

# Lessons from the US: using technology and homecare to improve chronic disease management

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May 2010

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### About Healthcare at Home Ltd

Healthcare at Home Ltd is the UK's leading provider of hi-tech, home healthcare. It also delivers innovative services both in the community and on-site within the NHS and independent sector. Established in 1992, the company has grown rapidly and now employs almost 1,000 staff, approximately half of whom are highly skilled and experienced clinicians.

Operating from locations throughout the UK, Healthcare at Home Ltd provides nationwide services, delivered locally to over 100,000 patients each year. A broad range of care options is offered across many disease areas to patients of almost every NHS trust in the UK.

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## Introduction



fam Garride

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# What can the UK learn from the way patients with chronic disease are managed in the US?

Both healthcare systems face pressure from the growing number of people with chronic diseases, the need to minimise the cost of such care, and the need to avoid unnecessary admissions and interventions from the secondary sector. Helping people with chronic conditions to better manage their condition and remain at home will benefit both the patient and the health systems.

In November 2009 a group of eight people from the UK set out to answer this question by visiting the San Francisco area to look at out-of-hospital care and 'teleheath'. Healthcare at Home Ltd, the UK's leading provider of hi-tech home healthcare and specialty pharmacy services, initiated the trip. I organised it with US colleagues at Kaiser Permanente and HealthTech (two of the largest US healthcare providers), and three colleagues from the NHS joined us. We were essentially looking at the system from the point of view of a group of practitioners and managers.

The overall purpose was:

- to explore how diagnostics and care are delivered in the home,
- to see how clinical interventions are managed using technology and support workers for increased value, and
- to glean any lessons for the UK from how the US is addressing these issues.

We found a healthcare system that, despite its levels of expenditure, in many ways faces greater challenges than the NHS. It made some of us grateful that we work on this side of the Atlantic. While the US was not as far ahead in the use of technology as we expected, there was much we could learn from it, and adapt and adopt in the UK. We wish to share these learnings in order to provoke thinking and ideas around the use of technology in chronic disease management.

We hope that UK colleagues will find our observations on the US system both illuminating and of practical use. We would like to say a huge thank you to our US colleagues for being so generous with both their time and information.

## **Chapter one: The US healthcare context**

Healthcare in the US offers many lessons and examples of good practice. But it was clear from the trip that the US system as a whole is not something the UK should aspire to. It absorbs unprecedented resources (17% of US GDP), but few inside the system seem happy within it and it was easy to see why.

- The system is fragmented. The largest sources of healthcare funding are the federal government, through Medicare (which funds services for the over-65s) and employers. Health plans, which purchase healthcare on behalf of government and employers, have been consolidated over the past decade, leading to around six larger national plans. Yet each geographic area will still have more than ten competing health plans.
- There is little incentive to invest in long-term health improvement and promotion, as members typically only stay with a health plan for two to three years. Even Kaiser keeps its members for only seven years on average.
- The delivery of care in the home and in nursing homes is fragmented and unconsolidated. On the provider side, hospital groups have consolidated over the past 20 years. Hospital groups and health plans appear to take turns to consolidate as a strategy to increase negotiating power over reimbursement rates. Nationally, around 75% of physicians work in groups of less than ten physicians. Outpatient care is typically delivered separately from hospital care.
- The US home healthcare market is a 50 billion dollar market, with over 9,000 agencies, a mix of investor-owned, non-profit and charitable. There are three main segments: skilled home care, often insurer-funded; hospice; and 'private duty', which individuals pay for themselves. Yet the home care sector lacks the lobbying strength of the hospitals and doctors' organisations.
- There is a large and increasing number of regulators but no overarching system: for instance the Joint Commission (which focuses on quality accreditation); federal, state and local governments' professional organisations; and independent third party quality measuring organisations, often sponsored by employers (e.g. the Leapfrog Group). There is no organisation with accountability for the system as a whole.
- Hospitals and physicians get paid for what they do, and sued for what they don't. This results in defensive medicine, high use of hi-tech interventions across almost all international comparisons, a very high ratio of readmission, and poor focus on costs overall. Reimbursement rates are the primary means for influencing care delivery. Medicare is the national rate-setting leader, and while it is a relatively sophisticated buyer, it can unilaterally slash fees for particular market segments in response to continually increasing overall costs. It has the power to disable sectors of the industry at the stroke of a pen.

'It's not a system, it is multiple steps of aggravation.'

Senior US physician

'I was surprised at how prohibitive the US system could be to doing the right thing for the patient.'

KATHRYN BERRY, Associate Director, Capital, Investment and PFI, NHS North West

- Specialist interventions are usually better reimbursed than primary care and there are few incentives to encourage preventive care. This impacts on career choices: with the medical specialist dominating the system, both in and out of an acute setting<sup>1</sup>, only 2% of medical graduates choose to go into primary care/family practice. Waiting times to see primary care physicians are increasing in some parts of the country<sup>2</sup>. The Organisation for Economic Co-operation and Development (OECD)'s latest figures show that with only 2.4 practising physicians per 1,000 population, the US is well under the OECD average of 3.1<sup>3</sup>.
- Healthcare IT systems are generally highly fragmented, with a primary focus on billing systems rather than care coordination or supported clinical decisions, unless it is within a given organisation.

The result of this is that overall costs are extremely high by international standards. Not only does the system absorb 17% of national output, its unit costs are dramatically high. Both Kaiser and Sutter (the second largest acute provider group in California) estimate a bed day to cost up to £3,500, compared to McKinsey's recent estimate of £1,009 for bed days in the NHS<sup>4</sup>.

Reimbursement on a fixed 'case rate' (in effect a tariff similar to the English system) has forced providers to address issues such as the length of hospital stays. A leading cardiologist in Kaiser said he could not remember when he had a patient in for longer than seven days. This has allowed the system to operate with fewer beds per capita than in England. In England, a typical NHS trust will have 2.43 general and acute beds per 1,000 population<sup>5</sup>. Kaiser has less than half this

#### **Recent trends in the US**

■ US employers and health plans are increasing co-payment and the amount of self-pay care, essentially shifting costs to individuals to keep premiums down and to increase personal responsibility for healthcare use.

■ Hospitals are beginning to directly employ some physicians to increase care coordination and secure greater revenue, with mixed financial results.

Physicians are trying to capture revenues traditionally earned by hospitals by buying diagnostic equipment and even co-owning specialty hospitals. This has led to accusations of over-treatment and testing<sup>6</sup>.

■ Single chronic disease management companies are not prospering, and are being replaced by more general health plans. The majority of patients with a chronic illness have more than one condition; the models used by the original companies have been difficult to scale up, and these companies risk being seen as an 'add-on' cost by insurers. amount. It achieves this with actively managed short stays, relatively low admission rates, and fast discharge to a range of step-down care.

But much of this type of care is only available to the insured. Around 45 million people are currently uninsured<sup>7</sup> and will either have to pay out of their own pocket, rely on Medicaid (funded by individual states and aimed at the poor) or go without healthcare except in emergency situations where help may be available in publicly-funded hospitals.

As there is no reasonable way for the market to provide healthcare for this segment of society and be recompensed for the effort, they are largely ignored. This group of patients is the focus of the plans for extended coverage in the Obama health reforms.

Our conversations with insiders did not dispel the impression that they were focusing their very capable organisations on the insured and Medicare. The reimbursement system forces them to overlook others, such as the deprived and uninsured.

#### In comparison with the UK

It was, therefore, something of an unexpected relief to come back to the challenges of the UK, where, however great these challenges may be, the integration is much greater and the focus comprehensive.

The NHS has multiple advantages:

- •We serve all of the population all of the time on a long-term basis.
- •We have organisations with clear accountability for the whole system, in primary care trusts.
- We have a less fragmented provider landscape, albeit with considerable tension between policy direction that emphasises integration and policy direction that emphasises competition and choice.
- The payment system has rewarded acute trusts for doing more, while the primary care payment system has mixed rewards for outcome measures, targeted services, activity and capitation. Overall, in comparison to the US, there is a culture in the UK of understanding that health expenditures are capped overall, and of seeking to combine looking after the interests of the organisation they represent but also the overall health economy. The recently announced changes relating to marginal payments for additional activity signal a trend further in the direction of the health of the local economy over the interests of individual organisation<sup>8</sup>.
- The dramatic changes to health professionals' pay in the UK over the past few years will hopefully ensure that primary care and nursing as well as specialist careers are attractive to people entering the job market.
- A lack of continuity of purpose over multiple electoral cycles is common to UK and US politicians. In US health policy, intentions are eroded by the large lobbying industry representing the distinct fragments of the competitive market.

'The perverse incentives in the US system felt really uncomfortable. The focus of discussion is around the health plan. You can't get a sense of what the health needs of the population are. It's hard to get an idea of inequalities in the US system and where the gaps are.'

JANE STOPHER, Director, Modernisation Initiative (diabetes), Guy's and St Thomas' NHS Foundation Trust

#### FOOTNOTES

<sup>1</sup>Educational responses to declining student interest in internal medicine careers. Hauer KE, Alper EJ, Clayton CP et al. *American Journal of Medicine*, 2005; 118 (10) 1164-70

<sup>2</sup>Hearing before the House Energy & Commerce Health Subcommittee. Harris, J P, MD, FACP, president of the American College of Physicians (ACP), 24 March 2009

- <sup>3</sup>OECD Health Data 2009
- <sup>4</sup>Health Service Journal, 10 September 2009
- <sup>5</sup>Department of Health (2009); cited in Fewer hospitals, more competition, March 2010, Reform
- 6CMS Office of Public Affairs, 2005
- <sup>7</sup>Income, poverty and health insurance coverage in the United States: 2008; US Census Bureau, September 2009
- <sup>8</sup>NHS Operating Framework for England 2010-11, Department of Health, 16 December 2009



#### **Key points**

The US is not hugely ahead of the UK in the use of technology to manage the care of patients with chronic diseases and co-morbidities.

While technology has a part to play, it is still people who are crucial in case management.

■ It appears that the greatest benefit comes from focusing on patients with the most complex problems.

Patients are more likely to get care from a single team in the US, supported by a shared electronic record, whereas in the UK this may be more fragmented.

■ Effective electronic patient records can drive 'opportunistic' health monitoring or advice from health professionals.

# 1. Reaffirmation of the case management and pathway approach

#### People power is key

We expected to be impressed with technical solutions to the people- and resourceintensive task of managing the care of patients with complex co-morbidities. These are the patients who are most likely to suffer crises and be admitted to hospital, often for long stays.

What we came away with, however, was the reaffirmation of the continued importance of people in case management. If anything, we identified ideas for refinement. The application of technology was one such refinement, rather than a substitution for people-based case management.

'Home care agencies may well prove to be the most effective entities in the adoption of remote patient monitoring. Remote monitoring and management allow homecare nurses and support staff to maintain patient contact, assess needs, provide education and counsel caregivers, while reducing staff travel time. Moreover, home health agency administrators and staff have direct experience with managing patients in their homes and communities'<sup>9</sup>



Admission rates with and without remote patient management interventions

 Intervention = remote patient management
 Control

Source: SPAN-CHF II: Tufts-New England Medical Center; Lahey Clinic; Beth Israel-Deaconess Medical Center; Rhode Island Hospital.Weintraub et al AHA 2005 Case management focuses human resources on patients with the most complex problems. Both Sutter and Robert Bosch Healthcare (a provider of remote monitoring technology with sales across the US) found the greatest impact when human attention was focused on those patients with the most complex problems, and who use hospitals most intensively.

These organisations had seen reductions of 30-50% in the use of acute infrastructure through their approaches. Though they had not yet pushed their analysis to the level of cost-benefit, it seemed likely that this approach not only produced better outcomes, but also resulted in lower costs.

Research in the US has shown that remote patient management can reduce hospitalisation rates for patients with heart failure by 72% and for those with cardiac problems by  $63\%^9$  (see graph on previous page).

The Veteran's Association (one of the big healthcare providers in the US) has used home telehealth combined with case management for a number of years. It has seen a 25% reduction in bed days, 20% reduction in admissions and an 86% patient satisfaction rating. It is now scaling up its approach to reach 110,000 patients by 2011<sup>10</sup>.

#### Manage the risk, not just the disease

Bosch Healthcare says that simply managing the chronic disease itself may not prevent admission or exacerbation and could risk other key factors going unnoticed. The important thing is to manage the risk factors, e.g. if the risk factor in a COPD patient is depression then that is what should be actively managed, preventing deterioration in the principal disease.

**How remote patient monitoring reduced utilisation in the Veteran's Association** RPM impact on > 30 conditions in the Veteran's Association

Condition	Number of patients	% decrease utilisation
Diabetes	8,954	20.4
Hypertension	7,7447	30.3
CHF	4,089	25.9
COPD	1,963	20.7
PTSD	129	45.1
Depression	337	56.4
Other mental health	653	40.9
Single condition	10,885	24.8
Multiple conditions	6,140	26.0

Source: VA care co-ordination/home telehealth solutions, 2004-07. Darkins et al, Telemedicine and e-health, December 2008

'What struck me was the importance of implementation at scale. That is where you can start to see the impact of this technology.'

JANE STOPHER, Director, Modernisation Initiative (diabetes), Guy's and St Thomas' NHS Foundation Trust 'I expected to see lots of new technology in action but, for all sorts of reasons, it was not being used. I expected the US to be adopting new technology much more quickly than we are – but again that was not the case.'

KATHRYN BERRY, Associate Director, Capital, Investment and PFI, NHS North West Similarly, Kaiser also has multidisciplinary case management for patients who breach certain thresholds (e.g. blood sugar levels of HbA1c> 8 or 9 in diabetic patients). The foundation of this approach is a central register, minimal technology and a multidisciplinary team. Initially, the interventions are quite simple and cheap, such as automated reminders for those who do not refill their prescriptions as expected, and calls to prompt visits to GPs if blood tests show results that are beyond the acceptable range.

These simple, early reminders are greatly helped by the availability of Kaiser's single patient record, which allows the automation of these tasks. If these interventions fail, or the case is more acute, then the 'human' case managers get more involved.

#### Use shared data to improve integration

This approach is similar to the UK approach in its building blocks. The UK too now has registers of patients with various diseases in primary care. GPs get QOF (Quality and outcome framework) points, and therefore income, from measuring various markers and maintaining patient records on diabetes, renal failure, etc. In addition, the UK has also invested in community teams who are focused on targeting the patients with the greatest potential for crises.

The difference, however, is the level of integration. In the UK, the admission and acute provision is managed by NHS trusts who also retain information on acute patients. The patient registers and regular monitoring are maintained by GPs as independent contractors to the NHS. Community trusts or PCT provider arms often provide the case management personnel (e.g. community nurses) for more complex patients.

In Kaiser, a case management team provides all of this with a unified electronic patient record (EPR) as the effective connector. In the UK it is provided across three NHS organisations and potentially more if the private sector is also involved, without an effective EPR. There are obviously risks if information is not shared or kept up-to-date and if different computer systems prevent sharing, hindering effective care management.

However, this situation should change in the UK over the next year as the summary care record programme is rolled out across the country. This will enable health professionals to access basic healthcare information on all patients (except when they have opted out). More detailed records will be available locally, allowing sharing of information between trusts and GP surgeries, for example.

#### Make every interaction count

A significant learning point was that we must make every health and social interaction with the patient count. In our fragmented delivery system, many of the interventions are so focused on the particular function of the professional who delivers the intervention that the opportunities for reinforcing positive health

management messages are lost. An example is a continence nurse who does not reinforce the blood pressure management messages.

The Kaiser EPR prompts all healthcare providers to give patients reminders about other aspects of their care, so a patient who needs a mammogram will be reminded of this when she picks up medications for another family member, or phones to make an appointment for another service. This works for almost every contact with the Kaiser system and includes nearly all cancer screening and smoking cessation.

As all Kaiser Permanente providers (across primary, secondary and all settings) have access to the same record, this means allergies, drug interactions and patient preferences (in particular their end-of-life decisions) are all available at the point of care. The ready availability of this information reduces the repeat investigations that tend to happen otherwise. The system can also assist providers with best practice alerts and links to evidence. Certain core quality measures such as aspirin and beta-blockers are flagged on every admission, transfer and discharge, leading to sharp improvements in adherence.

#### FOOTNOTES

<sup>9</sup>Remote Patient Management: Technology-Enabled Innovation And Evolving Business Models For Chronic Disease Care. Coye MJ, Haselkorn A and DeMello S, *Health Affairs*, January 2009 <sup>10</sup>*ibid* 

#### Using Information Technology to promote patient-centric care

Healthcare at Home's nurses are out in the field 24/7, so having real-time patient data, collated in one central record is essential to offering patients co-ordinated and personalised care. Patient and nurse teams are supported by the Care Bureau – an information hub, collecting patient data and records in real time 24 hours a day, 7 days a week. All field nurses have handheld devices that transmit real-time electronic records to the Care Bureau. This information is collated and used to support the patient advice line and triage service and can be accessed by the on call nurses 24 hours a day. Importantly, as everything can be co-ordinated centrally from one data source, patients only have one number to call. A printed copy is given to the patient and an N3 Connection allows the secure transmission of data back to the patient's principal care giver.



#### **Key points**

■ Technology must be designed to fit into the care process rather than vice versa.

Technology is unlikely to be the 'whole' answer.

There are useful technologies that are widely used in the US and could be adopted here.

Email communication between Kaiser doctors and their patients has reduced physician visits by 25% in some specialties.

# 2. Technology in care management systems

#### System design first, technology second

One clear conclusion of our visit was that technology alone should not drive the care system: technology should be a tool to help patients receive better care. The clinical intervention remains the critical element in patient care and technology needs to be linked to the care manager and clinical practice.

One of the consequences of this is that technologies will not deliver their potential benefits if they are used in the wrong system. System design and change should come first and only afterwards should technologies be considered that would facilitate the desired process and result in a cost-effective way.

Part of the change management must focus on the changes required in the workforce: in the UK as in the US we need to shift emphasis and work between different professional groups as well as using technology.

Care management systems should be able to manage variation: accessing the evidence, using guidelines and eliminating unjustified variation in care. Pathways should reflect this and appropriate technology should be used at the correct point in the pathway.

But there are several areas where more widespread use of technology in the UK could improve patient care and cost-effectiveness.

The UK is significantly challenged by the burden of unwell, uncontrolled mental health patients who still have largely non-therapeutic inpatient interventions to manage their disease. This is an area where we could learn from the US, where telehealth is more widely used for medication monitoring and compliance, including 'talking' pill bottles that remind the patient to take their medication.

A very simple use of technology – which could improve patient access and reduce GP visits – is email communication between doctors and patients. Kaiser patients can send secure emails to their primary care practitioners (PCPs, broadly equivalent to UK GPs). PCPs can work with specialists in the same way. This has reduced physician visits by 25% in some specialties<sup>11</sup>.

In the UK, adoption has been hindered by concerns about confidentiality and security of clinical information and advice sent by email.

Technology can this way be the vehicle for integration, within the right model of care. But there is a note of caution: new technologies are often marketed as magic bullets to solve chronic problems, and results typically disappoint. A range of technology works best, often not particularly hi-tech but carefully selected to enhance the delivery of care pathways. Care management systems will have to adapt to rapidly developing technologies and systems, many of which will be marketed direct to consumers. There are already more than 2,000 health-related smart phone apps available and consumer health is one of the three fastest growth areas in this field. The next level, where wearable or implanted monitors upload information about your body to your phone and transmit it to health professionals, is attracting considerable commercial interest and investment<sup>12</sup>. Wireless devices and internet-based health software are precipitating the mass customisation of healthcare in both developed and developing countries, creating entirely new business models in the process<sup>13</sup>.

Smart pills are also in development that will transmit data from inside the body to a phone to monitor a range of clinical markers, such as whether an individual has taken medicines as prescribed. Health systems, including the NHS, have to anticipate and embrace these types of innovation.

In the US there are larger multi-specialty medical groups. These have been well positioned to pursue chronic disease management and use of technology. These groups tend to be physician-owned and develop strong physician leaders. They are very self reliant as there is no central body to which they would look for technology assessment.

LAWRENCE HAMILTON, Director, Regional Cardiac Implementation, Kaiser Permanente

#### Avoid data jails

No common architecture system for data exists in the US, yet the individual EPR systems (such as Epic Systems at Kaiser and the Veteran Association's system) are extraordinarily impressive in their comprehensive coverage of all the medical records, their interactivity and their accessibility by both patients and professionals.

Systems can work in the absence of an inter-operable environment but research in California shows that the lack of accessible medical information compromises quality and cost, and that the availability of these data across organisational boundaries, as well as between clinician and patient, improves care<sup>14 15 16</sup>.

Health Information Exchanges are being established to enable different types of provider IT systems to connect with each other. These provide the capability of moving clinical information electronically among disparate healthcare information systems while maintaining the meaning of the information being exchanged. These organisations are developing rapidly in the US. A 2009 survey conducted by eHealth Initiative (eHI) showed there to be 193 initiatives active in the United States in 2009, a 40% increase on the previous year.

The initiatives reported numerous positive impacts on clinical practices, including a reduction in the cost of healthcare, fewer medication errors and improved efficiency without disrupting patient care, to name but a few<sup>17</sup>.

'You need to be thinking about the business case at the outset; the long-term view over five, ten, 15 years. You need a clear invest-to-save philosophy with clear benefits realised over time.'

JANE STOPHER, Director, Modernisation Initiative (diabetes), Guy's and St Thomas' NHS Foundation Trust

# Enhancing diabetes care with remote patient monitoring: how it could work in the UK

Edna is 70 and has recently been diagnosed with type II diabetes. After an initial secondary care appointment, she is now being monitored by her local GP surgery. Although she has regular appointments with a nurse specialising in diabetes, she finds self-management difficult. She sometimes forgets to take her medications or to check her insulin level, and does not have all the data when she attends her appointments. Her diet is sometimes unhealthy and she has not yet realised the link between what she eats and her subsequent insulin levels. She is at greater risk of diabetic complications, including damage to her kidneys, losing her sight and suffering a hypoglycaemic attack.

Remote monitoring (using a device attached to her phone line) helps in several areas:

She is reminded to take her medications and check her insulin levels at fixed times in the day.

■ Her insulin levels are transmitted automatically, allowing them to be fed back to a central monitoring point. Unusual or dangerous variations – such as no recordings within a certain time – trigger a call from one of the care assistants at the centre.

The device asks a series of questions to establish links between insulin levels and lifestyle factors,

such as whether she had eaten
an unusually large meal. This
could help her to link her food
consumption or exercise with
changes in her insulin levels.
A short period of high blood
sugar levels triggers an appointment

with the specialist nurse, rather than relying on a regular appointment. This helps to limit complications.

The device is also used to monitor other medicines she may be on, such as statins or cholesterol-lowering drugs, and to remind her to take these. She also inputs other measurements, such as weight, and the device comes with a blood pressure cuff attached. A link to the surgery ensures the specialist nurse has all the data available when she attends. And the consultant who saw her when she was diagnosed is kept informed of her progress and requests that she is reviewed when he has any concerns.

If all goes well, Edna's blood sugar control improves, reducing the chance of complications later on and unplanned admissions. Her overall use of the health service reduces, bringing cost savings. Ultimately, Edna could have a wireless device to supplement the home-based one so that she can continue to transmit data if she is away from home for a period.

#### FOOTNOTES

- <sup>11</sup>The Kaiser Permanente Electronic Health Record: Transforming And Streamlining Modalities Of Care. Chen C, Garrido T, Chock C, Okawa G and Liang L; *Health Affairs*, 28, no. 2 (2009): 323-333
- <sup>12</sup> The Times, 2 February 2010
- <sup>13</sup>When the carpet calls your doctor. *The Economist*, 10 April 2010
- <sup>14</sup>The Value Of Health Care Information Exchange and Interoperability. Walker J, Pan E, Johnston D, dler-Milstein J, Bates DW and Middleton B. *Health Affairs* (Millwood). 19 January 2005
- <sup>15</sup>Benefits of Information Technology-Enabled Diabetes Management. Bu D; Pan E; Walker J; Adler- Milstein J; Kendrick D; Hook JM; Cusack CM; Bates DW; Middleton B. *Diabetes Care*, May 2007 30:1137-1142;
- <sup>16</sup>The Value of Personal Health Records (PHRs). Kaelber DC, Shah S, Vincent A, Pan E, Hook JM, Johnston D, Bates DW and Middleton B. Center for Information Technology Leadership (CITL), 12 November 2008
- <sup>17</sup>Migrating towards meaningful use: the state of Health Information Exchanges. eHealth Initiative, Sixth Annual Survey of Health Information Exchange, 2009

# 3. The activated patient

#### **Involve patients**

Though we did not see any breathtaking breakthroughs in technology or practice, one underlying theme was the benefit to be gained by empowering and educating patients, reflecting the early Wanless thinking on the 'fully engaged scenario' in the UK.

One of the impressive aspects of the Kaiser electronic patient record was the ability of patients to use it themselves. Kaiser members have access to a web portal called My Health Manager<sup>18</sup>. Through this secure system they can now email their doctors, view lab results, order prescriptions (which are sent by mail order or can be collected) and book appointments where email contact is insufficient. Patients can also see any correspondence between doctors which they have been copied into, and some images.

In contrast, proposals for patient involvement in the NHS Connecting for Health programme are modest. Patients can keep health-related information on Healthspace and will be able to view their summary care record once this is available. Healthspace is also linked to Choose and Book. But there is no provision for patients to take the initiative beyond this.

#### Technology to focus community teams

Robert Bosch Healthcare in northern California distributes the Health Buddy. This desktop unit integrates with one or more of five instruments such as a blood pressure cuff and a glucose meter. When the patient measures their blood pressure or glucose level, the monitor notes the reading and transmits it to a central team, who can then monitor the results of all patients. This enables them to focus telephone calls and visits on those who most need it.

'Some of the mobile technology solutions were really exciting in terms of self-management and I'm keen to explore them locally.We need a catalyst to really move that forward in the UK.' JANE STOPHER, Director, Modernisation Initiative (diabetes), Guy's and St Thomas' NHS Foundation Trust

#### Use information to keep patients engaged

The advantage of such a system does not stop with improving the productivity of community teams, who no longer have to see patients in order to monitor their condition: it also educates the patient. Home-health monitoring companies achieved great improvements through patient education. If values are outside an

#### **Key points**

■ Technology can offer a way for patients to become more engaged and empowered.

■ Its educational effect can be reinforced by clinicians' actions. acceptable range - e.g. blood pressure is too high - the unit asks questions to find out why, such as whether the patient has eaten salty food. This allows the patient to understand the causes of their symptoms and potentially to take responsibility and modify their behaviour to prevent reoccurrence. This education can then be reinforced if a nurse calls the following day, reminding them that salty foods cause high blood pressure and result in medical review.

The self-management effect also makes the care manager more efficient. Patients understand the value of the support system offered but they need incentives for weight loss and other targets. They need to trust that the system or health plan will support them.

Age is not a barrier to being an activated patient. Older people will use technology to manage their own health - and familiar technology such as TV or mobile phones may encourage them to do so. There has been some exploration of the use of computer gaming, at both ends of the age spectrum: children's games to help them engage in healthy lifestyle choices, and games aimed at keeping elderly minds active to prevent deterioration in cognitive capacity. Playing computer games has led to improvements in cognitive ability in older people including switching between tasks and working memory<sup>19</sup>, and the EU has funded a major project, Eldergames, to assess and encourage the use of games among older people.

#### FOOTNOTES

<sup>18</sup>https://members.kaiserpermanente.org./ kpweb/tol.do?theme=myhealthmanagermembers

<sup>19</sup>Can training in a real-time strategy video game attenuate cognitive decline in older adults? Basak C, *Psychology and Ageing*, November 2008

## 4. Research and innovation in new technologies and ways of delivering care

#### Fail early, fail cheap

Much research in both the US and the UK focuses on scientific or technological breakthroughs, and leaves the question of how these can be implemented for later. But the extremely impressive Garfield Healthcare Innovation Centre (Kaiser's in-house research and development arm) looks at the immediate practical application of ideas and allows an early assessment of how a 'good idea' will work out in the home or hospitals, and whether modification is needed.

The centre uses cheap plywood and cardboard to mock up potential layouts of hospitals and individual rooms in actual size. Practising healthcare professionals are brought to the centre to simulate day-to-day healthcare delivery. In this way, the layout can be optimised for the necessary process. The centre also recreates replicas of actual hospital areas and peoples' homes in precise detail.

These realistic environments lead to applicable solutions. New technologies are tested in real situations before expensive mistakes are made, and interdisciplinary teams can work together to address real issues. Guy's & St Thomas' NHS Foundation Trust uses a similar approach to the Garfield Centre, with a simulated operating and ward environment for training and planning. The centre recreates a scenario so that staff can test how best to work together as a team, how to respond to incidents, test out new techniques, and review patient safety improvements.

It is common practice in the UK for potential solutions to be piloted in practice. This alternative modeling approach allows intensive study of normal working practices, and allows solutions that do not work in practice to be swiftly discarded.

#### Look for simple solutions

Often low-tech solutions turn out to be more powerful than hi-tech options. While technology has redefined cost structures in many industries, this has not happened in healthcare. But some simple solutions could bring immediate benefits.

Drug administration errors are a problem in both the US and UK and are a leading cause of patients suffering harm in a hospital setting. Minimising the chances of the wrong drug or the wrong dose being administered is a concern for all health systems.

In the US, the best results come when nurses wear brightly coloured sashes. While they are wearing the sashes they are not to be interrupted, so they can

#### **Key points**

Testing the practical application of technological solutions can help adoption.

Low-tech solutions are often better than hi-tech ones.

'What particularly impressed me about the Garfield Centre was the way normal working practice was observed to find out what was behind a problem – and then a solution was worked on.'

KATHRYN BERRY, Associate Director, Capital, Investment and PFI, NHS North West

## Transformational technologies

Medication management, such as electronic reminders and dispensers of drugs.

Care giver communication including email, Interactive Voice Response and two-way video.

■ In-home remote patient management.

Discharge management on admission or entry to hospital not exit.

Data mining of individual patients or groups of patients.

Cognitive assessment through interactive computer programmes.

Remote training and supervision of health workers.

■ Social networking among patients, caregivers and health workers (e.g. Facebook).

FOOTNOTES

focus on complex drug administrations. This 'technology' had a major impact on error reduction and is being adopted across Kaiser's forty hospitals. Many UK hospitals aim to have uninterrupted drugs rounds, but few use such a simple and effective solution.

Molly Coye's work at HealthTech has shown that a few key transformational technologies work (see table). In addition, her research shows that only a directive approach works to achieve adoption at scale, which suits the NHS and its top-down management system<sup>20</sup>.

#### Early trials of a transformative technology: remote patient management

#### Home-based telemedicine for uninsured, high-risk diabetic population

Inpatient admissions	▼ 32%
Emergency room encounters	▼ 34%
Outpatient visits	▼ 49%
Source: Diabetes Technology & Therapeutics Four	nal 2002

#### Asthma self-management for high-risk pediatric population

Activity limitation	▼ (p = .03)
High peak flow readings	▲ (p = .01)
Urgent calls to hospital	▼ (p = .05)
Source: Arch Pediatr Adolesc Med, 2002	

#### Care coordination: hypertension, heart failure, COPD and diabetes

Emergency room visits	▼ 40%
Hospital admissions	▼ 63%
Hospital bed days of care	▼ 60%
Nursing home admissions	▼ 64%
Nursing home bed days of care	▼ 88%
Source: Disease Management, 2002	

It is tempting to start using some of these technologies that put additional equipment in patients' homes. But we believe that the technology may leap to existing devices, such as mobile phones. TVs also offer potential, through touchsensitive screens allowing two-way transmission of information (Intel is well advanced on this) and through use of the wiring in cabling systems to transmit and receive data.

<sup>&</sup>lt;sup>20</sup> Transformation In Chronic Disease Management Through Technology: Improving Productivity And Quality In The Shift From Acute To Home Based Settings. Coye MJ, MD, MPH, Health Tech, presentation to Cambridge Health Network, June 2009

## 5. Change management and the introduction of technologies

Two messages were repeatedly reinforced:

- 1. Getting doctors on board is tough but critical. Lack of clinical support can sink technologies.
- 2. Educating the patient and getting them to trust the technology is equally important.

Kaiser dropped home monitoring for cardiac in 2001/02 due to resistance from cardiologists. It is essential to have a doctor as a clinical champion of the new process or processes being introduced, and affected parties must be appropriately incentivised, as introducing technology can be disruptive.

'[Remote patient management] relies on the reorganisation of care processes that include physiologic monitoring, protocol-driven decision support, newly defined roles for clinical and nonclinical providers, and telecommunications that place patients at a distance in space, and frequently time, from the providers of their care. It also relies on a disruption of the usual business model for care of chronic disease, shifting some responsibilities to the patient and non-clinical providers'<sup>21</sup>

#### Consider gain shares to manage change

Savings have to be big for people to sit up and pay attention, even though the financial drivers are clear and proven. Gain sharing works in some contexts (profit or revenue sharing) including with primary care providers. This is important, as professional roles will inevitably be disrupted. The financial rewards can be converted into non-financial rewards such as time off or educational time/programmes.

Many of the companies doing imaginative work on healthcare technology are not the traditional health tech companies. These new companies are not focused on hospital or medical office care. Instead they are starting from the assumption that data will be omnipresent, used directly by patients at home as much as by healthcare professionals, as the focus on delivering healthcare.

#### Use consumer technology

Several companies see personal health services as a consumer retail market in the US (i.e. direct to consumer and retail expenditure rather than healthcare delivery and healthcare insurance). Seeing users as retail consumers rather than patients leads to a distinctly different mindset for new technology adoption.

#### **Key points**

Getting clinicians on board is key to change.

■ Patients need to be educated and feel they can trust the technology.

'Through our work in the UK we have learnt that in order to achieve step change, it is important that both clinical and management teams at all levels of the organisation are fully engaged in and committed to the project's objectives.'

RUTH POOLE, Group Clinical Director, Healthcare at Home Ltd 'We should use technology that is already in people's homes, and start with something simple and build on it.'

KATHRYN BERRY, Associate Director, Capital, Investment and PFI, NHS North West

FOOTNOTES <sup>21</sup> *ibid* 

These companies learn from other technologies that have been adopted quickly, such as mobile phones.

An example would be health apps for smart phones, a huge growth area for functions such as Warfarin and Glucose monitoring. Cable companies are developing programming to use existing TV sets for wellness and fitness uses and for interactive health management for the home-bound.

Using easily available and familiar technology for remote monitoring has great advantages and is likely to be more acceptable to patients. Technology linked to phones and televisions offers great opportunities.

This type of change may be particularly challenging for the UK, where access to healthcare has traditionally been through a 'gatekeeper' and there are restrictions on direct contact with patients (for example, limitations on direct advertising by drug companies). Patients generally don't have access to their medical records, except on request and in written form.

Will the UK be able to utilise this trend without changing some of these attitudes and access routes? Will the global nature of the internet mean patients will be able to purchase and utilise some of these products without the involvement of healthcare professionals? And how can the risks involved in this be reduced?

# 6. Management capability

A notable difference between the US and the UK systems, which appeared to be in the US's favour, was the strategic and analytic capacity of the US administrators that we met across the different types of organisations. It was not unusual for one to give us an impromptu and cogent strategic overview of the industry and their particular subsector of the market.

In the US, hospital administration is a graduate degree on par with an MBA or Law, and often part of an MBA course. Courses such as the Masters in Health Administration (MHA) from Minnesota and John Hopkins, and the Masters in Public Administration (MPA) from Harvard, are coveted. Graduates can command both prestige and a high salary. As a result, the calibre of the cohorts of managers produced tends to be high.

NHS management at its senior levels may be perceived as a prestigious career path, but our training does not place sufficient value on analytical competency. This skill is urgently required now as well as for the future, more data-rich environment. Succeeding as a manager in the 'political' system of the NHS has required a different set of skills. Other skill sets we will need in the UK as we shift to new types of care settings include strategic change and negotiation skills to work with clinicians to change clinical practice. To manage chronic disease we will need leaders (clinical and general managers) that are comfortable with multiple levers to change clinical practice, including the contractual and financial.

#### **Key points**

■ US managers are well trained strategically and analytically and have often had access to world-class training programmes with more emphasis on operating a business.

The NHS needs to place more emphasis on analytical competency.

- In general in the US, chasing the dollar through the reimbursement system is enervating; creativity is drained into seeking return on investments. Healthcare follows the money, not the population's health needs. The UK has an opportunity to look beyond this and concentrate on longer-term benefits.
- Both US and UK health systems perceive themselves to be at a critical moment. The UK is better placed to meet these challenges and the ability of its system to look beyond immediate costs and benefits could help it adopt innovative solutions, which will lessen the cost of the service in the future.
- Technologies delivered through familiar and widespread devices such as mobile phones and TVs are more likely to be adopted than those requiring new devices. Linking monitoring technology to TVs and mobiles may encourage greater compliance.
- SHAs which have access to innovation funds are ideally placed to lead on much of this system development.
- The coming shift to polyclinics and more care being delivered closer to home offers an unprecedented opportunity to build technological and IT systems into new models of care. If we simply transplant the same model of care used in hospitals to another setting we will not achieve the changes needed.
- The UK urgently needs to improve the flow of information between different health organisations, and to link the NHS, social care, health providers and patients. The implementation of Connecting for Health will do some of this, but other opportunities should be sought. A functioning EPR like that used by Kaiser is a critical platform for managing chronic disease.
- Capital investment in the NHS should be about the 'right' investment, which may not always be buildings.
- PCTs must be imaginative in their commissioning and examine alternatives to commissioning the same pathway from the usual provider. Commissioning staff will need to be aware of the developments and how to encourage them locally.
- There are opportunities to capture the enthusiasm and knowledge of GPs and other staff in primary care who will play a key role in providing care closer to home and keeping people with chronic diseases out of hospital. Practice-based commissioning could help here, as could incentivisation through the QOF system.
- Leaders and managers must have analytical competency and be trained in new types of skills for the UK context and its changing healthcare delivery patterns.

### Acknowledgements

We would like to extend an enormous thank you to our US colleagues: Lawrence Hamilton from Kaiser Permanente, Molly Coye from HealthTech and the Californian Regional Health Information Organization (CalRHIO), Steve DeMello from HealthTech and Deborah Hamilton, as well as all the individuals we visited in the various host organisations.

Thanks also to all our UK group for helping with this report.

Organisations visited: Robert Bosch Healthcare, Inc California Regional Health Information Organization Sutter VNA and Hospice Center for Technology and Aging, Public Health Institute Kaiser Permanente: Garfield Innovation Center BeWell Mobile HealthTech, Public Health Institute Professional Healthcare at Home Ltd

Author: Pam Garside Editors: Zoe Bedford, Alison Moore Sub-editor: Jacqui Gibbons Design: Kati Lopez

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