King's Fund

IT & Multimedia for Health Professionals

Simon Wallace

King's Fund
Publishing
11–13 Cavendish Square
London W1M 0AN

The New Information Age

The Victorians were filled with both excitement and fear about the prospect of entering the 20th century. One Home Secretary was reputed to have said about the telephone: 'It may be very useful in America, but in England we've got too many messenger boys'.

Similarly, as we approach the 21st century, the consequences on society of the information revolution leave both experts and the general public with more questions than answers. It is likely that our culture will become more information-dependent and we will use networked broadband multimedia technology as naturally as we use the telephone.

In health care, clinical information systems, digitised imaging and telemedicine have already made their mark. Patients and the general public are asking for more information about illness and health and the new technology is increasingly being used to meet these needs. For those involved in providing this information, one scenario for the Year 2005 could be:

Information about health and illness will be available in electronic form in the home. It will be interactive and consist of video and sound as well as text and graphics. As well as general information, lifestyle advice will be personalised and linked to the individual patient record. The service will be delivered to a combined television/computer/telephone unit and will include an e-mail and newsgroup facility so users can communicate with each other. Health information will also be available on a new compact disc technology.

The challenge for health professionals is to anticipate this scenario and be able to use the technology to meet the needs of patients and the public. *IT and Multimedia for Health Professionals*[1] provides health professionals with an overview of the so-called *information revolution*. It is a simple guide to digital information, computers, multimedia, CD-ROMs, CD-Is, the Internet, the World Wide Web, cable and satellite. A more detailed report,[2] exploring the issues involved in using the new technology for health information, is also available (see page 8 for details).

1. *IT and Multimedia for Health Professionals* can also be accessed from the National Association of Health Authorities and Trusts (NAHAT) home page (http://www.nahat.net).
2. Wallace S. *The Future's Bright: The Future's Digital. information technology and health information towards the millennium and beyond.* London: King's Fund, 1996.

Digital Technology

Information and data can be described or broken down into either analogue or digital form.

Analogue technology sends information in *wave form* either down wires or via the radio spectrum. It is used in television, video and vinyl records.

Digital technology uses the binary code and defines information as *bits*. The bit (BInary digiT) is a unit of digital information represented either by the number 0 or 1. When arranged in discrete sequences, it describes information such as text, graphics, sound or video. It is used in compact discs and computers. Digital production improves quality, enables exact copies to be made without deterioration and gives faster transfer speeds of increased amounts of information over networks.

Transmission Networks

There are a variety of transmission media to carry information between users with different equipment:

Copper wire *(or 'twisted copper pair')* – forms part of the telephone network between the exchange and the home or business (the so-called 'last mile'). The data leaves the sender as an analogue signal and travels along the copper wire to the exchange where it is digitised. It then travels along the optical fibre part of the network as a digital signal to the receiving exchange, where it is converted back to an analogue signal to complete its journey to the receiver along the copper wire.

Coaxial cable – offers greater bandwidth (see opposite) than copper wire but less than optical fibre and is used by many cable television systems.

Optical fibre – offers a high bandwidth, broadband service and is able to carry large amounts of complex data at great speeds. It far exceeds the capacity and capabilities of copper wire or coaxial cable. One channel in an optical fibre is big enough to transmit the contents of the Encyclopaedia Britannica in one second. With the potential to create thousands of lanes within the same fibre, its capacity is almost infinite. A wholly fibre network will allow computer data, television signals and telephone calls, to be carried fast and efficiently, permit complete interactivity and still have capacity to spare. The main disadvantage of optical fibre in the UK is that where conventional copper wire takes over from fibre (i.e. the 'last mile' into homes), a bottleneck is created and the system slows considerably.

Wireless – wireless technologies such as radio, cellular, microwave and infrared offer potentially high bandwidth. The concept of telephone calls from mobile phones and television pictures using satellite links is common. The Microwave Video Distribution System (MVDS) is a new television delivery mechanism which uses wireless transmissions at very high frequency and could offer an alternative to cable and satellite.

Network Services

Each of the above transmission media is capable of carrying information in either analogue and digital form. Although the broadband capabilities of optical fibre are the ideal, replacing the copper part of the network is extremely costly. This had led to improved techniques of transmitting digital data over the existing copper part of the network. Examples include the following.

ADSL – the Asymmetrical Digital Subscriber Loop. British Telecom have tested this technique in an interactive TV trial.

ISDN – the Integrated Services Digital Network. It is mainly employed by business and offers a high-speed, high-bandwidth (but less capacity than optical fibre) service. It can be used for telemedicine and videoconferencing.

Bandwidth and Data Compression

Information sent from one point to another takes up space. An effective transmission network depends upon *bandwidth* and *data compression*.

Bandwidth is a measure of the amount of data that can be transmitted over a network in a specific amount of time (i.e. the number of 'bits per second' (bps) it can carry). The greater the bandwidth, the more bits of information can pass in a specified period of time. Speed of data transmission is dependent upon two factors:

- *the type of information*. For example, voice needs less than 64,000 bps, music about 1 million bps and good quality video up to 45 million bps;
- *the capacity of the transmission medium*. Copper wire has the lowest capacity and is described as 'narrowband', while optical fibre has the greatest and is described as 'broadband'.

Data compression (reduces the amount of digital data) and ***data decompression*** (reconstitutes it to its full form for playback) techniques have been developed to increase the amount of information that computer hard

disks, CDs, networks, etc. can carry. For example, the amount of digital data in one hour of video is substantial. Today, compression ratios of 200 to 1 are possible with specialised hardware and software, enabling a basic CD-ROM to hold about an hour of audio and video.

The Silicon Chip and Computers

Computers used today are either the personal computer (the PC) or the Apple Mac. Over recent years the power and function of the computer have increased dramatically. Essential components of today's computer includethe follwoing.

CPU – the Central Processing Unit (also known as the 'microprocessor' or 'chip') is the main working part of the computer and dictates the speed of the machine. A bigger chip can perform more instructions, and in theory do the same work faster. A 486 is faster than a 386 but slower than a Pentium. The clock speed measures how fast program instructions are carried out and is measured in megahertz (MHz).

Hard disk – the fixed disk where the computer stores its files and software programs permanently until you decide to erase them. Although in early 1996 computers were being sold with 500Mb of disk space, machines with 1000Mb (1 gigabyte) or more of disk space have now become available.

Monitors – the quality of the computer screen depends upon its resolution. This is expressed as the number of pixels (i.e. the smallest point on the screen) which can be fitted across and down the screen.

RAM – Random Access Memory is the computer's short-term memory and is used to run its software. Combined with the size of the CPU, RAM is an important determinant of speed. With insufficient RAM, certain software programs are either unable to run or do so inefficiently.

Computers have also become easier to operate with graphical user interfaces adopting point-and-click and drag-and-drop principles.

> **Byte** describes a measurable number of consecutive bits. One byte represents eight bits and is called a character. 1000 bytes = 1 kilobyte. 1000 kilobytes = 1 megabyte. 1000 megabytes = 1 gigabyte.

Initially PCs were only capable of handling digital data relating to text. Today, the ***multimedia* PC** has the versatility to create, store and transmit digitised graphics, voice, music and video. It is fitted with a quality monitor, sound card, video facility and a CD-ROM drive.

There has been no equivalent of the multimedia PC on the Mac platform as Apple Macs have always had inbuilt, point-and-click and drag-and-drop multimedia capability. Despite a historic technical superiority, Apple only commands 10 per cent of the market. Today, Apple is gradually marketing a series of products that will run Windows and thus allow PC software and titles to be used on their machines.

The typical multimedia PC system will either be a Pentium PC class system or the equivalent Power Macintosh.

It has been estimated that 13 per cent of homes in the UK have a PC. Over the last three years, there has been an exponential growth in computers sold with a CD-ROM drive. It is estimated that by the end of 1996, 1.2 million CD-ROM PCs will be sold, with around 80 per cent of these to the home market sector.

Multimedia and CD Technology

Multimedia is becoming the chosen method for presenting information in an entertaining, interactive and timely manner. Essential components of a multimedia presentation include text, sound, video, animation and graphics. Each of these is linked together using ***hypertext links***. The user can click on a highlighted word, picture or button and be transported immediately to another area of the application to view either text, or still image, or a video clip relating to the original text. If you are surfing the World Wide Web, this link could be anywhere on the Internet – another town, country or continent.

Such interactive capability is a key element of any multimedia application and is operated by using a mouse, joystick, keyboard or touch-screen. It allows the user to answer questions and make decisions and choices, so that no two users end up seeing the program in the same way.

Multimedia can be accessed in a variety of ways:

- floppy disk
- laser disc
- compact disc – CD-ROM, CD-I (including SD-DVD, which is not yet on the market)
- Internet
- cable and satellite.

Floppy disk

The floppy disk, or 'diskette', is capable of storing 1.4Mb of data. Today it is used for transferring files between computers and has been superseded by the CD-ROM and other more powerful compact disc technologies.

Laser disc

The laser disc was the first multimedia system to put moving video on optical disc. Its distinct advantage to date has been its ability to give high-quality, full-screen, full-motion video in almost unlimited quantities. Each laser disc is 30cm (12") in diameter and can store up to either 55,000 still images, or around 70 minutes of video, or a combination of the two. Although there are an estimated 15,000 laser disc players in UK homes, this technology has been superseded by CD-ROM, CD-I and the newer compact disc technologies.

Compact discs

Compact discs are used for data storage. Data of any kind are digitally encoded on the bottom of the disc as a series of microscopic pits representing different sequences of 0s and 1s. The disc is covered with a transparent coating and is read by a special laser beam. Examples include CD-DA, CD-ROM, CD-I.

CD-DA

The most familiar and successful form of CD technology was launched in 1982 and is called the Compact Disc Digital Audio (CD-DA), or simply the CD. Like videodisc, CDs are read by a laser beam on a reflective optical surface and will not wear out like tape or vinyl records. Unlike videodisc, CDs are smaller (12cm, 4.75") and the data stored on them is digital, not analogue. The end product is 72 minutes of quality audio on a relatively cheap and durable player.

CD-ROM

The demand for greater storage capacity has resulted in the Compact Disc-Read Only Memory (CD-ROM). Derived from the CD, CD-ROMs have the same physical characteristics, disc size and read-out mechanism. They are used for storing large quantities of digital data and, as the name suggests, are a 'read-only' medium. This means that it is not possible to store your own data. In the near future, however, users will be able to store their own information on CD-ROM. This is called WORM ('write once read many'). A single CD-ROM can hold up from 650Mb of data, or the equivalent of 250,000 pages of text, or 12,000 scanned images, and has become the medium of choice for distributing multimedia titles. CD-ROM is accessed via CD-ROM drives built into the computer. Its main weakness is the quality and amount of video it can hold. Although compression techniques and the development of double-speed, quad-speed, six-speed, eight-speed and now ten-speed CD-ROM drives have led to improvements, high-quality, full-screen, full-motion video is still limited in length and quality.

CD-I

Compact Disc Interactive (CD-I) is a compact disc format with multimedia capabilities. Launched by Philips in the early 1990s, it was one of the first all-in multimedia platforms to combine text, still and moving pictures and sound on one disc. Completely independent of the computer, a set-top box plugs directly into the television and a handset similar to a TV remote control is used. The disc can hold 650Mb of data in the form of either 72 minutes of digital audio, or 6,000 television images, or various combinations of the two. CD-I discs look similar to CD-ROMs, and a CD-I player can also play audio CD. Compared with CD-ROM, CD-I has some distinct advantages, including: good-quality video, ease of setting up and use and its fast response time. Also most people already have a TV. The disadvantages include the lack of printer and the relative complexity of developing CD-I packages.

DVD – digital video disc

The Super Density Digital Video Disc (SD-DVD) will be released in 1997. Four types of disc, each with increasing storage capacity will be available. This will range from a 4.7 gigabyte disc capable of holding as much information as seven existing CD-ROMs or over 3,500 3.5" floppy disks. At the top of the range will be a DVD offering 17 gigabytes of storage or 28 times the capacity of a standard CD-ROM. Retrieval of data will be faster and interactivity much greater. Unlike CD-ROM, up to 133 minutes of high-quality, full-screen MPEG-2 video can be viewed on either a TV or computer screen. SD-DVD drives will be 'backward compatible', i.e. capable of playing existing CD-ROM discs and audio CDs.

Standards for multimedia and CD technology

A serious obstacle to the widespread use of multimedia applications has been the lack of a common set of international, dealer-independent standards. Such a set would enable files to be interchanged, with no loss of data integrity between different computer platforms and software packages.

A range of standard file formats now exist for text, graphics, sound and video. Examples include: Musical Instrument Digital Interface (MIDI) for sound; the Graphic Interchange Format (GIF) for compressing line art and sample cartoon-like images; the Joint Photograph Experts Group (JPEG) for compressing digitised images; the Motion Picture Expert Group (MPEG) for compressing and storing moving video images.

A series of physical formats have been developed for each new CD technology. Each applicable standard

is informally named and commonly referred to as the colour of its publication's cover. Examples include: the Red Book (standard for CD-DA); the Yellow Book (standard for CD-ROM); and the Green Book (standard for CD-I).

Originally, there was a standard for Apple Macintosh, which meant Mac CD-ROMs could only be viewed on their own hardware platform. Apple Mac are now developing machines which conform with other hardware platforms (e.g. the PC).

Computer Networks and the Internet

Over the last decade, organisations have become more decentralised, and computers have become linked through networks.

A ***local area network (LAN)*** links desktop computers within a room, office or building. It connects hardware such as computers, printers and fax servers, and instead of having separate software programmes on individual computers, those with proper authorisation can share software such as word-processing, electronic mail and spreadsheets from a central source.

A ***wide area network (WAN)*** is a collection of interconnected LANs and can span cities, countries and continents. The Internet is an example of a WAN on a global scale.

The Internet

The Internet or 'information superhighway' is the largest computer network in the world; it links millions of computers through a mixture of private and public telephone lines and has a set of rules and protocols governing the exchange of information. Its strengths include the wealth of available information and that it can be regularly updated. Its weakness lies in its somewhat disorganised nature, its lack of quality control, its lack of security, delays at certain times of the day and its limited ability to use multimedia, particularly video. The Internet has a wide range of facilities, including the following:

- electronic mail
- newsgroups
- gopherspace
- the World Wide Web
- online services.

electronic mail

Electronic mail (or e-mail) is the simplest and most widely used application on the Internet. Text can be sent to anyone in the world providing they have an Internet connection and an e-mail address. It can be one-to-one or to numerous people on a mailing list.

Advantages include the following.

- Delivery is fast and avoids printers and fax machines.
- Is cheap to use, costing only a few seconds of phone time, whether it is sent locally or abroad.
- Sending multiple copies is as easy as sending one.
- Incoming mail can be easily annotated and returned to sender, or forwarded to other people.
- Can attach graphics, sound and word-processing documents to e-mail messages.

Disadvantages include the following.

- e-mail does not always get through (usually due to an error in the address).
- Not everyone checks their e-mail regularly, while an envelope on the mat by the front door will get read.

Newsgroups

Newsgroups or bulletin boards consist of thousands of groups sharing information about a wide range of interests, activities and obsessions. They are accessed by an e-mail connection and organised into topics. Newsgroups exist for different illnesses, such as diabetes and arthritis, and users can find out the latest developments and have group discussions. As a subscriber to a newsgroup, it is possible to read articles by other people; post your own articles; respond to articles; and join 'live' discussions.

Gopherspace

The Gopher system was the forerunner of the World Wide Web (see below) and still provides a unified system for accessing the wealth of information on the Internet.

World Wide Web

The World Wide Web (WWW or the Web) was developed in the early 1990s by European scientists who wanted an easier way of using the Internet. It consists of several million *pages* (known as 'web pages') of information stored on host computers throughout the world. The pages contain text, graphics, video clips, sounds and most importantly *hypertext links* to other pages. Clicking on a link item calls up the related page, which may be on the same computer, or another machine the other side of the world. The web page addresses are recorded as *uniform resource locators* (URLs), transmitted by *hypertext transfer protocol* (HTTP) and written in *hypertext markup language* (HTML).

Web Browsers: allow users to access the Web, interpret hypertext links and display web pages.

Examples include Netscape, Mosaic and Microsoft Internet Explorer.

Net Directories: provide structured entries into the mass of web pages. Yahoo *(http://www.yahoo.com)* is one of the most popular and provides a hierarchical index of the Web. Its opening menu has a link to health and within this category, topic headings include Medicine, Drugs, Diseases and Fitness.

Search Engines *(or web crawlers)*: designed to hunt specifically through the Web to track down pages that meet required specifications. InfoSeek Search *(http://www.infoseek.com)* (available on Netscape), Lycos *(http://lycos.com)* and Alta Vista *(http://www.altavista.digital.com)* are examples. By typing in one or two words describing the health-related topic, a number of 'hits' will be shown, giving the title of the web page as well as the first few lines of text. The increasing popularity of these engines has made accessing difficult and using them slow.

Bookmark: allows users to have their own directory of web page files and thus direct access. Pages can be quickly revisited and the slowness of the system avoided.

Web pages are set up for many reasons: as a public service, an academic exercise or resource, to advertise, to provide services, or simply as a means of sharing interests with others. Some pages are excellent sources of information; some are treasure troves of links to other valuable pages; and some are pure trivia. Web-browsing is fascinating, but can be a time-consuming and costly activity. There is a wealth of web pages covering health-related matters, many of which are American in origin.

Online services

One of the developing features of the Internet is the increasing number of online services. Dominated by CompuServe in the early 1990s, companies such as UK Online, America Online/Bertelsmann and Microsoft Network have entered the cyberspace battlefield, each offering their own range of services. At present in the UK, CompuServe is the biggest commercial network and provides access to world news and weather services, shopping networks, technical support areas and even the AA's road database. The shopping directory includes audio equipment, books, gifts, health products and travel. Despite the increasing number of online services available, they have not yet taken off in the UK. Argos had sold only 22 items in the first nine months it was on the Web. This was partly due to unfamiliarity, poor quality multimedia and concern about security of online credit card transactions.

The size of the Internet

Assessing the size of the Internet is difficult. Its growth has been exponential and at the beginning of 1996, there were an estimated 33.4 million Internet users worldwide, of whom 2.5 million were in the UK. Of these around one million were thought to be home users. A survey in 1995 estimated that 1,300 British households were joining the Internet each week and that this figure would increase to 4,000 during 1996.

Connecting to the Internet

There are four essentials for going online:

- a personal computer – a PC running Windows or an Apple Macintosh
- a telephone line – any telephone line will do, although services such as ISDN are more efficient for multimedia functions
- a modem – to link the computer to the telephone line
- an account with a company providing access to the Internet (see below).

The type of computer and modem required partly depends upon how you intend to use the Internet. If it is for e-mail only, then an average computer and modem will suffice. If multimedia functions are required, then a Pentium PC/Power Macintosh and a modem with a high baud rate are essential. (Baud rate refers to the speed at which a modem can process data and is expressed in bits per second.)

Users can connect to the Internet by one of two ways:

- ***Online Commercial Networks,*** such as CompuServe, have their own information service and link into the wider world of the Internet.
- ***Internet Service Providers,*** such as Demon, simply provide a 'socket' directly into the Internet with little of their own information.

The commercial networks are like a private members' room in a library. Being a member allows you to enter the private rooms to read whatever you like as well as wander around the public part of the library. Service providers are like doorkeepers to the public section – they will let you in to see the general information already on the shelves, but prevent access to the private rooms. The cost of being connected to the Internet depends on the kind of service you choose and how often you go online. For online commercial services, a monthly fee and hourly rate is charged. Internet service providers charge an initial registration fee and either a basic monthly fee or charge per minute. The standard charge for the use of the telephone line still applies for both services.

As commercial provision of Internet services is a fast-moving field, the best sources of advice, including a list of providers, are the latest issues of the popular Internet magazines, such as *.net* and *Internet*.

Cybercafés

Recently, a number of cybercafés have been set up in cities and large towns around the UK. In each café, there are a number of computer terminals which have access to the Internet. For a small fee, you can 'surf the Net' while drinking a cappuccino or a beer.

Security on the Internet

All electronic information is vulnerable to infringement. Risk of abuse and accidental destruction need to be prevented in order to safeguard an organisation's integrity and maintain the public's confidence in such a system.

However, such concerns need to be kept in context. Sending a highly confidential letter by fax or leaving the office unlocked seem obvious security issues that have been overcome. One way to secure an electronic system is to use a 'fire wall' which acts as a gateway between the organisation's network and the Internet. Staff are allowed the relevant level of access to complete their professional duties with e-mail access to the outside. Those from the outside can return e-mail but are prevented from any further access to the network.

The NHSnet has been established to employ such a scheme where NHS employees can access global information and communicate with other colleagues around the world, but sensitive local information is in theory secure. It is in its early stages of implementation.

Cable, Satellite and the Telecommunications Industry

Cable and satellite are an alternative to the traditional, terrestrial TV channels of the BBC and the independent television companies. They also offer an alternative telephone service to British Telecom and Mercury. Their importance to health professionals is that they will eventually offer a broadband delivery medium for health information.

At present, the cable industry is supported by government legislation to build and implement a broadband, broadcast telecommunications network. British Telecom and other national telecommunications operators have been banned from transmitting broadband entertainment services (cable TV) on their telephone network until 1998 and actually providing them until 2001.

The satellite industry is dominated by the TV channel BSkyB, which broadcasts on the ASTRA satellite system.

Towards the Millennium and Beyond

The traditional use of analogue technology in telecommunications and broadcasting will increasingly be replaced by digital technology. This will allow different types of equipment such as computers, telephones and televisions to merge into a single interactive TV, as all three devices will be essentially performing the same function – processing bits of data. The pace at which this occurs will depend upon cost (to both the industry and the consumer), consumer demand and the various regulatory authorities (e.g. Office of Telecommunications and the Independent Television Commission).

Transmission networks

Transmission of large amounts of complex data at high speed with a large element of interactivity will demand a broadband transmission network. Although a wholly optical fibre network would be the ideal, the cost of such an investment is somewhat prohibitive and dependent on a high financial yield. It is likely that ADSL and ISDN on the present copper network will be incremental stages to the ultimate high bandwidth optical fibre or radio network of the future.

Over the next 10–15 years, it is likely that networks delivering telephone-only services will disappear, due to their inability to compete with networks carrying a wide range of other value-added services at lower unit costs.

Computers

The upward trend in multimedia PCs will continue. Sale forecasts for 1997 expect the number of PCs sold with a CD-ROM drive to reach 1.5 million, rising to 1.8 million during 1998. Although sales are then predicted to fall, the future of disc technology has been secured by the recent development of the new super-density CD. Its success will depend upon price of the new player and of the discs themselves and consumer tolerance of yet another machine. Although nearly 100,000 CD-I machines have already been sold in the UK, the future of this technology remains uncertain.

The Internet

The Internet will continue to grow with predictions that more than 200 million people worldwide will be connected by 2002, of whom 5.5 million will be in the UK. Growth will increase once issues such as security, copyright and speed of downloading images have been satisfactorily addressed.

Online services are likely to become more popular and offer a wide variety of facilities. They will threaten a range of businesses involved with travel and those who act as intermediaries between suppliers and consumers.

Terrestrial TV, cable and satellite

Terrestrial, cable and satellite TV companies all plan to introduce a digital broadcast service. Competition will be intense, particularly if a change of government allows BT broadcasting rights before 2001. The future will not just be about the extension of programme services. To survive, each will need to become a significant transmission network supplying a range of value-added entertainment, shopping, health information or education.

Estimates suggest that between 30 and 40 per cent of TV households will be watching cable in the early millennium. For satellite, this figure is estimated to be 26 per cent of TV households.

Health information using the new technology

As the new information technology becomes integrated into our daily life, so the concept of electronically accessed health information will become more acceptable to health professionals and the general public.

Some multimedia-based health information material has already been developed in the UK by health and commercial organisations. These have included touch-screen information systems, computer games, interactive TV and CD-ROMs on various health-related topics.

Although the Internet and particularly the Web have rapidly become a major source of information about health and illness, the quality of information varies. The Help for Health Trust has compiled a list of useful web addresses on the Internet. The online services also provide their own source of health-related information.

Despite all this new technology, the quality of health information is the most important factor. If this is good, then it can be adapted for any of the technologies described in this publication.

Conclusion

Although only a small proportion of the population have access to the Internet or possess a computer with multimedia capabilities, this is likely to change over the next 5–10 years.

A new culture is developing where business and individuals will use both information and technology as naturally and instinctively as they now use transport and language. A number of worldwide initiatives support the development of an information society. This will result in a service distributing high-bandwidth, high-speed, interactive networking capabilities which will radically change the way information, education, commerce and entertainment are channelled into the 21st century office and home. There will be interactive TV; video on demand; universal electronic messaging; desktop video-conferencing; and a plethora of electronic media such as electronic newspapers, shopping and banking brought to us by means of public networks.

Information services about health and illness using the new technologies will flourish. Such services will need to be multidisciplinary and the information evidence-based, user-friendly, entertaining and easily accessible by all sections of the public. It will need to be regularly updated and originate from a respectable organisation which inspires public confidence.

If the potential of the new technologies is developed to the full, the health benefits to the population at large could be huge, providing that issues such as quality, equity, access, security and cost are addressed. In order to achieve this objective, all health professionals should become familiar with the new information technologies and produce and use material which is reliable and of high quality and deliver it by the most popular and appropriate technology at the time. This should be integrated with the more traditional methods to satisfy the needs of different target audiences.

Health professionals have the opportunity to apply the evolving information technology to the field of health information, not tomorrow, but today ... *The future's bright: the future's digital.*