

Diagnosis Blog: Checking Up on Health Blogs in the Blogosphere

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Health care consumers, patients, and caregivers use the Internet to search for information about diagnoses, physicians, treatment options, and medicines.^{1,2} They also search for support from virtual communities and post advice about managing their conditions. Health practitioners also rely on the Internet to search for information and to communicate with patients and colleagues. The role of the Internet in health care has grown considerably with the evolution of the World Wide Web, now commonly referred to as Web 2.0. Cornode and Krishnamurthy explained that the “essential difference between Web 1.0 and Web 2.0 is that content creators were few in Web 1.0 with the vast majority of users simply acting as consumers of content, while *any* participant can be a content creator in Web 2.0 and numerous technological aids have been created to maximize the potential for content creation.”³ User-generated content, the hallmark of Web 2.0, is responsible for the remarkable growth in health-related content on the Internet. This is reflected in tools ranging from Twitter to social networking sites to wikis. The blog (short for weblog) is the quintessential Web 2.0 application.

A blog is a Web site containing dated entries, or posts, presented in reverse-chronological order. Blog features commonly include archives (previous posts, typically grouped by month and year), a blogroll (a list of recommended blogs), and a reader comment section. The term blog was first introduced in 1997 to describe a log of links that chronicled visits to various Web sites.⁴ Blogs once required programming knowledge to create, but with the emergence of free software such as Blogger and WordPress, virtually anyone with an Internet connection can create a blog. Not only are these software programs free and user friendly, allowing for easy posting of text, audio, pictures, video, and links, but they also provide the servers that host the blogs.⁵

The popularity of blogs should not be underestimated. Data show that between 12.0 and 26.4 million Americans blog and 57.0 to 94.1 million are blog readers.^{6,7} Blogs that focus

Objectives. We analyzed the content and characteristics of influential health blogs and bloggers to provide a more thorough understanding of the health blogosphere than was previously available.

Methods. We identified, through a purposive-snowball approach, 951 health blogs in 2007 and 2008. All blogs were US focused and updated regularly. We described their features, topics, perspectives, and blogger demographics.

Results. Approximately half of the bloggers in our sample were employed in the health field. A majority were female, aged in their 30s, and highly educated. Two thirds posted at least weekly; one quarter accepted advertisements. Most blogs were established after 2004. They typically focused on bloggers’ experiences with 1 disease or condition or on the personal experiences of health professionals. Half were written from a professional perspective, one third from a patient-consumer perspective, and a few from the perspective of an unpaid caregiver.

Conclusions. Data collected from health blogs could be aggregated for large-scale empirical investigations. Future research should assess the quality of the information posted and identify what blog features and elements best reflect adherence to prevailing norms of conduct. (*Am J Public Health.* 2010;100:1514–1519. doi:10.2105/AJPH.2009.175125)

on health care (whose exact number is unknown) have the potential to provide interactive support networks for caregivers and patients, generate real-time discussions about health news or policy, extend social and political mobilization efforts, and offer providers another forum in which to collaborate and consult.

Yet, despite their promise, little systematic empirical research has documented the content and characteristics of health blogs and bloggers. Virtually everything written about blogs to date has consisted of anecdotes and descriptions of individual blogs. Many articles focus on the use of blogs by health care professionals to chronicle their lives and practices.^{8–23} Several articles focus on the use of blogs by providers and patients coping with and learning about particular diseases and conditions.^{21,24–27} The potential role of blogging in health education,^{28–37} research collaboration and dissemination,^{6,38} and disaster planning³⁹ has been discussed as well. The few systematic empirical studies suffer from serious limitations, such as narrow focus (physicians, nurses, cancer, or mental health) or small sample size (47–271 blogs, bloggers, or blog readers).^{40–44}

We systematically cataloged the content and characteristics of the most influential health blogs and bloggers to provide a more thorough understanding of the health blogosphere than has been available to date. We aimed to identify the types of people who blog about health and health care, what elements and activities health blogs feature, what topics health bloggers write about, and from what perspectives health blogs are written.

METHODS

We identified health-related blogs during 2 periods: June to July 2007 and April to May 2008. Eligibility criteria were that the blogs focused predominately on a health-related topic and on the United States, were written in English, and carried a new post at least once during the 6 months prior to data collection. We analyzed a total of 951 blogs.

Sampling

We used a combined purposive-snowball sampling approach⁴⁵ to identify health-related blogs from keyword searches in various search engines and blog aggregators. From the

blogrolls provided by these blogs we identified additional blogs to consider for inclusion. This sampling approach is appropriate when the absence of a known population renders a truly random sample impossible to construct. This approach is especially appropriate for studying blogs.^{46,47} Hindman et al., for example, concluded that “any site which is more than three clicks away from any of the top 200 Google or Yahoo results on a given topic is definitely off the beaten track, and not likely to have any substantial impact.”^{47(p28)} This suggests that scholars need not catalog thousands of blogs but instead can credibly focus on the most heavily linked ones, because they are the most widely read and influential.

To compile the 2007 sample we relied on Web links, search engines, and blog aggregators such as Technorati and Google Blog, in searches on health-related keywords, including “health blog,” “medical blog,” “health policy,” “public health,” “physician,” “nurse,” “health provider,” “patient,” “caregiver,” and “disease.” We identified additional blogs through blogrolls, which led to other blogs, and so on. Sampling ceased once the same blogs appeared multiple times and no new blogs were identified. The 2007 sample consisted of 622 blogs.

To compile the 2008 sample we used Healthcare 100 (<http://www.edrugsearch.com/edsblog/healthcare100>), a global ranking of the top English-language health care blogs. Of the approximately 800 blogs listed, 329 new blogs were eligible for inclusion; we had already identified another 114. The remainder were ineligible.

Data Abstraction

Data abstraction included quantifying objective measures and identifying subjective themes. We derived preliminary categories describing blog features from previous research.^{48,49} We coded blogs according to these and other categories. We refined the categories over several iterations, developing them with an initial set of blogs and then applying them to all blogs in the final sample.^{50,51}

Demographic information involved the identification of blogger gender, age, occupation, and education. Features included the age of the blog (according to the first posting or biographical entry), the number of bloggers, and the frequency of posts during the month

preceding data collection. Other features were the presence or absence of a blogroll, SiteMeter (software that counts hits, or visits to the blog, and sites that link to the blog), archives, internal links, external links, a comment section, sponsorship, commercial advertising, audio clips, and video clips. We also identified topics discussed by reading blog descriptions and posts, and we coded the primary perspective of each blogger.

Most characteristics were readily identifiable through a cursory review of each blog. However, to verify the presence or absence of some information, we delved deeper, examining multiple posts when necessary. Because the vast majority of blogs were only a few years old, examining these entries was a manageable task. (Examples of health-related blogs and their characteristics are shown in Table A, available as a supplement to the online version of this article at <http://www.ajph.org>.)

RESULTS

The age of the 951 health-related blogs we analyzed ranged from 1 to 10 years, with the earliest 8 created between 1999 and 2001. Only 6.5% dated from 1999 to 2003; the remaining 93.5% were established between 2004 and 2008 (Figure 1). Some (12%) of the blogs featured multiple bloggers. Nearly two thirds (63.2%) of bloggers posted at least once per week; 12.5% posted daily. Only 12.7% did not post at all.

Slightly more than two thirds of blogs (34.3%) had a SiteMeter. Most health blogs

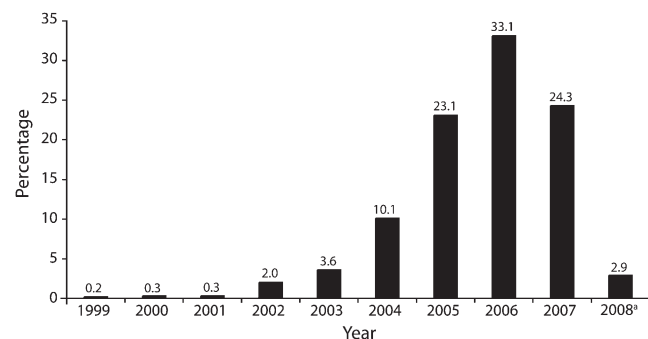
posted external links (90.2%), internal links (98.0%), and reader commentary (96.0%). Most blogs also featured archives (97.5%) and a blogroll (75.0%). Relatively few contained video (15.4%) and even fewer audio (5.5%). Sponsors supported 15% of the blogs, and more than one quarter (28.1%) accepted commercial advertising.

Characteristics of Health Bloggers

Women wrote 56.8% of the blogs (Table 1). Bloggers' average age was 35.8 years (range=18–69 years); approximately half (42.9%) were aged 30 to 39 years. Health bloggers were highly educated: two thirds held a master's degree or doctorate.

Half of the bloggers (49.8%) worked in health professions. Of these, 43.3% were physicians, with 14.9% specializing in internal medicine, 9.8% in both family practice and emergency medicine, 9.3% in surgery, 4.6% in pediatrics, 5.2% in psychiatry, 4.6% in pediatrics, 3.6% in obstetrics and gynecology, 2.1% in oncology, and 9.3% in other specialties. Approximately one fifth of physician bloggers (19.6%) were medical students. Twelve percent did not provide a specialty designation.

Of the 56.7% of health professionals who were not physicians, 19.9% worked in nursing, 8.7% in health consulting, 5.4% in counseling, 4.7% in research, 3.1% in emergency response, 2.0% in administration, 1.8% as a paraprofessional (e.g., as a technician or an assistant), 1.6% in therapies (e.g., physical, respiratory), 1.3% in medical journalism, and



Note. n = 893 (Of 951 blogs in the sample, information on blog age was not available for 58).

*2007–2008.

FIGURE 1—Percentage of Blogs Established, by Year.

TABLE 1—Demographic Characteristics of Health Bloggers: 2007–2008

Characteristic	Blogs, No.	% (No.)
Gender	861	
Female		56.8 (489)
Male		39.5 (340)
Both male and female authors		3.7 (32)
Age, y	326	
18–29		25.5 (83)
30–39		42.9 (140)
40–49		23.6 (77)
50–69		8.0 (26)
Education	490	
≤High school		6.1 (30)
College graduate		26.7 (131)
Master's degree		21.6 (106)
Doctoral degree		45.5 (223)
Occupation	899	
Physician		21.6 (194)
Other health professional		28.3 (254)
Other occupation		50.2 (451)

8.2% in other professions (e.g., insurance, nutrition, pharmacy). We collected specific occupational information for half of health bloggers not employed as health professionals (50.2%). More than one quarter (27.4%) of these bloggers identified themselves as journalists or writers. Other frequently identified professions were professor (8.7%), information technology specialist (8.3%), student, and lawyer (both 7.3%).

More than half of health bloggers (54.3%) assumed a professional perspective in their posts. More than one third (37.7%) blogged from the perspective of a patient–consumer and fewer than one tenth (8.0%) from the perspective of someone caring for an afflicted individual. Some blogs from each perspective were personal (self-focused) and others were informational (outwardly focused).

Health Blog Topics

Most blogs focused on a single topic, but some (4.1%) discussed 2 or more topics. Two fifths (42.6%) of the blogs detailed individuals' experiences with a particular condition (Table 2). Examples of these and other health-related blogs are provided in Table 3.

The second most frequently identified blog topic was recent developments in health law, policy, and business (17.1%). The third most popular topic was health research and news (15.1%). Several blogs in this category focused on specific diseases and conditions, but unlike those reporting individuals' experiences, they were purely informational. Relatively few blogs (5.0%) focused on nutrition or personal experiences with weight loss or fat acceptance.

Other blogs explored the professional experiences of physicians (9.7%), medical students (3.6%), and other providers (11.3%). Although most physician blogs focused on physicians' own experiences, some also discussed other topics (health policy and law, health research and news).

Among blogs about particular conditions, mental health was the most prevalent focus, with most about autism spectrum disorders (26.6%), bipolar disorder (25.5%), or specific eating disorders (22.9%). Reproduction, chronic disease, disabilities, HIV/AIDS, and cancer were the next most common topics. Most reproduction blogs addressed infertility issues (81.5%); the remainder tackled multiple and premature births, delivery, and conception. Slightly fewer than half of chronic disease blogs (41.2%) dealt with diabetes; others addressed multiple sclerosis, back pain, Parkinson's disease, and asthma. Most disability blogs (69.0%) dealt with physical disabilities generally; a large proportion (31.0%) were about deafness.

DISCUSSION

We analyzed the content of 951 health blogs and the characteristics of the bloggers. Like other bloggers—and like people who seek health information on the Internet^{2,52,53}—health bloggers tend to be younger and better educated than the general population.^{6,7,54} Regarding gender, our findings contrasted with previous research showing that more blogs are written by men than by women.^{6,7,54} We found the opposite in our sample, possibly because women are more likely to coordinate health services for themselves and their families or because they experience greater morbidity and poorer health outcomes.⁵⁵

Like blogging more generally, health blogging is a rapidly emerging phenomenon. Health blogs feature typical elements of blogging such as internal and external links,

TABLE 2—Characteristics of Health Blogs (n = 951): 2007–2008

Characteristic	% (No.)
Blog topic	
General	
Disease/disability experience	42.6 (405)
Health policy/law/business	17.1 (163)
Health research/news	15.1 (144)
Other provider experience	11.3 (107)
Physician experience	9.7 (92)
Nutrition information/news	4.9 (47)
Medical student experience	3.6 (34)
Multiple	4.1 (39)
Specific disease	
Mental health	19.8 (188)
Reproduction	9.7 (92)
Chronic disease	5.4 (51)
Physical disability	4.4 (42)
HIV/AIDS	4.3 (41)
Cancer	3.6 (34)
Blogger's perspective	
Professional	54.3 (516)
Patient/individual/consumer	37.7 (359)
Caregiver	8.0 (76)

archives, blogrolls, and comment sections. We observed several differences between health blogs and other blogs, however. Few health blogs featured audio or video. Consequently, posts on health blogs tended to rely more heavily on text. Many health blogs were personal rather than informational, emphasizing the journaling aspect of blogging in which bloggers share their experiences with others. This may help patients and caregivers cope with particular diseases and conditions. Similarly, it may prove cathartic for health professionals dealing with stressful work environments. Producing personal narratives can increase self-awareness, which can, in turn, promote active coping.^{56,57}

Nearly half of our sample comprised blogs addressing particular conditions. That most of these blogs were written from a patient–consumer or caregiver perspective suggests that health blogs are being used, in part, to forge support networks among bloggers and their readers.^{14,25,42,58} Blogging's interactive features—blogrolls, links that appear in posts, and comment sections—might be especially well suited to creating virtual support networks.^{8,41} These online communities might

TABLE 3—Examples of Health Blogs by Topic: 2007–2008

Blog Name	URL	Blogger's Descriptive Quote
Disease and disability experiences		
Crazy Tracy	http://www.crazytracy.com/blog	"Where humor meets 4-point restraints"
Brokenclay.org/journal	http://brokenclay.org/journal/index.php	"The art of intermittent disability"
Journey Through Breast Cancer	http://fightingbreastcancer.blogspot.com	"My experience going through breast cancer"
HIV.Positive	http://hivchild.blogspot.com	"Story of a real family living with a child with HIV"
Child-Bearing Hips	http://child-bearing-hips.blogspot.com	"Ah, the joys of unexplained infertility"
Managing the Sweetness Within	http://www.thesweetnesswithin.blogspot.com	"Living with type 1 diabetes"
Physicians and other health professionals		
Family Medicine Notes	http://www.docnotes.net	"Occasional notes from a family physician"
Miami M.D.	http://www.miamimd.net	"Medicine as seen through the eyes of a resident"
Buckeye Surgeon	http://ohiosurgery.blogspot.com	"Ruminations by a non-academic general surgeon"
Type B Medicine	http://typemedicine.blogspot.com	"Med students who have decided to come out of hiding"
Lost on the Floor	http://lostonthefloor.wordpress.com	"New nurse navigating the road to success/competency"
Homebirth Diaries	http://homebirthingdiaries.blogspot.com	"Homebirth enthusiast and obstetrical nurse"
Health research and news		
The Back Pain Blog	http://www.rebuildyourback.com	"News, commentary, articles, and opinions on back pain"
About Pediatrics	http://pediatrics.about.com	"Strong interest in pediatrics and the Internet"
EverythingHealth	http://everythinghealth.net	"Rapid changes in science, medicine, health and healing"
Clinical Trials Web	http://clinicaltrialsweb.blogspot.com	"Latest news about clinical research"
Crohn's Disease	http://crohnsnews.blogspot.com	"Articles and information about Crohn's Disease"
Our Bodies, Our Blog	http://ourbodiesourblog.org	"Your daily dose of women's health news and analysis"
Health policy, law, and business		
Physician Law	http://physicianlaw.foxrothschild.com	"News, updates . . . useful tips relating to legal issues"
Health Blog	http://blogs.wsj.com/health	"Blog on health and the business of health"
The Sentinel Effect	http://sentineleffect.wordpress.com	"Health policy, business, & innovation"
Running a Hospital	http://runningahospital.blogspot.com	"Started by a CEO of a large Boston hospital"
The Covert Rationing Blog	http://covertrationingblog.com	"Healthcare rationing: where angels fear to tread"
Nutrition information and news		
Big Fat Blog	http://www.bigfatblog.com	"How insanely poorly fat people are portrayed"
Diet Detective	http://dietdetective.blogspot.com	"A nutrition, fitness and health resource blog"
The Nutritional/Dietary Supplement Law Blog	http://nutrisuplaw.com	"Nutritional supplements, dietary ingredients"
Low Carb Craig	http://lowcarbrcraig.blogspot.com	"Fighting fat with fat"
Cranky Fitness	http://www.crankyfitness.com	"Your guide to health, fitness, nutrition"
Cron-fetti	http://cronfetti.blogspot.com	"More fun, less calories"

serve to empower patient–consumers, providing people with the information necessary to care for themselves and bringing more equality to the provider–patient relationship.⁵⁹ The extent to which patients use blogs and other Internet resources to complement, and in some instances to substitute for, conventional health system contact remains to be seen.^{2,60}

Health blogs written by patient–consumers might prove useful to providers seeking to better understand the mental, emotional, and physical state of people living with specific conditions.⁶¹ Blogging might also serve to improve the broader public health. Large-scale

empirical investigations of information posted on health blogs might better elucidate the state of health and health care. Health blogging communities could act as conduits for disseminating evidence-based information as well.⁴³

The high proportion of blogs focused on mental health, reproduction, HIV/AIDS, and disabilities suggests that blogging might be especially appealing to those with stigmatizing illnesses or circumstances. Blogging may provide people with an environment to safely explore that part of themselves that may be stigmatized by society.⁴⁴ Thus, rather than keeping aspects of their identities hidden as they

might do in their everyday interactions, blogging might allow people with potentially stigmatizing conditions to freely express themselves while sharing their experiences with others.

The prevalence of certain types of blogs might also reflect significant social and political mobilization among communities of persons living with or at risk for particular conditions. This may be particularly true among those with HIV/AIDS and physical disability, groups that have a strong advocacy presence. Blogs such as these might be devoted to mobilizing people to attend rallies, protests, or marches; sign petitions; raise funds; and support legislation.⁵⁴ Identifying

the extent to which health bloggers promulgate political or advocacy messages or seek contact with or support from others could be an especially fruitful avenue for future research.

Nearly half the blogs in our sample were written by health professionals, including a large number of physicians, nurses, and other direct-care workers. Blogs written by health professionals are noteworthy because they may serve to make health and medical information less arcane and more available to lay people while maintaining professional credibility. Although information posted on the Internet is not always reliable because anyone can post content,^{62,63} typically health providers are viewed as a trustworthy source. If health professional blogs are to serve in such a translational role, clear professional guidelines are needed, or at a minimum, a disclaimer governing the nature of the information posted. These standards should cover such areas as the quality of that information,^{2,62,63} patient confidentiality,^{19,22,43} and real or perceived conflicts of interest,^{2,43} especially because one quarter of the health blogs we studied featured advertisements.

Professional organizations such as the American Public Health Association and the American Medical Association have developed guidelines regarding the quality and nature of health and medical information posted on the Internet.^{64,65} Professional norms governing blogging are also beginning to emerge organically within the health blog community itself. This is reflected in the promulgation of codes of conduct covering such areas as confidentiality, sponsorship, commercial disclosure, reliability, transparency, anonymity, courtesy, and respect.^{66,67} Although important, professional standards are only a first step. These, in turn, need to be connected explicitly to concrete steps health bloggers should take to best reflect adherence to professional guidelines.

Limitations

Although we identified a large proportion of the most influential health blogs active during the study periods, our sampling method had inherent bias. Because we had no sampling frame, blogs that would have otherwise met our inclusion criteria may have been excluded because they were not captured in either the purposive or snowball samples. Our methods may have missed some blogs with

health-related content that did not meet our eligibility criteria, such as blogs that did not focus predominately on health or health care, that were inactive (not updated at least once in the 6 months prior to data collection), or that died. We also did not identify an unknown number of less widely linked blogs that were not captured by a search engine or connected to a blog aggregator or blogroll.

Because it is likely that the sample was biased toward popular blogs of comparatively greater influence and prestige, some blog topics and areas may have been underrepresented (e.g., concerns of parents about the link between vaccination and autism) and others overrepresented (e.g., physician bloggers' interests). Because we did not exhaust all possible search terms but instead relied on a selection of general ones, we may have missed some potentially relevant health blog topics as well. Blogs also were sampled during a single year. The rapid increase in the number of health blogs suggests that the health blogosphere will continue to evolve in ways that differ from this snapshot in time.

Because many bloggers seek to remain anonymous, comprehensive sociodemographic data were not available. Furthermore, authors' representations may have been inaccurate. A large proportion of our data documented features and topics that appeared on health blogs. However, the authenticity of other information, such as blogger occupation, was unverifiable. Thus, as in other research relying on self-report rather than on direct observation, we had no way of confirming the information posted.⁶⁸

Conclusions

Web 2.0 applications are increasingly being used in the health sector with the aim of creating a more user-friendly, interactive, and efficient health care system. Blogs are an integral part of this next stage in the development of online health care. Although the potential of blogs to facilitate communication about health issues is increasingly being recognized, further data on the quality, veracity, and usefulness of health blogs are needed.

Future research should examine relationships among the blog and blogger characteristics we identified, investigating whether blog features and elements vary systematically by bloggers' gender, occupation, and perspective.

Nationally representative surveys of bloggers and textual analysis of their postings would be a useful way to expand on our content analysis. The roles of other Web 2.0 technologies should be explored as well. ■

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Contributors

Both authors conceptualized and designed the study, interpreted the data, and wrote the article. E. A. Miller analyzed the data.

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