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**Finding medical information on the Internet: Who
should do it and what should they know**

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Finding medical information on the Internet: Who should do it and what should they know*

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Introduction

More and more medical information is appearing on the Internet, but it is not easy to get at the nuggets amongst all the spoil. Bruce McKenzie's editorial in the December 1997 edition of *SIM Quarterly* [1] dealt very well with the problems of quality, but I would suggest that the problem of accessibility is as much of a challenge. As ever-greater quantities of high quality medical information are published electronically, the need to be able to find it becomes imperative. There are a number of tools to find what you want on the Internet — search engines, agents, indexing and classification schemes and hyperlinks, but their use requires care, skill and experience.

The current scene

What a library looks like

Information is widely scattered around the Internet. The quality, reliability and organisation of sites vary on a continuum from the electronic versions of the *BMJ* and *Lancet* to the chelation and vitamin sellers of the alternative fringe. Medical libraries are required to hold vast numbers of journals but still have an inadequate collection for detailed research, and smaller or poorer hospitals are inadequately served. MEDLINE is available in most places but still has pitfalls for the unwary, and is rarely used to its full potential. The Cochrane collaboration and the bandwagon of meta-analysis continue to roll. Each of these information sources is useful, but each requires different skills to use.

The Library as a clinical department

Clinical staff are expected to learn how to access information in the library. There are never enough and never can be enough librarians to allow all information searches to be conducted by them. When the sources of information are standardised and validity assured by the standing of a printed journal, then this is an almost acceptable state of affairs. The medical and nursing students have a short course in using the library and their superiors and mentors are usually adept at using the literature so there is support for the junior clinician. Medical journals are a miracle of the evolution

* This article appeared in the "Personal View" column of Issue 4 (March 1998) of *SIM Quarterly*, the on-line journal of the Society for the Internet in Medicine. The original article may be found at the following URL: <<http://mednet.qut.edu.au/simq/issue4/views.html>>.

of a standard format for delivering information, but even then, postgraduate training is necessary to keep skills up to scratch.

Most libraries now offer MEDLINE courses, but the way information is represented is multiplying too rapidly for the systems to keep up. Anyone with over 10-15 years experience will remember the days when computerised literature searches had to be planned with and conducted by a specialist librarian, cost a relatively enormous amount, were slow, and produced data in an unwieldy mass of fanfold paper. The introduction of desktop computers and CD-ROM based MEDLINE has allowed individuals to conduct their own searches, but there is far less support available for the intellectual task of framing the queries, both from the librarians who have to do this in addition to acting as technical support, and the clinical hierarchy who may have no experience of producing such questions. The medical library has not yet become a clinical information department.

The next five years

The emptying of the shelves

Paper journals are migrating to the Internet at a rising rate: *Nature*, *BMJ*, the *Lancet*, and the *New England Journal of Medicine* all have electronic versions and are quickly moving toward full-text versions. If the popular, general journals are accessible on the Internet, can the more specialist ones be far behind? Subscription services have been run for a number of years and are becoming more common in the mainstream (e.g., the *Economist*). Here in New Zealand we are often faced with a wait of up to a week for even air-freighted journals and up to 6 weeks for surface post. In fact many articles are already ordered by electronic means; the reference found on MEDLINE, the article ordered via inter-library loans, and a photocopy delivered. How long before the final stage is just the unlocking of a Web site?

Libraries are spending an ever-larger percentage of their budget on IT. There are more journals published every year. An efficient electronic Interloan service does away with need for subscriptions to all but the most popular journals.

In five years time, I believe, many journal stacks will look like the card index areas or the paper *Index Medicus*, deserted except for the thesis writer and the historical researcher. The medical library of old will become an information centre, as will every modern library. It will become the clinical information centre; like the pathology department, it will have no inpatients but it will be equally important to the practice of medicine. It will also have to be available to the healthcare providers in the community, with the decreasing cost and increasing availability of wide area networks the information poor parts of the health system will be able to benefit from the information rich.

The information explosion continues

Not all medical information on the Internet is held in duplicates of paper journals. In fact this is a tiny subset of the information available. Much of this non-journal material is of high quality, and as time goes by there will be more and more internet-only publications: where the information is too time-sensitive (e.g., epidemiological information), too voluminous (for example,

the proposed data amnesty for unpublished trials), too specialised or just of the wrong format to be reasonably available to paper libraries.

If we are to follow the principles of evidence-based medicine [2] then we need to be able to access all of these sources of information. If evidence-based medicine is to be applied in a relevant and timely manner to clinical problems then obtaining information has to be regarded as part of the clinical process.

At San Francisco medical school [3] they are already providing the tools for clinicians to access electronic medical information. More than tools are needed; skills and support are also required if the practicing clinician is to fulfill Archie Cochrane's dream in the 21st century.

What skills are needed — and how can people get them

Searching the Internet — a non-trivial task

There is a great deal more to searching for electronic information and converting it to clinical knowledge than getting a browser a modem and a PC. There are skills in three major areas, as well as a fourth new skill area:

1. Basic computing skills

Being able to move around the computer in an efficient way, understanding how to use the features of local and Internet based software and how to learn to use new features. I regularly use at least four different interfaces to CD-ROM based information sources (MEDLINE, INSPEC, MathSci and Current Contents).

Each search engine and indexing system has its own interface, format and editorial policy. Martin Gardner in the *BMJ* [4] has pointed out the fact that information gatherers still need technical skills to deal with the information sources.

These skills are not trivial and there is always a danger that the user will stick to what they know, rather than what is most appropriate because it just takes too long to learn a new method, or they find they take too long to carry the task out. Virtually anyone can type but only a touch typist can take dictation.

The clinical information about the patient may also be located on a computer system. Systems will continue to change and the skill to learn new systems is an important skill.

2. Information management

These are the traditional preserve of the librarian, but every scientific discipline requires the ability to review and report on the current literature. This task is made even more difficult because of the variable quality and huge amount of material on the Internet. These skills are important for not only locating the information but also assessing its quality in terms of the reliability of the source (validation) and its timeliness.

3. Clinical understanding

There are all sorts of skills here, but this is required if the information obtained is to be transformed into knowledge that can be used to treat or

diagnose the patient (which is, of course, the reason why we have healthcare anyway). Clinical understanding needs to be used to reject information that may be inappropriate or out-of date or misleading. It is also essential to allow the information gleaned to be presented to other clinicians in an appropriate way.

4. Clinical information management

This brings together all the above skills as well as a leadership and research role in the provision of clinical information. The clinical information specialist will understand the sources of information, study their reliability and ensure their accessibility. It is this synthesis that creates a whole new skill.

The Nuclear Medicine Model

I will concentrate on nuclear medicine, but many of the points apply to a number of disciplines such as pathology, public health and radiology. A nuclear medicine department is a clinical department of a hospital, responsible for a number of imaging procedures and sometimes administration of some forms of radiotherapy. There are always medical staff (degree in medicine and membership of the appropriate college) as well as radiographers or medical physics technicians (sometimes graduates) and usually physicists (always graduates sometimes with post-graduate qualifications). All three groups have a large degree of patient contact, all three use sophisticated computers and software and all three are responsible for the accuracy and appropriateness of the tests performed which lead to changes in patient management. All the groups can be regarded as taking part of the clinical care of the patient.

On the research side all three groups may perform research — and present the research at the same conferences and in the same journals although there are more specialist journals for each group. People may often be members of their own professional society as well as a general nuclear medicine society.

Traditionally, clinicians undergo a combination of examinations and supervised experience before becoming independent practitioners. This is generally supervised by their postgraduate college and although it may include commercial or university run courses, it does not depend on them.

Clinical scientists, such as physicists generally undergo a period of postgraduate university training — often a MSc or PhD, and qualify for more seniority through supervised experience only. The same sort of model applies to engineers, where membership of the IEEE for example is based on a combination of initial degree and experience rather than a formal postgraduate examination. Formal postgraduate qualifications are even less important in theory for the radiographers/medical physics technicians, but in practice the apprenticeship model is being replaced by a combination of formal courses and post graduate qualifications.

So, who does the searching?

The sort of people who will be successful in the clinical information department will be those who have a commitment to patient care along with a natural curiosity and a desire to manage information effectively. Individual hospitals and community groups will have different establishments, and I'm

sure that in many places the medical library will take over this role. In terms of the source of these people the information technologists, librarians as well as clinical staff and clerical staff will start to be employed in this way.

As already happens in nuclear medicine and other departments, people will move into this field and learn in both formal and informal ways.

Doctors will need to have some sort of College/Board certification to progress in their career, while other workers will be more likely to gain higher degrees and diplomas. There is starting to be a blurring of the lines between doctors and other staff in many fields. In dentistry and public health medicine, for example, taught masters degrees are becoming more common and increasingly doctors are studying for the same sort of research-based qualifications as non-clinicians. At the lower level, there are starting to be more and more diplomas and postgraduate courses taught in this field. Ultimately, the only difference between many clinical and non-clinical courses is what they are called. I prefer the term medical informatics but evidenced-based medicine covers the same field.

“Medical Informatics is as much about computers as cardiology is about stethoscopes” [5].

There are already special interest groups in the ACM, IPED and IEEE for computing professionals interested in medical computing, as well as medical librarian societies (for example the Medical Librarian Association in the US). Just as in other fields, the qualification structure will evolve, but I think it has to be based on a combination of experience as well as learning from books. The professional societies can provide some assurance about ethical standards, and levels of competence but this is a changing field and any qualification will become obsolete quite quickly.

All people involved in this area need a commitment to life-long learning and those working in the education and research sector need to provide innovative and flexible ways of keeping the professionals up with the play. As doctors need CME points, something similar should be essential for workers in this field. At the present time this is enforced by the employer. I believe organisations such as SIM can fill a need if they can facilitate education in this area.

What is to be done?

I do not believe that SIM should attempt to become the Royal College of the Medicinal Internet. At the same time, I see no reason why SIM (or a similar body) should not become as well respected and important as the British Nuclear Medicine Society. I think that SIM should stay cosmopolitan in its membership and remain research and teaching based rather than a professionally validating society.

Clinicians interested in the use of medical information should press their Colleges to recognise training posts in this area, both for short attachments for those going on to other things and as career posts (as is the case in most specialties that have both diploma and membership schemes).

Hospitals and other health-care providers will have to allow other staff to become increasingly specialised in this field and work towards the construction of the clinical information department. This will be painful as the IT and library establishments will both see it as a loss of power but it has to be

done. The clinical information department will have to adapt itself to the need of its users, the clinical staff, and keep sight of its ultimate consumer: the patient.

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