The impact of ICT on health and healthcare: response to the call for evidence

1. Introduction

The Medicine & Health Panel of the Worshipful Company of Information Technologists is pleased to submit this response to the Royal Society's call for evidence in support of their study into the impact of ICT on health and healthcare.

The Worshipful Company of Information Technologists is the 100th Livery Company of the City of London, bringing together the centuries old Livery tradition and information technology - the key industry of the new millennium, (http://www.wcit.org.uk).

The Company's work covers three broad areas:

- Promoting the IT profession - increasing awareness and understanding of the IT industry, raising issues that are relevant to the industry's future and supporting the development of qualified IT professionals;
- Education and Training - helping young people acquire IT skills through projects such as the apprenticeship scheme;
- Charitable Activities - using members' experience and skills to benefit charitable projects related to IT.

The Company was granted Livery status by the Court of Aldermen of the City of London in 1992 and currently has over 620 members - all of whom are leading practitioners in the IT profession.

2. Specific responses to the Royal Society's questions

Identifying relevant future technological developments

1 What relevant technology trends are likely to impact on health and healthcare in the next ten to fifteen years?

Response:-

(a) The following technology trends are most relevant:-

- **Increased telecommunications bandwidth, at reducing cost;**
- **Mobile telecommunications;**
- **Miniaturisation and reduced power consumption of components;**
- **Imaging techniques, both hardware & software;**
- **Improved man-machine interfaces, especially in secondary care;**
- **Nanotechnology (allowing smaller devices and new delivery of interventions and drugs).**

A general point here is that many health and healthcare issues are not ICT-specific. Relevant technological developments could include those in biotechnology, microsurgery, robotics, instrumentation, etc. ICT will play a part, directly or indirectly, in all of these. Hence it may be unhelpful of the Royal Society to try to single out just ICT developments – they could be rather missing the overall picture.

Assessing the potential positive and negative impacts of relevant future technological developments

2 What areas in the provision of health and healthcare could be positively or negatively affected by these developments?

Response:-

(a) Improved pervasiveness and bandwidth of communications particularly allowing distance monitoring of health.

e.g. for diabetics, tracking implants in dementia patients to follow movements (e.g. wandering out of semi-secure accommodation and getting lost or having accidents, or for mental patients to check taking of drugs, or for remote diagnosis using scarce resources both humans and machines better).

(b) The most positive impacts would be on those extremely important, pervasive, but Cinderella aspects of healthcare, namely the care of the chronically sick and of the elderly.

3 What actions should be undertaken now to maximise positive impacts, or to prevent or minimise adverse effects?

Response:-

(a) To educate and persuade all citizens that their health is their own responsibility, and that the responsibility of the National Health Service is – as with any private care provider – merely to deliver the best service that it can within the available technology and funding. This relates to a response to question 12 below.

(b) To undertake trials to ascertain feasibility and cost benefits.

Evaluating the wider implications of relevant future technological developments

4 Do you have any concerns associated with the generation, release and subsequent use of personal data?

Response:-

(a) There needs to be clarification about which health providers produce what data for whom, by when and with what accuracy. No national health information system will work effectively until this is done and implemented. Patients should have the facility to verify the data about themselves and to impose restrictions on the use of their personal healthcare details by other organisations.

(b) All aspects of information assurance are key to feasibility and safety of using new technology and public acceptability.

5 What medico-legal and ethical issues merit consideration when introducing new technologies, such as the responsibilities, processes and liabilities for decision making?

Response:-

(a) In the UK, an increasingly informed, demanding, and litigious public is swelling the frequency and cost of legal action against healthcare providers. There are good and bad points about this trend. It encourages better record keeping and more responsible practice, but it also wastes resources, may hinder innovation (including the use of new technology), and can curb best practice (for instance, where what is done is more defensible from attack via the legal system rather than in the interests of the patient). If or when the bad is judged to outweigh the good, it may be worth considering if a condition of the use of a free health system (such as the NHS) should be that the patients' rights to sue should be withdrawn, and that the health system itself should apply its own regulation. In other words, if people should want to be able to sue, they would need to go to a private healthcare provider.

(b) New technologies will increase the range of choices. For instance, parents may be able to choose the sex, intelligence, and behaviour of their children and commercial organisations may be able to offer personally-specific life insurance policies. The technical ability to make these choices will raise social, moral, and ethical issues (and probably religious ones, too) that will probably be best handled by being debated in Parliament and then regulated by Law. The key will lie in spotting the possibilities in advance, and then debating the issues in time for the Law to be defined before the first cases arise in practice. This will require continuous monitoring for such issues by the Department of Health and might well be accorded a Ministerial responsibility.

(c) Normal ethical scrutiny plus need for a public debate on the ethics of monitoring medication of mental patients released into the community for their own and societies protection.

(d) Disease management systems that concentrate on specific diseases are a critical issue. E.g. the diabetic management system now in place has made a major contribution which reflects this.

6 What regulations or other mechanisms (including standards) would facilitate the responsible development of relevant technologies?

Response:-

(a) At present the responsibility for the development of relevant ICT is left largely – as it is with drugs – to private organisations and/or academia. These take the risks, but, if the developments are adopted, can take the profits, too. An alternative model would be for large healthcare organisations (such as the NHS) to undertake their own development of relevant technologies – or, perhaps better, to commission what they believe they need. A good analogy could be the British Army specification, issued at the end of the 2nd World War, for a field car. The result, in 1948, was the Land Rover, one of the best off-road vehicles ever designed, and still in production more than 50 years later.

7 What infrastructure would be required to allow any new technologies to be used effectively?

Response:-

(a) The increase in technological complexity will cause the acute care infrastructure to become even more condensed into a smaller number of large hospitals. Remote care (observation, monitoring, and diagnosis) will require a high bandwidth telecommunications infrastructure to be in place in most homes.

(b) Secure wireless networks with high bandwidth.

8 What are the most likely promoters and barriers to the take up of new ICT devices and systems?

Response:-

(a) Among the principal barriers to the take-up of any technologies, or, indeed, any innovation in the NHS, are its management and business models. Managerially, the NHS often seems incapable of extracting cost savings from new investment. Any improvements in efficiency from the use of new technologies are hi-jacked into better staff salaries, working conditions or improved patient care, not cost savings. Its business model, too, is the inverse of a commercial one. The more investment is made, the longer people live, and therefore the more its costs rise, rather than fall. Hence the take-up of new technologies is funding-limited, and the priorities are determined by the funder.

(b) Public acceptance and cost effectiveness compared to traditional methods.

9 What education and training would need to accompany the introduction of any technologies, and who would need to be involved?

Response:-

(a) Professional roles and responsibilities will grow increasingly specialised. In the education of such people, increased emphasis will need to be placed on the fact that they are all contributing to the care of the patient, rather than (as often seems to be the case at present) in charge of it.

(b) The training given to the professional and lay staff will determine the range and quality of the impact of ICT. A study needs to be undertaken to assess the current situation and plan for the now and here on.

(d) A focus on the ethnic population distribution and the variant needs should help to concentrate on specific requirements and so help to reduce the costs of the current tendency for global distribution.

10 How are professional roles and responsibilities likely to be affected by the increasing use of ICT?

Response:-

(a) Not likely to be changed by new technology per se.

11 How can the development of technologies that meet patients and informal carers' needs and are practically useable be best facilitated?

Response:-

(a) To ensure that adequate trials demonstrate proven value; followed by appropriate investment.

12 What are the potential impacts of the costs of any of these new technologies?

Response:-

(a) New technologies which include not just ICT but also biotechnology, medicine, microsurgery, robotics, etc will greatly increase the capability and knowledge of healthcare providers. However, all of these capabilities will come at a cost, and more and more often it will become technically possible to treat a condition but unaffordable to do so, at least from the public purse. The French National Health Service already appears to have reached this position. Addressing this issue is really a political matter, since striking a balance between what the public would like and what the country can afford is a job for politicians. What may well need to be stressed, though, is the urgency with which the issue needs to be faced, now.

(b) The ability to reduce costs-of-care and improve the quality of life of patients and carers.

13 What are the implications of the international use of future technological developments, such as global use of health data, variability of ICT-enabled support, and interoperability?

Response:-

(a) With the increasing spread of globalisation, particularly with the increased mobility of human populations, healthcare issues can no longer be considered just at the national or regional level. The work of the WHO in preventing worldwide pandemics e.g. SARs, avian influenza etc, illustrates the point.

(b) The most important catalyst for the effective use of ICT to assist in this international activity is in the development of international standards & protocols for interoperability of medical codes and systems. Thus when the politics of international healthcare collaboration have been ironed out the technical infrastructures necessary to realise international healthcare information exchange will really be usable.

Are there any other important issues that have not been addressed by the questions above and that you think the working group should address?

Response:-

(a) It is assumed the UK is the target geographic area in making some general points below.

(b) Medicine of all types at point of care is advancing at a rapid rate and the ICT to support it at point of care is advancing in parallel if a little behind. In most advanced countries, medicine is a business and a highly competitive one. Hence innovation succeeds where clear business benefit is delivered.

In the NHS there is no competition and hence in general little motivation to seek the improvements that would derive from technology. There is rarely sufficient stability in the NHS organisations that might be the catalysts for identifying trends and developments and intercepting them for the benefit of the NHS as a whole. The latest body is the 'Institute for Innovation and Improvement' which is a Special Health Authority replacing the Modernisation Agency, the NHS University and several other predecessor bodies. (See www.institute.nhs.uk).

It advertises that its budget is £80 million per annum, a miniscule amount invested in Innovation and Improvement for a Department with an annual budget now approaching £80 Billion. Moreover its main modus operandi seems to be to reinvent the wheel through UK academic research and teaching, when proven technology is already available in many countries in the world.

(c) Some have noted that the NHS is already some years behind certain localities in the USA in the use of moving images. Whereas x-rays were the great advance of the immediate post war days, the advent of minimal invasive fibre techniques and test devices involving magnetic resonance and/or sound has changed the point of care potential. But monitoring a patient's progress by examining a series of such outputs over a time continuum is not well advanced generally in the NHS, which will not invest in deploying the technology, since confidence is low in the field of technology transfer.

(d) The absence of skills in the NHS in absorbing inward technology transfer is a major deficiency. In the USA many localities have MRI scanning available "on the High Street". The 'press' reports that the Department of Health has bulk bought wholesale a huge quantity of MRI capacity, which the local NHS bodies will not purchase this retail from the Department even at the low prices available. There is a great reluctance by clinicians to use 'off-site' test resources, because they do not have direct control over the test and unfettered access to, and 'ownership' of, the results.

In the UK it is reported that surgeons are uneasy about externally derived reports in pathology and imaging because much more local communication takes place than is given credit for. There is also the issue of liability for actions taken on the basis of incorrect reports. Though common sense has a role! It

was interesting to see how far ahead US is in image transmission and remote use of these images forced by distance. This then came back to the need for standards of nomenclature and data structure. A spade has still to be a spade at the far end.

(e) Consultants in their private practice often use local point of care ICT systems that are not available to them within the NHS. Often there is an imaging element involved, e.g. audio test recording with video pictures of ear drums or retina photographs coupled with diabetes history records. On other occasions sound is involved as in echo cardiograms.

The focus in Richmond House is on administrative collection of data to suit their policy and strategy needs, when the real advances and benefits come, and will come, from patient direct care systems that are simple to install and use if they are not burdened with the need to integrate with some national implementation initiative.

(f) A major area for the Royal Society to focus upon is the effective deployment of technology, rather than just its development. Other countries, driven by a more competitive healthcare economy, will ensure that the basic research and development takes place.

There is a real need to know where the existing developments will have reached in 5 and 10 years time. It is from these that any future developments in the timescale of the Royal Society study will have to project.

(g) A point about patients: there are challenges associated with the considerable and growing body of medical information made available to the general public, particularly those who become very familiar with accessing the internet. Knowledgeable patients are in a position to question the clinicians about their condition and could be demanding of consultation time, new drugs and technologies. Their expectations of what is possible may not be matched by an increasingly cash stretched health service. This could lead to inequalities of care, if clinicians respond to such pressures.