Home-based care: Implications for education and insurance providers

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Many papers have been published that concern technological change and its application to health service delivery. However, this is just one of the innovations required to establish a holistic solution for a purposeful intervention. A further two are considered in this paper: education provision to support all stakeholders involved in the health delivery system; and insurance-led services to pay for some of the support required. The transition of point-of-care delivery from hospital-based care to home-based care is also a focus of the work. Key adoption issues for the change are identified, from which implications for the education and insurance sectors are discussed. Gaps in provision are recognized and outline solutions suggested. It is clear that there are beacons of good practice in the areas scrutinized, but it is found that it is sometimes difficult to disseminate findings and scale up provision from the NHS whole-system demonstrators in eHealth.

1. Introduction

For the purposes of this paper, "home-based care" means using eHealth services as a means to access cost-effective policies, services and equipment available to support the greater independence of citizens. Crucial to the definition is the location of the care setting, moving away from hospital-based delivery of care to delivery in the community and, more often than not, in the patient's own home. The term "eHealth" embraces telehealth, telemedicine, telecare and health informatics and so can be:
- delivered via telecommunications media over any distance;
- delivered in real time or stored and broadcast through a range of media options;
- involved in consultation, patient monitoring, diagnosis, treatment, prescription and treatment;
- used with sensors and the devices connected to them;
- facilitated by the collection, analysis, access and dissemination of health information.

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This paper will address two of the essential yet non-technical aspects of delivering care in home-based environments, namely the need for education and training for all identified stakeholders in the "care at home" sector and implications for health and life insurance services as a means to pay for it.

Stakeholders can be divided into three broad categories: primary, secondary and tertiary. Primary stakeholders are those who combine to receive or provide care services in the home and include patients and their relatives, carers (who may also be relatives), community-based nurses, the general practitioner and other clinical professionals. Secondary stakeholders include those who provide technologies for home-based monitoring, therapeutic devices and any other "assist" devices. Tertiary stakeholders include those who affect home-based care without being directly involved in its delivery; typical tertiary stakeholders include politicians and other policymakers and the bodies concerned with setting standards—both technical and clinical.

Implications for health and life insurance in this care setting are informed by future payment models to deliver an alternative vision of future health service delivery, principally for application in the UK, although more general lessons may also be drawn.

The objectives of this paper are to uncover issues relating to the education and training needs of stakeholders, raise awareness of the likely insurance-led changes and place findings in the context of UK National Health Service (NHS) delivery. To achieve these objectives, the paper first provides a brief historic context of current eHealth delivery and then shows how innovation impacts upon identified facets of change. The implication for change in the education and insurance sectors follows. A discussion on findings returns the argument to future context and the conclusions feed back to the objectives above and indicate gaps to be explored.

2. Current situation regarding home-based care

The concept of eHealth is not new. One-off computer-based research applications can be found in many developed countries from the 1960s onwards. Health informatics was prominent in France and the Netherlands in the 1970s before spreading to the rest of Europe, North America, Australasia, Japan and South Korea. The advent of the personal computer (PC) in the early 1980s brought a second wave of research studies, which included considering improvements in sensor devices to the extent that they became suitable for home-based healthcare delivery. These advances were not coordinated in any way and were often proof-of-concept technical solutions looking for clinical problems. In Europe, consecutive EU "Framework" research and technical development programmes from the 1980s may have been responsible for more clinical involvement; they delivered potential impact via academia–industry collaborations.

A home-based care market emerged fuelled by research advances in several areas simultaneously: sensors and actuators were getting smaller—some shrinking to the nanoscale; devices were becoming integrated with existing technologies; wearable technologies became possible, which added to their comfort and, by extension, user acceptance; and an identifiable technology cluster of small- to medium-sized enterprises was formed to respond to increasing market demands. In the UK, like most EU countries, the majority of home-based monitoring and therapeutic devices are purchased privately or provided by local area social services, independently of the NHS. As a consequence, there is a lack of coordination in provision and providers are guilty of "silo" thinking; that is, only being aware of their own input into the process.

From an insurance perspective, each year one million people in the UK suffer a prolonged absence from work due to sickness. Most have to rely initially on Statutory Sick Pay of currently less than £90 per week, while a minority of absentees get additional sick pay from their employer. An issue with Statutory Sick Pay is that it is not available to the self-employed. It has been estimated that up to half a million self-employed people would find their savings running out after just a few weeks. The traditional role for insurance products up to today has been one of providing cash payouts, support and rehabilitation to get people back into work. Around 2 million people in the UK are members of insured occupational sick pay schemes and a further 1.1 million have a personal policy. Some employers, usually larger firms, provide occupational sick pay schemes but do not insure it. In fact, the number of insured schemes has been falling each year from 2006 to 2015, while the number of people insured is increasing (albeit both slowly). Around 10% of the working population has a proportion of income covered on an insured basis.

The monetary benefits of current occupational sick schemes include:
- replacement income, normally a maximum of 75% of pre-disability earnings, while the policyholder or scheme member is unable to work as a result of disability, continuing until the person returns to work, dies or the benefit payment term expires;
- benefits paid after what is called a "deferred period", typically anything between three days and two years; the shorter the deferred period, the more expensive the cover;
- benefits can be paid until a selected retirement age, or for a maximum term (such as two or five years);
- benefits are paid as earned income as a continuation of pay, hence they generate taxable income and liability for national insurance contributions.

Other (non-monetary) benefits provided by occupational sick pay schemes include: early intervention with potential claimants; rehabilitation services; an employee assistance programme; provision of a second medical opinion; and online and telephone-based legal support.

3. eHealth as a driver for health service innovation

Fig. 1 shows six different facets of innovation that can be driven by the use of eHealth technologies.[1] Examples of indicators of change brought about by each facet of innovation include:
- Technical—use of big data analytics; secondary uses of data;
- Medical/Social—continuity of care across the health–social care boundary;
- Organizational—use of insurance-led services;
- Policy—the shift of economic burden from health to social care;
- Business—intellectual property (IP) aspects from other facets that contribute to innovative propositions (e.g., use of secondary data to speed up the process of clinical trials);
- Products/services—innovation in devices and processes at the point-of-care.

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[1] Wintlev-Jensen, P. Awareness and skills: a key ingredient for scaling up innovation. In: AAL Forum 2016—Theme 4—*Formal and Informal Ways of Awareness Creation, Education, Training in AAL for Everyone* (2016).
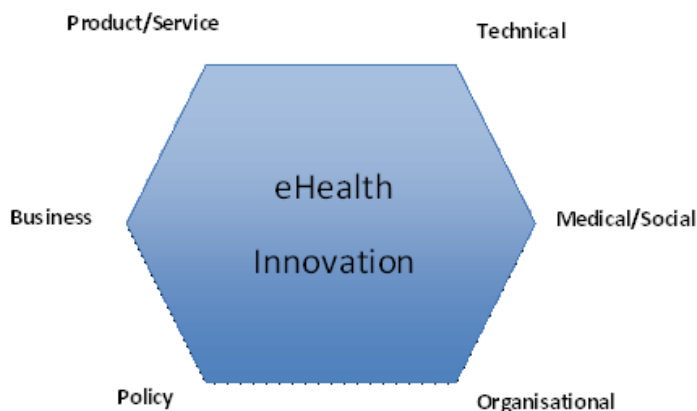
Figure 1. Facets of eHealth innovation (after Wintlev-Jensen[1]).

Even though the list of indicative domains that contribute to each facet is incomplete, it demonstrates the rich nature of the transformative change expected as a consequence of recent advances in underpinning concepts and ideas. Each facet can be integrated with one or more of the others in many ways, revealing a treasure trove of possible improvements to health service provision. It is clear, even from this brief analysis, that the role of innovation is crucial to drive the change necessary for the population to take advantage of the health gains signaled. It will be argued later that education for policymakers is needed to make best use of the intended innovations listed above, from which benefits accrue for all sectors of society.

4. Digital health service provision—education perspective

The future of healthcare given the change in age profile of the population, the ever-rising costs of service delivery, and the change profiles of the contributing sectors have been discussed elsewhere.[2] For the purposes of this paper, the increasing burden of disease caused by the aging population coupled with ever-increasing costs of hospital-based healthcare have created a perfect storm, out of which has emerged the need for eHealth-based interventions that enable swifter hospital discharge through a seamless transition to delivery of care in the community. Some sectors of the population are uncomfortable with this change in arrangements and have the perception of overreliance on home-based care. This cultural antipathy is an important issue for the adoption of digital service delivery and needs to be addressed. A second adoption issue is that, to a large extent, eHealth relies on patient engagement with self-management; although the challenges faced are not limited to patient–technology interactions; some can be alleviated by better education and training opportunities. Some of the issues relate to time of measurement, missed measurement, proxy measurement and incorrectly-input data. As an example in the last category, consider the routine measurement of blood pressure by a digital sphygmomanometer. Although the patient or carer is spared the sometimes tricky decision of linking blood pressure readings with the onset of Korotkoff sounds and then the lack of them, which indicate systolic

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2   Ramsden, J.J. The future of healthcare. *J. Biol. Phys. Chem.* **14** (2014) 31–33.

and diastolic blood pressures respectively, the patient may not know the significance of sitting down during the measurement period, the cuff may be incorrectly placed anatomically, the cuff may be placed on top of a shirt or blouse, the sphygmomanometer itself may need calibrating, or the traceability of the measurement chain may be broken.

Other key adoption issues conserning patients and their carers are digital inclusion and health literacy. With respect to the former, the attitude to eHealth delivery depends on the degree of patient/carer digital maturity; vulnerable populations are sometimes excluded due to their ignorance (it has been estimated that five million adults in the UK have never used the Internet, with the largest proportion being in the over-65 age range). Health literacy is a strong predictor of individual health and wellbeing. For those who can access digital service delivery, the issue often becomes one of being able to find reliable sources of information.

Each of the adoption issues indicated above can be addressed and alleviated through patient education and training. It is unlikely that the NHS will be able to continue to provide in the future as it has in the past. Should patients be made aware of the cost of a hospital stay, it will help them understand the clinical and economic arguments for change. In simple terms, the bed occupied has "hotel" costs and "care" costs for each day of stay; from the perspective of the NHS, discharge to home sees the "hotel" costs go to zero and the "care" costs significantly reduced, while at the same time releasing a much-needed resource (that is, the hospital bed). Of course, the huge caveat that applies to this argument is that, first, the patient is ready and safe to be discharged; and, second, that community-based services are available to take over the care component.

The adoption issue related to patient engagement with technology-led self-management is an education and training issue that is more mainstream and mimics needs in other everyday domains. For example, the patient might be used to consulting manufacturer-supplied user manuals—say for a new household appliance; their role in eHealth technologies is somewhat similar. Unlike the household situation, however, is that a third party (e.g., the community nurse) normally first demonstrates the use of assistive technology and its relationship to self-management.

Digital inclusion in the context of eHealth service delivery is an access issue; should initial resistance to technological change be overcome, a secondary access issue is how to use the Internet to search for what services are, or might be, available. Fortunately, health literacy in the population is increasing, with the technology used for eCommerce (online shopping) being directly transferable to the eHealth domain.

There are other stakeholders as well as the patient and, for each, an education and training policy can be outlined. From the perspective of the clinician and other health professionals, education and training are mandated by their professional bodies. As such, a learning audit can be undertaken to establish the curriculum changes needed to accommodate eHealth service delivery. A likely area of concern is the experience of medical technologists with regulations for medical devices.[3] Currently, too many interventions by practitioners using smartphone

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[3] Ivarsson, B., Wiinberg, S. and Svensson, M. Information and/or medical technology staff experience with regulations for medical information systems and medical devices. *Health Policy and Technology* **5** (2016) 383–388.

technologies do not have regulatory compliance and, further, do not link results to the patient's electronic health record. From the perspective of policymakers, the description and interpretation of Figure 1 reveals the innovations and technological changes that can be expected as a consequence of adopting new methods. Educational intervention is needed here to subverse the political will of the élite so that benefits can be gained for the many. Introducing secondary use of patient data is a good example of such intervention. Health professionals and bioscientists have argued that secondary use of anonymous patient data would benefit the understanding of subjects such as epidemiology but, disappointingly, this use was banned by the Government due to what they viewed as patient data security concerns.

5. Digital health service provision—insurance perspective

The provision of digital health services makes a tangible difference to citizens. For example, over 13,000 families were supported financially through individual income protection insurance policies in 2015, with tax-free claims payments totalling £131 million. In the same year, a further 14,604 claimants were paid a total of £347 million through group schemes for a long-term work absence. Additional non-monetary support such as early intervention, rehabilitation and active claims management is offered, which has been found to reduce the length of sickness absences.

The financial case for supporting people back to the workplace is illuminating. Due to the aging population and the diminishing ratio of worker to pensioner, the total annual cost of long-term absence to the private sector could rise from £4170 million in 2014 to £4810 million in 2030 and, when the public sector is added, the costs over the same period rise from £6710 million to £7600 million.[4] Factors considered to influence these figures include changes to the composition of the workforce, such as increases to the number of older workers. It has been estimated that for each £1 spent on rehabilitation for group scheme claimants, these costs are lessened by £16.80.[5] A further annual direct financial benefit of £74 million can be assigned to rehabilitation through group income protection, where additional quantified indirect benefits for employers were found to be worth around £35 million.[5]

A recent UK Government Green Paper sponsored jointly by the Department of Work and Pensions and the Department of Health repeated a maxim from the birth of the NHS, that the nature of health or disability should not dictate the path that a person takes in life, including the workplace. Further, through the actions promulgated by the Green Paper or otherwise, change is inevitable—"not by tinkering at the margins, but through real, innovative action".[6] It is likely that one of these innovative actions will be the secondary use of personal data, conflicting with statements and actions already taken on the use of patient health data (see above).

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[4]   *The Benefits to Business and the Economy of Early Intervention and Rehabilitation* (Report for Unum). London: Centre for Economics and Business Research (CEBR) (2015).
[5]   Malcolm, K. *Income Protection—Working Together to Improve Take-Up*. (Economics, Policy and Competition Report). Zurich Insurance Company Ltd (2014).
[6]   UK Department of Work and Pensions; Department of Health. *Work, Health and Disability Green Paper: Improving Lives* (Cm 9342). London: The Stationery Office (2016).

6. Discussion

In terms of innovation and its effect on change processes, the health (and) care sector is little different to other sectors undergoing transformative change and from which lessons can be learned. A key common concern is the need for urgent action in a society whose demography is shifting to more representation in the more aged deciles.

To address this key issue needs leadership and informed decision-makers. Whereas it is presumed that there is no lack of knowledge among decision-makers responsible for difficult decisions with long-term implications, there seems to be an incipient fear of change, in effect driving them to deal mainly with issues regarding legacy systems. Currently, there are very few directed education and training programmes that address the evolving needs of decision-makers, and those that exist are *ad hoc* responses to specific, abruptly arising requirements.

Experiences so far in agile decision-making concerning health and care innovation at scale include NHS whole-system demonstrators; for example, an eHealth system in Newham (London). A snapshot taken at the beginning of 2016 showed that this demonstrator gave a total gross saving to the NHS of £597,940 based on a service provided to 353 people at home. This saving is based on device installation costs in each home of £170 and £35 per month for their rental. This can be highlighted as a success—some aspects of innovations in eHealth are truly transformative, yet many decision-makers seemingly remain unaware of their full impact due to lack of knowledge and understanding of the domain. As mentioned, decision-makers are working in an environment that is risk-averse, hence few demonstrator projects are adopted. The short-term budget cycle that endures in the sector is also unhelpful for introducing innovation. There is a dearth of commitment to innovation within parts of the health and care professions and palpably insufficient leadership from the professional institutions to tackle this issue.

7. Recommendations

To address some of these problems a longer budget cycle is needed (5–10 years) to encourage and measure[7] adventure (i.e., risk-taking). There is also a need to empower decision-makers to take risks via appropriate education to inculcate methods and techniques capable of responding to the issues involved in decision-making in high-risk environments. Recognizing that *top–down* solutions to difficult decisions with long-term implications tend to lead to log-jams, *bottom–up* solutions that empower the end-user (patients) should be adopted; it is crucial to listen to the often-missed voice of the patient. To achieve these goals, professional institutions should be encouraged to engage with these issues, taking the lead from the UK Royal College of Nurses,[8] which has issued a report about the impact of eHealth.

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[7] By "measure" we mean some quantification of outcomes that may well require monitoring beyond the formal termination of a demonstrator.
[8] *Integrating Health and Social Care Across the UK: Toolkit for Nursing Leaders* (Report 005 910). London: Royal College of Nursing (2017).

8. Conclusions

The issues that relate to education and training needs have been flagged with examples given for each level of stakeholder identified (primary, secondary and tertiary). Consultation of the insurance sector by Government will lead to likely change in cover offered. Both of these responses have been placed partly in the context of transition of onus of care from hospital-based to home-based service delivery. Along with these signalled changes, there is a further cultural change in provision of healthcare—another transition—from treating illness to maintaining "wellness". The technology required is largely the same, but the emphasis in the education and insurance sectors is turned towards prevention and promotion of healthy life-styles.

The technological revolution will continue to change the way we live our lives and the way we work—the education and insurance sectors have to assimilate and adapt this proposition in order to be and remain relevant to the changes. Adaptation may partly involve repositioning the proposition to focus more on the prevention and/or return to work aspects of employer support: rehabilitation will no longer be confined to returning to work from the home environment. Digital health services will reduce the cost of intervention and become a key tool to support wellbeing around the workplace, which is itself evolving to encompass a plethora of definitions.