

RADIOLOGY INFORMATION SYSTEMS: BASIC PRINCIPLES AND CURRENT PRACTICE

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operating expenses.

Abstract

Because radiology represents a sizeable financial and operational component of any health care delivery system, the needs for and opportunities provided by a radiology information system should be carefully considered in planning any medical data processing system. Experience with such systems over the past fifteen years has demonstrated that they can improve service quality and save money. The functions which can be performed by radiology computer systems are relatively well defined and will be presented during the morning session of this workshop. Eleven of the systems which are currently in operation, several of which can be acquired from vendors, will be discussed in the afternoon.

This paper provides background for the Workshop on Radiology Information Systems, which is being sponsored in conjunction with the American College of Radiology Committee on Computer Applications. For several years this Committee has encouraged applications of computers to all aspects of radiology, and has provided a forum to discuss and disseminate radiologists' experience with such applications through a series of six symposia. At the first of these, held in 1966, four prototype radiology information systems were presented. Over the years interest in this area burgeoned, and many systems were developed, installed and utilized in both university and private radiology departments. There was considerable cross-fertilization among these systems, and although there were some casualties, new systems have arisen to replace them. The surviving systems have continued to develop and multiply so that it is no longer unusual to find sophisticated information processing systems in radiology departments. These automated systems have helped radiology departments achieve a high level of service quality which is rarely duplicated by manual systems. Furthermore, these benefits have been achieved while reducing overall

During the evolution of radiology systems it became clear that although implementation strategies might vary considerably there were certain basic radiology functions which could be automated. Over the years a classification of these functions which provides a useful format for discussing any radiology information system has emerged. This classification was employed in organizing the most recent symposium on Computer Applications in Radiology at which the information systems presentations were organized by function rather than by system. These presentations, in turn, provided the basis for a book entitled Radiology Information Systems written by members of the Committee and being published by the American College of Radiology as part of the series, "Planning Guide for Radiologic Installations." This book, written by members of the Committee, discusses radiology information systems by devoting a chapter to each of the following functions:

- Registration and Patient Information Files
- Scheduling
- Process Control
- Film File Management
- Diagnostic Reporting
- Billing and Statistics

The morning session of the workshop will comprise a general introduction to radiology information systems followed by presentations dealing with each of the functions listed above given by the chapter's author. Each speaker will define the set of functions in detail, explain why it appears useful to computerize them, describe at least some of the different computer techniques which have been used to automate them, and assess the advantages and disadvantages of these techniques.

The afternoon session will present eleven radiology information systems which are currently in use. For each system the speaker will describe the overall implementation strategy, the scope of functions performed by the system and the experience which has been gained operating the system. Finally each speaker will assess overall costs and benefits for the system. These eleven systems have been chosen to represent the wide range of options available for radiology departments. Some systems have been developed in-house

to suit the particular needs of individual departments while others have been developed by software firms to appeal to a large segment of the market for radiology systems. Some systems automate the entire set of radiology functions listed above, others focus on relatively few functions, and still others can be expanded or contracted functionally according to the needs of individual departments. Many of the systems have been developed on small dedicated computers (several in MUMPS), but at least one runs on a large mainframe as an integral part of a total hospital information system. Several of these systems can be purchased or leased from software vendors, and one system is being refined and developed further by a consortium of interested hospitals.