An Integrated Surgical Suite Management Information System

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The operational aspects, application areas, and results achieved from an integrated surgical suite management information system are described. The system, which has been operating within Henry Ford Hospital in Detroit, Michigan, for 4 years, captures comprehensive data for each surgical episode, performs extensive edits on these data to assure data base integrity, and utilizes this data base in multiple applications. These applications include fixed-format reporting for medical staff and management; ad hoc retrieval capabilities to support research, education, and decision making; and linkage to other hospital systems to reduce both data redundancy and paper flow.

INTRODUCTION

Prompt access to accurate computerized data is essential to maintain and improve the overall performance of a surgical suite. For example, the surgically related functions of utilization monitoring, surgical case scheduling, patient billing, and retrospective medical studies all require readily accessible and correct data that can be manipulated easily. Large volumes of pertinent data are generated manually within a surgical suite in the form of patients’ surgical records. A well-designed information system will capture a subset of these data in an efficient manner and generate, upon demand, information needed to support both medical and management functions. ORMIS (Operating Room Management Information System), designed for Henry Ford Hospital (HFH) in Detroit, Michigan, is such an information system. The purposes of this article are to describe the design, operation, and uses of ORMIS and to discuss lessons that have been learned during the implementation and operational phases of this system’s life cycle.

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PREVIOUSLY REPORTED WORK

Given that the surgical suite is both a high-cost and high-revenue-generation area, one would expect considerable activity in surgically related MIS. Surprisingly few implemented systems, however, have been described in the literature. The majority of reported systems are batch-oriented and appear to have been developed primarily to provide for the automated generation of fixed format utilization reports on a periodic basis.1–9 These systems are, for the most part, not integrated with other hospital systems, although most are run on large mainframe systems. Recently, in accordance with general technological developments in the field, systems with on-line data entry have been reported,10–12 and several of these have been integrated with other hospital systems (ADT, medical records abstract, and infection control).11–12

ENVIRONMENT

HFH is a large teaching hospital with 22 ORs in its surgical suite and a closed group-practice medical staff. The hospital performs all surgically related billing, including both surgery and anesthesiology professional fees. Surgically related staff include approximately 120 surgeons (distributed among 18 services), 23 anesthesiologists, 34 certified nurse anesthetists (CRNAs), 136 surgical residents, and 190 OR personnel. ORMIS design and development work has been performed by the Management Information Systems Group (MISG) of the Program and Bureau of Hospital Administration, the University of Michigan, through an ongoing research agreement with HFH. The ongoing operation of ORMIS is the responsibility of the OR billing section, a group of four clericals reporting to the assistant administrator for the surgical suite.

DATA CAPTURE

The OR record (Figure 1) is used to record data for each surgical episode, serving as a legal, historical, and financial document. The current OR record replaced two separate documents—one medically related and one financially related. Data collection is conducted in the OR during surgery, primarily by the circulating nurse, although as detailed below, some data are recorded by other OR staff members. The anesthetic record (Figure 2) is used to document the administration of anesthesia. This form is a legal document completed whenever a member of the professional anesthesia staff, either an anesthesiologist or a CRNA, is involved with a case. Like the OR record, the anesthetic record was designed to include both medical and financial data. Completed by the anesthesiologist and/or CRNA(s), the anesthetic record follows the patient into the recovery room.

COMPUTER SYSTEM OVERVIEW

ORMIS is currently run on the Michigan Terminal System (MTS), the operating