

Health 2.0 And Telecare For The Elderly

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Overview

Over the next two decades an increasing number of people will reach the age at which they need the type of support that can be provided using a telecare service. Most telecare vendors and providers market their products and services within a framework based on the 'ageing in place' concept. 'Ageing in place' assumes that if a person is given the required support they can remain in their own home rather than being cared for in sheltered accommodation or a nursing home. This concept appeals both to elderly people, as they can lead relatively independent lives in familiar surroundings, and also to healthcare providers because care costs less to provide at the edge of the healthcare network.

The first wave of baby boomers, i.e. people born in the years following the 1914-18 war, dominates today's market for telecare for the aged. However these people are about to be joined by a second wave of ageing baby boomers: people born in the late 1940s and early 1950s. This second wave of elderly consumers is more computer literate than their parents and has different aspirations with regard to how they expect to be treated and cared for in their old age. The people who drove social change in the sixties may want something more from life than merely 'ageing in place.'

Each year will see more people who have used computers and the Internet during their working lives using their IT skills to improve the quality of their lives during old age. Already some people who have been exposed to Internet-based social networking have reached retirement age, and as more do so the market for telecare for the aged will become more complex for the vendors and service providers who have to address an increasing mix of user skills and requirements.

Some vendors are beginning to experiment with a new generation of telecare services that use Health 2.0-type technology as a platform. These vendors may soon be able to launch next generation telecare services in a section of the healthcare market where incumbent healthcare providers have little influence over the type of service the consumer has access to. If this trend continues, elderly telecare users will make up an important part of the market for services such as Google Health and Microsoft's Health Vault, especially if access and privacy issues slow the adoption of the electronic patient record systems deployed by incumbent healthcare providers.

This report examines the changing market for telecare for the aged, and analyses the potential impact of Health 2.0 on this sector of the healthcare market. The report also looks at the way vendors are building a range of remote monitoring and communications technology into both existing and next generation telecare and support services for the elderly.

At A Glance

Currently telecare vendors and providers market their products and services within a framework based on the 'ageing in place' concept.

However a second wave of elderly consumers is more computer literate than their parents and has different aspiration with regard to how they expect to be treated and cared for in their old age.

The people who drove social change in the sixties may want something more from life than merely 'ageing in place.'

Each year will see more people who have used computers and the Internet during their working lives using their IT skills to improve the quality of their lives during old age.

This may allow telecare vendors to experiment with a new generation of telecare technologies and Health 2.0 type services such as Google Health and Microsoft's Health Vault.

This report examines the changing market of telecare for the aged and analyses the potential impact of Health 2.0 on this sector of the healthcare market. Included are profiles of Docobo, AT&T, Tunstall, AMDTelehealth and Caregiver Technology.

1. Introduction – A Maturing Market

The first Wireless Healthcare report on telecare for the elderly highlighted a number of factors that were inhibiting market growth. Examining the market again we find that many of these inhibitors are still in place and that, since publishing the initial report, health providers have eased some of the pressures being placed on them by an ageing population without any substantial investment in new technology.

In the first Wireless Healthcare report on telecare for the elderly a number of key factors that were limiting market growth were highlighted.

In the UK improved co-operation between social services and healthcare providers has ensured that, in a majority of cases, the elderly are cared for in the cheapest part of the care network. Instances of bed blocking, where an elderly patient cannot be discharged from hospital after treatment due to a lack of sheltered accommodation or rooms in care homes, is now less common than it was five years ago.

Government health departments have attempted to force the elderly to contribute more to their own care and in some cases unlock the equity in their homes to do so. While this has encouraged a certain amount of private spending on telecare products it is unclear that this trend will continue. As we highlighted in our original report any prolonged fall in property prices will reduce the amount of money an elderly person is able to contribute to their own care.

However there are now also some key drivers that could accelerate the take up of healthcare IT services in particular, and telecare services in general, by the elderly. In the UK the government is moving away from a centralised approach to healthcare IT, adopting instead the piecemeal approach that benefited specialist telecare vendors in the past.

There are now also some key drivers that could accelerate the take up of healthcare IT services in particular, and telecare services in general, by the elderly.

Throughout the developed world a second wave of baby boomers is approaching the age at which it will start using telecare services to support independent living. Whereas the first wave of baby boomers, i.e. people born after the First World War and the 1918 influenza epidemic, had very limited IT skills, many of the second generation baby boomers, i.e. people born after the Second World War, have been exposed to IT and online services during their working lives. Some will have even had experience of Web 2.0 services and social networking. This could provide a significant boost to the emerging, but still only loosely defined, concept referred to as Health 2.0.

The next wave of ageing baby boomers, who have spent their lives driving change in the consumer market and have come to expect a wide range of services to be accessible at the touch of a button, could be about to make their presence felt in the healthcare market.

The ageing consumer will represent an important market for vendors who are developing Health 2.0 based products and services. Although Health 2.0 will meet significant resistance from incumbent healthcare providers, the market for telecare services for the aged is largely beyond the reach of these incumbents. The ageing baby boomers, who have spent their lives driving change in the consumer market and have come to expect a wide range of services to be accessible at the touch of a button, could be about to make their presence felt in the healthcare market.

2. Ageing In Place

'Ageing in place' is a convenient model on which the telecare vendor can base their marketing strategy. It is also a model which the healthcare provider can use to reduce the cost of supporting the elderly. Keeping a person in their own home for as long as possible avoids the costs associated with the patient's move from the edge to the core of the care network – the core, in this case, being a hospital ward. In between the elderly patient's home and the hospital ward are three zones within which care can be provided for the elderly person. The first is sheltered accommodation, the second is a care home and the third is a nursing home. Each zone on the elderly patient's journey into the core of the network sees the cost of care increase. The increase in the cost of care at the boundary of each zone governs how cost effective the deployment of a telecare system would be within the zone itself.

The fact that a certain amount of communications and monitoring technology is required to slow or even arrest the elderly person's journey into the centre of the care network is what makes the 'ageing in place' model so appealing to the IT and telecoms industry.

Many older people, perhaps from a professional background and now in their sixties, seventies and eighties, have embraced the concept commonly referred to as 'ageing in place.' In the US this has shown itself in a number of ways, for example:

- Elder communities for the over-50s, with purpose-built housing, communal recreational facilities and the ability to 'graduate' to apartments and supervised care all on the same site
- Second homes in the southern states to avoid the northern winters

These models are built around the desire to live independently, stay well, and remain mentally and physically active for as long as possible. When illness or frailty eventually takes its toll, the older person can continue to live in the familiar surroundings and communities that they have cultivated over previous years.

This can also be seen happening in the UK. There is an increasing number of elder communities being developed by property developers and more enlightened care home companies. The equivalent of spending winter in the sun manifests itself as retirement to the Mediterranean.

As the baby boomers seek models for living in their older age, new thoughts, pressures and opportunities come into play and there is an increasing drive for change:

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As the baby boomers seek models for living in their older age, new thoughts, pressures and opportunities come into play and there is an increasing drive for change.

- Desire to employ their accumulated wealth, property ownership and pension funds to live in surroundings that they have known and enjoyed
- Greater intellectual independence and desire for choice in their lives
- Desire to adopt a lifestyle that extend wellness
- Desire to take a proactive role in managing their own health condition if they do develop a chronic condition or disability
- Experience of watching how a largely state-determined model of old age and care has impacted upon their family
- Seeing how their parents' accumulated wealth has been used by the state and private care industry in simplistic and rather crude ways which leave very little choice, particularly once illness and frailty set in
- Regard for older people's social networks and the value they attach to them and the comfort that can be derived from maintaining long standing friendships in familiar surroundings

The concept of 'ageing in place', i.e. living out one's life in familiar surroundings, relying perhaps upon a mix of friends and family as carers and mutual support between people in the neighbourhood, has emerged from passionate intellectual debate about how things could be better. It has gained credibility as new models have been created and adopted. The 'ageing in place' movement is more developed in the USA but is almost certain to gain ground in the rest of the developed world.

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It is often reported that older people, particularly widows and widowers, enjoy the move to care homes because it offers new friendships and companionship and is clearly an attractive alternative to isolation in their own home. When these are the only two choices it is unsurprising that older people or their family will opt for the care home. If isolation or institutionalisation are the only two options then we have not tried hard enough to look for new models.

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Two things which may curtail the independence of the older person or indeed the chronically ill or disabled person, despite their desire to be independent, make their own choices and maintain their strong and positive spirit, are:

- Limitations in the design of their home

- Fear and concern of family members living many miles from the older person

Poorly designed houses, built before people lived to the kind of ages that many now achieve, when personal choice for the elderly was regarded as of little importance and families lived close together and were on hand to lend daily support, are now a major limitation to the passionate desire to 'age in place'. These houses consequently lead to increased levels of enforced institutionalisation.

The answer for the last few decades has been retrofitting of often ugly structural or mechanical devices and deployment of simple electromechanical alarms, rationed by hard-pressed social services who themselves have to resort to hired carers of mixed quality and reliability. The whole approach leads to a prevailing mood that older people are an expensive burden.

Additional factors are the social changes in relation to employment, family mobility, family breakdown, new models of 'the family' and the complexity for forty- to sixty-year-olds who have demanding jobs, are bringing up children and often live remotely and yet feel some responsibility towards the physical, mental and economic wellbeing of their ageing parents or step-parents.

Without under-estimating for a moment the importance of social networks (friends and family) and the support they can provide not only in the practical sense but also, equally importantly, in the avoidance of loneliness and a slide into depression or self neglect, wireless technology is finding many roles in support of independent living and the option to 'age in place'. Technology is increasingly an acceptable offering as baby boomers for example have grown up with the IT and technology revolution of the past three decades.

Applications include:

Managing the home environment:

- Managing heating and lighting for comfort and safety
- Managing home security
- Managing telecoms
- Managing audiovisual entertainment systems and mental stimulation
- IT communications

Managing personal health:

- Increasingly sophisticated alarm systems
- Systems that provide bespoke electronic reminders concerning medication and daily living tasks for those

During the last few decades telecare has been limited to the retrofitting of structural or mechanical devices and deployment of simple electromechanical alarms rationed by hard pressed social services who themselves have to resort to hired carers of mixed quality and reliability.

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recovering from many kinds of brain damage or suffering from dementia

- Telemedicine, including wireless medical devices used in a hospital or clinic situation and remotely monitored rehabilitation at home after major surgery
- Telecare for those with chronic health conditions such as diabetes, heart and lung conditions, blood pressure, rheumatic / arthritic conditions, to ensure that early signs of deterioration are dealt with promptly thereby avoiding hospitalisation
- Subtle 'supervision' at a distance by carers (particularly family)

Modern telecare should include monitoring services for people with chronic health conditions to ensure early signs of deterioration are dealt with promptly thereby avoiding hospitalisation

3. The European And US Markets

Traditionally much of the care for the elderly in Europe has been borne by the state. However in the early 1990s it became clear that the cost of supporting a rapid increase in the ageing population would become an impossible burden for healthcare providers and social services. Government health departments have been able to ease this burden by encouraging, and in some cases forcing, elderly people to contribute more to the cost of their care. In the UK improved co-ordination between healthcare providers who run hospitals and nursing homes, and social services who oversee residential homes and sheltered accommodation, eased bed blocking or delayed patient discharges in hospitals. In some cases the families of elderly people who would otherwise be forced to refinance their homes to pay for care started to play a more active role in the care of their parents.

In the early 1990s it became clear that the cost of supporting a rapid increase in the ageing population would become an impossible burden for healthcare providers and social services.

In the US, where the state had traditionally played only a minor role in supporting the aged, a number of schemes emerged, especially in remote rural areas, where government agencies started to play a more active role in providing support for the elderly.

These trends tended to draw government attention away from technology as a means of supporting the aged in the UK but unlocking state funds for a number of 'telehealth for the aged' initiatives in the US.

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Europe has an innovative, entrepreneurial culture but works in a monopolistic, national, centrally funded (rationed) health economy with historical separation between primary care, acute care and social care. It is struggling to provide world class healthcare even at record levels of expenditure (around 8 -9 % of GDP)

The US also has an innovative, entrepreneurial culture but works within a healthcare system which has a complexity of national and state influenced public funding, as well as privately funded health insurance. The diverse and fragmented healthcare delivery system results in many poorer or underinsured citizens being in comparative health poverty despite the country having the highest percentage of GDP spent on healthcare in the world (around 18% of GDP).

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UK's NHS has a significant rationing role in healthcare and historically has shown limited interest in the preventative management of health conditions which is a major feature and selling point for wireless healthcare technology.

In comparison, despite federal and state investments in Medicaid and Medicare, the US has taken more of a market-based attitude to healthcare, and so health insurers are major players and influencers of healthcare management and delivery in the US. Through commercial pressures, but often in partnerships and alliances with providers, this is leading to greater innovation and application of the available technology. The US has demonstrated a greater willingness to use such technologies to aid personal management of health and avoidance of hospitalisation.

The general presumption by providers in the UK for example is that there are only two routes to market for wireless healthcare:

- The NHS, which uses a central purchasing mechanism, hence only large national or multinational equipment or service providers have the capacity to engage with the purchasing bureaucracy. Currently of course the NHS is preoccupied with pursuing the utopian electronic patient records system which, if it comes about, will further cement centralised decision-making about healthcare and may well control rather than encourage choice and market development
- Sales to social services departments at local level, often small-scale time limited trials of only moderately sophisticated alarm systems with little or no attempt at self management of chronic health conditions

These UK approaches are certainly not intended to raise public awareness of the possibilities offered by the technology. Consequently, in this climate of low awareness, there is inevitably no great evidence of demand and so a market is not perceived and hence is not developing. The UK lags behind the US, where not only are the technologies being deployed but also many wireless healthcare devices and services are approaching the status of consumer goods. There are compelling arguments in favour of wireless healthcare goods and services being marketed in the UK as a logical development of lifestyle choices, enabled by the now-ubiquitous broadband network. Initial preventative use, followed by self-management of chronic health conditions to avoid hospitalisation and maintain personal independence and ultimately 'ageing in place', offers business models and product and service markets which complement but which are not subservient to the current UK models of health and social care.

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4. The Impact Of Health 2.0

4.1 What Is Health 2.0

Health 2.0 is still a loosely defined model based on Web 2.0, which is an enhanced form of the World Wide Web that supports social networking and user-generated content. It remains unclear exactly how healthcare will ultimately benefit from user-generated content, although there are certain advantages associated with patients and healthcare providers sharing information. The healthcare bulletin boards that already exist on the conventional World Wide Web have played a key role in helping patients manage their conditions, and as collection and dissemination points for medical knowledge. Health 2.0 could further enhance the performance of web-based healthcare by hosting more advanced tools for storing and delivering medical information as well as providing support for health monitoring devices.

It remains unclear exactly how healthcare will ultimately benefit from user-generated content although there are certain advantages associated with patients and healthcare providers sharing information.

Two of the world's largest IT companies, Google and Microsoft, have a keen interest in the Health 2.0 model. Both companies are developing services that could provide a platform for next-generation healthcare providers. Their health portals, Google Health and Microsoft Health Vault, envisage the patient taking control of their own healthcare records and building their own electronic patient record. The patient would also be provided with a set of advanced Internet search tools to help them locate information related to their condition. At a time when incumbent healthcare providers are struggling to deploy their own electronic patient record systems and face issues regarding ownership, access to and security of patient data, an 'opt in' Health 2.0 solution will have some appeal. Even if take up is limited in any particular geographical region the fact that both Google Health and Microsoft Health Vault will have the same user interface, regardless of where they are accessed from, will provide the services with an advantage over the mutually incompatible systems being deployed by regional healthcare providers.

Both Google Health and Microsoft Health Vault envisage the patient themselves taking control of their own healthcare records and building their own electronic patient record.

Health 2.0 will also provide patients with access to peer support, and the vendor's analytical engines, which lie at the heart of the services, will benefit from the patients' experiences. If taken up by a large enough group of patients Health 2.0 services will begin to resemble the online services that have revolutionised the travel industry and provide a new model for ehealth and telecare. (This model is examined in more detail in the Wireless Healthcare Report, 'The New eHealth Model', a copy of which is supplied with this report.)

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4.2 Adoption Of Health 2.0 By Ageing Consumers.

Health 2.0 is, as were the Internet and World Wide Web in the early 1990s, very much a utopian concept. The healthcare industry itself has yet to fully take on board much of the basic functionality of Web 1.0, let alone the advanced functionality of services based on Web 2.0.

At first sight this seems to indicate against any large scale roll out of Health 2.0-based services to support telecare for the aged, especially as most consumers currently aged over 65 lack even the most basic IT skills.

However many of the next generation of elderly telehealth users will have organised holidays using web-based travel services and ordered goods from online stores. They will be familiar with concepts such as user feedback and customer rating of services. In some cases they will already be managing a medical condition with the help of a healthcare related website or 'blog' and may even have partially diagnosed their condition using data collected using a search engine such as Google or Yahoo. For this demographic group the leap from conventional healthcare, in the form of a face-to-face encounter with a GP, to an online experience using a Health 2.0-type service is not so great as it would be for the current generation of over 65s.

4.3 The Impact Of Health 2.0 On Incumbent Healthcare Providers.

The next generation of elderly telecare users will be drawn from the demographic group that drove social change in the 1960s. Their attitude to healthcare, or for that matter any other professional service, will be markedly different from that of their parents. Medical websites have already helped to erode the authority of the GP, and Health 2.0 services could well be the tool that ageing baby boomers use to exert even more influence over healthcare providers in the coming years.

Health 2.0 has the potential to empower all patients but it is the elderly telecare user, who lies beyond what the healthcare provider regards as the core part of their business, who could become an important early adopter. It is at the edge of the healthcare network that next-generation healthcare providers will be able to deploy new and innovative online services with the minimum of interference from the incumbent healthcare provider.

If companies that are currently deploying simple monitoring services designed for use by the elderly team up with one or more of the major IT vendors who are developing Health 2.0 services they could build a significant user base by picking off incumbent healthcare providers' underserved customers, in this case the elderly patient. This would wrong-foot the IT departments of the incumbent healthcare providers who are expecting the telecare technology used by the next generation of elderly patients to be the same as that used by the current generation.

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5. Blood Glucose Monitoring Case Study

Some elderly people who suffer from diabetes have been encouraged by their GPs to manage their condition with the aid of an over-the-counter blood glucose monitor. The experience of one such patient provides an illustration of the key factors that are either driving or inhibiting growth in the telecare for the aged market.

Some elderly people who suffer from diabetes have been encouraged by their GPs to manage their condition with the aid of an over-the-counter blood glucose monitor.

5.1 Overview

On the advice of their GP an elderly patient purchased an Accu-Chek Advantage blood glucose monitoring kit from their local pharmacy. The patient, who was in their mid-seventies, was still physically active and mentally alert. However they had been diagnosed as having type 1 diabetes, were prescribed insulin and told to adhere to a glucose free diet.

The Accu-Chek device used in this case relied on the patient pricking their finger and placing a drop of blood on a slide. The slide was then inserted into a device that displayed a reading of the patient's blood glucose level. Prior to initial use the device needed to be calibrated using chemicals provided with the monitoring kit.

5.2 Rational For Using The Device

The GP suggested the use of the glucose-monitoring device as they felt that if the patient monitored their own condition on a regular basis they would find it easier to manage their diabetes. They could, for example, modify their diet without waiting for the results of tests carried out by a nurse in the GP's surgery. It was also suggested that self-administered tests would reduce the number of times the patient would need to consult the GP.

The GP suggested the use of the glucose-monitoring device as they felt that if the patient monitored their condition on a regular basis they would find it easier to manage their diabetes.

If the self-administered test worked as envisaged it would save both the GP and the patient time and money and improve the quality of disease management. It would also provide the patient with a degree of independence and a feeling that they were in control of their healthcare.

5.3 Home Monitoring In Practice

Prior to using the blood glucose monitoring device the patient had little exposure to technology. While they did possess a mobile phone they had never used a PC or digital camera, or accessed online services. As a result they found the monitoring device's user interface difficult and the calibration process could not be completed without assistance.

For the GP, the potential benefits of home monitoring were not great enough to encourage the investment of time and effort required to set up this particular monitoring service.

It can be argued that the calibration process should have been undertaken at the GP's surgery. However, for the GP the potential benefits of home monitoring were not great enough to encourage the investment in time and effort required to set

up this particular monitoring service, a key part of which was the calibration of the device.

The patient may have persisted with home monitoring if it had been possible to demonstrate that in doing so they would save time and effort. However the patient was required to log the results in a diary which they were expected to take with them to their next appointment with the GP. During the intervening period the patient was expected to interpret the results of the tests and alter their diet accordingly. This may have proved relatively straightforward for a person who knew more about their condition and was familiar with the type of technology they were using, however this patient felt overwhelmed by the process and decided it would be safer to revert to intermittent testing at the GP's surgery.

The patient may have persisted with home monitoring if it had been possible to demonstrate that they could have saved time and effort by doing so.

5.4 Where To Next?

The lack of any real-time feedback was one of the key reasons the patient did not persist with the home monitoring of their blood glucose level. They felt very much on their own with the device, which may not have been the case if the monitor had been connected to back-office systems and support services hosted by a healthcare provider. Currently this patient's healthcare provider, the UK's NHS, does not have the communications infrastructure or back-office systems in place to support remote blood glucose monitoring and diabetes management.

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If supporting infrastructure had been in place it could have been used to guide the patient through complex parts of the procedure, such as calibration. The ability to transmit test results from the device to a patient record database, where it could have been accessed by the GP, would have saved the GP's practise both time and money. This would have meant that, even if it were not possible to guide the patient through the calibration of the device remotely, there would have been more incentive for the GP to invite the patient into the surgery and help them to set up the device.

Once the NHS has infrastructure in place to support remote blood glucose monitoring, then take up amongst the elderly, especially those that are housebound, may increase. However there are other potential drivers for this type of telehealth service:

- User support that could be offered via Health 2.0 type services, for example extensions to Google Health or Microsoft Health Vault. This support could extend beyond mere assistance with the use of the device to the hosting of records containing patient details and historic monitoring data. It might even prove possible to use a data analysis engine within such a service to carry out rudimentary diagnosis and provide the feedback that would help the patient manage their condition

In the future user support could be offered via Health 2.0 type services, for example extensions to Google Health or Microsoft Health Vault.

- While the lack of elementary IT skills prevents many elderly people getting to grips with monitoring devices, people who are currently approaching the end of their working lives have been exposed to a range of electronic devices such as digital cameras and smart phones. This next generation of elderly people will therefore be better able to cope with tasks such as the calibration of a glucose monitoring device.
- As the age at which people begin to suffer from diabetes is falling, it is likely that an increasing number of people will have experience of using a blood glucose monitor before they reach old age.

The next generation of elderly people will be better able to cope with tasks such as calibration of a glucose monitoring device.

These potential drivers should encourage blood glucose monitor manufacturers to add connectivity and other advanced functionality to their devices.

6. Changing Expectations Of The Elderly

'Aging in place' as a concept, and much of the telecare technology that supports it, have been designed by, and marketed to, the descendents of the current generation of elderly people. They are sold as a solution for busy professional people who are either living away from their family home or are too 'time poor' to provide the full support that their elderly parents need. This approach to the market is evident in the promotional videos produced by Intel and the marketing strategies of smaller players in the telecare market such as Caregiver Technology.

Today, aiming the technology which supports 'aging in place' at the busy descendents of elderly people makes a great deal of sense. It is these people who wish to retain their freedom while being, to some extent, absolved of the guilt they feel because they do not have the time to support their parents. In fact the founders of Caregiver Technology designed their Attentivecare system to provide their own parents with remote care.

However, if you were to ask the people who are currently designing and buying 'telecare for the elderly' solutions how they want to spend their old age, then the answer would no doubt differ from the current 'aging in place' model. The descendents of people who are currently 'ageing in place' will probably aim to remain as fit and active as they can for as long as possible, with mobility being high on the list of must-haves. They will expect the technology with which they have become familiar during their working lives to help them maintain links with their peer groups and also access a range of healthcare services that allow them to manage any conditions from which they may be suffering.

For the telehealth vendor this shift in the perception of what 'aging in place' is will create a moving target for their marketing departments. To add to the complexity, the elderly population will contain people with a wide variety of IT skills, ranging from zero to people who have been heavy users of mobile computing devices and social networking on-line services.

The traditional telecare vendors will also find themselves under pressure from consumer electronics companies who have followed their young professional customer base into old age. There is already some evidence that the manufacturers of consumer electronics are adding telehealth style functionality to the devices they produce. One example is Nintendo's Brain Age product. It is conceivable that companies that market GPS devices will also start to produce products that support people who are suffering from the onset of dementia. These companies will be following in the footsteps of Polar Electronics who have broadened the market for their fitness monitors by building up a presence in the telehealth sector.

Currently it is the family and carers of elderly people who are targeted by the marketing departments of companies who are providing products and services related to telecare for the elderly.

If you were to ask the people who are currently designing or buying telecare for elderly technology how they wanted to spend their old age, then the answer would no doubt differ from the current 'ageing in place' model.

For the telehealth vendor this shift in the perception of what ageing in place is will create a moving target for their marketing departments.

It is conceivable that companies that market GPS devices will start to produce products that support people who are suffering from the onset of dementia.

7. Market Evolution

A substantial amount of research has been carried out into determining the IT skills of the elderly.

The Pew Internet and American Life Project measured the age profile of people who were accessing the Internet in 2004. The percentages of people within an age band who were accessing the Internet were as follows:

Age	2004
50-58	62%
59-68	46%
69+	17%

The Kaiser Family Foundation measured the change in the demographic profile of ageing computer users between 2000 and 2005. The results were as follows:-

Age	2000	2002	2005
50-64	54%	66%	67%
65+	20%	28%	31%

It is tempting to make the assumption, based on the above data, that all the 50 to 58 year old people currently accessing the Internet (62% of the demographic group) will continue to do so when they move into the 59 – 68 year old demographic grouping.

This would result in a substantial increase in Internet use amongst retired people and provide a substantial boost for any company active in the market for 'telecare for the elderly' technology.

However vendors also need to consider that while a large number of older middle age people access the Internet in the workplace only time will tell how many continue to do so once they retire. Some, who currently have no access to the Internet at home, may acquire access when they retire as a means of staying in touch with friends, family and colleagues. Others may not, preferring face-to-face contact. In time it is likely that access to the Internet will be a norm in most households and most people will persist with it when they reach old age. The challenge for the telecare vendor is to determine the duration of this transition period.

With life expectancies rising throughout the developed world it is likely that the members of the 69+ demographic group, only 17% of which access the Internet, will make up part of the telehealth vendors' customer base for some time to come. An indication of the rate at which this demographic group is diluted by the addition of elderly people with higher IT skills

One assumption that could be made is that all the 50 to 58 year old people currently accessing the Internet (62% of the demographic group) will continue to do so when they move into the 59 – 68 year old demographic grouping.

Vendors also need to consider that while a large number of older middle age people access the Internet in the workplace only time will tell how many continue to do so once they retire.

can be seen from the figures from The Kaiser Family Foundation, who found that computer use by the 65+ group rose from 20% to 31% between 2000 and 2005.

One way vendors can insure themselves against a miscalculation of the proportion of elderly people with IT skills and access to online services is to design telecare services and technology that can be used by either the patient themselves or the domiciliary care workers who provide the support for the elderly person.

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8. How Vendors Are Adapting

Three players, Tunstall, Docobo and Caregiver Technology, are active at different levels in the telecare for the aged market. Tunstall and Docobo were profiled in the original Wireless Healthcare report on ehealth for the aged and this provides an opportunity to examine how their business model has changed as the market has evolved. Caregiver Technology is a relatively new player in this market and still retains its original business model.

8.1 Tunstall - On Both Sides OF The Fence

UK based Tunstall has built an ehealth and telecare business on the back of a simple alarm and entry detection systems platform which it has been using to monitor sheltered housing and residential homes. With a substantial customer base and a large amount of communications infrastructure in place it has begun developing and marketing more complex services such as cardio monitoring of patients who have recently undergone heart surgery.

Some UK based vendors who targeted the telecare for the elderly market, and positioned their products as potential solutions to 'bed blocking' by elderly patients, found themselves in difficulty when the government started to employ alternative, non-technology solutions to speed up the discharge of elderly patients from hospitals. One such solution was to improve co-ordination between social services and the healthcare provider (the NHS). Tunstall were fortunate in that social service providers were already key customers for its basic technology and the company was able to position itself as a facilitator of the co-ordination between the NHS and social services. Tunstall have been able to develop call centre operations that alert both the health provider and social services if an elderly person who is being monitored in sheltered accommodation or in a care home experiences problems.

With a substantial customer base and a large amount of communications infrastructure in place Tunstall has begun developing and marketing more complex services such as cardio monitoring of patients who have recently undergone heart surgery.

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8.2 Docobo - Catching Them While They Are Young

UK based Docobo has been particularly active in the telecare for the aged market and has positioned its Doctor@Home product as a solution that can be used by either elderly patients themselves or by domiciliary workers who provide that patient with support. While the company has supplied technology for ehealth projects across mainland Europe it has struggled to penetrate the UK market where the incumbent healthcare provider, the NHS, has been focussed on developing core IT infrastructure and has cut spending on technology and services that are deployed at the edge of its care network.

While Docobo has supplied technology for ehealth and technology projects across mainland Europe it has struggled to penetrate the UK market where the incumbent healthcare provider, the NHS, has been focussed on developing core IT infrastructure.

Docobo has responded by marketing its technology as a 'health hub' that is relevant to anyone who is monitoring their own health or managing a condition. This strategy is

particularly well suited to a market such as the UK where cases of diabetes amongst people in late middle age are increasing and where there is the prospect of picking up technology-aware healthcare consumers while they are young and then following them into old age.

8.3 Caregiver Technology - New Kids On The Block

The founders of US based Caregiver Technology developed their Attentivecare technology to help them remotely monitor their elderly parent. The company is focussed on providing an 'ageing in place' solution, and its target market is the carer and family providing support for the elderly person rather than the elderly person themselves. Being a relatively young company, Caregiver Technology has not yet had to realign itself to take account of changing market conditions. However if there is an increase in the IT skills of the elderly or a change in the aspirations of the next generation of elderly people the company may have to make some adjustments to its business model.

Being a relatively young company Caregiver has not yet had to realign itself to take account of changing market conditions.

8.4 Vendors And Health 2.0

All three vendors could realign their business models to exploit Health 2.0 type services. However, this would be simpler for Docobo and Caregiver Technology as they are working independently of incumbent healthcare providers whereas Tunstall's business model is, to a large extent shaped by the now well-established working relationship between social services and the NHS. It is unlikely that Tunstall would take on board an alternative to the electronic patient record system being developed by the incumbent healthcare provider unless it started providing services to a private organisation that had already taken that route. A Google Health or Microsoft Health Vault platform would be an option for Docobo, and perhaps would be the preferred route for Caregiver Technology given that this would provide the US company with access to a nationwide, and possibly international, market for its technology and services.

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9. Projections

The market for telecare services for the aged is evolving rapidly. While the traditional image of a telecare system is of a healthcare-orientated videoconferencing system, Health 2.0 type services could shift the focus away from simulated face-to-face communication. Instead a less intrusive and perhaps more intelligent and analytical form of communication between the elderly person, the monitoring service and the carers and family members who are providing support could be employed. Tacit data obtained by analysing voice calls, internet browsing data and movement of the elderly person will become equally, and perhaps more, important than visual communication within a telecare for the aged service.

In the UK the healthcare market is moving into a post NPfIT (or Connecting For Health) phase and, to some extent, is likely to return to the localised projects that characterised the telecare market a decade ago. This could encourage a number of small initiatives based on telecare for the aged systems. While such projects should in theory link to the core NHS infrastructure, primarily electronic patient records, which are still under development, many small vendors as well as patients and GPs are losing faith in the project. If electronic patient records fail to live up to expectations the door will be open to the large global IT vendors with Health 2.0 solutions which can provide back office solutions and services for telecare systems.

Some of the concerns, chiefly relating to security, being expressed about the electronic patient record systems under development by incumbent healthcare providers will also become an issue for vendors hosting Health 2.0-based patient records. However problems of ownership and compatibility will not hold back the deployment of Health 2.0-based electronic patient records.

In Europe only Denmark with its Sundhed.dk has a system that appears to bridge the gap between the traditional approach to patient data and the one envisaged within the health 2.0 model. The evolution of the Sundhed.dk service could provide an important indication of how electronic patient record systems could be deployed in the future and the extent to which a user-owned record system might be used as a platform for a Health 2.0-based telecare service for the elderly.

Telecare may become a key component in wide area networking systems that are specially designed to meet the needs of the elderly. Some communication companies emphasise the suitability of their services for use by the elderly. It is likely that other companies will, at some point, include telecare-related applications in the service bundles that they offer to consumers.

Tacit data obtained by analysing voice calls, internet browsing data and movement of the elderly person will perhaps be more important than visual communication within a telecare for the aged service.

If electronic patient records fail to live up to expectations the door will be open to the large global IT vendors with health 2.0 solutions to provide back-office solutions and services for telecare systems.

Security and access will also be an issue with patient record systems hosted by health 2.0 vendors.

Sundhed.dk is the official Danish eHealth Portal for the public Danish Healthcare Services

www.sundhed.dk

Already some companies offer Internet services targeted at the aged.

www.pchomehelper.co.uk

10. Conclusions

The telecare for the elderly market will evolve as a new generation of retired people join the pool of potential users. Future users will possess a greater awareness of IT than their predecessors, having been exposed to PCs and Internet technology during their working lives and grown used to accessing a wide range of services on-line.

The current attitude to growing old, encapsulated in the concept of 'aging in place', will change as the generation that was a key driver of social change in the 1960s reaches old age. While people will still be interested in remaining in their own homes and leading independent lives they will also want to remain both physically and socially active for as long as possible.

While the concept of Health 2.0 has yet to be clearly defined it does seem to be aligned with many of the aspirations of the next generation of elderly telecare users. Providers of Health 2.0 services will also benefit from the fact that much of the telecare for the elderly market lies outside the area of the healthcare market controlled by incumbent healthcare providers. This means that take-up of Health 2.0 based telecare applications by the elderly will not be inhibited by the type of restrictive practices often present within the mainstream healthcare sector.

The mix of IT skills and a diverse range of social attitudes amongst the two or three generations that make up the section of the population defined as elderly will create a complex market that will require a range of telecare solutions.

Consumer electronics companies who are following their customer base into old age may, if they have products which are low cost and simple to use, find themselves with a strategic advantage over conventional healthcare IT vendors.

There will be a growing demand for online blood glucose monitoring devices and services, as people with IT skills and a familiarity with online services reach an age where they are likely to suffer from diabetes. This growth in potential users will encourage the building of support services, the absence of which currently inhibits the growth of online diabetes management.

The ownership of patient records will become an important issue in a market where an increasing number of elderly people wish to manage their own health. If this is the case, telecare for the aged will become a key driver for Health 2.0-based back-office systems.

Healthcare IT vendors whose products are built solely around videoconferencing services will need to expand into areas such as the collection and analysis of tacit healthcare related data, for example voice patterns and movement.

The telecare for the elderly market will evolve as a new generation of retired people, with IT skills, join the pool of potential users.

The current attitude to growing old, encapsulated in the concept of 'ageing in place', will change.

Providers of health 2.0 applications will also benefit from the fact that much of the telecare for the elderly market lies outside the area of the healthcare market controlled by incumbent healthcare providers.

A mix of IT skills amongst elderly users will create a complex market.

Consumer electronics may have a role in future telecare systems.

In the future there will be enough elderly diabetes sufferers with IT skills to support online blood glucose monitoring.

The need for a user owned patient record system to support telecare services may drive the market for Health 2.0.

Smart data analysis will become as important as videoconferencing within the telecare for the aged market

11.0 Vendors

11.1 Tunstall



Tunstall At A Glance

The UK based telecare services provider was founded in 1957, employs 1000 people and supports 2.5m people around the world with telecare services.

www.tunstall.co.uk

Tunstall employs a range of telecare sensors to monitor risks, hazards and environmental conditions, such as smoke, floods, extremes of temperature, CO and natural gas, triggering a call to the Response Centre or designated carer if assistance is required. Its bed occupancy sensor can be programmed to switch on the lights on the way to the bathroom if a person gets out of bed, helping them to find their way there and back more easily.

Tunstall's UK response centre currently monitors over 120,000 connections

A typical example of the company's service is a husband and wife who had both been in hospital. The wife was recovering from major surgery and was very frail; the husband, who is diabetic and had recently had his right leg amputated, was being discharged into residential care. Both were distressed at being separated and wondered if they would ever return home together.

It was decided the husband could go home if one of Tunstall's Intermediate Care packages, which included a fall detector, was put in place. He also had help from the Community Support Team and District Nurses. The wife was discharged two weeks later with the Intermediate Care package still in place.

The above demonstrates how the company has positioned itself to exploit the increased co-ordination between the UK's main incumbent healthcare provider, the NHS, and local social services departments. This co-ordinated approach has played a key role in reduction of bed-blocking, i.e. hospital beds taken up by elderly people who could not be discharged due to a lack of support at home. The company has been successful at a time when some telecare service providers, especially those with high-technology based solutions and those who targeted either the health provider or the social services, have failed to penetrate the telecare for the aged market in the UK.

Analysis

While other, telehealth and telecare companies attempted to market a purely technology-based solution to the bed-blocking problem Tunstall built services that recognised that delayed hospital discharge owed much to a lack of co-ordination between social services and healthcare providers. Tunstall's long standing relationship with social service organisations, charities, carers and healthcare providers served it well in this respect and it is likely the company's business will continue to grow as more elderly patients enter the market for healthcare and support. However the company's close ties with incumbent healthcare providers such as the NHS means it is now locked into some of the systems those incumbents are deploying. It is unlikely that Tunstall will adopt Health 2.0-based services. While in the short to medium term this may not matter, in the longer term it could find itself under pressure from a number of small telehealth vendors who use Health 2.0 as a universally available and low cost telecare platform.

11.2 AT&T

The AT&T home monitor service uses both live and recorded video in combination with a range of environmental sensor options to provide users with the tools they need to remotely monitor their own or their elderly parents' homes. The service allows users to remotely control lighting, and it can provide a range of alerts and reports on home conditions, such as motion, door and window activity, water leakage, and temperature changes.

The company has highlighted the monitoring of elderly parents as one of the applications of their home monitoring system. For the user, the service costs \$199 to set up and \$9.95 a month to run.

Additional equipment is available to expand the home monitoring solution, such as additional cameras and contact sensors, wireless temperature and water sensors, and wireless power controls for light fixtures or other appliances.

All monitoring equipment is controlled via an integrated Web-based portal. Users can access live video feeds and reports from the portal, and establish customised instructions for the service to provide alerts or to take action under specific conditions.

While the remote monitoring service is supplied by the company's business development group, AT&T itself also funds the AT&T Centre for Telehealth Research and Policy. The Centre, which is based at the University of Texas Medical Branch, sponsors programmes in experimental telehealth, performs outcomes studies, and undertakes policy development in the areas of telemedicine, telehealth, and technology-supported medicine.



AT&T At A Glance

The Texas, US headquartered company employs 303,670 people worldwide and markets a home monitoring service which can be used within a telecare for the aged solution.

www.at&t.com



Analysis

Most major telecom companies actively promote telehealth and telecare and provide support for a wide range of healthcare related research projects. AT&T's focus is on hospital-based systems where either directly via its consultancy division, or in conjunction with partners, it builds network infrastructure and deploys wireless services. However the Remote Monitoring service is not a medical solution but is aimed primarily at small business owners who wish to monitor their premises while they are at home, and security conscious homeowners who wish to monitor their homes while they are at work or away on holiday. Care for the elderly is just one of the applications that AT&T has identified this service. The Remote Monitoring service does include many of the key elements required to monitor a patient in their own home and could also provide a platform for additional healthcare related monitoring and support services. However it is unlikely that telecare will become a key application for the service unless a partner who is active in the telecare business takes the service on board and develops it for a vertical market such as, for example, telecare for the aged.

11.3 Docobo

Docobo has been heavily involved in the development of systems for the management of patients with long term conditions such as heart disease in their own homes. It provides a range of products and services including the doc@HOME service for the management of chronic disease and the HealthHUB for collecting physiological, quality of life and life style data; data transfer and receipt of messages permit effective and efficient management of patients in their own homes.

The doc@HOME service offers care providers an integrated solution for the collection, management and analysis of essential patient related data, and permits efficient interaction between clinicians and patients at home. Trials of the system have been carried out in several EU countries including Portugal, Germany, Estonia and Finland.

The doc@HOME service is intended for use in the patient's own home, to answer a range of pertinent health and quality of life questions. The collected data is supplemented with medical parameters including blood pressure and weight on a daily basis. Analysis of this data is performed automatically by the system, and the website is reviewed by the CHF (Chronic Heart Failure) team. Where issues of concern are apparent patients are telephoned, advice given and medication changed where required. Additionally, if the telephone intervention is not successful then a member of the CHF team (joint hospital and primary care provider) will visit the patient in their home.

The company's HealthHUB has been developed for home use and is intended for use by patients, of all ages, who have long term conditions. It is similar to a PDA and uses the principle of 'store and forward' to ensure that measurements of vital signs and changes in symptoms, side effects, life style and quality of life are securely recorded and transferred to a monitoring centre.

Docobo has sales offices in Estonia and Portugal.

doc@HOME

Docobo At A Glance

The Leatherhead, UK based company is a communications solutions provider that was formed in 2001 and is developer of the doc@home and HealthHub telecare products.

www.docobo.co.uk



Analysis

Like many UK based telehealth companies Docobo lost its traditional customer base when the NHS's IT funding was channelled away from smaller projects at the edge of the care network and into the construction of core infrastructure. Smaller independent projects have now started to re-appear in some parts of the NHS but their success is to some degree dependent on applications working with core NHS applications such as electronic patient records. If deployment of electronic patient records is slow then vendors such as Docobo may have to consider using Google Health or Microsoft Health Vault or other Health 2.0 based services as platforms for their telecare and telehealth solutions. The company, like other health hub vendors, may be drawn to this market due to the fact that at some point Health 2.0 will need to support devices rather than merely managing healthcare related content.

Docobo has been adept at finding ways around obstacles within its market. It has established itself abroad when the UK market ground to a halt and rebranded its key products as a generalised health and telecare solution rather than purely a solution for the elderly house-bound patient. This change in direction should allow it to address the needs of late middle-aged people with diabetes and heart disease and continue to serve these patients when they retire from work.

11.4 Caregiver Technology

AttentiveCare was originally developed to meet the needs of three long-distance caregivers: three brothers who were primary caregivers to their mother who was diagnosed with Alzheimer's disease in 1994. The brothers lived three to five hours away and had full-time jobs. AttentiveCare was conceived and developed to enhance the support provided to their mother, optimise the time the caregivers had available to devote to caregiving, and maintain their mother's independence, keeping her on the family farm for as long as possible.

The first prototype system became operational in December 2001 as an integral part of their intervention strategy. It enabled their mother to remain the farm for the next 2 ½ years.

A broadband Internet service became available from the local telephone company in early 2001. With that service, they decided to set up a videoconferencing capability with their mother. This involved installing a broadband Internet connection and a computer system with a video cam in her home. The intervention strategy used included weekly onsite visits complemented with the Internet-based technology.

The system was first used productively in December 2001. This system was built using off-the-shelf products which lacked the functionality required in a caregiving environment as they were unsuitable for someone with no computer skills or who suffered from Alzheimer's. As a result Attentivecare uses a customised videoconferencing platform.

After eighteen months, the Internet-based technology and weekly onsite visits were complemented by professional in-home support of two hours per day, five days per week. The primary objectives of the professional in-home care were to provide social interaction for the mother and keep her physically active (up and out of the recliner). This support continued for the next twelve months.

The Attentivecare software is now marketed via a web site and costs \$198 to set up with a \$58 monthly subscription. Caregiver Technology also provides custom installations that include hardware, software, installation and ongoing technical support.



Caregiver At A Glance

Oklahoma US based Caregiver was formed in 2002, to market technology that three brothers had used to remotely monitor their elderly parent.

www.caregivertech.com



Analysis

Attentivecare is a service that is provided independently of incumbent healthcare providers or social service organisations. At the most basic level it is a videoconferencing system customised for use by an elderly person. However it is also an ideal platform for a number of emerging telecare for the aged services and if Caregiver Technology is able to build some of these services into Attentivecare it may develop into an interesting Health 2.0 service for the senior citizen. Some repositioning of Attentivecare, which is essentially a tool to support 'ageing in place', may be required due to the fact that the current generation of ageing baby boomers are likely to have a different attitude to old age than their parents.

11.5 AMD Telehealth

AMDTelehealth's main product is a home monitoring solution called CareCompanion. The latest version of CareCompanion is a self-contained home unit designed for patients requiring assessment and reminders. AMDtelehealth claim that patients find the service easy to use due to features such as large text and a colour graphics touch screen interface. The system prompts the patient to take medications and answer easily programmed questions related to their specific needs. The CareCompanion's hub can be linked to a variety of medical peripherals. These peripherals include: blood pressure monitor, pulse oximeter, peak flow meter, glucometer, videophone and stethoscope.

The CareCompanion system also allows the patient to access education content provided by their caregiver and allows the patient to see a history of their performance over time. Data collected is sent to a server via the patient's home telephone line. Caregivers can access this data via a secure website at any time from any internet-enabled computer. Any data collected by the CareCompanion that falls outside a range pre-set by the caregiver can generate an alert to the caregiver.

The complete CareCompanion System, comprising device and website, is intended to be a remote, retrospective monitoring tool to supplement a patient's care. The device is intended to be a simple 'store and forward' communications platform that allows clinicians and privileged users to access a patient's information for review through the website. The device is intended for use as a tool to monitor patients 'more closely from a distance' and motivate them through education and reminders. AMDTelecare do not envisage the CareCompanion system being used to replace existing treatments or consultations, nor is it to be used as a substitute for a qualified healthcare professional's judgment/treatment plan. The CareCompanion System is also not intended to act as an emergency response system.

The system has yet to receive FDA approval and will be marketed by AMDTelehealth to telecare service providers.



AMDTelehealth At A Glance

The Massachusetts, USA based company is the former home-telemedicine business of AMD Telemedicine, which itself first became involved in telemedicine in 1993.

www.amdtelehealth.com



Analysis

AMDTelehealth are one of a number of companies supplying telehealth hubs (see the profile of Docobo), however unlike other companies they have their roots in the telemedicine, as opposed to the communications, industry. The separation of AMDTelehealth and AMDTelemedicine made sense as there is more to supporting elderly people in their home than merely monitoring an existing medical condition. Like other companies who are building telehealth systems the company would find their market more buoyant if Google Health and Microsoft Health Vault were fully developed, as these Health 2.0 based services would provide an ideal platform for AMDTelehealth's applications and devices.

Appendix A. Author Biographies

Peter Kruger is a senior analyst with Wireless Healthcare; he specialises in the impact of demographic trends on the healthcare sector and the growing use of consumer wireless devices in ehealth applications.

David Cudby is the founder of Networks For Independent Living and a specialist in technology and services that support 'ageing in place'

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