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Healthcare TECHnology

PLUGGING INTO PROGRESS

There's no question that technology has driven extraordinary innovation in medical science. However, while such advancement continues apace, the hot topic in healthcare today is information technology.

The sheer volume of data about patients, protocols, medications, utilization, billing and insurance has reached near-epidemic proportions. No part of the healthcare system is immune; hospitals, physician practices and laboratories alike are obligated to manage medical information with rigorous accuracy and accountability.

Hankamer School of Business responded to this need in 2003 by introducing an MBA Healthcare Administration program.

"Healthcare information and its management is very important right now," notes Scott Garner, preceptor coordinator of Baylor's MBA healthcare administration specialization. "This is clearly an area that's of interest to growing numbers of students"

A cornerstone of the program is a seven month residency, which falls for most students at the beginning of their second year. The experience provides "real world" experience healthcare providers value greatly when screening candidates.

Garner explains. "By taking students through this type of experience, we're positioning them to compete more effectively in the marketplace."

» TECHNOLOGY THAT STRETCHES FROM BEDSIDE TO THE BANK

With information technology a defining – some might argue the defining – force in healthcare, information technology is becoming central to everything from patient care to administration and medical records, and even blurring the lines in-between.

"A system like voice recognition charting improves accuracy that directly benefits the patient, and also has significant impact on an institution from an administrative standpoint," explains Dr. Louis Martin, professor of Radiology at Emory School of Medicine and former chief of Interventional Radiology at Emory University Hospital. "The more accurate, easier to read and accessible that chart becomes, the more useful it is to all areas of the organization."

Numerous other advances impact both care and management, and are quite literally changing the face of healthcare.

"Today, for instance, we're seeing distance clinics emerge where patients are seen by a nurse practitioner instead of a physician," observes Sean M. Haynes, Baylor MBA – Healthcare/MSIS candidate. "A physician can be patched in by video and do a distance consult. This is a cost-saving solution, especially in rural areas, and can make available to a facility specialists they could not afford to keep on staff."

» THE CHANGING FACES OF PATIENT CARE

As scanning and monitoring modalities like CT scans, MRIs, heart monitors and numerous others move from analog to digital, their data can be sent real-time around the world. "These images are no longer subject to location. They can be shipped off to be read and sent back."

"Robotics is another big force on the horizon," notes Haynes. "These minimally invasive procedures can have patients up and mobile in three days, not three weeks. That's a significant development for both patient care and for cost management."

Early detection is another area where technology, and the required IT underpinning will expand medicine's future scope. "Cancer, for example, is now considered a long term disease, as diagnosis is enabled by more granular imaging," Haynes adds.

Close to home, at Dallas-Fort Worth's Baylor University Medical Center, surgeons have developed a laparoscopic version of the gastric bypass for obese patients, enabling most to leave the hospital within 23 hours. This is a significant improvement over the complex open gastric bypass procedure, which requires several days' stay, post op.

» IT INNOVATION — AND COST

Not only does all this innovation demand new systems and approaches to data management, it also comes with a high price tag. Most institutions are actually earmarking between one and three percent of annual operating budget for IT. Small wonder the business world is taking the challenge seriously.

Senior hospital executives responding to a *Modern Healthcare* 2005 survey indicated their primary near-term IT priority to be the electronic health record (EHR). A key impetus in the increased interest in the EHR was the 2004 pledge by President George W. Bush to establish an interoperable system of health records within a decade.

The total national cost of introducing this system has been estimated at $276 billion to $320 billion over 10 years. Some industry observers believe that the challenges of building such a national infrastructure are comparable to those of putting a man on the moon, and that the project is more likely to require several decades to complete.

Much of the cost and complexity of healthcare IT management is a result of the Health Insurance Portability and Accountability Act (HIPAA), originating in 1996 and reaching final form in 2003. This ground-breaking legislation ambitiously proposed to simplify and standardize the transfer and storage of patient information, with a mandate to protect patient rights and privacy with carefully defined security protocols.

However, even with stringent HIPAA regulations, there remains room for much subjectivity. It is in both system-building and management of compliance that finely honed management training and skills are essential.

» MAJOR CHALLENGES AHEAD: ACCEPTANCE AND COMPLIANCE

Another key issue in this brave new world of medical technology management is the varying degrees of acceptance among practitioners. Clearly, technology is a younger folks' game, with older practitioners sometimes only embracing technology in a rudimentary way.

"Physicians are using more healthcare information technology in their clinical practices, but in some cases the use may well be fairly rudimentary, such as looking up information about drugs and unfamiliar diseases on the Internet vs. a printed reference" reports Joseph Conn in *Modern Healthcare*. "But many of them lack sophisticated systems."

Michelle Nelson, Baylor MBA Healthcare candidate, recently spent her residency at Bearing Point Healthcare Group in San Francisco as part of a Change Management team.

"It was such an enlightening experience. Our challenge was to oversee our client's adoption of electronic medical records system," states Nelson. "Because I worked as a nurse for many years, I can see the advantage of all this technology from the caregiver perspective. But there is a sharp learning curve, because this kind of technology assumes and requires a certain level of technical savvy from its users.

"The biggest hurdle seems to be getting everyone in an organization to buy in and take ownership of the change."

One area where major advances in healthcare technology and IT are at the leading edge is in the military. Kevin Peck, a Baylor MBA Healthcare graduate, is now deployed to Iraq as Chief Information Officer of a field hospital there.

He suggests that "the military will end up being a model for the health record, like it has been for so many other medical innovations. EMR development (electronic medical records) is moving forward far faster than in civilian life." (See sidebar.)

"The EMR hasn't been rolled out yet. It's in field testing now. But there's so much more standardization across the board compared to civilian life," says Peck. "For instance, there's just one form for requesting medication. It's really much simpler than the various forms in civilian use."

"Of course, security and privacy are much more guarded in the military," he continues. "They just came out in April with new ARMY regulations regarding handling of medical records. If you're negligent, it can end your career. You're dealing with the uniform code of military justice. In effect, all medical records are the Commander's possession. All medical records are kept in a records room and under lock and key at all times, with controlled access and afterwards immediately locked down. As CIO, I'm responsible. If anyone wants to see them, release of information must be through patient information division and LEGAL and HIPAA. Rules exist regarding may see records, what parts of records and under what conditions. Everything is documented."

"Army deployed hospitals are mirror image of what you'd see here. Facilities are every bit as good as what we have here in the States. But in a tent."

Some tent. It may just define the future of medical IT.

MEDICAL TECHnologies

THE NECESSITY OF HIGH-QUALITY, ON-THE-GO CARE HAS FORCED THE MILITARY TO BECOME A LEADER IN HEALTHCARE INNOVATION. HERE ARE SOME EXAMPLES OF EMERGING TECHNOLOGIES STRAIGHT FROM MILITARY FIELD OPERATIONS:

1999 **+TELECONSULTATION / TELEDERMATOLOGY:** Teleconsultation is the application of information and telecommunications technologies to facilitate delivery of medical treatment across all barriers. Teledermatology is a proven, clinically focused teleconsultation system designed to enable dermatology interactions between various parties located anywhere in the world.

2001 **+ DIGITAL INFORMATION AND COMMUNICATIONS SYSTEM:** The goal of the digital information and communications system is to create and support a medical global information grid that will extend far forward into a combat zone

2002 **+ BATTLEFIELD MEDICAL INFORMATION SYSTEM TELEMEDICINE (BMIST):** A wireless hand-held assistant designed to record the essential elements of a medical history and physical examination and then provide the medical analysis and decision supports.

2004 **+ FORWARD DEPLOYABLE DIGITAL MEDICAL TREATMENT FACILITY (FDDMTF):** A lightweight, wireless, digitized forward surgical capability that can be deployed across a range of military operations.

NOW **+ WARFIGHTER PHYSIOLOGICAL STATUS MONITOR (WPSM):** Networked array of physiological sensors embedded in the Objective Force Warrior (OFW) suit and transparent to the soldier. Data management algorithms in the soldier computer deduce near-real-time physiological data from the sensors to medics.

+ UNIVERSAL RED BLOOD CELLS FOR SEVERE HEMORRHAGE:
Non-type-specific red blood cells for battlefield blood replacement.

NOW

2007 **+ ADVANCED HEMOSTATIC DRESSING:** Will stop lethal severe arterial or large venous hemorrhage within two minutes. In the field, this will be most useful for compressible hemorrhage.

+ HEMOGLOBIN-BASED OXYGEN CARRIER (HBOC): A temperature-stable alternative to red blood cells.

2009 **+ FIELD THERAPY UTILITY PACK FOR LASER EYE INJURY:** Field therapy utility pack containing a diagnostic card and therapeutics that can be easily administered by a combat medic immediately after injury to prevent secondary retinal degeneration and vision loss.

2010 **+ SPRAY-ON PROTECTIVE BANDAGE:** A spray-on, self-sanitizing, flexible bandage that will reduce or eliminate blood and fluid loss, reduce or eliminate pain associated with motion and protect wounds from environmental contamination.

+ LIQUID TOURNIQUET: A lightweight polymerizing gel that will be used for compressible hemorrhage or amputation. If tourniquet is required to stop extremity bleeding, it will only be applied for the time necessary for placement of gel into/onto the wound surface and gel polymerization (less than 15 minutes).

+ LIGHTWEIGHT EXTREMITY SPLINT: The lightweight extremity splint will allow soldiers with immobilized and nondisplaced fractures to continue their mission and soldiers with serious open fractures to be stabilized and unit transportable for several days under battle conditions.

+ IV HEMOSTATIC DRUG: An IV agent that will safely enhance the ability of the combat casualty with hemorrhage to form natural clots and stop bleeding on the battlefield.

+ ENZYMATIC WOUND DEBRIDEMENT: A spray-on, self-limited enzymatic/chemical and analgesic debridement system for chemical and burn injuries prior to covering with a spray-on bandage.

2012 **+ UNIVERSAL FREEZE-DRIED PLASMA:** Freeze-dried plasma that is not type-specific and is packaged for rapid reconstitution and administration on the battlefield by the combat medic or the physician assistant.

+ HIGH-INTENSITY FOCUSED ULTRASOUND: The high-intensity focused ultrasound device will provide cauterization of both internal and external bleeding structures without damaging overlying tissues. The device will feature a computerized Doppler guidance system designed to locate and focus on hemorrhaging structures.

+ INTRACAVITARY HEMOSTATIC AGENT: Foam, gel or liquid form that can be introduced into a body cavity via a large-bore needle (without surgery) to slow or stop internal hemorrhage.

2015 **+ ADVANCED RESUSCITATION FLUID:** A resuscitation fluid that sustains wounded soldiers and preserves organ integrity and function even in the face of resuscitation and hypotension.

+ WARRIOR MEDIC "BIOCORDER"
A hand-held device used by combat medics to detect or collect and analyze physiological and metabolic information in combat casualties. Results of analysis are displayed as well as the recommended actions to be taken by the medic.

2015

+ TRANSPORTABLE AUTOMATED LIFE SUPPORT SYSTEM (TALSS), SUMMARY: A portable, self-contained, lightweight (under 40 pounds), protected environment for one casualty, capable of providing sustained monitoring and automated life support for combat casualties for up to 72 hours on the battlefield.