“Anticipating Information Needs for Clinicians”

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Anticipating Information Needs for Clinicians

“Even small healthcare organizations are complex, barely manageable place… Large healthcare organizations may be the most complex in human history.”

Peter Drucker

The complexity of healthcare delivery in both small and large organizations complicates the management aspects of the healthcare delivery system. The goal for these systems has to be to consolidate, simplify and integrate the many disparate components comprising healthcare. This requires the integration of information into usable components that assist in the treatment of patients in a timely and cost-effective manner to achieve excellent clinical outcomes.

Anticipating the Needs for Clinicians

To anticipate the needs of clinicians within the health sector one needs to take into account the following driving forces:

- Changing Environment
- Demographics and the aging population
- Expenditures
- Reimbursement
- Skilled Work Force
- Financing
- Technology Evolution

Each of these areas has a significant impact on the anticipated needs of clinicians. Some will push the needs forward and other will place a drag on the forward process. A careful understanding each of these forces may help shape the future requirements, guide the development of a plan, and provide a call to action. This document will explore each driving force briefly before concentrating on Technology.
Factors Driving Information Needs of Clinicians

Changing Environment

There is a push by the Baby Boomers and the Graying Society for more healthcare to both increase their life expectancy and the quality of their lives. As people live longer, we have a growing proportion of the population with many chronic illnesses, yet people refuse to live in pain and suffering and are spending more time looking for a remedy. This pushes and taxes the healthcare system further as these consumers and patients seek a better quality of life.

These people expect healthcare to be readily available and without long delays for appointments or treatment. They fully expect healthcare to be provided in a comfortable and convenient environment. They expect easy and affordable access. The demand continues to grow. This group expects to see disease screening and aggressive diagnostic evaluations and treatment. They expect the treatment as a “right” of living in the US and not a privilege.

We have seen a very effective lobbying by the more mature population aged with AARP. AARP has tremendous power in driving governmental regulations and services for the “graying society.” We will see a growing and strong push for and from the poor and uninsured. They will become a great coalition power over time. Their demands will be for more and better services also increasing demand for accessible and affordable healthcare services.

To meet these expectations and to differentiate their services, healthcare facilities offer valet service, elaborate visiting areas, outreach clinics, surgery centers, specialty
hospitals, home care and other services. Patients, consumers, employers, and affinity groups such as AARP have become strong lobbying organizations and their voice is heard by elected officials as these constituencies attempt to shape the allocation of healthcare resources, spending, and regulation. The demand for services is increasing faster than the ability to fund it and the allocation and rationing of healthcare is a highly political process.

Those in the hospital will be sicker and require more medical attention. As our society continues to move to an outpatient care environment, patients in hospitals have more complex problems. Patients in hospitals not only need more individual attention but they need more equipment, product and services to treat their illness(es).

Compounded by the aging of the population, three major conditions are affecting our care processes: hypertension, diabetes, and obesity. People will need more attention at a much earlier age than they have in prior generations. There will also be an increase demand for services for allergies, disease management, wellness programs and hospital case mix will shift to greater acuity thus requiring more resources.

Consumerism is growing. The public wants easy access, convenience, amenities and ambiance. This is enhancing the life style of the individual and provides for a more comfortable healthcare environment. They prefer to have information access and self service. They can do many things on their own schedule and, in a more convenient environment.

In summary, the demands for healthcare will grow as pressure is applied from all levels. This demand is complicated by the workforce issues surrounding healthcare.

**Skilled Workforce**

There is an enormous demand for healthcare workers. Yet at the same time, there is a shrinking supply of qualified workers. In addition, to a shortage of health professionals, a corresponding shortage of education programs and enrollment will push hospitals to make better use of existing employees and to create new ways to attract, educate, retain, and use physicians, nurses, technologists, allied health workers and other assistive personnel.

Over the years, medical and nursing schools have produced a finite number of graduates. These trained professionals are not always staying involved in the direct delivery of patient care. Many life science companies are successfully competing for healthcare worker skill sets. It is no secret that the standard of living of a primary care physician or a nurse can leave a lot to be desired. Professionals are finding the option of regular work hours, reduced stress, avoidable expense for malpractice insurance and other benefits far more attractive than working in the current healthcare environment.; all contributing to the lack of available staff during specific time periods. The opportunities and pressure is less in the urban areas, but the income potential, lack of things-to-do and need for
specialist is greatly reduced. Thus, the rural communities have a difficult time attracting and retaining quality medical staff.

Nursing and allied health personnel have been underpaid for years. This lack of pay, compounded by the general lack of appreciation and the extreme pressure of dealing with sick people leads them to seek other more fruitful occupations. Many times it just results in certified medical staff just spending more time with their family or other interests. As a result, we are generally understaffed with many foreign nurses coming to practice in the United States.

During the next 15 years the U.S. healthcare system, particularly inpatient institutions, will face two critical workforce problems:

- Not enough workers
- Available workers will not have the skills needed for the advanced technical system that are emerging, women in particular are seeking more balance between the professional life and family resulting in reduced work hours

These conclusions demonstrate the severity of the issue. In response, hospitals will compensate with benefits and pay that increases with levels of technology that will compensate for the lack of staff. This will address part of the problem. We have seen the workforce issues paralleled in the laboratory environment where cannot enough Medical Technologists are trained (issues similar to nursing). This problem became more complicated with diseases such as AIDS as Medical Technologist’s do not want to be exposed to this serious disease. While the industry has responded with more advanced laboratory instruments and slight increases in school enrollments, there are nonetheless shortages in Medical Technologists due to insufficient number of training programs, many inactive licenses and perceived low wages.

Historically, teaching hospitals have been given a slightly greater reimbursement for Medicare and Medicaid patients who have helped defray the cost of training healthcare professionals. In recent years, however, this reimbursement has been limited and has caused some hospitals to turn away from teaching and resident programs. This will need to be rationalized in the future. Training is a requirement.

The same problem is true for allied health personnel. It is declining at an alarming rate across the nation. There is a structural deficit in the number of people in the pipeline.

Workforce issues are complicated even further by the life style people want to live. Employees want shorter work weeks and more flexible time. They do not want to work without breaks or take call every other weekend. They want to have more personal time and not have to take their work home with them. Physicians are joining groups to insure they do not have to work long extended periods or take repetitive call. Other healthcare professionals are following the model.

Physicians whose career horizon does not extend far past 2010 can probably do quite well by continuing to practice as they are at present. Nevertheless, the young physicians need
to be prepared for the pay for performance (P4P) environment and close relationships with nearby hospitals. The coordination between hospital care processes and physician directed care orders requires the use of advanced health information technology systems in order to succeed in implementation and daily use.

Cost

We are seeing major swings to outpatient services to help shift cost. In addition, health responsibility is being pushed more to the individual and the family. Cumulatively, these changes are causing a major shift from inpatient to outpatient services. With fewer trained healthcare professionals and the increase in the “graying society”, these trends will continue.

For most hospitals and health systems, labor costs exceed 50% of the budget. Labor is still and will remain the major contributor to cost. In the future it is expected that “value” will drive the payment for services. Future payments will be outcome based and are expected to drive down cost and increase quality. There will be an effort to push best practices supported by data collected in transparency. The measurable outcome of best practice is expected to benefit both inpatients and outpatients.

Cost management imperatives are a must. Incentives for hospitals will continue to push many procedures to the outpatient setting. Physician incentives on a pay for performance (P4P) basis will give higher payments for office procedures, thereby driving volumes even higher in the outpatient arena.

The highest value delivery options will be stressed by focusing on the location of the service, physician assistants, and strict formularies and protocols. Some of these initiatives will also be the lowest cost for that episode. The future will continue to see easy access specialty referral hospitals focused on short term stays focused on proven outcome procedures. Specialty hospitals will be sponsored by healthcare systems, private enterprise and groups of specialty physicians. The smaller community hospitals will continue to be major referral centers to both specialty and tertiary care hospitals. Home care will continue to be expanded and more dependence will be placed on families and friends to care for patients.

Telemedicine will add more capabilities to smaller hospitals and specialty facilities. The technology will assist local physicals to perform more service.
The factors contributing to the huge outpatient shift in the last 25 years involve:

- Emerging technology
  - Advances in imaging capabilities (screening, diagnostic and image guided procedures)
  - Shift to minimally invasive surgeries, interventional procedures
  - Emerging rapid and point-of-care diagnostic procedures
- Care management (increase chronic disease management programs, reducing hospital admissions)
- Cost reduction imperative (incentives for hospitals to use OP settings to reduce costs)
- Market competition (proliferation of freestanding, corporate or physician owned facilities; direct-to-consumer marketing)
- Consumer preferences (easy access to facilities, convenient scheduling of services, expanded amenities [valet service, family waiting areas, etc.])
- Physician incentives (P4P, higher payments for office procedures)

Today, Tenet says “32% of net operating revenue is from outpatient areas like imaging and diagnostic centers, surgery centers and outpatient facilities.

Outpatient volumes and revenues will continue to grow. Outpatient activity is moving to other specialty procedures that are made possible by advanced technology. The larger healthcare systems are focused on quality care at the lowest possible price. As technologies for treatment are improved and additional non-invasive produces are discovered and proven, the trend to outpatient will grow even more.
It today’s environment there are relatively few minimally invasive procedures (MIP); experts estimate that within 10 years 80% of today’s procedures will be MIP. This will dramatically impact the use and need for technology. More information will need to be shared across the continuum of care. This means that all systems, including those in physician offices will have to feed a patient centered electronic record in order to obtain a full view of a patient’s medical history and treatment regimen.

Over the past 25 years the number of outpatient surgeries has increased by 2.5 times, this will only increase in the future. And, as minimally invasive procedures increase, we will continue to see the conversion of hospital inpatient space to more elaborate outpatient settings.

Surgical breakthroughs will incorporate emerging technologies with information technology (IT). The expanded use of technology means that riskier patients will become candidates for surgery offsetting some of the declines in length of stay and increasing the risk of complications and adverse outcomes. Technology will dramatically alter the way in which surgical suites, patient beds, diagnostic centers and the emergency department are designed. Point of care (POC) testing will allow reductions in central labs or their replacement by shared labs within local systems. New treatment modalities such as MIS, imaging and infusion are likely to shift an even greater number of procedures to the outpatient setting. For traditional hospital stays, IT will support the patient shift to new locations for treatment and in the case of eICU, location of the treating provider.
Reimbursement

Outcome based reimbursement will drive better outcomes and reduce medical errors. In the hospital, care and disease management models will be pushed aggressively. The presence of hospitalists will facilitate this process. Physicians employed by the hospital will be more duty bound to follow strict care protocols as opposed to independent physicians.

Considerable time will be spent reengineering the healthcare delivery process based on best outcomes. The process will include the industry standard of Lean, Six Sigma, best practice and QA monitoring. Reengineering efforts will help reduce and control cost. Physicians that are a part of managed care organizations will have required adherence to care protocols. Health care delivery system physicians will also bear expectations to follow best practices. The hospitalist will end up policing these activities through administration, the medical director and robust use of transparent data.

Reimbursement will be driven by care management. We will see an increase in chronic disease management programs and reduced hospital admissions for chronic diseases. The physician and nursing treatment plans will be critical to reimbursement. Standards of care will be used to control spending and increase quality. Deviations from the standard of care will have to be well documented for reimbursement; computer aided documentation will be critical. The move to hospitalists by larger facilities will facilitate this practice, while the smaller hospitals will struggle as they work with physicians and nurses to document the care.

Healthcare IT systems will be used to track outcomes and medical errors much more closely. Responsible parties will become much more apparent. There will be a requirement at all organizations to facilitate best practice and improve patient safety. If P4P rewards quality of care and cost control, then this will forge a new level of cooperation between the hospital and physician for both IP and OP care. In fact, it will cause a level of cooperation across the continuum of care between the doctors and hospitals.

Finance

The free market and the more tightly regulated industries will be increasingly data driven to increase operating efficiencies. This will greatly push need for IT and IT sharing in medical facilities. This expansion will include data, voice and images. It will also include the ability to turn data into useful information.

Healthcare is a very significant part of the Gross National Product in the United States. It continues to be at 14% of the GNP. Many people would like to see it shrink, but it has shown no apparent signs of dropping. Americas demand for services exceed the expectations of all other nations. Americans are demanding the advantages of healthcare to help improve the quality of life.
The drive to make healthcare cheaper and more affordable is fueling a proliferation of freestanding, corporate or physician-owned facilities and direct-to-consumer marketing, which today is under close scrutiny. In these arrangements, the large overhead of a hospital and its broad range of many service departments is removed. Some hospitals have contracted with physicians for cardiac services. In order to provide this service they merely bring in a specialized trailer in the parking lot and perform the surgeries there. This is happening with image centers, surgical centers and many other special procedures. While carving out these seemingly profitable areas of healthcare delivery is attractive the responsibility towards the national betterment of healthcare delivery as a whole is in question. What, for example, are the responsibilities of these types of facilities when it comes to emergency care, mitigating diseases such as diabetes, etc.?

The changes with Stark Legislation will allow creative partnerships between physicians and healthcare organizations. Both parties will be looking for “safe harbors” that provide mutual benefit. Hospitals will want to gain physician loyalty by providing products and services to the physicians. The physicians will be looking to reduce their costs and maintain some independence. This will add a new level of service to the hospital IT staff to very demanding users and potentially additional software programs.

There will be creative capitalization and asset ownership. The market will see off balance sheet financing, condo type facilities, leased specialties and multiple facility owners. All of these will be focused on spreading the wealth and risk. The clustering of various healthcare organizations will extend the referral patterns, tie in physicians and other allied health professionals, and allow for growth.

Growth will also come from greater cooperation with retail distribution channels. These are avenues that have been seldom used in the past. The providing of outreach facilities for laboratory, wellness, medical supplies and others will greatly expand.

Larger, more geographically diverse health systems will have non-contiguous consolidation. Organizations of this type will focus on market leverage, operating efficiencies, economies of scale and technology. Their growth will not focus on bricks and mortar or large complex buildings. They will reach out to compete with the many entrepreneurial physicians and companies to protect their market share.

Technology Evolution

Technology solutions will be available and exceed our ability to rapidly deploy them. This will include the handling all types of images and making them readily available to caregivers. Storage technologies will be so robust and inexpensive that retention will be indefinite. Storage and communications will expand into reporting, analysis and inference systems. There will be virtually unlimited communication bandwidth and connectivity possibilities.
The end user devices will be smaller, cheaper and pervasive. This will make it possible to provide mass amounts of information to end users. There will be virtually no limit to the amount of data valuable with controlled access and it will be affordable on nearly every level.

Funding for documentation and image systems will have a positive ROI allowing for more medical care organizations to move rapidly. The ability to use decision support and view the consolidated financial and clinical data will increase productivity and provide some cost avoidance.

The changes in healthcare technology have reduced the cost of care by allowing us to do more for more people. The major issues driving the technological solution within healthcare in the next 5-7 years are:

1. Interoperability
2. Implementation of EMRs
3. Feeding a Patient EHR
4. Mandatory reporting of medical errors
5. Nurse and Physician Documentation Systems
6. Emerging Technology
   - Bio-Science Advances
   - Advances in imaging capabilities (screening, diagnostic and image guided procedures)
   - Shift to minimally invasive surgeries; interventional procedures
   - Emerging rapid and point-of-care diagnostic procedures

(1) Interoperability:
The only way to address the movement of data from the inpatient setting to the outpatient data is to have interoperability between today’s traditional inpatient and outpatient systems. It is critical to have all the medical history of an individual to provide the most efficient and cost effective delivery of care. The overriding issue is to effectively share data between systems. The ability to make systems talk between one another, however, within a single entity, enterprise and a community are separate and complicated steps.

Interoperability is a question of when not if. HHS definition of Interoperability means—the ability to communicate and exchange data accurately, effectively, securely, and consistently with different information technology systems, software applications, and networks in various settings, and exchange data such that clinical or operational purpose and meaning of the data are preserved and unaltered.

Clinicians will be highly dependent on interoperability in the future to obtain information. This is NOT only across the enterprise but the ability to share data with all providers who service a patient.

A recent 2006 KLAS report states that many of today’s CIOs, CTOs and Directors of Interface Services have developed plans (some more formal than others) for interoperability with goals reflective of today’s systems and tools. Most, however, are
disappointed as evidenced by the low scoring of the question “In general, how well do today’s healthcare software products interoperate with another vendor’s software products central to meeting the typical provider organization’s goals? On a scale of 1 (low) to 9 (high) the overall average score (all bed sizes) was 4.0; with those over 1,000 beds averaging a score of only 3.4.

While these results may be disappointing, it appears to have provided the realization and rationale to develop a plan and dialogue that (1) improves integration/interoperability over time; (2) provides a better understanding of what the challenges, solutions and trigger events are; and (3) better manages expectations. Near term steps maximize assets under their control in an effort to provide the user with integrated data and displays. Longer term plans rely on unification and adoption of newer technology (Service Orientated Architecture), standardized vocabularies and solutions to the privacy question. Plans typically assume a heterogeneous information application environment such that data will always be captured in multiple systems.

True interoperability requires standardization of clinical data and a unified approach for access to those data. A standardized set of vocabularies, with semantic interoperability, is necessary to allow data to be queried by meaning rather than by particular code, phrase, word, or term and to ensure that all appropriate data are identified and displayed. In addition, through interoperability, data entered in one clinical setting can update the data in another system, and update the information entered by another clinician. Appropriate rules and business/clinical logic for these activities are required to ensure that the record reflects the most complete and accurate picture of the patient at all times.

The lessons learned in the KLAS survey with over a 120 large organizations participating included:

- The largest organizations (over 1,000 beds) reported they were least likely to be meeting their interoperability goals.
- Over 60 percent of the providers using large HIS vendors report that they are over half way to reaching their interoperability goals. No one reported having achieved 100 percent of their interoperability goals.
- Larger organizations are more likely to see external interoperability goals different than internal interoperability goals.
- There are vendor differences when it comes to integration, interfacing and interoperability in a heterogeneous environment.
- Real-time interfaces far exceed batch interfaces by a ratio of 3.7:1.
- An average site has a little less than 100 interfaces (both batch an interactive).
- A surprising number of sites use multiple interface engines with almost half of them reporting well over 100 real-time interfaces.
Average interface costs vary widely, from ~$15,000 to ~ $30,000.

Despite the challenges, many are looking forward and speak to the incremental benefits that should accrue as interoperable systems are more broadly implemented. Examples of benefits that can be achieved by the effective integration of the clinical record include:

- Reduction in medication errors
- Reduction in duplicate testing
- Reduction in time spent in duplicate data entry
- Reduction in time spent by physicians searching for results
- Reduction in patient days
- Reduction in costs
- Improved quality, better outcomes
- Better outcomes measurement

(2) Implementation of EMRs:
The entire market is moving toward an EMR. The hospital may be able to bring all their data together for individual patients. Nevertheless, it represents only the data within the hospital organization. If the physician is outside the organization all the data in the physicians EMR may not be in the hospital EMR. Most efforts to address the EMR do not include medical data outside their own enterprise. This is where a change that must take place. Both the hospital and all the physicians involved need access to the information. The ability to feed from all systems is critical.

(3) Feeding a Patient EHR:
HIPAA says a patient not an enterprise owns the data. Patients long-term will need to have access and even carry all their personal medical data. This personal health record will need to aggregate all the data. This requires all health professionals to update the patients EHR after an occasion of service.

(4) Mandatory reporting of medical errors:
The Institute Of Medicine reports have focused on the criticality of this information. The focus is to reduce the adverse drug events (ADE). Since this is a major patient safety issue, hospitals and physicians should pay particular attention to this capability.

(5) Nursing and Physician Documentation Systems:
To reduce the errors, improve quality and follow best practices, documentation systems are critical. They will effect reimbursement and show that standard practice and procedures are in place. Such documentation systems are available in specialty systems like in the Emergency Department (ED) and ICU. Clinical documentation will be required for P4P and quality. The physicians and nursing documentation systems will help address the workforce shortage issues when information is more readily available. Clinical documentation is a major step to CPOE and frankly the most critical. This will
help eliminate the flow of paper in an organization. It will improve electronic access, reduce handling and save storage costs.

(6) Emerging technology:
- Advances in imaging capabilities (screening, diagnostic and image procedures)
- Shift to minimally invasive surgeries, interventional procedures
- Emerging rapid and point-of-care diagnostic procedures
- Life Sciences

Major technological advances will have dramatic impact on the practice of medicine and on IT. We must be ready to understand and adopt these changes. Some examples are:

Advanced Imaging - We have seen the rapid expansion into the PACS marketplace in less than 10 years. The results are amazing. The technology is advancing so quickly that the useful life of equipment is only about 3 years. Physicians can use the information to more accurately diagnose and treat patients. These non-invasive procedures will only increase over time. Advanced images will be available for radiology, cardiology, orthopedics, pathology, endoscopy, colonoscopy and oncology.

Life Sciences - Organizations in the fields of biotechnology, pharmaceuticals, biomedical technologies, life systems technologies, nutraceuticals, cosmeceuticals, food processing, environmental, biomedical devices and organizations and institutions that devote the majority of their efforts in the various stages of research, development, technology transfer and communications. The effects of life sciences will be dramatic in the next few years. Each of the four specialty sciences will dramatically change the treatment patterns for patients. Each will have dramatic impact on currently installed computer software.

- Molecular Medicine – will provide accurate and precise detection and treatment of disease-causing abnormalities long before symptoms occur.
- Regeneration medicine – will allow re-growth of damaged tissue and organs.
- Nanotechnology – will deliver customized drugs to precise points in the body.
- Genomics – will provide new avenues in medicine and technology; near term - predisposition to illness; response to drugs; etc.

In a cooperative effort 22 companies announce joint effort to help to empower people with the information they need to better manage their health and the health of their loved ones. They believe the “Only solution (to reducing healthcare costs) is to shift more care to the home, using devices that monitor the condition of patients & transmit data to medical professionals for analysis and recommendations.” Besides helping patients, the companies hope to make it easier for family members to remotely monitor the condition of patients. The founding members of the group include BodyMedia, Cisco Systems, GE Healthcare, IBM, Intel Corporation, Kaiser Permanente, Medtronic, Motorola, Nonin, Omron Healthcare, Panasonic (Matsushita Electric), Partners HealthCare, Polar Electro,

Summary

As Peter Drucker said, “Even small healthcare organizations are complex, barely manageable places…Large healthcare organizations may be the most complex in human history.” Healthcare is a complex environment and technology is needed to help bring all the components together and change data into information. The task is monumental, especially with all the various components, limited budgets and poor linkages between costs, reimbursement and quality. Harnessing applicable technology will be a large part of the answer.

The demand for healthcare services is growing at an increasing rate. It is propelled by a population that will demand healthcare as a “right”. This is facilitated by the graying society of baby boomers and the rapid influx of poor that have entered the country. The problems with obesity and rapid growth (fertility) of the poor are major contributors.

The demand exceeds the ability to delivery due to labor and cost constraints. The cost of services are growing and ability to pay is getting smaller. The result is many healthcare occupations are under paid and people are electing to go into other fields. It is difficult to get people to work the demanding hours required by health professionals. The extensive education for the low pay of a nurse, medical technologists and other allied health professionals is a deterrent to staffing.

The government is a substantial payor and will need to lead in the reimbursement and cost issues. This will make the delivery of healthcare easier with appropriate reimbursements. Services will need to be rationed and controlled, but provided to those in need. The control will come through best practice protocols. This will limit the use but help insure best quality.

Technology will enable less staff to do more work in the clinical world. With full access to information and new automated tools, the ability to handle larger volumes of work will be a reality. New systems will lighten the load and increase productivity. We will see greater specialization and manual and redundant tasks will be eliminated. The cost containment, quality improvement and process initiatives will be data driven and will require substantial investments in IT. These are the main factors driving healthcare today and each will require an investment in technology.

The free market and tightly regulated industries will be heavy dependent on the data modules to increase operating efficiencies. This will require integration with retail distributors like pharmacies, commercial laboratories, medical supplies and other medical services. Marketing will aggressively be more direct to the consumer. The large “bricks and mortar” organizations will be replaced by user friendly store fronts. These will be the independent and delivery network sponsored.
Technology solutions will be available, but our ability to deploy will not keep pace. The ability to integrate technology in the “complex healthcare environment” (as mentioned by Peter Drucker) will not be an easy task. It will be driven by the need to have EMR and personal health records thorough out an organization. Advances on every front of medicine will require continued investments in technology to be competitive in this complex environment.

The interoperability of systems must be a core issue as we move forward in the healthcare IT environment. The benefits will have to be apparent to drive investment, effort and use. Technology will be a critical part of the delivery of healthcare in the future. It will help reduce cost, increase quality and patient safety.