

Consumer-Oriented Broadcasting & Video Archives for Health

by

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The United States and other developed nations are entering a new era of rapid expansion in national communication capacity and declining costs that is likely to continue for at least two decades. This is good news for consumers who need health information and for anybody with health information to communicate. We can begin to design national information strategies that use consumer-oriented broadcasting, along with the Internet, to improve health.

Today nearly all American households have color television sets (98%); about 2/3 have at least basic cable television subscriptions (typically with several dozen basic channels);² and more than half of Americans (ages 18 - 60) have an Internet connection, most with limited-capacity telephone lines built for voice conversations (53%).³ An increasing number of Americans - now, 18 million households - have purchased small dish antennas to receive television and digital radio signals direct from a satellite.⁴

In the new telecommunications era most households will be able to receive broadcasts from many hundreds (or more) of TV channels from competing vendors of cable channel upgrades, direct-broadcast satellite television, and telephone lines upgraded to video-program capabilities. In addition, these connections will soon support "video on demand" so consumers can order the programs they want to watch and choose when they want to watch them. The Internet and World Wide Web also will be connected through these high-speed linkups, bringing worldwide video broadcasting (Webcasting) to American households from many thousands (or more) potential channels.

Telecommunications companies and venture capitalists have been investing hundreds of billions of dollars to bring these new telecommunication capabilities to the American consumer and developed nations worldwide. But, as more than 12 million American households have already discovered about their newly-upgraded cable TV (e.g., with 250 channels), the new national broadcast capabilities are now used mostly to offer entertainment-oriented programs. The "vast wasteland" of commercial TV broadcasting is being multiplied. It includes dozens of movie rerun channels featuring many movies that had little audience even when originally released and reruns of television series that died for lack of viewers years ago. The new communications companies, however, are mostly in the business of broadcasting, rather than program content, and cannot fairly be blamed for not offering programs that do not yet exist.

The development of channels, programs, and strategies to make the best societal use of these new technological capabilities has hardly begun. With few notable exceptions, our society's institutions with missions to advance health (and other institutions) are not ready with broadcast programs and channels that would take advantage of the opportunities of this new telecommunications era.

To stimulate discussion about how these new national capabilities could be used for health, this paper envisions a nonprofit, national Health Channel - sponsored perhaps by

foundations or by foundations and government - that would offer trustworthy, first-rate programs that consumers also could use, as needed, via the Internet or “video on demand” cable or satellite connections. The national Health Channel also would inform consumers about Internet resources for reliable information. The paper discusses how this new capability could help consumers and providers, and increase the effectiveness of organizations committed to health and health care quality. It is divided into four sections: 1) What new health programs would be useful? And what are the kinds of options to consider with respect to: 2) technology and distribution; 3) cost and financing; and 4) organization and governance?

This paper focuses on a U.S. national strategy, but it also can be relevant for foundations and others with geographically-focused priorities, since their sponsored programs could readily be broadcast nationally and they, in turn, might draw upon programming developed for a national channel. Additionally, Canada, the United Kingdom, and other countries with national health systems, government broadcasting capabilities, and rapidly advancing telecommunications systems, may find opportunities for dialogue with ideas under discussion for their own national health strategies.

NEW HEALTH PROGRAMS

An important starting point is to generate a cornucopia of ideas for the kinds of health-related programs that could be made available and identify their potential audience(s). Such considerations can form the basis for a market analysis and business plan for a national Health Channel. Once a Health Channel is initiated, a constant flow of creative ideas could be encouraged through competitive program development grants by foundations to a wide range of interested associations and groups.

For-profit television seeks to maximize a mass audience in each time slot and usually delivers a daily-changing flow of new programming. Frequently, network program schedules are fashioned for entertainment appeal to selected demographic groups - typically younger (non-elderly) and affluent - whom sponsors hope will watch regularly. In return for entertainment, viewers are subjected to commercial advertising.

During the last decade, a number of for-profit broadcast channels (and Internet sites) were launched to provide health information for consumers. Most of these projects have failed. The most commercially successful television ventures focused on upscale audiences with topical health infotainment: a Web-MD initiative that targeted young and middle-aged women (health and fitness, relationships, beauty); and Discovery-Health (the fascination of scientific discovery). The nation’s TV experience shows that the vehicle of commercial TV broadcast channels cannot be relied upon to meet most of the health information needs of the American public.

Most for-profit Internet health sites also have been unable to sustain themselves through advertising, sales of products, and selling information about their users.⁵ And they also have encountered consumer mistrust about commercial motives, reliability of information, and confidentiality of searches.⁶ (It is therefore not surprising that the National Institutes of Health/ National Library of Medicine Web site, www.nlm.nih.gov/medlineplus, is emerging as a leading source for consumer-oriented health information with more than six million “hits” per month.)⁷

A national Health Channel - designed to provide people the information they need, when they need it, in a form they can use - could imagine its potential audience and program philosophy quite differently from commercial TV. It can view its target audience as the full U.S. population, existing in dozens of niche markets created by information needs that arise from each individual's circumstances and health conditions, with new audiences continually being created by recent diagnoses or immediate needs of the consumer and/or family members. For example, each year 1.6 million women become pregnant with their first child, several million people suffer from lower back pain or become depressed, and an estimated 105 million Americans have developed a chronic condition or have a chronic disease.⁸ A Health Channel might have a small number of programs with steady viewerships by the general public; other basic programs could be rebroadcast on a schedule determined by audience needs and archived in a national library for consumers with upgraded cable and Internet capability so they could be viewed or reviewed via "video-on-demand" (i.e., *whenever an individual wanted to do so*, rather than only in a specific time/date slot when it was broadcast). The Channel also could be a "filter" and guide to other Internet-based resources.

The health policy literature documents many ways in which the health of the U.S. population and health system performance fall far short of what they could be (e.g., *Healthy People 2010*,⁹ the National Committee for Quality Assurance's health plan performance measures,¹⁰ recent Institute of Medicine reports on health quality and chronic disease.¹¹) There are many areas for improvement and, in nearly all of these instances, better-informed consumers could be a significant factor in improving health and health care.¹²

In addition to basic medical information for patients with new conditions, other types of programs might be created. For example:

- For people with chronic conditions, the channel could provide *Updates* when there are major developments.
- The topics also could be practical (e.g., commissioned programs by *Consumer Reports* concerning wheelchairs or insurance options, or briefing new seniors about their Medicare rights).
- The formats could vary (e.g., for different groups, interviews with people like themselves, or call-in shows hosted by trusted physicians and/or interviews with leaders in a field).¹³ Rather than standard 30-minute or 60-minute programs, there might be a series of mini-videos that also would be especially suited to a Web site (e.g., demonstrations of how to help family members in wheelchairs transfer safely and how to care for a bedridden patient, or a demonstration and parts list for how to construct a good wheelchair ramp). There could be discussion formats with health and science journalists like *Washington Week in Review*, or travel-based shows, like Charles Kurault's *On the Road*, looking at new devices for people with disabilities, supports for independent living, or cross-fertilizing ideas from innovative programs around the nation.¹⁴
- The level of information could vary, from simple and authoritative presentations of existing knowledge to rigorous discussions of treatment options and issues such as

how consumers with life-threatening illness should evaluate *U.S. News & World Report* rankings of hospitals and other emerging report cards.¹⁵

- The information needs of many different audiences, rather than the size of the audience for any single show, would generate programming. Thus, patients with relatively rare diseases, scattered throughout the country, could receive information and support.
- An accompanying Web site could be structured in a user-friendly manner. Archived videos could be offered in different languages including basic English and made accessible for people with disabilities to access using computer-based aids. Written information could also be spoken aloud (voice over text or with a visible speaker) for people who prefer to absorb information aurally.
- The Web site could be designed to allow consumers to have personalized home pages displaying messages and links relevant to their individual circumstances. Similarly, a physician, nurse or other provider could set up customized home pages for patients (e.g., by their conditions, language and literacy level, or other special needs). The design of personalized home pages could be shaped by research that identifies the information that people *most* need to hear, but are not hearing. For example, annual eye examinations for diabetic patients have been identified as one of the most cost-effective and needed steps to improve health quality: an *Alerts* heading at the top of the consumer home page for diabetic patients could display this warning prominently.¹⁶
- Packets of material from the Web site could be printed for patients (and customized further, if desired) at a provider's office.¹⁷
- There could also be national and community-level information. For example, a C-SPAN like component could permit rapid, high-visibility, national distribution of new measures, research, and programs concerning health quality, support sustained journalistic attention to these issues, and increase the effectiveness of groups committed to health quality. National goals in *Healthy People 2010* (probably unknown to most Americans) also could be presented, with scheduled follow-up reports that help build momentum. The channel also could reserve specific slots for state and local programming related to *Healthy People 2010* and other health quality initiatives. Community-level discussions could be scheduled that assist consumers in finding entry into the local health system (e.g., interviews that introduce the people to call for help with alcoholism or abusive relationships, or the addiction problems of a family member, or to discuss claims rejected by Medicare and appeal rights.)

The program ideas described above are intended to stimulate discussions of the possibilities for what a national Health Channel could do. More ideas appear in Appendix A. Focus group meetings with health-oriented groups and consumers could likely multiply these program ideas and audiences, and would be an essential part of developing a business plan for a national Channel. But the fact that virtually none of these ideas are now the basis for television-broadcast programs - even for customers who have 250 television channels - is an indicator of what the future may hold for consumer-focused broadcasting and of how far the current reality falls short of such a future.

TECHNOLOGY & DISTRIBUTION

A national Health Channel can use a changing mix of telecommunications technology that reflects the changing options and choices of consumers. At the moment, for consumers, the available communication options will depend on the evolving business strategies of companies that serve their areas. As new technologies and competition evolve, however, most consumers will be able to choose their programs from several sources.

For a consumer-oriented health initiative, the most important technological developments will be: 1) upgrades of capability to homes (“broadband”) that will deliver hundreds of standard television channels and potentially thousands of Internet television channels; and 2) the integration of this upgraded (digital) communication technology with high-speed Internet-based interactivity to permit easy user-initiated access, on demand, to video archives and other on-line health information.

At least six major types of communications companies are vying to build and sell upgraded (wireline and wireless broadband) communication capacity to consumers. Each may differ in their role in a national Health Channel depending on a number of key differences in their technologies, public regulatory positions, and competitive market strategies vis-a-vis each another.

At this time, the two leading candidates/technologies for national Health Channel broadcasting are: cable companies, which are upgrading their capacities; and Direct-Broadcast Satellite (DBS) companies that operate fixed-orbit (geosynchronous orbit) satellites (e.g., DirecTV). A third major group of competitors is the telephone companies that are offering high-speed upgrades to their existing lines through Digital Subscriber Line (DSL) technology.

Soon, these broadcast options will likely be increased by the following types of companies: cellular telephone companies that will offer expanded networks and Internet access, and video-equipped cellular telephone hybrids, sometimes called 3G (“Third Generation”) cellular;¹⁸ companies using Low Earth Orbit (LEO) satellites, the new Internet-in-the-Sky system of 288 low-earth-orbit satellites to sell wireless broadband services, including telephone, Internet, and Internet-TV broadcasting, at competitive prices in the US and globally (e.g., Teledesic’s of Bill Gates et. al)¹⁹; and traditional television channels, the dinosaurs of the information age with their analog technology, which also can carry digital broadband in their frequency spectrum and which seem about to bestir themselves as they steadily lose market share.

Another type of potential entrant is a partnership of municipalities with their local electric power utilities. Several score of small and medium-sized municipalities have started to build fiber optic networks for all of their residents as regulated public utilities, typically in alliance with local electric power companies (who already have rights of way, trucks and crews, etc.) These municipalities have judged that fiber optic cable can be installed less expensively, more universally, and more rapidly than waiting for cable and telephone companies. The new fiber optic nets can be underwritten by municipal bonds and are freed of the requirements to pay off the old-technology coaxial cable investments of cable companies. About 5% of the nation’s public power utilities have built telecom networks.²⁰

Several points are noted below about these major players and technologies that may be helpful in forecasting options for a Channel.

Traditional Television Broadcasting

Commercial Broadcasters

The three old-time commercial TV networks (NBC, ABC, and CBS) are not major players (yet) in the new communications revolution. In the United States, the Federal Communications Commission (FCC) has allocated a substantial portion of the frequency from 54 MHz to 806 MHz for their traditional analog television technology, the VHF and UHF broadcast channels 2-69.²¹ Currently, about 200 local broadcast stations are affiliated with each of the national television networks. Their major advantage for a national health/communication strategy is that nearly all American households have access to these channels with a TV set alone. A drawback to expanding analog broadcast television technology for a new Health Channel is that new broadcast stations in each urban area are expensive and require regulatory approval.²² Commercial networks and their local affiliates also are unlikely to carry many health-related programs unless the broadcasts are sponsored by advertisers (e.g., drug companies.) Nevertheless, it might be worthwhile to explore a partnership with local television stations that have a strong community service orientation and/or seek programming for non-English viewers (e.g., Spanish-language stations, which might carry health programming in Spanish if it were available to them without charge).²³

Public Broadcasting

The current national public broadcasting system (PBS) links 347 local stations. It was established through foundation initiatives and government support. PBS channels (which are included in all cable TV and direct-broadcast satellite packages) have the potential to reach 99% of households. The daytime programming of many PBS stations also has many reruns of “babysitter” programs and might be available for new health programming, particularly for growing retired and elderly populations who are potential daytime viewers. However the economics of PBS - a heavy reliance on local viewer contributions via local stations - now limits the ability to move beyond a narrow base of market share and financial support.

PBS has recently taken a step forward to launch “wireless PBS” to transmit content directly to Personal Data Assistants (e.g., Palm Pilots).²⁴ If it were to add a major investment - perhaps with a foundation-supported move into direct-broadcast satellite (DBS) technology to homes? - an upgraded PBS system could become a vehicle for a national Health Channel and support visionary national broadcasting initiatives in many fields. In the past decade, we have seen what the low-cost public Internet technology can mean to the country; a “free” national DBS service for nonprofit initiatives might call forth creative imagination and have many benefits as well.

Direct Broadcast Satellite (DBS) Companies

The newest major players are DBS companies (e.g., DirecTV and EchoStar's DishNetwork) who provide 200+ television channels, 30+ CD-quality music stations, etc. to about 16 million US households via small satellite dishes.²⁵ DirecTV's subscribers (10 million) already make it the third largest of the new national networks. DirecTV forecasts that the cable industry has already peaked and that DirecTV will serve 30+ million households by 2005.²⁶

In the near future, a new DirecTV satellite will bring its broadcasting capacity across six satellites to about 750 national channels and will bring spot beams with different programming to dozens of different local markets. EchoStar has a capacity for 600 television and digital music channels on six current satellites.²⁷ Both EchoStar's and DirecTV's satellites are being linked to provide Internet broadband (e.g., a joint venture of DirecTV and American Online) and can offer video-on-demand. At first, a future of millions of homes with small dish antennas alongside the house may seem unlikely, but many readers will remember that, in the early days of television, many homeowners had roof antennas. Installation can be free and subscription rates are competitive with cable.

Cable Network Operators

Another fast-moving technology is cable upgrade. The largest companies are AT&T Broadband cable, including MediaOne, at 15.9 million viewers and AOL/Time Warner cable at 12.8 million. Other key cable network operators are Comcast (7.7 million), Charter (6.3), Cox (6.2), Adelphia (5.7), and Cablevision (2.9).²⁸ The industry is investing \$10 billion+/year to deliver higher capacity broadband & interactive cable with 100+ channels (and 250+ channels with digital upgrades, depending upon the geographic area). Contrary to the forecast by competitor DirecTV, the cable companies advertise themselves as moving from 12 million cable-upgraded homes in June 2001²⁹ to 48.2 million upgrades (about 48% of television households) by the end of 2005.³⁰

Telephone Companies/DSL

As noted, telephone companies can provide broadband connections (e.g., for Internet video) over ordinary telephone lines by an upgrade technology called Digital Subscriber Line (DSL). However, they have not yet shown the initiative to become major broadcast players (although they could) and the technology has proven complicated and frustrating to install.³¹ Currently, a national Health Channel cannot rely upon telephone companies and this technology. But local telephone companies have an advantage over cable companies in that the basic "last mile" copper wire connection used by DSL is already available to most homes, and the investment has been amortized in the distant past. Since DSL provides at least one high speed Internet connection, any DSL subscriber will have the Health Channel's video archives and other Internet resources available.

Distribution of Upgraded Internet Technologies for Desktop Television

It appears likely that broadband household connections to the Internet (e.g., ten to twenty + times faster than 56k modems) will grow from about 5.9% of online households in 2000 to about

26.7% of online households - about 70 million people - by 2004.³² Broadband Internet delivered by upgraded cable, DBS, DSL, or cellular/wireless technology is therefore likely to emerge as an important broadcast option.

Even before upgraded Internet capacity is available more widely, it will be useful to combine a national Channel with a Web site that archives the same information (e.g., in text or low bandwidth multimedia) and serves as a portal to other health Web sites since, as noted, a majority of households have the basic Internet technology (usually 56K dial-up modems) to access a Web site.

In sum, at least six different kinds of broadcast technologies are being expanded, with upgraded cable and/or DBS technology companies taking the lead, and they will produce a steadily growing national communications capacity for broadcast over television sets and computers. They also will upgrade the Internet with video capabilities.

Distribution through Libraries and Digital Divides

A brief comment about “digital divides” and distribution options: we have a foundation for a public information distribution system via the country’s 16,213 (main and branch) public libraries. The merits of 56K dial-up (and broadband) linkups to every home aside, public libraries are important access points for people motivated to seek serious health information.³³ The libraries also have reference staffs who, as first contacts with the public, are important and natural allies and who are able to provide observations about unmet needs.³⁴ If public libraries have broadband access, they also can help to bridge any digital divides.³⁵

COSTS AND FINANCING

This section discusses Health Channel costs (e.g., satellite and cable broadcasting costs, Internet distribution costs, programming costs), and models of financing. Most importantly, this section explains why it may be possible to arrange for the communications industry to provide broadcasting services free or at highly subsidized prices compared to commercial rates because of the public interest nature of the Health Channel’s programming.

Satellite and Cable Costs

At first, creating a national television channel may seem impossibly difficult and expensive, but it is a well-established technology that simply involves contracting for a satellite transponder, an uplink, and a downlink to potential viewers. Charges for an uplink to a national satellite are about \$10,000-\$15,000/month. PBS, for example, has spare channel capacity on the GE-3 satellite that can be leased for \$15,000/month for a year’s 24 x 7 lease which is more economical beyond about 3 ½ - 4 hours/day of programming. However this lease, in itself, would be an unsatisfactory solution for the Health Channel because household reception requires a large and expensive dish or a downlink dish at a cable company and further distribution via its cable system.

Until Internet broadband grows, the key issue for the proposed Health Channel is the cost of distribution to households, via cable or DBS operators. In the current communications market, if a company or organization (e.g., AARP or a national Health Channel sponsor) came to a DBS or large cable company with a proposal that it carry a new channel, the companies would normally ask for a payment, usually based on the broadcaster's subscriber base. The launch of a new channel as a nationwide commercial venture, based on paying the recent asking prices of DBS or cable companies, would be several hundred million dollars to buy distribution.³⁶

Ideally, it may be possible for the Health Channel to obtain broadcast distribution free from DBS and/or cable companies because of the public interest nature of the programming. In the past, DirecTV has set aside 3% of its channels, allocated annually on a competitive and renewable basis, for public interest initiatives at about \$10,000/month.³⁷ The cable industry has voluntarily supported public interest projects in lieu of regulation (e.g., 540 hours/month of educational programming and CSPAN).

A Health Channel will have a good case to be considered in the public interest. We know that people seek health information at high rates (55% of those with home access to the Internet have searched for health information, a higher percentage than use the Internet for e-commerce purchases). They are serious about wanting it (70% went online most recently for information about a specific illness or condition and 54% look for information for somebody else).³⁸ They want reliable information and are unsure about what they find; they want privacy and are mistrustful of Web sites they visit. A high-quality national Health Channel, organized by leading and trusted national institutions that people will instinctively consult, can meet these needs.

Another entrée to obtain free public access, besides national -level support from the DBS or cable industry, would be to seek public interest access regionally. It may be easy for a nonprofit Health Channel, supported by major national or regional organizations, to get cooperation from cable companies in areas where there is a strong government regulatory philosophy vis-a-vis cable and the public interest. The New York City market is one such place. AOL/Time-Warner has some 6 million cable subscribers in this market alone and, as a fully integrated company, may be amenable to combining Internet and broadcasting as part of a health package. Alternatively, under-used capacity may be available on some public use channels (e.g., local government, education channels).³⁹ Another possibility is to bring the Health Channel before local regulatory bodies who mandate local-access and other set-asides as a condition for the local monopoly that cable operators enjoy.

Even if it is not possible to obtain free distribution, a group of organizations working together with a joint negotiating strategy should be able to obtain much more favorable rates than current commercial rates. It is an increasingly competitive and changing market, and all numbers are negotiable. Since both DBS and cable systems offer similar delivery capacity (number of channels, Internet upgrade options) and similar program packages, there will be intense competition to be the first to sign-up a customer for the new technologies. DBS companies (today's GEO- satellites and tomorrow's LEO- satellites) have an inherent competitive advantage over cable because they do not have to install and maintain coaxial and fiber optic cables to each subscriber. DBS is the greatest immediate challenge to the semi-monopoly position of the cable companies, and if cable companies were initially reluctant to carry a Health Channel at a reasonable price, one promising strategy would be to start with DBS companies and then let the

competition between the satellite and cable companies lead the cable companies to more favorable terms.

It is worth knowing that annual revenue from DirectTV's current 320 channels is about \$5 billion/year. At this point, the investment is an extraordinary "cash cow" and the two DBS companies are not strapped for funds.⁴⁰ (DirecTV will spend about \$200 million for its newest satellite, which will provide an additional 465 channels, less than \$500,000/channel).

The judgment that the cable and DBS operators will want to compete for the business of the national Health Channel is supported by several considerations:

- 1) The viewing audience in each time slot is relatively stable. The for-profit broadcast companies are running out of new ideas for unique cable and/or DBS channels that viewers want to watch, that will fill the hundreds of time slots, and attract new customers to their services. Today's original ideas seem to appeal to small niches, especially to justify 24 x 7 national slots (e.g., The Puppy Channel; Children's Fashion Network).
- 2) There is nothing like the Health Channel on commercial television. If a Health Channel could show that it had unique programming that would attract a lot of viewers - particularly among demographic groups the DBS or cable company is targeting - this might affect the equation: Assume the basic DBS or cable charge is about \$30/month, and an upgraded package will double the revenue per subscription. Thus, a new DBS or cable customer or upgrade customer is worth an extra \$360/year to a company that has primarily fixed costs. If the national Health Channel can shift 100,000 subscribers, that is \$36 million/year of revenue to the company that carries it.
- 3) Eventually, audience interest and revenue from the many movie and television-serial re run channels are likely to fall. Also, Hollywood film companies will shortly begin to take advantage of the Internet's video-on-demand capacity and offer their motion pictures directly over the Internet to customers with broadband upgrades, i.e., if you have any broadband Internet link, you will not need to subscribe to Home Box Office on cable to see a recent movie, and Hollywood does not need to pay the middlemen either. (In fact, in the long-run, consumers may not need technologies that deliver 250+ channels simultaneously to their dish antennas or their wall-outlet cable connection. All that they may need is one good broadband Internet connection that can switch quickly to any source in the world.)⁴¹
- 4) It might be possible to include a Health Channel as a "mini-premium" channel on some distribution routes. If, on a DBS satellite, 6 million households felt that the best and latest medical information was worth \$0.60/month (\$7.20/year), the result would be \$43+ million/year in revenue. Or if 20 million households were willing to spend \$5/month for a PBS package of add-on public channels via cable and DBS, that package would generate \$1.2 billion/year.

In sum, it may well be possible to have broadcast distribution costs for the Health Channel underwritten by the cable and DBS operators or heavily subsidized by them depending upon the plan developed, the case that is made, and who supports it.

Internet-Television Distribution Costs

Broadband upgrades will take the “streaming technology” of the Internet - that now provides a painfully jerky and murky 3" picture over a standard 56K dial-up connection - and turn it into a reasonably good approximation of television at 400K-500K/second broadband. A prototype for global research colloquia, developed at Yale Medical School, suggested that a good (and humane!) current use of streaming technology is audio + slideshow lectures or demonstrations; or simply audio alone (which compresses well to about 5K/second for human voice.)⁴² Internet Webcasting/television and video-on-demand will get better, and it is worthwhile to include a steadily growing use of this technology as part of a package.⁴³ All costs of Internet distribution technologies are negotiable, especially for large users and long-term contracts; and even more negotiable in the long term.

For illustrative purposes, Appendix B outlines cost components and provides some cost estimates. If programming is developed by other organizations, it is straightforward to structure a click-through from a Web page or Webcast to the other site or its Webcaster, in which case the other organization bears the cost of the encoding, online storage, and download charges for consumers who want to view their material. Those organizations also thereby acquire visitors to their sites. Similarly, other Web sites that today develop medical information and keep it current could reduce their costs by mirroring some or all of the content from the Health Channel Web site, and would thereby help distribute the Health Channel’s content more broadly.

Programming Costs

The program development costs for a national Health Channel could vary tremendously. A budget would need to be determined after ideas are gathered and considered, current sources of programming are assessed, and levels of funding and divisions of responsibility are discussed among interested institutions. Almost any national organization or foundation committed to assist people with specific conditions might be interested in producing programming in its area and having online links from a channel site to its own site.⁴⁴

Original programming can vary considerably in cost, as illustrated in Appendix C. It would be possible, for example, to spend \$100,000+ to develop a single program, translate it into several languages, and build an on-line home page for the specific condition.

An interesting model is the initiative of the Annenberg Foundation and the Corporation for Public Broadcasting, a 168 hours/week (24 x 7) national channel for the development of excellent teaching in public schools. The cost of the channel, including programming & Web site, is \$14 million/year, a commitment made by the Annenberg Foundation for five years, and renewable for another 15 years.⁴⁵

Financing Models

A Health Channel could be financed in many different ways as illustrated in Table 1 (below). They are not mutually exclusive. Many organizations and individuals may want to

participate. While there can be user-fees and/or cost-reimbursement, I have not outlined for-profit options which seem unlikely to succeed or meet consumer needs.

Table 1	
Existing Broadcast Financing Models	
C-SPAN	National industry pays. Programming & distribution fully paid by the cable industry
Public access	Local cable companies pay. (Federal law permits local franchising authorities to create obligations for public access, education, and governmental channels as a condition of licensing.)
www.research.com	Program initiators pay. University of Washington consortium for research universities which supply programming in standard format at their own expense and pay \$10,000 - \$30,000 annual fees for rights to uplink their research conferences and programming for national distribution on DirecTV (w/ several repeats/program) and a video-on-demand Internet archive. (Includes partial cost pass-through to NSF and other grants.)
Commercial TV	Advertisers pay.
Basic cable	Consumers pay for subscriptions and pay-per-view
PBS	Government pays + private/corporate philanthropy pays + mix and match: elements from all of the above. ⁴⁶

ORGANIZATION AND GOVERNANCE

A range of options for organization and governance are outlined in Table 2. The model chosen will undoubtedly be influenced by the source(s) of funding.

Table 2

Alternative Organization/Governance Models

Foundation Organizer	Single non-profit organizer. Provides funds and leadership for initial operations, signature programs and grants for other programs. Invites outside participation at its discretion. After an initial period (3 years?) possible spin-off with its own Governing Board.
PBS-II	PBS affiliate. Core support for a new PBS-II channel, an independent Governing Board, and (later) selective program funding. Uses our institutions (including local stations) previously established for national public-interest broadcasting.
NIH Channel	NIH initiative. Develops a national Health Channel with input and funding from all Institutes. Draws upon crossroads conferences at NIH and (as part of the doubling of the NIH budget) makes new grants and provides add-on funds to develop peer-reviewed programming.
Consortium	Major players share governance (e.g., www.research.com). A lead foundation arranges umbrella contracts with cost-reimbursement from an (invited) group of leading institutions, who make decisions for their x hours of broadcast capacity.
Umbrella Contract	Board holds unreimbursed contract. Open application process with peer review and ranking. Grants of airtime by ranking as slots permit. Grantees supply programming at their own expense.

PBS - II

One option could be a partnership with the Public Broadcasting System, to begin a PBS-II channel, similar to the Annenberg/CPB initiative to upgrade the quality of teaching. A consumer-oriented national Health Channel initiative would be a core of the PBS-II channel. It is the kind of public interest project for which PBS was created and would have a high likelihood of being picked-up quickly by cable systems. The expansion might be acceptable to Congress and the current Administration if it were user-funded, supported by a wide range of leading institutions, and explicitly envisioned to help institutions work together to achieve national medical quality goals (such as Healthy People 2010). The initiative has the practical advantage of using

broadcasting institutions, facilities, and experienced people and providing a national network of local stations that can help with local programming.

This PBS-II option also has the advantage, if there is not 24 x 7 initial programming for a Health initiative, that it can be a de facto Foundation Channel that permits other foundation programs to share part of a national channel for low-risk experiments and innovative programs, and to accelerate national progress in their areas.

NIH Channel

There may be a major role for NIH and for other public agencies (e.g., an *AHRQ Reports* series developed by the Agency for Healthcare Research and Quality's remarkable Evidence-based Practice Centers).⁴⁷ Each NIH Institute is an international crossroads of state-of-the-art lectures and conferences, and NIH has excellent capabilities to record this programming and to serve as a splendid capture point for the best and latest information at low marginal cost.⁴⁸ And it should be a simple matter, since the NIH budget is expected to double, for NIH Institutes to provide peer-reviewed grants to other institutions to select their conferences of national interest for consumers, or develop new health programming and make it available for a national channel and Web site. With the doubling budget, and growing interest in genome-based research, this may be an excellent historical opportunity to build a continuing flow of strong, science-based programming. If this worked well, even in several areas, foundations could use their own resources more economically to fill-in whatever gaps remain.⁴⁹

Furthermore, at NIH, the National Library of Medicine has created *MEDLINEplus*, building upon its MEDLINE database to provide free state-of-the-art medical information to the public (www.nlm.nih.gov/databases/freemedl.html). The library's online services now support more than 250 million searches/year, almost 1/3 of them from the general public.⁵⁰ Several Institutes (e.g., NCI) also have developed very good Internet sites for the public. These could contribute to a full package of information resources. NIH/NLM search specialists also may have unique experience and competence to understand the range of search strategies used by members of the public, and to provide both information that members of the public are seeking, and that they probably should know but may not request.

Other Considerations

One important consideration is to define the mission of the Health Channel and structure governance accordingly. There is sobering historical experience with the processes by which American health quality improves. As Michael Millenson notes in *Pursuit of Medical Excellence*, simply publishing a rational analysis or information seldom produces the rapid change that the authors of the studies believe is warranted.⁵¹ Today, we can introduce a new variable: new national communication capacity that can provide high-visibility, regularly-scheduled programming and national linkups, on-line video archives, and the best and latest information directly to consumers. But the most effective uses of the Channel remain to be discovered.

A Health Channel needs to be governed so that it can be as purposive, rigorous, and empirically-grounded about its own effectiveness as it expects other institutions, and a national

health system, to become.⁵² Thus, from the options in Table 2, it may be wiser for high-profile nonprofit organizers that are committed to health quality and consumer empowerment to play a leading initial role, even if they eventually use several of the models for parts of the channel and/or hand-off parts of the initiative to public institutions (PBS or NIH) which might be permanent homes.

A related question is whether the national health information strategy should be incremental or organized to create high-visibility, bold and focused action, and rapid implementation. Traditionally, many institutions innovate slowly and incrementally - and this would imply moving gradually “toward” a national Channel (i.e., which may never arrive) via expanded Web sites, video-on-demand programs, augmenting health reports on existing channels or shows (*Oprah*, *Good Morning America*, *PBS News Hour*), etc. By contrast, the strategy of securing a 24 x 7 satellite channel can capture imaginations, call forth partnerships and resources, create agendas, and build consumer/civic movements more quickly. One fundamental issue is whether there is enough interest and willingness to fund a Channel at a level that will accelerate a national movement for health quality, including altering the behavior of institutions and systems (rather than, for example, simply providing convenient library-like functions with new technology).

Another question is the desirable balance between national and local focus. The history of PBS suggests, *inter alia*, that alongside national-level plans and coordination, there may be important roles for initiatives that develop in specific cities or states. Within PBS, certain stations (e.g., WGBH, Boston; WNET, New York; WQED, Pittsburgh; WETA, Washington; WTTW, Chicago; and KCET, Los Angeles) became leading production centers and national resources whose series, and ability to attract underwriters for good ideas, helped to build the vitality of the system.⁵³ It could be important to structure governance with this experience in mind.

APPENDIX A

EXAMPLES OF TYPES OF CONSUMER-ORIENTED HEALTH PROGRAMS

New Illness Diagnoses

Diabetes: Information for New Patients (e.g., a three-part series)

_____ Cancer: Information for New Patients

Alcohol and Drug Abuse

Depression

New Conditions & Life Cycle Issues

Becoming a Mother for the First Time

Your Child, Year One

How to Choose an HMO

Aging Society: Building Community Care Options (*On the Road* format?)

Preparing for Retirement (home improvements, evaluating your insurance)

Chronic Conditions: New Information

Independent Living: new devices for the handicapped

Living with _____ (could include patient interviews, perhaps targeted to different groups, with people like themselves). [It may be especially important to have these programs for rarer conditions as local support groups and information may not be readily available in many communities.]

Local Programs (incl. local access)

(Interviews with local shelters for women, representatives of AA and other programs.

Health information programs at local hospitals.)

First-Aid/How to Be Your Own Doctor Sometimes (Red Cross sponsorship?)

Basic first-aid - and when to call a doctor

Targeted information for different groups: First-Aid for New Parents; First-Aid for Summer Vacations.

Consumer Reports (a wide range of commissioned studies: wheelchairs and wheelchair ramps; lift chairs; new devices for the handicapped; health insurance; selecting a nursing home for quality)

Self-Help

Smoking

Weight Loss

Family Members: Drugs and Alcohol

Depression

Appendix A (continued)

Managing Stress

T'ai chi & other morning exercise classes for seniors (AARP sponsorship?)

Government Information & Rights

Medicare/Medicaid Rights (including call-in)

Health Benefits for Children in Poverty

Assistance for the Handicapped

Updates - Science Journalist Roundtables

NIH conferences

Medical Update (weekly - all topics - e.g., Washington Week in Review/Wall Street Week)

New Developments in Women's Health

Health Issues for the Black Community

New Developments in _____ (as needed - e.g., Breast Cancer, AIDS)

Body-Mind Update

Quality & Consumer Awareness

Healthy People 2010: key national conferences, state & local discussions & annual progress reports for consumers/citizens

Local strategy planning conferences for public health planners and educators in an urban area or region (e.g., NYC).

Health Quality CSPAN: new developments in health indicators, report cards, research findings and program innovations that deserve wide and rapid dissemination. [This also could support physician awareness of the results, as they also will be available to physicians, and the programs could become a source of questions from patients.]

Policy Choices for Health Quality

Selective CSPAN-like coverage of relevant hearings in Washington. (Possible partnership with www.kaisernetwork.org.)

Feedback and Planning

Evolving the Health Channel - a series of ongoing research discussions concerning the national health information infrastructure and systems, health quality outcomes, and lessons.

APPENDIX B

INTERNET COSTS (INCLUDING WEBCASTING & VIDEO-ON-DEMAND)

I. Basic Web Site	
500 megabytes online	\$100/month
+ 50 GB/month of transfer	
II. Webcasting & Video-on-Demand (assumes 500 hours of programs)	
Basic Webcasting contract (incl. basic 200 megabytes of on- line storage & 20,000 MCGA- bytes of user transfer)	\$1,300/month
+ Initial Sure stream encoding @ \$3/minute x 500 hours	\$90,000*
+ Addnl. online storage (startup of 20K/second files only = 500 hours @ 9 megabytes/file)**	\$1,730/month
+ 40,000 hours/month of consumer downloads @ 9 megabytes/hour= 360,000 megabytes/month	\$9,520/month

*If outsourced. Costs are steeply reduced by an in-house encoding lab.

**Most programs will not be 1-hour - e.g., 30 minutes, or 5-minute clips, etc. Until broadband is more widely available, the maximum encoding might be 20K-only files suitable for 28.8 modems and close to the real transfer rate of most 56K dial-up modem users. The size of files is multiplicative: a 100K/second file would require 45 megabytes of storage and 45 megabytes of transfer. As a practical matter, however, I would recommend audio + slideshow & text formats (e.g., about 1.5 - 2 megabytes/hour) as the most user-friendly way to use Internet video-on-demand in the near future. This also reduces storage and transfer costs proportionately. All charges are negotiable, especially for large users and long-term contracts.

Appendix B (continued)

Costs for Internet Streaming Video and On-Demand Retrieval

Charges in 3 categories:

1) Encoding. From standard videotape, \$1 - \$8/minute if outsourced, or can be created at in-house labs. If outsourced, 500 hours (@ \$3/min = \$180/hour) would cost about \$90,000+ depending upon the complexity and number of files to be created (e.g., one 20K/second file, a 34K/second file, a 100K/second file, etc.) Equipment and RealNetworks software for an in-house encoding lab would probably be about \$5,000.

2) On-line archiving. Online storage depends upon the number and size of files for Sure stream Webcasts. A 1 hour presentation that delivers 20Kb/second (suitable for 28.8K users) is about 9 megabytes (if only audio + slideshow, perhaps 2-3 megabytes); a 34 Kb/second file (recommended for 56K modems) is about 14 megabytes; a high-end (e.g., for broadband users) of 100 Kb might be 45 megabytes for 1 hour. Archiving charge is a \$1300/month base rate for the first 200 megabytes, plus \$10/month for each additional 100 megabytes. Five hundred hours of programming, encoded at 20K (9 megabytes/hour) = 4500 megabytes = \$1300/month (base) + (43 x \$10 = \$430/month) = \$1730/month for on-line storage.

Archiving charges depend upon the amount of storage, not the number of files. For example, 1500 programs of 20 minutes each still would cost \$1730/month to store.

3) Transfer charges. 20,000 megabytes/month of user transfer is included in the basic \$1300/month rate. Beyond this, the charges are 0.03/megabyte till 50,000 megabytes of user transfer and fall to 0.01/megabyte for more than 10 million megabytes of transfer. For example, if 40,000 people/month view 9 megabyte files, that's 360,000 megabytes @ 0.028/megabyte for the 340,000 megabytes above the base or \$9,520/month.

All charges can be negotiated and can be lower - e.g., if there is a guaranteed minimum, a long-term contract, etc.⁵⁴

APPENDIX C

SAMPLE PROGRAMMING COSTS

<i>Annenberg/CPB</i> 24 x 7 national channel, incl. programming ⁵⁵	\$14,000,000/year
<i>Washington Week in Review</i> ⁵⁶ (Professional production staff, weekly)	\$15,000/week
<i>Nova</i> -quality PBS, 30-minutes	\$150,000 +
Commercial-quality television series, 39 weeks Production costs + pilot ⁵⁷	\$4,300,000
Academic medical lecture - one hour 2 man-hours, original set-up & recording + 1.5 hours to digitize audio, + 0.5 hours to digitize 15 -20 slides = 4 hours @ \$65/hour	\$260
CSPAN panel discussions - one hour incl. more than one camera, lighting, light editing: \$650 + encoding at \$3/min	\$830
NIH Conference on Women's Health (4 hours, plenary sessions)	N/C

ENDNOTES

1. Discussion paper prepared for the Health Insurance Reform Project supported by the Robert Wood Johnson Foundation. Lloyd Etheredge was a member of the MIT faculty for eight years and, later, Director of Graduate Studies for International Relations at Yale. As Director of an International Scientific Networks project, he helped to develop early uses of the Internet for science and international cooperation (www.policyscience.net). He is currently writing a book on innovative uses of new communication technology. Comments are welcome: (301)-365-5241 (voice); lloyd.etheredge@yale.edu (E-mail).

2. John W. Wright et al. (Eds.) *The New York Times Almanac 2001* (New York: Penguin Books, 2000), p. 393.

3. Internet data from November/December, 1999 reported in Mollyann Brodie, Rebecca E. Flournoy, Drew E. Altman, Robert J. Blendon, John M. Benson, and Marcus D. Rosenbaum, "Health Information, the Internet, and the Digital Divide" *Health Affairs*, 19:6 (November/December, 2000), pp. 255 - 265, p. 256. Above age 60 Internet access drops to 24%.

4. Theresa Foley, "DirecTV Proceeds With a Local-Market Plan," *The New York Times*, August 13, 2001, p. C4. There were 11.4 million direct-broadcast subscribers at the end of 1999.

5. For the roller-coaster experience of for-profit sites, see James C. Robinson, "Financing the Health Care Internet," *Health Affairs* 19:6 (November/December, 2000), pp. 72 - 88 and Stephen T. Parente, "Beyond the Hype: A Taxonomy of E-Health Business Models," *loc. cit.*, pp. 89 - 102. As Robinson notes, by June, 2000 twenty-one leading Internet health firms were trading at more than 80% below their previous 52-week highs, including drkoop.com (97.3% below high), [PlanetRx](http://PlanetRx.com) (93.2% below high), Neoforma.com (89.9% below high) and [MedicaLogic](http://MedicaLogic.com) (85.1% below high), *Ibid.*, p. 82.

6. For example, Susannah Fox, Lee Rainie et al., "The Online Health Care Revolution; How the Web Helps Americans Take Better Care of Themselves," online report (November 26, 2000) at www.pewinternet.org report (p. 11) that 69% of users are "very concerned" that a Web site would sell or give away information about what they did online.

Similar percentages emerge from a survey of 1,000 patients and 250 physicians conducted by the Boston Consulting Group in Sweden and Germany: consumers are mistrustful of Web advice and skeptical of commercial Web portals or online services backed by pharmaceutical companies or health insurers. Online summary of Boston Consulting Group, *Patients, Physicians, and the Internet: Myth, Reality, and Implications*, at <http://www.bcg.com>.

Concerning privacy of Internet searching, data (from 9/6/2000 - 9/18/2000) reported by the Internet Healthcare Coalition and National Mental Health Association show that 58% of the online public is "not confident that health-related Web sites are able to maintain the privacy and confidentiality of individuals who provide them with personal information." Katherine Binns, Kinga Zapert, and Blaze Blyth, "Ethics and the Internet: Consumers vs. Webmasters," a study by Harris Interactive, Inc., October 5, 2000. Online at www.ihc.net. A recent survey of 1,600 US online adults by Jupiter Communications found 75% of those seeking healthcare information on the Internet were "concerned" or "very concerned" about the sites with which they registered

sharing personal information with a third party without their permission. Cyberatlas, "Internet Health Offerings Lacking in Consumers Eyes," online at http://cyberatlas.internet.com/big_picture/demographics/article/0.1323,10101_299081,00.html.

7. The site is starting to incorporate short videos ("tutorials") and will link with the National Institute of Aging (NIA) for topics and presentations that are particularly geared to senior citizens.

8. By one estimate, 105 million Americans had at least one chronic health condition in 2000, for which total medical expenditures were \$503 billion/year. See "Estimated Number of Persons with Chronic Conditions and Direct Medical Costs for Persons with Chronic Conditions, Selected Years, 1995 - 2000." Institute for Health and Aging, *Chronic Care in America: A 21st Century Challenge*. Report prepared for the Robert Wood Johnson Foundation. (Princeton, NJ: Robert Wood Johnson Foundation, 1996).

9. See www.health.gov/healthypeople/.

10. See www.ncqa.org.

11. See www.iom.edu. For example, Mark R. Chassin, Robert W. Galvin, and the National Roundtable on Health Care Quality. "The Urgent Need to Improve Health Care Quality: Institute of Medicine National Roundtable on Health Care Quality." *JAMA* 280, no. 11 (1998), pp. 1000 - 1005; Margarita P. Hurtado, Elaine K. Swift, Janet M. Corrigan (Eds.), *Envisioning the National Health Care Quality Report*, Washington, DC; Institute of Medicine, 2001), "Box 2.2 - Examples of Areas in Which Measures of Effectiveness May Be Applied and Selected Measures," *et passim*.

12. For example, Steven Asch et al., "Measuring Under-use of Necessary Care Among Elderly Medicare Beneficiaries Using Inpatient and Outpatient Claims," *JAMA*. Nov 8, 2000; 284 (18), pp. 2325-33.

13. A good example of a targeted show is *Loveline* (on *MTV*, usually weeknights at 11:30 PM) which includes, as co-host, a physician who also is an addictive medicine specialist.

14. I understand that, in North Carolina, engineers from the Division of Vocational Rehabilitation visit the homes of elderly individuals who need assistance with disabilities, to discuss home modifications and options that will allow them to live independently. It sounds like a wonderful idea. If a host and camera crew followed-around several of these engineers, there might be a core group of usable ideas to communicate. And the idea for these home visits could - now, once it was known and seen in action - catch-on in other communities.

15. Concerning the developing capacity of new information technology to distribute rankings and (potentially) encourage improvement in institutions, as well as consumer choices, see David W. Bates and Atul A. Gawande, "The Impact of the Internet on Quality Measurement," *Health Affairs*, 19:6 (November/December, 2000), pp. 104 - 114. As they note, it is important to establish expectations for good methodology, and research that analyzes resources and

procedures as well as outcomes.

We are entering a period when an increasing percentage of an aging population will have been to college. Many are scientifically literate, have a lifetime experience with making decisions, and might be deeply grateful to know the research literature. And they may wish, as citizens, to use this information to improve health quality in their communities.

Note that *www.usnews.com* provides its hospital rankings online, with click-through links. The leading Centers typically provide online information about how patients and/or their physicians can receive second opinions, or new patients can arrange to travel to the Center for treatment. It is a useful service, as most consumers who read the rankings probably do not know whether it is possible to do this, and that it can be done easily.

16. Asch et al., *op. cit.*,

17. A cancer patient's site might include *Clinical Trials*. A site for Hip-Replacement Surgery patients could include *Wheelchairs and Ramps*; *Caring for a Bed-Ridden Patient*; *Medicare Benefits and Home Care*; etc.

Today, physicians sometimes provide pamphlets (if they happen to be available). But with the help of specialty societies, a standard packet of customized information also could be downloaded and printed by a physician's nurse for a newly-diagnosed patient. It would provide a written version of information the physician has covered briefly (so the patient can review it at home) and information that the physician might wish to provide himself, but does not have time to acquire and review (e.g., *Consumer Reports* review of disability aids and good places to buy or rent them, the types of drugs that might complicate the condition, etc.) The packet also could be customized for people whose native language is not English - and once the translation is made (I understand that New York City tries to provide for 14 languages) - it can become available to patients nationwide (or worldwide) without additional cost.

Note that the WebMD Foundation, the United Nations Foundation (Ted Turner's \$1 billion) and WHO are putting 10,000+ Internet sites (wireless, where appropriate) in 130 countries and seeking to provide high quality (translated, where appropriate) health information, (See the announcement online at *www.policyscience.net.*) There may be wider uses of translated material.

Personalized consumer or patient Home Pages also could include standard features that are not readily available on current Web sites - for example, a *Medicare Benefits* click-through. It also could organize listings of related sites by different categories than are used by standard search engines (e.g., government sites, national patient organizations, national medical organizations, commercial sites) and also indicate whether the organizations adhere to the emerging ethical and privacy codes for Internet-based medical sites: for the development of such codes, see the work of the Internet Healthcare Coalition, online at *www.ihc.net*.

The Channel's Web site could be mirrored and/or licensed and customized by HMOs for their doctors and patients.

18. Catherine Greenman, "Next Step for Cell Phones: Adding Pictures to the Conversation," *The New York Times*, January 28, 2001, p. E7.

19. DBS technology requires a clear window to the Southern sky (see www.directv.com); LEO systems will not have this restriction. There also will be growing competition among DBS/GEO and DBS/LEO providers: By the end of 2000 companies had launched over 125 low Earth orbit (LEO) communication satellites, about 350 more are scheduled by the end of 2002, Wright (2000), *op. cit.*, p. 804, although these plans may be delayed because of the recession.

An historical footnote: The early Iridium (66 LEO satellite) initiative failed as a global cellular-telephone net, but continues under contract by the Department of Defense and other large organizations: it illustrates the degree of risk in the industry, as it is not clear what people are willing to buy, when, at what price - and outcomes depend, in part, on how quickly competitors and competing technologies can move. In the US, both High Definition Television (HDTV) and Web-TV are examples of products that have not yet caught-on as quickly as their inventors have hoped.

20. David Armstrong and Dennis K. Berman, "Municipal Networks Become Rivals For Fiber-Optic Telecom Companies," *The Wall Street Journal*, August 17, 2001, p. 1 *et seq.* and online at www.wsj.com. A measure of the potential is that the cable industry has launched a pre-emptive strike through state legislatures and achieved legislative bans, in 10 states, restricting local municipalities from these initiatives.

Another example of a potential entrant: 8.) Traditional radio stations who, from a recent breakthrough in antenna design, probably can carry 6 digital channels via each frequency: P. Weiss, "Technique Puts More Data Into Airwaves," *Science News*, 159:3 (January 20, 2001), p. 37. The first interests of traditional AM and FM radio stations may be to provide new digital radio subscription services for American homes and automobiles.

The Internet domain name system has recently been upgraded to permit hundreds of millions of individual devices (including small wireless devices) to have unique Internet addresses. Concerning new standards for wireless connections, see www.bluetooth.com. Other new competitors may offer broadband links, including video, via technology similar to the new (3G) generation of cell phones, to Personal Data Assistants, and other new, small wireless devices.

21. George Abe, *Residential Broadband* (Indianapolis, IN; Cisco Press, 2000), p. 6.

22. Concerning the possibility of using radio as part of the mix: In the US there are about 4,783 AM and 5,766 FM stations - see Borgna Brunner (Ed.), *Time Almanac 2001* (New York: Information Please, 2000), p. 119. As an experiment, the Association of Academic Health Centers used a Web site to make proceedings of an NIH conference on women's health available to local radio stations for use without charge. Eventually, they were able to document audiences of several hundred thousand for different portions of the conference. A link with National Public Radio might be worth exploring.

23. However, there probably is abundant broadcast (and cable) capacity available between 2AM - 5 AM, and 91% of households have VCRs that can be programmed for time-shifted viewing. It would be highly unusual to use this capacity for a serious purpose, but it is available.

24. See www.pbs.org/wireless/avantgo/signup.

25. Theresa Foley, *op. cit.* DirecTV's subscriptions have grown from 8 million at the end of 1999 to 10 million today; the subscribers to EchoStar (DishNetwork), the # 2 DBS provider rose from 3.4 million at the end of 1999 to 6 million today. DirecTV and EchoStar have 90% of the DBS television market in the US.
26. Christine Y. Chen, "DirecTV: Hughes Hasn't Been This Sexy Since . . ." *Fortune*, 143:3 (February 5, 2001), pp. 118 - 120, 122, 124., p. 122.
27. Theresa Foley, *op. cit.*, It has launch agreements to expand later this year and in 2002, but has not announced details.
28. Source: National Cable Television Association, "Top 25 MSOs Ranked by Number of Subscribers," online at www.ncta.com/industry_overview/ . Data for March, 2001.
29. National Cable Television Association, "US Digital Subscribers in Millions," online at www.ncta.com/industry_overview/ . Data for June 1, 2001.
30. National Cable Television Association, *Cable and Telecommunications Industry Overview* (June, 2001). Online at www.ncta.com, p. 7.
31. One estimate puts DSL subscribers at 10.9 million by 2003, but it may not grow this quickly. See Cassimir Medford, "Pipe Dreams: Broadband Special Report," *PC Magazine*, February 6, 2001, pp. 143 - 161, p. 148; for a skeptical assessment see Jonathan R. Laing, "Get Wired: Why Cable Will Beat the Bells in the Race to Wire Your Home," *Barron's Online*, August 20, 2001.
32. Medford, *op. cit.*, p. 150. It is not clear that census definitions and advertisers' definitions are the same, but there are roughly 2.7 people/household and the country is divided into 108 million households. For cable estimates see the Gartner Group, cited in Medford, *op. cit.*, p. 144. The major options to expand Internet pipelines (DSL, cable, and two-way satellite) cluster at about \$50/month, with about \$200 - \$300 setup costs. All provide enough bandwidth (usually estimated at about 400K/second - 500K/second) for reasonable television (streaming video). A similar forecast of broadband growth, from NBC Interactive's strategic planning division, puts online households at 65 million by the end of 2003, with about 31% having broadband: Daisy Whitney, "Streaming Video: Six Burning Questions," *Electronic Media Resource Guide*, p. 1. Online at www.emonline.com/resourceGuide/sixquest.html.
33. A "digital divide" [that will become a "broadband divide" and then an "ultraband" (fiber-optic) divide by the end of the decade] may not be a good predictor of the Internet's impact. When there is a need, friends, relatives, and children who are online can be alert for information: 54% of current Internet use for health information is for someone else. Fox, *op. cit.*, p. 4.
34. It might be helpful to make a professional assessment of the health information that is available in public libraries. For a discussion of First Contact Officers in the context of the World Bank's knowledge management planning, see Lloyd S. Etheredge, "Global Knowledge Management for Policy: A Proposal" (October, 1997), pp. 2-3. Online at www.policyscience.net.

35. Blank CD's that can store 600+ megabytes of text and multimedia clips can be purchased for less than \$0.30 and copied for less than \$1. Once a Health Channel is underway, it would be inexpensive to create sets of CDS or VHS tapes with high quality material, upgraded annually by subscription for each library.

36. A popular channel can easily afford these charges. If the Disney Channel has 40 million subscribers, at \$1/month as its share of a premium package, Disney receives \$ 480 million/year in revenue even before it sells advertising on the channel.

37. Foley, *op. cit*

38. The 55% estimate is from November/December, 1999 reported in Brodie et al., *op. cit.*, p. 261. The shopping rate is 52%. Email is the most widespread use (91%). The Pew Internet and American Life project (data from July - August, 2000) finds similar results: 55% of Internet users search for health information and a 48% shopping rate: Fox et al., *op. cit.* See also Boston Consulting Group, *op. cit.* Cyberatlas, *op. cit.*, reports 82% of Internet searchers want disease-specific data.

39. Public access television has been highly variable in quality and viewer support. Laura R. Linder, *Public Access Television: America's Electronic Soapbox* (Westport, CT: Praeger, 1999) reports that fund-raising is a serious problem, p. 68.

40. Foley, *op. cit*

41. Rick Lyman, "Hollywood to Rent Movies Online," *The New York Times*, August 17, 2001, online at www.nytimes.com.

42. Re audio: in early August, 2001 there were 406 live television stations and 4,028 live radio stations from 120+ countries on the Internet: see <http://www.comfm.com>.

43. Current offerings can be sampled at www.broadcast.com. And www.real.com is a good site to see technology and costs: the Internet encoding software to turn a VHS tape into Internet television (Real Producer Plus) is about \$200. Like cable television, subscription-based and pay-per-view models also can be used for Webcasting and Internet video-on-demand: see Whitney (2000), *op. cit.*, pp. 3-4.

44. For consumer rankings of 159 health-related Web sites, in 28 categories see "Harris Interactive Announces Best-In-Class e-Health Websites," Press Release January 29, 2001. Online at http://biz.yahoo.com/bw/010129/ny_harris_.html. Examples of top-ranked sites are the Mayo Clinic (clinical trials and men's health), WebMD (physician directories and pharmaceutical resources), Dr.Weil.com (alternative medicine and vegetarian resources), Merck (drug information), and *Prevention* (fitness and body building).

45. *Annenberg/CPB: 2000 Annual Report*. Online at www.learner.org.

46. Set-aside obligations for local access cable channels (public, education, and governmental) are determined, under the 1992 Cable Act, by local franchising authorities. Thus if the New York City franchising authority decided that it wanted a government channel devoted to Health for New Yorkers, it could require such a channel from all cable operators in NYC. There are no specific public service obligations required by federal law for new broadband carriers, or federally-administered public service obligations for the expansion of the cable industry. Technically, a requirement to carry a Health Channel per se might be challenged in court. But a franchise authority could mandate a governmental or educational channel that would be devoted to health.

The consortium provides several replays in different time slots. Using this model, a 24 x 7 channel might only use 1/3 of its time (56 hours/week) for new programming.

47. See www.ahrq.gov.

48. See <http://www.nih.gov/news/> and, *inter alia*, entries for “What’s Happening at NIH?” (Events of Interest to the Media) (monthly), NIH Videocasting, and the Medicine for the Public Lecture Series.”

49. Affecting health quality involves changing behavior of individuals and institutions, which may have only a partial fit with the appropriate role for NIH.

50. Current usage is reported by Laura Landro, “People Power: The Federal Government is Using the Web to Open Up a Treasure Trove of Medical Information to Consumers.” *Wall Street Journal*, February 21, 2001, pp. R8, R12, p. R8. Services to consumers continue to expand, most recently with ClinicalTrials.gov.

51. Michael L. Millenson, *Demanding Medical Excellence: Doctors and Accountability in the Information Age*. (Chicago: University of Chicago Press, 1997). See also Chassin et al., *op. cit.*; Asch et al., *op. cit.*

52. For a contrary view, forecasting unintended consequences, see J. K. Kleinke, “Vaporware.com: The Failed Promise of the Health Care Internet,” *Health Affairs* (November/December, 2000), pp. 57 - 71. Mr. Kleinke believes that the inadequacy of health information is a symptom. And that a revolution of information access for consumers will exacerbate cost and utilization problems “of a health care system in which patients demand more, physicians are legally and economically motivated to supply more, and public and private purchasers are expected to pay the bills,” p. 57.

53. See Robert K. Avery and Suzann Mitten Owen, “Promotion in Public Television and Radio” in Susan Tyler Eastman, Douglas A. Ferguson, and Robert A. Klein (Eds.), *Promotion and Marketing for Broadcasting and Cable* (Boston, MA: Focal Press/ Butterworth-Heinemann, 1999). Third edition, pp. 153-174, p. 154 *et passim*.

54. Source: Jeff DeJulio, Real Broadcast Networks (interview). For similar estimates see Jan Ozer, “Turnkey Hosted Solutions,” *PC Magazine*, October 3, 2000, p. 190. Loudeye (www.loudeye.com) is a leading encoding service. Hosting and Webcasting leaders include Real

Broadcast Networks ([ww.rbn.com](http://www.rbn.com)), and Yahoo! Broadcast (www.broadcast.com). Globix (www.globix.com) and streampipe.com are companies that provide a full package, with camera crews and encoding.

55. *Annenberg/CPB 2000 Annual Report*, online at www.learner.org.

56. The costs “depend upon a ton of variables” but a series “could be done for \$15,000 - \$25,000/show.” Interview with Jeff Beiber, Executive Producer. 1/23/2000. Costs also would be affected by whether there is a partnership with WETA that uses existing public broadcast studios and personnel, whether there is a long-term commitment, etc.

57. Howard J. Blumenthal and Oliver R. Goodenough, *This Business of Television*, Second edition. (New York: Billboard Books, 1998), p. 43.