What Should be the Role of Government-Supported Medical websites?

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Abstract: The National Library of Medicine produces websites for the general public that are supposed to meet official standards of scientific rigor. These sites exist in the context of the World Wide Web, where anyone is able to make claims about medical science and recommend treatment. Medical sites that are sponsored or endorsed by the government are not especially prominent online. For those who trust the medical profession, the failure of the official sites to draw the lion's share of public attention is a problem, and government medical sites should be more aggressively promoted. However, the official sites have provoked controversy and criticism. Those who are skeptical of the "medical establishment" may welcome the pluralism and diversity of views available on the Internet; they may oppose efforts to channel viewers to official sites. This paper argues in favor of the government-sponsored sites, but with some caveats.

1. A Troubling Example

In June 2004, if you went online to learn about "cholesterol," you might have typed that word into Google, the world's most heavily used search engine. Google would have quickly returned a list of more than five million websites containing the word "cholesterol."

The first ten websites would appear immediately before you; the remaining five million would take progressively more time and patience to find. The eighth result would be a page within MedlinePlus. This is an elaborate website created by the National Library of Medicine, a department of the United States government that has an annual budget of US \$250 million, a mandate from Congress to inform the public about medical issues, more than a century of experience, and a highly professional staff of scientists and librarians. The purpose of MedlinePlus is to "assist you"—presumably, any visitor—"in locating authoritative health information" (MedlinePlus,

n.d., A).

In June 2004, one of the 20 most common search terms used within the MedlinePlus website was “cholesterol” (MedlinePlus, n.d., B). Since more than 12 million “unique visitors” used MedlinePlus during that quarter, we can infer that quite a few people actually looked at the cholesterol page (MedlinePlus, n.d., C). They would have found links to selected articles and illustrations produced for lay readers by government agencies and medical societies such as the Mayo Foundation and the American Heart Association.

Somewhat higher up on the Google listing, at number five, was a site written by Uffe Ravnskov, MD and PhD, who described himself as the “spokesman of THINCS, The International Network of Cholesterol Skeptics.” His site announced: “The idea that too much animal fat and high cholesterol are dangerous to your heart and vessels is nothing but a myth. ... If you think this is written by another internet crackpot, take a look at Dr. Ravnskov’s credentials and the reviews of his book”—which was for sale on the site (Ravnskov, n.d.).

I am not competent to judge whether Dr. Ravnskov’s claims about cholesterol or his own credentials are accurate. However, it is remarkable that an individual with a low-budget website—registered to the “.nu” domain, which belongs to the New Zealand protectorate of Niue in the South Pacific—should be able to beat the National Library of Medicine of the United States in the competition for prominence on Google.

If one used Microsoft’s MSN search engine instead, Dr. Ravnskov would fare worse and MedlinePlus would place higher. However, MSN’s top result was not MedlinePlus but a commercial site operated by Pfizer to promote Lipitor, its cholesterol-lowering drug, the safety of which has been challenged (Woodcock, 2001).

This case is an example of a broader issue. The medical profession promises to discriminate between reliable and unreliable sources of information. Access to the profession is restricted; knowledge is deemed reliable if (and only if) it has been reviewed by credentialed professionals. The World Wide Web, in contrast, is open, pluralistic, and “democratic” in the sense that the prominence of a site depends on its popularity (and sometimes the amount of money its owner has paid search engines for placement)—not its quality according to professional criteria.

2. Centralized Medicine, Decentralized Cyberspace

The Internet is the most decentralized network in history. Hundreds of millions of people operate websites to disseminate their opinions and ideas. No qualifications are needed to start a site. The better-funded

ones may sometimes be easier to find and more impressive, but cheap sites are often very influential. Thanks to the Internet, individuals with no special wealth, education, or social status have managed to influence huge audiences.

Medicine is somewhat decentralized, too. Individual physicians still enter into voluntary professional relationships with individual patients. Medical advice and treatment of the same symptoms may differ from case to case, depending on the training and predilections of the doctor and the desires of the patient. However, Herculean efforts have been made to turn medicine from a highly decentralized system, in which anyone could dispense care according to his own whims, into a regularized, ordered, and hierarchical field. It is illegal to practice medicine without a license or to use or sell regulated drugs without a prescription. To gain a medical license, one must pass through an elaborate training and socialization process, including graduation from an accredited school and apprenticeship under experienced physicians. One then bears marks of membership in an exclusive body: diplomas on the office wall, a white lab coat, and an expectation that one is to be addressed as “doctor.”

Licensed medical practitioners must maintain formal standards of care that are established by associations in the various subfields. These standards are supposed to be based on current scientific knowledge, which is also regulated and organized by professional bodies and laws. In medical science, regulations are supposed to ensure that all research builds on relevant past work, is replicable, discloses its authors’ identities and conflicts of interest, appears in one of a finite number of refereed journals, is indexed, and uses specified research protocols (such double-blind clinical trials when appropriate).

Even when state regulation does not restrict the autonomy of physicians and other medical professionals, economics does. In some countries, the state directly funds medical doctors, hospitals, and medical research labs, mandating particular treatments and research priorities and protocols. The United States stands out among industrialized democracies for not providing universal health coverage. Nevertheless, the US government still regulates private health insurance and spends more than \$400 billion/year on healthcare—enough to give it great leverage over the field. In the United States, medical care is also much influenced by civil law and the judgments of courts in malpractice cases.

A purpose of all this regulation is to constrain doctors’ discretion and bring their advice and treatment up to a common standard. Standardization is not the only desideratum; physicians are granted considerable autonomy and discretion, presumably because they

need judgment to decide about particular symptoms in particular cases. Furthermore, a government may deliberately support a variety of approaches to medical care or research, in order to promote intellectual competition. However, the drive for standards is strong in medicine, and it arises from the belief that there ought to be a finite number of acceptable ways to handle any medical condition in a particular patient (once it is fully described), given the state of scientific knowledge at the time.

In addition to the ideal of standards of care, another concept that guides clinicians is the distinction between general and specific advice. When medical professionals address general audiences, for example in educating laypeople about nutrition, they pay attention to the degree of error in their knowledge and also the level of variance in the target population. (Margins of error and degrees of variance can often be predicted, because medical knowledge is highly statistical). Clinicians dispense public advice that they believe will have the best aggregate effects. Predicting and assessing the aggregate effects of advice is a complex matter, because one must consider the reliability of one's theories; the impact of one's message on average and atypical people; the costs versus the benefits of what one says; the capacity of the audience to understand subtleties; the obligation to be truthful and credible versus the need to present an effective message; and many other considerations.

When a physician treats a particular patient, different considerations arise. Now the message can (and must) be precisely tailored to the specific case, and the physician has ethical obligations to respect the patient's autonomy—for example, by providing all relevant information. A physician can carefully explain to a patient that his or her own circumstances differ from the norm for a particular medical condition. This can be crucial information, and it is not available in general sources such as medical encyclopedias or the Internet.

In principle, medical professionals are supposed to know the standards of acceptable treatment for any individual; they are also supposed to know what should be said to general audiences—and the two messages are not necessarily the same. In contrast, laypeople are unlikely to know how to diagnose and treat a particular case according to the best current research, nor what can be said in general about a medical issue, nor how the two kinds of knowledge are related.

On the Internet, both laypeople and medical professionals are able to disseminate their views and advice. Thus, someone who wants to locate medical information or advice online can easily find herself looking at a mix of official recommendations and ideas promoted by laypeople. On the Internet, it is considerably harder to tell the

difference than it was in the old days, when professional advice came from people in white coats or refereed journals. A 1997 study found wide variation in the reliability of medical information available on the Internet (Impicciatore, 1997). ("Reliability" here means consistency with official medical standards). In the United States, expensive services have sprung up that offer to sort through available online information and provide digests of everything that is valuable and appropriate for particular customers (Epstein, 2003). Their existence indicates that at least some users of the Internet find it difficult to distinguish between reliable and unreliable information.

To be sure, laypeople have always been able to dispense medical advice—telling a friend or relative (or even a complete stranger) how to improve his health. But the law has attempted to drive a wedge between official and unofficial medical advisors, giving only licensed clinicians the legal right to prescribe drugs, to use hospital equipment, to determine the cause of death, etc. Leaving aside cases of deliberate fraud, it is usually easy to tell the difference in "the real world" between a professional in a white lab coat and a layperson. The voice of professionals is fairly unified, since those who give advice contrary to the official doctrine can be disciplined. And their voice is amplified because they alone can dispense advice that leads directly to certain kinds of treatment, such as the use of regulated drugs. Laypeople face obstacles if they try to persuade others to act on their advice.

When one developed a disease in the days before the Internet, most of one's acquaintances had no knowledge of that medical condition—nor did they believe that they had such knowledge. Thus the volume of advice from laypeople was *relatively* low. Today, people who have no scientific knowledge of a particular medical condition can easily post messages about it in newsgroups and on websites. These messages are easy to find with search engines. If you are worried about a medical condition, you may be tempted to collect as much advice as possible. Thus you will likely read online messages from laypeople promoting their own views. It is difficult to measure the impact of this change, but one can reasonably hypothesize that the frequency of laypeople advising other laypeople has risen.

The Internet has some clear advantages for conventional medical practitioners. It is an efficient means for them to communicate to one another, and it is a cheap way to disseminate general, frequently updated medical advice to the public. If, for example, basic information about AIDS prevention can be disseminated at low cost, there may be public health benefits. Nevertheless, for physicians and public health professionals, the wide availability of unreliable online information is problematic. Expensive private search services have the disadvantage of being inaccessible to the poor (and perhaps

unreliable themselves).

3. A “Gold Standard” of Professional Online Medical Information?

There is an obvious way to respond: the medical profession can create a “gold standard.” This would be a single public website or portal that provided great quantities of organized, official information and advice, designed to draw as much of the national or global audience as possible. Examples include NHS Direct Online (www.nhsdirect.nhs.uk), a service of the British National Health Service; Health Canada (www.hc-sc.gc.ca/), and the website of the World Health Organization (www.who.int/). In Italy, the Ministero della Salute provides a considerable amount of medical information, although not a full-scale portal (www.ministerosalute.it). In France, an impressive nonprofit site (www.pasteur.fr) is meant mainly for physicians and scientists.

In the United States, the National Library of Medicine (NLM) was created by act of Congress “to assist the advancement of medical and related sciences and to aid the dissemination and exchange of scientific and other information important to the progress of medicine and to the public health” (U.S. Code, 2004). In 1879, NLM created *Index Medicus* as a printed bibliography of medical research. In 1971 this was computerized as MEDLINE. MEDLINE is now on the World Wide Web along with PubMed (a collection of 14 million biomedical articles), and MedlinePlus, an online service started in 1998 especially for laypeople. These sites contain hundreds of thousands of pages of generic advice, scientific data and findings, and medical news, written at various levels of complexity for various audiences. Statistics give some indication of their scale and scope. In Fiscal Year 2001, 463,014 new citations to medical literature were added to the portal. There were 313 million searches of MEDLINE that year, and MedlinePlus received 62 million page views (National Library of Medicine, 2003a). Although text, images, and other materials are created specifically for MedlinePlus, it mostly comprises carefully filtered, sorted, and selected links to other U.S. agency sites and sites created by major professional associations.

MEDLINE and MedlinePlus contain more text (by a factor of perhaps 100 or 1000) than the government health portals in other countries that I have been able to find. The National Library of Medicine calls MEDLINE “the most authoritative entry point into an ever-expanding biomedical literature.”

MEDLINE and MedlinePlus are official products of the medical establishment. Their parent, NLM, is a federal entity with an annual budget of US \$250 million. It sits on the campus of the National

Institutes of Health (NIH), which collectively embody the ideal of white-coated scientific medicine in the United States . NIH has a budget of US \$20 billion and employs 18,000 people; it has funded the work of 106 Nobel Laureates, 5-10 of whom actually work for NIH at any given time (National Institutes of Health, n.d., A, B, C). It is “the steward of biomedical and behavioral research for the Nation” (National Institutes of Health, 1998).

Seventy-two percent of MedlinePlus users are Americans; the rest come from all over the world. Half are either patients or close relatives of patients (the other users range from students to reporters). About two thirds are trying to find information on specific conditions; 86 percent said that they found what they wanted “always” or “frequently.” Although most users said that MedlinePlus improved their understanding of a medical condition or helped them to talk to friends or doctors, 19 percent said that they made a treatment decision directly as a result of MedlinePlus (National Library of Medicine, 2003B).

If there is any “gold standard” of online medical information in the United States (and perhaps in the world), it is MEDLINE. No individual knows enough about medical science to make a direct assessment of all the information presented on this huge portal, applying “content criteria” such as logic, statistical validity, and accordance with direct observations. However, most people most of the time use “pedigree criteria”: we trust information because of who provides it, not because we can verify it directly ourselves. Vedder and Wachbroit note that “the use of pedigree criteria is pervasive. ... Even researchers employing evidence criteria will often have to use pedigree criteria as well. For example, in performing an experiment, the scientist may have to rely on the information provided by an instrument whose reliability is based on the authority of the manufacturer of the instrument” (Vedder and Wachbroit, 2003; cf. Vedder, 2001). While even scientists and physicians cannot assess most of Medline’s information according to “content criteria,” the “pedigree criteria” are all in Medline’s favor. It is well-funded, separated from profit-seeking companies, and run by distinguished professional organizations and bodies that use approved scientific procedures.

4. Should the “Gold Standard” Predominate?

Thus a fundamental question arises: should a site like MEDLINE (and those sites to which MEDLINE links) predominate online? At the extreme, “predominate” could mean that everyone who consulted the Web for medical information would *only* see the “gold standard” site and those to which it links. A more modest definition of “predominate” would be satisfied if most people who consulted the World Wide Web visited the “gold standard” site, as well perhaps as other ones, in the

course of their research.

Should “gold standard” sites predominate, at least in this second sense? Our answer may be “yes” if we have a generally high regard for the overall performance of the medical profession and the ancillary branches of the federal government. We need not assume that every fact presented on MEDLINE is correct; scientists are fallible and normal science proceeds by the correction of error. We may, however, assume that the overall profession is more accurate than any rival in the majority of cases. And since we lack the “content criteria” necessary to identify cases when the profession is wrong, our best bet is to use professional advice instead of any substitute. If this argument is valid, then the federal government should consider spending considerable resources to maintain, expand, and advertise MEDLINE and MedlinePlus. (I discuss ways of doing this at the end of the essay.)

One problem with this goal is that government officials, including medical doctors, may have political agendas. The same is certainly true of other groups and individuals. However, government agencies and professional nongovernmental associations have massive resources and considerable prestige and authority. Thus it would be disturbing if they used their resources and stature to predominate online, and promoted ideological or normative agendas while claiming to wear the mantle of dispassionate science.

In 2002, various agencies of the United States Government (but not NLM) removed information about condom use and abortion from their websites, allegedly because elected politicians favored sexual abstinence before marriage and opposed abortion on moral or religious grounds. The National Cancer Institute (NCI) had posted information denying a link between abortion and breast cancer, but an anti-abortion Member of Congress objected, calling this denial “scientifically inaccurate and misleading to the public.” The NCI website was then changed to say (for a time) that the evidence was “inconclusive,” until a scientific review panel required the website to reinstate its original language. Likewise, the website of the Centers for Disease Control and Prevention removed its positive assessment of condoms’ role in preventing the transmission of disease and removed citations of evidence showing that education about condoms did not lead to earlier or more sexual activity. After the removal of these statements was criticized, some similar material reappeared online with the following text added in bold: “The surest way to avoid transmission of sexually transmitted diseases is to abstain from sexual intercourse, or to be in a long-term mutually monogamous relationship with a partner who has been tested and you know is uninfected.”

This last sentence is literally true. However, some critics disagree with the strategy and motives that they see lying behind such statements. Participants in this controversy divide into two camps. Some believe that it is the responsibility of public health professionals to reduce the spread of sexually-transmitted diseases, especially HIV/AIDS. Private, voluntary behavior that does not transmit such diseases—or otherwise increase morbidity and mortality—is not the business of medicine. For this group, it seems best to advocate condom-use aggressively. Universal condom-use is a more realistic goal than universal abstinence, and condoms generally prevent the spread of disease. Caveats about the effectiveness of condoms, like the one in bold on the revised website, may have the effect of discouraging condom use. As Representative Henry Waxman wrote in an official complaint, the website was “carefully edited to deny the public important information about the role condoms play in reducing sexually transmitted diseases and pregnancies” (Bluey, 2002).

Another group, however, believes that there are *two* evils to be minimized: (1) the transmission of dangerous disease, and (2) pre- or extra-marital sex, which is bad in itself. Ed Vitagliano, who represents the conservative American Family Association, said, “Science shows that condoms are not 100 percent effective, and offer no protection for certain sexually transmitted diseases like the human papilloma virus and to a lesser extent chlamydia and herpes We fall on the side of safety, encouraging children to wait until marriage, *not only for moral reasons*, but also for scientific reasons” (Bluey, 2002, emphasis added). For this group, it makes sense to advocate abstinence, since this is a good in itself as well as a means to avoid spreading various diseases. Wholehearted, public advocacy of condom use may strike such people as tacit support for non-marital sex. They disliked the website that was written under the Clinton Administration, seeing it as morally biased in favor of promiscuity. Vitagliano said, “For eight years, these Democrats had a dominant position under the Clinton administration in determining what kind of view would be promoted to our nation's children ... Now that the monopoly has been broken and is being challenged by a view they don't like, they want to bellyache about it” (Bluey, 2002). The other side in the debate, however, saw the *revised* text as morally biased; and the conflict led to the current text, which still offends some observers.

Similar charges were made by conservatives during the previous, Democratic administration. They objected, for example, to official pronouncements by the American Medical Association and various Federal health agencies that favored gun control as a matter of public health. Conservatives claimed, first, that medical researchers misstated the causal relationship between gun ownership and rates of violent crimes, because of their ideological bias; and, second, that the

question of gun regulation is not only scientific but also normative, involving questions of individual rights and fidelity to the U.S. Constitution (Kates, 1994). This controversy did not involve websites—perhaps because it occurred early in the history of the World Wide Web—but conservatives could reasonably fear that a liberal U.S. administration would prominently display anti-gun statements on medical websites at some point in the future. To be sure, not many people are likely to turn to medical websites for information about gun control; however, anti-gun statements on MedlinePlus could be found by anyone who was simply interested in the issue.

Each of these cases is complex and ambiguous, not least because we do not have much information about actual motives of the protagonists. (The main data are simply the shifting texts of the websites.) However, it is clear that a government website *could* appear to be highly scientific and *could* meet many secondary criteria of scientific reliability, yet it *could* promote normative or ideological views offensive either to the right or the left. Based on a study of US state agencies, Eschenfelder finds that “agency staff routinely forward sensitive content to high-level managers. The costs and benefits of high-level review [are] unknown. On one hand, high-level management review ensures the professionalism of the content, and it alerts high-level agency staff—who will ultimately be accountable for the information—to the potential publication of the content. On the other hand, the practice may result in the toning-down of controversial content or suppression of content from agency sites” (Eschenfelder, 2004).

One influential view of these cases rests on a distinction between science and ideology, facts and values. Thus Lawrence M. Krauss, a distinguished physicist, called the new text on condoms and abortion a “distortion of the results of medical studies.” A liberal Member of Congress said, “We’re concerned that [these] decisions are being driven by ideology and not science.” The President of the Planned Parenthood Federation of America (a group that favors abortion rights) put the charge more strongly: “They are gagging scientists and doctors. They are censoring medical and scientific facts. It’s ideology and not medicine” (Clymer, 2002a; Clymer, 2002b; Krauss, 2003). But a spokesperson for the Federal Department of Health and Human Services countered that science was the Department’s only guide when it changed its website on condoms: “We’re just trying to present a balanced approach with the scientific evidence that’s available” (Bluey, 2002).

Both critics and defenders of federal health websites seem to assume the same basic argument: there can be value-free science, and government-sponsored or -endorsed websites should present only scientific results, not colored by moral considerations. There seems to

be a missing premise here concerning the proper role of the government. Why *shouldn't* the state mix morality with science, as citizens do? Perhaps concerns about state power lead people to believe that the government must be morally neutral. Or perhaps critics believe that "gold standard" sites are falsely *presenting* themselves as purely scientific when they actually have moral agendas; then the real charge is hypocrisy.

Since the decline of positivism, however, most philosophers have doubted a basic premise of this argument, namely, that science *can be* value-free. Science is always imbued with normative choices, e.g., about what is important to study, what outcomes should be valued, and how much risk to tolerate. There certainly can be no value-free study of alcoholism, drug addiction, obesity, impotence, infertility, sexually transmitted diseases, embryo reduction in multi-embryo pregnancies, or end-of-life care. All these cases essentially involve ethical questions as well as questions about causality. If, for example, one treats alcoholism as a disease and not as a moral failing, that is itself a moral decision.

Thus perhaps we cannot reasonably demand that government or official medical sites present value-free advice. But we may worry more about their ideological agendas than about the agendas of other sites, since materials backed by the state have powerful authority and sufficient resources that they could obtain disproportionate influence. This is why, for example, there was an uproar when critics charged in 2003 that federal medical research proposals automatically receive special scrutiny if they contained the phrases "sex workers," "men who sleep with men," or "anal sex" (Goode, 2003).

One solution would be to try to prevent state (and other official) websites from dominating the Internet. Instead, we might argue, government sites should be constantly challenged by prominent, critical sites of all ideological stripes. We might even try to block the government from devoting public money to publicity for a "gold standard" website. As a result, however, many people would see websites that were unreliable by almost any standard.

Another approach would be to ask federal (and other official) websites to help visitors understand the normative as well as the scientific aspects of the questions that they discuss. For example, official websites such as MedlinePlus could provide the most current information about the relationships between (a) condom use and sexually transmitted diseases; (b) gun control laws and homicide rates. At the same time, they could note that sexual behavior and gun possession are contested issues that involve moral, religious, and constitutional questions. There may be a known rate of transmission of HIV/AIDS when people wear condoms. There is not, however, a

medical or scientific answer to the question: Should people have sex using condoms? The current Centers for Disease Control and Prevention website does not answer this question explicitly. However, conservatives evidently thought that the original, positive discussion of condoms was an implicit endorsement of promiscuity; and liberals see the current text as an implicit disparagement of non-marital sex. An alternative would be to state explicitly on the website that sexuality involves religious and/or ethical issues that science cannot settle.

Another group of potential critics might object to a predominant “gold standard” site because they have wholesale objections to “Western” medicine. For example, some people favor acupuncture, herbal treatments, and prayer and positive thinking. Perhaps the typical stance of MedlinePlus toward these approaches is captured by this title (linked from the MedlinePlus site): “Nontraditional Arthritis Treatments: Some May Help, But Be Wary” (Mayo Clinic, 2003). In short, the sites and materials linked by MedlinePlus endorse select non-traditional treatments, but only if they are standardized and tested by means of clinical trials. This approach will not satisfy full-fledged critics of “Western” medicine and its underlying assumptions. For them, the Internet is wonderful medium for communication that allows them to compete with the medical establishment. They may fear government efforts to dominate the World Wide Web (if such efforts have any chance of succeeding).

Doctors tend to distrust alternative medicine because they have attitudes toward risk and benefit that lead them to prefer the standardization of drugs and experimental trials. Consider herbal treatments. It is not that medical professionals dislike substances found in nature and traditionally used to fight disease. Rather, they do not think that people should take risks with un-standardized and untested substances, even if those substances have been trusted in folk cultures. So medical experts are guided by normative assumptions about trust, authority, and risk. These assumptions are not wrong, but they are debatable and they come from outside science. Again, it would be helpful if official sites were explicit about such normative issues. MedlinePlus could say, for example, that it does not recommend herbal treatments because it uses a set of presumptions about risk, evidence, and standards of proof that underlie “Western” medicine. This would be an implicit invitation to visitors to view alternative sites if they held different presumptions.

Finally, some people believe strongly in certain core principles of “Western” medicine—physicians are independent professionals, treatments are tested in rigorous clinical trials, scientific results are publicly disclosed, and everyone has certain rights to treatment (cf. American Medical Association, 2001)—but they assert that the medical profession has strayed far from these principles. Critics

charge that pharmaceutical companies sometimes pay physicians to promote drugs that are not safe or effective, silence scientific critics, and ignore medical problems that are common in poor populations. Regulators are ineffective and sometimes even abet the corruption of medical research. (See, for example, Rothman, 2000). For people who are concerned about these problems, the World Wide Web holds some promise: watchdog groups like Public Citizen's Health Research Group can post material challenging the claims of corporations and regulatory agencies. However, companies can also use the Internet to advertise their drugs; indeed, pharmaceutical sites are often the most prominent results of Web searches. Critics of industry should want government sites to predominate over commercial ones, but they will frequently challenge the content of government sites.

To conclude this section: I believe that government (and other official) medical websites should predominate online, in the sense that most people who search online for medical information should see these sites, as well perhaps as other ones. But I recognize that there are risks inherent in building a powerful presence for government and professional medical websites. One way to reduce some of these risks would be to demand that such websites discuss the limitations of science and the relevance of contested normative questions (about which they have no special authority). They should also prominently disclose conflicts of interest and cite reputable critics of commercial products.

5. How Could "Gold Standard" Sites Be Made More Predominant?

Three main factors determine how predominant a site is online. The first is the way that the site itself is built: how relevant, copious, and accessible is its content and how effectively it is marketed. A government has the necessary resources to make its own medical websites highly informative, relevant, reliable, and easy to use (thus promoting return visits and endorsements by third parties).

The second factor is the way a site is promoted. A government could advertise its online services in many media, including print announcements in appropriate magazines, television commercials, and free materials for schools and public libraries.

The third factor is the performance of "search engines": the services that index portions of the World Wide Web and then allow users to find webpages containing chosen terms. If one begins a search for online information by using a search engine, then the webpages that one views are the pages that the search engine has suggested—or ones linked to those pages. There is an alternative: one can go

directly to a particular website if one knows its address. (Or one may use a search engine for the purely mechanical task of finding the precise address of a known website.) However, it is more common to search without knowing what site one will visit. One enters a term such as the name of a medical condition or treatment, and simply looks at the results suggested by the search engine.

Unfortunately, no search engine can index the entire World Wide Web—covering about 16 percent of all sites seemed to be about the best that any service could manage in 2000. (Introna and Nissenbaum, 2000). And even if they could index everything, engines would have display search results in some kind of order. Google lists more than five million pages with information on “cholesterol.” To be listed among the top ten or twenty pages is hugely more advantageous than being listed at 50,000 or 75,000. Thus it matters what methods search engines use to select content for indexing and then to rank results.

At present, there are three major methods. First, some search engines rely on human reviewers (aided by software) who make value-judgments about what sites are most important to see. These services could decide to make “gold standard” sites such as MEDLINE predominant in their own search results. They could even deliberately remove sites whose information contradicted information presented by MEDLINE. They have an obligation to favor “gold standard” sites if they are persuaded by arguments presented in this article.

Second, one of the most popular search engines, Google, tries to give a neutral and unbiased picture of the World Wide Web by ranking highly those sites to which other sites have linked. Instead of making judgments about what sites are most important, Google lets the marketplace decide. As I have shown, official medical websites do not predominate in Google search results. Google discloses the “page rank” of all sites, a measure of how widely it is linked. MedlinePlus is ranked at eight (out of 10), but so is WebMD, Medscape.com, and Kidshealth.org, to name just a few competitors.

Google results can be manipulated. Organizations can deliberately create many, mutually-linked websites on different servers, giving the impression that each site is highly valued by others. Individuals can persuade (or pay) others to link to particular sites. Sometimes, Google even decides to abandon its usual algorithms for determining the rank of sites in order to promote or downgrade a particular site (Hiler, 2002; McHugh, 2003, Lithwick, 2003). It seems unlikely that a government would try to manipulate Google results, and doing so would be controversial. However, a government could, in theory, improve its own sites’ rankings on various search engine by

encouraging (or even paying) other sites to link to the “gold standards.” For those who believe strongly that government websites should predominate, certain kinds of manipulation by the state may seem desirable.

Third, most search engines simply increase the rank of sites that pay them for favorable treatment (Wachbroit, 2001; Cohen, 2001). Even Google sells advertising; companies bid for the right to have their own paid announcements appear at the right of the screen when one searches for a particular word. As a result, in May 2003, a search for “SARS” (meaning “severe acute respiratory syndrome”) would generate advertisements for “SARS protective kits” that contain, among other products, disinfectant sprays that have not been shown to kill the virus responsible for SARS (Peterson, 2003). Again, the susceptibility of search engines to manipulation (in this case, by direct payments) is both a problem and an opportunity. It means that commercial enterprises with highly unreliable medical information can buy themselves prominence. It also means that the government, with its especially deep pockets, could guarantee that it predominated online, simply by spending enough money on advertising.

6. Conclusion

One’s view of the proper role of official medical websites depends inevitably upon one’s opinion of the medical profession as whole. People who are fairly confident in the profession should hope that official, government-sanctioned websites are a popular source of medical information. For them, the prominence of non-official sites should be a source of worry, and they should urge the state to promote its own sites (and the ones it endorses) more energetically.

However, some reasonable people lack confidence in the medical profession, viewing it as subject to political pressure, covertly moralistic, corrupted by economic forces, and/or closed to alternative forms of treatment. For them, the openness of the World Wide Web is a great advantage, and it is a good thing if official sites do not predominate online.

I favor the former view, but I cannot defend the general reliability of the medical profession in this paper. If the state does promote certain websites, it should link to reputable critics of industry and include explicit disclaimers about the limitations of medical science. Science can explain the causes of diseases (and other medical conditions) and describe what is likely to happen as the result of various treatments. It cannot tell us what is right to do, since that is always partly a moral judgment.

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