Computer Technology in Health Care Settings

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Computer Technology in Health Care Settings

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.01 Systems Change (return to index)

Computer technology and electronic networking have penetrated just about every industry in modern society from fast food to fast cash, and the health care industry is no exception. The modern-day hospital, for example, like most large businesses, is an intricately networked organization whose information management department is typically responsible for a wide range of computer-based services used in clinical, administrative, fiscal, educational, and other settings. The telephone system, e-mail, intranet, billing and accounting system, payroll, patient records, appointments, digital imaging technologies, library databases, continuing education, and a growing number of diagnostic, treatment and monitoring devices rely on advanced computer technology and highly sophisticated networking capabilities. Businesses that specialize in health care management systems work in close collaboration with (and usually under the direction of) the hospital’s internal information systems department.

One important example of a major change in clinical practice made possible by specialized computer technology involves an alternative to traditional x-ray procedures. A technology called PACS, or Picture Archiving and Communication System, stores radiological images digitally. It is
sometimes referred to as filmless technology because the images are not processed on film, and thus the decades-old practice of x-ray film being transported in brown envelopes from one office to another is becoming a thing of the past. Instead of using lighted panel boxes to view x-ray films, radiologists and their medical colleagues can call up images (standard x-ray, CT scan, MRI, ultrasound, etc.) on high-resolution computer screens and share images over distances via computer networks. Radiologists can also dictate their evaluation of the images directly into the computer, which, using voice translation software, automatically transcribes the radiologist’s voice to written text. (Voice-machine transcription is not perfect, so the radiologist must carefully check the computer-generated text for accuracy.) In the old system, radiologists would usually dictate their evaluation of a specific case into a recorder, and a transcriber would type out the doctor’s recorded spoken comments into a written report, which, once written, would need to be approved by the radiologist. The process could take days.

Ideally, PACS facilitates a quicker turn-around from the time when the images are captured to when an evaluation from the radiologist reaches the patient’s primary care provider (or whoever else needs to see it). This decrease in time is important for many people involved – physicians, patients, patients’ families and friends. Few things are more anxiety-producing than having to wait for confirmation of what might or might not be a very serious medical problem. Moreover, in emergency situations, quick turn-around time is essential. Computers also allow many of these images to be viewed in different ways, from different angles, and in different dimensions for a more comprehensive and focused evaluation. Physicians from different locations can view the images simultaneously through a networked computer system (assuming they have authorized access) and can consult each other using teleconference while viewing the same images. If this technology exists in an area where a radiologist is not immediately present, the image can be sent electronically to a radiologist elsewhere for interpretation. An added bonus is that images are less likely to be lost, stolen, or misplaced if they are stored in digital form rather than as a “hard copy” being transported from one place to another. The digital images can also be linked to a patient’s computerized medical file so that the evaluating radiologist has considerable background information about the patient, including past images stored in a digital archive, at his fingertips. This context may aid radiologists in their evaluation, helping – for example – to explain anomalies in a patient’s anatomy. (It should be mentioned that it is possible to take x-rays the traditional way – i.e., on film – and have these images converted to a digital format. Also, some physicians prefer the traditional x-rays for a variety of reasons and continue to use them.)

PACS is just one example of how the modern hospital is incorporating sophisticated computer technology into its clinical operations. An entire book can be written about other examples and their consequences and benefits for patient care. The point is that technology has become a vital part of modern health care, and not just at the organizational level. Individuals are increasingly using the Web, computer databases, electronic discussion groups, and other popular online resources as part of their self-care, or co-care, as previous columns have already discussed. [1] These technologies have enhanced the practice of self-education where health care is concerned.
An early advocate – some would call him a pioneer – of clinical computing, or the use of computers in medicine – is Dr. Warner V. Slack, who has been writing and speaking about this topic for about four decades. Dr. Slack has witnessed, if not helped precipitate, the evolution of computers in medicine first-hand and wrote a book for the layperson about this sea change in health care. Called, *Cybermedicine: How Computing Empowers Doctors and Patients for Better Health Care*, the book discusses how computers can be mutually beneficial for both the patient and health care provider.

Although many people these days are concerned about the depersonalization of health care ushered in by the rise in medical technology, Dr. Slack’s book is reassuring. He comes across as a patient-centered physician, not a technophile (although the two do not have to be exclusive categories). “There are a number of ways in which doctors can help people become better informed about matters of health and disease,” he writes. “The oldest and in many ways still the most effective medium is face-to-face communication.” [2] But there are other ways that a patient can be informed about health and disease, and that is what the rest of the book explores. Dr. Slack writes in a way that is accessible, even to those who have little knowledge of technology or medicine. A number of his proposals developed years ago for how computers should be part of a hospital setting now seem to be coming of age. The book also deals with important issues of privacy and medical insurance. It is a helpful primer for those interested in a brief history of this field and one person’s view of how computer technology in medicine can be useful to both patient and health care provider.

Clinical staff members (physicians, nurses, lab technicians, social workers, therapists, pathologists, and others) at most hospitals are being trained or re-trained in how to use computers and specialized software applications. It is not uncommon to have computers in doctor’s offices, at nurses’ stations, and even in patients’ rooms. Hardware and software training will likely be a permanent component in many health care settings as systems and applications continually change.

Others in the health care field are seeking more specialized education. Clinical computing, medical informatics, health informatics, nursing informatics, telemedicine, and related monikers represent a large emerging field of study that has to do with the integration of computer technology with health and medicine. Today there are dozens of specialized programs, with a fairly wide range of emphases, which offer formal study in this field in the U.S. and elsewhere. There are also journals and publications that can be accessed online to learn more about the research going on in this field.

One of the best starting places to get a comprehensive view of computer technology in hospitals and the larger field of health or medical informatics is a Web site called, “Health Informatics World
Wide" (http://www.hiww.org), hereafter referred to as HIWW, which is an index of links maintained by Stefan Schulz of the Medical Informatics Department of the Freiburg University Hospital (Germany). These links to health informatics resources are diverse and far-reaching. [3]

HIWW provides a list of codes that it uses throughout the site but which are also useful to see what topics fall under the rubric of health informatics. As you can see by the list, the field is quite broad. These are the topics that health informatics encompasses in one form or another, as suggested by the HIWW codes. [4]

Artificial Intelligence
Biomedical Cognitive Science
Bioinformatics
Computer Based Training
Coding, Classification, Terminology
Computerized Clinical Guidelines
Consumer Health Informatics
Clinical Information Management
Decision Support Systems
Education and Training
Electronic Patient Records
Information Retrieval
Imaging, Robotics, Virtual Reality
Medical Language Processing
Nursing Informatics
Outcomes Assessment
Public Health Informatics
Signal processing
Standards, Social and Legal Issues
Telemedicine

Another Web site resource on health informatics is maintained by the University of Minnesota Graduate Program in Health Informatics, http://www.hinf.umn.edu/link/link.html. This site, combined with HIWW, provides an informative picture of how extensive the field is and where to get more information about formal programs and other resources.

.04 Professional Organizations (return to index)

There are a number of professional organizations for people who work in the field of medical or health informatics. One is the American Medical Informatics Association, http://www.amia.org. Here is a description from its Web site:

“The American Medical Informatics Association is a nonprofit 501(c)(3) membership organization of individuals, institutions, and corporations dedicated to developing and using information
technologies to improve health care. AMIA was formed in 1990 by the merger of three organizations – the American Association for Medical Systems and Informatics (AAMSI), the American College of Medical Informatics (ACMI), and the Symposium on Computer Applications in Medical Care (SCAMC). The 3,200 members of AMIA include physicians, nurses, computer and information scientists, biomedical engineers, medical librarians, and academic researchers and educators. AMIA is the official United States representative organization to the International Medical Informatics Association." [5]

Another organization, as mentioned above, is the International Medical Informatics Association, http://www.imia.org. Here is a description from its Web site:

“IMIA plays a major global role in the application of information science and technology in the fields of health care and research in medical, health and bio informatics. The basic goals and objectives of the association are to:

- promote informatics in health care and research in health, bio and medical informatics.
- advance and nurture international cooperation.
- to stimulate research, development and routine application.
- move informatics from theory into practice in a full range of health delivery settings, from physician’s office to acute and long term care.
- further the dissemination and exchange of knowledge, information and technology.
- promote education and responsible behavior.
- represent the medical and health informatics field with the World Health Organization and other international professional and governmental organizations.

In its function as a bridge organization, IMIA’s goals are:

- moving theory into practice by linking academic and research informaticians with care givers, consultants, vendors, and vendor-based researchers.
- leading the international medical and health informatics communities throughout the 21st century.
- promoting the cross-fertilization of health informatics information and knowledge across professional and geographical boundaries.
- serving as the catalyst for ubiquitous worldwide health information infrastructures for patient care and health research. [6]

Other organizations can be found through links on the HIWW and University of Minnesota Graduate Program in Health Informatics Web sites.

.05 Conclusion (return to index)

Computer technology in health care should, as Dr. Slack proposes, be empowering for the patient as well as increase the level of care that medical professionals provide to their patients.
Medical technology should not dehumanize the health care process, as many fear it will do or is already doing. Dr. Slack’s balanced and patient-centered view is instructive in this regard. Quality health care with the “human touch” will undoubtedly be a lingering and legitimate concern as the health care industry changes – not only because of technology but also fiscal priorities and policies. This question should be open to discussion at many different levels of society, from classrooms to health care boardrooms, and elsewhere.

As more personal information is put into computer systems, questions of privacy and confidentiality inevitably emerge. Some of these issues will be dealt with in a future column.

.06 Notes (return to index)

1. See past columns in this series:
   “Health Information Online Abundant and Varied,”
   “Teaching Students About Cyberhealth Information,”


3. Health Informatics World Wide (http://www.hiww.org) is a regularly updated index of the most relevant links to websites on Health Informatics.

4. Ibid.


Other Resources:


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15 THOUGHTS ON "COMPUTER TECHNOLOGY IN HEALTH CARE SETTINGS"

Kathrine Tevada  
on January 30, 2014 at 6:14 PM said:

It's like you read my thoughts! You seem to understand a lot approximately this, like you wrote the e-book in it or something. I believe that you could do with some p.c. to power the message house a little bit, however instead of that, this is great blog. A fantastic read. I will certainly be back.

best carry on luggage  
on January 30, 2014 at 7:33 PM said:

Superb post however, I was wondering if you could write a litte more on this subject? I'd be very thankful if you could elaborate a little bit further. Thanks!

espresso machine reviews  
on February 3, 2014 at 8:44 PM said:

Does your blog have a contact page? I'm having trouble locating it but, I'd like to send you an email. I've got some recommendations for your blog you might be interested in hearing. Either way, great site and I look forward to seeing it grow over time.

best vacuum for hardwood floors  
on February 3, 2014 at 11:39 PM said:

Asking questions are in fact pleasant thing if you are not understanding anything entirely, but this article gives pleasant understanding yet.
scroll saw reviews
on February 4, 2014 at 12:16 AM said:

Wonderful beat ! I would like to apprentice while you amend your website, how can i subscribe for a blog site? The account helped me a acceptable deal. I had been a little bit acquainted of this your broadcast offered bright clear concept

garment steamer reviews
on February 4, 2014 at 12:19 AM said:

Hi to all, how is the whole thing, I think every one is getting more from this site, and your views are pleasant designed for new viewers.

best electric kettle
on February 4, 2014 at 12:32 AM said:

It’s amazing for me to have a website, which is valuable in support of my knowledge. thanks admin

pressure washer reviews
on February 4, 2014 at 12:40 AM said:

bookmarked!!, I really like your website!

best robotic pool cleaner
on February 4, 2014 at 12:52 AM said:

Hi! I understand this is somewhat off-topic but I had to ask.
Does running a well-established blog such as yours take a massive amount work? I’m completely new to blogging but I do write in my journal daily. I’d like to start a blog so I will be able to share my experience and thoughts online. Please let me know if you have any kind of suggestions or tips for new aspiring bloggers. Thankyou!

infrared grill reviews
on February 4, 2014 at 2:13 AM said:

Simply desire to say your article is as astonishing.

The cleamness in your post is simply nice and i can assume you’re an expert on this subject. Fine with your permission allow me to grab your RSS feed to keep up to date with forthcoming post. Thanks a million and please continue the gratifying work.

best humidifier
on February 4, 2014 at 3:17 AM said:

You need to take part in a contest for one of the best blogs on the internet. I’m going to highly recommend this web site!

best home gym
on February 4, 2014 at 4:57 AM said:

Attractive portion of content. I simply stumbled upon your weblog and in accession capital to assert that I acquire in fact enjoyed account your weblog posts. Anyway I will be subscribing in your augment and even I fulfillment you access persistently fast.
garbage disposal reviews
on February 4, 2014 at 5:51 PM said:

Do you have a spam issue on this blog; I also am a blogger, and I was wanting to know your situation; we have developed some nice procedures and we are looking to trade techniques with others, be sure to shoot me an e-mail if interested.

jig saw reviews
on February 5, 2014 at 12:18 AM said:

Superb, what a web site it is! This webpage gives valuable facts to us, keep it up.

cork board ideas
on February 5, 2014 at 9:13 AM said:

Excellent site you have got here.. It