American Bankruptcy Institute Law Review

Volume 8 Number 1 Spring 2000

INFORMATION TECHNOLOGY AND HOSPITAL CLOSURES

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The Internet is changing the delivery of healthcare services. A radiologist, from her home, studies a set of pictures at 2:00 a.m. for an Emergency Room patient who has been in an accident. A physician answers a long distance telephone call at home from a patient regarding medications, and is able to concurrently retrieve the patient's medical record via the Internet before giving guidance on the interaction of the pharmaceutical products being taken by the patient. A referring physician in a small city receives pictures via the Internet of a patient's outcome from surgery simultaneously as the patient is being moved to the medical center's recovery room in Houston, Texas. These observations by an academic research team in 1998 are becoming more prevalent in 2000. [1]

Leading medical centers and physician group practices have made major changes in information technology over the past 36 months. Most hospitals, however, have been able to make only limited investments in information technology and thus do not have the necessary high−speed communication networks to support the above Internet examples. A 1998 study of forty−four hospitals and health systems representing 576 hospitals found that many hospitals did not have an electronic medical record interfaced with all application modules and medical devices. [2] This group of hospitals' information systems were more indicative of the early 1980s than the late 1990s, as many major medical devices had not been interfaced with the hospital information system.

A. Medical Devices

Numerous medical devices are used in the delivery of medical and healthcare services to patients. A small community hospital may have 2,500 medical devices, while a 250−bed community hospital may have 3,500 medical devices. A major medical center may have 7,000 or more medical devices. Community hospitals with returns to net patient revenue in excess of 6.25% (classified as being in the strategic planning phase) replaced many medical devices that were not Y2K compatible during 1998 and 1999, [3] but only forty−four percent of community hospitals are classified as members of this phase. As a result, many of the distressed and struggling community hospitals did not have the financial resources to replace old medical devices by year 2000. [4]

To illustrate this point, a distressed medical center in the 1998 research study, which owned eight hospitals containing more than 2,200 beds, had over 40,000 medical devices. An examination of these devices indicated that more than 5,000 had to be discarded in 1999 because their functionality was flawed by Y2K. Another 8,000 devices would continue to perform appropriate services, but any printout of dates would be incorrect. The distressed medical center plans on using many of these 8,000 devices through at least 2003 because it lacks the funds to replace these essential medical devices. To underscore the distressed status of the medical center, it was announced in late 1999 that one of the eight hospitals would be closed in 2000.

B. Interfaces

Numerous computerized medical devices are used in assessing or delivering health services. However, there is no current need for all of these technological capabilities to be interfaced with either the hospital information system (HIS) or the clinical information system (CIS). These types of independent devices are referred to as *stand alone* devices.

Some medical devices have a *one−way interface* with the HIS or CIS for processing the ordering of a test, procedure, or activity for a given patient. The order set includes required patient information that may be used in performing the test, procedure, or activity or in assessing the outcome. Detailed information is not currently required to be transferred from the medical device to the patient record or to the ordering physician.

Other medical devices have a *two−way interface* with the HIS or CIS for processing the ordering of a test, procedure, or activity for a given patient and then transmitting the results or outcomes. A protocol for the data elements included in the transmission of results or outcomes must be approved by physicians, nurses, technicians, accountants, administrators, medical records personnel, and staff.

Hospital laboratory departments have medical devices in all three existing categories— stand alone, one−way interfaces, and two−way interfaces. By 1979, more than thirty−five percent of community hospitals had two−way interfaces with hematology and chemistry devices in their laboratories. [5] During the 1980s, the laboratory information system (LIS) became a standard CIS in most hospitals that encompassed hematology, chemistry, microbiology, cytology, histology, pathology, oncology, autopsy, RIA (radioimmunoassay) and special chemistry, blood bank, and blood operations.

CISs for radiology and pharmacy were widely implemented in the late 1970s and early 1980s. One major HIS vendor had installed pharmacy systems in more than 450 hospitals by 1983 that were interfaced with the HIS. [6] The CISs for radiology and pharmacy were significantly revised and expanded in the 1990s to coincide with advancements in medical technology, diagnostic assessments, and pharmaceutical products. In addition, transcription of radiology, cardiology, and pathology results were added to the information flows and stored in medical records.

Before most community hospitals were able to fully integrate all CISs with the HIS in a high−speed network, new demands were imposed on facilities for outcomes assessment, quality management, and order management when dealing with remote sites. Distressed and struggling community hospitals did not have sufficient information technology (IT) staff to concurrently respond to new requests and at the same time complete the integration of old HIS and CIS modules. If the CISs were not fully integrated with the HIS, the resulting electronic medical record (EMR) would remain incomplete. As a result, most of the distressed and struggling hospitals in the 1998 research study did not have an EMR that fully encompassed all major clinical departments.

As the new IT modules that were implemented in the 1990s came from diverse vendors, a common person identifier was not able to be established in many hospitals. However, distressed community hospitals are beginning to address the requirement that a common person identifier must exist before substantial progress can be made on an enhanced EMR.

Currently, many distressed and struggling community hospitals have two strikes against their HIS. First, many medical devices are not Y2K compatible and must be addressed by one−way interfaces. Second, independent CISs within the hospital are not currently interfaced in a high−speed two−way network that can handle inquiries, order entries, and full result reporting. To provide a perspective on these interface problems, one major medical center has forty−one significant interfaces among major CISs and HIS plus a series of admission−discharge−transfer (ADT) interfaces. A significant investment in IT staff is required to maintain all of these interfaces, but distressed and struggling hospitals are unable to provide an adequate IT staff to maintain and support these modules.

C. Internet

Chief executive officers (CEOs) in many leading medical centers and proactive community hospitals realized by 1996 that the acquisition of physician practice groups was not always successful in enhancing referral patterns in the marketplace. Instead, some CEOs followed a "win−win" approach, where physicians' ability to interact with the hospital's CISs and HIS were strengthened, and the physicians were able to save time from an efficient business−office module. As the CEOs followed this dual approach, they closely adhered to established fraud and abuse guidelines, thus billing the medical groups at cost for the community hospital's IT assistance. The first module is referred to as the "physician−office−clinical connectivity" application. The second set of applications for the independent medical group is called "physician−office−financial−and−administrative systems."

Being sensitive to the unique requirements of physicians who may be new to the computer, the CEOs assigned members of the hospital's IT staff to the physician offices following implementation of the new modules. Specifically, the hospital IT staff members were given hospital projects which could be performed on their laptop computers from remote locations—specifically, the offices of the various physician groups. These IT personnel were, in reality, merely "baby sitting" the new modules. When a physician would approach a computer, the IT staff member would observe and assist (if necessary) the physician in having a successful interaction with the hospital's database or with the medical group's financial and administrative systems. These IT staff members assured the medical groups of a supportive environment in which the "least computer−oriented" physicians would receive individual assistance in interacting over the Internet with patient records, results reporting, and order entry.

Once physicians began to access the hospital's database from various locations, leading medical centers and proactive hospitals made additional IT investments. Connectivity of medical and health service modules was enhanced by major investments in high−speed picture, voice and data networks. In addition, Picture Archiving and Communication Systems (PACS) for radiology images were acquired to permit physicians to access all relevant patient information from various remote sites. [7] Then, an enterprise−wide scheduling module was implemented to fully support physicians in their offices, clinics, medical centers, and other locations. Through enterprise−wide scheduling, physicians are able to coordinate patient visits at various ancillary and support centers in an efficient and effective manner. These modules are not only a "win−win" for hospitals and physicians, but they are also beneficial to patients due to increased efficiency, effectiveness, and coordination of healthcare activities.

D. Return on Net Patient Revenue

A hospital must have a positive return in its Statement of Operations in order to "break even." [8] In healthcare, accounting problems arise when in matching costs against revenues medical technology is amortized over longer periods of time than will be realized. Depreciation is based on historical costs and is not related to current market or replacement values. As a result, some distressed and struggling hospitals may have a positive return on net patient revenue, because they are providing healthcare services with almost fully depreciated equipment. This set of distressed and struggling hospitals then report a nominal depreciation expense on the Statement of Operations because of the obsolete nature of significant segments of the medical technology currently employed.

A 5% return on net patient revenue is a general benchmark in a hospital before a financial analyst will even begin to perform a financial assessment for possible issuance of investment−grade securities. Another minimum guideline is that a hospital's depreciation expenses must be at least 5% of total operating expenses for an established hospital that is not leasing the facilities and equipment from another party. Generally, depreciation expenses for implementing and proactive hospitals are usually 6−8% of total operating expenses.

This 5% return on net operating revenue is necessary to provide financial reserves to cope with timing differences, delays in collection, and supporting transition periods for new technology. Hospital inpatients are billed within five days after discharge or on a monthly basis for long hospital stays. However, salaries, supplies, disposable equipment, contractual services, utilities, and other items must often be paid before third−party payers are billed. This timing difference means that the hospital must have sufficient financial reserves to pay for the services before patients are even billed.

Establishing financial reserves for support during the delayed collection period begins when the claims are transmitted to various third−party payers. Fiscal intermediaries for the Medicare program and Blue Cross tend to pay within fifteen days for a "clean" bill. [9] Major insurance carriers will often pay within forty−five days for a "clean" patient bill. It is not unusual for some managed care groups and health maintenance organizations (HMOs) to only pay after 90 to 120 days by extending the collection period through a series of structured questions by the processors. In a State where clean bills must be paid within forty−five days, HMOs may wait until after the fortieth day before starting to question a claim. Each new response starts the clock over again for required payments, amounting to an additional forty−five days for a clean claim.

Financial reserves are also required to offset possible losses in selected departments where medical technology is in the process of being implemented. Resources are required to train physicians, technicians, healthcare professionals

and staff on new medical practices supported by advanced technology and new treatment modalities. After training and implementation of new capabilities, it may take a few months for physicians, technicians, and other professional staff members to develop the necessary skills in using the new technology to be able to treat or provide services to the minimum number of patients necessary to break even. During a transition period, there may also be special requirements necessary to continue to provide selected medical services to existing patients in a low−volume program that is being discontinued. Financial reserves are required both for the start−up period with new medical technology and for the phase−out period with old technology.

E. Days Cash On Hand

After the Medicare program shifted in the 1980s from a Periodic Interim Payment (PIP) arrangement to a system providing payment within fifteen days after services were provided, financial analysts began to measure the financial pressures on hospitals by a series of liquidity ratios. One important example is the *days cash on hand* ratio, which is computed in two steps. First, "total operating expenses less depreciation" is divided by 365 to compute the "average cash expenditures per day." Second, the summation of "unrestricted cash and investments plus unrestricted board designed funds" is divided by "average cash expenditures per day."

Days cash on hand

indicates the number of days of liquid reserves on hand to pay for regular healthcare expenses, including salaries, wages, fringe benefits, contractual services, supplies, utilities, maintenance, and other services. This measure of liquid reserves informs financial analysts as to the individual hospital's ability to cope with delays of 90 to 120 days in collections from managed care plans and HMOs. This becomes highly relevant as, in some locations, delays in collection from the Medicaid program toward the end of the State's fiscal year range from 90 to 150 days.

Financial analysts have increased the acceptable range of values for *days cash on hand* by thirty days for the years 1996 through 1999. The 1999 assessments are based on 1998 certified financial statements. In 1996, an investment grade nonprofit hospital bond with a rating of A (which is 80 on a 100−point scale) had a median value of 137.5 days; by 1999 the median value for an A rated bond was 167 days. [10]

In 1998, community hospitals and some specialized facilities began to experience reductions in payments for inpatients from the Medicare program under the Balance Budget Act (BBA) of 1997. [11] Other provisions of the BBA were implemented in 1999 and 2000 that further reduced hospital payments for outpatients, nursing home units, rehabilitation facilities, and ambulatory surgical centers.

F. Hospital Closures

Distressed and struggling hospitals with returns of less than 5% on net patient revenue will not qualify for the issuance of investor−grade securities to support the acquisition of medical technology. Where the facility is owned by the county, district or city, the governmental body may elect to issue investor−grade securities for the benefit of the hospital. Otherwise, financial resources are not available at a reasonable interest rate for investing in medical technology and advancements in medical practice.

There are two major aspects of investments in medical technology. The first is the availability of resources for the current investment. The second is the speed in which current technology in medical practice is replaced by new advancements. These factors result in many distressed and struggling hospitals being unable to fully participate in the medical technology race.

Hospital closures may occur if the community feels that advancements in medical technology are occurring more rapidly than the distressed hospital is able to maintain "acceptable" current medical practice. Where the distressed facility is a non−government rural hospital, there is the additional risk that the medical technology offered in clinics owned by physician−practice−management (PPM) groups may be the final dagger for the rural hospital, despite special payments from governmental agencies. Other than a few exceptions, most distressed urban hospitals do not receive special payments from governmental agencies, and may be subject to strong competition from PPM clinics,

outpatient facilities, and other hospitals with current medical technology.

Many distressed and struggling hospitals have IT investments that, at best, are indicative of the early 1990s. In these facilities, all major medical devices are not interfaced with the HIS, so that a complete EMR is not available. The research team conducting the 1998 field study visited hospitals who were trying to provide interactive retrieval capabilities for physicians when key medical devices were excluded from the data set. [12] It is expected that the competitive marketplace in urban areas will cause some of these hospitals to close before the IT staff can interface the other major medical devices. These same distressed and struggling facilities have not replaced the medical devices that were not Y2K "correctable."

It is expected that the annual number of hospital closures will increase over the next five years because of the impact of BBA, aggressive efforts to monitor fraud and abuse, Y2K issues, and marketplace pressures for IT and medical technology. Proactive and implementing hospitals are assisting physicians in interacting with their hospital databases and permitting them to perform enterprise−wide scheduling for various locations. Patients, during a visit to a physician's office or clinic are able to see the advantages from the EMR and to experience the convenience of sequential scheduling of medical and healthcare services by their physicians. As other community members hear about these advantages and time−saving efforts in scheduling of multiple tests and activities, their loyalty for continuing to receive services at distressed or struggling hospitals may disappear.

An analysis of the American Hospital Association's registered hospitals indicated that 329 hospitals closed between 1993 and 1998 and another 239 hospitals were dropped from registration with the American Hospital Association as a result of merger activities. [13] These hospitals that closed or experienced a discontinuation of services at a merged location included 154 hospitals representing federal, psychiatric, TB and other respiratory diseases, and hospital units of institutions. Thus, 414 community hospitals were dropped from the registry between 1993 and 1998 before BBA was implemented and many IT issues occurred.

Conclusion

It is projected that at least 800 community hospitals will close or cease to be registered because of merger activities over the next sixty months. The BBA reductions will push more than 800 community hospitals toward closure, but, it is expected that the federal government will save at least 200 distressed community hospitals in rural areas by giving them special payments.

The Internet is changing how the general public views healthcare services. Many individuals spend hours each day on the Internet researching issues on pharmaceutical products, medical treatment programs for specific diseases, alternative medicines, and quality assessments of hospitals and clinics. In addition, there are "chat−rooms" for Internet discussions on various medical and healthcare issues. The intensity to which the Internet is being used in 2000 for healthcare inquiries has exceeded the expectations by most IT professionals. It is believed that this Internet experience will change the minimum levels of acceptable IT activities by hospitals over the next four years.

It is believed that, over the next four years, the marketplace will demand that all major medical devices in a hospital be interfaced with the HIS so as to complete the EMR. High−speed communication networks for voice, pictures, and data that connect the hospital's EMR to physicians at various locations will become a necessity in many urban areas as the general public increases their use of the Internet. Enterprise−wide scheduling by physicians of tests, procedures, treatments, operations, and activities will become a normal capability for even struggling community hospitals by 2004, if not earlier.

At the same time the Internet increases financial pressures on community hospitals for investments in IT and medical technology, the BBA is significantly reducing payments to hospitals for services to inpatient, outpatient, nursing home, rehabilitation treatments, and ambulatory surgical units. Advancements in technology are permitting PPM clinics to offer complex surgical procedures in an ambulatory setting that is directly in competition with those services traditionally offered by hospitals. These factors may lead to more hospital closings in the near future unless increases in IT funding are provided to the struggling hospitals.

FOOTNOTES:

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[1] See

Thomas R. Prince & Julie A. Sullivan, *Financial Viability, Medical Technology, and Hospital Closures,* J. Healthcare Fin., (forthcoming Summer 2000); Thomas R. Prince & Julie A. Sullivan, *Assessing Medical Technology Investments and Y2K Status: The Hidden Bankruptcy Crisis*, Com. Lending Rev., Fall 1999, at 17−22. Back To Text

[2] See

Prince & Sullivan, *Financial Viability, Medical Technology, and Hospital Closures, supra* note 1; Prince & Sullivan, *Assessing Medical Technology Investments and Y2K Status: The Hidden Bankruptcy Crisis*, *supra* note 1. Back To Text

[3] Community hospitals with returns that are less than 6.25% are classified as members of the reacting phase and includes two groups—distressed and struggling. Community hospitals in the strategic planning phase have two groups—implementing and proactive. *See* Thomas R. Prince, *Financial Statement Analysis*, *in* Strategic Management for Healthcare Entities; Creative Frameworks for Financial and Operational Analysis (1998). Back To Text

[4] Id

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[5] Computed from a computer tape containing data on the 2,496 participating hospitals in the 1979 survey of hospital information systems (Chicago: American Hospital Association, 1980). Back To Text

[6] Thomas R. Prince was an expert witness representing a medical center in a legal case in 1983 against this vendor (name withheld per written agreement). Back To Text

[7] See

Thomas R. Prince et al., *What Is Your Institutional IT Quotient?*, Decisions in Imaging Economics, July/August 1999, at 44−50. Back To Text

[8] These comments are based on the certified financial statements. There are excluded items on the Medicare cost report, and it is not meaningful to use the Medicare cost report as a basis for strategic financial assessment. *See* Stuart H. Altman et al., *Financial Viability Measures for Hospitals and Healthcare Systems*, Supplement to Healthcare Financial Management, December 1999, at 9−13 (documenting discussion on Medicare cost report). Back To Text

[9] A "clean" bill means that each and every data element on a claim form has been properly answered. Even when all data elements are answered, the claims processor may have questions about the appropriateness of the services provided. It has been suggested that some claim processors may be selective, not only by institution, but also by physician, as to when a claim submission is classified as a "clean" bill. The adjective "clean" indicates that there are no residual questions preventing the claim from being paid. Back To Text

[10] See

Martin D. Arrick et al., *Healthcare in the U.S.: Financial Pressures Mount for a Rapidly Changing Sector*, Standard & Poor's CreditWeek Mun., October 25, 1999, at 9−23; Jordan R. Melick et al., *Healthcare Special Report; Median Financial Ratios for Not−For−Profit Hospitals*, FitchIBCA, October 8, 1999, at 1−8. Back To Text

[11] Balanced Budget Act, Pub. L. No. 105−33, 111 Stat. 251 (1997). Back To Text

[12] See

Prince & Sullivan, Financial Viability, Medical Technology, and Hospital Closures, supra note 1. Back To Text

[13] Data provided by Mr. Peter D. Kralovec at Health Forum, an affiliate of the American Hospital Association (Chicago, IL, January 2000). Back To Text