

Patient use of the Internet for health care information in Switzerland

Jean-Gabriel Jeannot^{a,b}, Florian Froeblich^c, Vincent Wietlisbach^a, Bernard Burnand^a, Olivier Terraz^a, John-Paul Vader^a

^a Institute of Social and Preventive Medicine, Lausanne, Switzerland

^b Medical Informatics, Centre Electronique de Gestion, Hôpital des Cadolles, Neuchâtel, Switzerland

^c Department of Gastroenterology PMU/CHUV, Lausanne, Switzerland

Summary

Study aims: The aim of this study was to examine for the first time the frequency of Internet use for medical purposes by patients in Switzerland.

Methods: In 2001 over a period of one month, 1604 patients at 8 medical practices in Switzerland completed a self-administered questionnaire on their access to the Internet and any search for medical information using this media. The attending physician supplied the patient's diagnosis and information on the severity of the disorder motivating the visit using a separate questionnaire.

Results: 46% of the patients included in the study had a personal computer, 33% had an Internet connection and 10% used the Internet to find medical information. Age was inversely associated with the probability of having an Internet access, whereas educational level and command of the English language were factors directly associated with this. Among those patients with access to the Internet, young adults (25 to 44 years) and those with knowledge of the English language searched

for medical information significantly more frequently. Furthermore, patients attending urban medical practices and those with a more severe level of disease more often sought health care information on the Internet.

Conclusions: The proportion of patients in Switzerland who search for medical information on the Internet is similar to the rates observed in European English-speaking countries. The Internet allows patients to actively search for information concerning their own health problems but is not currently the most common source of information used by patients. Since health professionals generate, directly or indirectly, most of the medical information published on the Internet, additional research is needed to better understand patients' needs and expectations concerning medical information using this media.

Key words: internet/utilization; information systems; information services; delivery of health care; patients; patient satisfaction

Introduction

Do patients in Switzerland use the Internet to search for medical information? Few data are available to date on the subject of Internet use for such purposes and the only study available that sheds some light on this question is a European study in which 10% of the Swiss respondents indicated that they use the Internet as a source of medical information [1]. The aim of our study was therefore to examine the percentage of patients who had a computer, who had Internet access and who used it to look for medical information.

A recent survey [2] revealed that, at the beginning of 2003, there were more than 3.5 million net-surfers in Switzerland, i.e. over half the population. This study also showed that net-users prefer to surf

at home, where more than half of them have an Internet connection, which they use for both communication and information purposes, the most quoted reasons being e-mail, search-engine use and topical information. The results for Switzerland are similar to the averages noted in European Union countries [3].

Internet use among health professionals in Switzerland has not yet been widely studied. A study carried out among primary care physicians in the German-speaking part of Switzerland showed that, of 55% of those who responded to a study questionnaire, 75% had an Internet access, 14% searched regularly for medical information on the Internet and 7% used the Internet during

the actual consultation with the patient [4]. However, to our knowledge, no study has yet examined patient use of the Internet in Switzerland.

Our purpose was thus to examine whether the Internet is a widely used source of medical infor-

mation by patients and to identify variables that determine computer ownership, Internet connection and medical information seeking on the Internet.

Methods

In November 2001, a questionnaire was sent to patients and physicians at eight medical practices, including primary care physicians (four general practitioners) and specialists (four gastroenterologists). Five physicians practiced in an urban area and three in a small town or rural area.

One questionnaire was completed for each patient. Patients who consulted their physician more than once during the study period were included only once. One part of the questionnaire was completed by the patient and the other by the physician.

Questions to the patient included age, gender, educational level, knowledge of English, computer ownership, Internet access, frequency of Internet use, medical and non-medical information seeking and Internet use for medical information search.

Questions to the physicians included a categorization of the illness involved (cardio-vascular, cancer, metabolic, functional, other), its severity and chronicity.

All statistical analyses were performed using the STATA6 software programme. Associations between pa-

tient characteristics (gender, age, education level, type of disease, etc.), physician characteristics (medical speciality and location of practice) and the variables to be studied (Internet access and search for medical information on the Internet) were analysed in three steps. Firstly, the nature of the associations and their level of statistical significance were examined using cross-tabulations and chi-square test for independence. Secondly, for each significantly associated characteristic, the strength of the association was calculated using a simple logistic regression model and unadjusted odds ratios. Finally, a multiple-regression model was used to identify which of the characteristics were associated independently from the others with the variables of interest and to calculate odds ratios adjusted for the influence of the other factors. The choice of the dependent characteristics retained in the model was made by stepwise backward selection. Calculation of the odds ratios' confidence intervals was based on a robust estimator of their variance taking into account patient clustering as they were selected from the 8 medical practices.

Results

During the study period, the eight physicians saw 1,604 patients. Their mean age was 56 years (range 12–97), and 57% were females. Thirty-four percent had completed obligatory schooling, 33% had completed an apprenticeship, 16% had attended a specialised professional school and 10% had a higher or university education level. Only 318 (19.8%) had any knowledge of English.

Among the 1604 patients, 732 (46%) had a computer, 526 (32.8%) had Internet access and 156 (9.7%) used it to search for medical information (fig. 1). These figures mean that, among the patients owning a computer, 71.8% had an Internet connection and among those with access to the Internet, 30% sought medical information on the web.

Table 1 describes the rates of Internet access and Internet use for medical information according to patient and physician characteristics. Differences in the rates between patient subgroups are presented in terms of unadjusted odds ratios. Table 2 provides the same information in terms of adjusted odds ratios in order to express the specific effects of the different characteristics. In each table, results regarding Internet use to search for medical information are presented separately with respect to patients having access to the Internet (column 2) and to patients overall (column 3).

Computer ownership and Internet access

As the determinants of computer ownership and Internet access were very similar, results are described only for Internet access. Age, level of education and knowledge of English were the only independent determinants.

The older the patient, the lower was the rate of Internet access, varying from 69% among those under 25 years to 5% among those over 65. Twelve percent of patients who had completed only obligatory schooling had access to the Internet, compared to 76% for those with a university degree. Seventy-four percent of the patients with knowledge of English had access to the Internet, compared to only 23% of the non-English-speaking patients.

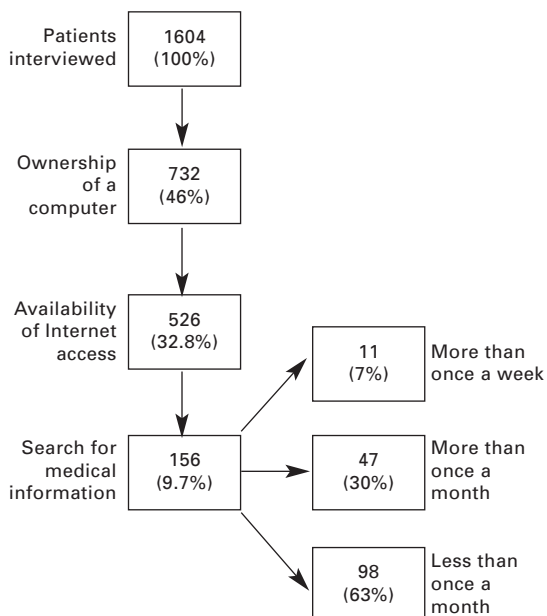
More men than women had access to Internet (41% vs. 28%), but this difference was, however, not confirmed by the multivariate analyses (table 2). Whether the patient suffered from an acute or a chronic disease, consulted a general practitioner or a specialist, in an urban or a small-town practice, did not significantly influence the rate of access to the web.

Search for medical information on Internet

Among the 526 patients who had an Internet access, 156 (30%) sought medical information on the web. The majority (63%) of these "cyber-pa-

Figure 1

Number and percentage of patients who had a computer, an Internet access and who looked for medical information on the Internet.



tients” performed searches less than once per month, 30% more than once per month and 7% more than once per week (figure 1). Regarding the search strategy, about 60% of patients used a search engine whereas 20% gave the name of a specific medical website. Furthermore, 86% answered that they conducted searches concerning disease treatment, 67% concerning diagnosis and only 14% concerning patients’ associations. 19% said that the information they found was reassuring,

86% judged it useful and 89% thought that the Internet would play an important role in finding medical information in the future.

Variables that determined which patients with an Internet connection looked for medical information were different from the variables that determined the availability of an Internet connection (table 1).

Age had a non-linear influence. The patients who looked most frequently for medical information were aged 25–44 years. Another variable strongly linked to the search for medical information was knowledge of the English language. Three other variables significantly influenced the frequency of medical information searches on the Internet, the acuteness or chronicity of the disease, its severity and the region where the medical practice was located. However, the severity of the disease was associated with the search for medical information only in patients with acute disease. When the disease was described as acute by the physician, 69% of patients searched for medical information, compared to only 21% of patients with a disease described as chronic. Patients consulting in urban areas more often looked for medical information than patients consulting in a rural area.

In summary, these results show that the typical patient looking for medical information on the Internet is a 25 to 44 year-old city dweller, who has a knowledge of English and who suffers from a severe acute disease.

Discussion

In the present study, 33% of patients had Internet access, which is lower than the rate of 50% observed at the time of our study in the Swiss general population [2]. This difference can certainly be explained by the fact that the characteristics of these two populations are different with, in particular, a higher mean age of “patients”. Otherwise, our results are similar to those of previous studies, which showed a significant influence by patient age, education level [5–9] and knowledge of English [10] on Internet access.

The most significant studies on Internet use for medical information search purposes by patients have been carried out in the USA [5, 6, 8, 11–18]. The majority of the European studies are British [9, 19–24] and, to our knowledge, there are only two studies concerning non-English-speaking patients. The studies in English-speaking countries were all based on questionnaires completed by outpatients, in a sample size ranging from 23 [21] to 1204 [9]. For studies that examined the rate of Internet access and the search for medical information [9, 22–24], the results indicated that Internet access ranged from 33 to 50% and that between 7% and 13% of patients search for medical information on the Internet. One of the

non-English-speaking country studies was conducted in Poland [25], but it gives little information as it is based on 161 answers given by patients who consulted a specialised gynaecological website. The other study was conducted in Germany [26] and showed that of 139 patients from an outpatient oncology consultation, 20% looked for medical information on the Internet.

We can conclude that, although knowledge of English is a variable that strongly influences the search for medical information on the Internet (and although only 20% of our patients had a knowledge of English), the percentage of outpatients who looked for medical information on the Internet in Switzerland was similar to that which has been observed in English-speaking European countries. The American studies [7, 8, 10, 12, 17] often showed higher rates, with between 20 and 30% of patients seeking medical information on the Internet.

Studies that have analysed variables that may influence the search for medical information [5, 6, 8, 10, 13, 15, 17, 27] show contradictory results. It is, however, important to remember that most of the published studies are based on a limited number of patients and that these studies differ widely,

Table 1

Internet access and search for medical information on the Internet by patient and physician characteristics. Unadjusted odds ratios calculated independently for each characteristic using a simple logistic regression model. (a) patients with access to the Internet; (b) all patients.

		Internet access				Medical information					
		n*	Rate (%)	Crude OR	p#	search on Internet (a)			search on Internet (b)		
						Rate (%)	Crude OR	p#	Rate (%)	Crude OR	p#
Gender	Male	670	40.8	1.00		26.7	1.00		10.9	1.00	
	Female	903	27.9	0.56	***	31.8	1.27	NS	8.9	0.79	NS
Age-range	<25	127	69.3	1.00		22.7	1.00		15.8	1.00	
	25–44	325	56.6	0.58	***	42.4	2.50	***	24.0	1.69	NS
	54–64	562	39.7	0.29	***	22.4	0.98	NS	8.9	0.52	*
	65+	553	5.2	0.02	***	17.2	0.71	NS	0.9	0.05	***
Educational level	Obligatory schooling	544	12.3	1.00		10.5	1.00		1.3	1.00	
	Apprenticeship	522	33.9	3.65	***	22.0	2.42	*	7.5	6.19	***
	Professional school	247	43.3	5.44	***	30.8	3.82	***	13.4	11.83	***
	Higher school	51	58.8	10.17	***	50.0	8.57	***	29.4	31.96	***
	University	105	76.2	22.78	***	46.3	7.38	***	35.2	41.74	***
	Other	90	61.1	11.19	***	36.4	4.90	***	22.2	21.92	***
Knowledge of English	No	1271	23.5	1.00		17.5	1.00		4.1	1.00	
	Yes	309	74.1	9.35	***	44.1	3.70	***	32.7	11.38	***
Type of disease	Acute	347	46.4	1.00		27.3	1.00		12.7	1.00	
	Chronic	1195	29.3	0.48	***	30.6	1.17	NS	9.0	0.68	*
Category of disease	Other type	863	13.5	1.00		27.6	1.00		10.8	1.00	
	Cardiovascular	282	18.9	0.24	***	26.3	0.94	NS	3.6	0.30	***
	Cancer	74	20.3	0.36	NS	42.9	1.97	NS	8.1	0.73	NS
	Metabolic	123	47.5	0.40	***	16.0	0.50	NS	3.3	0.28	*
	Functional	238	39.1	1.41	NS	35.4	1.44	NS	16.8	1.67	*
Severity of disease	Low	808	39.0	1.00		25.7	1.00		10.0	1.00	
	Moderate	497	27.0	0.58	***	34.3	1.51	NS	9.3	0.92	NS
	High	190	24.2	0.50	NS	41.3	2.03	*	10.0	1.00	NS
Type of physician	General Practitioner		30.6	1.00		25.6	1.00		7.8	1.00	
	Gastroenterologist		39.3	1.47	NS	34.9	1.56	*	13.7	1.87	***
Location of the practice	Urban	1084	57.9	1.00		47.8	1.00		27.7	1.00	
	Rural	496	28.3	0.29	***	21.1	0.29	***	6.0	0.17	***
	Total	1580	33.4			30.4			9.7		

* the number of patients in the categories of a given variable may not add up to the total number of patients because of missing values. OR = odds ratio. # NS non-significant; * p < 0.05; ** p < 0.01; *** p < 0.005.

in particular because of the nature of the population group studied (general population [5], general medicine [6, 13, 15], gastroenterology [8], oncology [10, 27] and heart surgery [17]).

It is interesting to note that not only are there differences between specialities, but also between different diseases within the same speciality [12, 22]. For instance, among patients at an orthopaedic consultation, patients who consulted for a fracture had a greater tendency to look for medical information on the Internet than those who consulted for a scoliosis [12].

We could also logically expect an increase in frequency according to the year during which each study was completed, but the basic differences between studies render such interpretations unreliable.

The search for medical information is a subject that is of major interest to physicians and our results demonstrate the influence of age, knowledge of the English language, disease characteristics (acute/chronic and severity) and the practice location (urban or rural). It is, however, interesting to note that the multivariate analysis showed no influence of education level on search frequency.

Our results show that patient age has an influence but that it is not linear. Indeed, those aged from 25 to 44 years used the Internet more frequently for medical information searches. We can thus make the assumption that this age group are young enough to be familiar with the Internet and old enough to be concerned about health problems.

Table 2

Adjusted odds ratios for Internet access and use of the Internet to find medical information by patient and physician characteristics. Odds ratios are adjusted to the influence of the other variables in the table using a multiple logistic regression model. (a) patients with access to the Internet; (b) all patients.

		Internet access		Medical information			
		Adjusted OR	p#	search on Internet (a)		search on Internet (b)	
				Adjusted OR	p#	Adjusted OR	p#
Age group	<25	1.00		1.00		1.00	
	25-44	0.46	***	2.15	***	1.64	*
	54-64	0.27	***	0.68	*	0.45	***
	65+	0.02	***	0.37	***	0.07	***
Educational level	Obligatory schooling	1.00		NR		1.00	
	Apprenticeship	2.48	NR	NR		2.96	NS
	Professional school	3.20	***	NR		3.99	NS
	Higher school	3.46	*	NR		6.54	*
	University	7.23	***	NR		7.19	***
	Other	7.57	***	NR		5.85	*
Knowledge of English	No	1.00		1.00		1.00	
	Yes	4.57	***	3.83	***	4.77	***
Type of disease	Acute	NR		1.00		1.00	
	Chronic	NR		1.87	*	1.51	NS
Severity of disease	Low	NR		1.00		1.00	
	Moderate	NR		1.64	***	1.32	NS
	High	NR		2.23	***	2.04	***
Location of the practice	Urban	NR		1.00		1.00	
	Rural	NR		0.46	***	0.48	***

NB: Gender, disease type and physician speciality have not been used in any of the multi-variate analyses.

OR = odds ratio. NR = not retained in the multiple logistic regression model. # NS non-significant; * p < 0.05; ** p < 0.01; *** p < 0.005.

Our study was limited in several respects. Firstly, we used a convenience sample and secondly, the number of physicians participating in this study was small (n = 8) and not representative. It is also important to note, in the context of the Internet world, where everything evolves extremely rapidly, that data capture was made in November 2001.

The novelty of our study is to provide results for a non English-speaking European country. They show that Internet use for medical purposes is relatively significant in Switzerland, even if many studies [15, 24] indicate that the Internet is not the most common source of medical information used by patients. Compared to other traditional media such as television, radio and newspapers, the Internet is the only medium that gives patients the opportunity to conduct active searches concerning their possible health problems.

In the future, new studies will be necessary to assess patients' use of the Internet. Health profes-

sionals directly or indirectly generate most of the health information available on the Internet and a special effort should thus be made to better inform these health professionals on patients' needs and expectations concerning medical information on the Internet.

Acknowledgements: Our thanks to the practising physicians whose active participation made this study possible: Fridez C, Froehlich F, Gonvers JJ, Ingold B, Monnat A, Muench R, Rey JP, Persoz C.

Correspondence:

Jean-Gabriel Jeannot, MD
 Institute of Social and Preventive Medicine
 Rue du Bugnon 17
 CH-1005 Lausanne
 Switzerland
 E-Mail: jean-gabriel.jeannot@ne.ch

References

- 1 Coulter A, Magee H. Communication, information, involvement and choice. In: Coulter A, Magee H, Eds. *The European patient of the future*. Maidenhead – Philadelphia: Open University Press, 2003; 205–29.
- 2 www.wemf.ch/f/studien/manet.shtml (accessed 5 Jan 2004).
- 3 www.infosociety (accessed 5 Jan 2004).
- 4 Koller M, Grutter R, Peltenburg M, Fischer JE, Steurer J. Use of the Internet by medical doctors in Switzerland. *Swiss Med Wkly* 2001;131:251–4.
- 5 Brodie M, Flournoy RE, Altman DE, Blendon RJ, Benson JM, Rosenbaum MD. Health information, the Internet, and the digital divide. *Health Aff (Millwood)* 2000;19:255–65.
- 6 Smith-Barbaro PA, Licciardone JC, Clarke HF, Coleridge ST. Factors associated with intended use of a Web site among family practice patients. *J Med Internet Res* 2001;3:E17.
- 7 Robinson C, Flowers CW, Alperson BL, Norris KC. Internet access and use among disadvantaged inner-city patients. *JAMA* 1999;281:988–9.
- 8 O'Connor JB, Johanson JF. Use of the Web for medical information by a gastroenterology clinic population. *JAMA* 2000; 284:1962–4.
- 9 Ross J, Chapman C, Murray C, Stevenson M, Natin D, Rogstad K. How much interest is the Internet to patients? *Sex Transm Infect* 2000;76:393–4.
- 10 Chen X, Siu LL. Impact of the media and the Internet on oncology: survey of cancer patients and oncologists in Canada. *J Clin Oncol* 2001;19:4291–7.
- 11 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: results from a national survey. *JAMA* 2003;289:2400–6.
- 12 Beall MS, III, Golladay GJ, Greenfield ML, Hensinger RN, Biermann JS. Use of the Internet by pediatric orthopaedic outpatients. *J Pediatr Orthop* 2002;22:261–4.
- 13 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.
- 14 Houston TK, Allison JJ. Users of Internet health information: differences by health status. *J Med Internet Res* 2002;4:E7.
- 15 Licciardone JC, Smith-Barbaro P, Coleridge ST. Use of the internet as a resource for consumer health information: results of the second osteopathic survey of health care in America (OS-TEOSURV-II). *J Med Internet Res* 2001;3:E31.
- 16 Mandl KD, Feit S, Pena BM, Kohane IS. Growth and determinants of access in patient e-mail and Internet use. *Arch Pediatr Adolesc Med* 2000;154:508–11.
- 17 Murero M, D'Ancona G, Karamanoukian H. Use of the Internet by patients before and after cardiac surgery: telephone survey. *J Med Internet Res* 2001;3:E27.
- 18 Pennbridge J, Moya R, Rodrigues L. Questionnaire survey of California consumers' use and rating of sources of health care information including the Internet. *West J Med* 1999;171: 302–5.
- 19 Potts HW, Wyatt JC. Survey of doctors' experience of patients using the Internet. *J Med Internet Res* 2002;4:e5.
- 20 Rose S, Bruce J, Maffulli N. Accessing the Internet for patient information about orthopedics. *JAMA* 1998;280:1309.
- 21 Eaden JA, Ward B, Mayberry JF. The use of the Internet amongst gastroenterology outpatients. *Postgrad Med J* 1998; 74:701.
- 22 Hellawell GO, Turner KJ, Le Monnier KJ, Brewster SF. Urology and the Internet: an evaluation of internet use by urology patients and of information available on urological topics. *BJU Int* 2000;86:191–4.
- 23 Larner AJ. Use of Internet medical websites and NHS direct by neurology outpatients before consultation. *Int J Clin Pract* 2002;56:219–21.
- 24 Wright JE, Brown RR, Chadwick C, Karadaglis D. The use of the Internet by orthopaedic outpatients. *J Bone Joint Surg Br* 2001;83:1096–7.
- 25 Rzymiski P. A study of Internet use by doctors and patients in Poland. *J Telemed Telecare* 2001;7:344–7.
- 26 Vordermark D, Kolbl O, Flentje M. The Internet as a source of medical information. II Investigation in a mixed cohort of radiotherapy patients. *Strahlenther Onkol* 2000;176:532–5.
- 27 Fogel J, Albert SM, Schnabel F, Ditkoff BA, Neugut AI. Use of the Internet by women with breast cancer. *J Med Internet Res* 2002;4:E9.

The many reasons why you should choose SMW to publish your research

What Swiss Medical Weekly has to offer:

- SMW's impact factor has been steadily rising, to the current 1.537
- Open access to the publication via the Internet, therefore wide audience and impact
- Rapid listing in Medline
- LinkOut-button from PubMed with link to the full text website <http://www.smw.ch> (direct link from each SMW record in PubMed)
- No-nonsense submission – you submit a single copy of your manuscript by e-mail attachment
- Peer review based on a broad spectrum of international academic referees
- Assistance of our professional statistician for every article with statistical analyses
- Fast peer review, by e-mail exchange with the referees
- Prompt decisions based on weekly conferences of the Editorial Board
- Prompt notification on the status of your manuscript by e-mail
- Professional English copy editing
- No page charges and attractive colour offprints at no extra cost

Editorial Board

Prof. Jean-Michel Dayer, Geneva
 Prof. Peter Gehr, Berne
 Prof. André P. Perruchoud, Basel
 Prof. Andreas Schaffner, Zurich
 (Editor in chief)
 Prof. Werner Straub, Berne
 Prof. Ludwig von Segesser, Lausanne

International Advisory Committee

Prof. K. E. Juhani Airaksinen, Turku, Finland
 Prof. Anthony Bayes de Luna, Barcelona, Spain
 Prof. Hubert E. Blum, Freiburg, Germany
 Prof. Walter E. Haefeli, Heidelberg, Germany
 Prof. Nino Kuenzli, Los Angeles, USA
 Prof. René Lutter, Amsterdam,
 The Netherlands
 Prof. Claude Martin, Marseille, France
 Prof. Josef Patsch, Innsbruck, Austria
 Prof. Luigi Tavazzi, Pavia, Italy

We evaluate manuscripts of broad clinical interest from all specialities, including experimental medicine and clinical investigation.

We look forward to receiving your paper!

Guidelines for authors:

http://www.smw.ch/set_authors.html

Impact factor Swiss Medical Weekly



All manuscripts should be sent in electronic form, to:

EMH Swiss Medical Publishers Ltd.
 SMW Editorial Secretariat
 Farnsburgerstrasse 8
 CH-4132 Muttenz

Manuscripts: submission@smw.ch
 Letters to the editor: letters@smw.ch
 Editorial Board: red@smw.ch
 Internet: <http://www.smw.ch>