Attitudes to changing technology in health care

Advances in science and technology over the past decade have had a dramatic impact on almost every aspect of our lives, with hardly a day going by where we are not touched in some way by this change. An example of one such technology is the mobile phone, which UK Office of Telecommunications (OFTEL) figures suggest are now owned by almost 80% of households in the UK (Aziz et al, 2003).

Within the medical community, however, the rate of uptake of technological advancement has been slower than the commercial sector, not only because of the cautiousness that accompanies change in health care but also because of the potential cost of the initial investment. This conservative approach by the medical establishment has resulted in a widening gap between what is technologically possible and what is actually achieved.

PERSONAL DIGITAL ASSISTANTS

An example of a technology that has achieved widespread commercial success but has only recently become prevalent in the medical community is the personal digital assistant (PDA). In the United States, an unpublished survey of physician practices undertaken by Price Waterhouse Coopers in 2001 found that 60% of hospital doctors used a PDA. Better organization, access to reference information, and in some cases a means of communication are all features that make this device a useful tool in patient management.

Examples of reference information that doctors may benefit from having on their person at all times include evidence-based guidelines, textbooks (such as *Oxford Handbook of Clinical Medicine*), electronic patient records, drug formularies (such as the British National Formulary), hospital address books and protocols (McAlearney et al, 2004). All this material can be easily stored on a single chip, to be used with a PDA while at the patient's bedside. This has led to some authors suggesting that PDAs may save the health-care system both time and money (Howard, 2003). Despite this, most UK hospitals do not issue doctors with a PDA, nor do they encourage or facilitate their use. Although the obvious reason for resistance to issuing doctors with a PDA is increased cost, there are other important issues that should be considered.

AVOIDING DISRUPTION

The 'disruptive' effect that the introduction of a new technology has on the process it replaces is well described (Christensen et al, 2000). These disruptive innovations by their nature upset the status quo, and although they initially offer a potentially simpler and better alternative to existing technology, they usually have less functional capability when they are first introduced, making them unattractive.

There is also much resistance from those who have a vested interest in the older technology now under threat. Eventually, however, the simpler offerings of the disruptive technology appeal to the vast majority of users and the innovation becomes part of mainstream daily work. Important historical examples of disruptive innovations that have transformed society include Eastman's photographic camera, Bell's telephone, and the minicomputer. Health-care systems all over the world would benefit from similar transformations.

IMPROVING PATIENT CARE

The inertia that is associated with large organizations such as the NHS can hold up or even completely halt technological change. A new technology that clearly improves patient care, however, can rarely be ignored for long. Endoscopy of the gastrointestinal tract is an excellent example of this, as although the surgical community initially treated it with scepticism, gastroenterologists have adopted and since developed it into the invaluable diagnostic and interventional tool it is today.

Similarly angioplasty for coronary artery disease, which when introduced was much less effective than coronary artery bypass surgery, now precedes surgery in many instances. The success of both these techniques may be attributed to technological advancements in instrumentation and increased operator experience. Ultimately it could be argued that these two advances have guaranteed the prosperous survival of both specialties involved.

A final example of technological change that has changed surgical management is laparoscopic cholecystectomy. Although initial reports suggested that the risk of biliary injury may be higher with laparoscopic as compared to open cholecystectomy (Strasberg et al, 1995), improvements in laparoscopic equipment, training and development of new techniques have meant that laparoscopic cholecystectomy has now replaced its open counterpart as the gold-standard operation for the management of gall-stone and gall bladder disease.

FUTURE DEVELOPMENTS

It is clear from these examples that although technology changes may initially have a disruptive effect on the processes they aim to improve, they cannot be ignored. Future technologies that are likely to have a dramatic effect on medicine include human cloning, tissue engineering, bioartificial organs, intelligent prostheses, nanotechnology and robotics to name but a few.

The ability to scout and harvest new technologies together with the ability

to respond to change have been described as essential characteristics of successful organizations, with the NHS being no exception (Satava, 2002). Having said this, in health care, and particularly in areas where technology change involves patient interventions, evidence of clear benefit compared to existing techniques needs to be demonstrated. With this in mind, it has been suggested that certain steps need to be followed in order to ensure that while the introduction of new technology is continued, risk to patients is minimized (Strasberg and Ludbrook, 2003).

In the current climate of innovation, unless the medical community faces and adapts to technology change, it risks being left behind. There is, more than ever, a need to establish efficient systems in health care to evaluate and adopt new innovations and replace outdated and ultimately less efficient ones. What is crucial, however, is our perception of change in technology, and whether we see this as a threat or an opportunity. HM

KEY POINTS

- Advances in technology have dramatically influenced our daily lives, yet within the medical community the rate of uptake of technology has been relatively slow.
- Disruptive innovations invariably upset the status quo, but often offer a potentially simpler and better alternative to existing technology.
- New technologies that clearly improve patient care cannot be ignored for long.
- Unless the medical community faces and adapts to technology change, it risks being left behind.

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