

The Use of Information Technology in Medicine: Defining Its Role and Limitations

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ABSTRACT

Information Technology (IT) has transformed the ways modern healthcare systems acquire, store, access and communicate medical information. These developments offer significant benefits to patients and healthcare providers, but they give rise to ethical and legal challenges in the protection of patient privacy and confidentiality. The traditional and humanistic concept of doctor-patient relationship is also under threat as IT is used to bypass the need for personal consultations. One effective approach to continue the use of IT in medicine while minimising its potential hazards is through legal reforms and setting public standards for accessibility and expression of patient autonomy. Ultimately, the role and limitations of IT as a tool to pursue the goals of medicine has to be carefully deliberated, clearly defined and judiciously delineated to ensure its effectiveness and safety.

Keywords: information technology, confidentiality, computer

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Information technology (IT) has, in the last few decades, become so well assimilated into healthcare delivery systems that few doctors can imagine a day without using the computer or the network. Two areas of medical practice have been particularly revolutionised by computer technology: the acquisition and storage of electronic medical records, and the accessibility and rapid transmission of healthcare information over the Internet. This issue of the Journal showcases two essays by authors who grew up in this IT age^(1,2). Their knowledge and familiarity with the technology is not surprising, but their ability to appreciate and discuss some of the ethical problems and hazards faced in adopting IT in a profession based on human interaction is certainly commendable.

One of these authors is spot-on in suggesting that the ethical scale be calibrated before embarking on a debate, and she used the Hippocratic tradition to assess if the use of IT is beneficial or potentially harmful to medicine⁽²⁾. Another set of compass useful in such an evaluation is the document by the Hastings Centre in 1996, which reiterated the goals of medicine in a simple yet inclusive manner: prevention of disease and injury, promotion and maintenance of health, relief of pain and suffering, care and cure of those with malady, avoidance of premature death, and pursuit of a peaceful death⁽³⁾. IT must therefore be applied as an instrument subject to the goals of medicine, and appraised in the context of whether it promotes or impedes the attainment of these medical goals. This standardisation will also answer the question of whose benefit is of primary concern. Medicine is a profession concerned with preserving and improving patients' lives. The considerations are thus obvious; the approach has to be patient-centred, and not merely for the convenience of the healthcare providers or administrators.

In general, it is difficult to deny the benefits of a more efficient information management system. However, at a less macroscopic level, such generic benefits cannot be assumed for all healthcare delivery systems. Confounding factors such as technical competency of staff, acceptance and adoption by doctors⁽⁴⁾ and patients, and intrinsic design-related features can impair rather than facilitate medical care and doctor-patient relationship in some settings⁽⁵⁾. As a worse quality of care is inconsistent with the goals of medicine, the use of IT in such systems or institutions can be considered unethical. It is clear therefore that the use of IT in medicine should always be based on whether the benefits to patients exceed the anticipated hazards, and whether risks to patient's privacy and confidentiality can be reduced to an acceptable level through regulation and education.

A related issue raised by Ng relates to who should bear the added cost of implementing IT⁽²⁾. If the

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use of a certain IT system is justifiable in terms of benefits to patients, then the healthcare provider should perhaps decide, preferably in consultation with the public, how the cost can be distributed fairly among providers and users. As in the use of any new and novel medical technology or drug, transferring part of the research and development cost back to patients may not be so unethical after all. What is important is for the usage to be guided by medical goals and ethics, for the public to be informed and be allowed a say in its design, and to ensure that the cost to patients does not become prohibitively high as to cause patients to decline medical care.

One major ethical conundrum in using IT in medicine is the inevitable increase in the vulnerability of patients' privacy and confidentiality. As the healthcare industry becomes increasingly driven by fiscal considerations, we will see an increase in the utilisation of IT to acquire, store and disseminate healthcare information in a cost effective manner. There is therefore a need to re-examine the appropriate balance between the competing values of personal privacy and the free flow of personal and sensitive health information. The relative merits have been discussed at length in both essays^(1,2), and in various other papers and position statements. All have expressed concerns at unprotected accessibility and potential abuse of confidential medical information via IT⁽⁶⁻⁹⁾. Although confidentiality issues have long existed before the arrival of the computer and the Internet, the use of IT that is capable of transmitting large amounts of data in very short time intervals, and of bypassing the conventional physical barriers and safeguards, certainly heightens public anxiety⁽⁶⁾. If the benefits of IT in medicine are deemed too good to forego, then one effective approach would be to manage the utilisation of IT in medicine through the use of legislative and regulatory measures. Hodge and his colleagues suggest looking into legal reforms to enhance the privacy of health information, for example, empowering patients with rights to consent to disclosure, laws to limit disclosure when consent is absent, incorporating industry-wide security protections and establishing a national data protection authority⁽¹⁰⁾. In addition, minimal privacy standards that protect individual autonomy yet take into account public health concerns should be established to guide the electronic collection and accessibility of personal healthcare information^(10,11).

In her paper, Yeo rightly points out that IT medicine, specifically telemedicine and cybermedicine, can result in ambiguous doctor-patient relationships⁽¹⁾. Healthcare professionals, especially doctors and nurses, are not trained nor tested in delivering

healthcare, both diagnostics and therapeutics, over an electronic domain. Medical judgment encompasses a complex interaction of facts, experience, values and clinical acumen, and cannot be expressed simply as a mathematical algorithm. It is difficult therefore to expect even the most sophisticated of computing systems to be able to simulate a clinician's professional judgment, and provide a safe and reliable answer. Another problematic area is in the communication between physician and patients via emails. This form of clinical interaction is asynchronous, lacks human touch, legally ambiguous, but equally costly in terms of time and resources, and is fragile in terms of privacy and confidentiality⁽¹²⁾. Even systems with audio-visual and real time capabilities such as teleconferencing also precludes sensory modalities such as sense of smell and touch, which can be vital in the assessment of patients. Most importantly, it erodes the humanistic nature of the doctor-patient interaction and deprives patients of the physician's healing touch, which can only be delivered through a person-to-person encounter. Electronic communication between doctors and patients should therefore be used judiciously and cautiously as an adjunct to clinical management, and not for diagnostic and therapeutic purposes. Its use should also be limited to situations when there are obstacles to accessibility, for example, geographical distances.

It is also imperative that healthcare providers and administrators avoid the pitfall of blindly adopting IT systems, and Ng's concern for the use of commercially driven IT in medicine is most definitely valid⁽²⁾. The answer can perhaps be found again in ensuring that our approach is patient-centred. As "service buyers", the healthcare providers must take proactive steps to assert and impose their ethical standards and philosophy on the research and development (R&D) as well as design of IT system to be used in practice, so that the end product is consistent and relevant to the goals and philosophy of the medical profession. For example, the medical profession must insist and persuade medical IT companies to focus their R&D efforts beyond mere capacity, power and speed, but instead on systems that are also safe and more controllable from patients' perspectives.

One of the potential harms caused by indiscriminate use of IT is information overload and worse, misinformation. Both can paralyse and impair the patients' decision-making capacity. The flood of readily accessible but unverified and unregulated information on the world-wide-web is a cause for concern. Many of these claims are not backed by scientific evidence and acting on such "information"

in an uncritical fashion can only be harmful and disruptive. Even with scientific or evidence-based information, many users do not appreciate the probabilistic nature of medicine, and the fact that medical decisions and judgment actually encompass a complex integration of information and experience. Application of partially understood medical principles on a whole spectrum of unprocessed information can and will lead to confusion and misunderstanding, and even distrust for the doctor. Similarly, an unlimited access to one's own medical records without the proper professional guidance can also be harmful to the patients themselves. Ng's example of *Slim 10*⁽²⁾, though not the most apt as it was marketed as a health product rather than a pharmaceutical product, and most came to know about it through direct sales, nevertheless highlights the importance of education and regulation of health-related information made available to the public. In the unpoliced environment of the world-wide-web, members of the public will have to learn to be more discerning and critical in their use of information.

It is crucial to first appreciate that IT is ultimately not indispensable to the delivery of health care. Like a double-edged sword, it can improve the quality and efficiency, but like any medical intervention, it can also cause harm. IT is a mere tool, and must be seen as a tool, or we will slip easily into the traps of technological imperative, causing the profession to be enslaved. Medical practitioners must therefore control the use of IT, and not vice versa. Ultimately, the utility of medical IT has to be evaluated as part of society's overall healthcare agenda, and its emphasis and development should therefore be weighed against other healthcare needs of society. The use of IT is not just about rapid communication and efficient data analysis, but also about respect for persons, the limits of medical science, and the just distribution of healthcare resources.

Finally, I cannot help but be perplexed by the popularity amongst young writers of the quote, "I'm not the God of this patient, just a technician with an education"^(2,13). Ng even goes on to say that "Sometimes after cracking one's head over ethics, it pays just to try and be a good technician". Indeed, it is of fundamental importance to possess the necessary technical competence, but this notion of a physician being just a "well-trained technician" reflects a tragic lack of comprehension and appreciation of the unique role played by the medical profession at both societal and personal levels. If physicians are

merely 'well-trained technicians', then it is very likely that artificial intelligence will one day replace humans as healthcare providers. But I am confident that this will not take place for the simple reason that healthcare interactions are based primarily on human relationships. As I have written previously⁽¹⁴⁾, doctors are in fact well-trained and caring friends⁽¹⁵⁾ who provide healing and comfort, a task that is just too complex and humanistic for technicians and technologies.

The debate on the safe and appropriate use of IT in medicine will continue to evolve as the capabilities of the technology are progressively being developed at a hurried pace. Only by returning to the fundamental precepts of medical ethics can we continue to meet new challenges posed by new inventions in order to preserve the ideals and aspirations of the profession, and society.

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