Dr Chris Mimnagh, a practicing GP and Director of Strategy for Liverpool Health Partners, discusses current telehealth solutions, his experience, and the possible future impact of telehealth on a generation for whom technology has become routine.
Welcome to the fourth issue of Innov-age and to a New Year!

It seems difficult to believe in 2014 that 32% of GP practices have not embraced technology and do not even have a web site.

This is all set to change as outlined by Dr Chris Mimnagh in his article on page 4 where he discusses his experiences as we move towards a tech savvy ageing population.

By the end of the year we can expect to see most UK practices making the most of online appointment and prescription services. Furthermore, other GP Practices will have extended technology-based services to include, for example, pre-appointment, pre-op and minor ailment screening.

Many people confuse these on-line services with telehealth and this issue serves to highlight that the focus of telehealth is much more on technology to help with living more independently at home. Specific examples are provided throughout the issue ranging from mobile phone technologies through to other remote home monitoring devices.

As with previous issues our focus has been to provide you with a summary of the underpinning science and those telehealth technologies and services that have been subjected to rigorous evaluation.

Cochrane Corner provides us with some useful insights through rigorous review into the breadth of future teleheath opportunities whilst other articles focus on specific developments.

Ultimately, whether you focus on the specific or the general, what is apparent throughout this issue is that teleheath is here to stay and we can look forward to a burgeoning of technologies and services throughout 2014 and beyond.

Jackie Oldham
Honorary Director, Edward Centre for Healthcare Management Research
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Changing Technology and the Ageing Population

Dr Chris Mimnagh

Dr Chris Mimnagh is a practising GP and Director of Strategy for Liverpool Health Partners. His interest in technology grew from a love of gadgets and culminated in a Masters in Health Informatics which included working with colleagues from across Europe. Once unplugged from the NHS he embarked on a career of disruptive innovation, including time as Director of Strategy for a large Foundation Trust on Merseyside. In his spare time he sings in a choir and enjoys urban mushing with his two dogs.

The current generation has seen some of the fastest ever changes in terms of technology in health. Heart transplants, cataract surgery, CT, MRI scanning and keyhole surgery are all creations of the last fifty years. Information itself has grown along with access to it. In 1995 0.4% of the world’s population had access to the internet, whereas this year 40% will have access. Right now the internet is moving 2 exabyte’s of data per month; that’s 200,000 Libraries of Congress flowing across the globe.

The rate of growth is staggering, but not without price. As each new technology emerges old ones are made redundant. For example, inventors of the modern film camera failed to spot that digital pictures would become the norm, believing that their customers would always want the excitement of waiting for development to occur, and to enjoy the feeling of an album in their hands.

Professor Clayton Christensen of Harvard Business School describes these new technologies as ‘disruptive innovations.’ He is the world’s foremost authority on the subject and has published extensively in the field (e.g. Christensen et al., 2006). These innovations are currently following some key trends in that they are becoming portable, closer to the end user and empowering better decisions in whatever domain they are implemented.

So what?

Our improved life expectancy is currently regarded as a crisis in healthcare. The Office of National Statistics suggests that in 2035 5% of our population will be over 85, and 22% will be over 60. The experts know that our current systems can’t cope with such an increase based on today’s healthcare systems and have suggested many approaches to coping with the problem, not least the role of telehealth. Indeed, as early as 1998 the role of telemedicine in the NHS and beyond was being discussed (Wallace et al., 1998).

Technology and an ageing population.

In terms of technology and an ageing population Douglas Adams suggested that there were not actually seven ages of man, just three; ages 0-18 when a new piece of technology is discovered the child assumes it was always there, and just gets on with it, over 35 when a new piece of technology is “for the kids” and 18-35 when a new piece of technology looks like a potential job opportunity. Current research suggests that Douglas Adams may have got this wrong as there is another age best described as ‘Silver Surfers.’ These are people who have retired, have time and income, and an interest in technology. For these individuals technology could start off simply as an amusement, but then subsequently a tool and, as the silver surfers’ age, finally a lifeline (Charness, 2014).
I suspect that in twenty years time when I’m seventy, I won’t be any less capable of operating my iPad. By then, new ways of interfacing will mean that physical limitations will be less significant, voice control will be the norm and we will almost certainly have computers capable of passing the Turing test, even if they are not yet recognized as sentient beings. If my musings sound far-fetched they are nothing in comparison to Ray Kurzweil, inventor and futurist who sees nanomachines being incorporated within our bodies to fix conditions such as diabetes and certain genetic afflictions, ultimately leading to a fusion of human and machine (Kurtzweil, 2011).

But enough of the far flung future, what is here now and what will be coming soon to a GP surgery near you?

The UK and Netherlands have a long track record of primary care computerisation. Within my own practice we have abolished paper, all letters and documents are scanned into our system, all results, both lab and x-ray are electronically requested and received, and most of us are using the national electronic referral service “Choose and Book”.

In August 2013 we moved to electronic prescribing. Previously our prescribing decisions were checked by machine for interactions, but our decisions were still recorded on paper and physically transferred to the pharmacy. Since August, once an individual has nominated their preferred pharmacy an electronic prescription is sent for delivery or pick up as requested. Even this simple change has an impact on paperwork, convenience and travel time.

There are great expectations of telehealth, telecare, telemonitoring and telecoaching with all of these various technologies being based on the idea of distant or remote support. To date they have tended to be “bits of kit” sold and supplied as such, but right now systems such as ‘Florence’, a simple NHS telehealth system (Cottrell et al., 2012) that takes data from mobile phone messages and raises alerts if the data is abnormal or has changed in a significant way, are starting to ‘disrupt’ this type of piecemeal approach.

...continued on next page
As we move towards a tech savvy ageing population, everyday social media and devices such as mobile phones may provide even more support and care. We often regard a decline in social function as a part of ageing, but in twenty years I hope to be using e-mail, Skype, Facetime and Facebook to defeat the pressures and consequences of social isolation, to act as my memory box for reminiscence therapy and to alert my family, friends and carers when I’m not well.

Even today in clinical practice my iPhone has replaced a whole shelf of text books, from the national formulary to clinical prediction rules. I have access to that data at the point of care, wherever that care happens to be. One particularly useful diagnostic tool is Cantabmobile. This is an evidence based memory and mood screening tool which runs on my iPad and enables me to screen for dementia, mild cognitive impairment and mood problems.

This app is aimed at detecting dementia at an earlier stage than traditional tests and I no longer send patients to the memory clinic who do not have cognitive impairment. Furthermore, early reassurance that their memory is fine often relieves the “worried well” or depressed patient, and the results act as a springboard for other discussions.

However, amid all this technology we still have a long way to go. Patients don’t currently view their own records online, despite good evidence showing it enhances the communication between physician and patient (Mold et al., 2012) and we still send people for consultations rather than bringing the consultation to them. Although the UK Health Secretary has called for all practices to move to online appointment booking, e-mail consultations, and prescription requests, these moves are simply just a start and we require significant ‘disruptive’ transformation to enable primary care to be fit for the future.


Dr Chris Mimnagh
GP & Director of Strategy
Liverpool Health Partners
Telemedicine

Telemedicine includes transmitting test results down phone lines, using video technology for long distance consultations or education, and many other uses. Generally people who self-monitor at home or had video consultations were satisfied with their experience.

Telephone support and monitoring can provide specialised heart failure care to a large number of people who may have limited access to healthcare services. Such use of information technology can reduce the rates of death and hospitalisation and improve the quality of life. The majority of elderly patients learned to use the technology (e.g. electrocardiograph (ECG), blood pressure, weight, pulse oximetry, respiratory rate and medicine administration) easily and were satisfied with receiving healthcare in this way.

Portable monitors allow patients to self-test at home so that they can adjust their medication according to a schedule, or they can call a clinic to be told the appropriate dose adjustment. This is helpful for patients on oral anticoagulation drugs and for self-monitoring of blood glucose in people with type 2 diabetes who are not using insulin and who have been diagnosed for more than one year. It is important that patients who wish to use this method complete some training. There is no evidence that it affects patient satisfaction, general well-being or general health-related quality of life.

Visits to emergency departments and family doctors have increased and one possible way to reduce the demands is to provide telephone helplines, hotlines or consultations. People can speak with health care professionals, such as doctors and nurses, on the telephone and receive medical advice or referral to an appropriate health service. Telephone consultation appears to decrease the number of immediate visits to doctors and does not appear to increase visits to emergency departments. It is still unclear though, whether it is just delaying visits to a later time. Telephone consultation also appears to be safe and people were just as satisfied using the telephone as going to see someone face-to-face.

Many patients encounter a variety of problems in the first weeks after they have been discharged from hospital to home. Telephone follow-up, initiated by hospital-based health professionals, is considered to be a good means of exchanging information, providing health education and advice, managing symptoms, early recognition of complications and giving reassurance to patients after discharge. Some research has shown that telephone follow-up is feasible, and that patients appreciate such calls. However, no firm conclusions about the effects of telephone follow-up can be made at this time.


Case Study

Telehealth Services Outcomes within an NHS Setting

Alex McGowan is the manager of Sefton Arc Telehealth and Telecare Services. Sefton Arc have been providing telehealth services for over four years. The services include the installation and maintenance, as well as the monitoring of patients’ readings. They also provide support and consultation services in helping to develop and set up effective telehealth programmes.

Since 2009 we have been responsible for the set up and delivery of multiple telehealth projects to providers in the North West, and have gained a good deal of experience about what works and what doesn’t when trying to provide and implement telehealth services within NHS settings.

For those unfamiliar with telehealth, it is the use of technology to remotely monitor patient’s vital signs and other health indicators that can be used in the effective long term management of their medical conditions. The readings commonly recorded using telehealth include: blood pressure, pulse, weight, SpO2, ECG and blood glucose. The ability to monitor patients’ vital signs on a daily basis without a clinician in attendance, and in the convenience of their homes, allows for any adverse changes to an individual’s health to be detected quickly, thus ensuring that appropriate action is taken at the earliest possible stage.

Early intervention prevents unnecessary hospital admissions, and allows for resources to be targeted more effectively by identifying those who need them most. In addition, telehealth has been shown to reduce length of stays in hospital admissions, reduce unnecessary home visits and give patients a greater understanding and responsibility in how they can manage their own health needs (Chen et al., 2013).

From our own experiences the patient groups most frequently requiring monitoring are those with chronic long term conditions such as COPD (chronic obstructive pulmonary disease) and CHF (congestive heart failure). However, telehealth has been used for a variety of other conditions, including patients who have suffered strokes.

With a population that is living longer but in poorer health, the cost effective management of people with long term conditions presents a significant financial and logistical challenge to the NHS. To continue to do the same things using existing methods of service delivery is not a viable option in the long term and exploring new ways of working is critical. The use of telehealth represents an important approach in changing how services are delivered to best respond to the increase in population of patients living longer and in poorer health.

Service Review

As a service provider the need to deliver real and observable outcomes is essential. A service review conducted independently by the Local Health Improvement Team, looked at the impact of telehealth on 34 patients in terms of hospital admissions, A&E visits and ambulance costs over the 12 months prior to and 12 months after the introduction of the service.

Following the introduction of telehealth a £200,000 reduction in costs relating to A&E admissions, hospital admissions, and ambulance call outs was observed.

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<th>Admissions</th>
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<td>Number of emergency admissions decreased</td>
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<td>Cost of emergency admissions decreased</td>
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<td>89%</td>
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<td>Savings on emergency admissions</td>
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<td>Emergency admissions</td>
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<td>Emergency Admissions</td>
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<td>A&amp;E Attendances</td>
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<td>Savings of Total</td>
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Ambulances

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Although not considered as part of the financial review the introduction of telehealth will undoubtedly have reduced the number of days spent in hospital thus producing further savings. The A&E admissions in this group of 34 patients, were reduced by a total of 67 visits compared to the previous year, which is approximately 2 less visits per person per year since the introduction of the telehealth programme. Some of these admissions would have undoubtedly led to a prolonged stay in hospital.

When looking to introduce new ways of working there will always be some resistance. One commonly cited reason as to why telehealth won’t work is that patients may not be able to operate or understand how to work the telehealth equipment. From our own experience, this is not the case, as patients abilities to cope with new technology and changes can often outstrip that of some clinicians. This has been supported through questionnaire evaluation that has shown on the whole, most patients cope well with the introduction of telehealth equipment and develop a greater responsibility for managing and understanding their condition. More specifically, in a questionnaire sent to over 50 patients who have used Sefton Arc telehealth services for a minimum of 6 weeks the following findings were observed in relation to the patient experience:

- 85% reported an improved understanding of the impact of the condition on their daily life.
- 79% reported an improved understanding of their condition.
- 81% reported developing a greater knowledge of what to do if their symptoms worsened.
- 79% answered ‘yes’ to having coped and managed with their condition better.
- 89% of patients benefited ‘a lot’ from using the telehealth service.
- 76% of patients and 79% of patient’s family’s/carers reduced their anxiety about their condition.
- 81% of patients who have had a telehealth system removed say they will continue to benefit from having used telehealth.

From the perspective of the clinicians involved in telehealth projects a number of significant benefits have been observed including the ability to safely manage a greater case load, while at the same allowing for earlier interventions where necessary. This is due to telehealth allowing for the more appropriate use of resources, effective workload prioritisation and increasing early intervention. While this may result in the reduction of time spent with each individual patient. **Telehealth helps to ensure that patients are seeing their clinicians when they most need to.** Taking away the reliance on scheduled visits or for patients to inform the clinicians when they may be feeling unwell increases the possibility for early intervention.

In a questionnaire sent to clinicians regarding the impact that telehealth has had upon patients:

- 82% of staff felt patients had benefited from the telehealth.
- 50% felt the one main benefit was anxiety reduction. However, many other benefits were highlighted including better medication compliance, increased knowledge, education and self-management.

In summary, the benefits of telehealth can make a real difference to patients’ lives while at the same time delivering savings to the NHS by reducing hospital admissions through early intervention and increasing patient responsibility for the management of their conditions. For clinicians, working practices can be improved, allowing for expanded capacity of services and ensuring those most in need of clinical intervention are seen promptly and quickly.

However, a cautionary note for anyone implementing telehealth programmes as services – those programmes that are set up poorly in the initial stages are only likely to increase burdens on clinicians and GPs, failing to deliver the desired outcomes. Telehealth services when set up and run correctly should be an asset to both the patient and the NHS in terms of cost and improved working practices. For further information regarding telehealth please feel free to Contact Alex McGowan at Sefton Arc on 0151 934 4470.

Patients benefit from receiving treatment in hospitals that are active in research

A project funded by the Health Services and Delivery Research (HS&DR) Programme has confirmed that patients benefit from receiving treatment in hospitals that are active in research.

Scientists, led by Dr Stephen Hanney of Brunel University, looked at research papers in a diverse range of areas such as breast cancer treatment and the rehabilitation of veterans with war injuries. Overall, positive results were described from receiving treatment in active research environments as, for example, in many cases it led to ground-breaking treatment options being taken up earlier or clinicians paying closer attention to research in their area of expertise. Twenty-eight papers demonstrated that research activities improve health-care performance. Seven of these also reported some improvement in health outcomes. For the rest, the improved care took the form of improved ways of implementing processes of care. There is also evidence that those hospitals where research is closely linked to patient care achieve better patient outcomes compared to other hospitals where research is not a priority.

To find out more please read the full report on the NIHR Journals Library website www.journalslibrary.nihr.ac.uk/hsdr/volume-1/issue-8

Primary research needed into benefits of telemedicine for heart failure patients

Further research is needed into the potential benefits of telemonitoring support for heart patients, concludes a study funded by the NIHR Health Technology Assessment (HTA) Programme.

The study carried out a systematic review of home telemonitoring, or structured telephone support programmes, for patients with heart failure who had recently been discharged from hospital. The study investigated the clinical and cost-effectiveness of these strategies when compared with usual post-discharge care. Heart failure affects more than 750,000 people in the UK, and is more common in those aged over 60 years. It is associated with a number of other serious health conditions, often resulting in repeated and lengthy hospital admissions. Patients are at a high risk of rehospitalisation in the first few weeks after discharge, with 20 to 30 percent being readmitted within a month, rising to 50 percent at six months. Home telemonitoring enables health care providers to monitor a patient’s progress remotely. Methods involve using a structured telephone support programme with the patient, or patient-initiated electronic monitoring. In patient-initiated monitoring, the patient enters data such as their current weight, blood pressure and electrocardiographic details via a telephone or digital cable from their home, direct to their healthcare provider. Mr Abdullah Pandor of the University of Sheffield, who led the review, states “The study reviewed the existing evidence base and found that there are some benefits to telemonitoring. However, the findings were statistically inconclusive, so more primary research is needed into this topic area, with a focus on how to deliver the service effectively, and the potential cost implications”.

To find out more about this project please visit the NIHR Journals Library www.journalslibrary.nihr.ac.uk/hta/volume-17/issue-32

2013 Bionow Annual Awards

On the 28th November 2013 the prestigious Bionow Annual Awards Dinner took place in the Northwest of England. The Bionow Awards, which are a highlight of the biomedical calendar, are now in their 12th year and showcase the very best of this world class sector. This year MIMIT and Edward Healthcare sponsored a new awards category - the Innovative Ageing Award, which was won by ELAROS, Medical Devices Technology International for their Elaros 24/7 service. This service provides a new way of carrying out initial assessment, diagnosis and triaging of patients with lower urinary tract symptoms. The UroDiary®, a hand held recording device, enables patients to monitor their own health both at home and on the move, safely and discreetly. This information is then uploaded remotely to UROCONNECT™, an intelligent data analysis and diagnostic solution providing a clinical diagnosis and recommended clinical action.

To find out more please visit www.elaros247.org.uk
Network urges care homes to become “research-ready” to give residents access to research

Professor Martin Rossor, Director at the National Institute for Health Research Dementia and Neurodegenerative Diseases Research Network (NIHR DeNDRoN) is urging care homes across England to become “research-ready” in order to help support vital research into dementia.

There are around 670,000 people with dementia in England, and an estimated 30% live in care homes. DeNDRoN set up the Enabling Research in Care Homes (ENRICH) project in 2012 in order to establish a network of “research-ready” care homes to help improve access to research for care home residents. Nearly 600 care homes have registered to the ENRICH programme so far providing approximately 13,000 residents access to research. However there is still more to do, as Professor Rossor explains:

“There are over 18,000 care homes providing care for over 386,000 people in England. Although ENRICH has seen some success over the last year there’s still a long way to go before we can offer all care home residents an opportunity to take part in research which could benefit patient care.”

“The number of people living with dementia is expected to rise to one million by 2021. Only through research can we design and deliver more effective therapies that will improve the quality of life for patients throughout the course of the condition. Tackling dementia is a national priority and we need to be able to reach care home residents to offer them the chance to be involved in research.”

The PrOVIDe study is one research study that is currently being carried out in care homes using the ENRICH network. Led by The College of Optometrists, it sets out to measure the prevalence of visual impairments in people with dementia.

Professor Rossor said: “Through the PrOVIDe study alone we have been able to give over 200 care home residents the chance to be involved in research which could have a great potential impact on patient care. Maintaining good vision can have a positive impact on quality of life. If you have better vision you are less likely to have trips, falls or other injuries, which can be very distressing and sometimes life-threatening to those with dementia, and are more likely to remain active which can have a positive impact on how dementia progresses.”

Belong Warrington opens in 2014 aiming to provide a number of facilities for the local community, as well as specialist nursing and dementia care in private households and 18 stylish independent living apartments for older people.

To find out more please visit www.focusondementia.nihr.ac.uk.
Care homes can register onto the ENRICH programme by visiting www.enrich.dendron.nihr.ac.uk.

Upcoming Events...

Ageing Well: Providing a Better Quality of Life for Older People
13th February 2014
This forum aims to provide delegates with the knowledge and best practice on how to best meet the challenges of an ageing society. In addition, delegates will hear from innovative case studies and senior public sector leaders on how to provide services that better meet the need of an ageing population and ensure wellbeing in later life.
www.insidegovernment.co.uk

NHS Health and Care Innovation Expo 2014
3rd & 4th March 2014
More than 10,000 people from across health and care and the voluntary and community sector, including commissioners, clinicians, patient leaders and innovators meet at Expo to share ideas to bring about change to improve NHS and care services. This year the theme is the “House of Care” and through this Expo will showcase what patient-centred coordinated care looks and feels like.
www.healthcareinnovationexpo.com

Fit for Purpose: Shaping the Future of General Practice Services
25th March 2014
Due to come into force in April 2014, GPs will ensure the four million patients aged 75 or over will get all the treatment they need for physical and mental conditions. This symposium is assessing how new models of primary care and responses to challenges posed to service provision and patient experience can be developed further as we countdown to its implementation and the impact on general practice.
www.publicpolicyexchange.co.uk/events

The Dementia Challenge: Responding to a National Priority
8th April 2014
This inaugural conference will provide a unique opportunity for all those working with, caring for and living with dementia to come together to gain real insight into the fight against the disease. Highlighting the latest strategies and policies throughout the dementia care community that are contributing in tackling the issues.
www.dementia-challenge.co.uk
‘From Click to Cognition’: How daily computer use might flag up the need for a memory assessment

Dr Iracema Leroi is a Clinical Senior Lecturer in the Institute of Brain, Behaviour and Mental Health (University of Manchester) and Honorary Consultant in Older Adult Psychiatry. She is also the Dementia Director for the Neurodegenerative Research Network DeNDRoN (NW region) and Mental Health Clinical Domain co-Lead for the Manchester Academic Health Sciences Centre (MAHSC). Dr Leroi has a special interest in the mental health of patients with Parkinson’s Disease, behavioural disturbances in dementia, and clinical trials for dementia.

Have you ever wondered whether you were losing your memory or starting to show the first signs of dementia? This is a common concern amongst people over the age of 60 and dementia is one of the most feared medical problems for those over the age of 55. Detecting dementia can sometimes be difficult and knowing whether a memory lapse is due to age-related cognitive problems, stress, absent-mindedness or early dementia can be challenging. Increasingly, older aged computer users are turning to the Internet to find the answers. There are now several on-line self-assessment memory tools and websites for ‘brain training’ that people can easily access. But will these methods really detect whether someone’s cognitive and functional ability is declining due to dementia-related changes? How can we track cognitive change on an ongoing daily basis? The answer to detecting subtle and early cognitive and functional decline may lie instead in developing a method to harness the rich pool of online data generated by daily computer use.

This is exactly what the ‘SAMS’ project is aiming to do. ‘SAMS’ stands for ‘Software Architecture for Mental health Self-assessment’ and is a 3-year project involving installation of computer software in older aged users’ laptops in order to monitor and detect changes in their patterns of computer use that might indicate the beginning of dementia (http://ucrel.lancs.ac.uk/sams/).

The SAMS project

SAMS, funded by a Engineering and Physical Sciences Research Council (EPSRC) ‘Working Together’ grant, is an exciting joint venture between computer scientists at Lancaster University and the University of Manchester, and clinical dementia experts at the Universities of Manchester and King’s College London. The goals of the project are to develop software that can monitor and detect changes in a variety of computer-based parameters and then match these changes in the ‘computer use profile’ with cognitive and functional changes that can be detected clinically in the standard manner used by most Memory Assessment Units in the UK. People who agree to sign up for the study will have the newly developed software installed in their computers for 12 months in order for data collection to occur.

They will continue with their usual daily computer activities such as email and Internet use and will get periodic reminders that the SAMS software is registering their activity.

How can computer software detect cognitive impairment?

When dementia develops, a variety of cognitive domains may be affected, all of which can impact on daily computer use. The SAMS software will therefore be designed to capture data to reflect the activity in several domains. For example, changes in motor function will be detected by monitoring the rate and efficiency of mouse movements; executive dysfunction, or the ability to plan and multitask, will be detected by the accuracy and efficiency of how the computer user navigates around various computer programs; memory impairment will be detected by the application of various computer games involving learning and prospective memory; language changes will be detected through text mining of written documents. These are only a few of the many aspects that can be analysed to build up a profile of an individual’s computer use from a cognitive perspective and to determine if impairment develops.
Early diagnosis of cognitive impairment is important

Policy drivers such as the National Dementia Strategy (2009) are encouraging people to come forward for investigation of memory complaints, but currently only about 50% of people with dementia ever receive a diagnosis, most commonly in the moderate or severe stages of the illness. Thus, promoting self-awareness of early change in cognitive function is a key step in enabling people to access clinical evaluations in a timely manner.

Early diagnosis facilitates interventions which can significantly improve the long term outcome of memory disorders. Novel approaches are needed to enable people’s own awareness of cognitive change and the importance of assessment.

The conventional approach to diagnosing the cause of cognitive impairment involves the clinic-based administration of neuropsychological tests. This involves referral to a specialty centre, the availability of trained clinical staff, delays in diagnosis, and dependence on cross-sectional data from the day of assessment. These limitations can be overcome through continuous unobtrusive or semi-passive monitoring of daily computer use through the SAMS system.

Furthermore, no single indicator is sufficient for accurate prediction of significant cognitive dysfunction, so the opportunity to capture data from a variety of sources and observe how they change over time is an enormous advantage. This approach also empowers the computer-user themselves to find out whether they are continuing to function at their usual level. Finally, as the system uses information that is readily available, it does not incur any of the costs of an extensive screening programme. This is particularly important since the already large number of people with dementia (over 800,000 in the UK) is projected to increase dramatically over the next decade.

How has computer technology been applied previously in mental health?

Internet-based technology has been successfully used to track physical activity and deliver interventions to improve post-operative care and to counteract obesity, but less attention has been devoted to use of the technology with people with mental health and cognitive disorders. ICT-based cognitive testing is well established but no initiatives have systematically attempted to use the rich data available from computer usage as part of the early identification of cognitive dysfunction and at present, the evidence to support claims about the impact and effectiveness of software applications to detect cognitive impairment over time is very limited. In spite of this, preliminary work has established the potential for evaluating problems arising during e-mail use by cognitively impaired users, and text analysis of diaries and novels has been successfully used to track longitudinal changes in cognition.

Ethical concerns of daily computer use tracking

Notwithstanding the promising potential of this technology, monitoring peoples’ daily computer use over a long period raises many challenging ethical issues, all of which will have to be addressed during the study. These ethical concerns are particularly important in people who might be developing cognitive problems. For example, monitoring computer activity in those who may forget that they have consented is a key concern, as is need to ensure that those who agree to the installation of SAMS have full capacity to make this decision. The researchers will have to guard against the potential for covert installation of the system by someone other than the user as well as the potential for loss of confidentiality of emails and other personal text. There is also a concern that a computer user’s level of anxiety may increase if they sense that they may be developing cognitive impairment.

In conclusion, through this exciting programme of work we aim to deliver novel software to promote the early detection of cognitive problems that may have applications far beyond the clinical setting.

Software Architecture for Mental Health Self Assessment’ (the SAMS project)
Under this EPSRC ‘Working Together’ project a unique cross-disciplinary collaboration has been struck up and involves the working together of software engineers, data and text mining experts and clinicians to develop the means to non-intrusively promote self-awareness of change in cognitive function. It will develop software interpreters to track changes in performance in people with different levels of clinically established cognitive impairment and early dementia and begin to explore the potential for technology-enhanced continuous detection of cognitive dysfunction and change in cognition.

The study is supported by the research network DeNDoReN.
Implementing telehealth
Making telehealth work in your organisation

Clive Savory is a Senior Lecturer in Technology Management at The Open University in Milton Keynes. His research is concerned with innovation and adoption of healthcare technologies in the NHS. He recently led a project funded by the National Institute for Health Research that studied how technologies were adopted into NHS organisations.

Implementing a telehealth system can be a very beneficial service improvement for patients and their carers. Telehealth implementation can also be a challenging, yet exciting and rewarding project for staff. Unfortunately, successful implementation can be jeopardised by a number of potentially unexpected issues. If you are involved in a new implementation of telehealth, either as a health professional or as a manager of a service, what issues do you need to be aware of? In this article I will draw upon some findings from our recent research that highlighted several factors that led to disruption of telehealth projects (Savory and Fortune, 2013). Our research suggested that four of the most important of these were: confusion about the project’s purpose; implementation issues; changes in working practice; and evaluation of the implementations.

Why are we doing this?
One of the risks when implementing a telehealth service is failing to build a shared vision of its intended purpose, as any confusion will undermine the project.

For example, some telehealth projects may be funded by primary care organisations. Some significant benefits may be accrual by other parts of the healthcare system. For example, a telehealth system funded by primary care organisations may bring benefits such as reducing unplanned admissions to the local hospital. Unfortunately, if staff involved in a telehealth project cannot see the broader benefits of implementing telehealth across the healthcare system then they may not fully engage with its implementation. It is important that the staff involved understand how their efforts in making telehealth work will have system-wide benefits, even though these may not be obvious. In setting out the vision for a telehealth project it is important to give staff a system-wide view of how the project will produce benefits, otherwise there is a real risk of staff disengaging from the project.

A major source of confusion that can arise in telehealth projects is that the commissioners, implementers and beneficiaries of the project may be different organisations.

Implementation issues
At the heart of a successful telehealth implementation is an effective service design. It is likely that some aspects of existing services will need to be re-designed to make optimal use of telehealth technology, while still maintaining links with existing processes and services. The new service might include new groups of staff or changing the roles of existing staff. In some cases re-design of a service may be significant, involving not just different groups of staff but also changes to the location of activities. Irrespective of the degree of change to a service, implementing telehealth will almost inevitably result in some changes to procedures and working patterns.

Getting telehealth systems working in practice requires skilful leadership and effective team working. Implementation relies on close relationships between all groups involved in the implementation. In addition to the frontline staff running a service, there will be a range of other staff that are critical to the project’s success. IT support is perhaps the most obvious of these as it is important that staff and patients have a clear point of contact for solving problems quickly. Every telehealth project will have many new routine tasks that need to be organised. For example, who will manage loan and return of
equipment to patients? Losing track of the location of equipment is a sure way of undermining the smooth operation of the service. Telehealth will have most impact on patients and their carers, and so it is important to involve patient groups as early as possible in the project. Patient involvement early on can help ensure the concerns and expectations of patients are addressed before problems arise.

Changes in working practice
Implementing telehealth can result in significant change to the roles of staff in a service. One fundamental shift will be that the task of caring for patients will be co-ordinated between health professionals and the telehealth system. This shift may result in many small changes to the way people work. For example, staff may be expected to routinely check email for notifications sent by a telehealth system. Some staff might find these new routines difficult. Despite many staff now using email routinely their work, some staff may not see checking email as an intrinsic part of their role. More broadly, some staff may not see what they regard as ‘computer work’ as an essential part of their role, seeing it as separate, rather than complementary to their main role of providing patient care.

A more fundamental and complex change is that a telehealth system can alter the responsibilities, accountability and roles of staff. Telehealth systems are often designed to give clinical decision support and apply evidence-based protocols. The reaction of staff to receiving ‘decision support’ may vary between seeing it as helpful aid to their job, to regarding the system as an intrusion into their own professional judgement. Implementation of telehealth can have a significant impact on the culture of an organisation shifting expectations of how staff work individually or as a team. Successful telehealth projects will support staff to gain any necessary skills and adjust to any new expectations placed upon their role.

Did we get it right?
One of the things that can be overlooked during and after implementation of a telehealth project is an evaluation. The evaluation needs to review not just the progress of the project but also consider how beneficial the new technology has been. Evaluation of many adoption projects can often be poorly resourced, resulting in only a partial evaluation or at worse none. It is understandable that once project teams get through the implementation they have neither the time nor energy to carry out an evaluation. Unfortunately, by omitting an evaluation the project team will miss out on critical feedback, least of all just how successful all the team’s work has been. Some of the questions that an evaluation might seek to answer include:

• How has telehealth improved patient care?
• Has the quality and efficiency of a service been improved?
• Does the service provide more consistent, evidence-based care?
• What new skills have staff gained from involvement in the project?
• Is the organisation better prepared for future technology adoption projects?

These last two questions reflect that evaluation is an important opportunity for reviewing what has been learnt from the project. The experience of implementing a small telehealth system can be invaluable in the future, especially when implementing another more complex project.

Summary
The benefits of implementing telehealth systems are potentially great but to achieve success everyone involved in a service needs to fully understand the purpose of the project and its objectives. Implementing telehealth creates an opportunity to reorganise how a service is delivered around the needs of patients. However, a critical factor affecting successful implementation is the people working in the service, so investing the effort to support them understanding and adjusting to new roles and ways of working will pay off in the long term.

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MHEALTH AND THE PAIN CLINIC: A STEP CHANGE IN PATIENT CARE

Katrina Delargy qualified in the physical sciences and has spent most of her career in problem-solving and diagnosis in a range of business areas, including IT and mobile. She then founded Aventura Ltd, a management consultancy, and developed a number of software tools aimed at enabling individuals and organisations to gather high quality evidence about daily activities and events. In recent years, her focus has been on the use of mobile technology by patients.

For the 7.8m people in the UK who suffer from chronic pain, either alone or in combination with other conditions, mobile health, or mHealth, provides a way to receive better targeted treatment. It does this by allowing the patient and pain clinic alike to engage more effectively with each other, through the use of smartphones, tablets or e-readers, with the result that a larger number of patients can communicate directly with their pain clinic without the inconvenience of a journey or a phone call.

Currently, such clinic-patient engagement is achieved through telehealth solutions, which enable measurements to be carried out remotely, at home, by the patient. Telehealth addresses routine measurements of heart rate, blood pressure, blood sugar levels and respiratory function, which are made via specialist metering equipment. The advantages of telehealth include helping people live more independently, reducing the number of visits they make to their healthcare provider and producing better tailored treatments. Many of these advantages can be delivered by mHealth solutions, using consumer technology chosen and owned by the patient. Furthermore, telehealth was not generally designed to cater for patients suffering from chronic pain and mHealth solutions may be more appropriate in such cases.

Some mHealth apps give patients choice, with the potential for them to report directly into their health record. They can do this simply and quickly via their mobile device, sharing their information with the clinic discreetly and in confidence. The result is empowerment of the patient, and information that is readily available at the clinic for consultation or for considering treatment modification. Patients report data when and where they want, in real time, and clinics can view the data when they want in the format that suits them. Unlike with a phone call or consultation, patients and healthcare professionals do not have to both be available at the same time.

Because the gold standard in treatment of pain is self-reporting, it makes sense to remove as many of the modulating factors [e.g. travel to the clinic and worries about the appointment] as possible when measuring pain, and allow the patient to report on their pain when and where they prefer. All that is required of the patient is a little time [from as little as 30 seconds] each day, or when advised by the GP or clinic, to record how they feel, via an easy to use touch entry system, and send their feedback. If they wish, they can also send their own free text comments about how they feel, instead of writing or typing patient diaries, which can be unstructured and time-consuming to digest.

Usability in mHealth is key. Self-reporting is a simple process in which patients can give the exact sequence of pain events or how long a particular pain or other event lasted. Timeliness is critical, and clinical staff are freed from some of the burden of the paper trail and phone. Rather than become a barrier between patient and clinician, mHealth can provide more patient-centric care and help to prioritise face time for those who need it most, while informing discussions with rich detail recorded and presented in a way that is meaningful to all concerned. The NHS has been tasked with becoming paperless by 2018. mHealth can contribute to this goal.

Cost and other health benefits

mHealth solutions can reduce costs to the healthcare provider as well as providing superior feedback. The UK has a £300m burden with medicines wastage and much of that is thought to be due to problems of non-adherence, a large part of which
could be related to actual or feared side-effects of treatment. mHealth offers the prospect of raising the bar and setting new standards, which may enable more efficient and effective communication that can reduce wastage of analgesics.

Furthermore with the side-effects of many medications often reliant upon qualitative descriptors, it is important to enable those descriptors to be reported to the clinic in as close to real time as possible, thereby informing professionals about trends and patterns. With the increasing uptake of cloud computing and health informatics, clinical staff can have the tools to analyse these data and support decision-making and audit trails.

A further financial benefit of mHealth is that it may make early diagnosis of new, emerging conditions more likely, thereby reducing costs associated with late diagnoses. Healthcare providers seek to anticipate demand; mHealth can support this aspiration.

In summary, with mobile technology becoming ever more ubiquitous, the year 2014 will see more people than ever able to send their pain data directly to their pain clinic. Smartphones are increasingly becoming the norm. And crucially, because mHealth is carried out by patients via their own consumer technology, healthcare providers can focus on designing services that benefit from this trend. This approach, allied to self-management and financial challenges in health, makes the mHealth proposition a viable and attractive one for patient and healthcare provider alike.

**Case study**

The NHS is for everyone, not just for the tech-savvy, as this user case study makes clear. An early user of the Pain Clinic app, a 52 year old floor layer, says “If I can use the app, anyone can.” It enabled him to let his doctor know exactly how he felt. “Just doing that made me feel better,” he adds. He does not need to use a computer in his job, he has never sent an email, yet he reported his pain scores and comments daily over a two month period using his smartphone.

He sent his data at times and frequency of his choice and was “very impressed” by the fact that his doctor knew how he felt by the time they spoke on the phone. “Phone calls might not have been shorter but they did feel more effective,” he points out, concluding with “I found the Pain Clinic app very easy to use and felt reassured that the doctor had all my information to hand.”
ICT 2013 Review

Europe’s biggest digital technology event, ICT 2013, took place in Vilnius, Lithuania on the 6-8 November 2013. More than 180 stands at ICT 2013 showcased advanced research, technologies, and new systems, services and businesses.

The exhibition demonstrated how current early stage ICT ideas and products will change the products and services available in the next decade. ICT professionals from both industry and academia featured as speakers, addressing issues from cloud computing, ICT infrastructures, ICT skills, and long term visions on the future. A number of these technologies have a huge potential impact on healthcare delivery and management.

The event took place as part of The Digital Agenda for Europe’s (DAE) flagship initiatives under Europe 2020, the EU’s strategy to deliver smart sustainable and inclusive growth to reboot Europe’s economy and help Europe’s citizens and businesses to get the most out of digital technologies.

Below are some of the highlights of ICT 2013 that could possibly have an impact on future eldercare across Europe.

**Cross border digital public services for a Connected Continent – epSOS, the European eHealth Project.**

EU citizens are increasingly moving across the borders of Europe, some seeking retirement and future eldercare, and so need to access healthcare records across these borders grows in parallel. epSOS (the European eHealth Project), aims to design, build and evaluate a service infrastructure that demonstrates cross-border interoperability between electronic health record systems in Europe. This 6 year project includes 45 members from a mix of EU member and non-member states, involving national health ministries, national competence centres, social insurance institutions and scientific institutions.

The key aim of the project is to improve the quality and safety of healthcare for citizens when travelling to another European country. epSOS hopes to make a significant contribution to patient safety by reducing the frequency of medical errors, and by providing quick access to documentation. The system also aims to improve the accessibility of prescribed medications for individuals while abroad. In emergency situations, life-saving information will be easily accessible and the need to repeat diagnostic procedures will be reduced.

**METABO – managing diabetes through smartphones, tablets and desktop PCs.**

Up to 1 in 5 older people has diabetes and it poses many significant challenges to the delivery of effective care. Over half (54%) of all people with diabetes in Europe are aged over 60. It is estimated that over 60% of diabetics will be aged over 60 by 2030 (Shaw et al., 2010). METABO has developed a technological platform to improve the flow of information between patients and physicians to help diabetics to self-manage their condition.

The application is available through smartphones, tablets and desktop PCs and aims to help professionals make treatments personalised, improving diagnosis and follow-up. METABO tracks diabetics as they eat, walk, travel, and gives personalised advice to the user.

It can connect with devices such as exercise monitors, continuous and regular glucose meters, weight scales and other sensors to help the users track their status and follow their prescriptions. Medical practitioners can also access this patient data and combine it with in-clinic data in a METABO professional tool.

**Active and Independent Living Through USEFIL.**

USEFIL (Unobtrusive Smart Environments for Independent Living) directly addresses the pressing issues of ageing, health and inclusion by promoting an approach that places the individual firmly in the centre of their healthcare.

The EU Seventh Framework Programme (FP7) funded USEFIL to address the gap between technological research advances and the practical needs of elderly people by developing advanced but affordable in-home monitoring and web communication solutions. USEFIL intends to use low cost ‘off-the-shelf’ technology to develop immediately applicable services that will assist the elderly in maintaining their independence and daily activities.

The USEFIL project will develop a holistic “platform” consisting of a number of systems and modules. These include, for example, a smart watch capable of recognising daily activities, household objects such as mirrors equipped with low cost wireless video cameras for monitoring emotional and physiological parameters. Professionals can also gain access to a different user interface.

They can access their patients’ health records, prescribe medications and schedule appointments and reminders via their personal calendar. They will also be able to communicate with their patients via audio and video communication.

www.usefil.eu

Dr Chris Mimnagh

What is your current position and what was your career path that got you there?

My current portfolio encompasses frontline clinical care, hospital based management and strategic director for a partnership involving NHS and academia. There is no career path to get to this position, all that matters is a drive to make things better for people at an individual, organisational and population level. It helps to have taken time outside of the NHS, completed a Masters in Health Informatics and be passionate about good care.

What challenges do you face in your current position and which has been the greatest one?

The biggest challenge in all my roles is the acceptance that permanence is an illusion and that change is the only certainty. Many people think that they are safe or trapped in the world as it is today, but the reality is that individually and collectively we are constantly changing how we think, live and work.

In your opinion, what are the top 3 issues affecting the care of older people?

In no particular order, the top three are cost of care, the model of care delivery and the compassion with which it is delivered. Many people are making poor choices because of concerns over costs, these choices are often cheap in the short term, expensive in the long run. Current models are often predicated on delivery of packages designed around the professional or organisation’s needs with the older person being a passive recipient. This cost based scheduled model results in delivery of care without compassion, a box tick, not a service.

What changes in elderly care do you anticipate in the next few years?

We are just on the edge of technology which can support and monitor our daily lives, banishing uncertainty and isolation, those approaches and devices will be everyday in the next three to five years.

If you hadn’t become a Doctor, what might you have done?

I have always been fascinated by computers, so if I had not done medicine I would have been a Geek.

What experience has influenced your career the most?

My MSc in Health Informatics was based partly at Erasmus in Rotterdam and drew students from all over Europe. At that point the myth that “the NHS way is the best way” was busted. We have a lot right in the NHS but it could be so much better.

What advice would you give to someone contemplating following in your footsteps?

Learn to think before you do anything else.

Where do you go for advice and information?

I look to my father’s generation, he worked in the NHS from leaving school and some of his contemporaries are still around. They might not be current on trends and policies but their guidance is based on values, compassion and wisdom - that never dates.

Who would you most like to work with?

I’ve had the chance to work with people from across the NHS, Europe and America, but the people I most like to work with, who define who I am and why I do what I do, are the patients in Kirkby, Merseyside.

What do you enjoy doing when you are not working?

I sing in a choir, play in two bands, blog and write about things that interest me as well as being Dad’s taxi for three offspring.

What do you do in a typical working day?

I avoid thinking of what I do as work. It’s what I do in order to try and improve the world around me. I know it sounds silly, but I enjoy the variety of every day, and each project is a new set of opportunities. Much of my time is spent dealing with individuals struggling with changes in work or health, searching for solutions, and taking baby steps to improve how they work or live. How cool is that?

If you were stranded on a desert island what would be your one luxury?

I would take one of my Swiss Army Knives – that way I could make a flute for relaxation and who knows – over time I might even make a Bamboo Saxophone in the style of Fred Fu-Manchu!

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In our next quarterly issue of Innov-age we will be looking at arthritis and musculoskeletal conditions. The team will be considering the different types of arthritis and other musculoskeletal conditions that affect the ageing population and explaining the challenges these long term conditions can have on an individual’s health. We will be looking at the development of treatments, and management of the common symptoms such as pain, joint stiffness and mobility, as well as other important eldercare issues…