the PCMH term was popularized. However, transformation is essentially impossible, if one is really going to use e-care/phone care as robustly as they should be used for example, in the current financing system.
Primary Care	Yes	Yes	I created my own database in residency which was very basic. When moving into private practice I used MS Access to create a more thorough database from which I used all my chart forms - I used from 1995-2005. In 2005 we implemented a full service vendor which includes a Patient Portal and have been very successful using it since. We have been running a PCMH for two years and are starting a new project through the Beacon grant. The R.I. Beacon project is taking select PCMH practices to work on interconnectivity with hospitals/specialists and clinical reporting to hopefully show improved outcomes with the PCMH model. We have had the patient portal running for the last several months and it has been very successful. Indicating that you would appreciate any information or experiences is too nonspecific - I can talk for weeks about hundreds of issues related to the topic. I would be glad to answer other questions if you want, or we can talk at some point for a few minutes if that would be easier for you.
Family Medicine	Yes	No	We use a Vendor EMR, a stand alone commercial product. We do not use the portal feature at this time purely because of cost issue. We use unsecure email for patient communication.

Practice Type	EMR Used	Patient Portal Used	Comments
Primary Care	Yes	Yes	<p>The practice is going very well, and we continue to be very actively participating in the Colorado PCMH Pilot (<a href="http://www.healthteamworks.org/pcmh/">http://www.healthteamworks.org/pcmh/</a>).</p> <p>Our practice has been using a Vendor software product since mid-2005 . Pretty much everybody in private practice using an EHR is using a commercial product (i.e. Allscripts, e-MDs, eClinicalWorks, SOAPware, etc.). There are of course organizations like Kaiser Permanente and the VA system that use their own "in-house" EHR systems, but only the really big guys like them do so.</p> <p>We use a separate Vendor solution for our electronic patient communication/patient portal, and it also serves as our chronic disease registry system. We recently decided to waive any and all subscription fees for direct-to-provider e-communications because we found that charging extra for this created a barrier to better healthcare for our patients. Starbucks has free Wi-Fi now... customers pretty much demand/expect free technologies like e-communication with their PCMH providers and staff. That's our opinion, but I think that's where the culture is heading. While the PCMH needs to be compensated for these e-communications, we feel that this is best accomplished by "bundling" this compensation within a care management fee paid regularly to the PCMH by the health insurance company (i.e. on a per-member/per-month or PMPM capitated basis). We are receiving PMPM reimbursement from the health insurers participating in the Colorado PCMH Pilot, and so we feel that we are being compensated relatively more fairly for offering/providing free e-communication w/the medical provider to our patients.</p>
Pediatrics	Yes	No	<p>We continue to add elements to our practice and continue to work toward full implementation and maybe even certification. To actually do all this is extremely time consuming, and very expensive and the Return on Investment is zero financially. Has it made us a better practice, yes. Do the patients like it, yes.</p> <p>We currently are on a Vendor EMR and use it to the fullest. We are not really happy with it as it is not pediatric friendly so we have started to demo others as we plan to probably move away from this one.</p> <p>We do not have a patient portal, again another expense that the Physicians are not willing to incur at this point in time. Also, some of the things we would like the portal to do, or some things that the portal sort of does, like appointment scheduling, is not automated enough for us to spend the money, only to have it be more work for our staff. Will we ultimately get there, probably yes. We do tell our patients that they have full access and if they desire, they can purchase a CD with the record on the CD. So far, no one has done this and the comment is most often, I trust this group that any errors in the chart would only be minor and not worth the time or money to go through the record themselves. We did participate in an insurance carriers risk assessment program review of our practice and they were satisfied that our records were as clean and accurate as they could be.</p> <p>In our state, unlike some other states, there is no incentive to become a medical home. We are working through the Pediatric Council of our State AAP chapter to get that changed but I do not see that happening in the near future and honestly, healthcare reform really put the brakes on a lot of things we were doing with the carriers to move forward with payment enhancements. It looks like now; enhancements in this state at least may only come if an employer is willing to pay more for insurance that includes medical home practices.</p>

Practice Type	EMR Used	Patient Portal Used	Comments
Primary Care	No	No	<p>We are not yet using an EMR, though our hospital system intends to have Vendor Package up &amp; running for us in time to qualify for the federal money available to EMR users who meet the meaningful use criteria. This is supposed to happen by 3rd quarter of 2011.</p> <p>In the office we make do with a file storage application that we use to scan paper documents, fill in forms we or our larger group have designed, and write word documents. I don't use a lot of the forms because they're not flexible for multiple problems. I use word documents that I've designed and fill in or modify as I go. I have a "template" for miscellaneous E&amp;M visits, a template for diabetes, templates for preventive visits (separate ones for age &amp; sex categories that include age/sex ROS &amp; PE items and specific educational items that I discuss during those visits), and I handwrite on some not very good forms that came from the local FP Dept for WCC.</p> <p>For keeping track of preventive care, vaccines, things that need monitoring for chronic disease, etc - I use a section that's visible on the main interface of file storage application. I'm compulsive, and I enter every mammogram, flu shot, Creatinine (for people with diabetes or HTN), smoking status, etc in this section. It's a massive commitment of my time, but I think it's the right thing to do. I kept these same records in the past on my problem list, but the problem list is now buried in a file, so I had to change what I was doing. I can't wait for the real EMR which will do this for me. We're promised that a good chunk of this data will download from our billing data and lab, so I won't be re-entering it another time.</p> <p>I've been working on building my staff to support my work better. I think this is central to making PCMH work. I've had weak medical assistants for years, and decided to upgrade to a nurse at the expense of my own income (which is already at the low end of family medicine because of the intensity of my care at each visit). I was only able to afford an LPN, and found one who was a mixed bag, but I think had potential. Unfortunately, she left after a month due to a family emergency, and I'm currently assisted by a temporary medical assistant who has turned out to be conscientious, hard working, lovely to patients, and enthusiastic about learning, so I may stick with her. Even if I stay with a medical assistant, I plan to hire a part-time nurse to help go through my voluminous inbox of mail, email, phone calls, and prescription refill requests. That chunk of work exceeds my face to face time with patients. My plan for the medical assistants is to increase their role in history taking and education, and to give them more responsibility for prepping for visits. They've always done medication lists, but I'd like them to become more attentive to the subtleties of med reconciliation, which has always been left for me. They've always gotten Hemoglobin A1Cs for diabetes visits, but I've started having them do diabetes histories, and I'd also like them to do education about foot care when they do the diabetes histories.</p>

Practice Type	EMR Used	Patient Portal Used	Comments
Primary Care	No	No	<p>My Family Medicine Board Recertification includes a requirement of quality improvement projects, and we've done two in the last few years: one was colon cancer screening and the other was diabetes. The colon cancer screening was done through the Ohio Academy of Family Physicians and included a 2 day retreat - which my staff loved. We staffed data collection with a patient volunteer, and she attended the retreat with us. The diabetes QI was done thru my larger group (they staffed data collection) and led to NCQA certification. I am starting a geriatric QI project, and my office coordinator is doing the initial baseline data collection, which only requires data from 15 patients. I hope to involve my staff in that project too.</p> <p>I don't have a patient portal, but I collect email addresses from all of my patients and let them know they are welcome to contact me that way as well. I've been cavalier about setting up rules on what to email me about, and rarely is anything inappropriate. I give feedback when it is inappropriate – eg, stream of consciousness rambling including “some suicidal thoughts”. It works well, other than its lack of reimbursement. It is definitely more efficient than phone calls, and I now get very few.</p> <p>I am active with the Ohio Academy of Family Physicians, the Cleveland Academy of Family Physicians, Better Health Greater Cleveland (a federally funded chronic care collaborative) and Doctors Organized for Health Care Solutions, a 600 member group in northeast Ohio focused on making change through supporting and making relationships with progressive political candidates and legislators. All of these groups are being very pro-active about PCMH. Meanwhile, my hospital system is starting an ACO for employees. They are working with a consortium of hospitals, but have rebuffed offers of input from me and at least one other of my family medicine colleagues. I think they are on the wrong track, but unfortunately, those with power are the hospitals, and at least my hospital has not been interested in input from family physicians. It's very frustrating. I have chosen not to go after PCMH certification because it is too big a burden with little to no reward for doing it. I prefer to just do the job the right way. I figure if I ever go for certification, I will have put the pieces in place.</p>

Appendix 6 – NCQA Certification Guidelines

PPC-PCMH Content and Scoring			
Standards 1: Access and Communications	Pts		Standard 5: Electronic Prescribing
A. <b>Has written standards for patient access and patient communications**</b>	4		A. Uses electronic system to write prescriptions
B. <b>Uses data to show it meets its standards for patient access and communication**</b>	5		B. Has electronic prescription writer with safety checks
	9		C. Has electronic prescription writer with cost checks
			Pts
			3
			3
			2
			8
Standard 2: Patient Tracking and Registry Functions	Pts		Standards 6: Test Tracking
A. Uses data system for basic patient information (mostly non-clinical data)	2		A. <b>Tracks tests and identifies abnormal results systematically**</b>
B. Has clinical data systems with clinical in searchable data fields	3		B. Uses electronic systems to order and retrieve tests and flag duplicates
C. Uses the critical data system	3		
D. <b>Uses paper or electronic-based charting tools to organize clinical data**</b>	6		Pts
E. <b>Uses data to identify important diagnoses and conditions in practice**</b>	4		7
F. Generates lists of patients and reminds patients and clinicians of services needed (population management)	3		6
			13
			Standards 7: Referral Tracking
			A. <b>Tracks referrals using paper-based or electronic systems**</b>
			Pts
			4
			4
Standard 3: Case Management	Pts		Standards 8: Performance Reporting and Improvement
A. <b>Adopts and implements evidence based guidelines for three conditions**</b>	3		A. <b>Measures clinical and/or service performance by physician and/or across the practice**</b>
B. Generates reminders about preventive services for clinicians	4		B. Survey of patients' care experience
C. Uses non-physician staff to manage patient care	3		C. <b>Reports performance across the practice or by physician**</b>
D. Conducts case management including care plans assessing progress addressing barriers	5		D. Sets goals to take action to improve performance
E. Coordinates care//follow-up for patients who receive care inpatient and outpatient facilities	5		E. Sets goals and takes action to improve performance
	20		F. Transmits reports with standardized measures electronically to external entities
			Pts
			3
			3
			3
			2
			1
			15
Standard 4: Patient Self-Management Support	Pts		Standard 9: Advanced Electronic Communications
A. Assess language preferences and other communication barriers	2		A. Availability of Interactive Website
B. <b>Actively supports patient self-management**</b>	4		B. Electronic Patient Identification
	6		C. Electronic Care Management Support
			Pts
			1
			2
			1
			4

\*\*Must Pass Elements

**NCQA**

**PPC-PCMH Scoring**

Level of Qualifying	Points	Must Pass Elements at 50% Performance Level
Level 3	75-100	10 of 10
Level 2	50-74	10 of 10
Level 1	25-49	5 of 10
Not recognized	0-24	<5

Levels: If there is a difference in Level Achieved between the number of points and "Must Pass" the practice will be awarded the lesser level: for example, if a practice has 65 points but passes only 7 "Must Pass" Elements, the practice will achieve Level 1. Practices with a numeric score of 0 to 24 points or less than 5 "Must Pass" Elements to not Qualify.

**NCQA**

Source: (NCQA, 2010)



Appendix 7 – Meaningful Use Objectives and Associated Measures

Core Set			
Health Outcomes Policy Priority	Stage 1 Objectives		Stage 1 Measures
	Eligible Professionals	Eligible Hospitals and CAH	
Improving quality, safety, efficiency and reducing health disparities	Use CPOE for medication orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines	Use CPOE for medication orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines	More than 30% of unique patients with at least one medication in their medication list seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have at least one medication order entered using CPOE
	Implement drug-drug and drug-allergy interaction checks	Implement drug-drug and drug-allergy interaction checks	The EP/eligible hospital/CAH has enabled this functionality for the entire EHR reporting period
	Generate and transmit permissible prescriptions electronically (eRx)		More than 40% of all permissible prescriptions written by the EP are transmitted electronically using certified EHR technology
	Record demographics <ul style="list-style-type: none"> <li>• Preferred language</li> <li>• Gender</li> <li>• Race</li> <li>• Ethnicity</li> <li>• Date of birth</li> </ul>	Record demographics <ul style="list-style-type: none"> <li>• Preferred language</li> <li>• Gender</li> <li>• Race</li> <li>• Ethnicity</li> <li>• Date of birth</li> </ul>	More than 50% of all unique patients seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have demographics recorded as structured data
	Maintain an up-to-date problem list of current and active diagnoses	Maintain an up-to-date problem list of current and active diagnoses	More than 80% of all unique patients seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have at least one entry or an indication that no problems are known for the patient recorded as structured data

Core Set			
Health Outcomes Policy Priority	Stage 1 Objectives		Stage 1 Measures
	Eligible Professionals	Eligible Hospitals and CAH	
Improving quality, safety, efficiency and reducing health disparities	Maintain active medication list	Maintain active medication list	More than 80%of all unique patients seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have at least one entry (or an indication that the patient is not currently prescribed any medication) recorded as structured data
	Maintain active medication allergy list	Maintain active medication allergy list	More than 80%of all unique patients seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have at least one entry (or an indication that the patient has no known medication allergies) recorded as structured data
	Record and chart changes in vital signs: Height Weight Blood pressure Calculate and display BMI Plot and display growth charts for children 2-20 years, including BMI	Record and chart changes in vital signs: Height Weight Blood pressure Calculate and display BMI Plot and display growth charts for children 2-20 years, including BMI	More than 50%of all unique patients seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23)height, weight and blood pressure are recorded as structured data
	Record smoking status for patients 13 years or older	Record smoking status for patients 13 years or older	More than 50%of all unique patients seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have smoling status recorded as structured data
	Implement one clinical decision support rule relevant to specialty or high clinical priority along with the ability to track compliance with that rule	Implement one clinical decision support rule relevant to specialty or high clinical priority along with the ability to track compliance with that rule	Implement one clinical decision support rule

Core Set			
Health Outcomes Policy Priority	Stage 1 Objectives		Stage 1 Measures
	Eligible Professionals	Eligible Hospitals and CAH	
Improving quality, safety, efficiency and reducing health disparities	Report ambulatory clinical quality measures to CMS or the States	Report hospital clinical quality measures to CMS or the States	For 2011, provide aggregate numerator, denominator and exclusions through attestation as discussed in section II(A)(3) of this final rule
			For 2012, electronically submit the clinical quality measures as discussed in section II(A)(3) of this final rule
Engage patients and families in their healthcare	Provide patients with an electronic copy of their health information (including diagnostic test results, problem list, medication lists, amedication allergies), upon request	Provide patients with an electronic copy of their health information (including diagnostic test results, problem list, medication lists, medication allergies, discharge summary, procedures), upon request	More than 50% of all patients of the EP or the inpatient or emergency departments of the eligible hospital or CAH (POS 21 or 23) who request a copy of their health information are provided it within 3 business days
		Provide patients with and electronic copy of their discharge instructions at time of discharge, upon request	More than 50% of all patients who are discharged from an eligible hospital or CAH's inpatient or emergency departments (POS 21 or 23)and who request an electronic copy of their discharge instructions are provided it
	Provide clinical summaries for patients for each office visit		Clinical summaries provided to patients for more than 50% of all office visits within 3 business days
Improve care coordination	Capability to exchange key clinical information (for example, problem list, medication list, medication allergies, diagnostic test results) among providers of care and patient authorized entities electronically	Capability to exchange key clinical information (for example, discharge summary, procedures, problem list, medication list, medication allergies, diagnostic test results) among providers of care and patient authorized entities electronically	Perform at least one test of certified EHR technology's capacity to electronically exchange key clinical information

Core Set			
Health Outcomes Policy Priority	Stage 1 Objectives		Stage 1 Measures
	Eligible Professionals	Eligible Hospitals and CAH	
Ensure adequate privacy and security protections for personal health information	Protect electronic health information created or maintained by the certified EHR technology through the implementation of appropriate technical capabilities	Protect electronic health information created or maintained by the certified EHR technology through the implementation of appropriate technical capabilities	Conduct or review a security risk analysis per 45 CFR 164.308(a)(1) and implement security updates as necessary and correct identified security deficiencies as part of its risk management process
Improving quality, safety, efficiency and reducing health disparities	Implement drug- formulary checks	Implement drug- formulary checks	The EP/eligible hospital/CAH has enabled this functionality and has access to at least one internal or external drug formulary for the entire EHR reporting period
		Record advance directives fo patients 65 years old or older	More than 50% of all unique patients 65 years or older admitted to the eligible hospital's or CAH's inpatient department (POS 21) have an indication of an advance directive status recorded
	Incorporate clinical lab test results into certified EHR technology as structured data	Incorporate clinical lab test results into certified EHR technology as structured data	More than 40% of all clinical lab test results ordered by the EP or the eligible hospital or CAH for patients admitted to its inpatient or emergency department (POS21 or 23) during the EHR reporting period whose results are either in a positive/negative or numerical format are incorporated in certified EHR technology as structured data
	Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research or outreach	Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research or outreach	Generate at least one report listing patients of the EP. Eligible hospital or CAH with a specific condition
	Send reminders to patients per patient preference for preventive/follow up care		More than 20% f all unique patients 65 years or older or 5 years old or younger were sent an appropriate reminder during the EHR reporting period

Core Set			
Health Outcomes Policy Priority	Stage 1 Objectives		Stage 1 Measures
	Eligible Professionals	Eligible Hospitals and CAH	
Engage Patients and families in their healthcare	Provide patients with timely electronic access to their health information (including lab results, problem list, medication lists, medication allergies) within four business days of the information being available to the EP		More than 10% of all unique patients seen by the EP provided timely (available to the patient within four business days of being updated in the certified EHR technology) electronic access to their health information subject to the EP's discretion to withhold certain information
	Use certified EHR technology to identify patient-specific education resources and provide those resources to the patient if appropriate	Use certified EHR technology to identify patient-specific education resources and provide those resources to the patient if appropriate	More than 10% of all unique patients seen by the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) are provided patient-specific education resources
Improve care coordination	The EP, eligible hospital or CAH who receives a patient from another setting of care or provider of care or believes and encounter is relevant should perform medication reconciliation	The EP, eligible hospital or CAH who receives a patient from another setting of care or provider of care or believes and encounter is relevant should perform medication reconciliation	The EP, eligible hospital or CAH provides medication reconciliation for more than 50% of transitions of care in which the patient is transitioned into the care of the EP or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23)
	The EP, eligible hospital or CAH who transitions their patient to another setting of care or provider of care or refers their patient to another provider of care should provide summary of care record for each transition of care or referral	The EP, eligible hospital or CAH who transitions their patient to another setting of care or provider of care or refers their patient to another provider of care should provide summary of care record for each transition of care or referral	The EP, eligible hospital or CAH who transitions or refers their patient to another setting of care or provider of care provides a summary of care record for more than 50% of transitions of care and referrals

Core Set			
Health Outcomes Policy Priority	Stage 1 Objectives		Stage 1 Measures
	Eligible Professionals	Eligible Hospitals and CAH	
Improve population and public health <sup>1</sup>	Capability to submit electronic data to immunization registries or Immunization Information Systems and actual submission in accordance with applicable law and practice	Capability to submit electronic data to immunization registries or Immunization Information Systems and actual submission in accordance with applicable law and practice	Performed at least one test of certified EHR technology's capacity to submit electronic data to immunization registries and follow up submission if the test is successful (unless none of the immunization registries to which the EP, eligible hospital or CAH submits such information have the capacity to receive the information electronically)
	Capability to submit electronic data on reportable (as required by state or local law) lab results to public health agencies and actual submission in accordance with applicable law and practice		Performed at least one test of certified EHR technology's capacity to provide electronic submission of reportable lab results and follow up submission if the test is successful (unless none of the public health agencies to which the eligible hospital or CAH submits such information have the capacity to receive the information electronically)
	Capability to submit electronic syndromic surveillance data to public health agencies and actual submission in accordance with applicable law and practice	Capability to submit electronic syndromic surveillance data to public health agencies and actual submission in accordance with applicable law and practice	Performed at least one test of certified EHR technology's capacity to provide electronic syndromic surveillance data to public health agencies and follow up submission if the test is successful (unless none of the public health agencies to which an EP, eligible hospital or CAH submits such information have the capacity to receive the information electronically)

<sup>1</sup>Unless a EP, eligible hospital or CAH has an exception for all of these objectives and measures they must complete at least one as part of their demonstration of the menu set in order to be a meaningful EHR user

Source: (Department of Health and Human Services, 2010)

## Appendix 8 – The Primary/Specialty Service Agreement

This is a component of what is called a service agreement. This is how to get into the work of access and flow between primary and secondary care. If you find yourselves asking the question "How in the world can we improve access with this specialist," this is a tried and effective approach. It requires work.

Approach a specialist and suggest working out an agreement. The agreement would entail that it is possible for you to send only the right stuff along with all the necessary information (that's what gets the specialist to the table), and the quid-pro-quo is that your office does not have to go through hoops for access (pre-screened and worked up patient is offered an appointment this week).

### Example of an Agreement in Place

#### PRIMARY CARE

1. State that you are requesting a consultation
2. The reason for the consultation and/or questions(s) you would like answered
3. List of any current or past pertinent medications
4. Any work-up and results that has been done so far
5. Your thought process in deciding to request a consult
6. What you would like the specialist to do

#### SPECIALTY CARE

1. State that you are returning the patient to primary care for follow-up in response to their consult request
2. What you did for the patient and the results
3. Answers to Primary Care Physician questions in their consult request

4. Your thought process in arriving at your answers
5. Recommendations for the Primary Care Physician and education notes as appropriate
6. When or under what circumstances the Primary Care Physician should consider sending the patient back to you.

Source: (IHI, 2009)



Appendix 9 – IT functionality needed to support PCMH

Component	Functionality
Registries	Disease registry <ul style="list-style-type: none"> <li>● Condition</li> <li>● Treatment</li> <li>● Risk factors</li> <li>● Clinical events</li> </ul>
PHR's	Content may vary – ensure ability to import data to the EHR from wide range of PHR's Synchronization critical
Care Transitions	Capacity to share information with other institutions and agencies to help coordinate patient care
Telehealth	Interface capability with patient monitoring devices Decrease hospitalizations Allow early intervention Brand neutral
Decision Support	Alerts and Reminders Documentation templates Order Templates Data presentation tools Algorithms/protocols (Evidenced-based) Reference Information example ClinXpert
Reporting Performance Measures	Meaningful use measures Dashboards <ul style="list-style-type: none"> <li>● Clinical</li> <li>● Process</li> <li>● Business</li> </ul> Performance measure and graphic presentation tools
Team approach to Care	Simultaneous access for team members Role based access Individual workflow management Assignment tracking across team members
Patient Portal-recommend hybrid development	Appointment requests Registration Email and text messages Access to PHR Test results Virtual Office visits Telehealth applications Access to defined portion of the HER
Registration	Critical to assign unique identifier to patient Must be able to “pre-register” via PHR/portal
Call Management	Smart phone access patients and providers 24/7 Text messaging to portal/physician Internet access to portal PHR and any other portions of HER defined by PCMH

Component	Functionality
Billing	Paperless collection Current technology successfully meets needs <ul style="list-style-type: none"> <li>● Revenue tracking</li> <li>● Automatic claims submissions to payers</li> <li>● HIPAA “Compliant formats</li> <li>● Electronic billing</li> <li>● Eligibility tracking</li> <li>● E &amp; M coding optimization diagnostic and procedural codes</li> </ul>
Interfaces	Varies from vendor to vendor Important to identify capacity for HIE Certified software Uses “standards” ex HL7

Source: (Nace & Steidl, 2010)

Appendix 10 – Patient Portal Examples

 <p><b>NORTHWESTERN UNIVERSITY</b></p>		<p><b>Northwestern University Feinburg School of Medicine Medical Home Clinic Patient Portal</b></p>	
<p><a href="#">Log Out</a>      <a href="#">Contact Us</a></p>		<p><a href="#">Help!</a></p>	
<p><a href="#">Information</a></p>		<p><a href="#">Communication</a></p>	<p><a href="#">Patient Data</a></p>
<p><i>Welcome Mike Rittenhouse</i></p>			
<p><b>Appointment Reminders:</b>  Monday November 1, 2010 - 2pm: MRI of right shoulder - Northwestern Medical Center, 1111 East 10th Street  Friday November 5, 2010 - 10am: Medical Clinic Office Appointment - NU Clinic, 503 Elmhurst Avenue</p>			
<p><a href="#">Allergies</a></p>		<p><b>About Your Health: Peanut Butter Good Protein Source</b> Did you know that peanut butter is an excellent source of protein?? Yes, it is true, peanut butter is an excellent source and protein and a high value source of nutrition value. Although it contains some level of fat, you have to accept some bad with the good so hey, eat peanut butter as a between the meal snack. Better yet, I would highly recommend you eat over 5 jars of peanut butter a day. This will give you all the protein you need for the next six months; however, you will have consumed it all in a single day. In this regard, you literally wouldn't have to eat for the next several days or even months! Consequently, invite some friends over for a peanut butter party - spread it on some fish for even a better nutritional value. This would then provide you not only the value of the protein source but the value of the fish oil as well. If you follow this diet, you should find it very satisfying and nutritional. Hey, you might actually lose some weight in the process!!</p>	
<p><a href="#">Medications</a></p>			
<p><a href="#">Laboratory Values</a></p>			
<p><a href="#">Radiology Values</a></p>			
<p><a href="#">Health History</a></p>			
<p><a href="#">Medical Record</a></p>			
<p><a href="#">Schedule Appointment</a></p>			
<p><a href="#">Patient Registration</a></p>			
<p><a href="#">Medication Renewal</a></p>			
<p> </p>			

<b>Northwestern University Clinic: Communication Center</b>					
Log Out	Contact Us			Help!	
Information		Communication		Patient Data	
<i>Welcome Mike Rittenhouse</i>					
<b>Appointment Reminders:</b>				Monday November	
1, 2010 - 2pm: MRI of right shoulder - Northwestern Medical Center, 1111 East 10th Street				Friday November 5, 2010 -	
10am: Medical Clinic Office Appointment - NU Clinic, 503 Elmhurst Avenue					
<b>Appointment Scheduler:</b>					
Select desired department/location:		Laboratory	Radiology	Clinic Office Visit	Other
Select test from listing provided:		(Drop down of available tests by each department - Select from List)			
Enter Date:		Select Time from Available Listing:			
<b>Patient Registration:</b>					
Patient Name:	Last:	First:	M.I.	Phone Number:	
Insurance Company:	Name:	Address:		Insurance Number:	
Type of Service:		Date of Service:		DOB:	
<b>Clinic Email</b>			<b>Health Discussion Forum</b>		
Send	Reply	Reply All		Comment	Users
Privacy					
<b>To:</b>	Dr. James Jones				
<b>Subject:</b>	Surgical Incision				
Dr. Jones,	Over				
the last couple days, I have noticed a burning sensation in my surgical incision. It	is red in color and more painful than it was just a couple days ago. It appears to be				
swelling more now as well. I have been cleaning it with soap and water and used	some hydrogen peroxide on it today. I am a little concerned. Is this normal??				
Mike					
<b>Jane Smith:</b>	I have been experiencing a great deal of thirst and hungar				
	lately but am not sure why. <a href="#">Reply: Fred</a>				
	<a href="#">Taylor</a> - My cousin was experencing the same thing and found out he				
	had diabetes <a href="#">Reply: Cindy Clay</a>				
	- Yes, my husband had diabetes and these were his initial symptoms so I				
	would have it checked out <a href="#">Reply :</a>				
<b>Sam Schmidt:</b>	I was recently diagnosed with an irregular heartbeat and				
	the doctor put me on coumadin but I am not sure why				
<a href="#">Reply: Brad Pennington, MD:</a>	Sam, with an irregular heartbeat, blood				
	is not pumped as efficiently from the chambers of the heart, allowing				
	opportunities for blood clot formation. This clots could move from the				
	heart and create blockages in your bloodstream. Coumadin is an				
	anticoagulant which will ;prevent this				
	<a href="#">Reply:</a>				

Northwestern University Clinic: Data Center					
Log Out	Contact Us			Help!	
Information	Communication		Patient Data		
<i>Welcome Mike Rittenhouse</i>					
<b>Appointment Reminders:</b> November 1, 2010 - 2pm: MRI of right shoulder - Northwestern Medical Center, 1111 East 10th Street November 5, 2010 - 10am: Medical Clinic Office Appointment - NU Clinic, 503 Elmhurst Avenue					Monday Friday
Allergies	Medications	Lab Values	Radiology	Health History	Medical Record
Avapro 300mg: Take one tablet by mouth in the morning Protonix 40mg: Take one tablet by mouth in the morning Norvasc 10mg: Take one tablet by mouth in the evening Lasix 20mg: Take one tablet by mouth in the morning 0.125 mg: Take one tablet by mouth in the morning at 10am 300mg: Take one tablet by mouth every six (6) hours Take one tablet by mouth at 9am and 9pm daily					
<b>Medication Renewal Request:</b>					
Drug Name:	<input type="text"/>	Dose:	<input type="text"/>	Route:	<input type="text"/>
Frequency (How often do you take the medication?):		<input type="text"/>			
Pharmacy:	<input type="text"/>	Date medication renewal needed:		<input type="text"/>	
Comment or question:					
Reply: <input style="width: 100px;" type="text"/>					

## Appendix 11 – Minimum Requirements to meet HITECH and HIPAA

Eligible Professionals Requirement	Requirement Owner	Requirement met
Use CPOE for medication orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines	HITECH	
Implement drug-drug and drug-allergy interaction checks	HITECH	
Generate and transmit permissible prescriptions electronically	HITECH	
Record demographics: preferred language, gender, race, ethnicity, and date of birth	HITECH	
Maintain and up-to-date problem list of current and active diagnoses	HITECH	
Maintain active medication list	HITECH	
Maintain active medication allergy list	HITECH	
Record and chart changes in vital signs: height, weight, blood pressure, calculate and display BMI, Plot and display growth charts for children 2 - 20 years including BMO	HITECH	
Record smoking status for patients 13 years or older	HITECH	
Implement one clinical decision support rule relevant to specialty or high clinical priority along with the ability to track compliance with that rule	HITECH	
Report ambulatory clinical quality measures to CMS or the States	HITECH	
Provide patients with an electronic copy of the health information (including diagnostic test results, problem list, medication lists, medication allergies), upon request	HITECH	
Provide clinical summaries for patients for each office visit	HITECH	
Capability to exchange key clinical information (for example, problem list, medication list, medication allergies, diagnostic test results), among providers of care and patient authorized entities electronically	HITECH	
Protect electronic health information created or maintained by the certified EHR technology through the implementation of appropriate technical capabilities	HITECH/HIPAA	
Implement drug formulary checks	HITECH	
Incorporate clinical lab-test results into certified EHR technology as structured data	HITECH	
Generate lists of patients by specific conditions to use for quality improvements, reduction of disparities, research or outreach	HITECH	
Send reminders to patients per patient preference for preventive/follow-up care	HITECH	
Provide patients with timely electronic access to their health information (including lab results, problem list, medication lists, medication allergies) within four business days of the information being available to the EP	HITECH	
Use certified EHR technology to identify patient-specific education resources and provide those resources to the patient if appropriate	HITECH	
The EP who receives a patient from another setting of care or provider of care or believes an encounter is relevant should perform medication reconciliation	HITECH	

Eligible Professionals Requirement	Requirement Owner	Requirement met
The EP who transitions their patient to another setting of care or provider of care or refers their patient to another provider of care should provide summary of care record for each transition of care or referral	HITECH	
Capability to submit electronic data to immunization registries of Immunization Information System and actual submission in accordance with applicable law and practice	HITECH	
Capability to submit electronic syndromic surveillance data to public health agencies and actual submission in accordance with applicable law and practice	HITECH	
Provisions for restricted visit types - including viewing, updating, and transmitting	HIPAA	
Consent for sharing of patient medical information is recorded electronically	HIPAA	
Data security model	HIPAA	
Secure transmission of medical information between systems	HIPAA	
Audit trail available with reporting available	HIPAA	

Source: (Department of Health and Human Services, 2010; Ray & Wimalasiri, 2006)

## Appendix 12 – NCQA Mandatory Core Measures

Mandatory Core Measure	IT solution
Written standards for patient access and patient communication	Patient Portal and Practice Management Software Solution
Uses data to show it meets its standards for patient access and communication	Integrated Patient Portal and EMR
Uses paper or electronic-based charting tools to organize clinical information	EMR
Uses data to identify important diagnoses and conditions in practice	EMR
Adopts and implements evidence-based guidelines for three conditions	EMR
Actively supports patient self-management	Integrated Patient Portal and EMR
Tracks tests and identifies abnormal results systematically	Integrated Patient Portal and EMR
Tracks referrals using paper-based or electronic system	Integrated Patient Portal and EMR
Measures clinical and/or service performance by physician or across the practice	EMR
Reports performance across the practice or by physician	EMR and Practice Management Software Solution

Source: (NCQA, 2010)



Appendix 13 – ROI Worksheets

Hard ROI

Costs Category	Elements	Year 1	Year 2	Year 3	Total
<i>EMR</i>	Software				
	Training				
	License Fees				
	Interfaces				
	Implementation				
	Other				
<i>Patient Portal</i>	Software				
	Training				
	License Fees				
	Interfaces				
	Implementation				
	Other				
<i>Additional Software</i>	Software				
	Training				
	License Fees				
	Interfaces				
	Implementation				
	Other				
<i>Hardware</i>	PC's				
	Laptop				
	Servers				
	Devices				
	Installation & Setup				
	Maintenance (annual)				
	Software (OS, database, etc)				
<i>Misc</i>	Disaster Recovery				
	Database Back-ups				
<b>TOTAL COSTS</b>		\$	\$	\$	\$
		Year 1	Year 2	Year 3	Total Cost

Benefits Category	Elements	Year 1	Year 2	Year 3	Total
<i>EMR</i>	No transcription (per provider)	provider * \$10,000	provider * \$10,000	provider * \$10,000	
	Support FTE's not needed (pull charts, filling labs results, transferring charges)	FTE * \$21,000	FTE * \$21,000	FTE * \$21,000	
	Increased Capture charges (per provider)(	provider * \$58,000	provider * \$58,000	provider * \$58,000	
	Decreased copy charges - approximately 75% decrease ()				
	Other				
<i>Patient Portal</i>	Increased payments due to portal	\$47 * patient	\$47 * patient	\$47 * patient	
	Collection of portal fee	# of patients * annual portal fee	# of patients * annual portal fee	# of patients * annual portal fee	
	Other				
<i>Additional Software</i>	Automated appointment reminders decreasing no-	Average # of no-shows * 50% reduction * Level 3 charge	Average # of no-shows * 50% reduction * Level 3 charge	Average # of no-shows * 50% reduction * Level 3 charge	
	Other				
<i>Other</i>	Item 1				
	Item 2				
<b>TOTAL BENEFITS</b>		\$ Year 1	\$ Year 2	\$ Year 3	\$ Total Cost
Total Benefits					
Total Costs					
ROI					
Note: ROI = (Total benefits - total costs)/total costs *100					

Soft ROI

Intangible Costs		Rank	Probability (0-5) 0 - 0% likely to occur 5 - 100% likely to occur	Intangible Benefits		Rank	Probability (0-5) 0 - 0% likely to occur 5 - 100% likely to occur
<i>Downtime for staff to learn how to use system</i>				<i>Improved quality of care</i>			
<i>Increased time spent on non-patient care</i>				<i>Scheduling efficiencies</i>			
<i>Unrealistic expectations for patient communications</i>				<i>Specialized treatment issues (DSS)</i>			
<i>Increased time spent responding to patient communications</i>				<i>Improved documentation capabilities</i>			
<i>Increased staff frustrations</i>				<i>Safer care</i>			
<i>Dissatisfaction with results achieved</i>				<i>More effective care</i>			
<i>Unable to meet meaningful use guidelines</i>				<i>Higher levels of staff productivity</i>			
<i>Lower levels of staff productivity</i>				<i>Ease of Use</i>			
<i>Total expended effort - unacceptable levels</i>				<i>Total expended effort - acceptable levels</i>			
<i>Unusable DSS</i>				<i>Satisfaction with results achieved</i>			
<i>Decreased patient satisfaction</i>				<i>Attract high-level talent</i>			
<i>Decreased provider satisfaction</i>				<i>Time savings</i>			
<i>Loss of patients due to electronic systems</i>				<i>Increased provider satisfaction</i>			
<i>Security and data breaches</i>				<i>Increased patient satisfaction</i>			
<i>Development of back-up plans for system downtime</i>				<i>Increased time spent on patient care</i>			
				<i>Increased communication with patient</i>			
				<i>Competitive Edge</i>			
				<i>Lawsuit avoidance</i>			
				<i>Improved medication administration</i>			

Source: (Gary Baldwin, 2009; T. Kuhn, 2009)

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