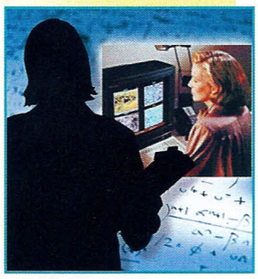

Planning Hospital Medical Technology Management

In the Healthcare System, the Technology Facilitates the Delivery of the "Human Touch"

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The appropriate deployment of technology contributes to the improvement in the quality of healthcare delivered, the containment of cost, and to increased access to services offered by the healthcare system. Over the past one-hundred years, the dependence of the healthcare system on medical technology for the delivery of its services has continuously grown. In this system, the technology facilitates the delivery of the "human touch." All medical specialties depend, to some extent, on technology for achieving their goals. Some specialties more than others use medical technology, be it in the area of preventive medicine, diagnosis, therapeutic care, rehabilitation, administration, or health-related education and training. Medical technology enables practitioners to collaboratively intervene together with other caregivers to treat patients in a cost-effective and efficient manner. Technology also enables integration and systems management in a way that contributes to improvements in the level of health indicators. Hospital and clinical administrators are faced with the expectation for return on investment that meets accounting guidelines and financial pressures.

Society's expectations for quality care and for the containment of the cost of care, as expressed in relationship to the gross national product, brought the need for even better integration and control into the public debate arena. In 1983, the U.S. government attempted to contain runaway healthcare costs through Federal regulation. These regulations established a new method of reimbursement, called the *prospective payment system*, that encouraged hospitals to manage their resources more effectively. Reimbursement methodology continues to guide innovation, development, and adoption of medical technologies.

As a result, routine methods for delivering care are being replaced with alternatives, such as the growth of outpatient clinics, ambulatory surgery, and telemedicine. Conventional as well as alternative sites of healthcare services are expected to meet a specific set of goals and objectives. These goals and objectives include administrative, clinical, financial, and regulatory parameters that influence how the integration of medical technological tools are planned for, funded, and executed. It also guides how these tools are selected, installed, trained for, integrated, safely operated, serviced, upgraded, and retired or replaced. These are essentially the phases of all technology, including medical technology. The application of knowledge about the optimal management of various life-cycle phases of capital assets will maximize system utilization during each one of the phases. Capital assets management, one life-cycle phase, the process of selecting and acquiring medical technology, has not been well coordinated in most hospitals until recently [1]. In addition, financial evaluations, which rely upon net present value (NPV) and internal rate of return would consume an enormous amount of a manager's or director's time and may in fact be questionable when put in their proper context [2]. NPV is an important evaluation tool that needs to be integrated with a clinical engineering assessment when evaluating new rather than existing demand-based service lines of business or large program comparisons of alternatives based on cost efficiencies. Examples include the proposed addition of a diagnostic imaging center or the comparison of major system software packages. Examples of equipment not needing NPV analysis include defibrillators, infusion pumps, and anesthesia machines. In this case, a typical healthcare organization may have an inventory encompassing thousands of individual pieces of equipment. However, in their attempt to improve allocation of resources to medical equipment, the majority of healthcare executives have been making significant capital expenditure decisions with growing involvement of clinical engineering expertise and cost-of-ownership information [3].

The concept of management of capital assets is a far-reaching one that goes beyond merely acquiring or maintaining medical equipment and generally includes market-based demand forecasting as a method of estimating future demand for a healthcare organization's services [4]. Changing payment methodology and existing inventory operations and maintenance costs are important factors in planning the deployment of new equipment; these are management issues that merge together in the clinical environment [5]. This article describes the emerging process for managing medical technology in the hospital and the role that clinical engineers are fulfilling.

The Technology Management Program—Achieving Goals

The healthcare delivery system is going through a transition that is led by three major driving forces: cost, technology,

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