Are “Computer-Based Knowledge Systems” Beneficial to the Medical Profession?

By: Deborah Janeczko

In his article, “Computer-Based Knowledge Systems”, Jeremy Wyatt discusses four reasons to encode knowledge in a computer and how this could aid in distributing medical knowledge. These four reasons are:

1. To allow a computer user to move freely between passages of text, illustrations, or even sound recordings is a non-linear “hypertext” document.
2. To help a computer user find specific details in a large mass of medical facts stored in a ‘knowledge base’, the electronic equivalent of a reference book.
3. To allow the computer to teach the user, by itself finding relevant details in its knowledge base that the user does not know (a teaching aid).
4. To allow the computer to help the user solve clinical problems, by itself finding details in the knowledge base that are relevant to the patient (a medical decision aid).

According to Wyatt, hypertext and hypermedia allows a user to quickly reference information about the text they are reading. He claims that hypertext is limited because it does not provide diagrams and photographs found in books. This, he explains, initiated the development of hypermedia, which can provide graphics, sound and video pictures. Medical knowledge bases provide valuable information regarding drug dosages and disease incidences. According to Wyatt, these “bases” can be “stored on a central computer, with remote access by telephone or network links, or can be duplicated on compact disk read-only memory (CD-ROM) or flash/thumb drive storage units and installed on personal computers.” However, these modalities encounter difficulties with symbols used for medical terminology, as well as compatibility with different computer systems. Also, assembling these systems takes a huge amount of time to prepare; impractical for short lessons. Yet, the ability to teach, re-mediate and retest are reasons to assume these systems will continue to increase in production and popularity. The use of a medical decision aid is an example of such system. Wyatt states “knowledge base[s] and search program[s] [are] similar to that of a teaching system, but contain a program that builds a patient model rather than [using] a student model.” These programs can produce inferences to possible diagnoses, drug reactions or therapies aiding the physician in patient treatment. Although all these aids enhance the learning process, Wyatt points out they cannot contain “as much knowledge as a medical textbook”. In Wyatt’s discussion of computer-based knowledge systems, he includes benefits and obstacles. He
concludes that if a quality, accessible system could be developed undoubtedly it would improve “the quality of medical care.”

Jeremy Wyatt has presented a balanced, informational article about computer-based knowledge systems. The ability to use computerized three dimensional “patients” during the learning process is exciting. To provide universal learning and worldwide referencing would benefit all. Arguably the teaching potential is enormous. Not only as Wyatt pointed out for learning, practicing and testing, but for shared knowledge. The ability to access the newest technologies and discoveries appear limitless. Agreeably the ability to search out information could provide improved quicker patient care. The physician need merely enter information into the system to receive a diagnosis or treatment regimen. However, would this compromise compassionate care? And the expense and constant need for updating strike a core issue: How to pay for such systems. Would everyone benefiting from such a system be willing to share the financial responsibility? Another key issue arising is who would be responsible for the continuous updating needed to keep such a system current? And how worldwide accessible could such a system be? Lastly, how could such a system protect the patient information, adhering to U.S. HIPAA guidelines? Obviously, the potential to improve medical knowledge and decision-making is possible with Computer-Based Knowledge Systems. However, the issues listed must be resolved before such systems are recognized and accepted throughout the medical profession worldwide.