

Original Article

Easy and effective - web-based information systems designed and maintained by physicians: experience with two gynecological projects

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Abstract. It is well established that medical information sources develop continuously from printed media to digital online sources. To demonstrate effectiveness and feasibility of decentralized performed web-based information sources for health professionals, two projects are described. The information platform of the German Working Group for Information Technologies in Gynecology and Obstetrics (AIG) and the information source concerning the German Registry for in vitro fertilization (DIR) were implemented using ordinary software and standard computer equipment. Only minimal resources and training were necessary to perform safe and reliable web-based information sources with a high correlation of effectiveness in costs and time exposure.

Keywords. Internet - Gynecology - Reproductive medicine - Web design

Introduction

It is well known that for physicians information sources change from printed media to web based systems [6, 8, 11]. An essential reason for the rapidly acceptance and distribution of the worldwide web (www) is the economically priced possibility to provide information contemporarily [10, 13]. This medium increasingly influences the work and decision expiry in medicine. Therefore the use of online medical databases and expert systems were well established during the last 10 years. Especially large data collections like medical registries attempt to present their results online to improve effectiveness and actuality. Over 20 national medical registries have now been established in Germany, some of them already perform data collection via electronic programs and present results via Internet [2, 3, 7].

The most established nationwide medical registry in Germany is the Perinatal Registry, which collects maternal health records concerning pregnancy, delivery and perinatal outcome from now more than 1100 hospitals. Over the past 16 years, data collection was transformed from printed questionnaires to digital records. A special web-based information source of the German Perinatal Registry does not exist. Therefore the Internet platform of the German Working Group for Information Technologies in Gynecology and Obstetrics (AIG) offers a related panel to support technical development and release of the actual dataset-description. In general the objectives of AIG are the introduction and development of digital tools for quality assessment in Obstetrics and Gynecology and utilization of new digital developments for patients, in science and teaching [12].

The second example is the German Registry for in vitro fertilization (DIR), which collects data from now 100 IVF units in Germany [7]. Since 1990 a digital record system based on a nationwide uniform template has been introduced. This uniformity is quite unusual in Germany due to territorially defined autonomy in the health care system. Structure and extent of the registry are similar to the Human Fertilization and Embryology Authority (HFEA) in the United Kingdom and the Society for Assisted Reproductive Technology (SART) in the United States. The described Internet platform is a private initiative to improve knowledge and to support development of electronic tools for data collection in reproductive medicine in Germany [9].

The aim of the study was to demonstrate the effectiveness and feasibility of web-based information sources created with a low budget and simple tools. One of the most reasonable criteria for such an evaluation is the measurement of the platform visits per month with the particular page views representing a prevalent method of evaluation correlated to contentment of the visitors [5, 10]. An inquiry of the working hours invested for the maintenance of the sites and the update frequency represents the other main outcome measurement.

Material and methods

The two Internet platforms were created in October 1998 using a standard web-design software (Front Page 2000, Microsoft). The Department of Information Research of the University of Bonn offered a fixed amount of memory on the hard disc drive of one Internet-server with password-protected access. Three persons working at different institutions; two physicians and one public health professional update the AIG web sites. Not more than one physician manages the DIR platform.

Only simple hypertext-mark up-language commands were used and a modern frame-based design, which was tested by colleagues in order to guarantee a user-friendly environment. of the department concerning usability and design. No Java-applets (computer language developed from Sun Microsystems), scripts or animated plug-ins were used. No "cookies" (small amounts of information

stored by a web-browser software on the workstation) were created. Other peculiarities of the sites are that the systems are updated frequently, that advertising is not a source for funding and that the webmasters' work is unsalaried. Privacy policy is implemented through different guarantees. Publication of personal information is dependent from a personal written agreement, for example, for the member list of AIG. The principles of the Health-On-the-Net-Foundation (HON) are implemented by both websites. These principles include processing by medically trained and qualified professionals, respect of the legal requirements of health information privacy which apply in the country and state where the web-sites are located, confidentiality of data relating to individual persons and transparency of authorship.

For evaluation of effectiveness and feasibility of the two platforms a commercial Internet service was introduced from October 1999 to September 2001 measuring the number of visitors (hits) and the content most frequently requested (page views). Normally one visit includes multiple page views. Both items are well known indicators for acceptability and quality. The update frequency per month and the average hours of maintenance per person were also analyzed.

Results

During the evaluation period of 24 months the service reported 10,442 visits for the platform of the German Working Group for Information Technologies in Gynecology and Obstetrics with a total of 54,298 page views (Table 1). An average number of 435 visits per month and 5.2 page views per visit were counted. Visitors searched most frequently for information offered by the new working group concerning the introduction of the Australian diagnosis-related group (DRG) system in Germany or for information offered by the panel of the Perinatal Registry. Each webmaster spent an average number of 6.5 h per month for maintenance.

Table 1. Page views and maintenance of the two Internet platforms AIG and DIR

Web site content	Established since	Update frequency per month ^a	Working hours per month per person	Page views per months	Percentage of page views
AIG current information ^b	October 1998	2	1.5 (1-3)	267 (225-294)	11.8 (9.9-12.9)
AIG annual meetings	October 1998	0.2	0.5 (0-1.5)	252 (136-359)	11.1 (6.0-15.9)
Panel of the German Perinatal Registry	January 1999	1	1.5 (1-2.5)	387 (261-627)	17.1 (11.5-27.7)
Panel of the working group DRG	March 2000	3	1.5 (1-3)	524 (464-568)	23.2 (20.5-25.1)
AIG useful links	October 1998	2	1 (0.5-2)	379 (253-421)	16.8 (11.2-18.6)
AIG member list	June 1999	1	0.5 (0-1)	187 (142-284)	8.3 (6.2-12.6)
DIR technical instructions for data export ^c	February 1999	0.2	0.5 (0-1)	196 (174-241)	27.6 (24.5-34.1)
DIR useful links	November 1998	2	1 (0.5-1.5)	204 (156-274)	28.8 (22.1-38.7)
DIR contact person information	October 1998	0.5	0.5 (0-1)	164 (149-189)	23.1 (21.0-26.7)

^a Evaluation period October 1999-September 2001

^b <http://www.aig-online.de>; overall 10,442 visits, only pages with more than 180 views per month are listed

^c <http://www.dir-online.de>; overall 3,618 visits, only pages with more than 150 views per month are listed

For the German Registry for in vitro fertilization platform the service reported 3.618 visits during which 17,004 pages of content were observed. An average of 149 visits per month and 4.7 page views per visit were counted. Maintenance demand 2 h each month. Visitors most frequently used the link library offered by the DIR platform and the website for technical instructions concerning the software for data collection, respectively.

Discussion

Web-design is no longer solely dependent on sophisticated technical equipment and professional knowledge [1, 2]. Software tools for web design were specially developed for professional users but progress in hardware development and common software packages at the present time make it easy also for private persons to create online information sources. The two described Internet platforms for physicians and health professionals were designed and updated with effectiveness in terms of money, time and equipment. Compared to other platforms concerning more common health related items a rate of 435 visits per month on average is relatively high. A pilot project for the evaluation of

alcoholism, for example, reported a rate of 500 hits per month [4]. The frequency increases dramatically if the target group is extended to a nonprofessional audience [10]. An Internet platform offering basic information about asthma described a frequency of 9,000 visitors per month [14]. It is interesting to note that the creation of health related information sources is mostly dependent on content specific knowledge rather than on expensive commercial web design. Concerning the numbers of hits, it has to be taken into consideration that health professionals represented the target groups for both platforms with interest in specific information technology related issues of gynecology and obstetrics. The frequency of page visits is therefore not comparable to commercial health related platforms. On the other hand for both systems no other web-based source covered the same content. Most of the visitors searched for information concerning software solutions related to gynecology, oncology, obstetrics or reproductive medicine. Presentation of the new dataset description of the Perinatal Registry has shown the highest visitor frequency. The introduction of the Australian DRG system in Germany also caused an increase of page visits due to specific technical information offered on the system.

Normally two different strategies are used for implementation of web sites for healthcare organizations; the exclusively use of in-house resources or outsourcing services. Nonprofit organizations prefer the in-house maintenances with a period of less than 10 h per week on average [13].

The conclusion of the study is that only a minimum of technical resources and training are needed to create safe and reliable web-based information sources in health related fields.

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