Short Communication

Software in Healthcare IT

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Software provides the face of healthcare IT. Hardware is not typically visible to the end users, but the applications that sit on that hardware are.

Use of the various software applications, along with changes in workflow and processes, can benefit the organization.

The software is what the end user works with, using a human–computer interface. There are a large number of applications, so we will discuss the major groups of applications and examine some of the newer ideas that are in the pipeline.

Clinical Applications

As with most specialties, healthcare IT has developed its own terminology and acronyms. Some of the terms seem interchangeable when, in fact, they do have different meanings.

The electronic health record (EHR), the electronic medical record (EMR), and the personal health record (PHR) are examples of this.

The EMR is the continuous, longitudinal electronic record in one specific setting-a provider's office, a hospital, or a home healthcare service. The EHR is a longitudinal record covering multiple settings over time [1,2]. The PHR is a medical record often created, edited, maintained, and controlled by the patient and possibly includes importation of clinical data from other sources. Often created on a website, it is accessible by providers when the patient invites providers to review information in the PHR using secure access.

Clinical applications support patient care wherever it is being delivered. The most apparent clinical application is the EHR. In some institutions, this is a one-vendor application; in others, it is a best of breed, with many different vendor applications performing different functions.

The EHR is used by clinicians to document patient care, from medication administration to order entry, as well as to retrieve patient data from the lab or from radiology. The provider's office can send electronic prescriptions to the patient's pharmacy, as well as import data from an inpatient stay or outpatient testing.

The EHR interfaces with specialized systems in different departments. As an example, in the United States, radiology and pathology labs have specific requirements, with formatting and data display governed by different accrediting agencies, such as Clinical Laboratory Improvement Amendments (CLIA), the College of American Pathologists (CAP), and the American College of Radiology [3,4]. In Europe, the European Cooperation for Accreditation [5] covers laboratory certifications.

Professional dietitians, case managers, and social workers all have specific needs in software functionality, often dictated by professional or regulatory standards

Some clinical areas, such as the perinatal areas (labor and delivery, nursery, neonatal intensive care, and postpartum), the perioperative areas (preop unit, operating rooms, and post anesthesia care unit), the critical care units, the outpatient centers for primary care, and special functions like renal dialysis, have specialized documentation and information needs. The PACS stores and displays images from ultrasounds to computed tomography (CT) scans and MRIs. These systems require fine-resolution monitors, large storage drives, and large amounts of RAM for image display.

Some of the major EHR vendors are able to support all the specialty areas; others do not and require the purchase and interface of a niche system specific to each specialty. The goal of all these systems is to communicate and exchange this patient health information, also known as interoperability. Interoperability is one of

the most important attributes of clinical systems, since data should not be entered into systems more than one time.

It is essential that these systems communicate with each other. Table 1 presents examples of specialized systems and their related clinical areas and users.

System	Clinical Area	Users
PACS	Radiology	Radiologists
		Nurses
		Technologists
		Physicians providing direct care
Fetal monitor archiving	Labor and delivery	Physicians
		Nurses
Perioperative system	Preoperative area	Physicians
	Postoperative area	Nurses
	Operating room	Schedulers
		Billers and coders
Intensive care	Intensive care units	Physicians
		Nurses

The availability of clinical data at the point of care has transformed how clinicians care for patients. They no longer need to go to the radiology department to look at MRIs or CT scans; those images can now be made available in the EHR application, saving time for clinicians, as well as money for the institution, since there are no films to create, store, or retrieve.

Perinatal systems archive the fetal monitor strips electronically, saving thousands of dollars in charges for storage of paper fetal strips [6].

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