IDEAS FACTORY

HOW TO TURN STAFF INSPIRATION INTO NHS REALITY 20
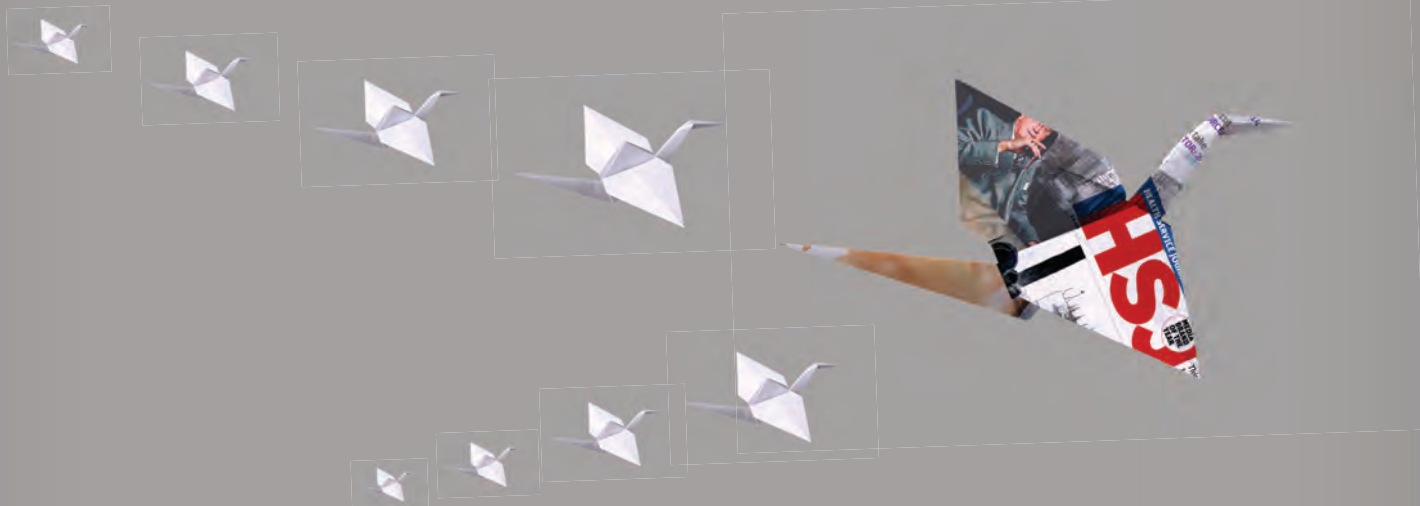
> There's no doubt the NHS can be saved. But for that to happen new ways of delivering care need to be the mainstream and not the exception.

Care integration is now widely accepted as a requirement of the "new" NHS. All patients – regardless of their health status – can benefit from well connected and co-ordinated care. While evidence for this exists around the care of those with long term conditions, the advantages for all patients must not be overlooked.

Identifying patients at risk of deterioration already involves advanced care planning to prevent unnecessary morbidity and avoid hospital admissions. However, delivering connected care and planning across services requires joined up working to be a routine approach.

Sharing the detailed electronic care record is now the conduit for care integration across health communities. But to deliver this nationally, technology must be scaled up to link the various contributors of patient care. No provider or clinician should be exempt if the patient is to receive the best care.

So how do we ensure our technology is up to the job? One option is health repositories which do deliver some benefits. But multi-system interoperability also creates overheads that detract from efficiency. It is also slow to achieve and difficult to maintain. If this route is

'Deployment of common systems provides the simplest, most effective route to integrated care'

taken, services need to ensure the chosen integrations are both proven and cost-effective.

Analysis of technical integration approaches has shown that the deployment of common systems provides the simplest and most effective route to integrated care. The greatest success – as illustrated at a local community level in the articles here – comes from common platform working across multiple services.

Commissioners are now stepping up to commission integrated working. Multi-directional integration needs to become the standard – pooling services that will support the patient at home, detect deterioration and also prompt early intervention.

Integrated care also needs to extend to urgent, as well as routine, care. The same integrated electronic care record is required 24 hours a day. The record is already being used, with much success, to deliver results for patients in many areas. We now need cultural change from clinicians, and a willingness from suppliers and providers, to make integrated care a national reality for our health service.

Dr John Parry is a GP and clinical director of TPP
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INTEGRATION

GO WITH THE FLOW

Improving the flow of patient data between all parts of the NHS is vital to integrating care. By Ingrid Torjesen

Few people would argue against improving horizontal integration of care. Numerous reports have highlighted the enormous benefits for patients of integrating care across primary and secondary sectors and community services in terms of ensuring better, safer care for patients, promoting self care and avoiding unnecessary hospital admissions.

However achieving integrated care requires excellent information flow, ideally in the form of compatible electronic patient record systems or a shared record, so that everyone caring for patients has a full picture of that patient's history and current care and health status.

The government's Future Forum, which is looking at how healthcare should be provided, argues that integration is "a means to achieving better outcomes for people" and says: "We need to move beyond arguing for integration to making it happen."

The government agrees. In its response to the second Future Forum in January, the Department of Health says it intends to ensure that a stronger duty is placed on the NHS Commissioning Board, clinical commissioning groups, health and wellbeing boards and Monitor to encourage integrated working at all levels and that it would explore "whether measures of service interoperability can be introduced into contracts with local commissioners in order to facilitate integration of services". It adds that it intends to hold the NHS Commissioning Board to account on furthering integration through the NHS Outcomes Framework.

In February, the King's Fund and Nuffield Trust published a joint report, *Integrated care for patients and populations: improving outcomes by working together*, looking at how integrated care can be achieved. One of the barriers identified was lack of information sharing. "Innovative approaches are needed to sharing data together with a commitment to developing shared clinical records," it says.

One of its authors, Nick Goodwin, a senior fellow at the King's Fund, says: "Even without thinking about integrated care you are not going to really get to a position where you can stimulate quality improvement in healthcare without having a robust and well-documented electronic patient record."

Mr Goodwin points out that one of the problems is that different services have separate information systems so the information needs to be drawn together to give clinicians a collective picture of what is happening to a particular patient. "If you don't have systems that talk to each other in terms of basic information flow you have got no hope of integrating care," he says.

"Good IT information exchange is the

Exchange rate: information exchange between different health staff must be improved

absolute bedrock of better integrated care or indeed of any integrated care."

TPP's SystmOne currently holds 24 million patient records: one fifth of the GP records and two fifths of community and child health records across England. In areas of the country where it is the dominant primary care system – the east of England from Newcastle in the north to Essex in the south – TPP has started rolling out its read-only SystmOne Clinical Record Viewer licence-free to all hospitals.

TPP managing director Frank Hester says this means secondary care will be able to see detailed records (with provided consent) for most patients and that this will aid care. "We don't have all the GP records, but we have a large proportion of the community records, which means we can access data for complex long term conditions."

When a patient arrives in secondary care and is registered on the hospital system, messages are sent to the SystmOne CRV. When a clinician then views a record using the CRV, that patient's GP is notified immediately – and automatically. "This gives real opportunities for the healthcare of people who have accidentally ended up in hospital," Mr Hester says. For example, a patient whose asthma has deteriorated or an elderly person who has got a bit confused and ended up in A&E, can be taken back into primary care.

Access to the detailed electronic record enables the clinician to confirm a patient's history, current drugs and any allergies and sensitivities, rather than ask them to repeat everything again. For end of life patients in particular, it is "extraordinarily upsetting" to have to repeatedly go over what is wrong, Mr Hester emphasises. "Special wishes functionality also ensures the patient dies where they want to, whether that's in palliative care or at home."

Even if the patient record is held on a competitor system, the SystmOne CRV will allow the clinician to access that patient's summary care record if it has been uploaded to the spine, which gives information about drugs prescribed and any allergies or sensitivities.

TPP is also trialling other functionality within their web-based service SystmOnline, which enables patients to see part of their record. This works alongside existing

'For end of life patients in particular, it is extraordinarily upsetting to have to repeatedly go over what is wrong'

functionality to order repeat prescriptions and book appointments from the comfort of patients' own homes. It also enables patients, particularly those with long term conditions, to raise issues they are worried about with their GP or a specialist nurse, who can reply at their convenience.

Knowing that another clinician can see the detailed patient record has revolutionised the content of referral letters and speeded up queries to other clinicians about care, says Mr Hester. "Rather than sending a letter to someone in the hospital you are literally sending an electronic version of the record with a question to the consultant that you want to speak to. Then it is a quick response, rather than waiting three, four or five days for a letter, or even worse sending the patient off to a clinic that they don't really need to be at."

If hospital clinicians want to be able to add information to the patient record or send discharge letters electronically to the patient's GP, they can do this if the hospital opts to deploy SystmOne fully. With SystmOne, records are stored securely in a centralised server, so deploying the system creates a shared record that can be updated by the hospital and the patient's GP and community services, if they are also using the system.

Mr Goodwin says there is much to gain from clinicians in different services being able to add to a shared care record. A practice managing a patient with diabetes, for example, is then able to see that the diabetes care plan is being followed, patients are having all their required checks and what decisions have been made.

"There is so much to gain particularly for people with chronic long term and complex illnesses where poor co-ordination, poor information records, poor information flows can lead to significant problems because people are not picking up on what has gone before," he emphasises.

Mr Goodwin says information sharing is not just about connecting clinicians but actually improving quality of care. The full set of information can be used for clinical decision making at the point of diagnosis or referral; for audit and commissioning purposes to help improve quality; the generation of care plans; and to help patients make decisions about their care and treatment. ●

GETTY IMAGES

tpp

INTEGRATION: CASE STUDIES

KNOWLEDGE GAP

Electronic records are helping NHS staff get the data they need instantly – and revealing the disparity between what patients say and what is on their record

Don't take a letter: shared records remove the need for much correspondence

SOUTHEND UNIVERSITY HOSPITAL FOUNDATION TRUST – COMMUNITY SERVICES IN AN ACUTE TRUST

In South Essex, 85 per cent of GPs use SystmOne for patient records, as do all community services. This means that more than three in four patients attending Southend University Hospital Foundation Trust have a detailed record accessible through SystmOne.

Richard Goodwin, project manager for SystmOne at Southend University Hospital, says: "It made an awful lot of sense for us to roll out SystmOne in the trust in order to link up with these GPs in a way that we can communicate with them and also share data."

Where the patient's GP is on SystmOne, the hospital has access to a full primary care record including information from community services, such as district nurse and continence services. Where the GP is not on SystmOne, the hospital can access the community services records that contain information about long term conditions.

Clinicians are able to view a patient's summary care record automatically but must obtain a patient's consent to access their detailed record. Southend follow a "consent to share" model where patients, and in some instances a relative, are asked to sign a document in order to activate access. The consultant can override the consent form if he or she considers it medically necessary.

Rather than just being able to view the information, the clinicians are using an editable version of the SystmOne Community module for services delivered under the acute trust.

The system went live in March 2011 in the heart and chest clinic for patients with chronic obstructive pulmonary disease, and was extended to palliative care in September 2011, and to the department of medicine for the elderly and the stroke unit in January 2012. The trust has plans for further roll out.

The community module allows clinicians to add information rather than just view what is already there and create a shared care record accessible to the clinic, the patient's GP practice and community services. The record updates immediately as the information is added.

The hospital clinic then sends a short message to the GP practice to inform them that the patient has been seen in the clinic, that their record has been updated to reflect what happened at the consultation and tell them about any changes to management. "In some instances we have stopped sending letters," Mr Goodwin says.

The messaging capability allows a message to be sent to any member of staff on any unit caring for the patient which has SystmOne. This is much quicker than faxing, phoning or sending letters. "Communication electronically has never been better," Mr Goodwin says.

He continues: "With heart and chest they rely very heavily on three particular community units – the oxygen unit, long term conditions and rapid response. Previously you had to phone, fax, or write a letter to get information from these units. All these units now share information, where patients have given their permission, with the heart and chest unit. Heart and chest can see what's going on, when nurses went to see one of their patients, what care plans they've been using and what actions are being carried out."

He adds that, on wards with access to SystmOne, consultants are not reliant on the ward clerks having to contact the patient's GP to find out what medication they are on, because it is outlined in the record.

The hospital has plans to begin using the free SystmOne Clinical Record Viewer in A&E shortly. Here the consent process will work differently due to the 24-hour nature of the department, time pressures for the provision of care and the likelihood that presumed consent will be needed more frequently for patients who arrive unconscious.

Where they can consent, patients will be asked for permission to view their detailed record, which will be activated by the A&E department rather than the GP practice. The GP practice will be informed immediately that the patient's record has been viewed and that the patient gave permission.

"If they are unconscious it can be overridden where appropriate and it generates an alert so someone will look into it and make sure that this patient was unconscious and that the person who accessed it was bona fide, so it is all audit trailed," Mr Goodwin explains.

SCARBOROUGH – CLINICAL RECORD VIEWER

In Scarborough, 80 per cent of local GP practices are on SystmOne. So it made sense for the A&E at Scarborough District General Hospital to take advantage of the free SystmOne Clinical Record Viewer available from TPP.

Dr Andy Volans, consultant in emergency medicine at the hospital, explains that when a patient now books into A&E the system will flag up if there is a detailed record for them containing information from primary care and/or community services. With so many tourists visiting the town, there is a record for around two thirds of them.

Where there is a record, the patient is asked to consent to staff viewing it, unless they are unconscious or unable to communicate for another reason, such as dementia, in which case the requirement is overridden. The data is extremely helpful and there is no danger of a patient either forgetting to tell the treating staff something important or getting confused.

This is a real danger: an audit by the A&E department revealed that most patients do not give full and accurate information about what drugs they are on or their allergies.

"With drugs, we have found that with 80 per cent of patients there is a disparity between what they tell us they are on and what is recorded in their record. Most of those are fairly minor and unimportant from the clinical point of view, but sometimes it is important," Mr Volans says.

"If you ask a patient, 'have you got any

'We didn't know what we didn't know. We really didn't understand how much data there was in general practice land'

allergies or sensitivities?', about 15 to 17 per cent of patients give you an allergy or a sensitivity. When we compare that to the history of those that we have got TPP access to, 80 per cent of patients have some form of sensitivity, allergy or didn't like this drug recorded.

"Often it is not important, but again it just shows the depths of detail that we do not get by simply asking patients."

Being able to check patients' medication and sensitivities accurately is extremely important – and not just for local people. Scarborough is a tourist attraction – but many of the tourists come from west Yorkshire where between 80 and 90 per cent are patients at TPP SystmOne practices. So clinicians can also access their records rather than rely on patients' memory. Dr Volans says. "It is so much safer if you can see what was prescribed."

Before SystmOne was installed, Dr Volans, who is a member of the College of Emergency Medicine committee for IT development (a subcommittee of the clinical effectiveness committee) assessed around 50 patients and asked whether it would have been useful to know anything from the GP notes to help make a decision if they had

been available. The results suggested that it would have been useful for 10 to 15 per cent of patients but, now the system has been introduced, the department has actually found that it is using data from the notes to help with clinical decisions for eight out of ten patients.

"We didn't know what we didn't know," he says. "We really didn't understand how much data there was in general practice land. We found that the stuff that we can get through from them – and that is just in the fairly tightly controlled system that they have got – helped us enormously."

The amount of a patient's record that the department is able to see varies from a very detailed history to the list of drugs they are on and any allergies, depending on which GP practice they are registered with. Dr Volans would like to see a users' group set up locally to standardise this and to alleviate any GP concerns.

He adds that the long term aim is to get the full version of SystmOne for A&E so that clinicians can message others caring for the patient outside of the department and update the shared record. Endocrinologists at the hospital have had this facility for over a year. Eight out of ten patients seen by them have their GP record on SystmOne so now have a shared record which helps patient management.

Dr Volans explains that the consultant can see what contact with services a patient has had, any changes to drugs that have been made and whether tests such as foot and retinal checks have been carried out. All services with full SystmOne can make changes to the record. ●

Emergency service: A&E staff are now accessing GP notes

CHRIS RODWELL
ON DICTATION

winscribe
Let's improve the process

"In recent years the reasons for deploying a digital dictation system in the NHS have changed. While it is still a good idea to replace tape-based processes and have better control of dictations going through your system, the business drivers for this technology now demand that vendors offer more.

It is rare now that a digital dictation system is purchased on its own. Trusts want to integrate digital dictation with the patient administration system to provide patient demographics and allow clinicians to dictate from clinic lists. This automation increases patient safety by reducing human error.

Digital dictation may also incorporate speech recognition technology and a clinical correspondence portal linking patient records with their current and historical documentation. Templating and e-distribution complete the package and ensure control of the document life cycle – from creation through review and approval and, finally, distribution.

Clinicians can use these functions in a variety of environments, from clinic rooms to remote community sites. They can dictate in a wide variety of ways to suit each type of work environment – for example, using wired or handheld microphones or smartphones.

As NHS organisations discover how beneficial integrated speech recognition and clinical workflow can be to patient care, they have

'It is rare now that a digital dictation system is purchased on its own'

begun to think about how these systems can offer a strategic investment to generate major savings year on year.

Taking advantage of these functionalities is not restricted to those procuring new systems now. Trusts can leverage existing investment by adding integration and moving away from paper-based correspondence systems.

Innovations in this area are often the easiest way to realise QIPP initiatives and drive change. Vendors such as Winscribe have had to rise to the challenge and be agile in their response to clinical needs. The breadth of our clinical portal system is a far cry from past digital dictation products and responds to the business needs driving innovation. We believe it is much cheaper and works better than the offerings from the big PAS vendors.

These innovations have come through partnership: with clinicians in industry developing the technology and clinicians and managers in the NHS telling us what works in clinical settings. The result is best of breed solutions that are proven. Trusts ignoring the opportunity to make the most of them are missing a trick.

Chris Rodwell is UK healthcare manager at Winscribe
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TECHNOLOGY

YOU'VE GOT

The bureaucracy and delays involved in paper clinic letters is prompting trusts to seek an electronic alternative. By Claire Read

From the patient's perspective it seems like a straightforward proposition: ensure that written information about an outpatient appointment or hospital admission is quickly available to both patient and GP.

But look at the multiple people and steps involved in producing clinic letters and discharge summaries – creation of the document including dictation and transcription, checking and authorisation, printing, enveloping, and sending by post – and it quickly becomes clear why this apparently simple task is something with which so many hospitals have struggled for so long.

A decade ago, Dr Adam Towler was working in an NHS skin oncology clinic and experiencing those struggles first hand. Long-term secretarial sick leave meant that letters for patients he had seen up to six months previously had still not been typed. The problems were exacerbated by the lack of notes available for a significant proportion of the patients he was seeing in clinic.

The result, he says: "You have these crazy conversations with the patients when they've been coming to your hospital for ten years and you have to ask them: 'Well, have we ever given you the light treatment, or have we ever given you the tablets that were orange?'

"It really struck me that in medicine we can do things like keyhole surgery and specific targeted cancer drugs but we can't actually get right a basic system of having the information about the patients recorded and available ... where the doctors need it."

The failure to create timely and accurate clinical correspondence is a common one, and it leaves GPs equally in the dark – and equally bemused.

Dr Michael Dixon, chair of the NHS Alliance and a practising GP, reports that, while he can get timely electronic information on blood test results – "often on the same day they've been done in the surgery" – letters from hospitals are still taking a week or a week and a half to arrive.

"And of course the irony is that when it

gets to my surgery it then gets put on the computer, which is where I read it," he says.

For the reality is that, while many GPs in England have embraced IT to reduce the administrative burden – 47 percent, according to a recent survey by consulting firm Accenture – acute trusts remain slow to adopt such systems. Only 25 percent of hospital and specialist care clinicians report using IT in this way, well below the international average of 49 percent.

Undoubtedly the complexity of the clinical correspondence process is part of the problem. While digital dictation is increasingly popular – allowing clinicians to create a sound file that can be sent for external transcription, or simply directed to the hospital secretary who has the lowest workload – it solves only part of the issue. Most organisations looking to guarantee speedy clinical correspondence will need to

MAIL

look at technology for all parts of the process.

Technology such as Epro, the software that Dr Towler ultimately left clinical practice to develop. Now in use at six trusts across the country, this web-based application enables complete electronic management of clinical correspondence. His company, Bluewire Technologies, has an exclusive technology partnership with digital dictation and workflow specialists Winscribe, which means digital dictation and speech recognition can also be integrated into the solution, creating a clinical correspondence portal.

First, clinicians digitally record their dictations directly from patient lists into Winscribe. The files are then available to medical secretaries and typists through Epro, and templates and auto-completion of details from other systems – basic demographic details through the patient administration system, for instance – make letter writing much quicker.

Next, doctors sign off drafts through the system. As it is web-based, that approval can happen from any computer in the hospital. Finally, documents are securely and electronically sent to the GP. Add-on modules mean the system can also manage the production of discharge and drugs summaries and assist in handover lists.

Dr Towler says Epro and Winscribe's Clinical Correspondence Portal are very

'Many commissioners are now imposing time limits for clinic and discharge letters'

much the product of his experiences: "You have to understand what motivates the average clinician and in the NHS, in hospitals, that is about seeing a patient," he argues. "One of the things that clients have said about Epro is that it thinks like a clinician, and that reflects ... who built it."

Although reactions to new IT systems tend to be mixed – "You get some people who just love new technology, people at the other end who say over my dead body, and the bulk in the middle," reports Dr Towler – with proper implementation, the benefits of electronic clinical correspondence systems tend to become clear quickly. Increased productivity for doctors and medical secretaries are the most obvious, but such software can also yield extremely valuable information for management.

"You can look at the process to see where the bottlenecks are," explains Dr Towler. "You might have brilliant typists who turn everything around within 24 hours but, if the doctors don't dictate the documents until three days after the clinic and then take four days to sign them off, then you've got an average seven day blockage in your whole process. And so [with a system like this] you can tell where you need to go to target the changes to the process to get more efficient."

There are also some financial benefits – by reducing paper use, through restructuring teams and in avoiding financial penalties, for example.

Moving to electronic correspondence is, of course, not without challenges. A major one is the need to tie together several systems and processes. The NHS Interoperability Toolkit (ITK) – a set of standards to make IT systems work together – can help in this regard. Winscribe has been a leading player in taking ITK projects forward.

Increasingly it seems NHS trusts will have little choice but to overcome such obstacles. Not only is the QIPP challenge forcing efficiency savings to be made, but many commissioners are now imposing time limits for clinic and discharge letters.

It is an approach that Dr Dixon of the NHS Alliance supports, saying that commissioners should be "quite ferocious" about it. "Because this really all comes down to a patient safety issue," he explains.

"If you don't know what drugs patients are on and can't compare what they're on with what they were on before then it can be extremely serious. It's really important we get this right." ●

TECHNOLOGY: CASE STUDIES

GOODBYE, TYPING POOL

How trusts are replacing ageing systems with electronic correspondence – delivering savings, security and much useful management information

EALING HOSPITAL TRUST

There was a clear motivation for Ealing Hospital Trust to move to electronic discharge summaries. "Our commissioners needed to know that we were providing discharge letters to the GPs within 24 hours of the patient leaving hospital," explains Stephen De Gabrielle, IT project manager at the trust. "So there was a financial incentive for us to improve the system, as well as the benefits to patients and to GPs."

It was a big change for the trust; one that involved training staff ward by ward, clinical team by clinical team over a two month period. Previously doctors had used paper forms to detail the medications with which a patient should leave hospital, as well as the summary of the care received during the admission.

"Those were then being typed up by, literally, a 1950s-style typing pool and faxed off to GPs," says Mr De Gabrielle. "It was an interim solution but certainly not an optimal one and we had lots of troubles with error rates and so forth."

And so in May 2010 the whole process was made electronic. Winscribe's clinical correspondence portal not only integrates with the hospital's patient administration system (PAS) – meaning all the correct patient data is available through the very application used to create the discharge summary – but is also fully linked to work processes in pharmacy.

Clinicians dictate the summary into Winscribe, which is linked to the clinical correspondence system, and through which the document can be seen for its lifecycle: in pharmacy, for review and authorisation, in the ward to support medicines dispensing, and finally when it is ready to email to the patient's GP and printed off for the patient at discharge.

Each and every stage of the process can be tracked and audited. According to Mr De

Gabrielle, the availability of that sort of detailed, real-time data has been one of the major benefits of introducing the system.

"We're just able to get better information about how our hospital's working," he says. "We've got a wonderful report dashboard and that gives us a range of data that we now feed to our acute performance team. And the information is not just at the hospital level but also at the departmental level and right down to individual wards."

Mr De Gabrielle admits this has led to a new, albeit welcome, pressure. "We're always being asked for information!" he laughs. "Previously it was just, 'No, sorry', because we just didn't have it. But now it's there for them and that's a great benefit. You provide more reports and then managers just want to have even more. Because they get addicted to knowing what's going on in their service and all of a sudden they say: 'Oh, yes, I can actually manage this now.'"

UNIVERSITY HOSPITALS BIRMINGHAM FOUNDATION TRUST

The move to the new Queen Elizabeth Hospital has involved big changes for University Hospitals Birmingham Foundation Trust, not least a shift to paperless clinical correspondence.

"We very much wanted to digitise the way we produced our letters as well as deliver paper-light outpatient clinics in the new hospital," explains Linda Mennell, service improvement manager. "There were savings targets linked to moving hospital and obviously taking out the need for paper – reducing the requirement to pull notes for our outpatient clinics, removing the need to send hard copy letters out to GPs – helped with these."

Several separate pieces of software were involved. While staff at the trust developed a clinical information portal to complement an existing home grown prescribing, decision

making and noting system, a partnership with Winscribe delivered digital dictation and a module to approve, edit and distribute letters. Together, they constitute an entirely electronic letter production system from dictation through to distribution.

With so many applications, interoperability was a priority. In addition to interfacing with one another, the components all link to the local GPs' computer system, enabling the direct electronic transfer of letters to surgeries.

Crucial too was ensuring that all aspects of the system reflected the way in which staff worked. To that end, clinicians and medical secretaries were closely involved in its development. That led to functions such as digital dictation launching directly from clinic lists in the clinical portal application.

"We have active consultant involvement in all our clinical IT developments at UHB," explains Ms Mennell. "The task and finish

At your fingertips: managers can draw a host of useful reports from the new systems

'I think people just like paper in front of them sometimes – it's quite a big change for some'

Attention is now turning to using the software to meet other needs, including internal referrals, the recording of patient alerts, and nursing handover.

"When our nurses finish their shifts at the moment they're just using a paper sheet with the handover, with all the patient information on it," Mr Lewis explains. "But Epro has this facility that allows you to bring up the list of all your patients by ward and so they should really be doing the handover using that."

He knows that encouraging this change will be a challenge. With the medical director an advocate of the system – and the project sponsor – doctor engagement has been easier to gain than it might otherwise have been. But some staff groups remain low-level users, particularly nurses. "I think people just like paper in front of them sometimes – it's quite a big change for some people," Mr Lewis says. "It needs a bit of change management process and a lot of training."

Training on its electronic clinical correspondence system is something the organisation has long been geared up to provide. Sessions are run as needed and a team of four, soon to be five, application support engineers are on hand to answer user queries. This sort of dip-in-and-out advice has been crucial at West Suffolk.

"The nature of the NHS is that doctors are coming and going, especially at a teaching hospital like ours where we have registrars on a rotation basis," says Mr Lewis. "We also have a lot of locums and the problem with that is that they need on-the-spot training even though they might only be here for a week or two."

With a separate project now underway to make all patient notes electronic, the ultimate goal of going entirely paper-free is moving closer than ever. But even at this stage the advantages of moving to an electronic clinical correspondence system are clear.

"There have been huge benefits for the trust," comments Mr Lewis. "Obviously we've got improved efficiency; reports show that turnaround times for documents have reduced since we brought this system in. Improved security is another big benefit. And everything's audited now. We've got the full history of every document from point of creation to actually sending it out." ●

groups on this project were chaired by or with full involvement from clinicians and the design and development group is led by a clinician. Medical secretaries were also closely involved as they too would be final users. Having that co-ordinated involvement certainly helped."

Equally important was involvement from operational teams: "I think it's much easier to do it that way," comments Ms Mennell. "It's not easy when projects of this kind are led either by IT or purely project-driven. They really need to be embedded into the infrastructure of the actual trust."

She also emphasises the importance of good training: "Our project team included two dedicated trainers and for part of the rollout we 'borrowed' two of the trust IT trainers. I'm not sure that all trusts recognise that a dedicated training team is fundamental to the success of the rollout and the actual product."

WEST SUFFOLK FOUNDATION TRUST

More than 4,500 clinical documents are now created or viewed each day in West Suffolk trust's electronic correspondence system. It is very different to the situation six years ago when all such documents were created using Microsoft Word and stored in a specific folder on the network – or not, as was often the case.

"We had problems with letters going missing, folders being stored in the wrong place," remembers Ashley Lewis, project manager on the six-strong team which supports Epro, the electronic correspondence system. "We mainly initially introduced it to have a repository for all of our letters and documents."

That mission seems to have been accomplished. Some 1.9 million letters are currently stored on the system, as well as admission records and discharge summaries.

**MARGARET EDWARDS
ON THE RIGHT
TECHNOLOGY**

IN ASSOCIATION WITH McKESSON

McKESSON
Empowering Healthcare

In the 2011 *Innovation, health and wealth* review, NHS chief executive Sir David Nicholson talks about the need for accelerating the diffusion and adoption of innovation in the NHS.

Demand is rising as our population grows and people live longer. New treatments are emerging and the public's expectations of healthcare are changing. As Sir David notes, the NHS must meet these demands from current real terms funding, while improving quality.

He argues that the challenge for the NHS and its industry partners is to pursue innovations that genuinely add value but not cost.

Technology is a major enabler of innovation, and it certainly allows innovation to be shared at pace and scale. And that is at the heart of Sir David's challenge. No one doubts that innovation is alive and well in the NHS; what's less clear is whether the NHS has the ability to implement it at a national, widespread level.

Success at this level does of course exist, and it is important that we honour these achievements. More important is the need to take what we have learned from these successful implementations and apply it to future projects.

The NHS Electronic Staff Record (ESR) is a successful IT solution for healthcare that was deployed on time and on budget across England and Wales. The sheer scale of the ESR project

'ESR is now the world's largest integrated HR and payroll system'

was unprecedented and it is now the world's largest integrated HR and payroll system.

ESR's success is just one example of what can be achieved with the right technology and the right partner. McKesson provided the technology, enabling the innovation, as commissioned by the Department of Health. The NHS and McKesson continue to work in close partnership to ensure ESR runs smoothly and is able to integrate innovative ideas about its use.

The application of technology in the NHS is already helping reduce costs each year. It does this by automating processes and by removing unnecessary procedures.

By applying best practice methodologies and by sharing these innovations and new ways of working, we can ensure that success continues across the NHS.

Healthcare requires continuous and systematic evaluation to remain cost-effective, efficient, timely and high quality. As we enter the next phase of healthcare reform, it remains critical that our eyes stay focused on the innovation that supports the evolution of the health service, both nationally and locally.
Margaret Edwards is vice president, care management and commissioning, at McKesson UK
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ELECTRONIC STAFF RECORD

GET ON TO MY CLOUD

Daloni Carlisle on the underused community cloud that has the potential to transform the way we do HR

There is a lot of talk these days in the NHS about cloud computing. But how many people know that the NHS already uses one of the largest community clouds in the world?

It's called the Electronic Staff Record (ESR) and it is one of the success stories of national IT projects in the NHS. Since it was fully rolled out to all NHS organisations in April 2008, it has brought together the employment and training records of over 1.4 million NHS workers and released over £83m in cash releasing benefits – one third over the business case of £62m – and over £133m in non-cash-releasing benefits.

Where it has been used to its full, it has transformed HR from a paper-driven process with administrators shuffling pieces of paper and doing inefficient duplicate data entries into their own systems into an automated system where managers and employees can take control of their own personal information and use it to help improve the delivery of patient care and the working lives of NHS staff (see case studies, overleaf).

It's future proofed, secure and it works in the background.

Yet the majority of NHS trusts have yet to make full use of what is on offer – let alone start to use this vast resource to innovate.

"I think part of the problem we have is that ESR pays people and so people tend to see it as a payroll tool and forget all the other applications," says Frank Rutley, ESR programme director and vice president of workforce solutions for McKesson, the multinational IT company that provides ESR for the NHS.

"But there is so much more to it and there are case studies that show the NHS could potentially realise further benefits just by adopting the 'ESR Model Office'," he adds.

The concept of the ESR Model Office will be familiar to many but it is worth recapping what this means. ESR does indeed pay NHS staff and keep their HR record in one place, ready to share with a new employer. But it can do much more.

ESR can transfer staff training records and occupational health information such as vaccinations from one employer to the next.

It can also interface with organisations inside and outside the NHS, so that data can be exchanged quickly, securely and accurately. For example, it has an interface with NHS Jobs so new recruits' personal details can be uploaded automatically rather than entered manually. It has another interface with the General Medical Council and the Nursing and Midwifery Council to ensure that trusts are automatically up to date with the registration status of their doctors, nurses and midwives.

Moreover, ESR provides learning management and e-learning functionalities which, when implemented with self service, enable trusts to monitor compliance for

'People tend to see ESR as a payroll tool and forget all the other applications'

statutory and mandatory training, sending staff alerts when they need to carry out some essential training – such as fire safety or child protection – and then book themselves onto the next available course.

"Access to e-learning allows staff to update their own training record," says Mr Rutley. "There are some real financial advantages to this in that having an electronic record showing staff are trained can potentially reduce a trust's contribution to the NHS Clinical Negligence Scheme by up to £1m."

ESR is also linked to the spine and can gather information about an employee's access to patient record information – supporting single sign-on to hospital IT clinical systems.

From a management perspective, one of the most powerful innovations in ESR is manager self service. This allows managers to view information about their staff in real time. It has been used to empower proactive

Sky's the limit: the ESR cloud has huge potential

management of sickness absence and of mandatory training (see case studies).

But only a minority of trusts are using this function to its full potential. "It empowers managers to manage," says Paul Spooner, NHS ESR programme director. "Currently around 42 per cent of NHS organisations are actively engaged with self service."

This is partly a function of the way that many NHS organisations deployed ESR, he says. "The core implementation set out to be realistic and achievable," he explains. "Organisations could choose to work at their own capacity and to their own business needs and then stage subsequent implementations at their own pace."

The fact that ESR roll out was such a success is, he says, a tribute to NHS organisations' willingness to engage and take it on. But most chose initially not to bite off more than they could chew.

As Mr Spooner explains: "The majority chose to implement the minimum core solution – typically payroll and HR functions – and since the completion of national rollout in 2008, organisations have continued to implement the wider applications such as learning management and self service."

His team continues to support many more to make the change, but some still face some local technology challenges.

"The local IT you require to access ESR is fairly standard," stresses Mr Spooner. "It relies on an N3 connection and a desktop PC but the reality is that some managers cannot regularly access a desktop. A trust cannot mandate the use of self service to manage sickness absence, for example, if some of their managers cannot access a computer."

Ian Leath, enterprise solutions manager at McKesson, says that even the most advanced of trusts are only scratching the surface of what ESR could deliver.

"The sort of things now coming up through the national ESR user group are ideas about using the data in ESR and feeding it into their own environments," he says.

Examples of this might be combining data about staffing from ESR with bed management data, or with theatres. "People want to bring all this data together and use it to drive efficiencies," he says.

Mr Rutley adds: "This is where the future is and trusts are just starting to nibble at the edges."

Trusts are also starting to ask about mobile ESR that would allow staff to, say, check a pay slip from their mobile or managers to review sickness absence while on the move.

But there is a consistent message from all sides: ESR represents a huge resource for the NHS that can deliver efficiencies, productivity gains and real cash savings. It's up to the NHS to use the innovation it offers – and to start demanding more. ●

ELECTRONIC STAFF RECORD: CASE STUDIES

ABSENCE MINDED

Uses of ESR, from monitoring and driving down sickness absence to making junior doctors a lot less frustrated

EMPOWERING MANAGERS: ST HELENS AND KNOWSLEY TEACHING HOSPITALS TRUST

When St Helens and Knowsley Teaching Hospitals went live with ESR in 2007, they did it with a big bang – and have made significant gains as a result.

Rather than go with the basic ESR, they implemented Oracle Learning Management, which allows managers and staff to keep their mandatory training up to date without the need for endless form filling.

By October 2009, all managers were using self service – meaning they could look at real time data about their team's sickness absence and intervene quickly to reduce it and tackle long term sickness as well as respond to urgent situations, such as outbreaks of flu.

Managers now know the split between long term and short term sickness absence, the cost of absence, each individual's absence pattern and when mandatory training is due.

"It has had real benefits," says Anne-Marie Stretch, director of HR at the 4,500-employee acute trust.

"It means we can pick up things quickly, such as a flu pandemic or stress-related absence, identify any trends and then implement any intervention we need. Managers can refer people to occupational health and record a return-to-work date."

It empowers managers and delivers efficiencies and productivity gains in administration, she adds.

But data is only as good as the managers managing it. So a year ago the trust went a step further in its bid to drive down sickness absence and approved a new attendance management policy for all staff, backed by a stepped programme of support for employees.

In the year since, sickness absence has fallen by 1 per cent.

Developing the system has involved new reporting structures for mangers, new systems for generating automatic alerts for staff going off sick more than twice in a year,

and a new reporting tool, COHORT, that interfaces with ESR to speed up referral and reporting back to managers.

The trust believes this is a powerful tool – and it has been cited by NHS North West as a good practice case study – but as Ms Stretch warns: "This will only work if managers use it. They do need ongoing support – it won't work if all you do is give them access to ESR – and it is important not to assume that everyone is comfortable with IT systems."

SPREADING GOOD PRACTICE: BIRMINGHAM COMMUNITY SERVICES

It's one thing to innovate – but quite another to transfer that innovation to a second organisation, as Chris Heward, senior business partner for ESR at Birmingham Community Trust knows well.

Mr Heward had been the ESR lead at Heart of Birmingham PCT, where he had led award-winning work. The PCT had been the first to go live with ESR's full functionality in 2006 and had released some astonishing cash savings through reducing sickness absence and driving out paper-driven administrative processes.

For example, an interface with NHS Jobs allowed the PCT to transfer new employee details electronically, saving £30,000 a year. Manager self service, which allows managers to capture and monitor sickness absence in real time and then proactively manage it, saved £80,000 in one service alone.

Employee self service, which reminds employees when they are due to undertake mandatory training and then allows them to book themselves onto a course, produced a dramatic drop in the number of paper forms handled by the HR department. The number of "did not attends" for training places dropped from 10 per cent to 5 per cent.

Then in 2010, the provider arms of Heart of Birmingham, South Birmingham and North and East Birmingham merged to form the new community trust with 5,000 employees.

And of course, the three organisations were each at different stages in their use of ESR.

"My initial task was to bring the three organisations together," says Mr Heward. The fact that all three had the ESR made some aspects of this process easy. They were not dealing with three separate payroll systems and three separate HR systems.

"We were able to do what is known as a technical demerge, and simply transfer records from one organisation to another," he explains. "Without ESR, that would have required us to sack everyone and re-employ them, with all the scope for error that implies."

Now his team is working hard to bring everyone up to the standard of the highest performer in using ESR.

It is both a technical and a cultural challenge. "The technology challenge is not a doddle but it is all there," says Mr Heward. "The real challenge is to get people to do things differently."

A year after the merger and everyone is now on a level playing field, he says. "Now we have to add the icing on the cake – and it is essential icing that will allow us to manage training better and to make sure staff are delivering safe care."

Already 95 per cent of managers are using

Human factors: managers can keep up to date with staff sick leave, training and professional registration via the ESR system

self service and the trust has established the link with the General Medical Council and Nursing and Midwifery Council that alerts them to changes in clinicians' registration.

Now the trust is embarking on workflow management that alerts employees and managers when mandatory training is due. Again, the technical bit is the easy part – harmonising three organisations' different education and training policies has proved harder. "It's been a job and a half," admits Mr Heward.

But he adds: "ESR is now part of what you do. If anyone has a policy that does not mention ESR, then they are doing something wrong."

INNOVATION THROUGH TECHNOLOGY – JUNIOR DOCTOR CHANGEOVER

There are many frustrations to being a junior doctor – but surely endless form filling, working without an ID badge and repeating mandatory training should not be among them.

That certainly was Dr Graham Hay-Smith's feeling when he was a junior doctor in the mid-2000s, moving from post to post every six months.

He was at the time on the Prepare to Lead

'The technology challenge is not a doddle, but the real challenge is to get people to do things differently'

programme under the mentorship of Ruth Carnall, chief executive of NHS London. "She suggested I do something about it, so I did."

In 2009 he shared his experience with a group of London HR directors and, to cut a long story short, this led to a programme supported by NHS London to use the ESR to improve the junior doctor changeover programme.

This programme researched the problem – finding junior doctors were wasting around one or two days in each rotation filling out forms. Many were repeating mandatory training in each new workplace and repeating occupational health checks and Criminal Records Bureau checks.

Medical HR teams in each trust spent six to eight weeks preparing and checking information before entering it on to ESR, which took approximately three to six days.

The solution lay with the ESR. The programme established a new interface with the London Deanery to allow electronic transfer of trainees' personal details. New interfaces also allowed automatic transfer of mandatory training records, occupational health checks and CRB checks.

The new system has been running since 2011 and is still being streamlined today.

According to NHS London, it has had multiple benefits around patient safety, reducing bureaucracy, improving induction for junior doctors and giving them more time to spend with patients. "Perhaps most importantly, the new system is now removing the frustration, leading to happier staff," notes an ESR briefing on the project.

The programme is already sharing the learning with other SHAs and deaneries.

Dr Hay-Smith has remained the "user voice" on the programme throughout and he says more use could be made of the ESR, for example as revalidation of doctors and approval of trainers come on stream.

"The concept of a web-based system where an employee can look at their details and correct them is a sensible way to go," he says. "There is no single person more interested in the minutiae of whether that record is correct than the employee." ●

ALAN FOWLES ON NEW WAYS OF THINKING

ELECTRONIC HEALTH RECORD

EYES ON THE PRIZE

Daloni Carlisle on unlocking the full benefits of EHR – from real-time alerts to powerful research tools

About a year ago, Matthew Swindells, chair of the British Computer Society's health section and senior vice president of Cerner, came clean about just how difficult it is to implement an electronic health record system in a hospital and how long it takes to see the benefits.

He said: "The change involved is enormous and we have forgotten to tell that to the NHS. The idea that anyone has a system that is flawless, that you can plug in like a TV and it will work is nonsense."

But, he added, given time and a good project that defines good working processes before automating them, the benefits can be enormous.

"When I talk to the staff [in US hospitals] about e-prescribing and other systems they say it's brilliant and improves quality and safety. Ask them how it was to implement and they say that the first six months was an absolute nightmare."

Right now, several NHS trusts are at this early stage. Can they keep their eyes on the eventual prize?

Paul Altman, chief clinical information officer at Oxford University Hospitals and a consultant nephrologist, certainly hopes so. Cerner Millennium went live in his trust in December 2011 and is so far going well. But, he adds, it is hard work and not everyone can see the benefit. He is addressing this by keeping fellow clinicians focused on the "fun things" he believes the system will support within a year or two.

So what does he mean by "fun"? Yes, there are the "clinical five" defined by Mr Swindells when he was chief information officer at the DH (integrating the PAS into the EHR; electronic requesting and diagnostic reporting; clinical documentation; scheduling; and e-prescribing) but now Cerner has developed new tools that promise to unlock the potential of the data within an EHR.

They fall into several areas: health information exchanges to support shared records across health economies; early warning systems to alert clinicians of patients at risk; semantic searches of the electronic health record; solutions that link the EHR to workforce information; mobile tools to allow clinicians to view records on the move; and tools that support research (see case studies).

David Davies, senior director for Cerner in the UK, says these tools have been developed to serve needs expressed globally and that they are as applicable to the NHS as anywhere in the developed world.

Take Health Information Exchange, an integration solution designed to enable disparate legacy systems in the community to provide a single view of the patient record that integrates with Cerner. It is live in the US (see case study) and a handful of the 22 NHS trusts now using Millennium plan to use it in future.

"It is essentially a clinical portal with services provided by a cloud," says Mr Davies. "It does not matter where each part of the record sits, whether that is in

inPractice, EMIS or in RiO, the patient record can be viewed as a single record showing in which system the different elements of that record sit."

Integrated records not only allow clinicians to view a shared record but also ensure that best practice is embedded across a whole patient pathway. Clinical portals can also allow patients to view their records and start to add their own information – this is up and running in the US in the form of Cerner Health.

Early warning systems are another application. Davies explains: "Within the clinical record there are certain indicators that a patient may be falling into septic shock, for example," he says. Background processes scan the dataset in real time looking for patients at risk. If certain preset conditions are met, they can then trigger an alert for clinical staff. This is already being tried in a Spanish hospital, going live in early April 2012.

Then there is the research element – and there are two parts to this: supporting clinical trials and mining the massive

'Background processes scan the dataset in real time looking for patients at risk and can trigger an alert'

database of information that is the EHR.

One of the problems for hospitals involved in clinical trials is identifying patients who are eligible to enrol in studies. Cerner has now developed tools that can track research trials underway in a given setting and alert clinicians when they see patients who may be eligible. Other tools allow clinicians to record information relevant to trials.

In North America, the company has an anonymised database of health records of 35 million patients treated in 500 healthcare institutions. Cerner is working with academic health science centres in the NHS

to bring the concept to the UK in line with the prime minister's goal of revitalising the life sciences industry. This will give researchers access to vast amounts of information on large cohorts to examine, for example, patterns of adverse drug reactions and the clinical outcomes of different treatments and drugs.

These are the "fun things" that Dr Altman is looking towards; not all of them may happen (they are not all in the contract between the NHS and Cerner) and they may take some time.

He hopes eventually to be able to use Millennium to redesign workflows, to identify people at risk of an adverse incident, and to use the research tools. The trust already has mobile applications – doctors can view PACS images on iPads, for example – and this will be extended.

"There are real benefits to clinicians and to the NHS in all this," he says. "But first we have to get to the point where doctors no longer work on paper. There are some basic things to put in place first – and we are well on the way to achieving that." ●

ELECTRONIC HEALTH RECORD: CASE STUDIES

SINGLE SOURCE OF TRUTH

How systems to exploit electronic records are already changing American healthcare, and demonstrating their potential uses on this side of the Atlantic

On the way out? Medical files

WORKFORCE MANAGEMENT

As health systems go, Catholic Health Initiatives is a big one: 76 hospitals, 40 long term conditions organisations, two schools of nursing, and 46 home health agencies that together span the US from east to west.

So when they talk about linking the workforce management solution with the personal health record of their patients, this is no small undertaking.

The reason for attempting to do so is one that many in the UK would recognise: trying to get the best value out of the system – and by value they mean cost and quality.

The outcomes they want from a collaborative platform are ambitious. "It will move us towards measuring and understanding the value," says Barbara Caspers, director of nursing research and practice. "It will support us in using evidence based practice, in introducing standardised processes and identifying outcomes."

It will begin to develop understanding around a hot topic both here and in the US: evidence based staffing.

This is a work in progress and is based around exploiting Cerner's workforce management solution, Clairvia. It is underpinned by an academic research programme.

"Our greatest success so far has been around standard care management," says Kathleen Sanford, senior vice president and chief nursing officer. "We have had clinicians from across our hospitals review literature and the evidence base for practice and identified processes to be standardised. We call it our single source of truth."

So, the hospitals now use standardised processes for patients from given diagnosis groups that tell nurses, doctors and care managers at what point on a standard plan a patient should be at a given time. Collaboration between these three is written into the processes – they meet daily, as appropriate –with supporting information available at the bedside. If a patient is not where they should be, for example ready for discharge or ready for progressing to another level of care, the team intervenes.

"It has saved us millions of dollars and improved our patient satisfaction," says Ms Sanford.

Next they are moving to develop nursing business intelligence – which is where the workforce integration comes in. A proof of concept trial last summer tested a staffing dashboard that allows managers to model their staffing complement against the profile of patients in a given area.

At its simplest, this gives nursing managers the ability to match the qualifications and skills needed with patient

acuity. "But we can also model different scenarios, such as the impact of increasing the registered nursing hours on outcomes and mortality," says Ms Caspers. Their published work indicates that more RNs means lower mortality.

Currently the work has been developed around nursing but the CHI wants to extend to other areas such as labs, radiology and physiotherapy.

"We do not believe anyone in the US has done this kind of work," says Ms Sanford. "It is all about linking real-time point of care technology and creating a new database that links information about the care giver and the patient. The financial case is compelling. In ten and a half months, we have achieved a return on investment of two to one."

SEMANTIC SEARCHING

One of the drawbacks levelled at paper records is that they are almost impossible to search. But how effectively can most EHRs be searched?

The answer is semantic or smart searching that allows clinicians to search not just for a word such as a diagnosis or medication but also for anything in the record that might be linked to that word.

The Tiger Institute for Health Innovation – a strategic alliance between Cerner and the University of Missouri – has helped develop just such a semantic search engine called Chart Search that can be embedded in Cerner Millennium.

Karl Kochendorfer, director of clinical informatics, says: "If I type in 'ACE inhibitor', it will find all the mentions in a patients record not just of the term 'ACE inhibitor', but search for all the branded drug names."

Type in 'heart disease' and it will find all mentions of not just the disease but also pulse rates. Type in diabetes and it will look for symptoms that may indicate an undiagnosed condition.

"It is wonderfully effective, you learn all kinds of things by using it," says Dr Kochendorfer. "Our trials show it reduces the number of clicks a doctor makes by 70 per cent and reduces the time they need to find relevant information by two minutes."

The only issue is integrating it into routine practice. "Adoption is slow," he admits. "People have to remember to use it."

It has been in use for a year in the state medical system and is now averaging 150 searches a day.

"What we have noticed is that more than half of the searches are by nurses and medical record staff," adds Jeff Belden, associate professor of clinical family and community medicine and self-proclaimed "usability evangelist".

Nurses are seeking clinical information – but medical records staff are looking for coding and this may be the source of a significant return on investment that will make Chart Search as attractive to finance directors as it is to clinicians.

SHARING PATIENT DATA

About five years ago Oklahoma family doctor Brian Yeaman achieved something that is hard to imagine: he persuaded nearly all the leaders of the busiest hospitals in Oklahoma City to sit round the same table to discuss how they might share their patient information.

He was able to build consensus around a single use: caring for uninsured patients who are frequent users of emergency services. Leveraging Cerner's health information exchange platform, the hospitals began to share data.

Then US healthcare reforms started to ratchet up the pressure on healthcare providers to share information in a meaningful way and out of this came SMRTNET, Oklahoma's Secure Medical Records Transfer Network, now recognised nationally and internationally for the way it has transformed healthcare. It allows clinicians and patients to bring all their healthcare information together in one view, and adds some evidence-based recommendations for preventive healthcare.

Today, 18 hospitals in the city as well as more in the outlying rural areas and some family doctor centres, are connected.

"It is a core system now," says Dr Yeaman. "We cannot really function without it. As we collect more and more data, it becomes a richer and richer database."

Last year, Dr Yeaman came to the UK to share his experience. So great was the interest that he extended his talks from two days to three.

"I know the situations are not directly comparable between the two healthcare systems," he says. "But there are some common themes – including the reluctance to share information – and the opportunity to make downstream savings is common to both."

His first lesson is that a single use case is a good way to start as it keeps minds focused. Developing from this single use case can be slow, however. "Practically, it is difficult to keep everyone on the same page and it just takes time," he says.

His experience has shown that an exchange only works if everyone involved contributes data. "There is a certain minimum dataset that needs to be contributed by everyone so that governance piece is extremely important. Everyone must be on a level playing field for information sharing."

'Type in "diabetes" and the system will look for symptoms that may indicate an undiagnosed condition'

The information should be accessible to patients and to clinicians – but not to administrators. "Only the doctor or nurse who is seeing the patient and has consent to do so should be able to access the information," he says.

It also takes time to mature and get enough people using it before you can begin to measure a reliable return on investment. "It takes three to five years for the network to mature and get enough data into it to begin to see that ROI," he says.

"Early data suggests that we are seeing a reduced number of laboratory tests and improved rates of preventive services being delivered. We don't have information yet on whether it is influencing re-admissions as that requires that time and maturation of the network." ●

Smart thinking: Missouri University, which has helped to pioneer smart searching

"Only through constant innovation can the NHS deliver the cost and efficiency savings demanded of it while improving outcomes for patients. The key question, then, is how best to promote and support innovation within the NHS.

Over 10 years ago, the first NHS innovations hubs were set up to manage valuable intellectual property created in the NHS. The Health Innovations Alliance (HIA) is the national alliance of these hubs.

The hubs provide practical local and, where applicable, cross-regional support to help frontline clinicians develop and bring to market new and improved diagnostic tools and medical devices. These can deliver advances in patient care, savings and long term income for the NHS.

The hubs also help the NHS access the innovations it needs to deliver the £20bn efficiency savings. Working at the interface between the NHS and healthcare industries, they help source solutions and create collaborative partnerships that work along the patient pathways to help to find better, safer and more cost-effective delivery systems.

By helping industry access clinical opinions, with the support of the National Institute for Health Research infrastructure, the hubs help to build an evidence base of worthwhile innovations that can be more swiftly and broadly adopted.

'The key is developing a culture that promotes innovation'

It is estimated that the projects in HIA's pipeline – almost all of which were originally the work of NHS clinicians – could deliver NHS efficiency savings of £50m by 2015 and an overall value of between £200m and £300m.

Impressive as this estimate is, it is vital that trusts understand that the key to unlocking the long term potential of innovation lies in developing a culture that promotes innovation.

NHS organisations need help to embed innovation at every level; for example by establishing clear lines of accountability, better reporting, proper incentives and benchmarking for innovation. Help to do this is available from HIA. There needs, too, to be greater willingness and encouragement to look beyond the annual budgeting cycle and commit resources that may not see a return for two or three years.

HIA members can help NHS organisations develop a more structured approach to innovation so when a new idea or process presents itself, there is a faster, more supportive response. The result of this cultural shift will be a more agile, innovation-friendly NHS, better access for industry and better outcomes for patients.
Anne Blackwood is chair of the Health Innovations Alliance
www.healthinnovationsalliance.org.uk"

INNOVATION SUPPORT

AFTER THE BRAINWAVE

The NHS is an ideas factory. Claire Read talks to key players in the business of turning these into reality

The publication last December of Sir David Nicholson's report *Innovation, health and wealth* was a concerted effort to make innovation one of the watchwords of the NHS. But in the subheading – "accelerating adoption and diffusion in the NHS" – lies a tacit acknowledgement that coming up with bright concepts has actually never been a problem for the health service.

"It never ceases to amaze me that, despite all the time pressures on NHS staff, they've never stopped coming up with new ideas," says Richard Clark, chief executive of Medipex, the NHS innovations hub for Yorkshire and Humber, one of the six Health Innovations Alliance hubs in England that champion and support health innovation. "We monitor this year-on-year and while the number of ideas is not increasing, it's not decreasing either."

The difficulty comes in moving these brainwaves to reality. To do so involves successfully negotiating what John Stedman, chief executive at NHS Innovations South East, refers to as the "innovation journey".

Its many hurdles include assessment, initial testing, intellectual property protection, market testing, business planning, funding, and potential partnership with an industrial or academic organisation – as well, of course, as spotting a good idea in the first place.

Sir Ian's report attempts to ensure more ideas complete this journey through to adoption and diffusion. It represents a shift from what Mr Stedman characterises as a "gentle encouragement to innovate" to "slightly more of a stick approach so that there are financial levers for implementing innovation".

The current NHS Operating Framework states that commissioners and providers should consider the recommendations of *Innovation, health and wealth* when developing local CQUIN (Commissioning for Quality and Innovation) schemes for 2012-13. More significantly, it states that doing this will be a prerequisite for the scheme the following year.

It is likely that, for many organisations, this will require a change in culture. "Innovation requires manager capacity and headroom," argues Professor Steve Smye, director of research and development at Leeds Teaching Hospitals Trust and director of the National Institute for Health Research Comprehensive Clinical Research Network.

"It's not something that just happens. You need to make it a serious business and that needs to be reflected in the management and expertise that is available to develop that."

Mr Clark and Mr Stedman agree but emphasise that top-down pressure to innovate isn't enough. Bottom-up support is also needed.

The team at Medipex, for instance, has found it has been most successful in organisations where it has helped set up innovation committees: "Because, firstly, innovation is seen to be supported by senior management but, secondly, because it's about encouraging the grassroots to come forward, give us your ideas," explains Mr Clark.

For those trusts that do manage to establish such a culture in which they learn to negotiate the tricky innovation journey there are clear potential benefits in addition to better patient care (see case studies, overleaf).

Unsurprisingly, financial benefits are most cited. But Dr Stedman emphasises it is not just about cost savings. "It's also about attracting world class clinicians to come here and do their research here," he says.

Mr Clark highlights the morale boost that can result from successful innovation. "That sort of pat of the back, especially when there's a constant fear of negative press, is incredibly helpful," he says.

He is keen that such benefits are not underestimated or overlooked, especially since he doubts technology innovation can be as big a solution to the QIPP challenge as is sometimes suggested. He points, for example, to the oesophageal doppler, a technology that can be used to assess the fluid status of a patient during surgery. Sir David's report states that, if it were more widely adopted, over £400m could be saved.

"But when we looked at current practice in one of our trusts who are using the doppler technology, they reported it was effective in only 20 per cent of the surgical cases," says Mr Clark. "So I think we need better information on where we think financial savings are the driver and where patient benefits but with no cost savings is a more realistic target."

Linked to this is the reality that innovation is not necessarily a quick fix; it needs to be understood as a longer term, strategic activity. "I've had conversations with trust chief executives and their focus is on 12 to 18 months," says Mr Stedman. "Sometimes innovation takes a lot longer to adopt and for you to see the benefits. If you are operating on a 12-month financial cycle, you're basically stuck in a lot of scenarios because you can't make the investment and see the return on it within that time."

Which is not to say that the return will never come. It could even come from non-domestic sources. "There is a great export opportunity here for all trusts in the UK to gather up, adopt and diffuse ideas, and then

'With no public funding now, innovation hub chief executives say that their organisations are struggling'

leverage them abroad," points out Martin Levermore, whose company Medical Devices Technology International Ltd helps commercialise health innovations.

Professor Smye at Leeds suggests academic partnerships can increase the chances of success in income generation: "And it's important to understand that this is not just about the large teaching trusts who have had long-standing academic partnerships; this is about every trust in England having an academic partner."

Relationships with private organisations are also helpful but the current uncertainty in the health service is causing difficulties here. Mr Clark reports a huge lack of confidence

among potential industrial partners, something he attributes to concerns about how new contracts may be viewed in future.

Traditionally, innovation hubs have helped build such relationships, as well as offering general support in spotting good ideas and moving them to market. But, with no public funding now, hub chief executives say that their organisations are struggling.

"My view is that we have mission drift," Mr Stedman says. "We're trying to do stuff to keep the boat afloat and may not be fulfilling our original mission to collect ideas for the benefit of patients."

Mr Clark is blunter. "I think, unless there's a continuation of innovation funds, then the reality will be that it's the usual smoke and mirrors and rhetoric with no substance. Because you can't expect a wholesale refocusing and adoption of something without putting resource in to make it happen."

Resources: as longstanding a concern for the NHS as innovation. The question for healthcare trusts now – and indeed for the government – is how to reconcile the two. ●

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INNOVATION SUPPORT: CASE STUDIES

'IDEAS ARE EASY TO KILL'

Experiences from the frontline reveal the obstacles in the journey from eureka moment to practical innovation

THE SUCCESSFUL INNOVATION: VITALPAC

In 2003, Roger Killen walked into the office of the medical director at Portsmouth Hospitals Trust to discuss using clinical data to assess patient risk. It was the start of what the businessman describes as "a confluence of different agendas that got the right people together at the right time", and ultimately resulted in an innovation now used at 20 hospitals across the country.

"We walked in five minutes after a meeting about MEWS [modified early warning score – used to assess the condition of a patient and identify deterioration]. So when I talked about measuring patient risk for audit purposes the medical director said: 'Well why don't you put MEWS in that? And if you do, why aren't we using that on the shop floor?' "

Within weeks, Mr Killen was at a meeting of the trust's "deteriorating patient" group. There he encountered both research and clinical staff who had long been searching for ways to better care for acutely ill patients.

"We understood that the way forward was through a collection of data from routine clinical practice," explains Dr Paul Schmidt, now consultant in acute medicine at the trust. "But innovation at the DGH level is very difficult to get off the ground without something like a partnership with a private company."

Enter The Learning Clinic (TLC), Mr Killen's newly founded firm. Today TLC employs almost 40 people and more than 800,000 observations are taken on 25,000 patients every month with VitalPAC, the clinical software system the company created with the Portsmouth team.

It all began with an intensive 18 months on Portsmouth hospital's medical and surgical assessment units. "It was literally developed on the shop floor," says Dr Schmidt. "We had a very good partner in TLC – there wasn't an attitude to the product of

'you have to take what you get'. It was really, truly seen as a partnership; a learning process that happened for both the company and for us."

Part of the learning was how to overcome the barriers surrounding innovation. "You have to be really determined," says Dr Schmidt, "because good ideas are easy to kill; it's easy to put a lot of bureaucratic red tape around it."

Mr Killen talks of the competing interests and priorities in the NHS and emphasises how important it was to have support at all levels – board, research and shop floor.

He also highlights the difficulties of moving from a small project to a larger one: "I think a lot of innovation really forgets that building scalability and robustness is very expensive, much more than making your ideas work."

The spread of the product to other organisations has been greatly aided by Portsmouth hosting visits from interested parties. But Dr Schmidt says he is somewhat mystified at the lack of attention from the centre of the NHS.

"Nobody has approached us at Portsmouth to say can you not help us leverage into other trusts more quickly, or how can we disseminate this learning so we can use this experience on a bigger scale. It's interesting that just doesn't occur."

THE INNOVATOR – ALEXANDER OBOH, HULL AND EAST RIDING TRUST

Alexander Oboh has only formally been involved in innovation for four years. But in a wider sense it has always been part of his approach to obstetrics and gynaecology, the specialty in which he is a consultant at Hull and East Riding Trust.

"I've always had this attitude of questioning things," he explains, an attitude which in 2008 he turned to the obstetric forceps. "For over 100 years the design hasn't

changed. I was thinking about the drawbacks of the current device. That's what started everything off for me."

"Everything" is the ongoing work to move Mr Oboh's bright idea – forceps that regulate the amount of force an obstetrician can apply, so minimising the risk of harm to mother or baby – to actual product. It is a process he freely admits has involved a steep learning curve. Getting the idea was the simple bit, he says. It is getting it to market which is proving to be the challenging, not to say time consuming, part.

"When we first got a

**In development:
Alexander Oboh's forceps**
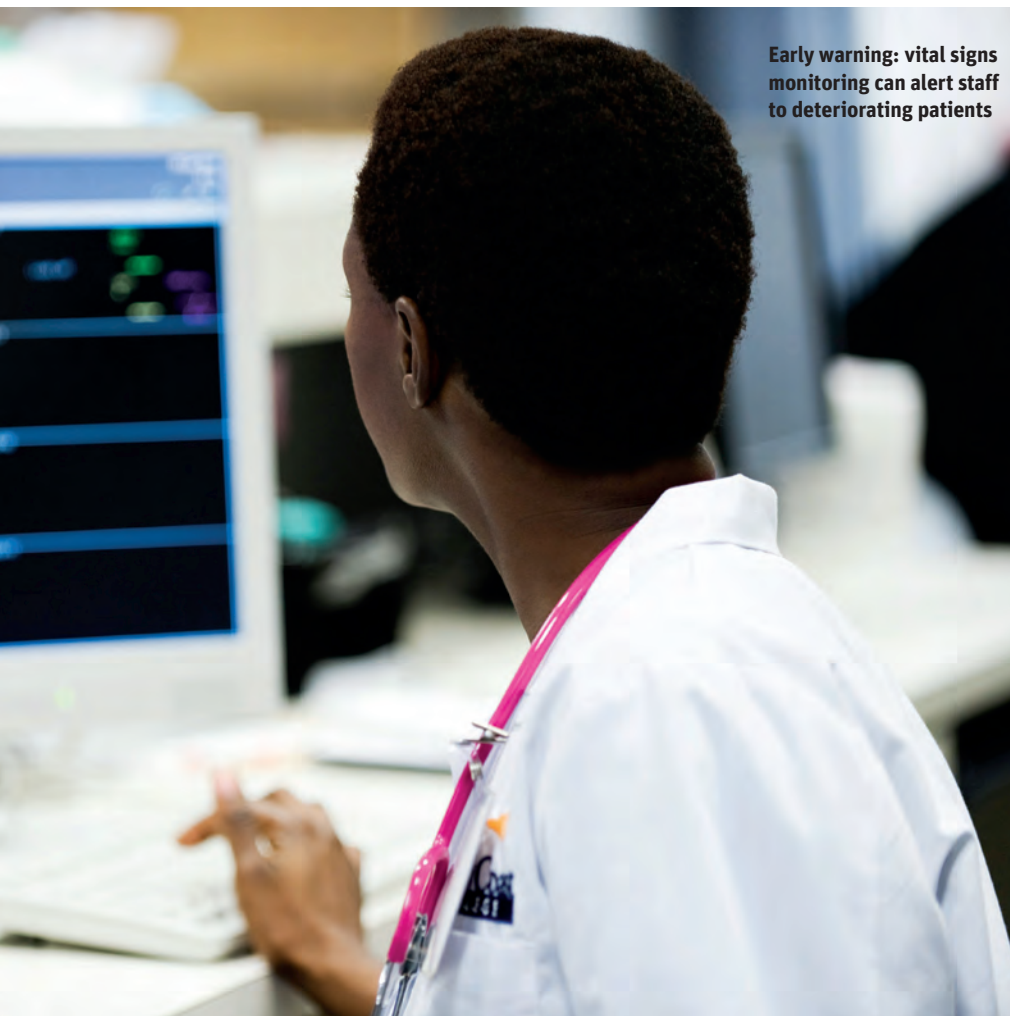
Early warning: vital signs monitoring can alert staff to deteriorating patients

team together to work on the project, I was asked to put together a Gantt chart. I centred it on a 12-month diary – that in 12 months we could have the product on the market. Everybody laughed at me! I said: 'What are you laughing at? It will happen!' And they just said: 'Welcome to the real world, Alex. It doesn't happen like that'. The team really had to prepare me for that."

While Mr Oboh now has a proof of concept model that has been successfully used on mannequins, he needs a clinically researchable working prototype – estimated price tag £250,000 – to stand any chance of taking the "Yorkshire" forceps to market.

He has applied for government research grants and is constantly on the lookout for potential industrial partners: "But because obstetrics is very open to medico-legal cases, for industry it's a high risk environment."

The worries over funding are compounded by the knowledge the clock is ticking: "Once you've got an idea going, loads of people have the same idea. But it's the first person who gets to market who gets the commercial benefits from it," he says.

Something Mr Oboh has not had to worry about is backing from his employer. He has been allowed to use supporting professional

'I put together a diary saying in 12 months we could have the product on the market. Everybody laughed at me!'

activities time for the project and the trust has paid for the design patent rights: "They haven't got a big chunk of money to get it into manufacturing, but they have supported me to this point very well."

His experience of innovating in the NHS may sometimes have been a challenging one, but Mr Oboh remains a strong believer in the value of a questioning attitude.

"Look at your mobile phone. Today you can see the people you are talking to. We could have stayed where we were with mobiles – they worked because you could speak to people – but now we know you can do it better.

"That [sort of progress] is something we've never moved for in obstetrics. But I feel it can be done. It's hard work, it's pretty slow, but I believe it can be done."

THE INNOVATION MANAGER – ELIZABETH DYMOND, NORTH BRISTOL TRUST

According to Elizabeth Dymond, describing the typical day of an innovation manager in the NHS is near impossible: "One day you can be working with researchers who are putting a grant application together, advising them about the potential intellectual property and commercialisation aspects. On another you can be working with a tissue viability nurse who's had a good idea coming from her clinical practice. The variety is what makes it quite exciting."

Dr Dymond, who has a research background and a PhD, has been innovation manager at North Bristol Trust since 2006, when NHS Innovations South West was set up.

The hub took the approach of training individuals to provide innovation leadership within their trusts. At the conclusion of the programme, North Bristol put together a business case for the role and she has been in post ever since.

She says that, until relatively recently, her work centred on product innovation and commercialising and managing intellectual property for the trust. Now the focus is significantly widening.

"I'm currently writing an innovation strategy which looks at all stages of the process – the invention, the adoption, and the diffusion," she explains. "A lot of those activities happen at a big trust like North Bristol and so now it's a question of joining up that activity."

Dr Dymond feels it is crucial to develop concrete activities and deliverables for innovation, and tightly tie them to the overall aims of the organisation. The government's increasing focus on the area is helping to this work.

"*Innovation, health and wealth* is providing a great opportunity for me to go and talk to colleagues. You can say: 'Right, we're doing this strategy based on some of the things here, let's translate some of that into what we need to do for our objectives as they're already set out.'"

She says she is fortunate to be in a trust with board level understanding of the value of innovation but acknowledges that securing resources can be hard.

"It's a difficult, challenging time in the NHS. Innovation is a demand that competes with other equally important demands that are placed on the service.

"We know that getting early stage funding is difficult for projects and getting staff released to have the sort of time and space to develop some of these activities will be a challenge.

"There is creativity needed in how you approach the leadership to get the resources you need to deliver." ●

EMR in action:
transforming healthcare, cutting costs

The UK healthcare sector is under unprecedented pressure to reduce operating costs while simultaneously improving patient care and safety. Without sophisticated technology to support new ways of working, such a feat might be considered impossible. It is no coincidence that organisations from across the sector are embracing innovative ICT solutions with new fervour, says Deirdre O'Neill, head of the Evolve Healthcare Division at Kainos

Deirdre O'Neill, head of the Evolve Healthcare Division at Kainos

No longer obliged to buy into a huge, prescriptive NHS-wide IT system, UK trusts now have new freedom to procure technology solutions that meet their individual needs - a luxury that couldn't have come at a better time for the sector given the uneasy convergence of budget cuts and service improvement targets.

For independent technology provider Kainos, this has created a rush of new business from UK NHS trusts. Kainos specialises in electronic document management (EDM) and workflow solutions - systems that digitise information so that it can be rapidly searched and easily distributed and shared. Over the last two years, the company has carved itself a niche in the UK healthcare sector. The catalyst was an initial project with Ipswich Hospital NHS Trust.

"In simple terms, it was all about managing the paper in their medical records library," Ms O'Neill explains. "We did some market research and realised that the scale of the problem with paper volumes in the NHS was phenomenal", she says. "Because of our broad background of delivering EDM solutions to the UK public sector and beyond we understood the business case around removing that paper, and how that can be the first step toward automating other processes across an organisation."

Through extensive work with NHS IT departments as well as clinicians and other direct users, Kainos has refined its solutions to directly address the current issues facing UK healthcare organisations in the form of a comprehensive electronic medical record (EMR) product suite.

Today, 12 NHS trusts have selected Kainos's branded EMR solution, Evolve® – a figure which is expected to rise to 20+ over the next year. "We have gone from targeting primarily small and medium-sized trusts up to larger organisations such as the big teaching hospitals," Ms O'Neill says. As the size of the organisation scales so too does the scope for innovation, she notes. "With the larger trusts comes a set of higher ambitions. Initially we described our solution as EDM, but it has evolved to become much more than that - with scope for extensive mobile use, transforming patient care at the bedside as well as right into the community."

EMR takes EDM beyond record digitisation to enable holistic patient management, Ms O'Neill explains. "So many existing processes in the NHS are 'paper bound'," she says. "This makes it harder for a trust to run optimally, to automate their processes. Removing the paper can have a very positive impact on patient care, while saving money for Trusts at the same time.

"It also allows them to manage the trust more like a business – and crucially, to drive out cost. This is perhaps the most exciting prospect for trusts in terms of where IT can take them."

NHS
Bradford Teaching Hospitals
NHS Foundation Trust

A case in point: Bradford Teaching Hospitals NHS Foundation Trust

Bradford Teaching Hospitals NHS Foundation Trust is currently rolling out a comprehensive EMR project in partnership with Kainos, as part of its 'Going Digital' programme. The organisation, which handles 120,000 A&E attendees, 430,000 outpatients and 120,000 in-patients annually, currently manages around 1 million physical records in its case-note library - a volume which is being added to each year.

 "We started this process three years ago and are now looking at a service transformation moving from existing paper patient records to electronic medical records," explains Mark Golding, electronic medical record solution architect at Bradford Teaching Hospitals NHS Foundation Trust.

An initial deployment will take place within the Trust's Yorkshire Cochlear Implant Service, within ENT. A model clinic and simulation centre has been set up to test the system's capabilities before it goes live in July.

According to Mr Golding digitising patient records and other related information will not only make significant inroads into the millions of pounds a year the Trust spends on handling paper, it will also drive up the accuracy and resilience of records, while making them available to clinicians at the point of care. One of the key ways it aims to do this is by making the eMR system 'mobile', with each clinician within the organisation using an iPad to instantly access electronic patient information.

"During my career this will be the single biggest change in our day to day clinical practice" said Mr David Strachan, Consultant ENT Surgeon and eMR Clinical Lead, describing the deployment of eMR. He goes on to add that not only will the immediate access to all patient records across the Trust improve patient care and safety but also the Evolve system has enormous potential for use with clinical audit and research.

The Trust aims to have the system up and running across its ENT and Ophthalmology departments by October this year and to have begun deployment across the rest of the Trust by early 2013.

KAREN LIVINGSTONE ON INVESTING IN IDEAS

NHS Midlands and East

"The innovation review led by Sir Ian Carruthers, which culminated in the *Innovation, health and wealth* report, set out a series of commitments to foster NHS innovation. It included the decision to double spending on the Small Business Research Initiative (SBRI) – taking the Department of Health/NHS contribution from £10m to £20m.

At a time of financial austerity, growing investment in anything might seem demanding. But the ambition should be to increase the use of SBRI in the UK to achieve the scale that has been achieved in the US after 30 years where $2.5bn is spent annually on their equivalent scheme (SBIR). That way the link between industry and health achieved through SBRI competitions could provide the NHS with a valuable means to save hundreds of millions of pounds and thousands of lives.

Running the competition in the East of England was a chance for clinicians to define the key challenges facing the NHS and back solutions proposed by some of the UK's most able scientists, engineers and entrepreneurs.

The competition entries included an idea to accurately diagnose asthma in children with technology developed for race horses; a specialist knitwear company who are creating bespoke compression garments for alleviating chronic venous insufficiency (see overleaf); and organic light emitting diodes that could do amazing things for diabetic retinopathy and

'One idea was to diagnose asthma in children with technology developed for horses'

age-related macular degeneration.

The SBRI programme is also creating real, skilled jobs and ultimately increasing UK exports and tax revenues. The benefits to Eykona, an Oxford company, are clear (see overleaf): if it weren't for SBRI, it wouldn't be in business. The 3D digital imaging camera it created will enable wounds to be better monitored, allowing adaptive treatment regimes for patients and fewer trips to hospital. The company has added 10 new staff in two years with UK and international sales.

The doubling of SBRI investment will support industry to produce the exact products the NHS needs. But the benefit will be reduced if the procurement process and slow adoption impede the spread of these new technologies.

Linking SBRI winners with the NHS high impact innovations, new ideas across the whole of the NHS, could realize the full value of the DH/NHS investment and deliver on wealth as well as health by supporting the development of world leading medical companies.
Karen Livingstone is director of strategic partnerships at NHS Midlands and East
www.eoe.nhs.uk

PRODUCT DEVELOPMENT

AND THE WINNER IS...

Firms are being urged to compete for a share of £4m to develop ideas to solve NHS problems. By Helen Mooney

It is testament to the government's belief in its cross-departmental Small Business Research Initiative (SBRI) that last month saw the Department of Health announce that it would be investing £4m in businesses to develop new ideas to address some of the UK's biggest health problems.

Through SBRI, it opened two new competitions with up to £2m of funding each to develop technological and innovative solutions in a bid to change people's behaviour in order to reduce the impact of obesity and alcohol-related diseases and to improve the number of patients taking their medication as prescribed.

Businesses have been invited to come up with innovative solutions to these challenges which the DH says "could be anything from a device which helps people monitor what they eat or drink or a personalised care package to help people take their medication as prescribed".

Although a relatively new concept in the NHS the SBRI has already had marked successes. Back in April 2009, NHS East of England – now NHS Midlands and East – launched its own SBRI competition to encourage small to medium sized

enterprises to provide innovative solutions for identified healthcare problems.

The SHA partnered with the European Regional Development Fund, the East of England Development Agency, and the government's Technology Strategy Board to put up £3m of funding for businesses to help them develop innovative solutions to tricky healthcare challenges. The programme was managed by Health Enterprise East.

Karen Livingstone, director of strategic partnerships at NHS Midlands and East, says the SHA was the first to run a regional SBRI programme, which has now completed its two year cycle. This first competition has already led to some businesses involved successfully launching their products which are now being used in the NHS.

"The programme was set up two and a half years ago, mid-recession, and there was an expectation from government about what the public sector was doing to support the economy and a growth in jobs.

"One of the things we wanted to do in the East of England was draw on the needs of the health services and some of its problems to get solutions from British business so we invested in the SBRI programme and its

SBRI: THE FACTS

SBRI, championed by the government's Technology Strategy Board, is a national programme of open competitions for ideas and new technologies.

It results in a fully funded development contract between the company and relevant government department – it is not a government grant.

It generally has a two-phased development approach that starts with initial feasibility and can then

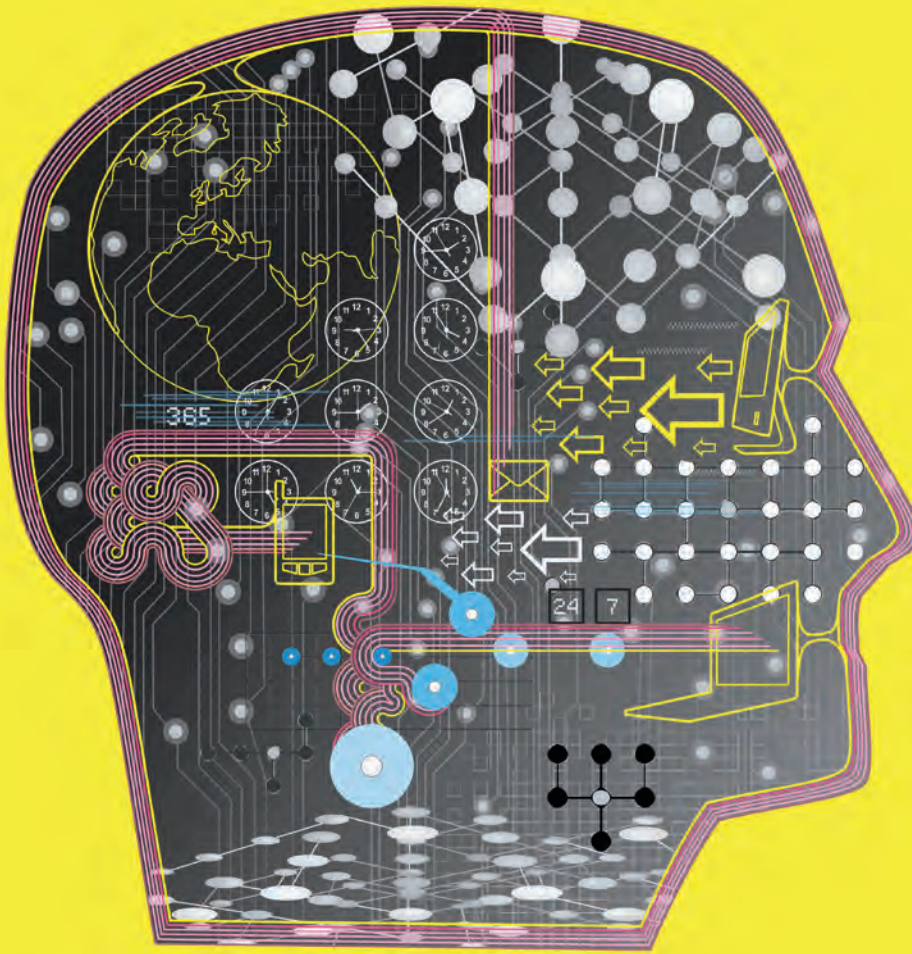move on to more detailed product development.

It is a fast track, simplified process that allows departments and other public bodies to engage with businesses they would not normally work with. It is particularly suitable for smaller and new businesses and gives funding for the critical stage of product development.

The department (or public sector body) acts as the lead customer and is instrumental

in helping the business develop its product or technology. The process should result in a commercial product or service.

The intellectual property is retained by the company, with certain rights of use held by the department.
Details of medicines management competition at www.hee.org.uk *and "Changing behaviours to reduce the impact of obesity and alcohol related diseases" at* www.london.nhs.uk/sbri

Technology Strategy Board
Driving Innovation

PROJECT
PART-FINANCED BY
THE EUROPEAN UNION
European Regional
Development Fund

ERDF
low carbon economic growth
in the East of England

principles," Ms Livingstone explains.

She says that the main principle of SBRI, which is based on a scheme in the US, is to use the power of public procurement to support new technology and innovation.

"It was like a *Dragons' Den* style competition which we promoted heavily in the UK ... We invited the business community to come forward with a technology focus. We had three main challenges in health; long term conditions; patient safety; and obesity in which we wanted to focus on encouraging children to be more physically active."

The SHA had 177 responses which it whittled down to 11 companies for the first phase. Each was given contracts worth up to £100k to develop the feasibility of their idea and a proof of concept over six months and four companies were then chosen to receive extra funding of between £250,000 and £500,000 to get the product to market within 18 months.

Ms Livingstone says SBRI investment is designed to shorten the timescales for companies developing things that the NHS needs. Because the process is speeded up, it can result in potentially huge cost savings.

"This is partly about health solving its own problems, but it is also about a

'SBRI investment is designed to shorten the timescales for companies developing things that the NHS needs'

contribution to the wider economy and growth. It is quite innovative to develop these partnerships. We want a dialogue with industry to solve these problems and to support the development of products to meet our needs," explains Ms Livingstone.

She says that it resembles what a lot of commercial organisations already do with suppliers although she admits the NHS has been "poor at having that dialogue in the past".

Stephen Browning, SBRI lead at the Technology Strategy Board (TSB) – the UK's national innovation agency – says that the SBRI enables the public sector to act as an intelligent lead customer. "The best customer supplier relationships are about sharing development and we try to do that through the SBRI. It allows people in the public sector that have practical challenges

which could be solved with new technology to engage with new suppliers and address those challenges. They can then work together to realise the best solution."

He says that often the types of challenges addressed in healthcare and across the public sector are the "really difficult knotty problems" where ideas are not really being developed. "There needs to be some sort of stimulation to develop these ideas."

"The idea is also to encourage UK industry to be more innovative and help the UK economy to grow. The TSB is helping to drive economic growth and innovation and SBRI is one of the mechanisms to do that."

Under the programme, the companies invested in are given autonomy and retain the intellectual property for their product in order to attract them to develop their ideas.

"Ultimately from an NHS point of view it does not need to secure an income stream, which would be pretty small. But for a relatively small upfront cost the NHS is getting products it badly needs and quickly," says Ms Livingstone.

Following on from the success of the first competition, the SHA has now embarked on a second competition with eight companies currently developing proof of concept for their products. ●

PRODUCT DEVELOPMENT: CASE STUDIES

A NEW DIMENSION

A 3D camera that allows wounds to be monitored in the community is just one of the original ideas that won the attention – and funding – of the SBRI scheme

ADVANCED THERAPEUTIC MATERIALS LTD – COMPRESSION GARMENTS

"As a start-up business the biggest difficulty is funding, all start-ups struggle like mad for cash ... the SBRI funding has enabled us to focus and develop something that is needed," explains Barney Haynes, business development manager at Advanced Therapeutic Materials Limited.

ATM was founded in 2004 with the aim of bringing its new bespoke compression garments to the healthcare market.

Aimed at improving treatment for symptoms of chronic venous insufficiency, particularly leg ulcers, ATM manufacture compression stockings which can consistently deliver the prescribed compression values for the treatment of patients with venous ulcers.

The ISOBAR bespoke compression stockings are tailored to individual patients after their limbs are measured with a hand-held 3D scanner which is linked to an electronic knitting machine.

The clinician specifies the compression values required which then translates it into a knitting instruction for the knitting machine.

The result is a compression garment which is fitted exactly to the shape of the patient's limb and which delivers the prescribed compression accurately. Unlike any other stocking or elastic bandage, the garment is engineered in such a way that it can deliver a specified pressure at a given point.

Clinical evaluations for the treatment of venous ulcers have already been carried out at Worcester PCT, University Hospital South Manchester, Guy's and St Thomas' Hospital and North Hampshire Hospital, Basingstoke.

"When the second SBRI competition was launched in 2011 we felt [ATM was] quite a suitable candidate and going through the application process was quite user friendly," Mr Haynes explains.

He says that although initial *Dragons' Den* style assessment was quite daunting some of the questions the panel asked did mean the company looked again in some areas at how they were bringing the product to market.

"One of the things being involved in the SBRI programme has enabled us to do is have a look at ways of getting ready for widespread roll out of the product in the NHS," he adds. "We benefited from their expertise in understanding the hot buttons that need to be pressed to get products like ours taken up and used in the NHS. Before this we had limited exposure to the NHS, so this advice has been extremely helpful."

CAMBRIDGE DESIGN PARTNERSHIP – RESPIRATORY HUMIDIFIER

Cambridge Design Partnership (CDP) is developing technology to reduce the occurrence of Ventilator Associated Pneumonia (VAP) in intensive care units. VAP is the most prevalent infection in ICUs with an incidence rate of 10-15 per cent. It causes 6,000 deaths annually, costing the NHS £600m. The company's novel respiratory humidifier could reduce VAP prevalence by 30 per cent, saving 2,000 lives per year, an estimated 20,000 bed days and £175m of costs to the NHS.

Ventilators keep patients alive by delivering air to breathe. Humidifiers are attached to the ventilators to heat and humidify the air to body conditions. An unfortunate side effect of humidifying is that it causes condensation in the breathing circuit. These pools of warm water promote colonisation of microbes which increase the likelihood of contracting deadly infections including VAP. CDP has designed a humidifier that, for the first time, removes the root cause of the condensation problem.

In 2009, CDP was one of four winners out of 177 bidders to win funding in the patient safety category of the SBRI East competition.

CDP partner Keith Turner says that the company used the SBRI funding to design and develop a series of prototypes and that it has enabled CDP to demonstrate ways in which real issues on critical care wards can be improved through innovation.

"The way a lot of government grants and funding works means you don't interact with people but in our work the thing that really sets something alight is that interaction ... during the initial panel interview [for the SBRI competition] we had a half hour session with around 12 people from business, the SHA, clinicians, and consultants, and it was good to have a dialogue with them and get a chance to explain things," he says.

Mr Turner says that, without the SBRI investment, the company would not have got

Better view: Eykona's wound measurement system uses a 3D camera

as far as it has in developing the product. "Another good thing was that we had no constraints on how we spent the money [within the remit of the project] which is really important and something I would encourage for all sorts of agencies, grants and funding arrangements," he adds.

The company is hoping to be able to launch the humidifier at the end of year following clinical trials.

EYKONA – WOUND MEASUREMENT SYSTEM

Originally developed at the University of Oxford, Eykona Technologies' 3D camera allows for improved monitoring and clinical intervention of chronic wounds in clinics, hospitals and even remotely in a patient's home.

The Eykona Wound Measurement System, which was launched in the UK in December and is already being used in 20 NHS hospitals and primary care settings, allows community nurses to monitor the wounds with the back-up of hospital-based experts.

Images can be evaluated without the need for patients to visit the outpatient department, which also means patients receive more effective treatment at home and at a reduced cost to the NHS. The technology allows wounds to be assessed by volume rather than depth, which is current practice, and is described as the equivalent of pouring liquid into a wound to measure that volume.

It is often difficult for clinicians to tell whether treatment to help wounds to heal is working, and because they heal from the base up, the most reliable measure of progress is a reduction in wound volume.

Wound care costs the NHS an estimated £3bn per year and in the East of England around 38,000 patients are treated at home for diabetic leg and pressure ulcers.

The company got involved in the first SBRI East competition in 2009 and chief executive Paul Murphy is frank about the impact Eykona's SBRI success has had.

"The company had been run on a shoestring since it was founded in 2006 … the funding from the first phase meant that we could make the clinical and economic case for our product and we were able to raise £1.2m ourselves on the back of the progress we made during phase 1 of the programme.

"When we received the second tranche of money in phase 2 we raised an additional £1.2m so for every £1 that the SBRI put in we raised £4 in external investment," he explains.

"It has given us massive, massive credibility, particularly the engagement with the NHS," he adds.

Mr Murphy says that although the SBRI process was very "in depth" with an assessment panel made up of health economists, clinicians and venture capitalists, among others, the product's SBRI success has meant that there is a very high level of confidence in the market that the Wound Measurement System has been "validated".

"My belief is that, had we not had the SBRI funding, we would not have raised

'It has given us massive credibility … had it not been for SBRI, I don't think this company would be around now'

additional private equity funding and, had it not been for SBRI validation, I don't think this company would be around now."

In April the company plans to launch its product in the US.

ANAXSYS – RESPIRATORY RATE COUNTER

Originally established in 2002 to develop sensors that could diagnose carbon monoxide in exhaled breath to detect asthma, the company Anaxsys Technology has been on an eventful journey of discovery in the development of its current product, a sensor that automatically and continuously monitors a patient's respiratory rate – the best indicator of a worsening medical condition.

The sensor is already been used in hospitals and the company is developing a model that can be used by paramedics on people who have been injured in accidents. A sensor is inserted inside a face mask that delivers the enriched oxygen supply to the patient. The mask is placed over the patient's mouth and nose and is fitted in the traditional way with an elastic band around the head.

Anaxsys received funding from the Technology Strategy Board to develop the hospital based version of the respiratory rate counter-or 'respiR8'-and a grant from SBRI to establish how the hospital product could be modified to produce a monitor that could be used by paramedics.

The counter is based on the traditional check to see if someone is still breathing after an accident by holding a mirror in front of the patient's mouth. If a patient is breathing, condensation is produced and the moisture from the patient's breath condenses on the sensor to produce a signal.

The mask is connected via a cable to an electronic monitor, which displays the current respiratory rate as well as a graph of its movement in the previous hour.

"We met Health Enterprise East who suggested we apply for the SBRI funding in 2010, before we were awarded this funding we had got to the stage of running clinical trials with the hospital version of respiR8," explains Barbara Lead, commercial and development director at Anaxsys.

"We knew that this version was not robust enough to be used by paramedics, so with the SBRI funding we did a feasibility study to see if we could develop a version of the monitor which was strong enough to be put into a fast response bag and be used by paramedics."

"SBRI has been invaluable in helping us to develop our technology," Ms Lead adds.

The company has now developed a prototype of the ambulance version and is now waiting until it can generate enough money from sales of its hospital version to be able to produce a finished product for the paramedic market. ●

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