The Internet as an Information Source for Geriatricians

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Summary

Electronic storage of and access to medical data is becoming increasingly common. Advances in computer technology and telecommunications have made it possible to store vast amounts of information in databases and transmit this information rapidly to any place on the globe. At the forefront of this technology is the Internet, a worldwide computer network that links together over 10 million computers in more than 80 countries.

The Internet is an unprecedented information resource. There are tens of thousands of computers on the Internet that are freely accessible to the general public. Commercial organisations, academic institutions and government agencies are just some of the entities that can be accessed through the Internet. There are a large number of medical resources at these sites including electronic journals, online databases and search services, teaching materials, and methods for obtaining online continuing medical education credits.

The Internet offers a variety of services such as electronic mail, discussion groups and the ability to log on to and run programs on remote computers. The one service, however, that has been responsible for the phenomenal growth of the Internet is the World Wide Web, the primary focus of this article. The World Wide Web allows a user to view documents that contain text, graphics, images, and movie and sound clips. In addition, any of these elements can be linked to other documents or services anywhere on the Internet.

This article gives a general overview of the Internet and the medical resources it contains, with an emphasis on material related to geriatrics and aging. The Internet is in a state of continual evolution, and it is likely that dramatic new capabilities will become available in the near future.

1. History and Structure of the Internet

The Internet itself is somewhat difficult to describe. It is not a single network, nor does it have a well defined structure. In many respects, it is similar to the international telephone service: each country creates its own telephone system that connects with telephone systems in other countries. In a similar fashion, the Internet consists of computer networks in different countries throughout the world that are linked together, allowing them to communicate. The basic organisational unit on the Internet is the network. Local networks can interconnect through data links to form larger regional networks.

High speed telecommunication systems, often referred to as backbone networks, interconnect re-
gional networks to create national networks. These in turn link to the backbone networks in other countries. The first major backbone network on the Internet was NSFNET, the National Science Foundation Network, created in the late 1980s by the US government. NSFNET linked together computer networks at academic, research and government institutions in the US and had major links to computer networks in Europe, Asia and Canada. NSFNET was gradually phased out and, by 1995, all major Internet traffic in the US was handled by the large telecommunication companies.

The Internet is not the only large international computer network, and most computer networks are not connected to the Internet. There are several reasons, however, why the Internet has assumed such a leading role in communications. First, any computer network can become connected to the Internet. Secondly, all computers use a common, freely available set of communication standards known as the TCP/IP protocols. This allows computer systems as diverse as Macintoshes and mainframe IBM computers to seamlessly communicate with each other. Lastly, there are central registries where computer networks are given unique identification numbers (IP addresses) and names so that there is a uniform method of designating computers on the Internet. These attributes allowed the Internet to become a worldwide network by the 1980s; however, until a user-friendly method of distributing information became available, the Internet remained confined to educational and research institutions.

2. The World Wide Web

The development that sparked the explosive growth of the Internet was the evolution of the World Wide Web (WWW). The WWW is a distributed document system in which individual files, known as Web pages, can contain links to other resources. A Web page can contain text, graphics, images and other multimedia elements that can be linked to resources anywhere on the Internet. A user chooses a linked element, typically by clicking on it with a mouse, and the resource is retrieved and displayed. Text linked in this fashion is called hypertext. The layout of a Web page is specified by a file written in a language called the HyperText Markup Language (HTML). The method by which Web pages are transferred across the Internet is described in the Hypertext Transfer Protocol (HTTP). Although the WWW had great potential when introduced in 1991, its rapid growth awaited the arrival of a user-friendly program, the Web browser, for accessing and displaying Web pages. The first widely used Web browser was Mosaic from the University of Illinois at Urbana Champaign, US. This program was made freely available to the general public in November 1993. Since then, many commercial Web browsers have been introduced, but the most successful by far has been Netscape from Netscape Communications Corporation (http://home.netscape.com; see appendix).

Web browsers use Uniform Resource Locators (URLs) to access resources on the Internet. URLs describe Internet resources using a syntax that employs 4 basic elements: (i) an access method; (ii) the computer on which the resource is located; (iii) a directory path to the resource; and (iv) the file where the resource is located. For example, the Web page describing new developments at the National Institute of Aging at the US National Institutes of Health (NIH) has the URL:

http://www.nih.gov/nia/new.htm

The computer at the NIH where the Web page resides is www.nih.gov. The file that specifies the Web page is called new.htm, which is in the directory nia. In practice, many Web sites can be reached using only the access method, http, and the name of the computer. When this is done, a document is retrieved called the home page that usually describes resources at that site.

3. Medical Resources on the Internet

What does the Internet offer to the practising physician? There are hundreds of Web sites related to medicine. As might be expected, there is a large diversity in the quantity and quality of information...