

Health Information Systems



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KEYWORDS

- Laboratory information system • Health information systems • Electronic medical record
- Electronic health record • Computerized provider order entry • Decision support

ABSTRACT

This article provides surgical pathologists an overview of health information systems (HISs): what they are, what they do, and how such systems relate to the practice of surgical pathology. Much of this article is dedicated to the electronic medical record. Information, in how it is captured, transmitted, and conveyed, drives the effectiveness of such electronic medical record functionalities. So critical is information from pathology in integrated clinical care that surgical pathologists are becoming gatekeepers of not only tissue but also information. Better understanding of HISs can empower surgical pathologists to become stakeholders who have an impact on the future direction of quality integrated clinical care.

PART 1—A. HEALTH INFORMATION SYSTEMS—SETTINGS AND FUNCTIONS

Hospitals and health care organizations are complex systems comprising innumerable intricate operations and processes. Factoring advances in technology and medical knowledge, this complexity is further compounded. With such complexity, there is generation of immense amounts of information. Health information systems (HISs) are computing systems that capture, store, manage, or transmit this vast amount of information as it pertains to the health of individuals, clinical care, or the activities of health-related organizations. **Fig. 1** provides an overview of various HISs, which can be divided into 4 categories: (1) foundational systems, (2) financial systems, (3) departmental systems, and (4) electronic medical records (EMRs).

Foundational systems handle the managerial aspects for health care organizations and include the master patient index (MPI) and computing systems, which inform other HISs about admission, discharge, and transfer (ADT) activities. The transmitted message from an ADT system includes demographic information, such as name, date of birth, and gender. The MPI serves to index this information, like name, date of birth, gender, race, and social security number, ensuring that all registered patients are represented once without duplicate identities. The MPI also ensures consistent demographic information across all HISs within a health care organization.

Financial systems handle the accounting aspects for a health-related organization and include billing systems, which handle hospital charges. The general ledger is another accounting system that serves as the backbone for financial and nonfinancial data. There are also financial systems that handle financial and strategic decision support (DS).

Departmental systems are computing systems that are specific to departmental needs and operations. The most visible system to surgical pathologists is the anatomic pathology laboratory information system (AP-LIS). The AP-LIS supports a vast array of operations and functionality for the anatomic pathology laboratory. As a counterpart, the clinical laboratory has the clinical laboratory information system, which frequently is not interoperable with the AP-LIS. Radiology has the radiology information system (RIS), which deals with patient lists, patient tracking, orders, workflows, and results entry with reporting. Serving in conjunction with the RIS in radiology is the picture archiving and communication system, which manages the

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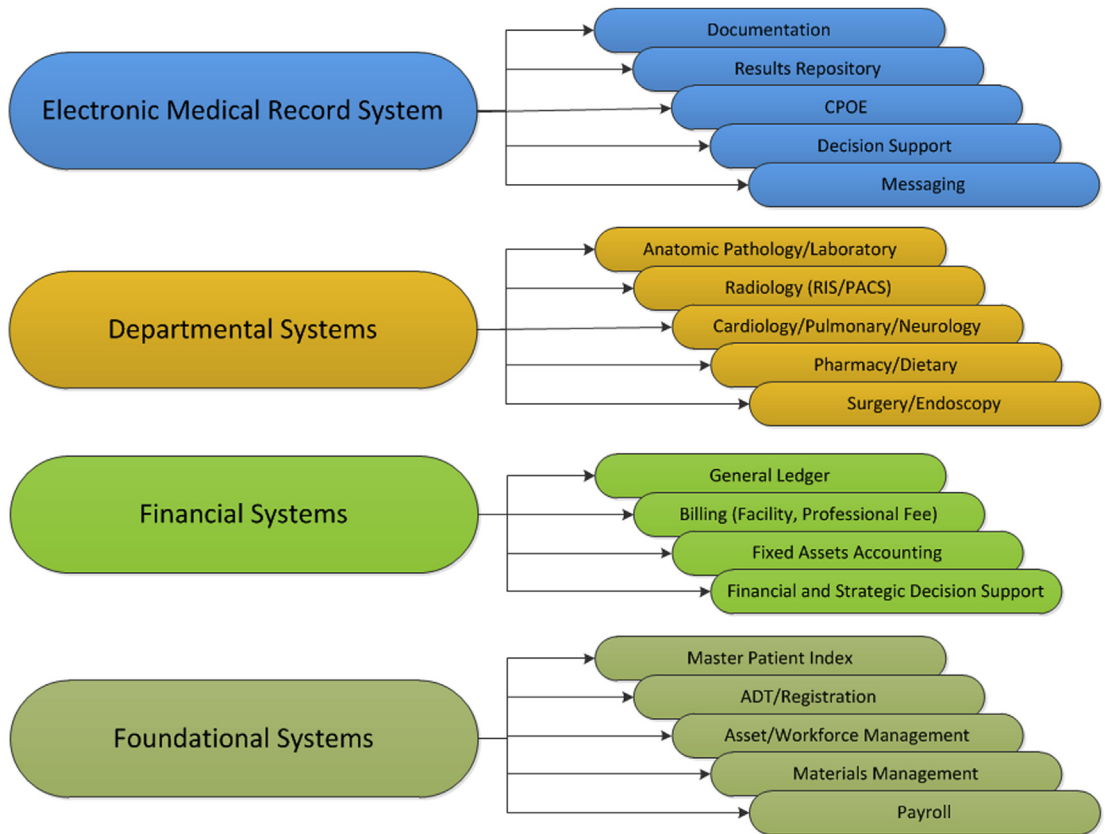


Fig. 1. Overview of HISs.

large repository of radiologic images. Cardiology also has its own version, separate from that in radiology, which handles cardiology images, such as echocardiograms and cardiac catheterization procedures. There are departmental systems for departments that perform specialized testing (ie, ECGs in cardiology, pulmonary function tests for pulmonology, and electromyograms for neurology). Some institutions may bring various imaging modalities together in a separate system, called a vendor neutral archive. Departmental systems exist for pharmacy and dietary departments to streamline workflows by handling medication and dietary orders, coordination administration, and distribution.

Clinical laboratories and financial management departments were the first to adopt HISs. Other types of HISs sprouted to reflect the operational and functional needs of their respective departments. As a consequence of this subspecialization, however, HISs developed independently in silos and with their own individual database infrastructure. This occurred with the AP-LIS and the clinical laboratory information system, and the consequence was a lack of interoperable HISs

that do not interface or interact with each other seamlessly. There are other reasons for this lack of interoperability, such as lack of standardization for interoperability. Vendors of departmental HISs had incentive to create dependency of health care organizations and not come together to create interoperable standards with other competing vendors. This ethos continued until recently where forces advocating for interoperability had become strong enough to influence policy.

The realization for the breakdown of silos and having a more interoperable HISs was not a recent idea, but began as early as 1991. Then, the Institute of Medicine (IOM) set forth a vision and issued a strong call for nationwide implementation of computer-based patient records.¹ The IOM acknowledged that physician groups, hospitals, and other health care organizations operated as silos, often providing care without the benefit of complete information about a patient's condition, medical history, services provided in other settings, or medications prescribed by other clinicians.² The IOM called for interoperability through automation and linking of information on services provided to patients in ambulatory and institutional settings (eg,

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