RETHINK DIAGNOSTICS

HOW CAN THE NHS MEET SURGING DEMAND FOR IMAGING?

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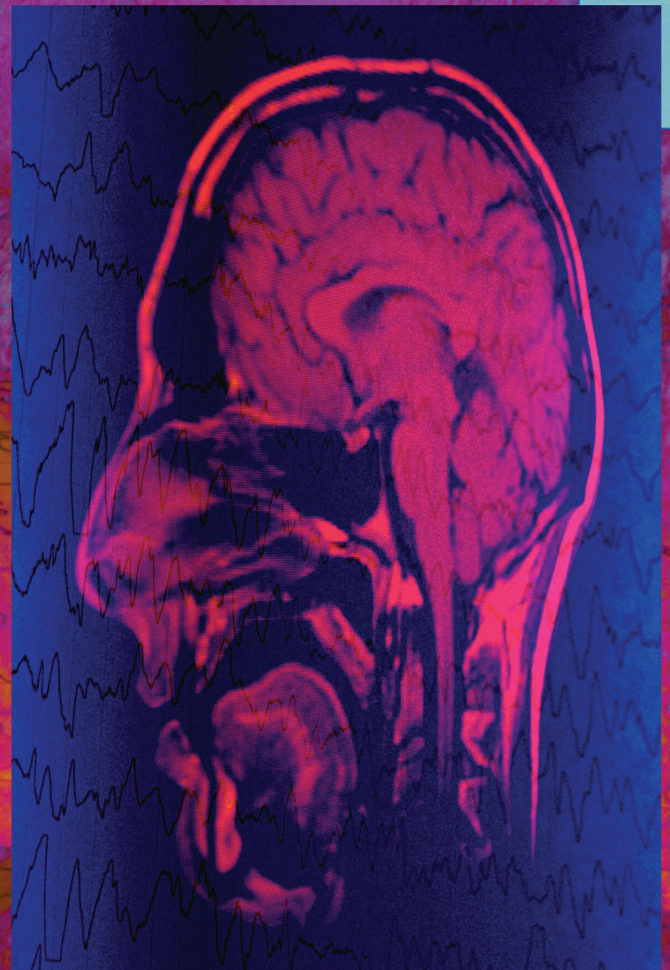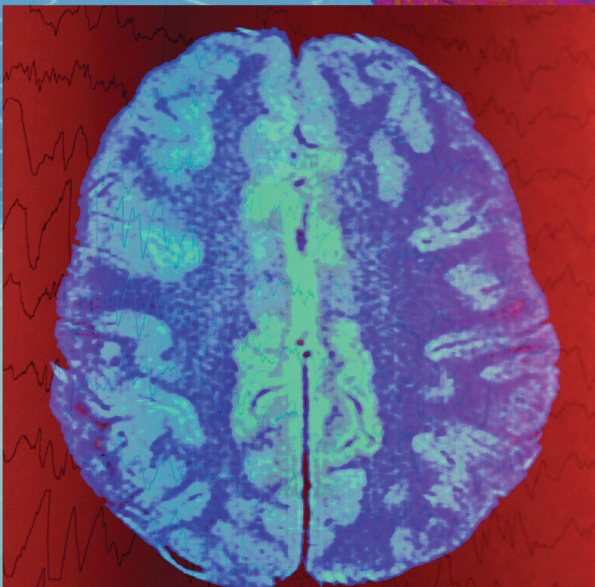
DIAGNOSTICS

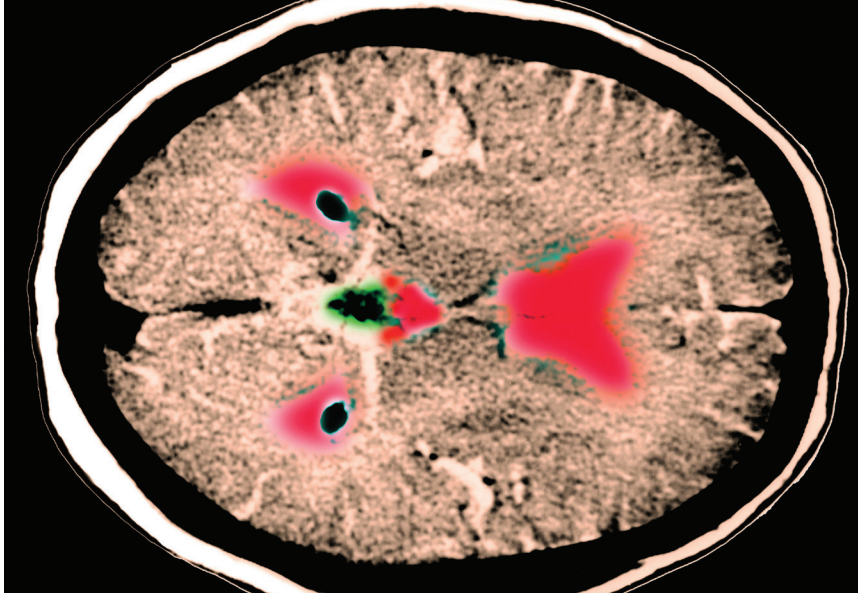Boards need to address the challenge of diagnostics. In medical imaging alone, activity has been growing at nearly 6 per cent a year for the past decade. However, much of the latest equipment to deliver such diagnostics is expensive and trusts must think hard about how to use it in the most efficient way. Now more organisations are turning to partnerships with suppliers. As well as contracts to buy, maintain and replace technology, suppliers are now also offering data and expertise to help trusts use equipment more efficiently. **Page 2**

PARTNERSHIPS

As wifi becomes available everywhere from shops to cafes to train carriages, NHS providers are under pressure to offer it too, despite the cost. Imaginative solutions include Imperial College Healthcare Trust's system, which costs it nothing: providing a free basic service for patients, visitors and staff, coupled with a premium service that allows people to pay to access high speed content such as video and audio streaming. **Page 8**

CLINICAL SUPPORT

Evidence suggests there is a particular problem with errors in medication for older people taking multiple drugs. Now a new tool for automatically screening older people's prescriptions is identifying combinations of drugs that could be harmful, and finding medications that could be stopped. The tool is a prime example of using data held in shared electronic patient records to provide better care. **Page 6**

DIAGNOSTICS

TESTING TIMES

As the demand for diagnostics using costly scanners and other equipment soars, organisations must consider how to keep up. Claire Read reports

Richard Evans knows that each and every specialty feels it gets insufficient attention at the top levels of healthcare. But he has a strong argument for his contention that boards need to be thinking about diagnostics: the explosion in demand for such services. A recent report from Cancer Research UK shows that, in medical imaging alone, activity has been growing at nearly 6 per cent a year for the past decade. Furthermore, research shows that demand is only set to increase further.

"I don't think anyone [at board level] would say diagnostics aren't important," says Mr Evans, chief executive of the Society and College of Radiographers. "But I would be surprised if there is a uniformity of understanding across the country at board level that, for example, the demand for CT scans is likely to be going up by 9 per cent a year in future. I think that most boards would find that surprising."

In some ways, there is little reason for such surprise. While diagnostic waiting times have fallen dramatically in recent years, it is notable that the operational standard of less than 1 per cent of patients in England waiting six weeks or longer for one of the 15 key diagnostic tests was last met in November 2013. Demand has been growing steadily for the past 20 years or so. In a large part this is due to the rapid development of innovative technology that can help physicians diagnose conditions more reliably than before.

"There's a long term growing dependency on diagnostic tools within healthcare practice generally," explains Mr Evans. "Physicians all learn how to diagnose conditions but, in practice, the diagnosis gets done by imaging or another diagnostic tool because it will answer the question definitively.

"Then there are clearly technological drivers for demand – as techniques have developed, people like to use them. So before CT scanners, getting images was a last resort when diagnosing a brain tumour, because the technique to get the images was so traumatic. But the innovation comes in and suddenly you can do these things you couldn't do before and, of course, the procedures are less invasive and immediately diagnostic. So as technology builds, that's a driver for demand."

The question that naturally follows is how can organisations meet the increased need for diagnostics?

Mr Evans sees several possible solutions, including reducing unnecessary requests – such as using multiple examinations unnecessarily, rather than choosing the right procedure first time – and ensuring that the workforce has the right skill mix. Inevitably, however, it is also about innovative technology, whether acquiring new equipment or using existing facilities in a more efficient way.

Plannable expenditure

"The reason that some chief executives will find diagnostics difficult is the expense," acknowledges Mr Evans. "The replacement schedules are a headache because a CT scanner, for instance, really should be replaced every seven years, so that's a big ticket item and it's very common now to have multiple scanners. So the whole thing becomes expensive; a drain. But it's plannable.

"If you look at the best practice, you'll see that some trusts have really got this and know they'll have to fund their replacements, otherwise things will go wrong. And where you don't have the opportunity of a major injection, or you have to basically do one piece of kit a year, then you're obviously going to need to be a little smarter – how do we make sure that equipment is really used to the optimum. It's making the most of what you've got."

Increasingly, planning and optimising

Expensive tools: replacement schedules for diagnostic systems are a challenge for trusts

technology is a conversation that is happening in partnership with suppliers. Some trusts are moving to managed equipment service contracts, where a private sector partner takes full responsibility for the purchase, maintenance and replacement of technology.

Others are using their supplier's data and expertise to find how to most efficiently use the capabilities they have. Either way, it's a very different conversation to the traditional customer/supplier interaction, suggests Nancy West, head of business development, enterprise solutions, at Siemens Healthcare.

"Customers have always talked to us about long term, partnership type arrangements, but previously it felt much more transactional," reports Ms West.

"So it's been about the customer saying to us, 'I want 50 items of diagnostic imaging equipment, and of those three should be a CT and three should be an MRI.' But the need to provide more from these assets has seen trusts keen to work with us to evaluate their demand and to match the imaging estate with patient and clinical mix. And that's a much healthier move in the market, definitely."

At University Hospital of North Midlands Trust, staff have used data gathered from Siemens technology to analyse how efficiently they are using their equipment and to make improvements. In Bolton, meanwhile, staff have worked with Siemens to introduce lean processes to ultrasound services (see case studies, overleaf).

"I can say that, almost without exception, we will help find areas where

'I can say that, almost without exception, we will help find areas where efficiencies can be gained'

efficiencies can be gained," says Ms West.

"We spend a lot of time analysing how the technology is being used, how staff are moving patients around the hospital and within the radiology department, and what happens when the patient is in the room. We consider the entire layout of radiology and make practical recommendations that can optimise the movement of staff and patients. It was this approach that led University Hospital Southampton Foundation Trust to create separate MRI inpatient and outpatient entrances.

"By understanding the challenges we can develop solutions. We spend time interviewing trust staff at all levels, observe clinical and administrative processes and carry out detailed demographic and utilisation analysis. This approach considers multiple dimensions of clinical operations to provide customers with practical solutions to make best use of their assets."

It is the sort of partnership style role that Mr Evans feels could be valuable in meeting the pressures on diagnostics. "We shouldn't get too sniffy about the fact that there's commercial interests involved – there's commercial interests involved over virtually everything we do [in life]," he suggests.

Continuous change

"So I think it's a shame if we get too hung up over commercial interests if the relationship can be mutually beneficial. And changing practice and technology clearly are not going to stop tomorrow; they're going to continue ramping up. So I think this is quite serious: [making sure] that your technology can keep up, that your workforce can keep up. The demand is not going to go away tomorrow, so it does need addressing." ●

ALAMY

DIAGNOSTICS: CASE STUDIES

SO HOW EFFICIENT ARE YOU?

Trusts up and down the country are finding out where they stand in diagnostics – and starting to make improvements. By Claire Read

UNIVERSITY HOSPITALS OF NORTH MIDLANDS TRUST

In a context of financial constraints, the pressure to prove efficiency is inevitable. Yet in diagnostics that can sometimes be easier said than done. For Alice Turner at University Hospitals of North Midlands Trust, the answer lay in using information gathered by Siemens CT scanners up and down the country.

"I wanted to prove we were using our assets as effectively as we could and, if we weren't, to do something about it," explains Ms Turner, principal radiographer at the organisation. "And to get a feel for where we sat within the NHS. Were we out of kilter with the rest of the UK? Is everybody else more efficient than we are?"

To get this sense, the team used utilisation management data from Siemens – the company that, through a managed equipment service, supplies the trust's diagnostic equipment.

Siemens CT equipment automatically collects information on the number of patients scanned, mean time between scans

Siemens suggested ways to make better use of the technology used every day by the trust

and the average length of scans. "So Siemens has got access to data I would never have access to," explains Ms Turner.
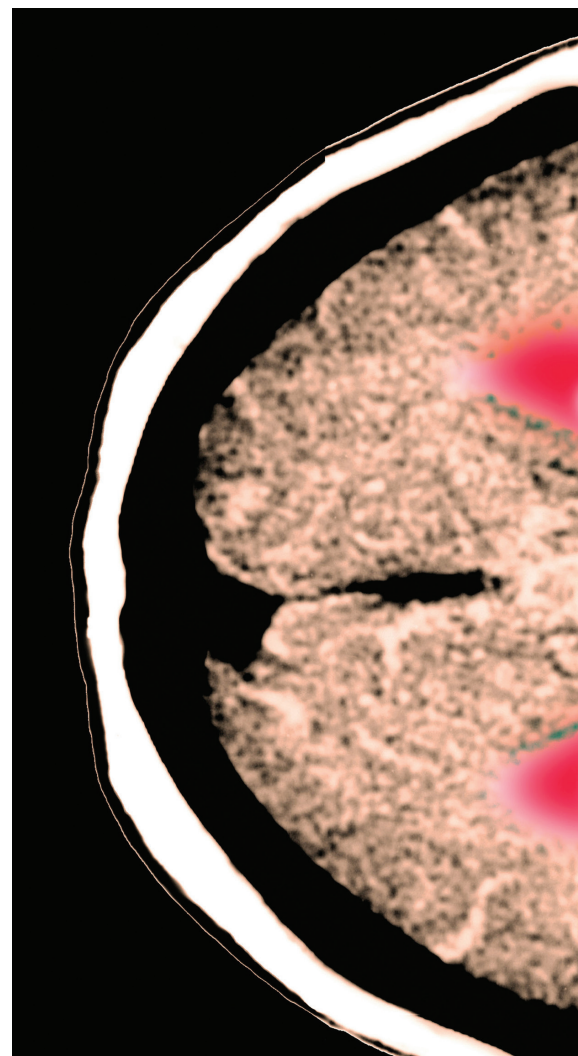
"And it is able to look at all of their systems in the NHS to benchmark us: how effectively are we using our scanners versus elsewhere in the country?"

The answer was efficiently: the trust's use of its CT scanners ranked sixth in efficiency out of 70 comparable Siemens systems. There was no resting on laurels, however. Having reviewed the Siemens data, Ms Turner then passed her own information to the company – "so what's our demand like, what's our turnaround time, what's our waiting lists, what are the processes that we go through on the patient journey" – and invited staff at Siemens in to observe the workings of the department. The aim: to find ways to make CT scanning at North Midlands even more efficient.

"They worked with the team to look at the whole process. So we had data, we had observations, we had communication with the staff: what does it feel like to be part of this team, is there anything we could do differently? It was a very rounded view of the service: it wasn't just about numbers. Because if you just keep hitting your staff with numbers, efficiency, turnaround times, that is guaranteed to turn them off."

Having collected all this information, staff at Siemens went away, analysed it, and suggested ways to help the department make even better use of the technology it used every day. "They pointed out best practice, what they felt we couldn't do any better, as well as some quick, easy fixes and things that were going to take a little bit longer to do," says Ms Turner.

In some instances it was necessary to strike a balance between improving efficiency and maintaining patient experience. "To give an example, we have a very strong philosophy around privacy and dignity and how our patients are seen while in the department," she explains. "No patient is ever seen on a corridor or in a waiting room dressed in a hospital gown: they go into a changing room to change into a gown and then pass through into the examination room. One of the things we could [have done] to speed up our throughput was relax that policy, but we weren't prepared to compromise."

Many changes were implemented, such as a focus on using scanners for scanning. "We used to prepare our patients outside the room most but not all the time. Now the vast majority of our patients are prepared outside the room: so any patient that needs a cannula put in will have it put in outside the scanning room, and removed with any bleeding stopped outside the room. That's how you change your turnaround times: it's perhaps a minute here, two minutes there; it's tiny little changes."

After a year, the Siemens team came back to review whether the department had become more efficient. It had: from sixth most efficient user of its Siemens CT
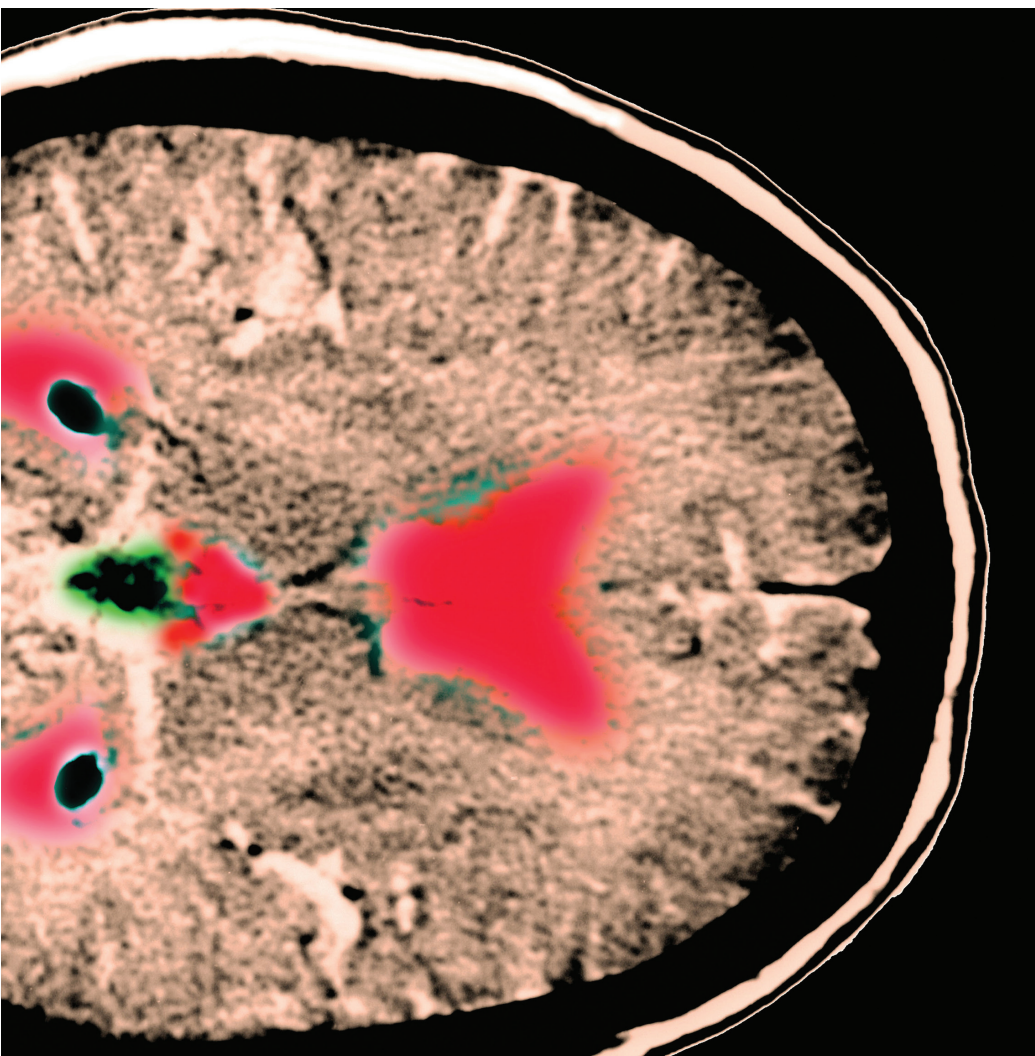
Brain wave: a CT brain scan. Data can now tell trusts how efficiently their scanners are used

been reconfigured, "made into a big three MR scanning suite with an inpatient entrance and an outpatient entrance, to keep the workflows separate, which has been really beneficial," Dr Sampson explains.

Aaron Hutchison, IISS programme lead, reports that further redevelopments are now taking place across diagnostics at the trust – all with the aim of ensuring maximum efficiency in the use of technology now and into the future. He suggests that a key benefit of the partnership with Siemens is future proofing: the confidence that as and when new innovations are made, they can be introduced at the trust.

Executive support has been key to the success of the work, according to Mary Gawne-Cain, consultant neuroradiologist and radiology care group lead.

"And it's not just for the equipment service, it's for the whole radiology department: supporting the importance of what we're doing so that people in the department feel they're valued," she says.

BOLTON FOUNDATION TRUST

At Bolton, there has long been a dedication to lean methodologies: Catherine Walsh says it has been a focus of her work since she joined as radiology manager nearly 10 years ago. "The main remit is always to do more with less, and there are lots of areas where we have improved efficiency and patient throughput so that we can make better use of the people and non-people resources that we've got," she says.

That has included considering the efficiencies of new technology. In 2010, introducing Siemens digital radiography to all X-ray rooms automatically improved efficiency by 30 per cent – the technology makes it possible to view images instantly. But it also made it possible to close some X-ray rooms and relocate all the examinations into one department, making it far easier for staff to move between rooms.

"As we all know, it gets more and more difficult to meet your savings targets, and nobody's going to get significantly more money these days. So we've got to come up with ways of being more efficient," argues Ms Walsh. To that end, the organisation has recently worked with Siemens on a new project to improve the flow of its ultrasound department.

"I don't think we're ever going to put the genie back in the bottle in terms of diagnostics, because as technology has increased we've got better at diagnosing from the diagnostics that are available, and therefore clinicians want more of that," suggests Ms Walsh. "In my experience, activity will only grow over the years." ●

scanners, the organisation had moved up to number two among comparable systems, scanning an average of six more patients a day. Staff satisfaction had also dramatically increased: from a score of 2.2 out of 5 at the initial assessment to 4.4 after the changes. Part of the reason for the increase may be that, since the service is much more efficient, sessions are no longer overrunning. That means staff are going home on time.

Ms Turner is clearly delighted by the success of the project, and emphasises the value of external data and expertise. "Would I have had the time, inclination or tools to have been able to do this work? No. Not to that level. The [utilisation data] is a really powerful tool. Because if you cannot prove you are efficient, who is going to believe you? We can all say we are. But having that dataset behind you is very, very powerful."

UNIVERSITY HOSPITAL SOUTHAMPTON FOUNDATION TRUST

If you want an example of the growth in demand for diagnostic technology and expertise, you could do worse than consider Southampton. When the organisation signed

'If you cannot prove you are efficient, who is going to believe you? Having that dataset behind you is very, very powerful'

a managed equipment service contract for its medical imaging – known internally as the imaging infrastructure support service (IISS) – the expectation was that two MRI scanners would need to be fitted. By the time installation began, it became clear that demand had risen sufficiently that a third scanner would be required.

"We've seen a 10 to 15 per cent year on year increase in demand in a cumulative fashion since 2005, and it shows no signs of slowing down," explains Madeleine Sampson, consultant radiologist and clinical lead for the IISS project.

The new scanner has been part of meeting that need, but so too has thinking about the efficiencies of the space in which the scanners are located. An existing area has

**CHRIS BATES
ON THE DATA
REVOLUTION**

IN ASSOCIATION WITH TPP

tpp

" In recent weeks NHS England has reiterated its goal of a paperless future, aiming for a fully digital service by 2020. This ambition should be applauded, its rationale lying in inefficiencies and poor patient experience that have yet to benefit from technological innovation.

The success of digital systems and data in primary care is beginning to be matched across further health and care settings, and is increasingly reaching patients themselves. This represents a serious opportunity to make the service far more data driven across all levels – through direct care, commissioning, service design, policy and research.

Comprehensive electronic health record data – available immediately at the point of care – provides an opportunity to improve patient safety, while reducing cognitive burden on clinicians. Clinical decision support, built on potentially complex algorithms, can be designed effectively around routinely collected data and readily deployed in modern clinical information systems. Increasingly we are seeing this support cross traditional healthcare boundaries, bringing primary care data intelligence into urgent care settings, for example.

This is also starting to be realised across all the major areas of national disease burden, moving away from working in a data desert to an information rich environment. Following the *Five Year Forward View* there are substantial changes to care delivery, with a focus on improving public health and promoting integrated care. Only by collecting data and designing metrics that run across all areas of care delivery can we evaluate and measure the performance and impact of this effectively and accurately. This needs to happen now or the opportunity for meaningful comparison will be lost.

From a research perspective, it is no exaggeration to say that UK primary care systems and the data they hold are among the best in the world. If we can work towards a secure, ethical framework to link primary care research data to hospital information and biomedical sources, there are significant academic, clinical and economic gains for the country as a whole.

Across all areas of the NHS we need to be mindful about what data we collect, utilise and analyse, ensuring as far as possible that our focus reflects the real human aims of improving patient experience, improving outcomes and enabling a modern NHS workforce.

There is no panacea here but there is a real opportunity nonetheless. With the right structures in place, with public transparency, with clinical engagement and with suitable investment in digital infrastructure, the NHS has a lot to gain from the data revolution. *Chris Bates is head of analytics, informatics and research for TPP.* tpp-uk.com "

CLINICAL SUPPORT

JUST WHAT THE DOCTOR ORDERED

Clinical systems are being used to automatically analyse patient data and provide better care. Claire Read reports

When Paul Johnson began to develop a multidisciplinary service for frail older people in the South Devon area, medication was a major area of focus – particularly the use of multiple medications by one person.

"There is good evidence that medication errors are quite high, particularly in the older population and particularly when you get cognitive decline," explains Dr Johnson, a GP at Cricketfield Surgery in Newton Abbott and clinical lead for frailty across six local practices. "In addition, polypharmacy [the term used to describe the use of multiple medications in one individual] is a major problem. So we were looking at ways to reduce the polypharmacy, and the STOPP criteria came to our attention."

STOPP stands for Screening Tool of Older People's potentially inappropriate Prescriptions. The tool is a valuable way of identifying combinations of drugs that could be harmful, and finding medications that could be stopped.

The challenge is that using this clinical decision support tool in practice is not necessarily straightforward. "In the most recent update, published in 2014, the researchers identified 77 criteria in 11 domains – the domains being things like cardiovascular and respiratory and central nervous system," explains Dr Johnson.

"So they found examples of where combinations of medication in people were ill advised, or where the combination of certain medical conditions and certain medications were ill advised. Now the problem with going through that manually is that takes trawling through patients' notes to see which of those 77 criteria actually apply to that patient."

It was a challenge that led Dr Johnson to draw on the programming skills he developed as a teenager with a BBC computer. Working within SystmOne – the computer system used by primary care locally – he developed an automated way of applying the STOPP criteria. "It effectively runs a protocol within the system, which automatically goes through the criteria and sees whether it applies to that particular patient," he explains.

"So you run the protocol on a patient record, and whichever of those STOPP criteria are applicable it produces an entry into the patient's notes – you have a summary report which will have anything from none to about five or six of those criteria that are relevant. And then it's up to the clinician to review those, and make any medication adjustments necessary."

In other words, the protocol is a quick and easy way of applying academic, evidence based research to actual practice. "I suspect it's beyond the cognitive burden of a GP in a six minute consultation to have the knowledge of that entire STOPP protocol, because you're talking about two or three hundred criteria that you would need to have in your mind," explains Chris Bates, head of analytics, informatics and research at TPP – developer and supplier of SystmOne. "Clinical systems can perform this analysis automatically."

TPP's clinical director John Parry says it illustrates how the quantities of data held within shared electronic patient care records can be used to provide better care – centred on the needs of local patients and clinicians.

"The tools within SystmOne that enable clinicians to build tools means that what we're doing is almost letting go of the approach to clinical decision support," he argues. "This is an example of where existing functionality in the IT system has been coupled with knowledge and research that created the STOPP algorithms. The two have been put together, and now you've got a point of care clinical decision support tool

Medicine check: a new tool can screen older people's records for dangerous combinations of medications

which has been generated on the basis of a local need.

"And it is very much more locally manageable rather than having to produce a much more cumbersome process where everything has to be fully tested and accredited before it can be rolled out across the national system – it gives the users and the communities the opportunity to build content which is relevant for whatever their priority is in the local area."

Through its database ResearchOne, TPP believes there is the potential to bring much clinical research into practice more speedily and more effortlessly. The database, developed by the company in partnership with the University of Leeds and government body Innovate UK, has 6 million de-identified electronic patient care records.

The initial thought was that the database could provide large quantities of data for researchers. "But we also realised," says Mr Bates, "that instead of having this static dataset for people to come and research on, in SystmOne we had a clinical information

'We think we've got an opportunity here to improve that translation of research into clinical practice'

system sitting above it to allow the researchers to build the results of their research back into the system and actually get it used in clinical practice.

"So we think we've got an opportunity here to improve that translation of research into clinical practice. And historically, certainly in the UK but also globally, that has been something that is very, very difficult to achieve."

Mr Bates reports there are currently 40-50 projects at some point in the ResearchOne cycle, "of which I would say probably half have the potential to inform new clinical decision support". This includes work with Macmillan Cancer Support to electronically

implement an existing cancer decision support tool.

"It looks at the combination of symptoms that a patient has presented at a GP practice for in the past 12 months and then gives you some indication, a flag really, as to if this could indicate a cancer diagnosis and you should be thinking about the two week referral. So they have the research there, and what they're trying to do now is use the clinical system to actually embed that clinical decision support in the system so that it triggers automatically, and supports the clinician."

In Newton Abbott, meanwhile, early data shows that of the 32 patients on whose records the automated STOPP tool was used, 22 had at least one potential unnecessary or problematic medication. Dr Johnson reports anecdotal evidence that prescriptions have been changed or discontinued as a result.

The tool he developed has now been made available to all SystmOne users to employ. Not only is research being applied quickly, but the results are being quickly shared too. ●

ALAMY

PARTNERSHIPS

CAN I WATCH NETFLIX?

Hospitals have been slow to implement wireless connectivity but with patients increasingly demanding it, some have found ways to make wifi available. Jennifer Trueland reports

As deputy chief information officer for Imperial College Healthcare Trust, Kathy Lanceley would be expected to recognise the benefits of good internet connectivity at work. But it was her role as a mother that really highlighted the need for wifi in healthcare settings.

"My daughter was in hospital for several months and there was no wifi," she says. "It was very hard for me to continue to work in those circumstances. Wifi isn't just important for patients, but also for visitors who don't want to put their jobs in jeopardy and who want to keep in touch with work. It's extremely important to enable that."

Even 10 years ago, there would be virtually no expectation that hospitals or GP practices would offer wireless connectivity. But today there is a growing sense that it will be available almost everywhere, from people's homes, to shops, cafes and public transport hubs. Indeed, research by Kantar Media last year showed that more than four in five adults access the internet via wifi using one or more devices. Although the majority are using it at home, it is becoming increasingly common for users to seek wireless connectivity when out and about.

The health system is no exception, although some argue that it has been slower than other sectors to make wifi available. One of the barriers has traditionally been cost, explains Ms Lanceley.

"Nobody can make the case for taking money away from direct patient care," she says. "There's a real struggle for money in the health service, so wifi can't be at the expense of patient care."

This is a debate that was recently played out on the pages of the *British Medical Journal*, where Leeds and York Partnership Foundation Trust's Victoria Betton argued that internet access was essential to shared decision making and better patient outcomes. Grant Ingrams, deputy chair of the IT subcommittee of the British Medical Association's GP Committee, however, said it was a luxury that should not take priority over other technological needs.

This discussion is only likely to continue as demand for connectivity grows. So what are trusts doing to cut through that conundrum? Imperial, which has five main hospital sites across London, and is one of the largest acute trusts in England, introduced a comprehensive public wifi service this spring, but decided to outsource the risk.

"We had limited free wifi for renal and chemotherapy patients, but the system and equipment were very old, and it didn't comply with new legislation," says Ms Lanceley. "Also, it didn't have family friendly filtering, so people could look at anything.

"We looked around at the market and saw that councils, places like Costa and McDonald's and so on all used external providers – unless you've got super specialist services there already, then it's a very big investment, so it makes sense to look at external providers."

Imperial sought bids for a contract to provide a wifi service, but with stringent conditions. "The trust knew that it didn't have revenue for this, so we asked for tenders for a free service with no cost to the trust or to patients. It was an extraordinary ask, but one of the companies said they would work with us to find a solution."

Working with provider WiFi SPARK, they came up with a system that provides a free basic service for patients, visitors and members of staff to use wifi at no cost to them for browsing the internet and using email and social media. This is coupled with a premium service that allows people to pay

Imperial has free basic wifi for patients and a premium service that allows them to pay for a high speed connection

to access high speed content such as video and audio streaming. "If someone has a Netflix subscription, for example, they can use that with the premium service," explains Ms Lanceley.

The new system is good for staff, she adds, because they can use it to access and upload data to central systems while they are on the move. This is important across the trust's acute sites, but also has important implications in community settings. "We've got staff working in social care and in children's centres, and even GP practices," she says.

Other trusts have become aware of the need to come up with imaginative ways to make wifi access work, without having a negative impact on budgets.

At King's College Hospital Foundation Trust in south London, for example, there is a mixed economy of wifi, depending partly on who is using it and for what. In general, guest public access to wifi services is a paid for service, with a funding structure that starts from £4.50 day. There is also a variety of tariffs including a week's access for £12, a

'Having wifi has been fantastic. It's transformative'

month for £17.50 and a year for £125. Users pay the provider directly for the service, and the provider pays the trust a fee for using its wifi distribution network. Access to some services, such as the trust's own website, giving ward and visitor information and NHS Direct, is free.

Free for children
However, it is a different story in the children's wards. Wifi is free to use, with the cost covered by charitable organisations.

According to trust information and communications technology services manager Nick Penlington, the service is popular with patients and visitors.

He believes there will come a time when

hospitals will be expected to provide free public wifi, but cautions that it will not be easy. "There is no such thing as 'free' wifi; there are always costs," he says, citing data security needs and proper filtering as well as the requirement to link it up to the internet via a provider.

The provision of public wifi will become increasingly vital as health and social care services move towards integration, says Ms Lanceley. It has the potential to overcome one of the traditional barriers – of IT systems not talking to each other.

She points to transplant nurses as one important area where public wifi can make a huge difference. "There are 29 of them in London and they've got to come to all sorts of sites to work," Ms Lanceley says.

"They've got a fantastic central system that they can put information into. If they have access to wifi, then they can input data to that system while they are on the different premises. It's a small example, but shows the possibilities.

"For us, having wifi has been fantastic. It's transformative." ●