IMPLEMENTATION GUIDE

QUALITY IMPROVEMENT STRATEGY PT 2

Optimizing Health Information Technology for Patient-Centered Medical Homes

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Introduction

Health information technology (HIT) is the set of sophisticated tools that support the information needs of the workflows within the patient-centered medical home (PCMH). A PCMH is defined by the way healthcare teams interact with their patients, not by technology. Yet modern healthcare depends on the availability of information that loses value rapidly if it cannot be found, is poorly organized, or is incorrect. The technical requirements for supporting the information infrastructure of a PCMH are complex. When a workflow is optimized to improve patient experience and outcomes, or reduce waste, information flow must also be optimized so that the information on which clinical decisions are based is readily available, easy to interpret, current, and accurate. Deploying HIT in alignment with overall PCMH transformation allows practices to optimize technology to best support the workflows of the PCMH.

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Message to Readers

Practices beginning the PCMH transformation journey often have questions about where and how to begin. We recommend that practices start with a self-assessment to understand their current level of "medical homeness" and identify opportunities for improvement. The SNMHI's self-assessment, the Patient-Centered Medical Home Assessment (PCMH-A), is an interactive, self-scoring instrument that can be downloaded, completed, saved, and shared.

The first four key changes are covered in Quality Improvement Strategy Part 1: Tools to Make and Measure Improvement. This Guide addresses the SNMHI key change:

- Optimize use of health information technology (HIT) to meet Meaningful Use (MU) criteria.

For additional information on how HIT supports each Change Concept for Practice Transformation, refer to the relevant health information technology appendix in each Guide:

- Engaged Leadership.
- Quality Improvement Strategy Part 1.
- Empanelment.
- Continuous and Team-Based Healing Relationships.
- Organized, Evidence-Based Care.
- Patient-Centered Interactions.
- Enhanced Access.
- Care Coordination.

Readers are also encouraged to download additional Quality Improvement Strategy materials:

- Quality Improvement Strategy Executive Summary provides a concise description of the Change Concept, its role in PCMH transformation, and key implementation activities and actions.

The Change Concepts for Practice Transformation: A Framework for PCMH

"Change concepts" are general ideas used to stimulate specific, actionable steps that lead to improvement. The Safety Net Medical Home Initiative (SNMHI) established a framework for PCMH transformation to help guide practices through the transformation process. The framework includes eight change concepts in four stages:

- Laying the Foundation: Engaged Leadership and Quality Improvement Strategy.
- Building Relationships: Empanelment and Continuous and Team-Based Healing Relationships.
- Changing Care Delivery: Organized, Evidence-Based Care and Patient-Centered Interactions.
- Reducing Barriers to Care: Enhanced Access and Care Coordination.

The Change Concepts for Practice Transformation have been most extensively tested by the 65 safety net practices that participated in the SNMHI, but they are applicable to a wide range of primary care practice types. The Change Concepts have been adopted by a number of other improvement initiatives, reflecting their generalizability in primary care regardless of patient population or practice structure. The Change Concepts were derived from reviews of the literature and also from discussions with leaders in primary care and quality improvement. They are supported by a comprehensive library of resources and tools that provide detailed descriptions and real examples of transformation strategies. These resources are free and publicly available. To learn more, see the Change Concepts for Practice Transformation.

Key Changes for Quality Improvement Strategy

The eight Change Concepts provide a framework for PCMH transformation. Each change concept includes multiple "key changes." These provide a practice undertaking PCMH transformation with more specific ideas for improvement. Each practice must decide how to implement these key changes in light of their organizational structure and context. The key changes for Quality Improvement Strategy are:

- Choose and use a formal model for quality improvement.
- Establish and monitor metrics to evaluate improvement efforts and outcomes; ensure all staff members understand the metrics for success.
- Obtain feedback from patients/family about their healthcare experience and use this information for quality improvement.
- Ensure that patients, families, providers, and care team members are involved in quality improvement activities. (To learn more, see the Patient-Centered Interactions Implementation Guide.)
- Optimize use of health information technology to meet Meaningful Use criteria.

Quality Improvement and Health Information Technology

Health Information Technology (HIT) is part of the Quality Improvement Strategy Change Concept because quality improvement requires information. HIT can help practices collect, manage, and report data accurately and efficiently, providing care teams with the information they need to improve processes and outcomes.

Federal incentives for meaningful use of electronic health records (EHR) have increased the adoption of HIT dramatically in recent years (see Appendix A: Meaningful Use). While experience suggests that optimized HIT can improve quality and patient safety, solid evidence is still lacking.[1] Yet unless a practice has a plan to leverage the power of HIT to improve the quality and efficiency of its operations, it risks becoming distracted by the complexity of technology and the amount of information it entails.[2] Deploying HIT in alignment with the PCMH Change Concepts for Practice Transformation allows practices to optimize their EHR to support PCMH workflows.

This Guide presents eight core processes that are central to the functioning of a PCMH. These processes are supported by HIT, and if optimized across the organization, can improve quality and help manage cost. Standardization requires assuring that each core process has a clear goal that is aligned with the organization's strategic goals. The workflows and HIT functionality in each core process must be carefully integrated to ensure that the PCMH functions as intended.

The PCMH core processes covered in this Guide are:

1. Scheduling appointments and monitoring access to care.
2. Defining and understanding each provider's patient population and key sub-populations.
3. Defining and tracking care of individual populations and sub-populations including referrals and abnormal lab/imaging results.
4. Providing patient-specific educational material.
5. Providing individual care reminders.
6. Providing an after-visit summary (AVS) with key information at the end of each visit.
7. Maintaining a system of action reports to guide the team's care management activity and a system of outcomes reports for monitoring processes of care and population outcomes.
8. Using technology to optimize communication between patients and their care team, including using a patient portal in the EHR.

For more information on planned care, decision support, and care management, see the Organized, Evidence-Based Care Implementation Guide. For more information on patient-specific educational materials and optimizing communication with patients, see the Patient-Centered Interactions Implementation Guide. For more information on enhancing access to care, see the Enhanced Access Implementation Guide. For more information on tracking patient results and referrals, see the Care Coordination Implementation Guide.

When a workflow is optimized to improve patient experience and outcomes, or reduce waste, information flow must also be optimized so that the information on which clinical decisions are based is readily available, easy to interpret, current, and accurate.

PCMH Workflows

Daily practice operations are made up of workflows—a series of connected steps to accomplish a collective action or goal (e.g., rooming patients). Information in an EHR can be used to measure precisely the things a workflow is intended to accomplish and gauge how well the workflow is meeting the goal (e.g., timeliness, accuracy). This makes it possible to identify and prioritize quality issues that can be addressed through workflow improvements, including how the corresponding information is managed. Accurate monitoring becomes especially important when implementing workflow changes. HIT is also central to care delivery. HIT is the information source for the countless clinical decisions that patients, providers, and their care teams must make.

For each of the core processes, identifying how information moves through workflows is essential. Information movement has four distinct phases. Information is:

1. Gathered and entered into the computer in a format the computer can recognize and use.
2. Presented to a user (member of the care team, patient/care-giver, billing staff, etc.) in a format the user can understand.
3. Used to make a decision. For care teams this usually means giving advice or placing an order for a test, treatment, or referral. For patients, information is used for participating in shared decision-making, self-management of chronic conditions, and making good lifestyle choices to reduce risk.[3]
4. Organized to provide data for measuring quality performance, process efficiency, benchmarking outcomes, and guiding improvement efforts.

Each core process is divided into five sections covering:

- Overview: Background and reason the process is central to a PCMH.
- Process Goals: What the core process is designed to accomplish.
- Workflow Requirements: Effective methods to organize work so the process accomplishes its goal.
- HIT Technical Requirements: HIT tools to manage information on which the workflow depends
- Getting Started Without an EHR: How to operate when HIT is limited. Core processes need to guide HIT optimization, and not wait for HIT to be optimized.

In the following discussion of technical requirements the phrase, "there should be" is intended to highlight a specific technical need, and is not intended to imply that every certified EHR has features that can meet these needs. Even if a technical need is not met, some sort of work-around can usually be devised to provide "a less than ideal, but adequate" low technology level of information to support each PCMH core process.

Core Processes

1. Scheduling Appointments and Monitoring Access to Care

Providing access to care is a core process for a PCMH. When patients do not have timely access to their primary care team they must defer care for a later time, or turn to a different facility. Worse yet, some may choose to forgo care altogether. Deferments result in lost opportunities to provide needed care, compromise continuity, and may result in higher overall costs to the healthcare system. Access to care in the PCMH is based on the assumption that every patient has an assigned primary care provider and care team, and every care team has a panel of patients for whom they are responsible to provide care. In order for care teams to offer adequate access for patients each provider's panel size must be kept below a level at which the predicted demand for care exceeds capacity. For more information on creating patient panels, see the Empanelment Implementation Guide.

Historically, patient needs have been met primarily using office visits with a provider or another care team member. Many practices now also use scheduled telephone visits, ad hoc telephone advice calls, and secure email (asynchronous secure messaging). The scheduling system needs to balance predicted demand for "same day" or "next day" appointments with the need for patients to be able to schedule appointments far into the future and do this using the type of encounter most appropriate for each clinical situation. The goal is to maximize the percent of time a patient is given an encounter with his or her care team of the type and at the time requested while minimizing the percent of unused appointments. An ideal system to optimize access must include a way to monitor demand and supply for each type of visit and a plan to alter supply based on objective measures of demand. To learn more about access to care and measuring supply and demand, see the Enhanced Access Implementation Guide. While payment for some types of clinical encounters is not yet widely available, many PCMH payment demonstrations and pilots have included support for enhanced care coordination and patient outreach services and phone, email, and group visits.

Process Goals

- Assign all patients to a panel. Whenever possible assign patients to the provider and care team of their choice.
- Maintain provider panels at a size so that demand for access does not exceed care team capacity.[4]
- Care teams have multiple ways to provide care for patients in their panels in addition to office visits with the provider. Types of access may include office visits with other care team members such as nurses or medical assistants (appropriate to clinical needs of the patient and with back-up from a provider), scheduled telephone visits with members of the care team, ad hoc telephone advice requests during and after regular office hours, and asynchronous secure messaging.
- Care teams make an effort to meet patients' needs for care at the time requested.
- Whenever possible, patients receive care from the assigned care team.
- Patients who contact the practice via telephone have their needs met (e.g., are offered an appointment, have medication refilled, or receive an answer to a question) the first time they call.

Workflow Requirements

- Assign each patient to the panel of an open care team at initial onboarding. Patients without panel assignment can be assigned to a panel based on an algorithm selected by the practice. At each subsequent visit the scheduler needs to confirm that the chart reflects the patient's choice of care team. Patients who report that their chart doesn't reflect the panel assignment of their choice, or who choose to change panels, need to be given an opportunity to change to a care team whose panel is open. For more information on creating patient panels, see the Empanelment Implementation Guide.

- The expected utilization based on demographic profile needs to be used to estimate expected demand for access in each team's panel. Estimate care team capacity based on size and composition of the care team and standard length of office visits and telephone encounters. Allot sufficient time during the day for the team to respond to ad hoc telephone advice calls and asynchronous secure messaging. A panel needs to be closed when the demand for access exceeds the care team's capacity, or is projected to exceed capacity in the near future (e.g., due to an anticipated loss of a care team member).
- The practice has a mechanism for setting the percent of office visits held for same day appointments (24–48 hours) that may vary by time block and day of the week. Adjust the number of same day appointments as needed based on actual utilization patterns.
- The practice has methods of providing care without the patient being seen in the practice, including scheduled telephone visits with the provider and asynchronous secure messaging.
- There is a mechanism to identify patients with a high chronic disease burden and adjust their predicted demand for access based on their actual utilization history.
- Phone calls are routed to a person who can respond to a caller's request or answer the question on the first call. Patients who call for clinical advice should have their needs met the first time they call, and the care team should be able to monitor performance in meeting this goal (e.g., all calls to the practice are tracked in a database along with the response).

HIT Technical Requirements

- A master demographic table in the electronic database stores information for both the practice management system (PMS) and the EHR. This table includes all of the data elements needed for reporting requirement including race, ethnicity and preferred language. The master demographic table has a field for primary care provider identifying the care team for the patient. This table must be able to be updated from both the PMS and the EHR.
- There is a mechanism to automatically assign a patient to a provider using an algorithm (refer to the Empanelment Implementation Guide for more information), as well a mechanism for changing provider at the patient's request.
- A demand calculator predicts office visit demand and telephone encounters for a panel based on demographic characteristics and if possible chronic illness profile of patients in the panel.
- The demand calculator can be adjusted based on individual patient characteristics including such issues as the need for interpreter services, presence of cognitive impairment, multiple chronic illnesses, social service needs, etc.
- A visual marker signals when a care team's panel is closed.
- An electronic scheduling system with functionality to modify appointment length and type, releases appointments at variable intervals prior to the day of appointment, and allows viewing of appointment availability for different members of the care team on a single screen.
- The number of appointments that are double-booked or left unfilled throughout the week are monitored to evaluate the degree to which a scheduling strategy was successful in matching demand to capacity. The monitoring mechanism should also be able to report on the percent of telephone advice calls from patients in which patients' needs were addressed the first time they called.

- The staff member responsible for answering the team's clinical advice calls (e.g., an RN) has immediate access to patients' clinical records, consultation with other care team members, clinical decision support and a telephone system capable of automatically routing calls to a backup line should the first person be unable to take the call.

Getting Started Without an EHR

- A PMS can be used to assign patients to the panels, and spreadsheet programs are well designed to adjust panel size for age/sex, estimate demand for appointments and match appointment capacity with predicted demand.
- If available, the PMS master demographic table is used to record PCP. If not, an electronic spreadsheet on a computer at the check-in area can be used to maintain a list of all patients with birth date, gender, and assigned provider.
- The algorithm for initial empanelment can use billing data for initial provider assignment, and front desk workflow includes updating the spreadsheet according to patient preference with each visit.
- Protocols for determining a care team's capacity will be limited to office visits, telephone visits, and nursing or medical assistant visits.
- Ability to monitor and adjust panel size, as well as percent of same day appointments, may require more work and be less precise than with an EHR and/or PMS. However, measures of time to next available appointment and demand for same day appointments can still be used to adjust the schedule templates, and close the practice to new patients when necessary.
- Incoming calls for clinical advice are routed to a person capable of answering the question on the first call. It is challenging to make the paper chart available to the provider taking advice calls without an EHR.

2. Defining and Understanding Each Primary Care Provider's Patient Population and Key Demographic Sub-Populations

Defining and understanding a provider's patient population and key sub-populations provides the denominators used for all panel-specific clinical quality measures. Without a clear definition of the panel and sub-populations within the panel, it is impossible to know how well a care team is meeting the health needs of the panel. In order to allocate resources required to adequately manage needs of a population, a practice must understand panel make-up. The needs of different populations vary in predictable ways ranging from how educational material should be presented or how much time is required for office visits, to the prevalence of different risk factors and medical conditions.[5]

A standard way to describe a patient panel is through demographic variables. In addition to age and gender the federal meaningful use requirements for documenting race, ethnicity, and preferred language are intended to help practices identify and address disparities in quality of care. However, official federal dataset requirements may miss socio-economic status and education level, two of the most powerful predictors of health status that a practice may want to track as well.

Process Goals

- Each care team receives periodic reports on their panel showing a demographic profile that includes federally required descriptors: age, gender, preferred language, race and ethnicity.
- Demographic information is used to develop strategies for optimizing access to care and health information using the patient's preferred language when possible.
- Information on preferred language is used to adjust projected length of visit in calculating the capacity for office visits due to additional time and effort required to deliver care via interpreter services.

Workflow Requirements

- The practice has a standardized workflow to ensure that patients are able to view and confirm or update demographic information.
- The practice has a standardized workflow to ensure key clinical variables used to define sub-populations are accurate and up to date. Key clinical variables include provider, problem list, medication list, allergy list, smoking status and vital signs including height and weight.
- Providers and care teams review demographic composition of their panel at regular intervals.
- Utilization patterns based on panel demographics are evaluated periodically. The results are used to modify demand for access projections and plan resource allocation.
- Care teams make a reasonable effort to ensure that translation services and patient information materials are available for the most prevalent preferred languages for patients in their panels.

HIT Technical Requirements

- The EHR has appropriate fields for entry of structured demographic data including preferred language, gender, race, ethnicity, and date of birth.
- The EHR allows non-provider care team members to edit data fields for key clinical variables including problem list, medication list, allergy list, vital signs, and smoking status so that non-provider team members can fully participate in optimized workflow and information flow.
- Patients are able to easily view their demographic and clinical data in the EHR to identify errors.
- A demographic report is run periodically showing providers and care teams a profile of their practice.
- Utilization reports are set up to help care teams understand their panel's resource use patterns.
- There is a way to store, quickly locate, and print patient education materials in multiple languages.

Getting Started Without an EHR

- Lists of patients in a practice can be derived from the panel's master list that is maintained for managing demand for care. Panel lists of patients maintained in spreadsheets should be set up to include demographic variables such as race, ethnicity, and language.
- Care teams review the demographic profiles of their panels periodically to ensure they are making an adequate effort to meet specific needs of patients by improving the cultural competency and language skills of teams.
- In the absence of an EHR, encounter diagnoses from billing data can be used to identify the most common diagnoses for which patients in the panel are seen.



3. Defining and Tracking Care of Individual Populations and Sub-Populations Including Referrals and Abnormal Lab/Imaging Results

Defining and tracking the care of populations and sub-populations is a core process. Many evidence-based interventions depend on population tracking, for example:

- Preventive interventions for populations (e.g., immunizations and cancer screening).
- Chronic disease management interventions for subpopulations (e.g., HbA1c monitoring in diabetes).
- Identifying populations with special needs.

Many evidence-based interventions must be tracked over long time intervals and can be easy to overlook.

Tracking referrals, imaging orders, and laboratory test results is a core process because poorly coordinated referrals and lost or delayed results lead to poor patient care experience and waste of resources. This core process can become a patient safety issue with serious quality and cost implications. Poorly coordinated referrals, laboratory tests, and imaging represent a major cause of waste in healthcare either when an order is not carried out, or when an order does not come back to the ordering provider, requiring the care team to track it down.[6] The order and referral process itself is complex enough that a provider's order may be routed to the wrong place, contain some minor error, or for other reasons get lost during the many hand-offs in the workflow. An order for a test or referral being placed does not mean that it will be received, the patient will be scheduled, the test or referral will happen, or the result of that test or referral will necessarily return to the ordering provider. This is especially important as most patients leave an encounter remembering only a fraction of what was discussed and often poorly understand what is required of them to follow through on tests and referrals.[7] The workflow must be prepared to compensate for patient memory issues.

Providers order many referrals and tests each day in a primary care practice. Usual workflows, in which test and referral results are routed to the ordering provider use the result itself as the visual cue for reviewing the result in the clinical context in which it was ordered. If no result comes back, either because the test or referral was never done or the result was lost, there is seldom a mechanism in place to notify the ordering provider. Patients may fail to have a test performed for a wide array of reasons, and the team must develop a process to triage non-resulted orders by level of importance to determine how they should be handled.

- **First category: High importance.** Examples of these include tests ordered in potentially emergency situations such as an ultrasound for suspected tubal pregnancy, follow-up on certain test results such as abnormal Pap smears or chest x-rays, blood tests to monitor medications to ensure that blood levels are in the therapeutic range, or to detect adverse medication reactions.
- **Second category: The care team deems a test important, but the patient has decided not to do it.** Examples of this would include evidence-based cancer screening for average-risk patients. Patient preference always trumps guidelines,[8] yet a balance must be struck. Often if a care team can determine the reason the patient has decided to not carry through with a necessary test, a solution can be found that will allow the patient to overcome barriers such as financial issues, transportation or scheduling problems, and poor understanding of the reason the test was ordered.
- **Third category: The result is not important enough to warrant pursuing.** These typically occur because the condition that led the provider to order the test has been resolved. This last category still requires following up with the patient to verify that the test is no longer worth doing and should be cancelled.

The more involved patients are in the process of monitoring the need for evidence-based preventive interventions and tracking orders, the less likely the results are to be lost or forgotten. If patients expect to receive results of tests and consultations and understand their meaning, they can notify the practice when they do not receive the result. In addition, patients can be instructed to notify their care team if they are unable to schedule the test/consultation, or if they decide to not have it done.

Process Goals

- Maintain up-to-date and accurate problem lists and medications lists on every patient in the panel, which can be used to quickly identify patients who are members of sub-populations.
- Care teams and patients clearly understand evidence-based protocols for preventive care and chronic disease management in high priority sub-populations.
- Patients are provided with timely results of tests and consultations.
- All orders for tests and referrals are entered into the EHR at the point-of-care using computerized provider order entry (CPOE).
- All imaging and referral results are incorporated into a certified EHR as structured data in a system in which each result is attached to the corresponding order.
- All overdue tests are resolved by taking steps to ensure that the test is done, documenting that the patient decided to not have the test done, or cancelling the order if the result is no longer needed.
- Care teams track patients with abnormal results for selected laboratory tests or imaging results to ensure that patients receive standardized follow up care.
- All patients receive an AVS, including tests and referrals ordered as well as expectations for when the patient will receive results of tests or referrals. If tests or referrals are ordered for which tracking processes are in place, the AVS includes the date by which the patients should expect to receive the results.

Workflow Requirements

- Each care team has a huddle at the start of each day to review patients on the schedule for the day. The care team can use the huddle to identify gaps in evidence-based preventive care and chronic disease monitoring protocols for each patient on the schedule and make a plan to close gaps during the visit.
- A pre-visit process (such as a pre-visit summary) shows each patient the gaps in the evidence-based guidelines pertaining to them, and prompts patients to discuss a plan to close those gaps during their visit with the care team.
- Each care team has a process to validate the medication list with each patient at each visit to ensure information is up to date and correct.
- Each care team has a process to review the problem list with each patient at each visit to identify problems that may be missing from the list or remove duplicate entries that can be consolidated into a single diagnosis and problems that have resolved.
- There is a process independent of office visits to identify patients in the panel with care gaps in evidence-based preventive guidelines or chronic disease management guidelines and contact patients as part of a plan to close gaps.
- Standardized workflows are in place to ensure that all orders are entered using CPOE.
- Standardized workflows are in place to ensure that patients receive a copy of test results and consultation reports subject to the discretion of the primary care provider.
- Standardized workflows are in place to ensure that all resulted orders are incorporated in the EHR as structured data.
- Care teams have a workflow for reliably informing patients about test results and referrals.
- All referrals, laboratory tests, and imaging results are tracked using a standardized process. This process includes establishing the time interval after which a result is designated as “overdue” and a process for responding appropriately to each overdue test or referral.
- A standardized procedure is in place to identify high-priority abnormal test results requiring a follow-up plan.

HIT Technical Requirements

- A dashboard view of each patient's chart is available showing, at a minimum, problem list, medication list, and any overdue evidence-based preventive interventions for that patient.
- Non-provider members of the care team can modify the medication list and the problem list using an established protocol with provider oversight.
- For each priority sub-population that care teams actively manage there is a patient-level dashboard or flow sheet view of evidence-based interventions to easily identify care gaps.
- CPOE is operational and required for all orders.
- Non-provider care team members can place and pend orders, leaving them for the provider to sign.
- All results for orders, including referrals, are entered into the EHR associated with the corresponding order.
- The EHR indentifies overdue results. This functionality needs to be able to route overdue result alerts to the most appropriate care team member.
- The care team gives each patient an after-visit summary (AVS) including a list of tests and referrals ordered during the visit. The AVS needs to include the date by which results will be considered overdue, with instructions to contact the care team if they are unable to schedule a test or referral, or decide not to have it done.
- The EHR has a patient portal through which results and the AVS can be released to patients. The ordering provider can attach a comment explaining the significance of the result to the patient. If a letter is used to release results to patients, the ordering provider is able to easily include text explaining the significance of the results to the patient.

Getting Started Without an EHR

- Tracking of referral, laboratory, and imaging orders is done in workflows supported by information technology. In the absence of technology, workflows can accomplish the same goal supported with workarounds. Workarounds tend to be labor intensive, error prone, and expensive so it may be necessary to limit result tracking to the highest priority orders.
- Start by identifying a small number of high priority orders and develop a workflow to track them, e.g., cervical cancer screening in which all Pap smears are tracked using a paper or electronic spreadsheet. Providers must determine a date for follow-up of Pap smears with abnormal results.
- Care teams agree on the workflow steps and information requirements at each step. The team determines who is the best team member to perform each of the steps using the principle that clinical decisions need to be made by primary care providers and patients, while other team members (all working at the top of their licensure) need to gather, organize, and manage the delivery of information.
- Care teams have a list of high priority referrals, tests, and imaging results that they track, and they develop workflows and information requirements for tracking these orders. Even if it is beyond the capacity of the team to track more than one or two orders, it is useful to establish corresponding workflows and plan how to implement them once more advanced information management tools become available.

4. Providing Patient-Specific Educational Material

PCMH and related payment models (e.g., Accountable Care Organizations) typically factor patient health outcomes into base or incentive payments. Patients have control over most of the factors that determine health outcomes for chronic diseases such as diet, exercise, smoking, and medication use. Patients who understand their health conditions are more likely to use healthcare services appropriately. When patients are actively engaged in managing their health, evidence suggests that they require fewer resources and have better outcomes when compared to those who are not actively engaged.[9] For more information on patient-specific educational materials and optimizing communication with patients, see the Patient-Centered Interactions Implementation Guide. Self-management is particularly important in chronic conditions in which outcomes depend on adhering to evidence-based guidelines for therapy and monitoring for complications. Educational materials should be designed to support a range of self-management support strategies.[10]

There are many patient education literature services available as "after-market products" offering integrated content material for EHRs. Most EHR vendors stay out of clinical content, but EHRs make it easy for users to operate an "add-on" educational literature service within the EHR environment. Unless a practice has developed a significant amount of specialized educational material for its population, it may make sense to buy a product that can print condition-specific educational material rather than try to create it. The challenge is to find educational material written at an appropriate educational level, in a language appropriate for the population, granular enough to really be "patient-specific," and that will cross-reference sections of an encounter to suggest material for the patient based on an encounter diagnosis.

Process Goals

- Patients are offered educational material relevant to their specific heath care needs upon request or on an "as needed" basis determined by the primary care provider.
- There is a way for patients capable of accessing their healthcare records electronically to search for educational material from a source that the practice has deemed credible and reliable.
- The patient portal allows patients to search for information pertinent to their needs.

Workflow Requirements

- A standardized process is in place to offer patients information at the end of each visit based on their diagnosis.
- Care teams have a mechanism for printing patient-specific educational material for patients during encounters. Patients have a choice as to whether they wish to receive printed material before leaving the office or view it online through the portal.
- Patients receive instructions on how to use the patient portal to explore web-based patient education material.

Patient-specific educational materials help support patients and families in understanding how to fully participate in managing their own health conditions.

HIT Technical Requirements

- The EHR contains a searchable electronic library in which any care team member can cross-reference encounter diagnoses and suggest possible educational material to print for patients.
- The printer location supports a workflow where a care team member can conveniently print patient educational material for the patient before he or she leaves the care setting.
- The EHR includes a structured or searchable field that can be used to document whether educational material was given to the patient. This could include placing an order for educational material in the chart, documenting a link in the progress note to the material received, or incorporating the education material text into the AVS so that it becomes part of the medical record.
- The patient portal allows patients access to a library of patient education materials. This functionality references the patient's problem-list entries and encounter diagnoses, and it offers the patient suggestions for educational material.

Getting Started Without an EHR

Providers have been giving educational pamphlets to patients on an ad hoc basis for years. Although an EHR may make this process easier, the task of providing patient-specific educational materials does not require an EHR. Rather, it requires a way to ensure the material is offered consistently and is patient-specific.

- The care team identifies the clinical topic of greatest importance for the visit for each patient.
- The care team identifies an electronic source of patient education material appropriate to meet the needs of their patient population. If the patient does not have access to electronic tools/databases, the care team provides written information.
- The care team designs and tests a workflow to ensure that relevant educational material is offered to every patient seen in the practice.



5. Providing Patient Care Reminders

Many of the outcomes by which quality is measured are based on evidence-based interventions carried out over long time intervals that can be easily forgotten (e.g., immunizations, Pap testing). Patients who receive interventions on schedule are at lower risk for costly avoidable illness. Providing timely preventive and chronic care services helps ensure the financial health of the practice. These services provide predictable revenue and positively contribute to healthy outcomes, which is increasingly being rewarded by payers. Clinical reminders have been shown to improve clinical outcomes for preventive services and routine follow-up for chronic conditions.[11] Reminders for preventive care can be designed to follow evidence-based guidelines for screening intervals based on age and gender. For some conditions (e.g., colorectal cancer screening) the screening interval must be individualized according to the patient's level of risk.

There is little evidence on which to base office visit follow-up intervals for most acute and chronic conditions. As a consequence, practice follow-up intervals vary widely for most conditions.[12] A system to send patients electronic follow-up reminders can be set up if providers designate a requested follow-up interval as structured data in the chart at the end of each visit. This entry can then be used to identify patients for whom the follow-up interval has elapsed without a visit or scheduled future visit.

Reminders are most effective when delivered at the right time; a moment when the patient is able to act on the information provided in the reminder.

For more information on planned care, see the Organized, Evidence-Based Care Implementation Guide. Care reminders can take the form of a "pre-visit summary" (PVS) involving the patient in their own care by giving them an overview of clinical status highlighting gaps between information in their chart and recommended evidence-based guidelines for preventive and chronic illness. The PVS serves as a care reminder not only for the patient, but if reviewed with a care team member, also acts as a prompt to update the chart with new information and place orders for overdue interventions during the visit. This type of communication improves the chance that preventive and chronic care monitoring issues are addressed while the patient is in the clinic, even if those topics are not the main reason for the visit.

Process Goals

- Patients receive reminders about care for which they may be overdue while in the office so they can help their care team remember to offer them recommended services.
- Every patient leaves the office with a follow-up interval entered as structured data in the EHR.
- Patients who do not return within the designated follow-up interval and have no future visit scheduled within a reasonable period of time are reviewed and contacted if clinically appropriate.
- Care teams send patients age- and gender-appropriate preventive test reminders at agreed upon times, such as birthdays, for preventive activities for which they are overdue according to information in the EHR.
- Patients with specified chronic illnesses receive reminders to schedule a visit if they have not been seen within a predetermined time interval and have no future visit scheduled.

Workflow Requirements

- There is a process for determining the preventive and chronic disease management activities for which the clinical team will send reminders to patients as well as the wording of the care reminders that patients receive.
- A standardized workflow is used for care teams to update information about preventive and chronic illness management activities at each visit. This workflow needs to include the patient. Every patient upon arrival at the clinic might receive a summary of preventive and chronic illness interventions for which his or her EHR record is not up to date. There is a standardized workflow to ensure that additional information the patient may have on preventive and chronic illness interventions is entered into the chart, and that patients are offered preventive and chronic illness interventions for which they are due.
- A process exists for documenting in the chart, as structured data, each patient's preferred method of receiving clinical reminders.
- A process exists to ensure that every visit ends with a follow-up plan documented in the chart.
- A standardized process is in place to send reminder letters, automated phone calls, or electronic messaging to patients (depending on patient preference).

HIT Technical Requirements

- Computerized provider order entry (CPOE) is used for all orders.
- All preventive measures, including immunizations and evidence-based screening tests (and those done in other settings), are entered into the EHR as structured data. If this cannot be accomplished via direct data interface, it is recommended to develop a data entry workaround until an interface can be implemented.
- There is a field in the EHR in which each patient's preferred method for receiving care reminders can be documented as structured data.
- There is a way for patients to review care reminders upon arrival for an office visit. If the workflow involves giving patients a paper copy of information from their records in the form of a PVS, there needs to be a simple mechanism to quickly print the PVS when the patent arrives. There also needs to be an easy way to ensure that the pre-visit summaries are disposed of in a way that does not risk the patient inadvertently leaving them behind.
- A clinical decision support intervention automatically produces patient care reminders based on structured data in the patient's chart.
- A field exists for providers to enter follow-up interval as structured data.
- A clinical decision support intervention identifies patients who have not been seen within the follow-up interval and have no future scheduled appointment. There needs to be a mechanism for care teams to easily contact these patients using the patient's preferred communication method as documented in the EHR.

Getting Started Without an EHR

There are many ways to remind patients, such as mail and phone calls. The workflow to send reminders to patients requires reminder content, a workflow that defines whose job it is to send the reminder, and information prompting that person when and to whom to send the reminder.

- Birth dates and gender, both available in practice management system, can be used to determine which patients need to be sent reminders for well exams and adult screening tests such as mammograms, colonoscopies or others.
- For follow-up visits, care teams can develop workflows in which every patient leaves with a follow-up appointment, even if the date is a year or more in the future for a well exam. For years offices have maintained paper card systems as "tickler files." These systems are labor intensive, but like all work-around activity they can accomplish the process goals.
  When the follow-up date draws near, the office needs to contact the patient to confirm or reschedule the visit. Once an EHR is installed, this labor-intensive system can be abandoned.

6. Providing an After-Visit Summary (AVS) with Key Information at Each Visit

The AVS helps patients remember information they need in making important healthcare decisions and managing their own care. Research has shown that patients remember only a fraction of what was discussed in an office visit after they leave.[13] Written summaries of what was discussed have been shown to help patients remember visit content and convey the health plan to family members. The AVS is also an opportunity for patients to review information in their chart and in so doing identify errors that the care team might miss. For more information on patient-centered communication, see the Patient-Centered Interactions Implementation Guide.

The key elements of an AVS include:

- Demographic information.
- Diagnoses.
- Tests and referrals ordered.
- Phone numbers for scheduling referrals or follow-up.
- Problem list.
- Medications ordered, discontinued, or changed.
- Current medication list.
- Allergy list.
- Current status of preventive and chronic disease measures including those that are due.

In addition, there needs to be a place for specific instructions the provider may have for the patient. It is important to get input from patients in designing the AVS because physicians and other care team members often have difficulty knowing the format that will be easiest for patients to understand.[14]

Process Goals

- A care team member reviews the AVS with each patient at the end of the visit.
- Patients are given a choice whether to receive a paper copy of the AVS or access it through their patient portal.

Workflow Requirements

- The office visit workflow includes a standard process to ensure that someone on the care team updates EHR information including demographics, preferred method of communication, problem list, medication and allergy lists, and status of preventive and chronic illness measures at the start of each visit. During the visit with the provider, data are captured for diagnoses, tests and referrals ordered and necessary phone numbers to schedule them. Also recorded are medications ordered, discontinued, or changed; a final medication list; any specific instructions; and a follow up interval.
- The AVS is printable with the click of a button at the end of an office visit.
- Providers include a statement in the AVS explaining the diagnosis, what it means to the patient, and what the patient needs to do.
- The end of visit workflow allows time for the patient to review the AVS on the computer screen with a care team member, or (for those choose to receive a paper copy) leave with with a printed AVS.
- The percentage of office visits in which an AVS is completed for the patient should be tracked.



HIT Technical Requirements

- The AVS can pull EHR data from the problem list, encounter diagnoses, tests, referrals ordered and how to schedule them, medications ordered, discontinued or changed, current medication list, allergy list, current status for preventive measures including those measures that are due and follow up plan.
- There is a place for specific instructions discussed in the course of the visit. The arrangement and formatting of data elements are flexible enough to modify the AVS based on patient input.
- Information entered in the EHR, including text instructions, during an office visit can be printed in the AVS at the end of the visit before the office encounter is closed.
- Printers are conveniently located so that patients can be given their AVS before they leave the practice.
- A report shows the percentage of office visits for which an AVS was created.

Getting Started Without an EHR

In the absence of an EHR, giving patients a copy of the information to be included in an AVS without asking the provider to create a second progress note can be challenging. The most important information to include in a written reminder is:

- Current medication list including changes in medications made during the visit.
- A brief narrative by the provider stating, "Here's what you have, here's what it means, here's what you do." Some paper charting systems make it easy to give patients a copy of visit information by using a progress note form with a duplicate copy that can be torn off and given to the patient.

7. Using Action Reports to Guide Team Care Management Activity and Outcomes Reports to Monitor Processes of Care and Population Outcomes

In most settings, a relatively small percentage of the general population is responsible for the majority of healthcare costs due to a disproportionate burden of chronic disease. Current evidence shows that population management of people with common chronic conditions, in accordance with evidence-based guidelines, can reduce morbidity and the cost of care. Specifically, self-management support, prevention, and early recognition and intervention to treat complications have been shown to be effective.[15, 16]

The first task in creating registry functionality within an EHR is to define the population to be monitored. Some sub-populations, such as those for whom cancer screening is recommended, will be defined by demographic variables including age, gender, or family history. Other sub-populations, based on the presence of chronic conditions, require regular monitoring and standardized interventions to help prevent, recognize, and manage complications. Practice leadership must prioritize populations for tracking and determine a care team's capacity for tracking multiple sub-populations.[17] For more information on care management, see the Organized, Evidence-Based Care Implementation Guide.

Many chronic illnesses can be defined for data purposes as having a diagnosis on a patient's problem list. Problem lists have the advantage of functioning as on-off switches for inclusion in a key sub-population. If diabetes is on the problem list, the patient is included in the population with diabetes. If diabetes is not on the problem list, the patient is not included. This requires that the team maintain accurate patient problem lists, updating them at each visit or more frequently if needed.

Other sub-populations, such as patients requiring anticoagulation management, cannot be defined by a single entry on a problem list. These situations require a more complex set of rules (e.g., patients with one of several problem list entries, an active prescription for Warfarin, and a standing laboratory order for International Normalized Ratio (INR) testing). In this situation a patient taking Warfarin but being managed in a specialty practice or anticoagulation clinic will not be on the list because the laboratory order is missing. A patient no longer taking the anticoagulant can be removed from the problem list by discontinuing the prescription or cancelling the standing order for testing.

Any system for identifying members of a sub-population will contain errors, resulting in patients who should be included being omitted from the patient list and vice versa. This will happen if a patient with diabetes has no entry for diabetes on the problem list, or was falsely diagnosed with diabetes on the basis of a laboratory error. It is advisable to create a "complementary report" to identify patients who are likely to have the target condition based on other clinical criteria, but are not included in the sub-population patient list. A review of the chart by someone on the care team is usually sufficient to find and correct the source of error. Once the sub-population is defined there are several situations that may require different information management tools for tracking.

- Individuals overdue for a specific recommended intervention, (e.g., patients with diabetes overdue for HbA1c monitoring, need to be identified so the intervention can be ordered.
- Individuals with abnormal tests requiring a change in management, (e.g., patients with an HbA1c above an acceptable level, need to be identified so that their care plan can be modified accordingly).

The format of the action report and the frequency at which it is run will depend on the workflow that the information is designed to support. If the report is to be used by a population management nurse to contact patients to come in for a test, the person who will use the report needs to be included in deciding what information is in the report (e.g., preferred method of contact, e-mail address, phone number) and how often the reports are run (e.g., weekly, monthly, quarterly).

Process Goals

- The organization focuses resources on programs to monitor and manage high-priority sub-populations.
- A program ensures registry functionality for care teams to monitor and manage high priority sub-populations, including a list of which patients in the care team panel belong to each sub-population, and action reports that identify care gaps for every patient in the sub-population.
- Patients belonging to priority sub-populations for whom there is a gap between the evidence-based care guideline and care received are contacted. Every effort is made to close the care gap. Clinical outcomes for each of the high priority sub-population are monitored to assess the practice's effectiveness in managing sub-populations.

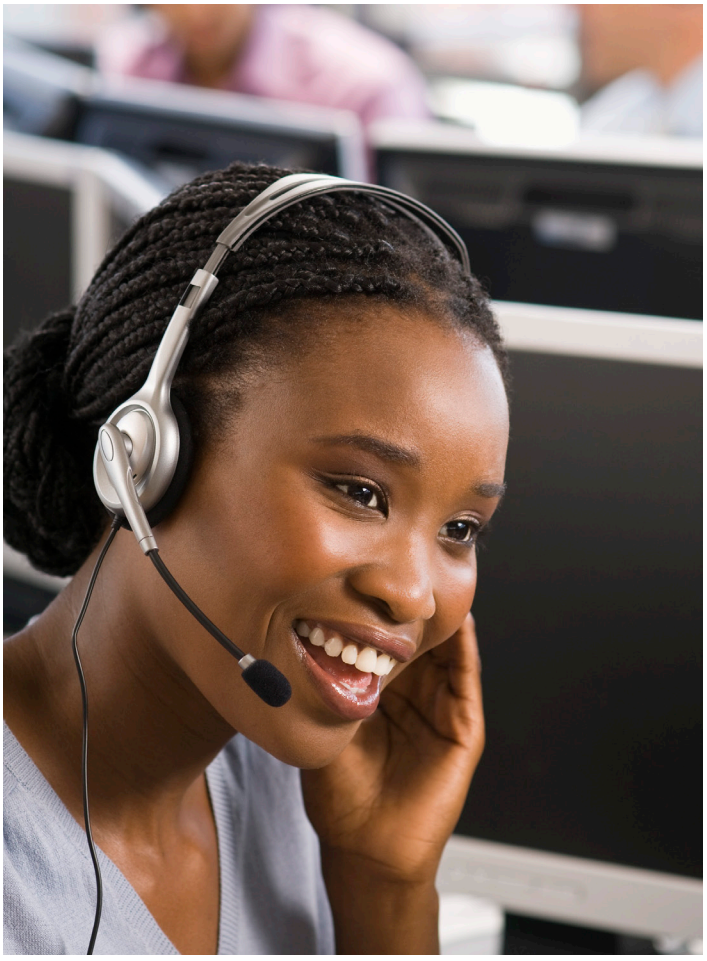
Workflow Requirements

- Leadership has a process to periodically review priorities for managing sub-populations so that efforts of the care teams remain aligned with the organization's evolving strategic priorities.
- Workflows to maintain accuracy of patients' empanelment, problem lists, and the medication lists must be standardized before efforts to manage sub-populations at a panel level can be effective.
- Workflows to manage sub-populations need to be determined before the action reports to support them are created so that the reports can be optimized for the person(s) doing the work.
- Action reports are carefully validated, including creating complimentary reports to identify patients missing from the list who should be included as members of the sub-population to be monitored.
- Action reports are run at intervals determined by the needs of the workflow(s) they support.
- A set of outcome reports for key parameters of each priority population are used to monitor effectiveness of the workflows. Outcome reports are run at defined intervals and allow comparison of outcomes between care teams.
- The practice has a defined process to modify workflows to improve outcomes for care teams with significant gaps in quality.



HIT Technical Requirements

- It is advisable to have a separate reporting database from the production EHR environment, which allows clinical quality reports to be run without interfering with the performance of the EHR for patient care. If a separate reporting database is not available, reports will have to be run at times when providers are not using the EHR.
- A set of action reports needs to be set up for each priority sub-population. These can be run at defined intervals for each care team to show which patients in the population need to be contacted for monitoring or have their care plan adjusted to close quality gaps.
- A set of outcome reports for each priority population can be run at defined intervals for each care team.



Getting Started Without an EHR

Population management requires technology. For years, innovative practices used stand-alone registries (electronic spreadsheets or relational databases), which often had better reporting functionality for monitoring care processes and population outcomes than the EHRs that replaced them. A practice without an EHR can go a long way with population management of a single disease by using an electronic spreadsheet. However stand-alone registries require data entry outside the clinical care workflow and are difficult to scale to multiple diseases. Still, a practice will learn a tremendous amount about the principles and workflows involved in population management with a disease like diabetes. Setting up a registry and getting started while waiting for the EHR makes sense. Workflows optimized to manage sub-populations using registries may require adjustment once data from the EHR are available to support them.

One of the major challenges for population management using a stand-alone registry is assuring that all of the patients with the chronic condition in question are actually in the registry. Once a practice installs an EHR, they at some point will need to switch to registry functionality within the EHR and retire the registry because double entry is unsustainable and prone to inaccuracy. In switching from a registry to EHR reports that offer registry functionality, it is common for outcome metrics to change. Patients are uncovered who are actually members of the sub-population but were never added to the registry and were not being managed. Experience gained with a single disease using a registry can be quickly scaled to other conditions by using EHR data to run outcome reports to measure overall performance and action reports to close care gaps for individual patients.

8. Using Technology to Optimize Patient/Care Team Communication Including a Patient Portal into the EHR

Patient activation is one the strongest determinants of success in managing chronic illness. Patients with access to their own health information are more likely to understand their illness, particularly the facets they can control such as diet, and they can take greater responsibility in managing their own conditions.[18] For more information on patient activation, communication, and self-management, see the Patient-Centered Interactions Implementation Guide.

Care team members must understand basic principles of identity management and privacy and security. Once they are comfortable sharing protected health information with patients, they can explain to patients how the EHR patient portal works, including patients' responsibility in protecting their own privacy. Basic principles include:

- Patient identity is validated in person at the front desk when patients come into the practice using one piece of government-issued picture ID.
- The front desk gives patients a packet containing a user name and temporary password, the URL for the website, written instructions on how to use the patient portal, and a user agreement for the patient to read. The front desk sets the patient's chart to accept the user name and temporary password for a limited time frame.
- From a remote computer at home or work (or a kiosk in the clinic waiting room), the patient logs into the URL, enters the username and temporary password, accepts the use agreement, and answers a set of shared secrets to verify his or her identity (e.g., name of first pet, mother's maiden name). After that, the patient will reset his or her password, enter a valid email address, and have access to the secure environment inside the EHR firewall.
- All transactions take place inside the EHR firewall. If the provider has a message for the patient such as a test result, the patient will receive a "You've got mail" email message, but can see protected health information only after logging into the secure web portal. The only way protected health information can leave the HIPAA protected secure environment of the EHR is for the patient to copy and paste it into a private document. Once the information leaves the firewall, HIPAA laws no longer apply and the patient, not the care team, is responsible for how it is shared.

The telephone is also an important way for patients and the care team to communicate. Telephones are used for brief follow-ups, requests for appointments, requests to renew prescriptions, and ad hoc requests for clinical advice. The most important principle in managing telephone communication with patients is to avoid playing phone tag, which wastes valuable clinic resources and frustrates patients. Ways to minimize phone tag include:

- A call router for in-coming calls separates advice calls from less time sensitive calls and connects patients with staff members associated with the patient's care team who are able to answer the patient's question on the first call. Requests for prescription reorders need to be left on voice mail and requests for appointments can be routed to a call center.
- A person with clinical skills (e.g., RN) associated with the patient's care team should be assigned to answer clinical advice calls so that non-clinical staff do not risk working beyond their scope of practice and the caller can receive an answer on the first call. Some clinics find that the majority of advice calls occur during the first hour of each day, and it can be worthwhile to have one or more providers on the team available to answer calls during those times. Call routers can be used to ensure advice calls are routed to a "hunt group" of clinical staff able to answer advice calls, perhaps on other care teams or even in other clinics if the first person to whom the call is directed is busy.

- Planned telephone visits need to be scheduled like office visits. The provider calls the patient at the appointed time with an open EHR.[19] Scheduling telephone visits at the start of clinic time blocks can minimize the chance a provider will be running late and keep the patient waiting for a call.

Process Goals

- The organization maximizes the percent of patients using the portal by helping all patients understand its value to them and their care teams, as well as the best practices for protecting privacy and security.
- All clinic personnel are required when hired and on a yearly basis to read, understand, and agree to comply with standard privacy and security policies pertaining to healthcare including sharing information with patients through a portal.
- Patients are given information in a language they can understand explaining how their privacy and the security of their health information is protected.
- Providers use the electronic portal as the primary way to communicate with patients who have access to it, including giving patients test and referral results. Patients need to understand that asynchronous communications is not appropriate for communicating with their care team during medical emergencies.
- Each provider has access to a report showing the percentage of his/her patients authenticated for access to the EHR patient portal.
- The clinic sets up a system to ensure that clinical advice calls are answered the first time a patient calls.
- Providers are encouraged to deliver care using telephone visits that are deemed clinically appropriate.

Workflow Requirements

- Each time a patient interacts with his or her care team a team member makes sure the patient has been given access to the patient portal. Those who have not done so are encouraged to complete the process. Patients are told that using the patient portal makes timely communication easier.
- Every care team member receives training including scripting on how to explain privacy and security issues related to the patient portal to patients.
- Care teams have a process in place for reviewing and releasing test and referral results to the patient through the patient portal.
- There is a process in place to properly route incoming communication from patients via the patient portal to ensure patients receive timely responses to requests for appointments, medication reorders, and clinical advice.
- Care teams receive periodic reports on the number of asynchronous secure messaging encounters they process as well as some measure of service quality such as average time to send the first response.
- Care teams develop workflows designed to maximize the probability that patients' phone calls for clinical advice will be answered the first time the patient calls.
- Care teams receive feedback on the percent of clinical advice telephone calls answered the first time the patient calls.
- Care teams develop workflows to identify patients for whom telephone follow-up visits are appropriate and a mechanism for scheduling telephone visits.

HIT Technical Requirements

- The EHR has a patient portal that allows patients to log on using a password to enter the secure EHR environment and view portions of their charts.
- Care teams are able to easily tell by looking at a chart if a patient's portal access has been activated.
- There is a service to answer patients' questions about using the patient portal, including resetting lost passwords.
- The provider is able to send custom messages to patients via the secure patient portal, and also order additional tests and referrals from within an electronic message encounter.
- The EHR has the capacity to report a range of statistical measures related to use of the asynchronous secure messaging system including number of medications reordered, number of message encounters per patient, and the number of exchanges via the portal associated with each patient encounter.
- The clinic has routing technology on its telephones enabling patients to route their call appropriately to best meet their needs.
- The person answering clinical advice calls has real-time access to patients' health records, decision support, and the clinical care team.
- Unanswered advice calls are routed to a "hunt group" to increase the probability they will be answered on the first call.
- Providers' EHR schedules include an appointment type for telephone encounter.

Getting Started Without an EHR

Without an EHR, there is little a practice can do to optimize information sharing with patients through a patient portal. Still, there are ways to prepare care teams and patients for when this technology is available.

- A practice begins to gather and store information on their patients' preferred methods for communication including percent and demographic profile of panel members comfortable using the Internet. Many patients use cell phones with Short Message Service (SMS), also known as text messaging, which is widely used for healthcare related communication in other countries.
- By experimenting with scheduled telephone visits, a practice can begin to learn how to use different media for communication and understand the limits of providing care and advice remotely. This will make it easier for the team to transition to asynchronous secure messaging once an EHR with a patient portal becomes available.

Conclusion

In this Implementation Guide, we have examined eight core processes that support the PCMH. Each of these processes represents an essential part of the work that a practice must perform to provide comprehensive, coordinated, and continuous care. The technical requirements for supporting the information infrastructure of a PCMH are complex. By using the framework presented in this guide you will be able to more easily recognize new technical requirements as policies and procedures change. Finally, it is important to point out that although all of the technical requirements presented in this guide are currently available in EHRs on the market today, it should not be assumed that all meaningful use certified EHRs meet all requirements for supporting a PCMH. Practices considering an information system must perform a rigorous set of tests with real use-case scenarios and carefully evaluate how the tools would function in their office to support their workflows.

Appendix A:
Electronic Health Records (EHRs) and Meaningful Use

The definition of meaningful use of an EHR by the Centers for Medicare & Medicaid Services (CMS) and the Office of the National Coordinator for Health Information Technology (ONC) has had a positive effect on EHR functionality for PCMHs.[20] As of 2010, "Stage 1 meaningful use of EHRs" defined a "floor" for certified EHR functionality that was closely aligned with the HIT requirements for achieving the Triple Aim and, so, are directly applicable to the SNMHI change concepts.[21, 22] As illustrated in Table 1, every one of the PCMH processes discussed in this Implementation Guide is supported by multiple elements of Stage 1 meaningful use.[23] Stage 2 meaningful use, beginning in 2014, increases the requirements for entering structured data and emphasizes enhancing the ability of patients to view their own information and communicate with their care team outside of office visits. Stage 2 meaningful use also requires care teams to expand their use of decision support tools to improve clinical quality. One effect of federal leadership in setting standards for EHR functionality has been to encourage a common nomenclature for EHR features and reduce variation in usability between EHR products.

The federal incentive program has also added turmoil to the EHR marketplace by pushing vendors to modify their products to keep pace with changing meaningful use standards, while simultaneously trying to meet expectations of customers seeking to implement or upgrade their EHR to achieve meaningful use. This dual tension has resulted in EHR vendors prioritizing their resources. One unintended consequence is that clinical reporting in most EHR products has been limited to the minimum necessary for attesting to meaningful use, including canned reports for specific clinical quality measures. In general, registry functionality required for population management and ad hoc reporting functionality to support rapid process improvement cycles remains a gap in the EHR tools available to PCMHs. After-market products are starting to fill the niche for intelligence functionality to guide such essential activities as access (e.g., demand-capacity) management, real-time process measure dashboards for chronic illness care, and ad hoc time-interval tracking to assist workflow redesign activity.

Table 1: The Elements of Stage 1 Meaningful Use Supporting PCMH Workflows

	Access to Care Appoint-ments	Define Panel Population	Results Tracking	Education Material	Patient Care Reminders	After Visit Summary	Clinical Reports	Patient Access to Records and Communication
Demographics	X	X		X	X		X	
Privacy & Security	X				X			X
Lab Interface			X		X		X	X
CPOE			X		X	X	X	X
ePrescribing		X				X	X	
Drug-Drug Interactions				X	X		X	X
Drug-Allergy Alerts				X	X	X	X	X
Medication List	X	X		X	X	X	X	X
Allergy List		X		X		X		X
Medication Reconciliation				X	X	X		X
Problem List	X	X		X	X	X	X	X
Vital Signs		X		X	X	X	X	X
Smoking Status		X		X	X	X	X	
Decision Support		X	X	X	X	X	X	
Formulary Checks					X			
Lists of Pts by Condition	X	X	X	X	X		X	
After Visit Summary						X		X
Patient Reminders	X			X	X	X		X
eAccess to Chart			X		X			X
eCopy of Chart Data			X	X	X	X		X
Patient Information				X	X	X		X
Immunization Registry				X	X	X	X	X
Syndromic Surveillance	X							

References

1 Black AD, Car J, Pagliari C, et al. The impact of ehealth on the quality and safety of health care: a systematic overview. *PLOS Medicine*. 2011;8(1):e1000387.

2 Kellermann AL and Jones SS. What it will take to achieve the as-yet-unfulfilled promises of health information technology. *Health Aff*. 2013;32(1):63-68.

3 Bates DW, Bitton A. The future of health information technology in the patient-centered medical home. *Health Aff*. 2010; 29(4):614-621.

4 Murray M, Davies M, Bouchon B. Panel size: how many patients can one doctor handle? *Family Practice Management*. 2007: 45-51.

5 Schillinger D, Piette J, Grumbach K, et al. Closing the loop: physician communication with diabetic patients who have low health literacy. *Arch Intern Med*. 2003; 13;163(1):83-90.

6 Smith PC, Araya-Guerra R, Bublitz C, et al. Missing clinical information during primary care visits. *JAMA*. 2005;293(5): 565-571.

7 Throop C, Seidman J. The Ix after-visit summary. eHealth Initiative. Updated October 2009. Accessed: January 2013.

8 Berwick DM. What 'patient-centered' should mean: confessions of an extremist. *Health Aff*. 2009; 28(4):w555-w565.

9 Hibbard JH, Mahoney ER, Stock R, Tusler M. Do increases in patient activation result in improved self-management behaviors? *Health Research and Educational Trust*. 2007; 42(4): 1443-1463.

10 Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. *JAMA. 2002; 288(19):2469-2475*.

11 Schmittdiel J, McMenamin SB, Halpin HA, et al. The use of patient and provider reminders for preventive services: results from a national study of physician organizations. *Preventive Medicine*. 2004; 39(5):1000-1006.

12 Welch HG, Chapko MK, James KE, Schwartz LM, Woloshin S. The role of patients and providers in the timing of follow-up visits. *J. Gen Intern Med*. 1999; 14(4):223-229.

13 Flocke SA, Stange KC. Direct observation and patient recall of health behavior advice. *Prev Med*. 2004;38(3):343-9.

14 Hummel J, Evans PC. Providing clinical summaries to patients after each office visit: a technical guide. Accessed: December 2012.

15 Inglis SC, Clark RA, McAlister FA, Ball J, Lewinter C, Cullington D, Stewart S, Cleland JG. Structured telephone support or telemonitoring programmes for patients with chronic heart failure. *Cochrane Database Syst Rev*. 2010; 4(8):CD007228.

16 Lemmens KM, Nieboer AP, Huijsman R. A systematic review of integrated use of disease-management interventions in asthma and COPD. *Respir Med*. 2009;103(5):670-91.

17 Berenson RA, Hammons T, Gans DN, Zuckerman S, Merrell K, Underwood WS, Williams AF. A house Is not a home: keeping patients at the center of practice redesign. *Health Aff*. 2008; 27(5):1219-1230.

18 Ralston JD, Carrell D, Reid R, Anderson M, Moran M, Hereford J. Patient web services integrated with a shared medical record: patient use and satisfaction. *JAMA*. 14(6):798-806.

19 Wasson J, Gaudette C, Whaley F, Sauvigne A, Baribeau P, Welch HG. Telephone care as a substitute for routine clinic follow-up. *JAMA*. 1992;267(13):1788-93.

20 Blumenthal D, Tavenner M. The "meaningful use" regulation for electronic health records. *NEJM*. 2010; 363(6):501-504.

21 Certification Commission for Health Information Technology. Accessed: December 2012.

22 Certified Health IT Product List. Office of the National Coordinator for Health Information Technology. Accessed: December 2012.

23 Moreno L, Peikes D, Krilla A. Necessary but not sufficient: the HITECH act and information technology's potential to build medical homes. (Prepared by Mathematica Policy Research under Contract No. HHSA290200900019I TO2.) AHRQ Publication No. 10-0080-EF. Rockville, MD: Agency for Healthcare Research and Quality. June 2010.

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