

Family Practice Web Sites: New Perspectives for Patient Care and Health Information?

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Background and Objectives: To cater to the needs of informed and proactive patients in family medicine, health care providers could offer access to care and health information via practice Web sites. To determine the content and quality of family medicine Web sites, we performed a cross-sectional study on a large sample of family practices' Web sites in Berlin, Germany. **Methods:** After screening of all family medicine practices in Berlin for the provision of their own practice Web site, we determined the content and quality using a predefined checklist based on a review of literature. **Results:** Among 1,453 family practices in Berlin, only 211 (15%) had an accessible Web site. Online tools for appointment scheduling (17/211, 8%) or prescription ordering (8/211, 4%) were rarely provided. Approximately half of all Web sites (102/211) provided health information on a wide range of topics, with complementary medicine dominating. Transparency about the source and currentness of information and barrier-free design were identified as main areas in which there was a need for quality improvement. **Conclusions:** Family physicians should be trained in quality requirements for Web sites and in how to use online solutions for practice reorganization.

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The challenge of crossing the quality chasm to adapt health systems to the needs of a complex morbidity burden demands innovative health information technologies.¹ Sharing information with patients effectively appears to be a crucial element of future health care. This could include both sharing patient data via electronic health records, as recommended by the Recovery and Reinvestment Act of 2009,² and the provision of reliable health information to promote patient self-management capabilities.³ Further, displaying information about the practice organization and team can enhance transparency for consumer choice.⁴

Sharing health information on the Internet presents both opportunities and pitfalls. Electronic medical records, especially if extended to communication

with patients, may lead to shared information about laboratory tests, medication, and other aspects of care, potentially reducing the need for office visits.⁵ However, concern about data security is an obstacle to their implementation. Further, although health information on the Internet is easily accessible and used by the majority of patients,^{6,7} it varies in quality.⁸

As part of the current discussion about implementation of health information technologies in the United States, it is proposed that family practices could become "Web-based medical homes" by using patient-shared electronic medical records and other communication tools integrated in practice Web sites.⁹ Provision of trustworthy health information as expected by patients¹⁰ could also be part of practice Web sites. However, at present only a minority of practices in the United States work with electronic medical records,¹¹ and only about 36% of the family practices provided their own Web site in 2001.¹² These numbers are expected to grow rapidly due to the financial incentives currently linked with the implementation of health information technologies in the United States. Nonetheless, there is little informa-

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tion available about the services currently provided on US family practice Web sites for the sharing of information with patients.

In Germany, health information technologies are thought to be widely implemented in family medicine practices due to the fact that its ambulatory fee-for-service payment system requires electronic medical records. Almost all of the family practices in Germany use electronic medical record systems, and 45% of the practices have Internet access.¹³ Recent data suggest that more than 50% of the practices in Germany provide their own practice Web site.¹⁴ As in the United States, however, little is known about content and quality of family practice Web sites in Germany and how they are currently used for sharing health information with patients. We therefore studied the distribution of Web sites among family practices in Germany and determined which services they provide for sharing information with their patients and whether they meet predetermined quality standards.

Methods

Distribution of Web Sites

In a pre-study to this project, we determined the distribution rates of family practice Web sites in a random sample of five German regions with about 60,000 inhabitants each (Sankt Wendel, Döbeln, Parchim, Bayreuth), including rural Eastern German and metropolitan areas (Berlin). Due to the fact that the distribution rate of Web sites was lower than expected, we decided to focus our study on Berlin to gain insight into as many family practice Web sites as possible in one area.

In Germany, family medicine is practiced by general practitioners and general internists. Pediatricians work as specialists in ambulatory care. Only practices of general practitioners or general internists providing family medicine were included in this study.

We screened all 1,767 registered family physicians in Berlin using a Web register provided online by the Association of Statutory Health Insurance Physicians (AHIP) Berlin. The search engine Google was used to look up the Internet presence of every practice (joint practices were only assessed once). The search terms used were "First Name," "Last Name," and "Berlin." To reduce the risk of failing to find an Internet presence, the first 30 entries were screened for existing practice Web sites. The search was performed during August 2008 and February 2009.

Content of Web Sites

Using a checklist, we determined the provision of different tasks for the sharing of information with patients. General information was defined as information containing organizational issues (opening hours, staff members, access to practice, etc); health information was defined as information dealing with all health-

related issues or medical problems. We also examined any services for direct online communication with patients, such as online contact forms or online prescription ordering and appointment scheduling. Services provided for the sharing of patient data online (eg, laboratory test results) were also surveyed. In a second step, content analysis of health information was used as a qualitative method to explore the range of health topics provided on the Web sites.

Quality Assessment

The quality of Web sites was assessed using a checklist based on commonly agreed standards based upon a review of the literature (Table 1).^{8,15-17} We defined five distinct quality domains: legal issues, transparency, currentness, accuracy, and usability.

Accuracy of general information was examined and defined as correct data about opening hours, address, and telephone number. We assessed a random sample of 53 practices (25% of total sample) using automatic random sampling of numbers from 1 to 211 for practice selection. The practices were phoned anonymously by a research assistant and asked to give information about their opening hours and address.

As it was not feasible to compare the vast variety of health information provided to existing evidence to determine the accuracy of all health information displayed on Web sites, we decided that a clear reference for all health-related issues needed to be displayed on the Web site as a minimum standard. Usability was assessed in terms of design and navigation characteristics and whether Web sites provide barrier-free design. Barrier-free design was determined by searching for tools to adapt font size or layout. We also looked up whether or not the Web site had been created by a professional Web designer.

Adherence to international quality standards, such as the Health on the Internet Code (HON-Code),¹⁵ is claimed mostly for Web sites containing health information. For that reason we compared the quality performance of practice Web sites that provide health information with that of those that do not.

The quality of all practice Web sites was assessed independently by two raters in March 2009. Agreement between the raters regarding quality standards was achieved after assessing the first 10 Web sites jointly. Conflicting results were discussed during consensus meetings.

Statistical Analysis

Descriptive statistics were calculated using percentages, means, and distribution of means. We calculated chi-squared test or Student's *t* test to determine the significance of observed differences. SPSS version 15.0 was used for all statistical analyses.

Table 1

Set of Quality Criteria for Practice Web Sites

| Quality Domain | Index | Measurement |
|--|-----------------------------|---|
| Legal issues | Legal notice complete | Yes/no |
| | Disclaimer | Yes/no |
| | Privacy policy statement | Yes/no |
| Transparency | Authorship disclosed | Yes/no |
| | Credentials of physician | Yes/no |
| | E-mail address | Yes/no |
| | Advertising | Yes/no |
| Currentness | Date of creation | Yes/no |
| | Date of last update | Yes/no |
| | Days after last update | Number of days |
| Accuracy General information | Opening hours correct | Yes/no |
| | Contact information correct | Yes/no |
| Health information | Clear reference | Yes/no |
| Usability | More than one Web page | Yes/no |
| | Barrier-free design | Yes/no |
| | Navigation properties | “Strong below average” to “strong above average” (5-point Likert scale) |
| | Design | “Strong below average” to “strong above average” (5-point Likert scale) |

Results

Distribution of Web Sites

In total, 228 of the 1,453 family practices included in the study provided their own Web site (16% of all practices). Twenty-six registered family practices providing specialized ambulatory care were excluded (Figure 1). The majority of Web sites (n=211, 93 %) were accessible at the time of the quality assessment.

Content of Web Sites

Most of the practices shared more details about their practices than opening hours or contact information. Information on practice equipment and a presentation of the practice team were provided online by a majority of the family practices (Table 2). Further, online route planning was offered on more than half of all Web sites. However, most of the practice Web sites did not provide details about barrier-free access. Special features for communicating with patients, such as online appointment scheduling (8%) or prescription ordering (4%), were rarely provided in our sample. We identified different approaches for these services. For online appointment scheduling, three practices used contact forms: a Web form with predefined fields that the user fills in, initiating contact and asking the practice to contact them. Six used a commercial Web-based service, and seven offered scheduling via e-mail. Online

prescription ordering was mainly organized via contact forms (two practices) or e-mail (four practices), and two practices offered a commercial Web-based tool. A service for the direct sharing of patient data online (eg, option of looking up laboratory test results) was not found on any Web site.

A total of 102 of the practices (48 %) provided health information on their Web site. Table 3 shows the health topics identified by content analysis. Information on complementary medicine was presented most frequently, followed by an almost equally distributed variety of topics concerning health-related issues. A large and heterogeneous proportion of topics could not be classified.

Quality Assessment

The quality performance of family practice Web sites differed between the quality domains and between those practices providing health information and those that did not (Table 4). While currentness of information appears to be a problem for Web sites with and without health information, Web sites providing health information performed significantly better on key transparency and legal issues.

Thirty-nine practices (39/53, 74%) could be contacted via telephone to assess the accuracy of general information provided on their Web sites. A total number of 12 practice Web sites (31% of the sample) did not display the correct opening hours. The contact information provided, however, was accurate in all 39 practices. Health information was referenced on only 30% (n=31) of the Web sites. Usability issues varied slightly between the two practice samples. Design was rated higher for Web sites providing health information, but professional Web design was used in only 39 (38%) of these practices compared to 44 (40%) of the practices that did not provide health information (difference not significant). Only eight practices (4%) of the total sample were identified as having barrier-free design.

Discussion

In this study, the content and quality of 211 family practice Web sites in Berlin were assessed. Most of the Web sites shared information about essential organizational issues, such as contact information and opening hours, along with details about the practice team and equipment. Online tools for appointment scheduling or prescription ordering were rarely provided. About half of the Web sites gave information on a wide range of health topics, with acupuncture predominant as the main topic. As expected, quality performance was better in several domains for Web sites providing

Table 2
Content of Web sites

| | |
|--|---------------|
| Address provided | 99% (210/211) |
| Opening hours provided | 95% (200/211) |
| Team pictures | 68% (144/211) |
| Information about special equipment (eg, ultrasound) | 64% (134/211) |
| Online route planning | 59% (124/211) |
| Room pictures | 32% (67/211) |
| Online contact form | 16% (33/211) |
| Barrier-free access to practice declared | 15% (31/211) |
| Online appointment scheduling | 8% (17/211) |
| Online prescription ordering | 4% (8/211) |

health information compared to the other practices, but transparency about the currentness of information was a concern in both groups of Web sites.

The actual distribution rate of family practice Web sites was quite low in this study. We initially predicted a higher number of Web sites among family physicians compared to the United States¹² and to a previous study in Germany.¹⁴ However, for their study, Obermann et al¹⁴ sent their survey instrument only to physicians with a valid e-mail address. This likely resulted in a significant selection bias, which may explain their estimation of a three times higher percentage of practices having Web sites. One advantage of our study is that we aimed to assess all registered family practices, including those that cannot be contacted by e-mail.

Sharing patient data and offering online tools for appointment scheduling or online prescription appear to be less common than expected among family practice Web sites in Germany. Although tools and Web-based services are easily available, their implementation in practice is still at a rudimentary level. This may be due to the lack of time and financial incentives needed for their implementation. Concerns about data security may be adding to these problems. Grover et al stated a perceived need for such tools in their survey among family practice patients in the United States¹⁸ and the future increase of chronically ill among a “digital generation” may increase the demand for sharing patient data on the Internet.

Transparency about the practice team, equipment, and how to access the office was provided on most of the family practice Web sites. Information about barrier-free access, however, was not routinely given online. It can be assumed that the increasing number of chronically ill patients in family medicine will be accompanied by growth in the number of handicapped people with a need for easy access to care. A lack of Web sites with barrier-free design is a well-known prob-

Table 3
Frequency of Health Topics Among Practices Providing Health Information (Total Number and Percentages)

| <i>Health Information Provided on the Following Topics</i> | <i># of Practices Providing Information on Topic (n=102)*</i> |
|--|---|
| Acupuncture | 45 (44%) |
| Homeopathy | 16 (16%) |
| Nutrition and diet | 16 (16%) |
| Medical examination and diagnostics (eg, ECG, blood pressure monitoring) | 16 (16%) |
| Osteopathy | 14 (14%) |
| Chronic diseases (eg, diabetes mellitus, asthma) | 13 (13%) |
| Vitamins, nutritional supplements | 10 (10%) |
| Infectious diseases (eg, HIV, borreliosis) | 10 (10%) |
| Health checkups/cancer screening | 10 (10%) |
| Vaccination | 10 (10%) |
| Others | 47 (46%) |

* Multiple answers were permitted.

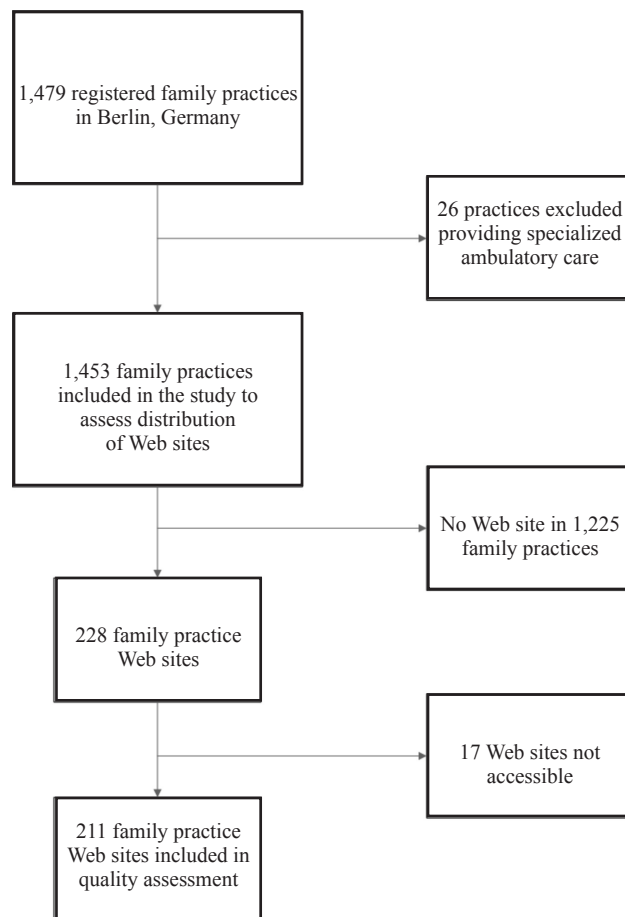
lem⁸ that should be targeted by quality improvement projects for health information Web sites.

The distribution of health information on family practice Web sites in our study is confirmed by a comparable study on orthopedic private practice Web sites in the United States revealing a similar proportion of 52% providing health information.¹⁹ Content analysis indicated a wide range of topics dealing with health-related issues, with acupuncture predominant as the major topic. Compared to the findings of Diaz et al, our distribution of topics corresponds to the search behavior of patients on the Internet, although nutrition and diet were most important to their sample.⁶

Complementary medicine is frequently provided by family physicians in Germany.²⁰ Most of the complementary diagnostic and therapeutic measures offered by German family physicians are provided as so-called Individual Health Services (IGeL),²¹ which are not covered by statutory health insurances. Although explicit advertisement was rarely found in our study, focusing on complementary medicine may be regarded as a sort of “grey advertisement” in which detailed background information is presented on payable services that are offered by the practice. The provision of health information about chronic conditions and their diagnosis and treatment could be one measure for enhancing self-management among family practice patients. To date, however, only a minority of family practices seem to be taking the opportunity to provide this kind of information on their Web sites.

Figure 1

Flow Diagram of Web Site Inclusion



Our results show that family practice Web sites providing health information perform consistently better on distinct issues in the predefined quality domains. This could be due to an enhanced awareness about quality of information on the Internet among the “Web-designing” family physicians, as professional Web designers were not consulted more frequently. However, the underlying cause for our finding still remains unclear.

The stating of the date and source of information and some legal issues are major domains where there is a need for further improvement in quality throughout the practice sample. These problems are common among health information Web sites.^{8,22} The education and training of family physicians may be one approach for addressing this problem. Accuracy of information seems to be crucial for its quality but also difficult to assess.⁸ We found a noticeable proportion of incorrect

information on opening hours in our sample, with one out of three practices providing misinformation on this topic. This may be due to problems with updating, but a practice’s Internet presence may be unfavorable if even general information is incorrect.

Limitations

Our study sample is limited to family practices in an urban area with a high density of family physicians. This setting may have influenced the distribution of Web sites and content. It cannot be ruled out that a practice Web site was missed by the search strategy. The study lacks detailed assessment of the accuracy of health information provided on family practice Web sites by comparing the content to existing evidence. This should be targeted by further research in this field.

Recommendations for Family Practice Web Sites

Based on the findings of our study, we make the following recommendations. Practice Web sites should provide details about purpose, authors, and date of creation/update. Contact information and information about staff and organizational issues should be updated at least monthly. Local legal requirements should be strictly observed. Barrier-free Web design should be used. Health information should be referenced accurately. Consider provision of links to high-quality health information rather than providing health information on the practice Web site. Consider provision of online appointment scheduling and online prescription ordering.

Conclusions

Only a minority of family practices in Berlin, Germany, run their own Web site. Although online tools for appointment scheduling or prescription ordering are available and may contribute effectively to the reorganization of care, they are only rarely in use. Efforts should be made to enhance the usage and evaluation of these tools in family practice.

Approximately half of the Web sites provided some kind of health information. Throughout our study we identified currentness and referencing of the information provided as major areas in need of further quality improvement. We suggest training for family physicians and residents as one approach for overcoming these problems.²³ In the future, family medicine may use practice Web sites as an innovative approach for sharing information with patients and for reorganizing the care effectively.

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Table 4

Fulfilment of Quality Criteria Among Family Practice Web Sites in Germany

| Quality Domain | Index | Web Sites Providing Health Information (n=102) | Web Sites Not Providing Health Information (n=109) | P Value |
|----------------|----------------------------|--|--|---------|
| Legal issues | Legal notice complete | 65 (64%) | 60 (55%) | .63 |
| | Disclaimer | 57 (56%)* | 42 (39%)* | .01 |
| | Privacy policy statement | 28 (28%)* | 14 (13%)* | .01 |
| Transparency | Authorship disclosed | 77 (76%)* | 62 (57%)* | .004 |
| | Credentials of physician | 76 (75%)* | 60 (55%)* | .003 |
| | E-mail address | 88 (86%) | 87 (80%) | .21 |
| | No advertising | 99 (97%) | 108 (99%) | .28 |
| Currentness | Date of creation | 16 (16%) | 15 (14%) | .71 |
| | Date of last update | 16 (16%) | 19 (18%) | .71 |
| | Days after last update | 510 (SD=576) | 846 (SD=971) | .23 |
| Usability | More than one Web page | 102 (100%)* | 97 (89%)* | .001 |
| | Navigation characteristics | 2.8 (SD=0.78) | 2.8 (SD=0.75) | .96 |
| | Design | 2.95 (SD=0.96)* | 2.49 (SD=1.05)* | .001 |

Displayed are total numbers and percentages. *P* values of differences are displayed as calculated with the chi squared or Student's *t* test.

SD—standard deviation

* Indicates *P*<.05

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REFERENCES

- Institute of Medicine. Committee on the Quality of Health Care in America. Crossing the quality chasm. A new health system for the 21st century. Washington, DC: National Academy Press, 2001.
- Blumenthal D. Stimulating the adoption of health information technology. *N Engl J Med* 2009;360(15):1477-9.
- Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi A. Improving chronic illness care: translating evidence into action. *Health Aff (Millwood)* 2001;20:64-78.
- Hibbard JH, Peters E. Supporting informed consumer health care decisions: data presentation approaches that facilitate the use of information in choice. *Annu Rev Public Health* 2003;24:413-33.
- Tang PC, Lee TH. Your doctor's office or the Internet? Two paths to personal health records. *N Engl J Med* 2009;360(13):1276-8.
- Diaz JA, Griffith RA, Ng JJ, Reinert SE, Friedmann P, Moulton AW. Patients use of the Internet for medical information. *J Gen Intern Med* 2002;17(3):180-5.
- Dickerson S, Reinhart AM, Feeley TH, et al. Patient Internet use for health information at three urban primary care clinics. *J Am Med Inform Assoc* 2004;11(6):499-504.
- Eysenbach G, Powell J, Kuss O, Sa ER. Empirical studies assessing the quality of health information for consumers on the World Wide Web. *JAMA* 2002;287(20):2691-700.
- Scherger JE. Future vision: is family medicine ready for patient-directed care? *Fam Med* 2009;41(4):285-8.
- Diaz JA, Sciamanna CN, Evangelou E, Stamp MJ, Ferguson T. What types of Internet guidance do patients want from their physicians? *J Gen Intern Med* 2005;20:683-5.
- Levy DE, Rosenbaum S, Shields AE, Blumenthal D. Electronic health records in ambulatory care—a national survey of physicians. *N Engl J Med* 2008;359(1):50-60.
- American Medical Association (AMA) 2002. The AMA Study on Physicians' use of the World Wide Web. www.ama-assn.org/amed-news/2002/10/07/edsa1007.htm. Accessed July 23, 2009.
- European Commission. Flash Eurobarometre 126. http://ec.europa.eu/public_opinion/flash/fl126_fr.pdf. Accessed October 7, 2009.
- www.stiftung-gesundheit.de/PDF/studien/AeLZG-2008-Kurzfassung.pdf. Accessed July 9, 2009.
- www.hon.ch/home1_de.html. Accessed July 6, 2009.
- Charnock D, Shepperd S, Needham G, Gann R. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. *J Epidemiol Community Health* 1999;53(2):105-11.
- Soot J, Moneta GL, Edwards J. Vascular surgery and the Internet: a poor source of patient-oriented information. *J Vasc Surg* 1999;30(1):84-91.
- Grover F Jr, Wu HD, Blanford C, Holcomb S, Tidler D. Computer-using patients want Internet services from their family physicians. *J Fam Pract* 2002;51(6):570-2.
- Rozental TD, Bozentka DJ, Beredjikian PK. Patient education through the Internet. *Clin Orthop Rel Res* 2004;421:50-3.
- Joos S, Musselmann B, Szecsenyi J. Integration of complementary and alternative medicine into family practices in Germany: results of a national survey. *Evid Based Complement Alternat Med* 2009;March 17 [Epub ahead of print].
- Joos S, Musselmann B, Miksch A, Rosemann T, Szecsenyi J. The role of complementary and alternative medicine (CAM) in Germany—a focus group study of GPs. *BMC Health Serv Res* 2008;8:127.
- Kind T, Wheeler KL, Robinson B, Cabana MD. Do the leading children's hospitals have quality Web sites? A description of children's hospital Web sites. *J Med Internet Res* 2004;6(2):e20.
- van Woerkum CM. The Internet and primary care physicians: coping with different expectations. *Am J Clin Nutr* 2003;77(4 Suppl):1016S-1018S.