



TECHNOLOGY FRAMEWORK

Advances in biomedical technology are occurring so rapidly that healthcare professionals can barely keep abreast of the changes. And these advances have cost hospitals dearly. They spent \$10 billion on capital equipment in 1991 and an estimated \$12 billion in 1992.¹ In fact, technology is one of the major contributors to the high cost of hospital care.²

Although a new or emerging technology can benefit patients, its expense can make it inaccessible to many. The ethical implications and costs are just two considerations when acquiring a new technology. Healthcare providers also must assess a technology's quality, efficacy, and appropriateness and how it relates to existing technology. The complexity of these issues requires a systematic process for technology assessment.

In March 1990 Mercy Health Services (MHS), Farmington Hills, MI, developed a five-phase technology assessment approach to help each hospital division balance its resources with the needs of its community. The system developed the program parameters in 1989 after a literature review and visits and interviews with healthcare providers (MHS members and nonmembers) practicing some form of technology assessment. In 1991 MHS's Iowa region began a pilot program to implement the five-phase approach so a

*A System's
Five-Phase
Approach
Integrates
Values with
Vision*

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systemwide approach and recommendations could be established.

WHAT IS TECHNOLOGY ASSESSMENT?

In developing its technology assessment approach, MHS leaders, together with the corporate strategic planning department, educated executive managers and regional leaders on the characteristics necessary for a positive approach to technology assessment. A technology assessment program should:

- Be apolitical, unbiased, and objective
- Be a collaborative, multidisciplinary effort among key technology decision makers
- Attempt to reallocate existing resources or allocate limited resources regardless of the

Summary

Healthcare providers must assess how a technology can benefit patients and how it relates to existing technology. They must also look at a new technology's expense, quality, efficacy, and appropriateness. In March 1990 Mercy Health Services (MHS), Farmington Hills, MI, developed a five-phase technology assessment approach to help each hospital division balance its resources with the needs of its community.

A technology assessment approach should:

- Be apolitical, unbiased, and objective
 - Examine the relationship between existing, new, and emerging technologies
 - Balance the community's needs with the healthcare organization's resources
- The five phases of MHS's technology assessment approach are as follows:
- Baseline assessment
 - Regional vision
 - Coordination and implementation
 - Measurement and analysis
 - Report results



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amount of money being spent

- Focus on medical devices, pharmaceuticals, equipment, techniques, and procedures
- Focus on existing, new, and emerging technologies
- Examine the relationship between existing, new, and emerging technologies
- Balance the community's needs with the healthcare organization's resources

FACTORS DRIVING TECHNOLOGY ASSESSMENT

The cost of technological advances compels providers to assess their benefits. In addition, other factors will force healthcare organizations to develop technology assessment programs during the decade ahead. These factors include new quality standards, physician payment reform, capital and outpatient payment reform, and increased consumer knowledge and demand.

New Standards In January 1992 the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) implemented new standards affecting quality assessment and improvement in hospitals.³ The JCAHO is continually placing more emphasis on the relationship between quality assurance, clinical outcomes, and technology management.

Physician Payment Reform Currently, healthcare analysts can only speculate what impact the resource-based relative value scale (RBRVS) payment system will have on hospitals and physicians.

Experts anticipate significant changes in physician behavior.⁴ For example, many health policy analysts believe the use of high-technology procedures will move out of hospitals and into private or group practice settings. Hospital-based high-technology specialists such as radiologists, anesthesiologists, and pathologists will be

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hardest hit by a reduction in payments. Contractual agreements between hospitals and physicians may also be more difficult to negotiate given decreased payments to some physicians. In the coming year hospital-physician relationships will be challenged as a result of RBRVS.

Capital and Outpatient Payment Reform The Health Care Financing Administration (HCFA) is finalizing a draft proposal for Medicare capital payments to be folded into the Medicare prospective payment system.⁵ When this occurs, many hospitals could be severely limited in their access to capital for new technologies. Health policy experts predict that small and rural hospitals will be hardest hit by HCFA's move.

Hospital outpatient payments reached \$44.5 billion in 1989, more than 25 percent of hospitals' total revenue. They continued to grow to more than 35 percent of total revenues in 1990 and are expected to have continued this escalation in 1991 and 1992.⁶ HCFA's plan for fixed outpatient payments would drastically affect hospitals' ability to acquire new and emerging technologies.

Increased Consumer Knowledge and Demand Private industry continues to be the largest producer of new and emerging technologies. As technology advances, industry will increase new product marketing, advertising, and promotion. As a result, consumers will be more aware of and knowledgeable about new and emerging drugs, techniques, and treatments and will demand them from providers.

To meet this new demand, hospitals and physicians will therefore need more information about new and emerging technologies. Technology assessment programs will play an important role in preparing healthcare providers to discuss these advances with their patients.



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MHS's STRATEGIC MODEL

Healthcare organizations must ensure they provide patients with safe, effective, high-quality care. Therefore they must define their vision and goals for their technology management and assessment programs.

MHS's technology assessment approach assists the system, its hospitals, and subsidiaries in determining their technology priorities on the basis of their mission and vision.⁷ Before a member organization designs its own program, MHS recommends that it review and understand the suggested strategic model for framing and addressing future corporate and divisional technology assessment needs. The model includes the following:

- The organization's *purpose* in assessing technology

- *Allowances* for organizational variances and regional diversity and hospital divisions' differences in need and commitment, strategies, activities, and program priorities

- *Basics* such as an organizational starting point with regard to technology assessment; values, mission, and vision; how to achieve these goals; and how to measure results

TECHNOLOGY ASSESSMENT PROGRAM PARAMETERS

The structure and focus of technology assessment programs will vary according to providers' needs and their strategic planning priorities.⁸ Some

FIVE-PHASE MODEL TECHNOLOGY

Mercy Health System's (MHS's) values—mercy, human dignity, justice, service, and an option for the poor—are integral to the purpose and outcome of each step of its five-phase technology assessment model approach. Each MHS member will integrate the values of the system into its technology assessment program as it develops its program parameters and vision.

MHS designed the specified activities of each phase so that an organization could integrate or expand them as needed. The activities are in no way inclusive.

PHASE I: BASELINE ASSESSMENT

Program Parameters Involved

- Technology review
- Technology audit
- Technology management

Purpose

- Determine current technology assessment practices using a values-based framework.
- Analyze previous program efforts and results for existing, new, and emerging technologies.
- Learn how integrated MHS values are in daily decision-making practices.
- Discuss the organization's needs and preferences.
- Determine clinical areas of highest priority and establish a feasible level of coverage for the program.

Activities

- Conduct technology audits.
- Name technology teams and assessors.
- Review technology.
- Manage technology.

Outcomes

- Knowledge about past technology assessment efforts

and practices and the success of each

- Identification of key technology decision makers
- Determination of desired program parameters
- Integration of MHS values as necessary to operate efficiently and effectively

Completion Time About three to six months

PHASE II: REGIONAL VISION

Program Parameters Involved

- Technology management
- Strategic technology planning

Purpose

- Define the regional vision within the scope of MHS values.
- Achieve technology team member consensus on the program's role, purpose, and expected outcomes.
- Summarize the technology parameters required to achieve the desired outcomes.
- Choose implementation sites.

Activities

- Finalize members of the task force or technology teams.
- Identify organizational and outside technology experts.
- Establish methodologies for measuring program parameters.

Outcomes

- A clearly defined vision of where technology fits in the organization's future
- Establishment of multidisciplinary technology team to lead, direct, and implement the organization's technology assessment activities
- Technology team member consensus on methodologies to ensure consistency and objectivity

Completion Time About two to four months



common components exist, but they differ in sophistication, design, and implementation. Most technology assessment program activities fall into five basic categories (see **Box**, p. 62). Not all hospitals will have the resources, desire, or need to implement all five program parameters in their technology assessment programs.

However, MHS's Five-Phase Model Technology Assessment approach does include all the parameters. The model need not be implemented in chronological sequence, but it can be if existing organizational technology assessment structures and activities are limited and require greater focus and direction. The **Box** below describes MHS's five-phase model.

INITIAL RESULTS

MHS launched its technology assessment pilot in the Iowa region in March 1991. Since then the system has accomplished much:

- MHS's Iowa regional executive managers have implemented phase I (baseline assessment) in their region. They have defined program parameters, discussed and outlined expected outcomes, and reviewed measurement mechanisms for each program parameter. They are now in phase II—determining what their regional vision will be.

- I established a computerized log of technology assessment requests in the fall of 1991. This ongoing record of the demand for technology

ASSESSMENT APPROACH

PHASE III: COORDINATION AND IMPLEMENTATION

Program Parameters Involved

- Technology management
- Technology assessment

Purpose

- Organize human, financial, and organizational resources.
- Educate technology team members on established methodologies.
- Implement strategies for program parameters.
- Coordinate and implement regional program efforts with commitment and consistency of purpose and vision.

Activities

- Implement the program at various sites.
- Use standardized tools for technology activities.
- Conduct technology team meetings.
- Monitor results.

Outcomes

- Program coordination
- Multidisciplinary collaboration on technology decisions
- Technology team consensus on technology approach
- Consistency in methodologies established
- Objective, apolitical results

Completion Time About six to twelve months

PHASE IV: MEASUREMENT AND ANALYSIS

Program Parameters Involved

- Technology assessment

Purpose

- Objectively measure program results.
- Compare baseline efforts with program results.
- Determine benefits and value added to the organization.

Activities

- Measure program parameters.

- Establish focus groups and expert panels.
- Prepare white papers.
- Produce summary reports on findings.

Outcomes

- Measurable results
- Reports on key findings and mechanisms in place
- An illustration of the benefits of a values-driven technology assessment model

Completion Time About one to three months

PHASE V: REPORT RESULTS

Program Parameters Involved

- Technology assessment
- Strategic technology planning

Purpose

- Share results with the organization and the community.
- Communicate the utility and value of technology to the organization and the community.
- Communicate about the integration of values with decision making and its effect on outcomes.

Activities

- Report impact, cost-benefit ratio, and cost-effectiveness determined in phase IV.
- Provide case studies.

Outcomes

- The opportunity to share results with the community, other providers, third parties, and managed care entities
- The ability to illustrate the linkage between mission, organizational values and vision, and established program parameters and results

• The chance to illustrate how linkages can be achieved and sustained

Completion Time About one to two months



assessment services requested of divisions and subsidiaries will be distributed quarterly systemwide. MHS executive managers will then review the log to determine whether human and financial resources need to be increased to respond to the divisions' needs. Hospitals have requested information on such topics as cardiac catheterization mobile laboratories and stereotactic neurosurgery techniques.

- MHS's strategic planning staff and an Iowa regional planner completed site visits to gather information at four Iowa hospital divisions in June 1992.

- A systemwide board education program and management workshop was held in fall 1992. A technology workshop is scheduled for fiscal year 1993.

- I completed a preliminary draft of a workbook to guide system members in the development and design of their own five-phase technology assessment program.

- In spring 1992 I gave a system resource directory to the MHS Iowa division that lists division and subsidiary technology team members. This listing allows technology team members to find out who assesses technology in the

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various facilities. They can then contact one another to discuss technology information, business plans, and experiences.

- One Iowa division and three of eleven Michigan divisions have drafted regional technology plans. MHS expects all four Iowa divisions to have regional technology plans in place by the end of fiscal year 1993.

ASSESSMENT IN THE REAL WORLD

Healthcare organizations need to establish technology assessment programs to stay informed about new and emerging technological advances. A variety of approaches are described in the literature; however, program definitions, scope, and priorities vary. Healthcare organizations may find that regional technology networks that further collaborative efforts help in technology assessment. Providers must begin working more closely when planning which services to provide. Their goal should be to decrease duplication and increase quality.

The future is bright, full of technological advances and new opportunities; however, providers must keep in mind the caution words of journalist Walter Lippmann: "A rational man acting in the real world may be defined as one who decides where he will strike a balance between what he desires and what can be done. It is only in imaginary worlds that we can do whatever we wish." □

COMMON TECHNOLOGY ASSESSMENT PROGRAM PARAMETERS

Technology Review A review of literature on and vendors of existing or emerging medical devices, equipment, techniques, and procedures. The review may be cursory or in-depth, as needed. Findings are summarized and shared with designated parties.

Technology Audit A process that involves an inventory of existing equipment and devices; an examination of clinical and technical appropriateness; and an identification of priorities for upgrading, replacing, and retiring technologies.

Technology Management A comprehensive mechanism designed to structure and focus an institution's technology activities to decrease costs, risks, and liabilities for those who use such a program.

Technology Assessment An analytical, value-driven, visionary process that integrates scientific facts and technological information into a framework for decision making when evaluating existing and emerging technologies.

Strategic Technology Planning A long-term rational process for setting priorities for an institution's technology needs. The process involves the coordination and integration of technology management, assessments, their impact, and the institution's strategic and financial plan and operating goals.

NOTES

1. ECRI Health Technology Trends, Plymouth Meeting, PA, August 1991 and January 1992.
2. Dean C. Coddington et al., "Factors Driving Costs Must Figure into Reform," *Healthcare Financial Management*, July 1991, pp. 44-62.
3. ECRI Special Report, "Technology Management: Preparing Your Hospitals for the 1990's," Plymouth Meeting, PA, Spring 1989.
4. Mary T. Koska, "Hospitals Begin Strategic Planning for RBRVS," *Hospitals*, February 20, 1991, pp. 28-30; Mary T. Koska, "Has HCFA 'Broken Faith' with Its New Physician Fee Schedule?" *Hospitals*, August 20, 1991, pp. 28-30.
5. Wendy W. Herr, "Taking a Deep Breath over Capital Payments," *Healthcare Financial Management*, April 1991, pp. 19-32; James Scott, American Healthcare System Institute memo, San Diego, June 1991.
6. Herr.
7. Theresa L. Stempien, American Hospital Association presentation, "Technology Assessment: A Role for Governance," Chicago, August 1991.
8. Stempien.