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E-HEALTH: THE HUMAN RESOURCES IMPLICATIONS

Prepared by Commonwealth Health Professional Associations

SUMMARY

The term e-health is used in this paper to include all applications of the use of information and communication technologies (ICTs) to support health and the delivery of healthcare¹. E-health has the potential to transform radically the delivery of healthcare and to address future health challenges at local, national, and global levels. However the single most important factor in realising the potential of e-health is the people who use it². This paper considers the human resources implications of e-health from the perspective of the health professionals (of all disciplines) who are its main users.

BACKGROUND

2. The potential benefits of e-health are now widely recognised by health policy makers, by health professionals of all disciplines, and increasingly by the general public. e-health applications offer the potential to increase the efficiency with which care is provided, make better use of scarce professional expertise, deliver healthcare services to remote areas, simplify diagnostic and therapeutic processes, and enable better care to be provided in the patient's personal environment. At the same time, they can increase patients' levels of awareness and understanding about their own health and thus support of self-care³. There is an extensive and rapidly growing literature which describes clinical, administrative, and research applications in many countries.

E-HEALTH: SCOPE AND RANGE

3. Although the term e-health has been in use for a relatively short time, it is now used to encompass a wide range of applications. The World Health Organisation defines e-health as:

“the use, in the health sector, of digital data – transmitted, stored and retrieved electronically – in support of healthcare, both at the local site and at a distance”¹.

and specifically refers to tele-consultations, tele-referrals, forward storage concepts (e.g. tele-radiology and tele-prescriptions) and electronic patient records (EPRs).

4. In their use of e-health, different countries are at different stages of development and have focused on different applications depending on their health needs and priorities. For example, while the WHO e-health for Healthcare Delivery (eHCD) programme targets primary health care and developing countries are focusing on telemedicine as a means of bringing specialist healthcare to rural communities, other countries are focusing on improving the safety and continuity of patient care through the use of electronic patient records. In all countries it is critically important that e-health applications are integrated into existing health systems as a means of strengthening them and meeting the country’s basic needs

5. The focus also differs across disciplines. For example, pharmacists have a specific interest in systems for e-prescribing, which transmit prescriptions electronically from a doctor to a pharmacy, enable the doctor and pharmacy to check formularies, warn of allergies and harmful drug interactions and deliver the patient’s medication history, all of which can cut costs and prevent medication errors. All disciplines, however, are concerned to a greater or lesser degree with:

- Access to knowledge sources to ensure evidence based practice and for their own continuing education and professional development;
- Patient and professional access to knowledge sources for patient information;
- Decision support systems (e.g. for telephone helpline services);
- Communication and information sharing with patients and other members of the health care team;
- Remote consultation between professionals (e.g. remote diagnosis) and between professional and patient (e.g. “virtual visiting” by community nurses);
- Transmission and electronic storage of images (e.g. x-rays);
- Electronic patient records;
- Electronic administrative and business systems;
- Secondary analysis of aggregated patient data for planning and management purposes;
- Telecare (i.e. the delivery of healthcare to individuals within the home or wider community, with the support of devices enabled by ICTs)

6. E-health encompasses more than just the use of new technology. Eysenbach⁴ notes:

“In a broader sense, the term characterises not only a technical development, but also a state-of-mind, a way of thinking, an attitude and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology”.

Technology alone is not enough. New types of skills, competencies and, above all, mindsets and attitudes to new ways of working are required for the effective exploitation of ICTs in healthcare. It is for this reason that the human resources implications of e-health are so important: without adequate attention to these issues, and to the associated change management processes that are required for successful implementation, the full potential of the new technology will not be realised.

ISSUES FOR HEALTH PROFESSIONALS

7. There is now a considerable literature on the attitudes of health professionals to e-health. For example, the Australian Nursing Federation, commissioned by the Australian Government, recently undertook a major study of the use of information technology by nurses in Australia⁵. The study concluded that nurses recognise benefits to adopting more information technology in the workplace, but are frustrated by limitations of access to the technology, software that is not fit for purpose and lack of opportunities for training. Nurses feel poorly informed about information technology health initiatives, and poorly consulted about their implementation. Workload, inadequate numbers of computers, and lack of technical support are identified as barriers. These findings are replicated almost exactly in repeated surveys carried out by the Royal College of Nursing in the United Kingdom⁶. A recent small-scale project in the UK found that there was a huge gap between the vision held by the leaders and the reality of practice experienced by front-line workers⁷.

8. While these studies were undertaken among nurses, it seems likely that the situation is not dissimilar among other health professionals. In general, the literature suggests that most health professionals have a positive attitude towards and welcome the introduction of, new technology, but there are also significant concerns and barriers to be overcome. In addition to the practical barriers of inadequate financial investment, inadequate access to computers and lack of technical support, human resource barriers identified include:

- Inability to accept and manage change
- Changes in the professional-patient relationship which are perceived as a threat to professional authority.
- Concerns about confidentiality and security of information
- Lack of, or inappropriate, education and training

AVAILABILITY OF COMPUTERS AND TECHNICAL SUPPORT

9. Infrastructure is essential. Even though the cost of hardware is decreasing and the range of available devices is increasing day by day, ability to achieve the potential of e-health is limited in many places by inadequate access to ICT devices. It is especially important that appropriate devices are available to mobile health workers. Since healthcare is a 24/7 activity it is also important that technical support is available to health professionals on the same basis.

NEW WAYS OF WORKING

10. The introduction of new technology requires not only the development of basic computer skills, but also new ways of working, and new ways of conceptualising clinical practice. While some health professionals welcome these changes, others see them as a

threat to core professional values. It is vital that e-health is seen not as an “add-on” or simply a “new procedure”, but as an integral part of professional practice.

CHANGES IN THE PROFESSIONAL-PATIENT RELATIONSHIP

11. For example, the use of e-health requires changes in the management of the professional-patient relationship. Both patients and professionals value the traditional face to face encounter which may now be replaced by a relationship managed remotely, or by the “intrusion” of a computer as a “third party” in the consultation. This requires the development of new communication skills, but it also requires that the ICT device is appropriate for the particular environment and that the professional is confident and comfortable with its use.

12. Greater access by patients to information removes much of the “mystique” of professional practice, and changes the power balance between professional and patient. However, to become useful, information requires interpretation and this increases the importance of the role of the professional as “knowledge broker”, helping patients to access the information they need, to appraise the information they find and to decide how to use it. Nurses in particular have traditionally been involved in teaching patients about their disease to encourage and enable self-care, and in helping them to understand and use information about healthcare resources and alternative treatments; this function is greatly enhanced by increased availability and accessibility of information through the internet.

CONCERNS ABOUT CONSENT, CONFIDENTIALITY AND SECURITY OF INFORMATION

13. Concerns about consent, confidentiality and security of patient data are significant and have sometimes been used as a reason for refusal for implementation. However, risks have to be weighed against benefits, both for individual patients and the wider public health. Moreover, electronic systems have the potential, though encryption, use of passwords, audit trails etc. to offer greater security than paper records. In some countries legislative and regulatory frameworks will need to be strengthened, and protocols and guidance will certainly be needed at local level.

INFORMATION OVERLOAD

14. The volume of information available to health professionals is increasing dramatically and while this undoubtedly improves evidence based practice, it may also bring problems in the form of information overload. The volume of internet and intranet based protocols, guidelines, research findings and knowledge sources, which are sometimes duplicative or even conflicting, may simply “turn off” the professionals who should be using them. These problems can be mitigated by rigorous quality assurance and presentation of information in form that make it easy to find and use.

DECISION SUPPORT ALGORITHMS

15. The use of algorithmic decision support systems, such as are used in telephone helpline services, similarly brings both benefits and risks. Benefits include the potential for

enabling lesser qualified health workers safely and effectively to diagnose, treat and monitor many clinical conditions. However, the use of algorithms can never entirely remove the need for clinical judgement based on sound clinical knowledge, and many professionals fear that abuse of such systems will lead to “tick-box” practice which does not allow for the uniqueness of individual needs.

16. The introduction of new technologies also raises issues relating to responsibilities and liabilities for decision making⁸. For example, questions such as whether, in the event of an error, this was due to a failure of professional judgement or a failure of the system, need to be considered. There is a clear need for guidelines and protocols to be developed.

TELECARE AND ASSISTIVE TECHNOLOGY

17. The distinction between the terms *telemedicine*, *tele-Health*, and *telecare* is sometimes blurred. *Telemedicine* and *tele-Health* are in practice synonymous, although *tele-Health* is generally preferred to *telemedicine* because it includes all disciplines; these terms encompass all forms of health care delivery that are provided remotely in time or place. In this paper the term *telecare* is used to refer to the use of devices in patients’ normal environments (e.g. in their own homes, or on their bodies) for monitoring physiological or environmental signs to provide alerts (followed by appropriate intervention) to deviations from normal. The most common application is probably falls monitoring, but applications are rapidly expanding to include “smart” houses in which alerts are triggered by, for example, doors opening or changes in temperature. These applications have great potential for supporting independent living for elderly, infirm, or disabled people (including those suffering from dementia). While implementation in many places is already delivering benefits, some health professionals are concerned about the ethical and legal issues that this kind of approach raises.

SECONDARY USAGE OF DATA

18. The retrospective analysis and use of aggregated (anonymised) patient data obtained from electronic patient records is a powerful tool for management and planning purposes. For example it can avoid, or at least minimise, the need for special surveys. In conjunction with administrative data, it can support resource management and service planning. Most importantly, it can identify clinical outcomes at all levels. However, these purposes can be achieved only if the relevant data has been included in the primary record, within a structure that makes it accessible and enables linkage between the various data elements. It is therefore important that standards for the content and structure of patient records are developed and agreed and that the data is not limited to medical information but includes a more comprehensive coverage of patient problems and the interventions of all disciplines. Such work is already in progress in many countries and in the international standards organisations.

19. One of the concerns identified by field level nurses is a fear that data will be misinterpreted or misused by managers and policy makers⁷. For example, it is sometimes assumed that use of ICT will save time, or will enable the substitution of lesser qualified staff for qualified health professionals. While this may be true in some particular circumstances, the general assumption is not supported by the evidence. There is also a risk that such fears may alienate the very people on whom successful use depends and lead to rejection of the

initiative. Staff also express concerns about the use of such data for performance management; while this may also be a legitimate use, it is important that the processes are transparent and trusted by staff.

IMPLEMENTATION OF E-HEALTH APPLICATIONS

20. Successful implementation of e-health applications, as of any major innovation or change in working practices, requires careful change management. This requires well-developed organisational and leadership skills, persuasive communication, negotiating skills, financial decision-making, team building, conflict resolution and interviewing⁹.

21. People-based skills, such as co-operation, leadership, and creative thinking are critical for motivating participants. The purposes of the innovation must be clear, and acceptability (and therefore use) by health professionals is likely to be greater if developments are perceived to be driven by clinical need rather than by technological advance.

22. There is now considerable evidence that successful implementation of e-health applications depends on appropriate clinical engagement. Many accounts document failures in implementation which are due to clinical engagement being too little, too late, or limited only to physicians rather than other disciplines who will be required to use the system. Without proper clinical engagement from the earliest stages of design and development, there is a risk that the systems will not be fit for purpose and will not be able to be properly integrated into clinical practice.

TOWARDS SOLUTIONS

23. Whatever the application, the single most important factor in realising the potential of e-health is the people who use it². As Kwankam¹⁰ has pointed out,

“the challenges are no longer technical, because most of the technology applications have been tried and tested in other environments such as finance or manufacturing. The challenge is to persuade the clinical community, and indeed the patients themselves, to adopt the new models of the healthcare services”

Most of the difficulties and barriers can be overcome, or at least mitigated, by the proper use of two strategies:

- Clinical engagement: involvement of the users (i.e. health professionals of all disciplines, not just medicine) in the design and development of applications and systems, in all decisions concerning implementation and in the evaluation in use.
- Education and training: it is a common mistake to believe that basic computer skills and specific training to use a particular system are all that is required. Health care professionals need to understand the concepts behind the systems, as well as training to use specific applications and systems. They need also to understand the legal and ethical issues surrounding patient consent, access, and the security and confidentiality of health data. e-health needs to be incorporated into the basic

preparation and continuing development of all health professionals. It is important that adequate funding for education and training is included in project costings.

RECOMMENDATIONS

24. Recognising that the use of e-health for the strengthening of health systems and the advancement of health care is principally a human issue, governments and healthcare organisations are urged to provide adequate resources and introduce appropriate strategies to:
1. Provide adequate access for health professionals to ICT devices and adequate technical support
 2. Involve the users, i.e. health professionals of all disciplines, in the design, development, implementation and evaluation of e-health applications and systems;
 3. Educate and train health professionals in the legal and ethical issues and the concepts behind e-health applications and systems, as well as in their specific uses;
 4. Implement appropriate change management processes.

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