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Speaking of EHRs: Parsing EHR Systems and the Start of IT Projects

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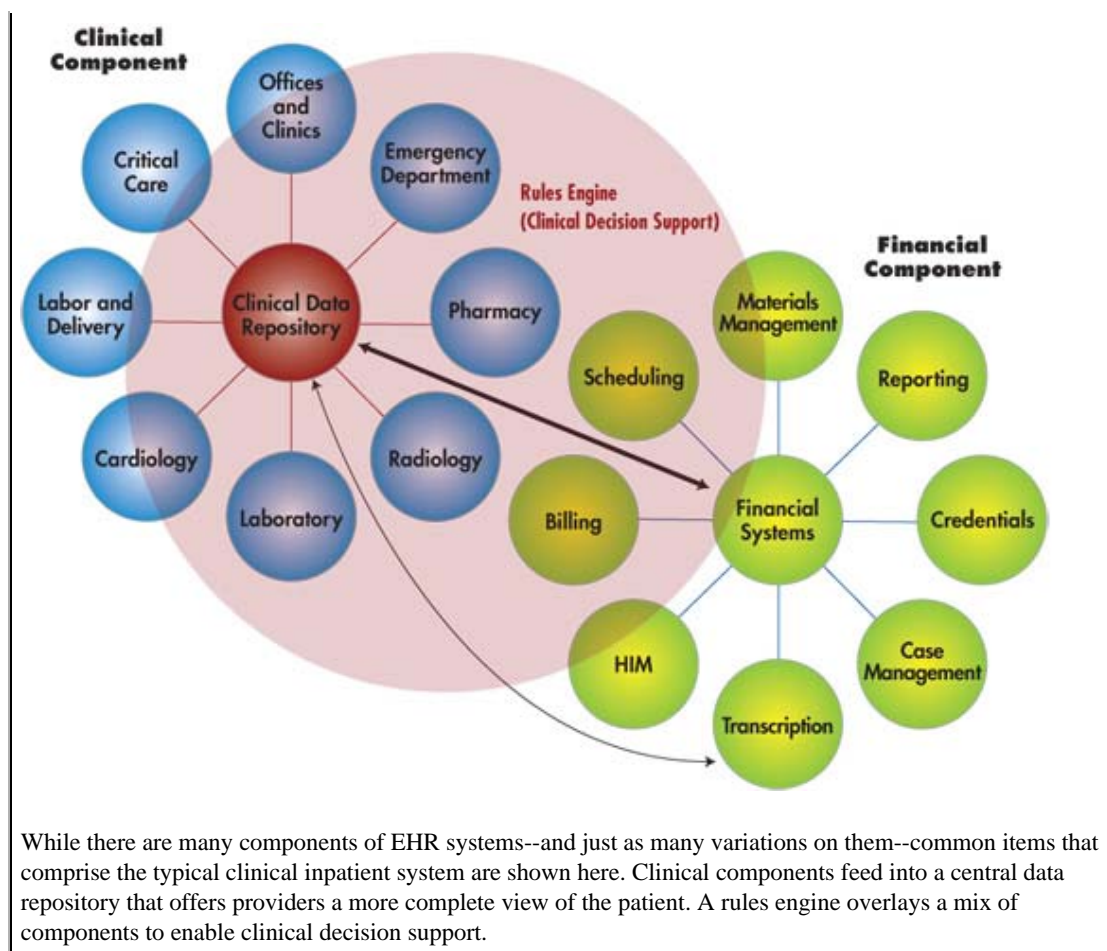
Being EHR-conversant begins with a review of EHR components, general issues in integrating systems, and how IT projects start.

Setting off on the EHR journey, or any single leg of it, requires being conversant in the common elements that comprise EHRs, the general choices in integrating them, and the first steps that get major health IT projects off to a good start.

While there are many components within clinical inpatient EHR systems, and many variations on them, there are some relatively common items that comprise the typical system. As the figure below illustrates, the universe of IT components installed in hospitals includes more than the commonly thought-of financial systems (variously known as access management, scheduling, and billing). Movement is finally afoot to install clinical systems as well.

Some ancillary clinical systems are actually more likely to be installed at local hospitals than EHRs, as laboratory information systems and even radiology information systems have been in use for decades. These systems may have begun as stand-alone systems, but now the clinical data contained within them must be shared with a greater universe of users than before.

EHR Universe



Some of these core ancillary systems have the capabilities of larger systems, including viewing data via portals (through the Internet or an intranet). Interfacing the data feeds into a clinical data repository (or CDR, the master holder of all the enterprise's clinical information) allows multiple disparate systems to populate the data into the CDR, making it possible for clinicians to view trends in patient results or financial and quality analysts to view trends in patient care via reporting programs.

While the laboratory system is the most likely to have already been installed, radiology systems are quickly catching or surpassing lab systems, as the digital images and transport of the images to clinicians is a critical driver for implementation. Long term, the costs of moving, storing, and retrieving film images are significantly greater than that of implementing a radiology system (once everyone gets over the sticker shock). Many larger vendors are also offering digital imaging as part of the core health IT product, as much of the required information exists in that product.

Some clinical components (like pharmacy) are requisites for other portions of the EHR. It would be difficult, if not impossible, to have computerized physician order entry without a system to actually deliver the medications to the administering nurse. Historically, medication management systems (pharmacy systems) were designed for supply chain management, not dispensing management. They were intended to ensure the least expensive method for giving a pill, not to address patient safety.

As demonstrated in the illustration, the various departmental systems can be interfaced to feed data into the CDR. A rules engine, or clinical decision support, can overlay most or all of the process in better designed systems. Recognizing the financial stress of having to

replace legacy systems such as those for lab and radiology, more vendors allow hospitals to keep existing core ancillaries and interface them into their products. Most major health IT vendors do not have systems that provide coverage for every niche in the hospital, and as discussed below, finding the correct balance between niche vendors and a single-vendor solution is challenging. The most challenging piece is the core product, with order entry and documentation pretty even in degrees of difficulty.

Documentation requirements differ for various users. Nurses in the ICU have different needs than those on a medical or surgical floor, and different physician specialists have wildly different needs as well. As the illustration indicates, transcription services will likely be required for some time, with documents generated by modern word processors imported into the CDR for review by all clinicians (as shown by the arrow). Some system vendors (as well as vendors of stand-alone products) offer voice processing of dictations that automate the transcription process and incorporation into the clinical record.

Integration between the ordering system (the core computerized physician order entry) and the medication management system (the pharmacy) and the dispensing system (which can be either the core ordering system or the pharmacy) requires an implementation team that truly understands the implications of choices before it. Nursing, physician, and pharmacist users will all be affected greatly by the team's decisions.

The illustration shows a typical EHR system, but not all systems operate off a CDR. This, of course, presents the problem of data that reside in different systems, or in different parts of the same system. Extraction of the data is difficult or impossible. Likewise, such a system cannot offer universal clinical decision support. It can be an extremely difficult sale for a vendor who does not provide clinical decision support, as most of the value for patient safety and quality of care comes from the ability to alert users of existing or potential problems.

The Sequence of Health IT Projects

Typical projects of this magnitude start when a significant stakeholder notes the need, perceived or real, for an improvement in the status quo. This may be the result of a physician who champions safety or quality improvements or a CEO responding to board questions about recent publicity on health IT benefits.

Properly done, a project should begin with a reality check on the organization's current state, its ability to change, its expected returns from the endeavor, and the requirements of the technology to meet the needs. The project then moves to vendor selection and implementation of the chosen product or suite of products. Defining success in advance helps keep the focus on what has been deemed important to the organization, and metrics (baseline and afterwards) help ensure the project deliverables are in line with expectations.

Strategic planning is critical, and the project team must consider a variety of internal and external forces. Are competing projects for the IT staff under way that will drain resources? Do physicians adequately understand the effort needed on their part to implement and use a clinical system? Have expectations been defined and accepted by the physician community in advance of the project's start? Are there marketing or financial drivers that compel an accelerated approach to selection and implementation? Support from senior leadership is absolutely essential to the project's success. A management group's inability to completely support the decision to undertake such a major change will likely seal the fate of the project

prior to its even getting started.

Assessing Readiness, Identifying Needs

IT projects typically begin with a readiness assessment. A glimpse into the organization's culture is the first aspect of assessing its ability to successfully deploy the components of an EHR system. Assessments often identify an organization's strengths and weaknesses in managing change, collect information about the organization's readiness and capacity to succeed in a major change initiative, study the history of previous IT projects (successful or not), and gauge the medical staff's perception of the project's value and need. These factors each have significant impact on the success of the project.

If the readiness assessment verifies the organization's fundamental ability to accept the change required by the implementation, the project then moves to identifying system requirements. System delineation requirements are the inventory of specific needs the technology must fulfill. The needs range from the financial office to the clinic. For instance, requirements should consider the types of legacy systems in use and whether or not they can (or should) be retained. The organization must decide if it wants the ability to implement clinical decision support, and if it does, whether the system should employ industry-standard nomenclature or a proprietary system. The strategic vision developed and communicated at this early stage sets the path for the next decade, and the organization, the vendor, and the resulting system should be heading down the same path.

Numerous methods exist for slogging through the vendor selection process. Organizations typically consider a variety of factors such as industry ratings, vendor longevity and financial stability, and direction of product development. The process that many facilities use, though, seems flawed. Vendor "shoot-outs" are often costly (both for the organization and for the vendors), and they usually fail to highlight truly important differences between vendors. Organizations may bring together a large cross section of staff to meet a wide variety of vendors, but the crowds moving through such fairs will have forgotten which vendor they liked by the time they see the fifth one. Exhausted, they may skip the last one or two, who may have been the best match for the facility. [*Editor's note:* the vendor selection process will be explored in greater depth in a following article in the May issue of the *Journal of AHIMA*.]

"System-ness" versus Niche Vendors

IT systems are complex, and most hospitals have literally hundreds installed. These range from pharmacy, laboratory, and radiology systems to transcription systems, billing, and scheduling systems. Data from each of these systems must find their way into the correct repository to match up with the correct patient. Interfaces must be written to allow the systems to communicate. Thus, trends have been away from "best of breed" niche vendors, which require interfacing to the main system, and toward an all-encompassing single system vendor.

While developing interfaces between systems may sound simple, it is far more complex and problematic than most would like to believe or admit. Interfaces can be a nightmare to create and maintain. Part of the problem is in the translation from one system to another. System A may have a database field for allergy that is 10 characters, while system B's field is only seven characters. How will you truncate the three characters in system A, and will

you match data? Validating the results can be painstaking, as well as ongoing with each upgrade of a system.

Enterprise software vendors have products that will often do many functions and are truly integrated. Vendors also have "siloeed" products that have been cobbled together from disparate products; these are actually interfaced behind the scenes rather than built off the same platform. Integrated products avoid interface issues of interfaces and thus have merit in more seamless flow of data.

That being the case, though, many of the large vendors do not address specific niches within healthcare. Such areas include labor and delivery, cardiology, and emergency departments. In these areas, specialty products that address workflows, unique concerns, more specific content for documentation, and specialty organization endorsements may offset the complications of interfacing. Some specialties are essentially self-contained (as, for example, labor and delivery), with little need for significant transfer of information from one unit to others within the hospital. There, flow of information from the obstetrician's office to labor and delivery and back to the office is of more concern.

Generally, reducing the number of moving parts in the system is a good thing and a strategically sound plan. But specific needs of specialties must be considered, and if a vendor is unable to address certain areas, niche vendors are optimal or required.

Thus understanding the building blocks of an EHR system and the relationship between potentially disparate component systems allows project teams to take better strategic approaches to system planning. Becoming conversant in EHRs is the first step in the journey of system selection and implementation.

The "What's in It for Me?" Factor

There is another dimension to major IT implementations--the human element. Multiple stakeholders are involved in EHR implementations, including strategic business owners, financial leaders, and clinicians. Their response to change is directly related to their intrinsic motivation to change and embrace the new business model.

The motivators require understanding the value of automating care processes--how it can reduce documentation effort and time, enhance the quality of care delivered, support research initiatives, minimize data entry, reduce manual processes, provide intuitive online resources, and reduce the risk of errors. Change management requires that project leaders recognize these intrinsic motivators.

An example of a high motivator for physicians may be reduced malpractice insurance premiums when using an EHR. Physicians may also want to know why they should help the hospital when doing so may slow them down and adversely affect their own productivity and pay. Understanding how each stakeholder views the process and ensuring each stakeholder's needs are considered leads to better engagement and greater success in the project implementation.

Addressing Physician Concerns up Front

Many organizations push out the time for physicians to actually enter orders into the system, but failure to include physicians in project planning early on is a major reason

why projects fail. Physician participation is necessary for several reasons: their workflow is influenced by--and in turn influences--most workflows throughout the hospital system. While speed and efficiency are desired by virtually everyone dealing with an electronic system, few who use the new system will be more significantly affected by it than physicians. As the majority of physicians in the US are not employed by hospitals, a reduction in their efficiency (time spent making rounds, for example) is equated with a direct link to their income. While hospital-employed physicians are no less encumbered by inefficiencies in systems, the hospital that requires use of an EHR can at least compensate for the use more directly. Most EHR benefits accrue to parties other than the physicians who use it. As physicians drive more than 85 percent of orders placed, physician adoption is critical in achieving a return on the considerable investment made by organizations in implementing these systems.

Physicians are the most directly affected by new health IT, but they are not the group that ultimately uses the products the most. Others in the hospital such as nurses, pharmacists, dietitians, and respiratory and occupational therapists will interact with the system with far greater frequency than the majority of physicians. Mid-level practitioners such as nurse midwives, physician's assistants, and nurse practitioners must also be considered in the selection, design, and build phases. Early engagement of each group in the process will solidify their understanding of the complexities, the need for the product, and the impact on how they do their jobs.

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