MEDINFO 2001
V. Patel et al. (Eds)
Amsterdam: IOS Press


# Is the Internet an Integral Part of General Practice in Australia?

**P.A.H. Williams[a], and S. P. Maj[b]**

[ab]*Department of Computer Science, Edith Cowan University, 2 Bradford St., Mount Lawley, Western Australia, 6050, Australia.*

**Abstract**

*Computerisation has seen significant changes in information management and procedures in General Practice. Whilst the majority of changes to date, have been apparent in administration, the clinical aspect of primary care is now increasingly taking advantage of the computer and significantly, the Internet. The professional obligation to maintain currency in medical developments has provided an opportunity to use the Internet as a low cost method to access a wide range of medical research information worldwide. Furthermore traditional methods of communication within the medical community have the potential to be transformed by the availability and use of electronic communication techniques such as email. The incorporation of these new technologies in clinical practice is not without its challenges, and includes quality, timeliness, information management and attitudes to Internet based information. This paper presents the results of a preliminary study of GP's undertaken in Western Australia analysing the usage of, and attitude to, the Internet in clinical practice.*

***Keywords:***

*Internet; Medical Informatics; General Practice; Communications Media; Information Services*

## Introduction

In Australia, there is wide spread use of computers in general practice for a variety of applications, which include practice management, prescription printing and to a lesser extent, patient clinical records [1, 2]. However, the full potential of computers in clinical practice may not be yet be realised [3]. General Practitioners (GP's) have a professional obligation to maintain currency in medical treatments and developments through continuing medical education (CME) and on-going professional development [4]. Traditionally this has meant referencing textbooks, reading numerous journals and keeping up to date with the vast amount of printed pharmaceutical information. This is a significant problem for the medical profession, and one that needs to be addressed [5]. The Internet technologies provide a vehicle with the potential for convenient, low cost access to a wide range of medical information worldwide (currently there are over 100,000 medical and health information web sites [6]). This phenomenon has presented numerous challenges to the medical profession. One result of this is the open accessibility to Web based medical information, which has given rise to an increase of the occurrence of patients presenting GP's with information obtained via the Internet [7]. Whilst this has the potential to educate the general public, it also requires the GP be familiar with such patient information sources, the quality of which may be questionable. Additionally, the 'virtual physician' handling on-line consultations, may result in changes to the management and delivery of health care [8]. Challenges are also apparent in the use of the Internet as a clinical resource. The incorporation of evidence based clinical guidelines into clinical practice is beneficial, however instantaneous access to such information at the time it is required can be difficult. Further, communication within the medical community, and between GP's and their patients, is traditionally through consultation, telephony or paper-based, however the use of the Internet technologies can provide for electronic communications such as email. The now widespread use of email has the potential to significantly improve communications between medical professionals and alter the dynamics of doctor/patient relationships. However there exists significant issues that may handicap the full utilisation of Internet in clinical practice. These barriers include connection availability, speed of access, cost, quality and reliability of data, and finally attitude towards the use of the technology by GP's. This paper examines the current status of the use of the Internet in general practice. It presents the results of a preliminary study of GP's undertaken in Western Australia analysing the usage of, and attitude to, the Internet in clinical practice, and makes recommendations accordingly.

## Current Internet Usage

The rapid expansion and development of the World Wide Web, together with the availability of the low cost technologies of the Internet has, according to Williams [9] resulted in *'the unrestricted access to medical and health information at the 'touch of a button''*. This enabling technological advance has potentially altered several aspects of clinical practice within the discipline of general practice. These include its effect on physician CME, patient education and management, referencing, electronic

communications and clinical performance. [In reference to the issue of electronic medical records: As the task of recording patient information is central to general practice, Bolton [10] suggests that the Internet may be a good '*universal platform*' upon which to develop information systems, enabling the collation of '*disparate information sources*'. However it is early days for such an application of the technology in Australia.]

**Continuing Medical Education**

With the expanding volume of medical research, the introduction of new medical technologies and with the demand for quality outcomes in medical care, CME is becoming increasingly important. As technology progresses, Towle [8] suggests that the medical profession will need to be educated in "*not only the theoretical basis of medicine but also the scientific basis of clinical practice*". The methods of information access will shift from memorizing vast quantities of facts, to possessing the ability to access, analyze and apply up to date information, obtained from electronic sources. The Internet technology offers GP's electronic communications, information access, and information sharing, promoted via discussion groups and bulletin boards [11], although one possible disadvantage in the use of computer-based education is the lack of personal professional contact. In Australia, rural areas suffer from professional and intellectual isolation, although this problem has been addressed by the Primary Health Oriented Computer Users' System (PHOCUS) project [12].

**Patient Education and Management**

Prior to the development of web-based medical information, the general public had little or no access to clinical data. Since this data is now freely available via the Internet, and patients may present such information to their GP, there is now a need for GP's to be conversant with Internet based, patient accessible, medical information [13], the verifiable quality of which may be problematic. Indeed as Williams [9] found in a recent study "*the general public whilst having the ability to retrieve information, only select appropriate and useful information (as assessed by primary care providers) approximately 50% of the time*". The Internet empowers the individual by giving them the same access as medical professionals to sources of clinical information. However, this is not without its consequences, both positive and negative. Inaccurate, misleading and inappropriate use of the information [14] may be detrimental to the patient. However, beneficial outcomes may include reinforcement of clinical decisions and potentially a better-informed general public leading to higher treatment compliance [15, 16]. Sheppard [17] concurs with the opinion that "*patients require access to good quality, evidence based information so they can take an active part in decisions about their health care*". A study by Wilson [15] concluded that those patients obtaining health relevant information via the Internet have significantly higher expectations of clinical performance and participate actively in their own treatment. Whilst the more informed GP may welcome the initiative of patients to search for and request information, many are not comfortable with this shift in the knowledge base and are reticent to share more information than they deem necessary with patients [16]. As the roles and responsibilities of the health care providers are challenged, there is little doubt that the doctor/patient relationship will alter due to the use of the Internet [3, 18]. Currently requests for electronic sources of information, such as known health web sites, email communication and discussion of Internet health information, are increasing [15, 19].

**Reference Material**

During patient consultations it is not uncommon for questions to arise that require further information. Smith [20] suggests that the preferred source of such information is from medical colleagues. Further to this, clinical information is generally obtained from journals and standard reference texts, some of which are now available in electronic format such as Harrison's Principles of Internal Medicine and assorted medical journals such as The Lancet [21] and the BMJ [22]. The introduction of the Internet has made access to research evidence vastly less complicated, and the use of evidence based databases, accessed via the Internet, such as the Cochrane Library is increasing. There is however, a lack of awareness of, and access to, these databases, creating a barrier to the use of such resources [23]. Finally for reference purposes, whilst the Internet is a global source of information, to date it has not been easy to use by non-experts for access to clinical information [24].

**Electronic Communications**

It is possible that electronic communication such as patient initiated email and online consultations may become important in the future, particularly as email encourages more efficient communication. However, issues such as payment for service, time, and the appropriate ways to employ the technology currently limit its use. Additionally, the legal and ethical implications of such communication are fraught with difficulty. As demand for this mode of communication between the medical profession and the general public expands, more attempts to shape the format and procedures for such communication will develop. Two sources of currently available guidelines are those from the American Medical Informatics Society [25] and the Medical Defence Union [26].

**Clinical Governance/Performance**

Rosen [27] talks of clinical governance and its recognition as an important facet of medical practice. Much of the discussions revolve around the issue of measuring clinical performance and effectiveness, and from this comes an increasing pressure to base best practice on evidence based medicine [28]. Rapid access to such information is greatly enhanced by use of the Internet technologies. There is little doubt that unmet information needs can potentially compromise patient care and affect clinical performance [29].

It can be concluded that whilst there are many facets and advantages to using the Internet in the clinical setting, there also exist numerous barriers to its use. These barriers include: the limited access to the technology and cost of computer resources in the clinical setting; the difficulty associated in learning or using multiple resources; poor organisation of the resources; variable quality of information; and time pressures and knowledge decline [29]. Of these none are more apparent as concerning issues for GP's than those of quality of information, time to access relevant information when its clinically required, management of the vast amount of medical information available/required, and the attitude of general practitioners to the use of the Internet.

## Associated Issues

### Quality

Quality is a significant concern for those accessing Internet based medical information. The responsibility for issues of quality lie with both web site providers and consumers. There exist principles to guide the development of web sites such as those from the American Medical Association [30] and the Health on the Net Foundation, Code of Conduct (HONcode) [31]. Secondly, quality appraisal tools, rating schemes and health information assessment guidelines are available for both medical practitioners and patients [32, 33]. Despite the existence of assessment tools, it may not be possible to rate the quality of Web sites on an overall scale, particularly in relation to rating medical web sites [34]. As a result of this issue it is suggested that web users tend to use a small number of pre-selected sites of known quality. The reliability of the source of information is a major concern in the quality debate. The use of national evaluated health information gateways [35], offering free access to catalogues of current, quality assured health and medical information, will assist in access to reliable sources of information [36].

### Timeliness

The time taken to access information on the Internet can vary significantly and factors that affect this access time include modem speed, Internet service provider (ISP), Internet traffic, page faults, etc. Hibble [37] suggests *"the issue of making information easily accessible and usable at the point of clinical contact indicates an electronic medium"*. The usefulness of journals and reference material is diminished if there is no fast easy method to access it. If access is attainable in a suitable time frame, there exists the added challenge, to most GP's, of filtering information [38]. All of these factors are considerable handicaps to the use of the Internet within the restraints of the limited consultation period.

### Information management

As increasing amounts of medical research information become available, the GP needs additional skills as an information manager [29]. It is not surprising that the term 'information overload' is being used to describe the current state of general practice information [34]. Much of this information is available via the Internet, although as Coiera [39] comments *"Just as the ability to suture doesn't make one a surgeon, the ability to surf the Web does not imply that one understand the principled use of information"*.

### Attitudes to Web based clinical information

The medical profession may not always readily accept the relatively new phenomena of patient access to medical information. Globally, information obtained from the Internet and presented to practitioners is seen as a nuisance [40]. Despite this view, the Internet creates new opportunities for strengthening the doctor / patient partnership although clinicians are mostly ill prepared to cope with web based health-related information presented by patients [18]. In regard to the attitude of GP's in the use of the Internet technology for clinical assistance, there exists little more than anecdotal evidence.

The issues of quality, timeliness, information management and attitude, as discussed above, make it difficult to persuade GP's to use the Internet as a source of reference in the clinical setting.

## Materials and Methods

Western Australia (WA) is approximately 2.5 million square kilometers in size, representing one third of the Australian continent. There are approximately 2 million people spread throughout the state, and despite its size WA has a high population density in the Perth metropolitan area (approx 1.5 million or 75% of the WA population). The state has approximately 1800 GP's. An anonymous questionnaire was chosen for this preliminary survey, (due to funding constraints and to assist response rates by eliminating personal identification). This was mailed to 400 GP's across the state, representing 22% of the WA GP population. A covering letter, personally addressed and signed, was sent with the questionnaire, outlining the objectives of the study. The respondents were asked about their use of the Internet to access clinical information and their attitudes towards this medium of communication and information retrieval. The data was collected form October to December 2000. The initial data analysis was performed using SPSS data analysis software (version 10).

## Results

The following data is a selection of results this survey. The response rate was 46%. Geographically 68% of the respondents were located in the metropolitan area and 26% in country WA (6% unknown). Demographically the results showed 74% male and 24% female, with 75% in group practice and 19% solo practitioners. The age range was normally distributed. These statistics are similar to the GP population: 75% metropolitan, 25% rural Australia wide; and 73% male, 27% female in WA; and normally distributed age group (Australian Bureau of Statistics). 95.1% (174) of GP's have computers at their medical practice, and the general type of usage is given in Table 1.

*Table 1 – Computer usage in General Practice*

| *Type of computer use* | *Usage* |
|---|---|
| Practice Management | 90.2% |
| Prescription Printing | 78.1% |
| Patient Clinical Records | 48.6% |
| Downloading Pathology/Radiology results | 51.9% |
| Accessing the Internet | 62.3% |

Whilst 62.3% report using computers at their practice for accessing the Internet, 75.4% of practitioners have access to the Internet at their practice. It appears that home usage of the Internet for accessing clinical information is higher than at work although access rates to drug information are similar. Also only 19.1% use email for work purposes with any regularity. Table 2 gives a comparison of the access percentages for each type of information.

*Table 2 – Information type and access location*

| *Information type / location* | *Regularly / Often* | *Sometimes / Rarely* |
|---|---|---|
| Clinical / home | 30.6% | 48.6% |
| Clinical / work | 14.8% | 43.8% |
| Drug / home | 8.8% | 50.8% |
| Drug / work | 9.3% | 32.8% |
| Email for work | 19.1% | 39.3% |

In regard to the access of information to give their patients, the GP's reported that only 8.8% do this regularly or often. Further results on patient access and presentation of Internet acquired information, together with the attitudes of the general practitioners associated with this have been published elsewhere by Williams [9]. The respondents' use of the Internet during consultations was low with only 2.2% of GP's using it 'often' (and none 'regularly'). 23.5% use it 'sometimes/rarely' and of those with Internet access 50.8% 'never' access it. The primary reason for not accessing information via the Internet at work, was reported as being time constraints in the consultation to search for appropriate information (43.7%), whilst difficulty in retrieving appropriate information (24.6%), the Internet being too slow (29.5%), questionable quality of information (20.2%), lack of experience (18.6%), and the computer software being sufficient (22.4%) all rated significantly. Finally in regard to CME and clinical performance, the respondents were asked whether or not they agreed "*using the Internet for CME is useful?*", 48% agreed and 10.4% disagreed. Surprisingly 60.7% agreed that "*accessing clinical information in the Internet can improve clinical performance*" whilst only 6.6% disagreed, yet only 28% use it regularly.

## Discussion

The percentages of country versus metropolitan respondents are consistent with those of the GP population in WA. Since Perth is remote to the rest of Australia and 25% of the WA population live outside the metropolitan area, the use of Internet based electronic communications may be useful. There has been an increase in GP access to the Internet over the past two years. Nori [41] reported that in 1998 43% of GP's in New South Wales had access, whilst currently this is 75.4% in WA. Most practices use computers for patient management, with a high percentage using them for prescription printing, although only half of GP's use it for downloading pathology/radiology and slightly less for clinical records. Interestingly, a higher percentage use computers to access the Internet, although not during consultations. One GP commented that "*the current time pressures on consults places significant restrictions in the economic viability of using the Internet in consultations*". It is also apparent from the responses that quality of patient information and reliability of sources are significant issues, as another GP comments "*I am concerned at the number of patients accessing irrelevant information or pushing me to investigate a condition further based on Internet trivia*". The higher home usage suggests that the barriers to Internet use in the clinical setting are prohibitive. It should be noted that selection bias in this study must be considered, based on the subject matter. However as a preliminary survey, and the similarity in demographic distribution between the respondents and the WA GP population, suggest the results are valid.

## Conclusions

Despite the benefits associated with on-line access to clinical information and the use of email, questions remain on how to integrate these with normal clinical practice and thus make the Internet an effective and essential decision support system. It can be concluded that access to the Internet during consultations is rare, due to time and quality concerns. However, further investigation is required to ascertain if this is due to a lack of need or logistical barriers such as lack of time, concerns over quality or education and attitude. Additionally, more extensive research is needed, possibly in other parts of Australia, to ascertain whether factors such as the remote geographical location of Perth and Western Australia may be an influencing factor in the use of the Internet.

## Acknowledgments

I would like to thank the many general practitioners that took the time to fill in and return the questionnaire.

## References

[1] Bolton P. Clinical decision Making: are computers really helpful? *Aust Fam Phys* 1995;24(5):882-885.

[2] Cook A, Schattner P, and Pleteshner C. The experiences of one divisional group of GPs in introducing computers into clinical practice. *Aust Fam Phys* 1999;28(9):971-975.

[3] Carlile S, and Sefton AJ. Healthcare and the information age: implications for medical education. *Med J Aust* 1998;168:340-343.

[4] Petersen S. Time for evidence based medical education. *BMJ* 1999;318:1223-1224.

[5] Hanka R. Guidelines in general practice. *BMJ* 1999;318:1212.
[6] Gottlieb R. Health information on Internet is often unreliable. *BMJ* 2000;321:136.
[7] Cooling N, Kidd M, and Sloggett S. Use of computers by general practitioners for patient education. *Aust Fam Phys* 1997;26(1):31-36.
[8] Towle A. Continuing medical education: Changes in health care and continuing medical education for the 21st century. *BMJ* 1998;316:301-304.
[9] Williams PAH and Maj SP. Does your doctor support your use of the Internet as a Decision Support System - an Australian perspective. In: *International NAISO Congress on Information Science Innovations (ISI'2001)*; American University in Dubai, U.A.E.: In Publication; 2001.
[10] Bolton P. Through the looking glass: Computers and general practice. *Aust Fam Phys* 1997;26(10):1167-1169.
[11] Roberts C, and Fox N. General practitioners and the Internet: modeling a 'virtual community'. *Family Practice* 1998;15(3):211-215.
[12] Cesnik B, McPhee W, and Kidd M. *Primary Health Orientated Computer Users' System: Overcoming the isolation of rural doctors with computer based communication.* [on-line] 1993;1999(15 May). Available from: http://www.hisavic.aus/net/hisa/mag/sep93/primary.htm.
[13] Clearihan L. Is information knowledge? Does it matter? *Aust Fam Phys* 1999;28(5):417.
[14] Coiera E. Information epidemics, economics, and immunity on the Internet. *BMJ* 1998;317:1469-1470.
[15] Wilson SM. Impact of the Internet on primary care staff in Glasgow. *JMIR* 1999;1 (2)(e7):1-7.
[16] Ruth D, Hodge M, and Murphy B. Patient drug education. Improving the working relationship between general practitioners and pharmacists. *Aust Fam Phys* 1994;23(8):1536-1541.
[17] Shepperd S, Charnock D, and Gann B. Helping patients access high quality health information. *BMJ* 1999;319:764-766.
[18] Jadad AR. Promoting partnerships: challenges for the Internet age. *BMJ* 1999;319:761-764.
[19] Ferguson T. Online patient-helpers and physicians working together: a new partnership for high quality health care. *BMJ* 2000;321:1129-1132.
[20] Smith R. What clinical information do doctors need? *BMJ* 1996;313:1062-1068.
[21] The Lancet.[on-line]. Available from: http://www.thelancet.com.
[22] BMJ.[on-line].Available from: http://www.bmj.com.
[23] Young JM, and Ward JE. General practitioners' use of evidence databases. *Med J Aust* 1999;170:56-58.
[24] Lowe HJ, Lomax EC, and Polonkey SE. The World Wide Web: a review of an emerging internet-based technology for the distribution of biomedical information. *J Am Med Inform Assoc* 1996;3:1-14.
[25] Kane B, and Sands DZ. *Guidelines for the clinical use of electronic mail with patients.* Am Med Internet Assoc [On-line] 2000;2000(16 Nov). Available from: http://www.amia.org/pubs/other/email_guidelines.html.
[26] Brown H. *View from the front line - medico-legal dangers.* He@lth Information on the Internet [On-line journal] 1999;2000(20 Oct). Available from: http://www.wellcome.ac.uk/en/l/homlibinfactiiarc12.html.
[27] Rosen R. Improving quality in the changing world of primary care. *BMJ* 2000;321:551-554.
[28] Glanville J, Haines M, and Auston I. Finding information: clinical effectiveness. *BMJ* 1998;317:200-203.
[29] Westberg EE, and Miller RA. The basis for using the Internet to support the information needs of primary care. *J Am Med Inform Assoc.* 1999;6:6-25.
[30] Winker M, Flanagin A, Chi-Lum B, White J, Andrews K, Kennett RL, et al. Guidelines for medical and health information sites on the Internet: principles governing AMA web sites. *JAMA* 2000;283:1600-1606.
[31] Health On the Net Foundation. *HON Code of Conduct (HONcode) for medical and health Web sites.* Health on the Net Foundation, [On-line] 1997;2000(14 Nov). Available from: http://www.hon.ch/HONcode.
[32] Kiley R. *Editorial - Online critical appraisal tools.* He@lth Information on the Internet [On-line journal] 1999;2000(20 Oct). Available from: http://www.wellcome.ac.uk/en/l/homlibinfactiiarc11.html.
[33] Kim P, Eng TR, Deering MJ, and Maxfield A. Published criteria for evaluating health related web sites: review. *BMJ* 1999;318:647-649.
[34] Delamothe T. Quality of websites: kitemarking the west wind. *BMJ* 2000;231:843-844.
[35] HealthInSite. Commonwealth Government of Australia [On-line];2000(16 Nov). Available from: http://www.healthinsite.gov.au.
[36] Gann B. *NHS Direct Online.* He@lth Information on the Internet [On-line journal] 1999;2000(20 Oct). Available from: http://www.wellcome.ac.uk/en/l/homlibinfactiiarc12nhs.html.
[37] Hibble A, Kanka D, Pencheon D, and Pooles F. Guidelines in general practice: the new Tower of Babel? *BMJ* 1998;317:862-863.
[38] Adkins P. Harnessing & controlling the information deluge. *Aust Fam Phys* 1997;26(1):25-29.
[39] Coiera E. Medical Informatics meets medical education. *Med J Aust* 1998;168:319-320.
[40] Pemberton PJ, and Goldblatt J. The Internet and the changing roles of doctors, patients and families. *Med J Aust* 1998;169:594-595.
[41] Nori A, and Gunn J. Data in general practice. *Aust Fam Phys* 1998;27(Suppl 2):S110-S111.

**Address for correspondence:**
Patricia Williams
CHA, School of Computing and Information Science, Edith Cowan University, 2 Bradford St., Mount Lawley, WA, 6050, Australia.
+61 (0) 412 322 999
Email: trishy@iinet.net.au