



Enabling Healthcare Reform Using Information Technology

Electronic Medical Record Capabilities and Expected Benefits in US Non-federal Hospitals and Physician Clinics

December 17, 2008

Overview

Understanding the level of electronic medical records (EMR) capabilities in hospitals and clinics is a challenge in the US healthcare IT market. HIMSS AnalyticsTM has created an EMR Adoption ModelSM that identifies the levels of EMR capabilities ranging from limited ancillary department systems through a paperless EMR environment in hospitals.

HIMSS Analytics has developed a methodology and algorithms to automatically score the more than 5,000 non-federal, US hospitals in our database relative to their IT-enabled clinical transformation status, to provide peer comparisons for hospital organizations as they strategize their path to a complete EMR and participation in an electronic health record (EHR) or Health Information Exchange initiative. HIMSS Analytics has also created a similar Ambulatory EMR Adoption Model. Both of the models—and the expected benefits to be derived from the various stages—follow in this document.

By December 31, 2014, with the proper incentives and funding, we believe it is reasonable to expect that all non-federal US hospitals can reach Stage 4, and all non-federal physician practices can reach Stage 3.

EMR Adoption ModelSM for Hospitals and Expected Benefits for Each Stage

The stages of the acute care model, and examples of what healthcare organizations at each of those stages could be expected to achieve in efficiencies and outcomes, are as follows. Note that all benefits by stage are cumulative and will be realized by all higher stages.

Stage 0: Not all major ancillary clinical systems are installed (i.e., pharmacy, laboratory, radiology). One or two may be, but not all three.

- *Hospitals of the 60s.*

- *Operational efficiencies for the automated ancillary departments.*
- *Diagnostic results may be available for access by clinicians.*
- *Some base level clinical decision support may be available, such as medication conflict checking in pharmacy systems, or duplicate or inappropriate test monitoring in laboratories.*

Stage 1: All three major ancillary clinical systems are installed.

- *Lab and radiology test results can be sent electronically to ordering physician, assuming the lab and radiology systems have that capability built in.*
- *Diagnostic results can be accessed from the various ancillary clinical systems, and single sign-on functions improve the efficiency for accessing results from multiple systems.*

Stage 2: Major ancillary clinical systems feed data to a clinical data repository (CDR) that provides physician access for retrieving and reviewing results. The CDR contains a controlled medical vocabulary and the clinical decision support/rules engine. Information from document imaging systems may be linked to the CDR.

- *Ancillary systems can be interfaced to repository to use CDR's results reporting capability – allows physicians remote access to results.*
- *ADT & patient accounting can also be interfaced to repository to enable population of billing records – internal efficiencies for hospitals.*
- *Reliance on the paper chart is significantly reduced for care delivery.*
- *Data can be used to supplement outcomes and business analysis.*

Stage 3: Clinical documentation (e.g., vital signs, flow sheets) is required; nursing notes, care plan charting, and/or the electronic medication administration record (eMAR) system are scored with extra points and are implemented and integrated with the CDR for at least one medical/surgical unit in the hospital. The first level of clinical decision support is implemented to conduct error checking with order entry (i.e., drug/drug, drug/food, drug/lab conflict checking normally found in the pharmacy). Some level of medical imaging access from picture archiving and communication systems (PACS) is available for access by physicians outside the radiology department via the organization's intranet or via the Web.

- *Significant efficiencies for nursing – standardization of nursing practice, alerts and reminders, electronic medication administration record integrated with pharmacy system which contributes to reducing medication errors, validating patient histories rather than recreating them, and so on.*
- *Remote access to radiology images helps eliminate duplicate tests, saves physicians from having to drive from home in the middle of the night to read a film of an ER patient.*
- *Adds a significant component of clinical data to further supplement outcomes and nursing protocol analysis.*

Stage 4: Computerized practitioner order entry (CPOE) for use by any clinician is added to the nursing and CDR environment along with the second level of clinical decision support capabilities related to evidence-based medicine protocols. If one patient service area has implemented CPOE and completed the previous stages, then this stage has been achieved.

- *Improves patient safety by eliminating medication errors associated with handwriting errors.*
- *Improves patient safety by adding a higher level of clinical decision support at order creation.*
- *Improves billing functions by ensuring all orders for patient services have been captured.*

- *Improves outcomes by eliminating order rework that may delay medication and treatment administration.*
- *Improves formulary compliance for medication orders.*

Stage 5: The closed-loop medication administration environment is fully implemented. The eMAR and bar coding or other auto identification technology, such as radio frequency identification (RFID), are implemented and integrated with CPOE and pharmacy to maximize point-of-care patient-safety processes for medication administration.

- *Improves patient safety - reduces or eliminates medication errors.*
- *Improves outcomes by reducing the time from medication order to medication administration.*
- *Improves medication management by identifying potential medication errors that clinicians may not be aware of.*
- *Improves the tracking of all medications dispensed and administered.*
- *Provides a data set to improve the management and administration of medications for use in both outcomes and protocols analyses.*
- *Nurse recruiting and retention are improved.*

Stage 6: Full physician documentation/charting (structured templates) is implemented for at least one patient care service area. Level three of clinical decision support provides guidance for all clinician activities related to protocols and outcomes in the form of variance and compliance alerts. A full complement of radiology PACS systems provides medical images to physicians via an intranet and displaces all film-based images.

- *Improves the timeliness and accuracy of physician documentation to support care delivery processes.*
- *Provides a higher level of clinical decision support with physician protocols and therefore improves clinical outcomes.*
- *Eliminates or significantly reduces the costs/expenses for dictation and transcription.*
- *Provides on-line access to all radiological medical images to improve physician consult processes.*
- *May reduce length of stay for many services.*
- *May reduce discharge-not-final-billed days for many services.*
- *May improve a hospital's bond rating.*
- *Creates another data set that further improves the ability to more effectively evaluate clinical outcomes and clinical protocols.*

Stage 7: The hospital has a paperless EMR environment. Clinical information can be readily shared via electronic transactions or exchange of electronic records with all entities within a health information exchange (i.e., other hospitals, ambulatory clinics, sub-acute environments, employers, payors and patients) using the Continuity of Care Document (CCD) transaction standard. The hospital is also using clinical data warehousing solutions to improve treatment protocols and review quality outcomes.

- *Paper charts/documents no longer negatively impact patient care relative to access or timeliness of data.*
- *All medical record data is on-line and available to all clinicians via secured access.*
- *All patient care data can be shared with other organizations that are treating the patient using a standard transaction that contains clinical data.*
- *The majority of the patient care data is discrete and provides a rich environment for analyzing clinical outcomes and protocols in a more timely and complete manner.*

- *Quality and outcomes reporting is a by product of the complete EMR environment.*
- *Competitive market advantages are achieved for the population that is served.*

EMR Adoption ModelSM for Physician Clinics and Expected Benefits for Each Stage

The stages of the physician clinic model, and examples of what clinics at each of those stages could be expected to achieve in efficiencies and outcomes are as follows. Note that all benefits by stage are cumulative and will be realized by all higher stages.

Stage 0: Paper charts are the only means of storing and accessing clinical information (even if there is a computerized billing system), and Web browsers are not routinely used for any clinical purposes.

- *The status quo in the majority of physician offices in the US today.*

Stage 1: The clinic provides a Web browser on the physician and/or nurse desktops for access to online reference material, eligibility information, lab results, etc. Permanent electronic storage of chart notes provided after transcription, but notes are only free text. The patient records are accessible from multiple computers via a local area network. Electronic messaging exists for informal, unstructured intra-office communication. Calling/faxing of prescriptions to pharmacies.

- *Physicians have access to clinical protocol and content Websites for researching diagnoses and treatment information.*
- *Clinic offices are more efficient and more profitable.*

Stage 2: Computers/handheld device may be at point-of-care but use is partial or optional. Basic medication management—electronic prescribing, maintaining medication lists, refill tracking. Electronically assisted ordering of tests and referrals (but no closed-loop tracking yet). Beginnings of a clinical data repository—ability to search for patients with particular diagnosis or particular medication. Electronic messaging is increasingly relied upon for clinical collaboration.

- *Patient safety increased by legible, computer-generated prescriptions.*
- *Improved patient care with the use of order sets that ensure complete and thorough diagnostic testing based on protocols and clinical guidelines.*

Stage 3 Computers have replaced the paper chart, are used at the point-of-care, and are mandatory for all clinical documentation (i.e., patient histories). Basic clinical decision support for medication interactions, medication allergies used before patient leaves the office. Electronic import and storage of lab results in structured form. Capture of some structured data from within encounters—vital signs, immunizations, etc. Electronic messaging is a standard means of intra-and inter-office clinical collaboration. Connectivity to hospitals for electronic receipt of discharge summaries, including care plans and transmission of admission documents.

- *Patient safety increased by drug interaction warnings by checking known current medications with medications being ordered to identify and flag any potential interactions.*
- *Savings to clinic practice in management of phone calls, time spent on chart pulls, reduction in transcription staff, new chart costs, reduction in medical records staff and device connectivity – more efficient operations, better service to patients.*

- *Decreases in patient wait time, drug refill time, telephone call turnaround time.*
- *Increases in efficiency of clinicians to be able to see more patients per day and increase in patient volume.*

Stage 4: Advanced clinical decision support—protocols, preventive care reminders based on diagnoses, medications, results, orders. Population-based quality measurement and reporting capabilities. Secure messaging and online consultations between physician and patient. Maintenance of an online personal health record for patients. Multiple payor eligibility, claims status inquiry and referral information messaging transactions between physician and payor. Structured messaging between physician, physician staff and payors for automation of disease management cases & communication and reminders to support clinical guidelines.

- *Further reductions in medication errors due to advanced clinical decision support tools.*
- *Physicians able to easily participate in pay-for-performance initiatives due to quality and outcome reporting capabilities.*
- *Clinics lower costs by using electronic data interchange in eligibility, claims, and remittance advice transactions.*

Stage 5: Proactive and automated outreach to patients for preventive care and chronic disease management. Proactive searching for patients with particular conditions and medications as new clinical evidence develops. Interconnected regional/community of physicians, hospitals, lab companies, health plans, pharmaceutical industry, imaging companies and patients to easily share and exchange information and collaborate for improved patient care. Capable of sending and receiving Continuity of Care Document transactions with other stakeholders.

- *Physicians now able to move from predominate focus on sick care to wellness and prevention activities with chronic illness patients.*
- *Clinics connected to health information exchanges that share patient encounter information with other providers and feed personal health records for consumers.*

For more information, contact Mike Davis at mdavis@himssanalytics.org or Pat Wise at pwise@himss.org.