

WEB PUBLICATION

Telemedicine: Ways of Working
the roller-coaster ride of technological change

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TELEMEDICINE: WAYS OF WORKING

Telemedicine: Ways of Working

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1 Preface

This paper is one of two commissioned by the UK Department of Health to scope some of the policy implications of telemedicine.

Telemedicine: Legal Issues and **Telemedicine: Ways of Working** together identify key issues involved in telemedicine, or telehealth or health telematics, depending on the phrase in vogue. Importantly, these two documents were the first to focus, not on the technology itself, but on the implications of that technology.

Legal issues is a tentative first statement to the government that something needed to be done. Since this report was commissioned, steps have been taken to identify a focus of expertise in legal issues and health, through the leadership shown in Wales.

500 years of technological change should have taught us that once the technological genie is out of the bottle, she can't be put back in. Our real responsibility is to understand the implications of this new technology, realising that what happens will probably always be a surprise.

A third area of enquiry, related to these two papers, focuses on the patient's response to care and the impact of clinical technology. Beneath the rhetoric, and change we find the same needs of people to receive care, be listened to and understood. The great fear is always that technology will replace the human ear and voice with a quick technological solution.

Michael Tremblay

1997

1 Overview: Telemedicine technology will change the nature and structure of clinical work, and influence the demarcation between health professions.

Technological change effects the design and organisation of work spaces.

- The electric light bulb, for instance, permitted working at night, and changed the design of buildings, since large windows to let in daylight were no longer needed. Large, interior working spaces became possible, and with the invention of the elevator, the modern large building was created, permitting a different organisation of activities, most notably night shift work.
- People once felt that there was a global need for perhaps five computers; then the microprocessor was invented, and now finds its way into even mundane objects like microwave ovens and washing machines. The telephone has created a distribution of work environments which, when linked with computers, is driving the current information revolution. In effect, people can be anywhere; in healthcare environments, the traditional centralisation of services to accommodate paper-based activities can be relocated to where the patient is, creating what is called “location-independent care”.

Technology changes the way work is done, creates new forms of work and occupations, and also creates obsolescence.

- The traditional view is that technology displaces people; however, the historical record shows that displaced occupations are replaced with new occupations. Individuals may suffer if they are not retrained, for instance, but the balance of employment is not radically altered. Comparing job advertisements today to just 20 years ago will reveal many jobs that did not exist then. Prior to 1948, street lighting was on timers or lit manually by workers who went around town turning on the lights. The invention of the photo-electric cell eliminated this occupation and ensured that lighting kept pace with the advance of darkness, everyday of the year.
- Some health professions have resisted the introduction of computers into the clinical setting, since the means of data entry, the keyboard, was associated with secretarial work; however, these same professionals were quite happy to continue to use paper and pen.
- Perhaps most important is the use to telemedicine to support the development of a primary-care led NHS. The traditional grouping of clinical services into general hospitals reflects clinical organising principles considerably out-of-date, when compared to developments in other industries. Telematic technology can achieve the shifting of access to specialist advice without the need for patients to leave the GP's practice. The merging of primary care and community care, plus elements of social services and social welfare benefits, could be supported. And of course, the primary care setting, too, need not be located in the usual places; why not health screening on the trains, or health checkups at shopping centres.

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- A specialist service may not require the extensive infrastructure associated with the general hospital. The re-emergence of specialist regional centres is possible with support services provided in other ways through telematic links.
- Indeed, even traditional notions of intensive care may be obsolete; telematic technology along with portable life-support equipment could turn any location or bed into an intensive care bed.
- Private sector interest in general practice is considerable since it is influencing the patient's thinking in the "pre-GP" sense that commercial opportunities exist.
 - High street chemists are a natural location for commercial wellness clinics as are the major supermarkets.

Our conceptions of work and working are in flux.

- The microprocessor is creating totally new forms of work and working. Shoshanna Zuboff's **In the Age of the Smart Machine** introduces us to the modern work environment, and how the "informed" society will be different. Already, people are aware of the tremendous cost of maintaining whole organisational layers of middle managers when more direct forms of control and communication are possible. But professional organisations have appeared to be the most resistant to wholesale changes in organisational structure up to now; Charles Perrow's **Complex Organisations** notes how resistant professional culture is to decentralisation and flat management systems. Most of the radical work on organisational change emerged from Eric Trist's work and the development of socio-technical systems analysis, a little-used but quite effective way of designing social and technical work places. Today, we now speak of "workplace ecologies", "distributed work places", and "teleworkers", the very notion of "being at work" having changed.
- On the other hand, Barbara Garson's book **The Electronic Sweatshop**, warns us of the transformation of modern office work into something equivalent to the 19th century sweatshop – her chapter on the "automated social worker" can be terrifying. Similarly, the managerial fad for BPR (business process reengineering) based on using new information technology, has resulted in many organisations so completely redesigning themselves that they have let go the very staff they need to know what is going on. Indeed, one consultancy has formed specifically to help these "anorexic organisations" regain their lost corporate memories.

The convergence of the telephone and the computer is creating wholly new ways of thinking about work.

- Theorists, such as Nicholas Negroponte, at the Media Lab, MIT, suggest the real revolution is in the power to digitise; the microprocessor just makes it easier, quicker and more certain. It is in healthcare settings where the need for considerable amounts of information asserts itself, and where the need for speedy communication between people is of paramount importance. Here, the convergence of these technologies makes it possible for doctors to be in one place, patients in another, their health record

somewhere else. This distribution of the healthcare setting means that traditional physical structures seem less relevant, the work practices, including management systems, that characterise them unnecessarily complex, and the professional role demarcations cumbersome.

1.1 Key question 1: How are work places changing, or likely to change, in response to wider use of telematics?

Traditional distinctions between management information and clinical information may blur with health professionals needing or having access to management information (on contracts, costs, capacity, staffing, and performance data) since they are likely to need to have ready access to this information as part of telecare. The wider availability of more information does question organisation structures and methods concerned with the collection, dissemination, analysis and use of information when a principle of telecare is to have all the necessary information together when needed.

- The value of having people solely responsible for working with management information may be doubtful from a value-added perspective. In this respect, considerable expenditure in building information systems that do not combine clinical and managerial information is questionable. The necessary convergence of various types of information around a tele-consultation, for instance, necessitates the active participants in this event to be able to do any necessary follow-up quickly, such as book a clinic visit on-line as well as share access to a common patient health record.

Organisational delayering is a fact of life and telemedicine is a direct link between clinical service providers. Systems of approval, and control associated with traditional clinical settings may be unsuitable when the clinical setting is distributed across many organisations, and geographies. It is not inconceivable that traditional notions of management control through managers may cease to be relevant. Writing many years ago, Shan Martin, in **Managing Without Managers**, showed how to reorganise work systems to incorporate the managerial component without the need to create the manager role. Today, these ideas are still considerably challenging but not without substance.

Developing effective telecare approaches depends on building systems which reflect best practice, protocols and other similar techniques. These methods have the effect of redesigning existing practice in the new telehealth mould where ease of access to on-demand specialist services is important. In that respect, these new 'customers' will expect speedy, consistent and effective service, as re-referral or further consultation undermines the very purpose of the tele-link in the first place. The process redesign associated with technological innovations in other organisational settings suggests that significant restructuring of traditional approaches is required.

- Telemedicine technology, by rationalising practice, and simplifying processes, will naturally challenge interventions and modifications which do not demonstrate similar effectiveness. This could raise a further challenge for management to demonstrate its value-add.

1.1 Key question 2: How are professional practice patterns, including the demarcation between professions, likely to change?

The broad clinical knowledge landscape is divided into professional groupings with individual professions trading on their generally exclusive access to specific clinical insight and techniques. Telehealth, with the support of innovations as expert systems, creates the possibility that the patient could be attended by a non-professional, accessing a professional over a telehealth link. The cascading of restricted knowledge and insight down, or out, into a wider public is typical of the dissemination of knowledge anyway; clinical insight has always been more inaccessible because of its technical and diagnostic features.

It has been said one of the strengths of the NHS is the gatekeeper role of the GP. Telemedicine, by creating the possibility of more direct access to specialist advice and service, could either undermine the controlling function of the GP, or create other gatekeepers with different relationships to the public.

- Nurse practitioners, dieticians, pharmacists may find their roles enhanced; new roles, such as independent “care brokers”, may emerge linked to accessing excess capacity in the NHS market.
- This may shift the focus of the consultant role, sharpening the distinction between those who provide on-line tele-consultation, and those who receive the referrals for a procedure.

Perhaps more importantly will be the rise of independent experts, supported by expert systems to augment knowledge by lesser qualified staff. This is already a feature of existing telemedicine links in A&E where clinical staff consult with trauma specialists at a distance. Military applications already suggest the need to expand the scope of action of the personnel “on the ground” when linked to distance experts.

1.1 Key question 3: Can we influence ways of working or not?

The dynamics of the changing work environment raise the issue of whether these changes can be anticipated, controlled, planned and organised, or whether they “just happen”. The evidence of changes from technological factors may suggest that in most cases we do not fully appreciate the magnitude, and nature of the changes whether we have tried to influence them or not.

It is possible to conceive of four areas within which this question can be phrased reflecting different notions of the extent to which the forces of change can be managed; of course, in reality, action will be likely in all four quadrants since the issues fall across all these issues and objectives.

	Can we be...	
	Proactive?	Reactive?
Policy-based initiatives	pursue an evidence-based strategy to ensure that technology produces only winners	ensure the capability of flexible responses to the changing technology and ensure people are trained to understand the issues
Market-based initiatives	encourage an experimental organisational paradigm which rewards winners, and produces exemplars of good practice	ensure that there are adequate safeguards to protect those unable to accommodate to the changes and minimise the risks to the public

1 Implications

- The use of telematic technology is rising very quickly, driven by the considerable commercial opportunities available; some of the world's largest companies are in the information business. The apparent failure of so many information-based improvements in healthcare raises questions about whether the purchasers are sophisticated enough to be clear about their requirements and able to properly assess the technology and its impact on ways of working. There is little evidence to suggest that telemedicine is any different as a technology-driven innovation.
- Clinical environments have traditionally been structured around the work activity of professionals, and the present structure of these workplaces reflects this style of organisation. The possible restructuring of clinical work environments extends beyond just linking a hospital-based consultant to a GP; it actually questions the logic of the physical settings themselves, and the roles these people assume. There are considerable opportunities which are available by reconceptualising the nature of work, certainly from a patient-centred perspective, in a way which capitalises on the use of telematic technology to disaggregate existing clinical workplaces such as acute hospitals, and redistributing their services either upward to regional referral centres, or downward into the community. This suggests that the healthcare supply chain is collapsing with corresponding opportunities for reintegration of services either horizontally (expansion across geographies and different health service markets) or vertically (enhanced sourcing of supplies and/or improved patient service quality). Telematics enables both.
- Healthcare workplaces share many common features with other types of workplaces. Information-based process redesign and reengineering in these other workplaces has had considerable impact on the organisation of services, the type of staff needed, and the cost structure of the work. Health service organisations may be lured into undertaking activities based on the apparent improvements in these other work settings (cost, time, resource use, staff deployment or skill-mix) without fully appreciating the impact on the health setting. Evidence from elsewhere suggests caution.