Moira G Sim
MBBS, FRACGP, FAChAM, is Associate Professor, Centre for Postgraduate Medicine, Deputy Director, Systems Intervention Research Centre for Health, Edith Cowan University, and a general practitioner, Yokine, Western Australia. m.sim@ecu.edu.au

Eric Khong
MBBS, GradCertHlthEcons, GradDipPHC, FRACGP, is Senior Lecturer, Centre for Postgraduate Medicine, Edith Cowan University and School of Psychiatry and Clinical Neurosciences, University of Western Australia, and a general practitioner, Duncraig, Western Australia.

Moyez Jiwa
DCH, MRCGP, FRACGP, MA, MD, is Professor of Primary Care, Curtin University of Technology, Co-Director WA Centre for Cancer and Palliative Care, and a general practitioner, Clarkson, Western Australia.

Does general practice Google?

Background
Searching websites during consultations with patients has been anecdotally reported to be useful by some medical practitioners. We aimed to investigate how and to what extent medical practitioners use the internet to aid clinical consultations.

Methods
A descriptive study of general practitioners in the Osborne Division of General Practice, Perth, Western Australia (N=132), using a postal questionnaire sent in May and June 2007.

Results
Ninety-three percent of those surveyed had broadband access. The majority used the computer for clinical tasks such as prescribing, ordering tests and writing letters. Fifty-six percent used the internet during consultations. The search engine 'Google' was the most commonly cited website. The most frequently mentioned reason for internet use was finding medical information for patients.

Discussion
Computers are now available in most general practices. The internet has impacted upon the traditional doctor-patient relationship. More research is needed into how GPs can better search and use the information available on the internet.

Since 2005, with the assistance of Commonwealth Government incentives, there has been a major uptake of broadband and internet use in general practices across Australia.[1] In a 2005 survey of 1186 general practitioners in Australia, 90% used a clinical software package, with 98% of these using the package for prescribing, 85% to order tests, and 64% to record progress notes.[2] According to a BEACH study of 1319 GPs in Australia between 2003 and 2005, 67.3% used the internet or email at their practice.[3]

Patients are increasingly 'internet savvy' and 'surf' the internet to search for information[4,5] or to prepare for and supplement visits to their doctor.[6–9] Internet searches can be viewed by patients as an additional resource to support existing and valued interactions with their doctor.[10] While internet searching is not necessarily disclosed at all consultations,[5] medical practitioners have seen an increasing number of patients attending consultations following internet searches.[9,11,12] The presentation of information from these searches by patients changes the dynamics of the consultation. It can be challenging to the patient-doctor relationship,[13] or it can provide an incentive for doctors to learn how to use electronic based resources.[14]

There is a plethora of medical information easily accessible through internet search engines such as 'Google'. Websites have the potential to both assist medical practitioners in formulating diagnoses[15,16] and to provide links to sites of variable quality.[4] The internet may be seen as more credible than physicians; but many consumers either do not know how to, or do not, assess indicators of credibility.[5,17] A lack of skills in evaluating the quality of health information provided in this context can leave some consumers vulnerable to misleading information.[4,18,19] Many instruments have been developed to evaluate the quality of health information on the internet but the validity and reliability of the instruments have also been questioned.[20] There is clearly a role for the 'internet savvy' GP to promote the use of quality sites and to help patients navigate through the conflicting and sometimes misleading information encountered.[5,9,17,19,21]

Computer use in the general practice consultation primarily relates to clinical tasks such as accessing and recording information in the patient file, prescribing, and ordering tests.[3,22] There is growing interest in the continuing development of computerised clinical decision support tools to improve clinical practice, the effects of computer

use on the consultation process, and the use of the internet as a tool during consultations.[2,23,24]

Searching websites during consultations with patients has been anecdotally reported to be a useful strategy but it can be time consuming. Medical practitioners vary in the level of knowledge of useful websites and search strategies. The internet is seen by general practice registrars in Australia as a useful resource, a good method of providing further details to patients, and an aid to shared decision making.[25,26]

Methods

In May and June 2007 a brief two page questionnaire was mailed out to all GPs in the Osborne Division of General Practice (ODGP) database, which included 92 general practices and 396 GPs. Invitations to complete the questionnaire were included in the weekly ODGP faxstream. The survey was anonymous, but those wishing to be eligible for a gift voucher (for the 10th, 50th, 100th and 200th surverys returned) needed to provide contact information in a tear-off section. Processes were established to ensure confidentiality of information provided.

The GPs were asked to provide personal and practice demographic information, information about the pattern of computer use at work and at home, and a list of the 10 most frequently visited websites. Completed questionnaires were returned to designated fax numbers and collated at Edith Cowan University, Western Australia.

Ethics approval was obtained from the Edith Cowan University Human Research Ethics Committee.

Results

Demographics of sample

Of the 488 questionnaires sent, no 'return to sender' mail indicating invalid addresses was received. We received 132 responses from GPs with graduation years distributed across the range 1963 to 2002. Approximately 50% of the sample had graduated in the past 25 years.

Four identified themselves as registrars, 55 as not registrars, while 74 ticked neither the 'yes' nor 'no' box. As there were only five people who graduated in 1999 or later, it is likely that the 74 respondents that did not answer the question were not registrars. That is, not ticking the boxes was misinterpreted as way of answering 'no' by a large number of respondents. Sixty-four identified themselves as a member of The Royal Australian College of General Practitioners (RACGP), 38 as not, and 31 did not answer. Ninety-five identified themselves as division of general practice members, 13 as not, and 25 did not answer. Fifty-six percent were men, 69% defined themselves as full time, and the age range was well distributed across the decade groups of 20–30 years, 30–40 years, 40–50 years, 50–60 years and 60+ years, with half the sample being over the age of 50 years. Numbers of GPs in the practice ranged from 1–16, with 65% being in practices of seven or less GPs and 88% being in practices of 10 or less.

Computer and internet access

Ninety-three percent used broadband in the practice, 3% used dial-up, 2% had no internet access and one GP reported not being sure of the type of internet access they had. Almost equal proportions of men and women used broadband. The use of computers for clinical tasks is summarised in *Table 1*.

Ninety-two percent used email at home and 64% at work. Eighty-seven percent used the internet at home, 62% used the internet at the surgery outside consultations and 56% used the internet in the surgery within consultations. Sixty-seven percent of male GPs and 53% of female GPs used the internet during consultations.

Year of graduation, age and use of computers and internet

While there was greater use of the computer by younger respondents for all tasks, respondents across the range of graduation years 1963 to 2002 used the computer for prescribing, letter writing, ordering of tests, medical notes, email and web browsing. In each decade group, the majority of GPs used the computer for ordering tests, prescribing and letter writing.

Of the eight GPs who did not use the computer for prescribing and ordering tests, all graduated in 1983 or earlier. Of the six GPs who did not use the computer to write letters, all graduated in 1979 or earlier. *Figure 1* and *2* illustrate the use of computers for clinical tasks by age cohort. *Figure 3* illustrates the use of email and the internet at home and at work.

Internet sites most commonly used

General practitioners were asked to list 10 websites, but only four provided the full 10. Seventy-nine GPs listed at least one website and 26 listed at least five websites. Included in the list were search engines, lay health information and medical professional websites. *Table 1* lists the most commonly listed sites.

Many websites were cited, but the most frequently mentioned categories of sites in order were: search engines (Google was the only search engine mentioned more than twice), medical organisations, government health related departments, nongovernment health organisations, medical tabloids and travel medicine sites.

Table 1. Commonly listed websites

Website	Frequency
Google (www.google.com)	53
The RACGP (www.racgp.org.au)	11
Osborne Division of General Practice (www.odgp.com.au)	10
Centres for Disease Control (www.cdc.gov)	10
Dermnet (www.dermnetnz.org)	9
Australian Doctor (www.australiandoctor.com.au)	9
Pharmaceutical Benefits Scheme (www.health.gov.au/pbs)	8
Family Planning WA (www.fpwa.org.au)	8
Medical Observer (www.medicalobserver.com.au	7
National Prescribing Service (www.nps.org.au)	6
Department of Health and Ageing (www.health.gov.au)	6
Beyondblue (www.beyondblue.org.au)	6
Travel medicine sites	6

Figure 1. Use of computer for clinical tasks by age cohort

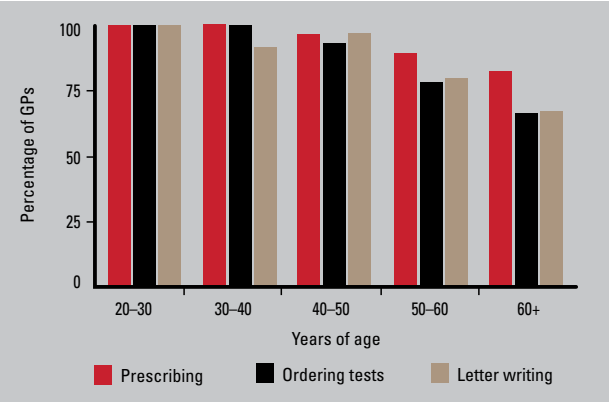
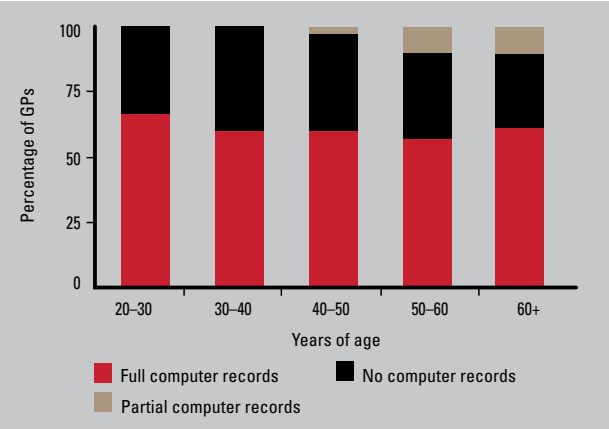


Figure 2. Use of computerised medical records by age cohort



Reasons for choosing websites

We asked respondents to explain why they chose particular websites. Common themes were: finding information for patients (eg. handouts), finding medical reference information (eg. medications, diseases, guidelines), finding information about local health services, and showing patients anatomical pictures.

Comparison with BEACH data

The demographic profile of GPs in our study was comparable with the GPs in previous similar studies.[2,3] However compared to BEACH 2004–2005 data,[3] a greater proportion of GPs in our study used the computer for clinical functions and email.

Discussion

Consistent with earlier research and the continued uptake of computerisation in recent years, in our study the majority of GPs used the computer for clinical tasks.[2,3] Younger GPs used computers more than their older colleagues, with all GPs who graduated after 1983 using the computer for prescribing, ordering tests and writing letters. This is not surprising given that this cohort grew up in the 'internet age'. However, computer use for clinical tasks was not confined to the young, with the majority of those who graduated before 1983 also using the computer for these tasks. We found that more than half of all respondents (56%) and all those aged 20–30 years used the internet during consultations. Broadband was widely available to GPs in our study and the increased speed and constantly 'on' access facilitates access to the internet during consultations.

We hypothesised before sending out the survey that the ubiquitous search engine Google would be one of the most popular websites, and this was indeed the case. Google was five times more popular than the next website and was noted to be a good starting point for internet browsing to more valued websites. However, its search results include websites of variable credibility and its efficiency in finding the information depends upon the search terms used. This raises several questions.

Why is Google more popular than other websites?

Twenty-five respondents provided comments about their use of Google. It was particularly valued for its ability to lead to other websites of value (n=9), ease of use (n=8), its fast search engine (n=5), convenience (n=4), and wide applicability (n=4). Three respondents noted that Google was a good starting point for finding information and led to other sites. One respondent said that it was useful to find medical information for patients.

How do GPs assess the credibility of websites?

In our study it is clear that there is an attempt to assess credibility of websites, with comments reflecting the quality of information available at some sites. Comments relating to the quality of information were never associated with Google. Examples of comments include:

- 'good patient handouts, worksheets' – Centre for Clinical Intervention
- 'validated information' – Center for Disease Control
- 'reliable, good pictures', 'good concise information' – Dermnet
- 'good summary of information' – Family Practice Notebook.

In our study, the internet was used to find clinical information, information for patients, information on local services and for clinical requirements (eg. to check the Pharmaceutical Benefits Scheme and Medicare for prescribing and item numbers). Google appears to be used as a starting point to find information on the internet. More specific websites are chosen as a result of familiarity and assessment of value of the information. More work remains to be done on how GPs assess the credibility of and make choices about websites.

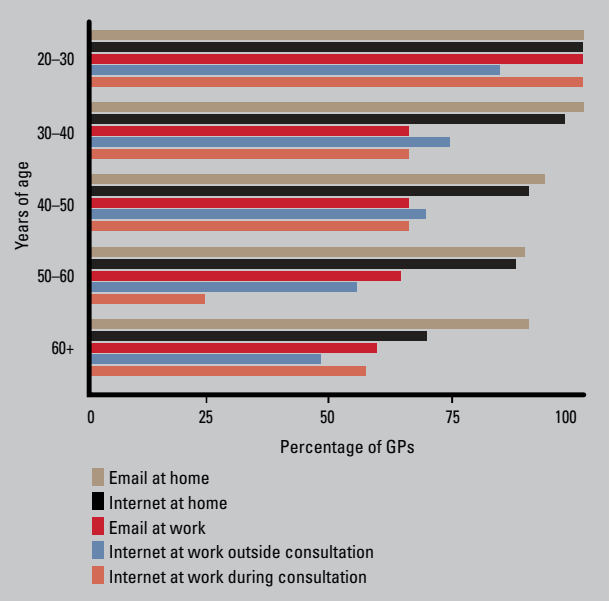
How can the internet assist GPs in providing better health care?

Respondents were also asked what factors would make it easier to use the internet with patients. The majority of answers related to ease of use, accuracy of information, faster connection speeds and the website being 'reputable'.

The volume of information available on the internet is rapidly increasing. Given that this study shows that GPs are already using the internet as part of the consultation:

- is there a need for a better open access website or search tool that can act as a clearing house for high quality medical information? Of

Figure 3. Use of email and internet by age cohort



the existing search tools that lead to high quality information, what are the barriers to their use?

- is Google a diagnostic aid for general practice when used by an 'internet savvy' health professional?
- should we, and how do we, help GPs becoming more 'internet savvy'?
- can website information, coupled with the GP providing 'expert filtering', improve patient understanding and self management?

Limitations of the study

One of limitations of the study was the modest response rate of 33%. However, post hoc calculations suggest that our response rate is consistent with a 95% confidence level and a maximum 8.5% margin of error on any specific question. A second limitation of the study was that responses were self reported and we did not explore the extent to which clinical tasks were performed. For example, a GP who only occasionally writes letters using the computer might have self reported as a computer letter writer.

Implications for general practice

The cohort trends suggest that the use of computers for clinical tasks and the use of the internet as a tool in consultations will increase as the older workforce is replaced by the younger. This has implications for health organisations seeking to communicate and work with GPs. The information obtained from this survey suggests further research, perhaps in the form of interviews and focus groups, is needed to explore how GPs can use the internet more effectively to find high quality clinical information which contributes to successful clinical consultations.

Conflict of interest: none declared.

Acknowledgments

We thank the GPs who completed the questionnaire and the ODGP for their assistance in promoting the project, sending out the questionnaire and providing the prizes for the draw. We also thank A/Prof Satvinder Dhaliwal, Curtin University of Technology, for advice on statistical matters, Ms Priscilla Rispoli and Ms Toni Wain from Edith Cowan University for assistance in data entry and analysis.

References

1. Health Connect. National. What's happening. Canberra: Australian Government Department of Health and Ageing, 2006.
2. McInnes DK, Saltman DC, Kidd MR. General practitioners' use of computers for prescribing and electronic health records: results from a national survey. Med J Aust 2006;185:88–91.
3. Henderson J, Britt H, Miller G. Extent and utilisation of computerisation in Australian general practice. Med J Aust 2006;185:84–7.
4. Cline RJ, Haynes KM. Consumer health information seeking on the internet: the state of the art. Health Educ Res 2001;16:671–92.
5. Diaz JA, Griffith RA, Ng JJ, Reinert SE, Friedmann PD, Moulton AW. Patients' use of the Internet for medical information. J Gen Intern Med 2002;17:180–5.
6. Budtz S, Witt K. Consulting the Internet before visit to general practice. Patients' use of the Internet and other sources of health information. Scand J Prim Health Care 2002;20:174–6.
7. Hesse BW, Nelson DE, Kreps GL, et al. Trust and sources of health information: the impact of the Internet and its implications for health care providers: findings from the first Health Information National Trends Survey. Arch Intern Med 2005;165:2618–24.
8. Kivits J. Informed patients and the internet: a mediated context for consultations with health professionals. J Health Psychol 2006;11:269–82.
9. McMullan M. Patients using the internet to obtain health information: how this affects the patient-health professional relationship. Patient Educ Couns 2006;63:24–8.
10. Stevenson FA, Kerr C, Murray E, Nazareth I. Information from the internet and the doctor-patient relationship: the patient perspective – a qualitative study. BMC Fam Pract 2007;8:47.
11. Smith JJ, Mallard-Smith RJ, Beattie V, Beattie DK. Use of information technology in general practice. J R Soc Med 2003;96:395–7.
12. Podichetty VK, Booher J, Whitfield M, Biscup RS. Assessment of internet use and effects among healthcare professionals: a cross sectional survey. Postgrad Med J 2006;82:274–9.
13. Malone M, Harris R, Hooker R, Tucker T, Tanna N, Honnor S. Health and the internet-changing boundaries in primary care. Fam Pract 2004;21:189–91.
14. Eysenbach G, Sa ER, Diepgen TL. Cybermedicine. Interview by Clare Thompson. BMJ 1999;319:1294.
15. Giustini D. How Google is changing medicine. BMJ 2005;331:1487–8.
16. Tang H, Ng JH. Googling for a diagnosis – use of Google as a diagnostic aid: internet based study. BMJ 2006;333:1143–5.
17. Morahan-Martin JM. How internet users find, evaluate, and use online health information: a cross-cultural review. Cyberpsychol Behav 2004;7:497–510.
18. Gilliam AD, Speake WJ, Scholefield JH, Beckingham IJ. Finding the best from the rest: evaluation of the quality of patient information on the Internet. Ann R Coll Surg Engl 2003;85:44–6.
19. Hart A, Henwood F, Wyatt S. The role of the internet in patient-practitioner relationships: findings from a qualitative research study. J Med Internet Res 2004;6:e36.
20. Gagliardi A, Jadad AR. Examination of instruments used to rate quality of health information on the internet: chronicle of a voyage with an unclear destination. BMJ 2002;324:569–73.
21. Ullrich PF, Jr., Vaccaro AR. Patient education on the internet: opportunities and pitfalls. Spine 2002;27:E185–8.
22. Watkins C, Harvey I, Langley C, Faulkner A, Gray S. General practitioners' use of computers during the consultation. Br J Gen Pract 1999;49:381–3.
23. Hunt DL, Haynes RB, Hanna SE, Smith K. Effects of computer-based clinical decision support systems on physician performance and patient outcomes: a systematic review. JAMA 1998;280:1339–46.
24. Sullivan F, Wyatt JC. How informatics tools help deal with patients' problems. BMJ 2005;331:955–7.
25. Tse J. Online tools to enhance evidence based practice. Melbourne: University of Melbourne, 2005.
26. Thistlethwaite J, Heal C, Tie RN, Evans R. Shared decision making between registrars and patients: Web based decision aids. Aust Fam Physician 2007;36:670–2.

AFP CORRESPONDENCE afp@racgp.org.au