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PHYSICIAN USE OF WEB-BASED TECHNOLOGY: Hype vs. Reality

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ABSTRACT

The Internet, particularly the World Wide Web, is redefining "how we do business" for the service and manufacturing sectors of our economy. In health care as in other industries, there is a growing pressure for physicians to create a "web presence" that will provide entrance into the realm of e-health service delivery. This research has surveyed 511 physician practice web sites to assess how the promise of the technology compares to the reality. We found that 94-95% of sites were using one or more site design elements, and providing educational content that would be attractive to potential patients. However, only 73% of the sites provided the professional credentials of the health care providers. Functionality that would yield cost reductions was much less common with only 39% of the sites using online forms to collect information. Automation for either scheduling or patient accounts was rare. Additionally, few sites had the infrastructure that would allow them to monitor site activity or provide secure transactions for their patients. Only 23% of the sites protected themselves against charges of providing medical consultations without seeing the patients by using a legal disclaimer. Clearly, this sample of web sites suggests that web technology is not yet being fully utilized by physician practices.

INTRODUCTION:

In the face of escalating health-related expenditures, physicians are seen as one of the keys to controlling service delivery costs. Competition among providers and alteration of financial incentives via managed care are two of the cost containment methods that are currently impacting physician practices. In other industries we have seen web-based technologies employed in a variety of ways that both enhance an organization's ability to compete and reduce the costs of doing business. This research addresses the question of whether physicians are responding to competitive forces by using web-based technologies in the same way that other industries have.

Recently the American Medical Association conducted a survey of its members asking questions about how they related to the Internet. Of the physicians responding to the survey, 27% indicated that they have established web sites for their practices. While the current number of sites may be small, there is every indication that the numbers are growing as more physicians avail themselves and their practices of free and low-cost web development services offered by numerous commercial health sites. The existence of a web site, however, does not magically lower costs or improve competitive position. Other features such as those that enable more efficient dissemination of educational materials, collection and maintenance of billing information, and improvement in communication with patients are some of the features required before the strategic potential of the technology can be realized. Specifically, the goal of this project is to examine the extent to which the surveyed sites have incorporated technical and functional features that could enhance competitive position, improve client recruitment and service, and/or lower the cost of doing business.

LITERATURE REVIEW:

Since 1997, medical literature, both professional journals and physician oriented lay publications, abound with articles detailing how web sites are being used to great advantage by some of the larger practices and health plans. (for example see Gilbert 1998; Hagland 1998; Bloom and Iannacone 1999; Coile and Howe 1999; Kalb and Branscum 1999; Reents 1999; Anon(a) 2000; Chin(a) 2000; Chin(c) 2000; Tyson 2000). Although several surveys have addressed how web technology is currently being used, most are directed toward large health plans rather than independent physician practices.(Cochrane 1999; Anon(a) 2000) Typically, case descriptions are used to demonstrate how web sites are revolutionizing the delivery of health care services.

Among the health related uses of the internet described in the literature are email (Widman and Tong 1997; Eysenbach and Diepgen 1998; Eysenbach and Diepgen 1999; Mandl and Kohane 1999; Furguson 2000; Sands 2000; Taylor 2000), patient education (Richards, Coleman et al. 1998; Dawson, Gilbertson et al. 1999; Helwig, Lovelle et al. 1999; Grandinetti 2000), and disease management (Anon 1999; Cochrane 1999; Peltz, Haskell et al. 1999). A few articles deal with competition and cost issues (Van Brunt 1998; Herreria 1999), while others discuss web site content (Impicciatore, Pandolfini et al. 1997; Winker, Flanagin et al. 2000). Together, these articles create a sense of urgency; physicians must either adopt use of the web for their practices or be left behind in the new health care environment.

While some reports give the distinct impression that physicians are responding to current pressures by flocking to the new technology as a means to control costs, attract new patients, and succeed in an ever increasing competitive environment (Kalb and Branscum 1999; anon(c) 2000; Chin(a) 2000; Chin(c) 2000), others lament the fact that few physicians are participating in the online revolution (Gilbert 1998; Cochrane 1999). Issues of physician adoption of web technology has been discussed briefly in a few articles (Peters and Sikorski 1998; Anderson 2000; Chin(b) 2000; Drezner 2000), but there have been no formal studies of physicians' adoption patterns, and how they are related to pressures of competition and/or managed care.

THE STUDY:

To begin to address the gap, this project used a variety of search engines to find physician web sites. These engines, including both crawlers and directories, employ different methods to compile their indexes, and different algorithms to rank sites. A multi-threaded engine, which sends parallel queries to multiple search engines, was also used. Search terms included quotes and

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the AND Boolean operator. For example, to locate web sites in New York we specified "M.D." AND "New York" using the engines. While there was no expectation that the search would be exhaustive, these techniques were able to unearth a wide variety of relevant sites. These sites were then studied to determine whether or not they contained features that would enable them to be used for strategic purposes.

While all sites located by the search engines have been included in the sample, 17 states were specifically targeted for inclusion in the study. These states provide a wide range of geographic regions, urban/rural areas, and managed care market penetration levels. Again, the selection was not meant to be all-inclusive, but rather to provide variation.

When appropriate sites were located, information about the practice, technical design, functionality, and intended audience were entered into a database and used to construct a picture of how existing sites are being used to respond to competitive pressures. By focusing on a limited number of features, we were able to minimize data collection while still providing an overview of the uses and complexity of the site. URLs, email addresses, and other contact information were collected for possible future use.

In particular, we were interested in gathering information about factors that would enable a web site to either enhance revenue generation or reduce costs for the practice. In terms of revenue enhancement, we looked at factors that might attract new patients to the web site itself, and from there to the practice as patients. For the web site, we looked for design elements that would make the site interesting, well organized, and easy to navigate (images, animation, frames, tables), as well as informative (patient educational material, FAQs, or hyperlinks). Features that could potentially lead a web surfer to become a patient were addresses and telephone numbers of the offices, directions and maps, the photographs of friendly office staff, and credentials of the professionals. Additionally, we looked at whether or not a site was intended to be used by other professionals as a referral generation source.

As an indicator of cost reduction, we looked at how the web site was used to provide services to existing patients such as online forms for gathering information, automated scheduling, online patient accounts, or other services. Patient educational materials and links were seen as both cost reduction and revenue enhancement features.

Because web sites can range from simple static pages to technically sophisticated marvels, we looked at the site's infrastructure for evidence of features that would support future revenue enhancement or cost reduction. Data were gathered on cookies, counters, dynamic pages, applets or Java Script, use of key words, security, software used, and developer information.

FINDINGS:

The search for physician web sites, which took place during July and August, 2000, yielded 551 sites in 40 states. Forty sites were deemed inappropriate and were eliminated resulting in a sample size of 511. The geographic distribution of the sample is depicted in Figure 1.

502 of the sites in our sample indicated specialties as listed in Table 1, with 9 sites not indicating a specialty. Three sub-specialties dominated the surgical group. Plastic or Cosmetic surgeons were the dominant sub-group with 87 sites, followed by Orthopedic surgeons with 29, and Ophthalmologists with 27. Six other sub-specialties accounted for the remaining 45 surgical web sites. The Internal Medicine web sites were not dominated by any particular sub-specialty but included Allergists, Oncologists, Cardiologists, Dermatologists, and Gastroenterologists, in addition to general Internal Medicine practices.

Figure 1: Geographic Distribution of Sample Web Sites

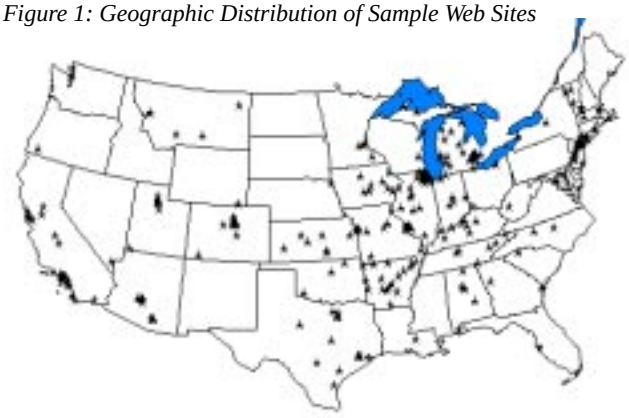

Table 1: Distribution of Specialties

Specialty Group	Number
Surgery	202
Internal Medicine	114
OB-GYN	63
Family Practice	44
Pediatrics	22
Anesthesiology	18
Psychiatry	14
Non-MD	11
Radiology	10
Pathology	4
Unknown	9

Revenue Generation:

Web sites in the sample were generally attractive, well organized, and easy to navigate. Of the 511 sample sites, 486 or 95%, used one or more of the design elements with images and tables being used most frequently (90% and 86% respectively), and animation and frames being used least frequently (39% and 30% respectively). Among the specialties, 86% of the Pediatric sites used one or more design elements under study, with the other specialties that used one or more elements ranging from 90-100%.

94% of the sample (479 sites) also provided patient education content using either FAQs (23%), links to other sites (61%), or other materials (57%). Patient education content was more varied by specialty, however, than was the use of design elements. Only 82% of the pediatric sites used one or more of the methods of providing content, followed by Family Practice, OB-GYN, Psychiatry, and Surgery with 92-94% of sites, and Internal Medicine with 96% of sites. All of the Anesthesiology, Pathology, Radiology, and the non-MDs (Chiropractic, Podiatry, etc.) sites provided educational content.

An important part of revenue generation is drawing patients from the web site into the practice as new patients, or enticing other professionals to make new referrals. The use of photographs, providing maps or directions, and Listing professional credentials could all be important devices in achieving this transition. While overall 95% of the sites studied (483) used one or more of these methods, only 46% provided maps, 49% provided directions, and 76% used photographs. Moreover, only 75% of the sites provided professional credentials, with 90% of surgical sites providing credentials, 82% non-MDs, 79% Psychiatry, 75% Pathology, 70% OB-GYN, 67% Anesthesiology, 66% Internal Medicine, 61%

Family Practice, 59% Pediatrics, and 50% Radiology.

Cost Reduction:

Although the sites studied had a high rate of patient educational content provision, other factors that might yield cost reductions were used infrequently. 39% of the sites used forms to collect various types of information, ranging from 50% of Family Practice, Radiology, and Pathology sites using forms to only 28% of Anesthesiology sites doing so. In contrast, only 12% (62) of the sites had any form of automated scheduling, with most relying on email to request an appointment, and none having what might be considered a truly automated system. Patient accounts with any sort of automation were truly rare (1% or 7 sites). Of the seven sites, however, two plastic surgery practices and one ophthalmology practice automated the process of securing loans for their patients for procedures not covered by insurance.

Infrastructure:

In order to gauge a site's technical capacity for either revenue generation or cost reduction, we collected information on infrastructure. 51% of the sites listed a copyright or developer's name ranging from "Wally's Wonderful Websites" to various consultants with copyrighted names and incorporated organizations. No attempt was made to assess the quality of the developer's work, but one might fairly assume that not all developers are created equal.

42% of the web sites used key words or page descriptions to increase the likelihood of search engine retrieval. Again, the success of these tactics may vary greatly. Most engines have the ability to ignore spam, and at least one site employed the key words "Viagra Viagra Viagra Viagra Viagra Viagra …".

Tracking web site activity can provide valuable information about the value of the site to the practice, but only 14% employed counters of any kind, and only one site used cookies. 20 sites (4% of the sample) had the capability to dynamically generate pages, while only 4 sites offered a secure section. Interestingly, none of the four secure sites appeared to have any type of patient account functionality.

Disclaimers:

One interesting finding concerned the use of disclaimers. Despite the current debate about providing medical consultations without ever seeing the patient, only 23% of the sites surveyed employed any type of disclaimer stating that information on the site should not be considered advice. This was particularly surprising for specialties such as Internal Medicine (21%), Pediatrics (18%), and Surgery (16%) where these issues could potentially cause severe legal problems.

DISCUSSION:

Faced with diminished compensation from managed care plans, physicians are increasingly seeking ways to reduce their own costs. Using practice web sites to provide educational materials for patients might provide one relatively simple cost reduction strategy. It is counter intuitive, then, that Pediatrics, a specialty with high demands for educational materials, would have a lower percentage (82%) of web sites providing educational content than do Anesthesiology, Pathology, or Radiology sites, which all provide the materials but generally have much lower demand. This is doubly puzzling because pediatric educational materials are readily available.

Other means of reducing costs such as using online forms to collect information from patients (39%), online appointment scheduling (12%), or online account servicing (1%) do not appear to be related to specialty. Because provision of these services is technically more complicated and thus more costly than provision of content, it is likely that more investment in the web sited would be required. Without a clear indication of return on investment, physicians may be reluctant to make the financial commitment.

In addition to pressure from managed care plans, competition among physicians in some specialties and in some markets is quite intense. Because surgery is one of the most competitive fields, it was no surprise to find surgical web sites (N = 202) outnumbering other specialties. Two surgical subspecialties that experience especially intense competition are cosmetic/plastic surgeons who accounted for close to half of all surgical web sites (44%) and ophthalmologists who accounted for 13%. This difference may be related to the number of procedures covered by insurance.

While some of the web site features that may enhance revenue generation are more common than those that reduce costs, the use of revenue enhancement features is not universal. Providing both maps and directions to office locations should offer a low cost service for new patients, and yet only 49% of the sites provided directions and only 46% provided maps. Although many more sites (75%) provided the professional credentials of their staff, this information is essential to both new patients and referring physicians; its lack on a quarter of the sample web sites is astonishing! Clearly, for the sites in the sample, web-based technology is not being fully utilized either to reduce the costs of doing business or to enhance revenue generation.

While this study provides a focused snapshot that helps to distinguish between the hype and the reality of how medical practices are currently using web sites to enhance competitive position and improve service delivery, the work has both strengths and weaknesses. Perhaps one of its greatest strengths is the variety of sites that have been included in the sample. An effort was made to include practices from a wide variety of geographic regions, urban/rural areas, and managed care markets. However, there is no assurance that the sample is representative and caution should be used in making any generalizations. Additionally, while we were able to collect information on numerous factors that **may** relate to revenue enhancement and cost reduction, there is not yet a sufficient body of research that can support the supposition that web-based technology, in fact, does either. Undoubtedly, physician adoption of web-based technology is a complex phenomenon with multiple drivers. Future research should include not only revenue/cost studies but also physician adoption behavior and investment decision making.

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