Chart Abstraction:
EHR Deployment Techniques

California HealthCare Foundation

ISSUE BRIEF

Introduction

This investigation and analysis of chart abstraction techniques is the first in a series of tactically oriented issue briefs based on lessons learned through the California Networks for EHR Adoption (CNEA) initiative. The CNEA program was initiated in 2006 to speed adoption and lower the overall cost of electronic health records (EHR) in California community clinics and health centers (CCHCs).[1] In August, 2008, eight grantees representing four models of EHR deployment were funded to advance the adoption of EHRs in the safety net and to share their experiences. Following are brief descriptions of the CNEA models, along with the grantees that are using them.[2]

1. **National network.** Build or leverage existing EHR networks, often national in scope, to provide for individual or groups of clinics in California. Grantees:
   - Open Door Community Health Center (ODCHC) in partnership with Our Community Health Information Network (OCHIN)
   - Next Generation Health Network (NGHN)
2. **Clinic consortia.** Work with a California clinic consortia to expand their existing EHR product and implementation services to at least three of their members. Grantees:
   - Redwood Community Health Coalition (RCHC)
   - California Rural Indian Health Board (CRIHB)
3. **Multi-site expansion.** Support multi-site clinics to expand adoption of their existing EHR product and implementation services to at least three additional clinic sites. Grantees:
   - Golden Valley Health Centers (GVHC)
   - Shasta Community Health Center (SCHC)
4. **Hospital-based regional extension.** Work with local hospital to extend their existing EHR product and implementation services to CCHCs in a region or service area. Grantees:
   - San Mateo Medical Center (SMMC)
   - The Children's Clinic, Serving Children and Their Families (TCC), Long Beach, California

Through this CNEA collaboration, an array of services is provided to support the adoption of EHR and other applications.

Chart Abstraction Overview

Electronic health records promise substantial efficiency and quality benefits to community clinics, but the implementation phase entails an inevitable decrease in productivity due to disruption in workflow, user training, and the need to maintain both paper and electronic records during the transition period. Productivity loss is of particular concern to organizations that are compensated on a per-visit basis. Reducing provider schedules to accommodate training and/or lengthening the duration of each visit reduces provider and clinic revenue and also decreases access to care.

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A well-thought-out chart abstraction strategy—the process of entering or "populating" the electronic chart with clinical data from the traditional paper record or other sources—is one technique that mitigates the loss in productivity and increases provider acceptance. This tactical brief offers lessons learned from the CNEA grantees and provides a framework from which to plan and assess the chart abstraction process.

Start with a Strategy

Through clinical committees or other consensus-building forums, CNEA grantees developed strategies that defined what information would be entered, when, and by whom—weighing the value of the information versus the cost of entering it. Here are some important considerations and questions to ask when developing a chart abstraction strategy:

- Which data are important to have entered prior to a patient coming in, and which are not? Which data are needed at the point of care?
- Is there a sub-segment of our patient population that should be prioritized, such as diabetic patients or those who seek care frequently?
- Do we have a way of identifying our active patients so that we can focus our efforts on their charts?
- Should we enter the same data elements for all patients or does it vary? What are the patient characteristics that would cause a variation in required data (e.g., pediatric vs. adult)?
- What is the quality of the source data that we want to replicate in the electronic chart? Is it up to date and complete? If not, what needs to be done to clean up the data?
- For each data element or chart document we wish to convert, what is the best method of entering the data, how long will it take, and who will do it?
- Do we have consensus from all providers about the type, quantity, and timing of data entry? Is there a decisionmaking body that has authority over these decisions? How much individual variation will be allowed among the providers?
- Have we considered all perspectives, including the medical records and billing personnel—who will be heavily burdened during the transition period.
- How do we want this information displayed? Should we allow free text or alter the EHR in some areas so that only pre-set drop-down menus of responses are available? Will the data entry method evolve over time (voice dictation first, then moving to templates with structured text)?
- How do we incorporate all of our reporting requirements (UDS, GPRA, OSHPD, etc.) into our abstraction process?
- How far in advance can we start the process? What will be entered in advance and what will be entered at the visit?

Among the CNEA grantees, most decided to enter some or all of the following data:

- Past medical and or surgical history
- Allergies
- Diagnostic history / recent consultations
- Last progress note
- Medications
- Immunizations
- Health maintenance and disease management indicators
- Alcohol and/or tobacco use

Methods for Chart Abstraction

Three primary methods are employed, often in combination, to accomplish chart abstraction:

- Scanning documents from the paper chart;
- Electronic migration of data from legacy systems; and/or
- Manual data entry (free text, structured entry from pick lists, or voice dictation).

Each of the three methods of building the initial electronic record has advantages and can be used effectively in certain circumstances and with specific types of clinical information. Conversely, each method presents its own challenges and has associated costs in dollars and staff time. Most of the CNEA grantees worked diligently to build the electronic chart as quickly as possible and retire the paper chart to minimize the transition period of working in a hybrid paper/electronic environment. This period is characterized by confusion regarding policies and workflow for remnant paper—working with information that is still being captured on paper, such as forms that are not reproducible in the EHR and information that comes in from organizations that do not send data electronically.

Nearly all of the CNEA grantees continued to provide access to the paper chart through the initial go-live period. Some organizations had a formal policy for retiring the paper chart. For example, the protocol might call for the paper chart pulls for the first three patient visits post go-live. Others let each provider determine when they were ready to let go of the paper chart at the point of care. Most clinics were able to place an indicator on the patient's electronic record indicating that the paper chart was no longer needed at the time of the next visit. Eventually, paper records can be migrated to off-site storage. Data entry methods are outlined in Table 1.

Table 1. Chart Abstraction Data Entry Methods

Scanning	
Advantages	Scanning has an appeal in its relative simplicity and it remains a necessary method for ensuring that non-electronic clinical information from external sources gets entered into the electronic record. Extensive scanning of a large quantity of clinical documents can also minimize the number of chart pulls for viewing historical data, enabling the chart to be retired sooner.
Disadvantages	Scanned documents produce an image that is available for viewing only; the data are not structured or "actionable" and are, therefore, of limited value in the EHR. In addition, some CNEA grantees reported difficulty in organizing and categorizing the scanned documents in the electronic chart, and providers can have difficulty locating the document. Excessive scanning can potentially degrade system performance if the EMR is not architected to support the volume.
Best suited for	Most recent progress notes (handwritten), diagnostic reports, consult notes from external sources, patient correspondence.
Costs and staffing	Generally inexpensive technology. Medical records staff is typically responsible for scanning and can become overburdened during initial implementation.
Electronic Data Conversion	
Advantages	Data that can be transferred from one database to another through an electronic conversion offers an efficient way to "bulk load" the EMR. Demographic data can be converted from the practice management system that creates the shell of an EHR chart.
Disadvantages	Most health centers do not have a significant amount of clinical information captured electronically other than data from registries and chronic disease management systems. Each data element needs to be evaluated to be sure that the definition and format is the same in both the sending and receiving system, and that the data are of high quality.
Best suited for	Demographic data, registry data, lab results.
Costs and staffing	Data conversions, like interfaces, often require programming interventions on the part of both the legacy system and the new PM/EHR vendor, which can be expensive. Estimates range from $5,000 to $20,000 for various types of conversions. Clinic staff needs to be available for testing a statistically significant sample of the data to verify the conversion program worked properly.

Manual Data Entry	
Advantages	Data entered manually can be input into the EHR in a structured format that allows providers to act upon it and that can drive alerts and care protocols. Accuracy checking and clean-up naturally accompanies manual data entry, and the process provides valuable pre-live training for providers and staff.
Disadvantages	Manual entry of clinical data is time-consuming and often overwhelming for staff.
Best suited for	Medications, allergies, problem lists, population health management indicators, and recall dates.
Costs and staffing	Although some data can be entered by medical assistants, medical students, or temporary staff, most entry needs to be done by someone who knows the patient. Providers are ultimately responsible for data accuracy. The time-consuming process is costly in terms of extra administrative time for providers and the potential hiring of temporary staff.

Fine-Tuning the Process

The CNEA grantees' experiences with the above methods provide fine-tuning techniques as well as insights to learn from. The examples below illustrate the impact of chart abstraction on staff and productivity, and demonstrate the value of flexibility and constant adjustment of the process to obtain the best outcomes.

Scanning

- Shasta Community Health Center struggled with scanning initially. Their challenges were in organizing and retrieving the data. For example, if four radiology reports were scanned into a patient's chart, all four reports would carry the date of the scan rather than the date of the test or consult. To find these dates, providers had to open each document, which was frustrating and time-consuming. Shasta worked with their vendor to upgrade a software module that provides more descriptive headers for scanned documents. In addition, Director of Health Information Services Alexis Parsons devised a detailed hierarchical categorization for scanned documents that further helped providers to rapidly access and organize clinical date in the electronic chart.
- At Golden Valley Health Centers, the clinical committee that was convened to guide system configuration and implementation defined what needed to be converted into the electronic chart and gave these standards and guidelines to the medical records staff for scanning. Providers were given the opportunity to flag additional documents to be scanned in at the time of the patient visit. GVHC soon discovered that they did not have the resources to convert charts via scanning and manage their daily operational demands. Their solution was to hold off on extensive scanning of the paper chart and instead continue to keep it readily available as providers need it. At the same time, GVHC was able to make innovative use of scanning as an implementation/clinical documentation approach. As providers begin their use of EMR "light"—ePrescribing and lab ordering—their handwritten progress note for the visit is immediately scanned at any one of several locations throughout the clinic, thus initiating the transition to full digital charts.
- At San Mateo Medical Center, scanning existing documents for pre-load was left to the discretion of each of the 11 ambulatory clinics. Although each chart was allowed a limit of five pre-loaded documents (per the decision of the clinical steering committee), all clinics elected not to do any scanning prior to go-live, citing inadequate time or resources available beyond those dedicated to patient care.

Electronic Data Conversion

- The Children's Clinic, Serving Children and their Families (TCC) of Long Beach agreed on a standard set of data that needed to be entered into the chart and gave providers early access to their EMR so they could preload chart data. Providers filled out a form to abstract patient charts as part of their training, and the abstraction process itself forced

users to build skills on the system. First, however, a "shell" of the chart needed to be created through the practice management module. The electronic conversion of patient demographics was used as a way to both build and clean up the database. Social security number, name, and birth date were the only fields converted electronically. Each time patients come in they are treated as new patients with all remaining demographic data, consents, etc., updated at that time. Duplicate patients were identified and merged as part of the conversion. TCC reported that the entire process has enabled staff to feel confident about the data.

Manual Data Entry

- At Golden Valley Health Centers, the overriding implementation goal was to keep visit activity and productivity stable while increasing the use of EHR over time. Allergies and medication lists were entered by support staff initially. However, it became apparent that medication lists are dynamic and changing as patients navigate the medical system, diminishing the value of this data-entry effort. Therefore the process was adjusted to have medication lists entered at the time of the patient visit and reconciled at every visit thereafter.

- At Clinic Ole, a member of the RCHC network, Medical Director Robert Moore acknowledged that chart abstraction takes time. "It is a productivity hit, but it's an investment in patient safety, quality data, and an effective system going forward. If you want chart abstraction you need to give providers the time to do it." Dr. Moore initially gave providers an hour a day to abstract the charts of complex patients in the weeks preceding go-live in an attempt to minimize dramatic productivity losses as the system went live. One hour per day proved to be insufficient due to competing administrative activities, and Clinic Ole moved to offering blocks of four to eight hours, in addition to asking providers if they were willing to work some extra shifts to do chart abstraction.

- SMMC's pre-EHR documentation environment consisted of dictated notes that were edited and electronically signed through a vendor's Web site and then transferred to the center's health information system (HIS). These dictations could then easily be accessed digitally by all providers within the system, along with laboratory and radiology results.

  A pre-loading strategy was initiated several months before go-live. All primary care providers were instructed to do at least one dictation with a new document type labeled "AEMR Data Extraction," which included, at a minimum, the problem list, the patient's current medications, and allergies. These key data elements had been decided upon by the Clinical Standards Committee, a group of providers convened to make decisions about EMR implementation, content, and display.

  Interns at the high school or beginning college level were hired as temporary help and trained in the task of pre-populating the electronic charts with the data. The advantages of this approach were less expensive labor and protecting clinical personnel so that they could continue to care for patients. A significant number of charts were pre-populated, and the entered data were validated or modified by the clinician when he or she saw the patient. However, it turned out to be an unsustainable model for chart pre-loading. Extra time was needed to train people inexperienced in medical data entry and to catch and correct their inevitable mistakes. Go-live later revealed charts of extremely complex patients with long problem lists and medications numbering in the teens that had not been touched by the interns. When clinicians became frustrated, SMMC's provider champion suggested that providers enter only 30 to 50 percent of the crucial data (which would include items relevant to their current visit and immediate future care), and leave the rest for the patient's next clinic visit.

- Shasta Community Health Center discussed the tactic of using nurses to populate the EMR with medications and other clinical elements, but stressed to the medical staff that it was their responsibility to ensure that the entries were accurate. They also used clinical and clerical support from the quality improvement department to help input certain data elements, such as the last dates of services for PAPs, mammograms, etc. Shasta explored using a private company that hires RNs to preload data, but found it too costly for most CHCs. As they started the EMR implementation, the practitioners and their nursing teams started to enter data. Schedules were reduced and the clinicians typically worked several hours beyond their normal daily hours to do this. They were compensated for these hours and, while expensive, the alternative was to cut access further during the day. "It was a tough six to eight months," said CEO Dean Germano, "realizing that your most complex patients are typically the first ones you will see first, and that made it even more difficult."

Conclusion

There is a natural reluctance among providers to relinquish the paper chart, with all the historical data it contains, and a desire to then replicate as much information as possible in the electronic chart. However, most of the CNEA grantees found that only a few key data elements are necessary to have in the electronic chart at the time of the visit, and there is a diminishing return on the investment of time and energy for entering the rest. Establishing a solid strategy that identifies the key elements of what, when, who, and how the data will enter the chart is essential to getting the job done in a way that minimizes productivity loss and paves the way for a smooth transition. Balancing cost with utility is fundamental to developing the approach that works best for each health center.

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About the Foundation

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Endnotes

1. The Blue Shield of California Foundation (BSCF), the California HealthCare Foundation (CHCF), and the Community Clinics Initiative (CCI), a joint project of the Tides Foundation and The California Endowment, are funding this project.
2. For additional information about the CNEA initiative and the collaborative models of adoption, please see "Making a Connection: Clinics Collaborate on EHR Deployment" from the California HealthCare Foundation at www.chcf.org/topics/view.cfm?itemid=134138.