

Computer Support for Elderly Women With Breast Cancer

To the Editor.—CHESS, the Comprehensive Health Enhancement Support System, provides patient education through a personal computer in the home. Patients read detailed articles, tutorials about services, and brief answers to many questions; anonymously question experts; communicate with and read accounts of other patients; monitor health status; and receive help making and implementing decisions (<http://chess.chsra.wisc.edu>).

Methods.—In 1997, we conducted an institutional review board–approved study of CHESS for elderly women with breast cancer. We approached 51 surgeons in 5 Wisconsin counties from 12 clinics, 10 hospitals, and 7 health maintenance organizations and hoped to have all surgeons refer all eligible women and have each of those patients use CHESS. We maximized enrollment with help from community leaders and the media and spoke with all surgeons and nursing staff.

Women had to be Medicare eligible, have a diagnosis of breast cancer within 4 months, be able to read and provide informed consent, and not have dementia. Outcome measures included surgeon acceptance and referral rates and patient acceptance and use rates.

Results.—During the 21-week recruitment period, 48 surgeons (94%) agreed to participate and referred 51 patients (69% of the estimated 74 patients eligible). Thirty-eight (74%) of 51 patients accepted CHESS for a 10-week installation. The mean age was 71.8 years (SD, 6.06 years), 24 (63%) lived alone, 22 (58%) had comorbidities, and 2 (5.3%) had known metastatic breast cancer. Users were equally likely to be in urban or rural settings (28 [76%] of 37 potentially eligible urban vs 10 [71%] of 14 rural). Those living alone (24 [92%] of 26 accepted) were more likely to accept CHESS than those who lived with someone (15 [61%] of 25 accepted). Fourteen acceptors (37%) and 2 decliners (16%) had previous computer experience. Of those who declined, only 1 stated the computer was too complicated, and 1 stated she was “too old.”

Patients averaged 6.8 uses per week (Table). Of the 743 times the discussion group was used, messages were left 315 times (42%). Only 16% of messages sought treatment information, while 71% sought or provided social support. In a regression analysis, no patient characteristics predicted use rates, although women living alone used CHESS slightly more (6.9 vs 6.6 times).

Comment.—This study was small and preliminary, but was the first population-wide study of CHESS and the first focus on elderly patients. Most surgeons and eligible patients participated. Previous randomized controlled trials of CHESS have found benefits for quality of life and health service use.^{1,2}

Developing an appealing, content-rich Web site is not sufficient to reach people who do not have access to a computer. This study indicates that elderly women with breast cancer and individuals not usually targeted on the Web will use an online resource for obtaining basic information about the disease, risk factors, and treatment and support for and from others. Although 33% of American adults (age >16 years) use the Internet,³ most users are young. Millions of persons facing major illnesses will not access this powerful medium without

CHESS, the Comprehensive Health Enhancement Support System, Use Rates for Each Service Provided Online for 38 Elderly Women Using CHESS in Their Homes*

CHESS Service	Total No. (%) of Uses	No. (%) of Patients Using Service
Discussion group	743 (33.9)	38 (100)
Ask an expert	374 (17.1)	38 (100)
Questions and answers†	287(13.1)	38 (100)
Health charts/profiles‡	214 (9.7)	38 (100)
Instant library§	161 (7.3)	32 (85)
Personal stories	138 (6.3)	36 (95)
Consumer guide/referral	75 (3.4)	29 (76)
Decision analysis	97 (4.4)	30 (79)
Stress management	52 (2.4)	18 (48)
Action plan	51 (2.4)	20 (52)

*Use is defined as any use more than 1 minute long.

†The most frequently asked questions and answers were what is breast cancer (read 77 times); what are the risks for breast cancer (36); do food additives, pesticides, or radiation influence recurrence (32); and how does nutrition affect breast cancer (30).

‡Health charts/profiles enable patients to confidentially record their health history and track health changes.

§The instant library included more than 100 articles, but only 10% were read by 18% or more patients. The most frequently read articles were “Diet and Breast Cancer—What is the Risk?” (33% of women); “Breast Cancer—Understanding the Treatment Options” (33%); and “Mastectomy: A Treatment for Breast Cancer” (30%).

strategies to enlist providers and identify, recruit, and train patients and loan them computers.

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Telemedicine: Low-Bandwidth Applications for Intermittent Health Services in Remote Areas

To the Editor.—Telemedicine has benefited greatly from rapid advances in imaging hardware and transmission technology.

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Edited by Margaret A. Winker, MD, Senior Editor, and Phil B. Fontanarosa, MD, Senior Editor.

Patient Characteristics	Age, y									
	0-1	2-4	5-7	8-10	11-13	14-16	17-19	20-22	23-25	>25
Unilateral or bilateral cleft lip, No. (n = 30)	22	3	3	0	1	0	0	0	0	1
Cleft palate, No. (n = 51)	7	14	4	6	4	5	7	2	1	1
Cleft lip or nasolabial deformity, No. (n = 14)	0	2	1	3	2	3	0	0	0	3
Hand deformity, No. (n = 4)	0	1	2	0	0	0	1	0	0	0

*From an initial data set of 626 images (frontal and intraoral); comprising 167 patients, a remote schedule comprising 99 (59%) of 167 patients was generated. An average of 71 (72%) of 99 patients were placed on the local operative schedule in Manaus, in the state of Amazonas, Brazil. Patients were prioritized (in descending priority) as group 1, cleft lip-cleft palate, 18 months old or younger; group 2, cleft palate, 18 to 36 months old; group 3, cleft palate, 36 months old and older and cleft lip-nasolabial deformity revision; group 4, palatal fistula (previously repaired cleft palate). Of the 51 patients on the local schedule for whom issues such as intercurrent health problems, loss to follow-up, and local scheduling issues did not apply, 100% received surgical treatment.

gies.¹⁻⁵ Intermittent service projects can augment medical care in developing countries with effectiveness and quality in such fields as plastic surgery, which are characterized by low morbidity and rapid recovery. Yale University, in collaboration with Interplast (<http://www.Interplast.org>), a pro bono plastic surgery program, used Internet telemedicine to make more efficient use of limited service project time by screening patients prior to arriving on-site in Manaus, in the state of Amazonas, Brazil, on the Amazon River.

The program was publicized through the news media and patients were referred to an oncological hospital, the Hospital CECON (Centro de Controle de Oncologia [Center of Oncology Control]), where they underwent an initial evaluation including imaging of the congenital malformation and a history and physical examination. The initial service mission took place in 1996.

Yale used a Power Macintosh 8100/100 AV with System 7.5.5 (Apple Computers, Cupertino, Calif); CECON used a Pentium 100-MHz processor with Windows 95 (Microsoft Inc, Seattle, Wash). The Color QuickCam (Connectix, Inc, San Mateo, Calif) at 640 x 480 pixels facilitated imaging. Images of patients were attachments to a consistent, bilingual history-physical examination form and were sent by e-mail to Yale using Netscape 3.01 (Netscape Communications Corp, Mountain View, Calif), a 22.8 kilobytes per second bandwidth modem, and a local Internet service provider. Patient identification was by code and photograph.

Patient history, physical examination, and image data were evaluated at Yale by plastic surgeons, pediatricians, and anesthesiologists. Diagnosis, proposed operation, health assessment, and tentative operative schedule were forwarded to CECON to permit patients to be notified of the proposed surgery and date. Once in Manaus, the team repeated single-blinded evaluations of each patient prior to surgery.

Patient characteristics are shown in the Table. The preoperative diagnoses and specific treatment recommendations made from the remote consultation agreed with evaluations made on-site. For the 99 patients scheduled (30 patients with remote diagnosis of cleft lip, 51 patients with cleft palate, 4 patients with hand deformities, and 14 patients with cleft lip-nasolabial deformities), agreement of remote and on-site preoperative diagnosis and treatment plan was 100%.

Prior to the establishment of the telemedicine link in Manaus, a previous Interplast mission at this site dedicated some 20% of each day to screening patients. Interplast/Yale in Manaus was able to treat 100 patients in 9 days in 1997 and 101 patients in 10 operative days in 1996.

The specific costs associated with remote consultation including telephone tolls and local Internet service provider fees totaled approximately US \$20 for all patients screened. The total cost of the hardware was US \$4400 for 2 computers and 2 videocameras. Thus, we have shown that an inexpensive, low-bandwidth system can add value in the context of an intermittent health service in a remote area.

A telemedicine link permits follow-up of patient care. However, no surgical complications required consultations in the subsequent year. The persistence of an Internet link provides a communication pathway by which future health service missions to Manaus can be planned. Regular exchanges with the medical staff at CECON have resulted in the initiation of educational programming via the Internet. All patient information necessary for planning the mission was received via the Internet. The Internet connection was more expeditious and reliable than the mail service in Manaus. Additionally, the electronic transmission of data has allowed the creation of a patient database for future missions to Manaus. Telemedicine can support and integrate health care wherever a simple computer can access the Internet.

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Use of Internet Technology by Obstetricians and Family Physicians

To the Editor.—We conducted a study to determine whether practice differences of family physicians (FPs) vs obstetricians (OBs) would lead to a difference in their Internet use.

Methods.—All OBs (172) and FPs (438) practicing obstetrics in Iowa received a questionnaire exploring attitudes and practice patterns. Age, specialty, and type of degree (MD vs DO) were obtained from a University of Iowa College of Medicine registry. The data were analyzed using the χ^2 statistic, odds ratios, and multiple logistic regression. We fit multiple logistic regression models with physician age (10-year increments), sex, degree, practice location (rural vs urban), and specialty (OB vs FP) as independent variables. Separate models were used for each outcome variable. All variables were forced into the model and retained regardless of their statistical significance.

Results.—The response rate was 87.9% (610 invited, 536 responded); (OB, 146 [85.5%] of 172 vs FP, 389 [88.9%] of 438; $P > .25$). Family physicians were more often male (328 [84.3%] of 389 vs 112 [76.2%] of 147; $P = .03$) and younger (age, 43.7 years vs 45.4 years; $P < .05$) than OBs. Obstetricians and FPs (67 [45.9%] of 146 vs 192 [50.0%] of 385; $P = .41$) were similar in their level of Internet access (through a commercial or other server). The majority of OBs and FPs perceived the Internet

Question	Adjusted OR (95% CI)	P Value
Access to the Internet (n = 531)		
Increasing age (per 10 y)	0.78 (0.63-0.96)	.02
Male vs female (213/436 vs 46/95)	1.21 (0.76-1.93)	.43
MD vs DO (218/434 vs 41/97)	1.44 (0.29-2.27)	.11
Rural vs urban (175/368 vs 84/163)	0.80 (0.52-1.22)	.29
OB vs FP (67/146 vs 192/385)	0.78 (0.50-1.21)	.26
Participate in user groups (n = 256)		
Increasing age (per 10 y)	0.85 (0.58-1.23)	.38
Male vs female (65/210 vs 9/46)	2.36 (1.03-5.41)	.04
MD vs DO (61/215 vs 13/41)	0.82 (0.39-1.72)	.60
Rural vs urban (44/172 vs 30/84)	0.50 (0.27-0.93)	.03
OB vs FP (19/67 vs 55/189)	0.80 (0.41-1.57)	.51
Exchange questions and answers (n = 255)		
Increasing age (per 10 y)	0.92 (0.58-1.46)	.72
Male vs female (39/209 vs 7/46)	1.63 (0.64-4.17)	.31
MD vs DO (36/214 vs 10/41)	0.60 (0.26-1.37)	.23
Rural vs urban (26/171 vs 20/84)	0.37 (0.18-0.76)	.007
OB vs FP (7/67 vs 39/188)	0.32 (0.13-0.80)	.02
Consider the Internet a valuable resource (n = 253)		
Increasing age (per 10 y)	0.69 (0.49-0.99)	.04
Male vs female (143/208 vs 33/45)	1.02 (0.48-2.19)	.95
MD vs DO (148/213 vs 28/40)	0.98 (0.46-2.06)	.95
Rural vs urban (115/171 vs 61/82)	0.76 (0.40-1.45)	.41
OB vs FP (47/65 vs 129/188)	1.22 (0.61-2.42)	.58

*OR indicates odds ratio; CI, confidence interval; MD, medical doctor; DO, doctor of osteopathy; OB, obstetrician; and FP, family practitioner. Ratios after each comparison represent the number with the characteristic who responded "yes" to a question divided by the total number answering the question. Odds ratios are derived from multiple logistic regression and are adjusted for all other characteristics listed.

to be a valuable clinical resource (90 [64.3%] of 140 vs 229 [61.1%] of 375; $P = .50$), more so for those with access than without (176 [69.6%] of 253 vs 142 [54.8%] of 259; $P \leq .001$). Multivariate analysis (Table) showed that urban (practice city population >50 000) and rural physicians had equal access to the Internet. However, urban physicians more frequently participated in user groups and exchanged questions and answers with other medical professionals. Younger physicians and physicians graduating within the past 10 years were more likely to consider the Internet a valuable medical resource (graduated 1-9 years, 80 [74.1%] of 108; 10-19 years, 105 [61.8%] of 170; 20-29 years, 52 [61.2%] of 85; >30 years, 82 [54.0%] of 152; $P = .002$). Few physicians reported currently exchanging information with other physicians (FPs, 55 [29.1%] of 189 vs OBs, 19 [28.4%] of 67; $P > .90$) or asked for or offered answers to medical questions over the Internet (FPs, 39 [20.7%] of 188 vs OBs, 7 [10.5%] of 67; $P = .06$). Female physicians were less likely than male physicians to participate in user groups.

Comment.—Our study found few differences between OBs and FPs in Internet use. Nearly half used the Internet, suggesting that it could provide another means of disseminating information such as practice guidelines to physicians in different specialties caring for patients with similar medical problems and could possibly reduce practice differences. The Internet can provide immediate access to clinical protocols, authoritative textbooks¹ and peer-reviewed medical journals, consultation with specialists, and continuing medical education.² We found that female physicians use the Internet less often than male physicians but the gender difference is not as pronounced as is often assumed. To our knowledge, few data concerning Internet use are available in the medical literature to provide guidance in developing this medium for physicians. As more physicians gain familiarity with the Internet, we expect they will integrate it into their clinical practices. This

suggests benefits for development of user-friendly, clinically relevant Internet sites for medical personnel. New medical graduates bring with them a stronger understanding of the clinical applications of computer technology.

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Applicability and Quality of Information for Answering Clinical Questions on the Web

To the Editor.—What is the applicability and quality of information on the World Wide Web for answering questions generated by clinicians during practice? This new medium has lowered the bar for publishing, allowing anyone with access to a Web server to distribute words, images, and other media to a worldwide audience. While this may be a positive trend for a democratic society, whether it is beneficial for professional fields such as medicine in which peer review and the deliberate editing process in general serve as filters (albeit imperfect) is unclear. Information used to make the most personal decisions, ie, those concerning an individual's health, should be of the highest quality.^{1,2}

Methods.—We performed an observational study to assess the ability of an experienced medical librarian using an Internet search engine to find pages and rate them for applicability to the clinical question and quality based on credentials and affiliations of authors, attribution of sources and copyright, disclosure of findings and conflicts of interest, and currency of content. Since our focus was to determine the quality of the best information that could be retrieved, we chose to use a medical librarian experienced in searching the Internet and a "meta" search engine that sends search statements to multiple other search engines (Metacrawler, <http://www.metacrawler.com>). For assessing applicability and quality of retrieved pages, we developed an instrument based on attributes from a published quality standard,² although as others have noted, there is no "gold standard" for this sort of quality assessment.³ Fifty questions were selected from a database of clinical questions captured ethnographically during observation of clinical practice,⁴ searched using Metacrawler, and rated based on our instrument.

Results.—A total of 629 pages were retrieved for the 50 questions (average, 12.6 pages; range, 2-20 pages). The Table lists the attributes from the instrument and how often they occurred. Most of the retrieved pages were neither clinically applicable nor of high quality. Sixty percent of pages retrieved were not oriented to an audience of health care professionals. Eighty-nine percent of the retrieved pages were not applicable to the question that prompted the search. Only 26 (52%) of the 50 searches had 1 or more applicable pages. About 58% of pages were subject reviews, but fewer than 1% consisted of "evidence-based" resources (original research or systematic reviews). Only 1 quality measure (site affiliation) was present in a majority of pages. Sixty-nine percent of the pages did not indicate an author, and more than 80% did not give the author's credentials. Disclosure of financial or other conflicts of interest was present in only 1%. Fewer than 18% of pages gave the date posted or updated.

Comment.—We conclude that the bulk of information on the World Wide Web, ie, the "HTML" pages, is of low applicability and poor quality for answering clinical questions. Users may be better off relying on online versions of traditional information sources, eg, medical literature and textbooks, an

Attributes of Pages	Pages With Attribute, No. (%)
Professionally oriented Document type	249 (39.6)
URLs or citations only	45 (7.2)
URLs or citations with abstracts or commentary	48 (7.6)
Subject review or summary	363 (57.7)
Systematic review with references and explicit methods	3 (0.5)
Editorial or opinion	35 (5.6)
Original research	1 (0.2)
Image	6 (1.0)
Other	128 (20.3)
Previously published	
Cannot tell	27 (4.3)
Yes	137 (21.8)
No	465 (73.9)
Context applicability (content directly addresses clinical question)	67 (10.7)
Authors/contributors clearly indicated	194 (30.8)
Credentials of author clearly indicated	120 (19.1)
Sources, bibliography listed	77 (12.2)
Copyright indicated, symbol or word present	189 (30.0)
Affiliation of site clearly indicated	336 (53.4)
Financial and other support clearly indicated	6 (1.0)
Disclosure of potential conflicts of interest	70 (11.1)
Advertising	
Integrated in content	54 (8.6)
Separate from content	28 (4.5)
Absent	538 (85.5)
Date posted or updated indicated	112 (17.8)

*Sample questions for the searches were as follows: What is the prognosis and current treatment of undifferentiated brainstem glioma (in a teenager)? What are the differences between hairy leukoplakia and (lingual) thrush? What is the 5- to 10-year outcome for persons with prostate-specific antigen levels of 4 to 10 ng/mL? Do anabolic steroids cause gallstones? How do treatment options in prostate cancer differ for older patients (≥ 80 years)? URLs indicates uniform resource locators.

increasing number of which are available in World Wide Web format.

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Report of Randomized Controlled Trials Identified in the Chinese Literature vs MEDLINE

To the Editor.—For systematic reviews to be comprehensive and reliable, they need to include as many as possible relevant randomized controlled trials (RCTs) in any language. Excluding RCTs from a systematic review on the basis of language of publication can lead to loss of precision¹ and bias.² Most Chinese research is published in Chinese and is therefore not accessible to the Western world. The Cochrane Stroke Group, therefore, developed collaborative links to identify RCTs in the Chinese literature and to facilitate the conduct of systematic reviews both in stroke and other fields.

Methods.—One of the authors (M.L.) searched by hand 5 leading Chinese medical and neurology journals that might publish RCTs relevant to stroke and the proceedings of 1 stroke conference (Table). *Randomized controlled trials* were defined as trials that reported random allocation to 1 of at least 2 intervention groups.³ We also searched MEDLINE for each article identified by our manual search to determine which articles were included in it.

Randomized Controlled Trials (RCTs) in the Chinese Literature

Journals Searched	Years	Total Years	Total Articles Searched	Total RCTs (% of Total Articles)	Stroke RCTs (% of Total Articles)
<i>Chinese Journal of Neurology & Psychiatry*</i>	1965-1996	32	2714	47 (1.7)	16 (0.6)
<i>Chinese Journal of Nervous & Mental Diseases</i>	1980-1995	16	2908	23 (0.8)	3 (0.1)
<i>Chinese Journal of Neurosurgery</i>	1985-1995	11	1601	0	0
<i>Chinese Journal of Internal Medicine*</i>	1989-1995	7	2852	55 (1.9)	0
<i>Chinese Medical Journal*</i>	1987-1995	9	1996	48 (2.4)	4 (0.2)
Proceedings of Fourth Chinese Stroke Conference	1995	1	356	5 (1.4)	5 (1.4)
Total			12 427	178 (1.4)	28 (0.2)

*Journals indexed in MEDLINE.

Results.—A total of 430 issues and 12 427 articles were searched. One hundred seventy-eight RCTs (1.4% of all articles) were identified that were relevant to a wide range of medical specialties. There was a significant trend for increasing numbers of RCTs over time (1965-1983: 2 [0.16%] trials in 1229 articles, 1984-1989: 42 [1.1%] of 3759, 1990-April 1996: 134 [1.8%] of 7439; χ^2 trend = 23.59, $P < .001$). Only 3 of the journals were indexed in MEDLINE (150 RCTs identified) and even for these many of the identified RCTs were published in abstract form (73 [49%] of 150) and so were not included in MEDLINE. Overall, 101 RCTs (57%) were not identified in MEDLINE. Of the 178 trials, 28 (16%) were relevant to stroke, 18 (64%) of which evaluated the treatment of acute ischemic stroke. The interventions assessed included herbal medicine (7 trials), thrombolysis (4 trials), antiplatelet therapy (3 trials), β -blockers (2 trials), and phototherapy (2 trials). Although the trials were mainly small (ie, ≤ 200 subjects), the world's largest trial (5665 patients) of blood pressure reduction in the secondary prevention of stroke was published in China.⁴

Comment.—As there are at least 80 other journals relevant to stroke or neurology published in China, the Chinese literature almost certainly contains a large number of RCTs relevant to stroke. Some of these evaluate treatments that are not routinely available in the Western world (eg, herbal medicines), but many test more conventional treatments. Excluding Chinese studies from systematic reviews may mean important data are missed. The Post-Stroke Antihypertensive Treatment Study (PATS) trial⁴ has major implications for the secondary prevention of stroke but is not widely cited. The increasing numbers of large, good-quality, Chinese studies like PATS cannot be ignored. The Cochrane Collaboration seeks to make all reports of RCTs widely available through its Central Trials Register,⁵ and some Chinese trials have already been included in Cochrane systematic reviews. In summary, RCTs relevant to a wide variety of specialties do exist in the Chinese literature but few are identified in MEDLINE. Further searching by hand and collaborative links are needed to make these trials available worldwide to those performing systematic reviews.

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Accessing the Internet for Patient Information About Orthopedics

To the Editor.—Patients want information about their medical condition from their physician, and it is not uncommon for patients to present at clinics with printed information obtained from the Internet.^{1,2} There are few reports about the accessibility of patient information on the Internet for those who want to improve their knowledge of their medical condition. We conducted a descriptive study to explore the accessibility and volume of orthopedic patient information on the Internet using nonmedical terms. Our aim was to categorize the information a patient would get when searching the Internet about his/her medical condition.

Methods.—A questionnaire was administered to 100 consecutive orthopedic patients with knee (meniscal or anterior cruciate ligament) injuries attending outpatient clinics to determine what terms and keywords they would use to describe their medical condition. The 25 most frequently used terms were used to retrieve information from the Internet from 5 search engines (AltaVista, Excite, Lycos, Yahoo, and HotBot). The Web pages were then categorized according to intended audience and content.

Results.—Of the 100 patients surveyed (78 male, 22 female; mean ages, 32 years, SD, 9.61 years; 32 years, SD, 15.16 years, respectively) 79% had access to a computer either at home or at work; 56% used a computer regularly; and 40% searched the Internet either occasionally or regularly. Twenty-five of the most frequently occurring terms (eg, *knee, ligament, cruciate*) were used by the researcher (S.R.) to search the first 50 uniform resource locators from 5 search engines. Although only correctly spelled terms ($n = 20$) were used in the search, 20% of the terms had been misspelled by patients (eg, *cruchiat, cartilidge*). Almost 5947 Web pages were accessed and categorized according to patient information, specialist information, commercial pages, sports news, unavailable, and other. Of the 5947 Web pages, 1219 (20%) contained patient information; 1130 (19%) professional information; 535 (9%) commercial information; 119 (2%) sports news; 488 (8%) were unavailable, and 2456 (41%) were classed as *other* (eg, non-English pages without English translation, bulletin boards, chat rooms). Of the patient information pages, only 395 contained knee-related information. Therefore, only 7% of the identified Web pages were considered of relevance for our patient sample. The choice of “lay” search terms did not significantly influence the search result. Only 1 page of 5947 was provided by a gateway service, ie, a service that facilitates access to previously reviewed Web pages.

Comment.—The number of patients using the Internet to retrieve information on their condition is increasing; however, patients tend to use nonmedical terms to describe and search for information on their condition. In this study, patients who were assumed to have no special skills in information retrieval

would have found only 7% of Web pages useful to their needs using their search terms. We suggest that access to reliable and valid Web sites should be provided for patients who express an interest in searching the Internet for medical information.

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Use and Benefits of a Web Site for Pancreatic Cancer

To the Editor.—The World Wide Web is a powerful medium for the communication of medical information. Approximately 27 million US households have Internet access and thousands of medically related Web sites have been established.¹ Despite this activity, little is known about how the Internet is used to obtain medical information.

The department of pathology at the Johns Hopkins Hospital maintains the Pancreatic Cancer Web site. In addition to content information about treatment options, research, bibliography, clinicians, and appointments, the site has an active, unmoderated discussion board (chat room) where users can post messages and read and reply to all previously posted messages. Monthly updates to the “What’s New” page highlight recent advances in pancreatic cancer research.

We investigated the patterns of use and the benefits of this Web site (<http://pathology.jhu.edu/pancreas>). Details of these analyses are available at <http://pathology.jhu.edu/pancreas.jama>. Briefly, we identified 975 978 accesses to this Web site since its inception in 1995. Between September 1996 and March 1998, the discussion board received 16 065 messages and 521 624 accesses. These numbers are remarkable considering that only 27 000 patients are diagnosed annually with pancreatic cancer in the United States and that most patients live only a few months.² Clearly, there are considerable needs not being met by the traditional delivery of medical care.³

During February 1998, 80% of accesses (86/107) to the discussion board and 51% (54/105) of accesses to other areas of the Web site were through commercial Internet providers. Women constituted the majority (77.2% [139/180]) of individuals posting messages to the discussion board. By contrast, surveys estimate that only 22% to 38.5% of current World Wide Web users are women.⁴ Most (86% [146/169]) users of the discussion board were relatives of patients, suggesting that the Web can provide a resource for loved ones. Ten percent of individuals (20/206) posting messages stated they lived outside the United States. Of the 1541 messages posted in February, 267 (14.5%) requested information about pancreatic cancer, 237 (12.8%) requested support or acknowledged support received, 640 messages (34.1%) were posted to provide information, and 608 (33.6%) to provide emotional support. One author (R.H.H.) who regularly monitors the discussion board replied to 23 messages (1.5%). Few messages were posted advocating alternative therapies (1.5% [23]), which may reflect the demography of discussion board users. In this regard, our Web site may improve our users’ understanding of pancreatic cancer. We believe that by providing sites dedicated to diseases for which they have specialist knowledge, academic centers can ensure that high-quality information is available on the Internet.

Web sites can also benefit an institution. Our Web site generates hospital referrals. During February 1998, 52 patient-related contacts and 22 requests for referral to Johns Hopkins

Hospital were made through the Web site. Indeed, in 1997, 167 Whipple operations were performed at Johns Hopkins, more than in any previous year. Similarly, Web pages can be helpful in studying rare diseases. For example, the majority of families registered in the National Familial Pancreas Tumor Registry (NFPTR) contacted the NFPTR through our Web site.⁵

The tremendous growth in the use of the Johns Hopkins Pancreatic Cancer Web site was unanticipated and underscores a well-recognized Web phenomenon, namely, that Web sites can “take on a life of their own,” often with unexpected consequences and benefits.

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Clinic-Based Health Information Web Site for International Travelers

To the Editor.—The Internet has been described as the next transformation in the delivery of health care.¹ Telemedicine, medical informatics, and consumer health information systems are expected to emerge as integral components of future medical practice.² We conducted this study to learn more about consumer use of a clinic-based health information Web site.

Methods.—In 1996, the International Travel Medicine Clinic of the University of North Texas Health Science Center, Fort Worth, developed a Web site to provide health information for its patients and to promote the clinic's services within its catchment area. The Web site conformed to subsequently established standards concerning authorship, attribution, disclosure, and currency.³ The home page address was disseminated on clinic stationery, business cards, prescription forms, educational materials, international certificates of vaccination, and in the local telephone directory. In addition, the home page (<http://www.hsc.unt.edu/clinics/itmc/travel.htm>) was registered with several search engines.

Web site accesses for 1997 were measured using “hits,” the number of Web pages successfully transferred from our server to requesting client computers. Geographical access patterns were determined by international domain descriptors. Within the United States, hits were subclassified by domain type,

such as “.com” (commercial), “.net” (network), and “.edu” (educational). Sites that hyperlinked users to the Web site were identified by their uniform resource locator.

Results.—A total of 26 129 hits were recorded throughout 1997. Web page transfers were requested by 8236 client computers in 105 countries. There were 12 521 hits (47.9%) from the United States, of which 5567 (44.5%) were commercial, 3776 were network (30.2%), and 2276 were educational domains (18.2%). There were 3031 hits (11.6%) from non-US domains, of which 497 (16.4%) were from Australia, 407 (13.4%) from Canada, 398 (13.1%) from the United Kingdom, 251 (8.3%) from Singapore, 162 (5.3%) from Germany, 119 (3.9%) from Brazil, 106 (3.5%) from the Netherlands, 94 (3.1%) from Slovenia, 60 (2.0%) from Sweden, and 59 (2.0%) from Japan. Another 10 577 hits (40.5%) were from domains having unresolvable Internet protocol addresses. The leading sources of hyperlinks to the Web site were Yahoo (3727 [14.3%]) and AltaVista (2873 [11.0%]).

Comment.—These results indicate that our clinic-based health information Web site is used by persons well beyond the target audience. While not surprising, the ability to reach thousands of client computers in more than 100 countries with only limited efforts is staggering. Because many international accesses were from countries not typically visited by our clinic patients, such as Australia, Canada, and the United Kingdom, it is unlikely that international users were clinic patients traveling abroad. In all, about 20% of resolvable domains were attributed to international users. A majority of these users were located in countries in which English is not the primary language. These findings appear to refute the contention that the Web is a poor source of public health information, particularly outside North America,⁴ although we have not polled users to determine whether they found the site useful. In addition, our results may not be generalizable to all health topics on the Web because the international nature of health information provided makes the site potentially appealing to a more global audience.

Patients are increasingly using the Internet to help manage their health. About half the Web users have sought online health-related information within the past month.⁵ With 78 million Americans on the Internet, including 63 million Web users,⁶ and a growing international audience, it is imperative that Web sites adhere to high-quality standards in disseminating health information.

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