Medicine and Information Technology

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Most recently the medical teaching has ingressed into a whole new world of Bioinformatics the relevance of which is being realized globally even in Pakistan. As recently as a decade ago medical education was merely lectures, textbooks to some extent, journal articles up to attending physician. The classroom education has become very static especially in this medical field where dynamic commitment and life long experience is also not enough[1]. Now the new education models, which are coming up, persue informatics training.

The technology of Bioinformatics, in isolation is merely physical objects. Its application determines its meaning. For example computer terminal is a technology but more important than the terminal itself is the way in which it is used to cre tte a net worked data base. To understand how technology has interacted with health care (or any other system of human endeavour) we must consider as technology both the knowledge and the systems of medicine we practice[1].

Technology Support for Diagnosis

Technology can help clinicians interpret the latest scientific data, often in ways a single practitioner could not do alone. The decision-support tools can be used to make or exclude a diagnosis of myocardial infarction in the emergency department more accurately than a physician trying to synthesize the data by him or herself, thus allowing more patients to benefit froni the high technology of the intensive care unit to derive that benefit, while allowing those patients merely suffering from indigestion to go home. Other decision-support tools are used to guide therapy for patients who have suffered myocardial infarction, or to estimate the prognosis for a critically ill patient in the intensive care unit. Also technologies can identify the caregiver who, from ignorance, substance abuse, or pure avarice, is mal practicing medicine). (Adhoc judgernents are an essential part of any decision-support tool). While making decisions, a physician must bring in use his humanistic qualities to ensure that compromises would be made with all of the patient's interests at heart. For example the echocardiogram may give an answer more precisely for the diagnosis of vascular heart disease but the comfort and satisfaction that a patient derives through auscultation will be lost2.

On-line Resources

Today at our social gatherings one thing is frequently discussed, pros and cons of different Internet search engines. That is because physicians, medical students and the patients are all doing routinely searches. A host of resources is available that can provide information about a given topic. Even these currently meet only a fraction of many information needs physicians require.

It is obvious that on-line access to medical knowledge has the potential to greatly influence health care. A variety of resources are available free or at an affordable cost. Probably the best producers of high-quality on-line information are the health-related government agencies. The National Library of Medicine (the NLM www.nlm.nih.gov), of course, makes Medline and other databases available free to the entire world. Other agencies have impressive on-line information as well, such as the Centers for Disease Control and Prevention (the CDC, www.cdc.gov), the National Cancer Institute (the NCI www.nci.gov) and the Agency for Health Care Policy and Research (the AI-ICPR www.ahcpr.gov). A number of medical schools and other health center sites also produce an array of sound information. In addition, the information picture is brightened by the maturity and growing acceptance of evidence-based medicine (EBM)[2].

Current Situation

The information retrieval systems are not yet well integrated with clinical workflow because they disrupt the workflow of clinical care. A minority of physicians have computers directly connected to

networks that allow rapid access to on-line resources. Even those with fast, dedicated computer networks must launch applications (e.g., Web browsers) and log on. taking valuable time in the busy clinical setting. Securely there is much redundancy iii the medical literature. It is difficult to know the subset one should access that contains the most important articles. Even when good articles are found, they must be read, or better yet critically appraised. Then one may also be lured into looking for information in the wrong places. While the preponderance of high-quality clinical Web sites grows daily, there is still a low signal-to-noise ratio on the Web. It has been recently found that only 1 0% of the pages retrieved during reading for information are relevant to subject. Despite the maturity and acceptance of EBM, few physicians have the complete set of skills required to apply for the "first generation approach". Skills such as Framing the clinical question, using medline or other databases to find the best article (s), critically appraising each article, applying the answer to the care of the patient are all needed for Evidence Based Medicine (EBM) process. Secondly the EBM process is time-consuming and treatment of a disease often cannot be covered in a single article. Rather, a picture emerges over time: new tests emerge that alter the ways disease are diagnosed and, new clinical trials of recommended treatments may conflict with the results of old ones[2].

Directions for Tomorrow

For future we need to make information retrieval systems more effective for clinical users and for that following steps have been suggested:

1. Integrate their use more seamlessly into clinical settings. As technology leads to "instant-on" connections to networks and the Internet, particularly via such innovations as digital subscriber lines (DSIs) and cable moderns, the bar for getting connected quickly will be lowered, making it easier for physicians to quickly access the information they need.

2. Information searching must be better integrated with other clinical computing applications, particularly the electronic medical record (EMR), for several reasons. As the use of the EMR grows, physicians will be more easily able to "jump" from the EMR to the retrieval system. But perhaps even more important, is that the EMR and searching applications should be linked such that the search made by the latter might be tailored, based on the context of the former. For example, an EMR system might "know" information about the patient (e.g., his or her diagnosis and/or treatments) as well as about the physician (e.g., his or her specially or preferred information resources.

3. To develop better World Wide Web sites, we will probably see an increasing number of "portal" sites that provide focussed and filtered access to content. Such sites are currently in their infancy, but feature such attributes as editorial boards (e.g., Medical Matrix,) and the use of classification schemes such as the NLM's Medical Subject Heading (MeSH) vocabulary (e.g.. Cl in Web, <www.ohsu.edulcliniweb>). And a number of approaches to rating the quality of this content have emerged[2].

Whatever approach to on-line information is ultimately accepted, one clear need is better education in its use and in medical informatics in general. A common edge is that the "half life" of medical education is three to four years, which means that half of what a medical student learns is out of date before he or she completes residency training. Whether or not this half-life has been estimated correctly, it is clear that physicians need better training in infonnation management. A great deal of medical education is still devoted to learning facts, where as a solid factual knowledge base is necessary for effective clinical practice[2]. Problem Base Learning (PBL) is a good start taken by some of our Private Medical Colleges. The future physicians should know how to find and apply evidence-based information more effectively than is currently done. As the technology of Bioinforniatics develops and medical informatics researches figure out the best way to deliver clinical information, we will have to train and produce medical professionals implementing learning activities to keep up to the par with the world.

Reference

1. liowell JD. The physicians role in a world of technology. Acad. Med., 1999; 74:3
2. William H. 'A world of knowledge at your Finger tips: the promise. Reality and Future Directions of on—line Information Retrieval. Acad. Med., 1999, 74:3-4.