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Shaping healthcare through medtech

Enhancing services with new innovations

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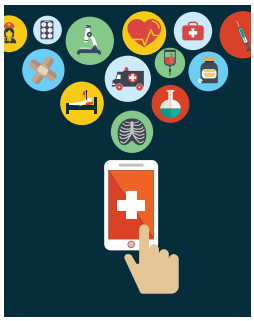

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How innovation can tackle healthcare inefficiency

John Bell, regius professor of medicine at the University of Oxford and author of the life sciences industrial strategy, says new technologies are the perfect tonic for flagging healthcare systems

Healthcare systems globally are struggling to cope with increasing demand driven by shifting demography associated with a growing burden of chronic disease. In most countries, funding for healthcare provision is limited and, as a result, efficiency and cost-effectiveness have become core tenets of modern healthcare.

Although there is a tendency for healthcare systems to resort to conventional responses to growing demand by training and hiring more nurses and doctors, this is clearly not a sustainable solution and improving outcomes while reducing costs is likely only to be achieved by applying significant innovation to the problem. Much of this innovation comes in the form of new technologies created in the commercial sector, hence the single biggest challenge is to find ways by which healthcare systems can rapidly and effectively both evaluate and adopt innovation in a way that improves costs but, at the same time, improves patient outcomes.

A key challenge, if one was to implement this strategy, is obtaining sufficiently robust evidence of how innovative technologies work in the real world, but also how they can be used to change care pathways and significantly reduce cost across the system. This data is seldom available with recently approved products and indeed the only arena in which this data can be generated are healthcare systems themselves.

Therefore, it becomes imperative for healthcare systems such as the NHS to work closely with innovative companies to provide the capacity to evaluate the benefits of innovation and to determine their cost-effectiveness. This may provide the necessary information that will allow the change in care pathways and the decommissioning of other tools and processes within the healthcare system that lead to genuine cost savings from the adoption of innovation, rather than the layering of new innovations on top of old, existing systems.

Such a system for evaluation could be easily integrated with the Accelerated Access Programme recently announced by the NHS. This could provide a mechanism for industry and the healthcare system to work more

Innovation cuts costs and improves outcomes

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efficiently together. The recent experience of the transformation of genomic services in the NHS using genome sequencing to replace a wide range of labour-intensive, less informative tests should save the NHS several hundred million pounds over the next few years. Similar strategies could be applied in the area of digital pathology and the application of artificial intelligence to images of all kinds, including radiology.

Healthcare systems are preoccupied with managing the day-to-day issues of responding to demand in safe ways. They need now to think more clearly about how the adoption of innovation can transform their services and work more systematically with partners, including industry, to fundamentally change the way they do their business to achieve a more sustainable model for the future.

Innovative companies and healthcare systems have a shared problem. After the discovery of new, innovative technology, the challenges are invariably how one demonstrates both utility and cost-effectiveness. Sometimes, in order to demonstrate this, particularly for medtech and diagnostics, one needs to operate in a holistic healthcare system and this may require a significant change in care pathways to demonstrate the real utility of new interventions.

Companies seldom have access on their own to these capabilities and healthcare systems that equally need access to cost-effectiveness and efficacy data are ideally positioned to collaborate to try to establish the utility of new products. Historically, the approach to throwing innovations over the wall from the commercial sector into the healthcare space has failed to deliver the kind of uptake or utility that might have been expected.

This is, in part, because companies have failed to consider or demonstrate how their innovations might be used in the real world to significantly improve outcomes and, ideally, also to reduce cost. It is no wonder, therefore, that adoption – particularly in financially stressed healthcare systems – is invariably slow. An obvious solution to this problem would be to have a closer relationship between these two parties so that they can make efforts to work together on new innovations and bring them to patients faster because they have generated the data they need to show that it is in everyone's interest to implement these tools in a particular way.

Healthcare systems are no longer in a position to ignore the potential advantages of using innovative tools to fundamentally change their workforce and how they deliver healthcare. Services cannot be transformed by hiring more people to deal with the workload and, unless healthcare systems more aggressively embrace technology, but do so with the explicit objective of improved efficiency and overall lower costs, then they are likely to continue to slip further into the realm of the inefficient and unaffordable.

Professor Sir John Bell GBE, FRS is regius professor of medicine at the University of Oxford , and chairman of the Office for the Strategic Coordination of Health

Turning potential into reality

Medtech is developing value-based healthcare for the benefit of patients. With government support, the UK can be a global lead in nurturing innovation, explains **Philip Kennedy**, chairman of the Association of British Healthcare Industries

The Association of British Healthcare Industries partnered with Dell Medical School, University of Texas to launch the ABHI Innovation Hub in 2017

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The medtech sector is broad and exciting. It is built on solid foundations: necessity, hard work and innovation. Products are developed to target a specific need, be it the need to do something faster or more efficiently, cleaner or more cost effectively. There are thousands of products on the market, from wound dressings, needles and syringes, pacemakers, knees and hips, MRI scanners and blood pressure monitors. The products made are integral to the delivery of modern healthcare and chances are, you will need medtech throughout your life. The sector employs close to 100,000 people here in the United Kingdom, generating a collective turnover of £17bn.

When we consider the value of getting people back to work, paying their taxes, removing the need for carers and employer sick pay, medtech transcends the operating theatre. It allows people to live their lives the way they intend to. The Association of British Healthcare Industries (ABHI) is the trade association representing this sector. With over 260 member companies, ABHI leads the advocacy of the industry to advance access to safe and effective medtech in delivering high-quality patient care. When we look at the positive impact on patients, the healthcare system and the wider economy, the capabilities of our members cannot be underestimated.

Yet despite the medtech available, there is often a gap between ambition and reality. In a global context for healthcare, the UK's differentiating factor is the National Health Service. As the fifth-largest employer in the world, it is comfortably the biggest single-payer health system.

The NHS can be a superb test-bed for members' innovative technologies, yet navigating the challenges of the market are difficult. As initiatives to reduce the number of suppliers kick in, survival is

becoming tougher, and naturally, SMEs are disproportionately affected. These are often British companies, supplying British innovation. Their loss to the NHS affects the health and wealth of our nation.

For a healthcare system to be handled efficiently, managing cost savings where necessary and appropriate is crucial. However, the cheapest product does not always mean the best value. A product that has a longer shelf life, is more durable and of a higher quality, may cost fractionally more per unit, but will have better outcomes for the patient and the system. This, in turn, leads to far greater cost savings in the long run.

Partnered with this is the effect of Brexit. Its impact has seen manufacturing costs significantly increase due to the weaker pound. Suppliers have traditionally absorbed price fluctuations, but this has been particularly challenging. Greater contract flexibility is needed to offset such increases.

Medtech products, like those in many other sectors, rely on international supply chains, meaning that products are moved around different countries for material sourcing, manufacturing, packaging and sterilisation. It is not uncommon for a "British" product to have touched several jurisdictions before reaching the market place. For suppliers to be able to move their products across borders, there needs to be practical measures in place to ensure the supply of products to patients is uninterrupted.

Regulation underpins all areas of medtech and for the last eight years, ABHI has been working with the Medicines & Healthcare products Regulatory Agency (MHRA) and European partners to ensure that this next generation of regulation for devices is considered the "gold standard" globally. For our industry, this modernises the original rules, bringing together best practices from existing Commission guidance. The transition period is now underway and by May 2019, the new regulation must be adhered to by European Union members in full.

Post-Brexit, the UK will require its own, sovereign regulatory system. We are strongly advocating a pragmatic approach by the government to develop such a system, which should include the adoption of the new regulation, and any secondary legislation arising from it. A recent survey to the ABHI membership found almost unanimous agreement with this ask, with 97 per cent of companies eager to avoid regulatory divergence from the EU.

Yet despite the challenges and uncertainty, 2018 is filled with opportunity. We are seeing real support and backing from key decision makers. For example, the government's response to the Accelerated Access Review has highlighted the importance of speeding up the uptake of innovations through a variety of support programmes.

Furthermore, we have the Industrial Strategy which was launched in November 2017. As part of its roadmap for success, a specific sector deal for life sciences has been announced as a key area for future growth. Medtech will be a pillar in ensuring its success.

Since Brexit, members tell us that exports of international orders have increased by over a third, and more companies are looking for new markets outside of the EU. With greater practical trade support from government, this can boosted even further. To complement this, ABHI have seized the initiative at international level, by launching the ABHI Innovation Hub at the Dell Medical School at Austin, Texas. The Hub offers UK companies the opportunity to locate themselves at a world-class facility and develop their United States business within an ecosystem of clinicians, investors and mentors. This has been tremendously successful, and we have ambitions to replicate this offering to other key global markets. Our outreach is reciprocated by encouraging inward investment through ABHI's international membership scheme. Non-UK domiciled companies looking to introduce innovative medtech to the UK are offered insight and market-access knowledge, as well as assistance from several partner organisations, including the Department of International Trade.

Throughout myriad of changes across the healthcare landscape, ABHI continues to lead and guide members. Collaboration between industry and the NHS is vital. This is where trade associations can have real impact, as the interlocutor between the public and private sector. We are uniquely positioned to act as the glue for new models of care delivery, particularly in the digital space. When we consider the sheer potential healthcare data has in revolutionising services as we know it, I firmly believe there has never been a better and more exciting time to work in our industry.

Brexit must not block collaboration

The UK's decision to leave should not distance it from the European Union's regulatory framework, writes Martin Frost, CEO of Cambridge Medical Robotics

Across the United Kingdom today, a quiet revolution is taking place. In anonymous business parks, research laboratories and even converted barns, something exciting is happening. The medical technology sector (often referred to as medtech) is delivering some truly remarkable developments which promise to make life better for people across the world. Nowhere better symbolises this work than the city of Cambridge, home to one of the biggest science and technology hubs in Europe.

The growth in the medtech sector is a sign that the era of British technological achievement is far from over. The company I lead, Cambridge Medical Robotics, wants to revolutionise the world of surgery through a robot which is smaller and more cost-effective than anything that has gone before it. In this city, we are not the only pioneers. Cambridge is teeming with energy, buzzing with brilliant minds and home to scores of companies looking to do nothing short of changing the world. However, a cloud of unpredictability hangs over our ancient spires and green hills. Its name is Brexit.

The UK medtech sector employs almost 115,000 people in nearly 3,700 companies – 98 per cent of which are small or medium-sized enterprises (SMEs). It would be foolish to pretend that medtech companies currently based in the UK, including here in Cambridge, have not benefited from our membership of the European Union. We have.

As negotiations progress, we must not lose sight of what works with our relationship with the EU. We must seek to shape our future relationship around our common goals. The ability to work across Europe, with a single and unified set of standards, has helped British companies punch above their weight in a highly competitive, globalised marketplace. We cannot simply walk away and hope for the best. From regulation and clinical trials, to business ethics and investments, the government must seek a pragmatic deal that works for Britain.

Amidst all the arguments made during the referendum campaign, particularly regarding the ever-ambiguous "red tape", did you hear

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We must shape our future around common goals

anyone say we should no longer abide by the internationally respected CE mark system? No? That's because it works. Did you hear complaints about pan-European standards for clinical trials? No? Again, because they work.

Take the CE mark: a globally recognised symbol that informs any governance body that the product complies with the various protection standards of the European Economic Area (EEA). All compliant devices have the same CE mark as you find on your smartphone, computer and clock. The Medical Devices Directive harmonised regulation of medical devices across the EEA, thereby reducing the levels of unnecessary regulatory burdens. Medtech companies can sell their goods to 28 nations across Europe, whilst conforming to one set of commonly agreed regulatory rules. No-one really knows what will happen to this mutually beneficial system once we leave the EU.

The uncertainty posed by the ongoing negotiations is highly problematic for a business such as ours. We expect to launch our next-generation surgical robotic system in 2018. Yet we have no idea if any of the regulatory hurdles we are currently seeking to meet will be valid in the medium term. The Institute of Mechanical Engineering recently published a report which notes if we leave without any form of agreement, British manufacturers may not be allowed to affix a CE mark onto their products. Such an approach would curtail growth into European markets and introduce significant barriers to trade overnight.

Clinical trials are another area where European regulatory integration has helped to deliver consistency and bring innovations to patients faster. The Medicines and Healthcare products Regulatory Agency (MHRA) oversees clinical trial standards across Europe. A company wishing to prove that their medical device works on patients has to meet one set of trial rules and the results are respected across all 28 member states. Should Britain divorce itself from these arrangements, companies may stop undertaking trials in this country and in doing so will remove the investment and expertise that come with them. What's more, if Britain has its own set of standards for the approval of devices or medicines, we will see our access to innovations slow down, as companies opt to prioritise Europe and its 27 markets before ours. We do not want to be at the back of this particular queue. Cambridge Medical Robotics was set up with global aspirations, and an organisation and infrastructure to support this – we won't be deflected from our mission by Brexit, but it doesn't help.

It has become a cliché for companies to come out and ask for stability. However, Brexit poses a challenge like no other to businesses, particularly small and medium-sized companies that make up the vast majority of the medtech sector. We have invested heavily in the European knowledge base because we know the benefits that can be brought by collaboration and partnerships across Europe. At CMR, doctors, engineers and researchers from across the continent come together to build a robotic system that will improve the reality for patients, surgeons and health systems. This work should not be placed in jeopardy by a Brexit that fails to recognise (or even understand) the benefits of pan-European regulation, investigation and investment.

The medtech sector represents the very best of Britain. It is innovative, risk-taking and highly disruptive; all attributes that will be of huge significance in a post-Brexit economy. However, we cannot just drop out of a system we have been part of for over 40 years without agreement on what happens next. It is clear the government is only just appreciating the numerous challenges posed by Brexit, so it needs more time to establish what the future may look like. Meanwhile, businesses cannot continue to grow and invest without a stable regulatory environment. So, it is up to the government to work with our European partners to devise a sensible transition agreement that considers the needs of the economy, then – eventually – they must agree a practical exit deal.

For the sake of patients, let's just hope they can do it.

Patient care is key to a thriving health system

Investment in cutting-edge care will reap long-term benefits for patients and healthcare budgets alike, argues **Mike Fairbourn**, vice-president general manager at BD UK & Ireland

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The NHS is one of the finest healthcare systems in the world, and an integral part of the United Kingdom's post-war identity. That is why I am so proud to run the UK operations of BD (Becton, Dickinson and Company), a world leader in patient safety, which is the standard benchmark of modern, high-quality healthcare.

We are a global medical technology company leading the world in innovations to improve health outcomes. Health systems today need a collaborative approach to deliver higher quality care for less. We want to share the responsibility to improve health outcomes – ensuring safer, more efficient care delivered to patients – and to do it sustainably. We work across the continuum, from discovery of new markers for disease to diagnostics to the delivery of care and have end-to-end, interconnected solutions. We have the resources and global network to gather the finest minds to make it happen.

The NHS's basic formula is built on the Hippocratic Oath of "First, Do No Harm" to patients and maximising patient safety is key to that. In order for the NHS to provide quality affordable care we need to provide joined up solutions and deliver improvements on patient safety.

The crucial patient safety challenge, and one which some NHS leaders across the past few decades have occasionally struggled with, is infection prevention and control. Most people understand this as Healthcare Acquired Infections (HAIs) such as MRSA (methicillin-resistant Staphylococcus aureus), and there have been many examples in the press of the severe effect these infections have on patients.

There is good news. Infection rates have fallen, and improvements have certainly been made. MRSA Action have reported that there has been a 37 per cent drop in the number of MRSA bloodstream infections reported in the

primary care setting between 2011 and 2016, with 1,116 cases reported in 2011/12 down to 820 cases in 2015/16. However, the trend in reductions halted in 2014/15 and a 3 per cent increase was seen in 2015/16. Clostridium difficile (C. diff) reduced significantly between 2011 and 2016, with a 48 per cent reduction in hospital cases and 27 per cent reduction in primary care. However, the reducing trend has stalled since then and it is vital we continue to monitor and highlight the importance of managing both MRSA and C. diff, along with other infections.

This is still a problem. In certain areas MRSA and C. diff are too high and sepsis still kills about 14,000 people unnecessarily every year in the UK, even though basic interventions could prevent these complications.

Antimicrobial resistance (AMR) is the new challenge on the horizon, and this problem is potentially more challenging than any in healthcare. Current trends project that AMR could cause up to 10 million deaths annually by 2050, surpassing deaths currently caused by cancer. If we fail to tackle it at the root, surgical and commonplace medical procedures, which are now routine, will come with huge risks to the patient, and antibiotics that have been used for decades will become useless. Preventing this catastrophe will involve rethinking our approach to surveillance, diagnostics and treatment. Diagnostic operations will have to become far more effective, and appropriately targeted antibiotics must only be given out where a set of conditions are met.

Medication errors also present a significant and avoidable burden of harm and cost to patients and the efficient running of health services. There is a 45 per cent chance for error in the medication administration process. Campaigns to reduce errors were launched in 2017 by both the UK Department of Health and the World Health Organization. Through our research, we have shown medication errors can be reduced through the better use of technology, including automated dispensing systems in pharmacies and digital checks at every step of the process.

BD has solutions to some of the key pillars underpinning safer patient care, be it medication errors or HAIs and its related problem, AMR, and we are ready to partner with the NHS to implement these solutions. Industry needs to take shared responsibility for failures in patient safety and must deliver improvements, not just through the technologies we provide but by working alongside healthcare providers to ensure the necessary practices and procedures, supported by the most appropriate proven technologies, are used to ensure we put patient safety at the heart of everything we do.

We work tirelessly to educate clinicians in using these tools effectively. We are here as a resource for clinicians, managers and politicians to draw on in tackling some of the biggest challenges facing the NHS – challenges which needlessly costs thousands of lives and many millions of pounds.

In April, BD announced our intent to acquire C. R. Bard, Inc., a company with similarly international operations and complementary safety platforms that broadens our offering right across this landscape. After the acquisition is completed, it will enable us to provide even more comprehensive solutions.

In an austerity economy, we must find ways to save money and improve outcomes wherever possible. This is easier said than done, of course, but it is possible. Companies such as ours must be realistic about the reality of budgetary pressures and pose solutions to both clinical and economical challenges. But there is no false dichotomy.

By procuring for the longer term, healthcare leaders can improve outcomes and save money. Effective, safe solutions are not always the cheapest but, often, provide efficiencies further down the line and avoid additional cost burdens by reducing errors. For example, by diagnosing the correct pathogen in a case of suspected sepsis, clinicians can halt the systemic infection and avoid life-changing injuries, which will take a patient out of work for decades, and lifelong care, which is costly. By investing in technological solutions, this can be avoided not just in one case, but thousands.

Patient safety is not simply a luxury – it makes complete financial sense to treat it as a long-term investment.

BD supported Health First Europe's Declaration for Patient Safety, which was launched in December, and urged Ministers of Health across Europe to agree a high level of understanding on patient safety practices and standards to make care consistently safe across Europe's healthcare systems.

My message is this: we are here to help make the NHS the safest healthcare system in the world. Our experts are a resource for healthcare professionals to draw on. We want to contribute in any way we can to the UK's national objectives of keeping patients safe and, by doing that, lowering the cost of healthcare delivery.

The power of data is at the "vanguard" of progress

Predictive analytic technology can help to identify illnesses sooner and reduce time spent in hospital, according to Michael Macdonnell, director of system transformation at NHS England

In November, *The Economist* reported that "almost unnoticed, the NHS is starting to change at its core". It has to, because what people need from their health service is changing too. Today there are half a million more people aged over 75 than there were in 2010, and there will be 2m more in ten years' time. There are already 15m people with chronic conditions and there will be 3m more by 2025. One in four of us will experience mental health problems. Chronic conditions such as depression or hypertension aren't cured by a trip to the hospital; they are long-term, requiring continuity of care and joined up services that help people manage their own health.

If the illnesses that afflict us are changing, the way we treat them is changing even faster. Every year the NHS funds and adopts new life-saving therapies and technologies. Take three examples. The NHS is rolling out new oral treatments for Hepatitis C that reduce mortality by around 10 per cent and liver transplants by about half. By 2019, more than 6,200 brain tumour patients each year will be treated by stereotactic radiotherapy, which precisely targets radiation and avoids invasive surgery. The NHS has invested in 13 genomic medicine centres that, later this year, will have processed over 28,000 DNA samples from patients with cancer and rare diseases, and lay the foundations for the next generation of more precisely targeted therapies.

Yet despite this astonishing innovation in treatments and technologies, the way we deliver care has not kept pace. GP surgeries, community services and hospitals still look a lot like they did nearly 70 years ago when the NHS was founded, all too often interacting by letters and providing services in an episodic way that befits the health needs of the past—not the future. That's why our aim over the next several years is to make the biggest move towards integrated care of any western country.

This integration is already happening. In Blackpool, so-called "extensivist" teams proactively help people most at risk of becoming acutely ill, providing continuity whether they are on a ward or at home, and preventing people from spending unnecessary time in hospital. In Rushcliffe, enhanced support for people

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We need to stop unnecessary time in hospital

living in care homes means residents attending A&E 29 per cent less often, and being admitted 23 per cent less frequently, compared to matched controls. In Dudley, teams of doctors, nurses and other professionals have reduced the time people spend in hospital by the equivalent of 9,600 bed days in just over two years. These and other new care model "vanguards" are making a difference, providing much more joined up care for those who use them.

We now need to spread these examples and hardwire them into the wider NHS. This is a job for the "accountable care systems" we are catalysing across the country. They express a simple idea – that NHS bodies and local government should collaborate to improve the health of the people in their systems working within a defined "population budget" – but one with profound implications. Taking this idea seriously means preventing illness, not just treating it, and investing in primary, mental health and community services that keep people out of hospital. It means thinking beyond organisational boundaries. It marks the effective end of the "internal market" in the NHS and of hospital payments that over-reward activity and reinforce the fragmentation of services.

Collaborating – rather than competing – produces results. In Dorset they are investing in general practice. Collaboration between Bournemouth and Poole hospitals has held hospital activity steady, unlike other parts of the NHS. In Frimley, Surrey they are developing primary care "hubs" and connecting GPs and consultants to join up services and reduce unnecessary referrals to hospital. Far from worrying about keeping his hospital full, the CEO says it has been "the most successful period of my 29 years".

As these and other areas of the country attest, the NHS is in the midst of innovating its "delivery model". At the heart of this innovation is redesigned care. This isn't about structures; it's about teams of doctors, nurses, pharmacists, therapists and other professionals working together to join up services and proactively prevent illness or acute deterioration. These innovations in care design are very bottom-up and they take time; as international health guru Don Berwick puts it, these changes are human and "have their own native tempo".

Technology is part of the answer. Services are integrated more easily and safely when underpinned by interoperable, digital health records. In other countries, technologies help clinicians apply the best and latest evidence to each new patient, reducing unwarranted variation, whilst digital channels improve access and help put people in charge of their own health and healthcare. As the NHS integrates, it will provide a global test-bed for cutting-edge predictive analytics and machine learning technologies that could help spot and manage illness earlier, and precisely target therapies to a person's specific profile.

Innovating the NHS's delivery model is neither easy nor complete. There are countervailing pressures including tight finances and workforce shortages, but even with lots more money and staff, we would still have to change the NHS to sustain the high confidence the public accords it. As the NHS celebrates its 70th year, the good news is that the future of the health service is already here. It's just unevenly spread.

Partnerships in a new era of excellence

Stephen O'Callaghan, senior director of Johnson & Johnson Managed Services, GB & Ireland, says collaboration between the supply chain and frontline clinical staff is key to creating better healthcare infrastructure in the UK

The NHS is facing more pressure than ever before; by 2030 it is estimated that there will be around 15m people in the United Kingdom over the age of 65[1]. Whilst we can be proud of the role that industry has played in increasing life expectancy, this brings both opportunities and challenges to continue to improve patient outcomes and to increase patient satisfaction. A growing and ageing population also continues to add to the financial challenges facing our healthcare system, and with an estimated funding gap of around £30bn by 2020[2] , the NHS also needs to find ways to reduce the total cost of care.

Clearly, there is no doubt that hospitals and healthcare providers are under increasing pressure to do more with less. The NHS Five Year Forward View[3] published in October 2014, along with recent reports led by Lord Carter[4] and Professor Briggs[5], highlight the challenges of meeting the increasing demands of an ageing population and make a number of recommendations that aim to help the NHS improve efficiency and quality of care for patients, whilst reducing costs.

Today, we believe that industry can play a key role in shaping the future healthcare landscape by partnering with healthcare systems to co-create solutions that deliver value to healthcare providers and improve satisfaction for patients.

We created Johnson & Johnson Managed Services, part of Johnson & Johnson Finance Limited, with these needs in mind. We have developed a unique programme and offer capabilities to help hospitals and healthcare providers achieve their aims of improving outcomes, increasing patient satisfaction whilst reducing the cost of care delivery. An example of exactly how this works was recently revealed when we announced a new 15-year partnership to deliver an Orthopaedics

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Centre of Excellence with Guy's and St Thomas' NHS Foundation Trust.

As part of the managed services agreement, the orthopaedics centre at Guy's Hospital is being expanded and redeveloped, giving more patients access to services through the development of additional operating theatres within the first three years. This centre of excellence will provide a hub for education and training, and offer a dedicated space to facilitate cutting-edge research to improve clinical outcomes for patients. We are also responsible for streamlining the supply chain through a managed service agreement for the procurement of devices, surgical instruments and implants required for orthopaedic surgery, working to improve efficiency and reduce costs for the trust.

This partnership is the first of its kind that we've developed within Johnson & Johnson, both in the UK and globally, and was created through our insight that the changing healthcare landscape in the UK requires a new type of partnership between industry and healthcare providers. It reflects our joint commitment to improving the future of healthcare through innovation and collaboration and is designed to improve the standard of care for orthopaedic patients. What's really exciting is that this new business model will allow us to take a leading role in shaping the healthcare environment in the UK.

Managed services are already used across the NHS and are designed to make the best use of external expertise and allow healthcare providers to focus on delivering quality care. The role of Johnson & Johnson Managed Services in this partnership is to leverage our core organisational capabilities in logistical and operational management to allow clinicians within the Trust to focus on surgical excellence, improving patient experience and clinical outcomes, while reducing cost.

We're extremely proud of this collaboration which we have developed alongside our partners at Guy's and St Thomas'. It is designed to eliminate inefficiencies which will deliver significant value back to our customers, and will improve the overall experience for patients. This is just the beginning of a new business model that will bring significant benefits to the healthcare community we serve.

Peter Earnshaw, clinical director of surgery at Guy's and St Thomas', outlines how this collaboration will benefit patients and clinicians alike. "As we redesign patient pathways and introduce innovative new technology, it allows us to improve the overall experience of patients having surgery in our institution," he commented.

"The Johnson & Johnson Managed Services partnership will further increase the time that frontline clinicians can focus on patient care and enable us to identify opportunities to improve the supply chain. Through the development of new operating theatres, it will also increase capacity so that we can treat more patients more quickly and will give our clinical teams opportunities to be at the forefront of new developments in orthopaedic care."

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A network determines net worth

Mike Hannay, chair of the Academic Health Science Network, explains the need to align education, research, informatics and training in the health and care industries

This year marks the 70th anniversary of the National Health Service, offering a great opportunity to celebrate a truly unique and beloved healthcare system. As we look ahead to this summer's milestone we know that the NHS faces unprecedented challenges as it seeks to manage increasing demand. People living longer with more years of ill health, alongside the pressure on public finances and contraction of social care, is making it harder to provide health and care services that meet the complex needs of our diverse population.

In recent years the NHS has delivered enormous efficiency savings and whilst this is necessary, it is not sufficient. To meet the demands of today and tomorrow we need to do things differently: to innovate. The United Kingdom is home to some of the world's best innovators and entrepreneurs and unlocking this engine of innovation has the potential to transform our health and care services, using new technologies to improve clinical outcomes, provide better patient experiences and drive down the cost of care.

However, spreading innovation at space and scale is a challenge for all healthcare systems including the NHS. It can take 15 years for medical innovations to progress from pivotal studies to widespread use. England's 15 Academic Health Science Networks (AHSNs) exist to help make this happen. We operate locally and also come together as a national network to work across health and social care, industry, third sector and with research organisations to progress the adoption and spread of innovative technologies, systems, processes and pathways.

The AHSNs were established in 2013 by NHS England and over the past four years have spread 200 innovations across 11,000 locations, benefiting 6m patients. Working collaboratively with bodies such as the ABHI (Association of British Healthcare Industries), the ABPI (Association of the British Pharmaceutical Industry), MediLinks, their members and individual entrepreneurs, AHSNs support UK industry in developing innovative products that improve patient outcomes and drive down the cost of care. This approach has facilitated £330m of

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The AHSNs have helped 6m patients over four years

investment and helped create 500 jobs since 2013.

Necessity is often said to be the mother of invention, and frontline clinicians are developing solutions to problems they see in their daily clinical practice. Three examples of innovations that are improving patient safety are the non-injectable arterial connector (NIC) – a simple needle-free connector with a one-way valve that prevents medicines being incorrectly administered through arterial lines – an error that can lead to limb amputation, the PneuX – designed to prevent ventilator-acquired pneumonia (VAP) which is one of the leading causes of death in intensive care units; and Wiresafe – an engineered solution to prevent central line guide wires being left in patients.

These are all fantastic innovations in their own right, but what is incredible is that they have been developed by a single clinical entrepreneur. With support from AHSNs, life and money-saving technologies like these, developed by frontline NHS clinicians, are being spread at pace and scale.

The increasingly important role of medtech in the life sciences industry

We have one of the best medtech sectors in the world. The government's Life Sciences Industrial Strategy – published in August – seeks to support the life sciences sector to capitalise on the potential for new technologies to both drive health and care transformation and generate wealth for the UK by exporting innovation.

SMEs are an important source of innovation and I was delighted that over 30 companies joined the AHSN Network at the recent NHS Expo event to showcase their technologies. We are currently working with dozens of companies across the whole innovation pathway and I am continually coming across amazing technologies. Here are just a few examples:

- Kardia Mobile – a small device that attaches to a smartphone; the patient places their fingers on the device and within seconds it identifies if they are at risk of Atrial Fibrillation – allowing swift action to be taken to avoid the risk of a life-threatening stroke.
- Sleepio – proven to be effective at helping with sleeping problems and overcoming long-term poor sleep.
- MyCOPD – an online system to help people manage chronic obstructive pulmonary disease.

Mass adoption

In the four years since they were established the AHSNs have built significant knowledge and expertise of the enablers and barriers to adoption and spread. There are many reasons why some innovations gain traction and others that might seem great fail to spread.

However, the success of change, innovation and transformation share common characteristics which we have summarised as the "Six Cs". These include having a sound clinical, economic and user-experience evidence base, seeking out champions for change and genuine co-production that seeks out the voice of patients and carers.

Whilst I'm sure these seem obvious points, there are countless examples of projects that fail because they don't take these issues on board. Looking to the future, I welcome the recent news that the NHS is to extend the life of AHSNs for a further five years from April 2018 with an enhanced remit to operate as the key innovation arm of the NHS.

As part of our expanded roles the AHSNs will all run "innovation exchanges", which will support the government's Life Sciences Industrial Strategy. Innovation exchanges are a unique collaboration between AHSNs and the Office of Life Sciences.

Matching the needs of the NHS with evidence-based innovations will enable the spread of transformative technologies that improve clinical outcomes, deliver better patient experiences and help secure the future of our NHS for the next 70 years and beyond.

Mike Hannay was elected chair of the AHSN Network in 2016. He is also the managing director of East Midlands AHSN

Healthcare with home comforts

Andy Goldney, general manager, Baxter UK, Ireland and Nordics, explains how medtech can be the catalyst for an increase in home-based care and relieve pressure on the NHS

Against the backdrop of a pressurised National Health Service the need to improve and change models of care in the United Kingdom is clear. Indeed, the NHS Five Year Forward View is targeting £22bn in efficiency savings by 2020; and the scale of this challenge is underlined when one considers that NHS demand is growing by four per cent each year and current funding growth is only at a rate of one per cent in comparison. The NHS needs to drive further efficiency savings as a matter of urgency, and patients should be empowered to improve their own quality of life during and post-treatment.

Some of the core tenets of the Five Year Forward View can only be realised if there is more collaboration between the government, NHS, third sector, industry and patients themselves. Partnerships play a key role in working towards the shared goal of making the NHS a world-leading organisation.

The UK is on a challenging journey, but obstacles can be overcome if we adopt a fresh approach to working collaboratively. Baxter is a recognised supplier of products and services to the NHS, supporting patients at all stages from hospital admission to managing a long-term condition at home. We see ourselves as an integral partner to the NHS. We work with clinicians and patients to share our expertise on how to integrate and change patient pathways which can drive efficiencies as well as improve outcomes.

Medical technology (medtech) is a growing sector which encompasses innovations that can be used in any care setting: hospital, community or home. Increased out-of-hospital care offers significant advantages to both patients and providers alike. Home therapies enable patients to take control of their own treatment, drawing on clinical expertise expediently to support and inform their choices.

BAXTER HEALTHCARE

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Baxter

Baxter has a number of examples to demonstrate how this is possible. An outpatient parenteral antimicrobial therapy (OPAT) service that we set up, in partnership with an NHS Trust, gave a carefully selected group of patients the chance to receive intravenous antibiotics at home. It has saved the hospital up to 2,700 bed days. OPAT reduces the length of hospital stays and allows patients to continue their treatment at home and avoid unnecessary trips to the hospital. In some cases, it can completely eliminate the need for hospitalisation. Baxter provides the home delivery of medication, the support to train patients to self-care, or the nurses to administer the drug as required.

Give the gift of sustained autonomy

Renal dialysis is another example where product innovation supports treatment at home, gifting patients sustained autonomy. Baxter's cloud-based communication platform, called Sharesource, connects home dialysis devices to Renal Units enabling clinicians to monitor and manage their patients daily. This simple technology has the potential to increase both patients' and clinicians' confidence in home treatment and reduce avoidable and costly hospital visits – costly not only to the host hospital but to the patients in terms of travel and time.

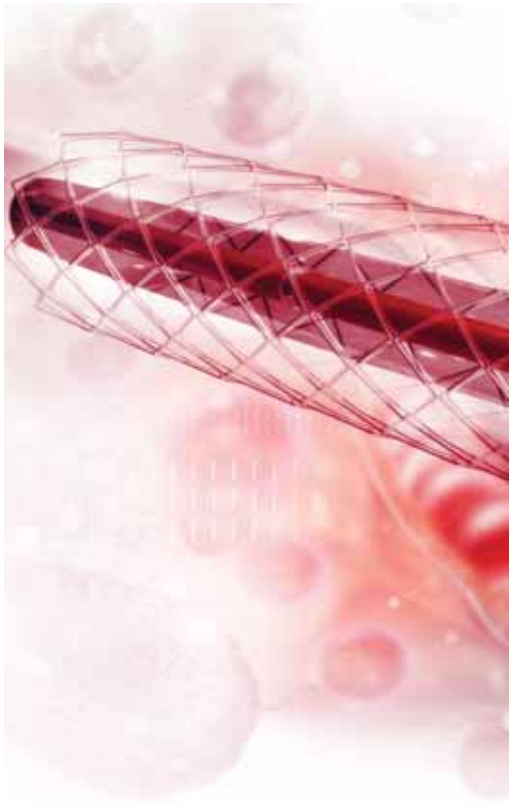
Treatment parameters are set and each therapy is uploaded to the server automatically, in near real time. The technology enables clinicians to review, change and manage patients' therapy remotely. The clinic's dashboard shows who has had dialysis, which patients have had problems and what the problems were for individual patients. It also shows how the prescription compares to their delivered dialysis session. It also records critical information and any alarms that occurred during treatment.

The two-way connectivity provided by Sharesource lets clinicians change the device's default settings such as prescription parameters, dwell time and total therapy length. This enables more timely intervention by clinical teams, optimising the patient's therapy. Having a two-way connection to the patients' home therapy instils greater confidence in patients, carers and healthcare professionals. The technology gives valuable reassurance to new patients who may have previously seen in-centre treatment as the safer option:"my doctor can keep an eye on me".

"My doctor can keep an eye on me"

Ultimately, if delivered successfully and supported adequately from the top down, the advances in medtech can signal a real step-change in the quality and efficiency of care which the NHS can offer to patients. Medtech can support stemming the tide of ever-expanding hospital clinics. It can be a liberator for patients, because it gives them control, and can be a liberator for providers because it allows them to redistribute their time and resources more effectively. Increasing the opportunity for patients to receive their treatment and care at home is not a dereliction of duty, it's not cutting corners. Rather, it is a chance to deliver an improved experience for the patient at the same time as managing the demands on a heavily pressurised healthcare system.

UK1/MG234/17-0011 DECEMBER 2017



Manufacturing a miracle: how to beat the stroke crisis

Game-changing medtech treatments such as mechanical thrombectomy require investment and government support, argues Lyn Brown MP, chair of the APPG on thrombosis

As it approaches its 70th anniversary, the National Health Service – one of the United Kingdom's proudest assets – is being pushed to its limits by the combination of an ageing population, the rise in those living with many long-term conditions, continuing difficult funding settlements and over stretched workforces. If the NHS is to continue to be a world leader, whatever the hue of the government, it must harness the power of innovative technology to prevent avoidable harm and reduce long-term costs. Tackling the harm of dangerous blood clots is a good place to start.

Clotting is part of the body's natural healing process, but when blood clots form in the veins or arteries, they can cause debilitating illness and even death. Strokes are the fourth biggest killer in the UK, claiming the lives of over 40,000 people per year. Those who survive are often left with debilitating and, put bluntly, costly disabilities. Strokes cost the NHS around £3bn per year. In addition, they cost the economy £4bn in lost productivity by increasing disability and placing a greater burden on our millions of voluntary carers.

Last April, NHS England announced that it will begin commissioning mechanical thrombectomy for stroke in a select number of neuroscience centres. Mechanical thrombectomy is a revolutionary procedure in which stroke-causing clots are physically removed from the artery to the brain using a special device. If the procedure is performed quickly, within six hours of symptoms beginning to show, it significantly reduces the risk of disability or death, and increases quality of life by restoring blood flow to the brain and limiting organ damage. It has an 80-90 per cent chance of opening up the blocked artery, compared to 30 per cent with clot-preventing drugs like warfarin. Patients who have been left paralysed or unable to speak can recover life functions like these in a matter of minutes. It is frankly miraculous.

NHS England anticipates that 8,000 stroke patients could benefit every year. However, delivering this treatment on a widespread 24/7 basis requires investment to expand the number of interventional neuroradiologists able to

perform the procedure. Currently, there are only 90 in England. Considering the long-term costs associated with stroke, it is likely that this investment would pay itself back over and over: a real bonus for those concerned only with the financial bottom line.

Blood clots are also a major cause of death and preventable illness in the form of venous thromboembolism, or VTE. Hospital patients are at particular risk of VTE, because they are unwell which makes blood "sticky" and often immobile, which makes VTE prevention key to patient safety.

Twelve years ago, the Healthcare Select Committee reported that an estimated 25,000 deaths due to hospital associated VTE each year could be prevented if patients at risk received adequate prevention. As chair of the All-Party Parliamentary Group on thrombosis, and someone with personal experience of health conditions related to thrombosis, I'm proud to say that the NHS has come a very long way since that report and NHS England leads the world in preventing such clots by using a mandated system of risk assessment on admission. Since it was introduced in 2010 there has been a nine per cent reduction in death due to such blood clots.

The main challenge now is expanding access to preventative treatments that are truly appropriate to each patient's needs. This includes both newer anticoagulant medications and innovations in coagulation self-monitoring. Anticoagulants work by slightly thinning blood, thus slowing or decreasing the body's ability to produce blood clots. For over 50 years, the main anticoagulant used for the prevention of conditions involving dangerous clots has been warfarin. Currently, there are over 1.2m people on warfarin therapy in the UK.

However, warfarin has serious disadvantages. It requires care with diet and alcohol and the blood levels vary from day to day and person to person. How a patient responds to it depends on factors including genetics, and the presence of other drugs. For this reason, warfarin requires frequent monitoring of blood clotting times, so that doses can be adjusted. Despite this there is still a high rate of bleeding.

For these reasons, direct oral anticoagulants (DOACS) have been developed that have fewer side effects, cause less bleeding and have predictable behaviours in blood so regular monitoring is not required. That saves a lot of time, energy, and discomfort for patients and frees up precious time for medical staff. As it happens, I have personal experience of the improvement that DOACS represent. My father had to take warfarin for much of his later life and it caused him real difficulties, whereas I now take a newer drug called rivaroxaban, which has far less impact on my life.

The complication is that DOACS cost a lot more for each course than warfarin, but the costs of looking after someone on warfarin and dealing with them if they bleed is often forgotten. This can make them a target for short-sighted commissioners looking to save money. Those cost savings are small over the longer term, because of the extra clinician time and other resources taken up with constant monitoring of warfarin, and because of the extra negative side effects. For these reasons, the newer anticoagulants are another medical innovation that our NHS simply can't afford not to invest in.

This doesn't mean that warfarin is obsolete. It is still a lifeline for people who have a prosthetic heart valve, or with kidney problems, as DOACS are not licenced for use with these conditions. Here, too, there are new ideas that can improve care and save the NHS money.

I mentioned that warfarin requires intensive monitoring. Most patients go to their GP's surgery or hospital anticoagulation clinic for this monitoring, through a blood test. An alternative option is for patients to self-monitor, using special devices called coagulometers. This can be done from the comfort of the patient's home, with the test results reported by phone, text or email, or even sent to their clinician automatically. Self-monitoring has been found to cut the risk of stroke by half, and the risk of death by nearly two-fifths, and it saves time for clinicians. Despite this, self-monitoring devices are not available to most people on the NHS, and access is now even being cut in some areas by bean counters that do not see the bigger picture.

I personally believe the government should review the long-term costs to the NHS associated with blood clots and produce a national strategy to harness innovation for the benefit of sufferers of both stroke and VTE: a really welcome 70th birthday present for our NHS.

SHUTTERSTOCK/CRYSTALLIGHT

A revolution in the palm of your hand

As society gets smarter, so too must medical technology, writes Mike Standing, global LSHC EMEA life sciences and healthcare consulting leader at Deloitte

The Internet of Things (IoT) and the increasing capacity and capability of smartphones, tablets and bio-sensing wearables, are having a profound impact on society as a whole – changing consumer expectations, behaviours and demand. In response, industries are constantly adapting and innovating from contactless and online banking services to smart energy meters and driverless cars. As far as health and social care are concerned, the advent of initiatives like the "digital hospital", "connected home" and virtual consultations are helping to ensure the right care is delivered in the right place at the right time.

Our 2015 report, *Connected Health: how digital technology is transforming health and social care*, found increasing evidence that healthcare was approaching a tipping point in its digital revolution. It highlighted numerous examples of emerging practice which illustrated the potential power of technology-enabled care (TEC) as well as some of the concerns and barriers to its use. These include the ability to properly diagnose patients remotely without physical examinations, the loss of important emotional support provided by face-to-face interactions and regulatory concerns over data privacy, security, ownership and liability.

Despite these concerns, the prospect of a more digital healthcare service has gained traction across the United Kingdom. This was highlighted in 2015 in the NHS's Five Year Forward View and the introduction of some "new models of care" or "vanguards", all of which are underpinned by new digital technology. There is also a growing private market offering people access to doctors (that is more advanced than online booking systems) at convenient times, via virtual online chat/video rooms and interactive health apps accessed from a smart device or computer. Albeit most services are currently provided through out-of-pocket subscriptions, insurance companies, commissioners and providers are starting to commission such services to help alleviate demand.

As a result, people are using virtual consultation services in increasing numbers, attracted by the perceived

benefits, including: minimising travel; being able to see multiple patients quickly, such as residents in nursing homes; convenience in booking consultations to times that suit your life style; improving networks between doctors, patients and other healthcare professionals; empowering patients to take more control of their own health; and potentially reducing costs to the healthcare service (though evidence on costs is still very mixed).

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Global estimates suggest the virtual consultation market will have grown from 19.7m consultations in 2014 to 158.4m by 2020. The virtual consultation market has been particularly successful in the United States largely due to the dominance of favourable reimbursement by payers and the convenience the service offers patients who may sometimes be large distances away from their "local" practice or teams. It is also a rapidly expanding market in low-income countries. However, countries with mature healthcare systems with relatively costly infrastructure, such as the UK, are still struggling to improve the scale of adoption, due to ethical and regulatory barriers as well as concerns about data security and affordability.

When we published our repor, we focused predominately on how technology could improve people's access and ability to self-manage and develop better communication and understanding between patients and healthcare professionals. One issue we found difficult to quantify was the current size of the digital health market in the UK. However, in September 2015, our colleagues in Monitor Deloitte published a report, *Digital Health in the UK: An industry study for the Office of Life Sciences*, acknowledging that digital health innovations are necessary for the future of efficient healthcare service delivery. It noted that if the identified market challenges can be resolved, then digital health advances have the potential to help increase access, decrease healthcare system costs and improve health outcomes.

Overall, the report considers the UK to be well positioned in many elements of digital health with the potential to grow into a global leader. It analysed four inter-related sub-sectors:

• Telehealthcare: comprising telecare which provides care and support at a distance based on fixed line and analogue technology, which is a mature market in the UK and is expected to grow at a steady rate (a compound annual growth rate (CAGR) of four to five per cent to 2018). Meanwhile, telehealth – the remote exchange of clinical data between a clinician and their physician – is a faster growing and more dynamic market. However, disappointing results on the evidence on cost-effectiveness from a large scale telehealth trial, has impeded adoption with concerns over reimbursement mechanisms and clinical buy-in, undermining growth forecasts.

• M-health, or health–related apps and wearable devices, is an emerging market with the m-health apps sub-sector growing rapidly at a CAGR of around 35 per cent in the UK and 49 per cent globally. Although there is a high consumer demand for m-health apps, monetising them in the UK is difficult due to a lack of clear reimbursement models. The introduction of a hospital tariff payment system in 2017, for a small number of approved health apps, is expected to change this situation.

• Health analytics is an emergent and fast-growing market with a CAGR of 24 per cent up to 2018. Barriers include the development of relevant skills and capabilities alongside data access challenges and governance issues. The UK, however, has a unique environment to develop the health analytics industry, combining the large volume of data being generated by digital health solutions with NHS medical records and investment in genomics. Continuing to build the necessary infrastructure to access and use data will be key to fulfilling its potential.

• The largest (and slowest growing) of the four sectors in the UK is digital health systems, including health records and e-prescribing, the market for which has an estimated total size of £1.3bn. Implementing the use of EMR platforms and investing in interoperability is needed if the market is to reach its potential.

Digital health has enormous potential to improve access to healthcare. Wide-scale adoption also has the potential to improve the efficiency, productivity and cost effectiveness of healthcare delivery, but only if used as a lever to transform delivery systems. Health analytics, in particular, are already transforming our understanding of treatment pathways and patient outcomes. The future is bright; the future is digital.

Digitising the diagnostic process

Neil Mesher, CEO of Philips UK and Ireland (UKI), explains how healthcare technology can be used to shorten referral times and improve capacity

SHUTTERSTOCK/MONKEY BUSINESS IMAGES

Tackling cancer is now a national priority. It affects over 14m lives each year and accounts for around 15 per cent of all deaths[1]. Newly detected cancer cases and the number of people living with cancer are on the increase, and in 2011 this disease eclipsed cardiovascular disease as the top cause of death in the United Kingdom[2].

Improvements in cancer awareness mean more and more people are coming forward for investigative testing, and over 1.5m urgent GP referrals for suspected cancer were made in 2016 – an increase of 50 per cent in the last four years[3] . In addition, as people age their risk of living with multiple healthcare conditions increases, so any design of cancer services should take into account the management of the elderly patient population.

The Cancer Strategy for England sees late presentation and a lack of early, definitive diagnosis as the key cancer-related challenge faced by the health service[2]. With diagnosis at an earlier stage consistently associated with better survival, the potential gains are clearly significant. Technology has a key role to play in making earlier diagnosis a real and tangible possibility.

Shortening referral times

A perfect storm of increasing demand, capital squeeze and workforce deficits, have led to an inconsistency in waiting times from referral time to actual diagnosis; this is exacerbated by the majority of diagnoses taking place within the hospital system. As a leader in diagnostic solutions, Philips is working with a number of public and private partners to deliver a solution that will drive efficiencies and introduce additional capacity into the system. Multidisciplinary Community Diagnostic Centres will offer patients access to dedicated facilities within the community setting helping to alleviate some of the demand on hospitals by

efficiently and effectively providing earlier diagnosis using NHS protocols, and ultimately better survival rates.

Improving diagnosis capacity

Pathology plays a critical role in the detection and diagnosis of a range of diseases, including cancer. In the past 40 years the number of new cancer cases has tripled. However, the quickly growing demand for pathology tests has not been matched by the number of highly trained specialists entering the field[4].

Digitisation offers enormous opportunities. Operationally, preparing a tissue sample for review is a complex process. Technology such as Philips IntelliSite helps pathologists to organise and review a large number of cases quickly and with ease. Listed as one of the 12 most important healthcare innovations for 2017 by *Popular Science*[5], IntelliSite enables scanned slides to be accessed digitally and reviewed by specialists from anywhere.

What is more, digitisation can also improve accuracy. Automation of the exchange of information reduces manual errors. They can also be shared with experts anywhere in the world at the press of a button, creating the option of a second opinion. In addition, the computational algorithms used within the Philips IntelliSite solution can distribute cases to the right experts to prioritise workflow.

The East and South Yorkshire Pathology (EASY Path) Network was initially set up between Sheffield Teaching Hospitals NHS Foundation Trust, Hull and East Yorkshire NHS Trust and Philips to prototype a new model of histopathology service delivery, utilising digital pathology. It is now exploring the feasibility of including other organisations to create a virtual distributed network of specialist histopathology teams across the boundaries of the individual acute trusts in the region.

Removing information silos

Technology holds the key to bringing together all key patient and medical data in one location, so that clinicians have a clear and intuitive view of a patient's status across the pathway – from early detection to diagnosis, treatment and homecare. Philips IntelliSpace Oncology is a new cloud-based cancer decision support solution that uses Artificial Intelligence to ensure seamless data integration across specialties and locations. Available through a single-view dashboard, IntelliSpace Oncology offers powerful data mining and analytics capabilities that integrate a hospital's cancer patient records. This means clinicians have easy access to an extensive patient database, enabling them to compare their patients' data with that of other patients who have similar characteristics to gain data-driven insights into treatment choices and the effects those choices have on patients' quality of life.

From a patient perspective, they will need to make many difficult choices about their treatment path and care, so having the ability to view all the relevant data is key to helping them make solid decisions along with their doctor. In fact, according to the Future Health Index, an international report commissioned by Philips, more than half of the UK's general population believe the use of connected care technology made their cancer experience better. IntelliSpace Oncology enables deeper patient involvement through personalised educational materials, access to status dashboards, patient-reported outcomes and satisfaction surveys, along with family and care giver support.

At Philips, we believe in seamless care – partnering with healthcare systems such as the NHS to unlock the collective potential of data, technology and, most importantly, people. Technology can cut through complexity to improve productivity and organise care around people so everyone receives the right care, in the right place, at the right time. As a result, Philips is committed to supporting the NHS as it moves towards adopting and integrating digital solutions and technology to support diagnosis and treatment.

For more information, please visit: http://philips.to/nobounds3

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Citizen engaged: empowering people through technology

The UK must foster a world leader status in the life sciences industry, says Malcolm Lowe-Lauri, executive director at Cambridge University Health Partners

World leadership from the United Kingdom is a term of many different uses and perspectives when it comes to life sciences. To the industry this means pre-eminent invention, innovation, sales and growth. To government it is investment, export, tax revenues and employment. To our universities and their research partners such as the research councils and charities it is successful partnership and (financial) support in discovery and development. To patients and providers of health services it is a matter of ready access to the best available diagnosis and treatment, preferably on an affordable basis. Meeting these requirements simultaneously has never been easy for the UK. The regular industry complaint, for instance, is that they have to research here and sell elsewhere. So can we really be world-leading?

To the UK government's credit, and with Brexit in the background, it has launched two highly appropriate initiatives. First, its Life Sciences Industrial Strategy covers many of the themes essential for world leadership – digital innovation, R&D capability building, new approaches to life science research, fiscal support (although some EU countries would say we already do this through, say, the patent box). Second, its acceptance of the recommendations of the 2016 Accelerated Access Review – such as creating regional innovation exchanges and tasking the 15 Academic Health Science Networks – signal a seriousness about identifying and supporting the distribution of effective life sciences innovations into the market.

Perhaps understated in these reviews, but strongly emphasised by economists reviewing city clusters, is the importance of place. We have some impressive examples of this – Cambridge, Edinburgh, Leeds (for medtech), London, Oxford. The Cambridge cluster alone is home to some 431 life sciences companies with a current growth rate in turnover of over 33 per cent. There is an interesting mixture of planning, scientific excellence and history in how these ecosystems have evolved. Johnson & Johnson has a long-standing local partnership with health services in Leeds for its orthopaedic research.

The Cambridge Biomedical Campus is one of the largest centres of medical research in the world

Cambridge is home to 431 life science companies

CAMBRIDGE BIOMEDICAL CAMPUS

To foster world leader status on a sustainable basis requires a systematic approach to place, from government support, through scientific excellence, high-class clinical services and space to develop. In essence this will turn accident into design. That in turn will direct the life sciences industry to core clusters. Having the right place will help the industry redefine its relationship with science and health with more embedded R&D and access to clinicians and data. That means redefining its business models and developing products with greater certainty of reaching the market. This is about at last taking advantage of a public payer, public provider environment. We know investment can be attracted to this on a sporadic basis, for example AZ moving almost in its entirety to Cambridge.

All this needs proper differentiation. It is no help distributing government support for this on a fair shares basis. Investment will go where commercial due diligence says it should. But core clusters do not have everything, and they must exercise national responsibility. Each must develop a clear portfolio of partnerships, networks and alliances to science and service excellence in other parts of the UK, to manufacturing bases in economic development zones with lower labour costs, and to support activities, for example for system and data support. The Cambridge cluster for instance would want to be closely linked to research into aging in Newcastle and to precision medicine in Manchester. There are already strong links planned through the Cambridge-Oxford rail link and the growth of the Cambridge-Stansted-London corridor.

For a place like Cambridge there is also a regional responsibility and opportunity in the east of England. While Cambridge itself is a full employment city with a very high quotient of knowledge-based industries, the nearby Fenland towns enjoy high employment but in processing jobs which are likely to be superseded by robotics. At the same time educational attainment is low. This is already under consideration through the Accelerate East group of HEIs, local authorities and secondary education providers. The Technology Institute proposition in the government's Industrial Strategy would increase the STEM-qualified teenage population, give this group access to "Cambridge jobs", and secure the long-term economic prospects of the region. This can also go some way to address the vacuum in scientific and technical skills which may flow from Brexit.

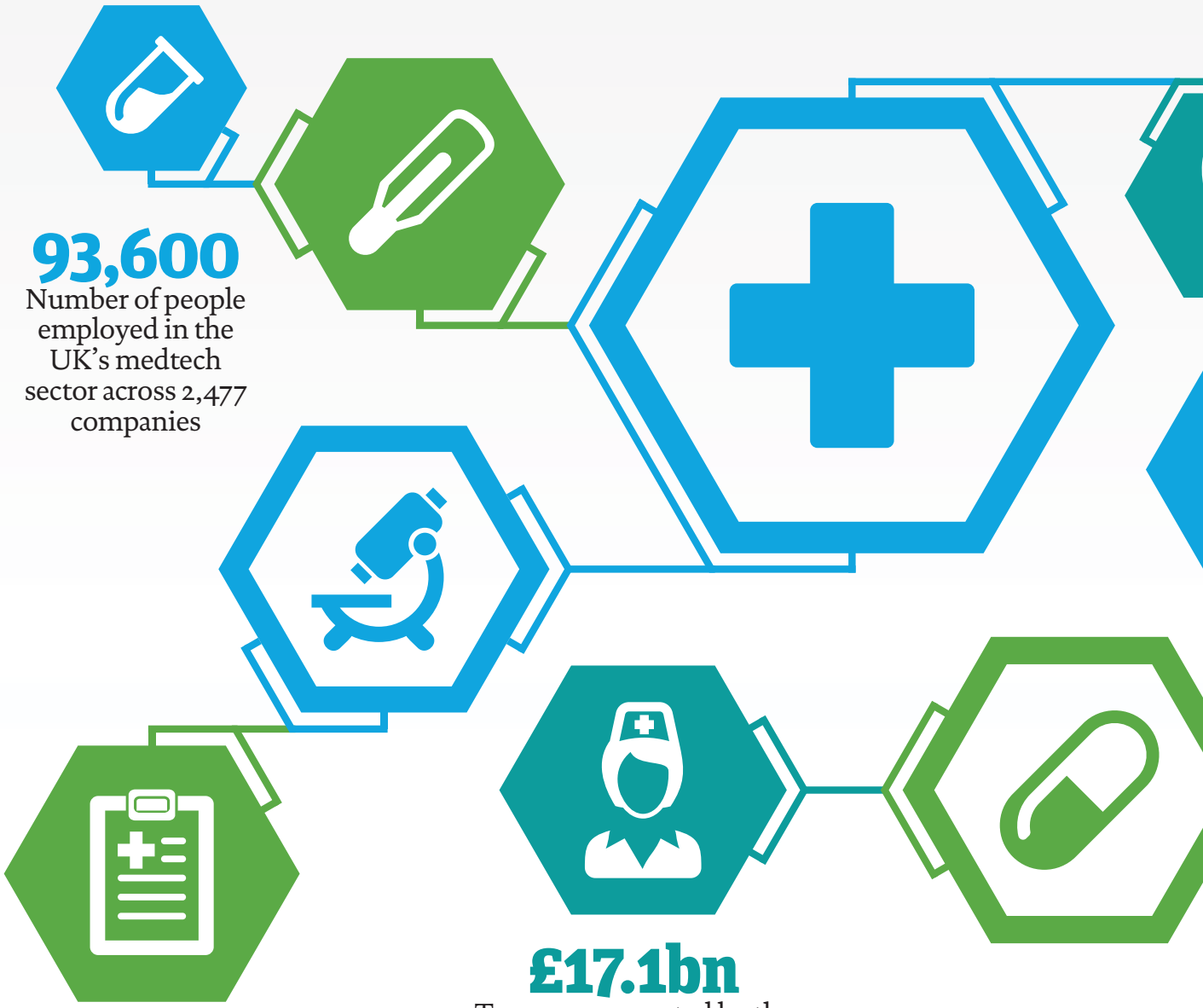
We have touched on academic, industry and economic thoughts on world-class sciences but what about health services and their patients, relatives and carers? A public health system understands innovation. But at the operational level it is trapped in crowded emergency departments, declining wait times for scheduled care and fiscal instability. Innovation is simultaneously interesting and threatening. So the gold standard for world-class would be subtractive as opposed to additive innovation. Can innovation – new goods and services – contribute to a reduction in the demand for services, or easier delivery of demand, or even radical change in the delivery system, away from institutions in favour of self-management by the empowered patient? Industry has to step up here.

There are further signs that the wider medtech industry understands the need to move from selling kit to integrating their R&D approach into providers to create two benefits. First, a solution which is co-produced and thus more implementable and generalisable, second, a reworking of the firms' business models to cheapen dramatically its R&D processes. This must extend into kit which redraws the boundary between healthcare and self-care.

A tech and medtech partnership also provides data handling expertise which could help in the development of digital innovation hubs. Understanding the Philips partnership with Amazon for instance would bring tremendous insights into consumer identification and motivation from which the NHS is currently a long way. But if we create an environment which transforms the citizen role at the same time as it harnesses UK discovery and grows the industry, that would certainly be world-leading.

MEDTECH BY THE NUMBERS

What is medtech worth to the wider UK economy?



93,600
Number of people employed in the UK's medtech sector across 2,477 companies

£17.1bn
Turnover generated by the medtech sector in 2016-17

12,400
Number of medtech-related patent applications filed to the European Patent Office in 2015

11%
Annual employment growth in the UK medtech sector

500,000
Number of medtech technologies currently available worldwide

Mobilising mental health

Simon Wright, Daisy Group's head of PR, communication and engagement, explores the advantages of community-based assessment teams and electronic patient records when treating mental health conditions

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X-ray. Steel knees. Pacemakers. For decades technology has blazed a trail in the furthering of physical wellbeing. Now, innovative providers of cutting-edge mental healthcare are harnessing its limitless potential to drive up care quality, and ultimately save lives.

Life for all of us can be hectic and fast-paced. Work, family, and the highs and lows of everyday life present a range of challenges most of us take in our stride. But sadly – for people with a mental health issue – life can go suddenly, and badly, wrong.

For the majority, episodes of crisis occur in the community. Drug and counselling regimes are, by their very nature, tools that more often contribute positively to the management of mental health conditions rather than provide a permanent cure. When, for whatever reason, those regimes falter, for many timely help can be too inaccessible to prevent a serious outcome.

Digital technology is being used increasingly to help vulnerable service users in one area of the United Kingdom. At Sussex Partnership NHS Foundation Trust, technology is being used increasingly to try and help frontline clinicians respond to crisis right where it's happening. Here, the use of tablets and smartphones is being explored to help specialist community-based teams assess mentally ill and vulnerable people on the street, and in a host of other challenging environments and locations.

Members of this Street Triage Team – who buddy with police officers – are connected permanently to the Trust's Electronic Patient Record (EPR), giving them secure, 24/7 access to all the information they need to embark on the appropriate course of action, from identifying missed medication and outpatient appointments, to benefitting from potentially critical risk assessments. Not only is on-the-spot delivery of care driving up the quality of clinical outcomes, but the service users in question often avoid an inappropriate encounter with the criminal justice system – improving their experience of care.

For those people in the most acute need, this is significant. "When you witness it first hand, it's easy to understanding the dramatic impact that real, meaningful digitisation can have on 21st century healthcare," says the Trust's director of IT Karl Goatley. "But, for the NHS, delivering it can be really difficult. With money tighter than ever before, there's a risk that investment in IT comes lower down on the priority list. But at Sussex Partnership, it's seen as a fundamental part of continuously improving care for patients, families and communities. It isn't just about going paperless per se – it's about digitisation of those paper records. We plan to integrate our systems and share information which is critical to quality patient care, across both health and social care settings. We are maximising the power of digital technology in order to do things better. One of our values at Sussex Partnership is 'embracing change', which involves being bold, innovative and disciplined about making use of our resources to continuously improve. That's the essence of our transformational IT programme."

And that's the thing about technology and healthcare: together, they have always been a fusion of boldness and innovation (as well as lots of vision, skill and application).

Sussex Partnership NHS Foundation Trust's digital strategy is powered by Daisy Group, the UK's leading IT, communications and cloud services provider. For more information, please visit: www.daisygroup.com

How does the UK solve the innovation puzzle?

The government should help SMEs to reward their advances with quicker mass adoption by the NHS, according to Andy Mears, managing director of Deltex

Companies can seek grant funding or tax breaks ranging from R&D credits to the Enterprise Investment Scheme for risk investors. The Department for International Trade has helped us at Deltex get exports going in many countries. However, the great unmet challenge comes in getting the National Health Service to actually adopt innovative products even when they know how good they are.

The NHS has long been committed to driving the uptake of innovative medical technologies. Academic Health Science Networks (AHSNs) and the NICE Medical Technologies Evaluation Programme (MTEP) were primarily created to help companies, especially the United Kingdom's SMEs, who have clinically supported innovation, achieve implementation at pace and scale.

Sequential innovation ensures that each clinical generation can improve standards of care for their patients. Many solutions address the very problems that healthcare systems face: more and older patients stretching limited financial resources. Innovations that improve outcomes and shorten length of hospital stays combine to deliver reduced total healthcare costs. Theoretically, then, it's a no-brainer, but in truth it's really not that simple.

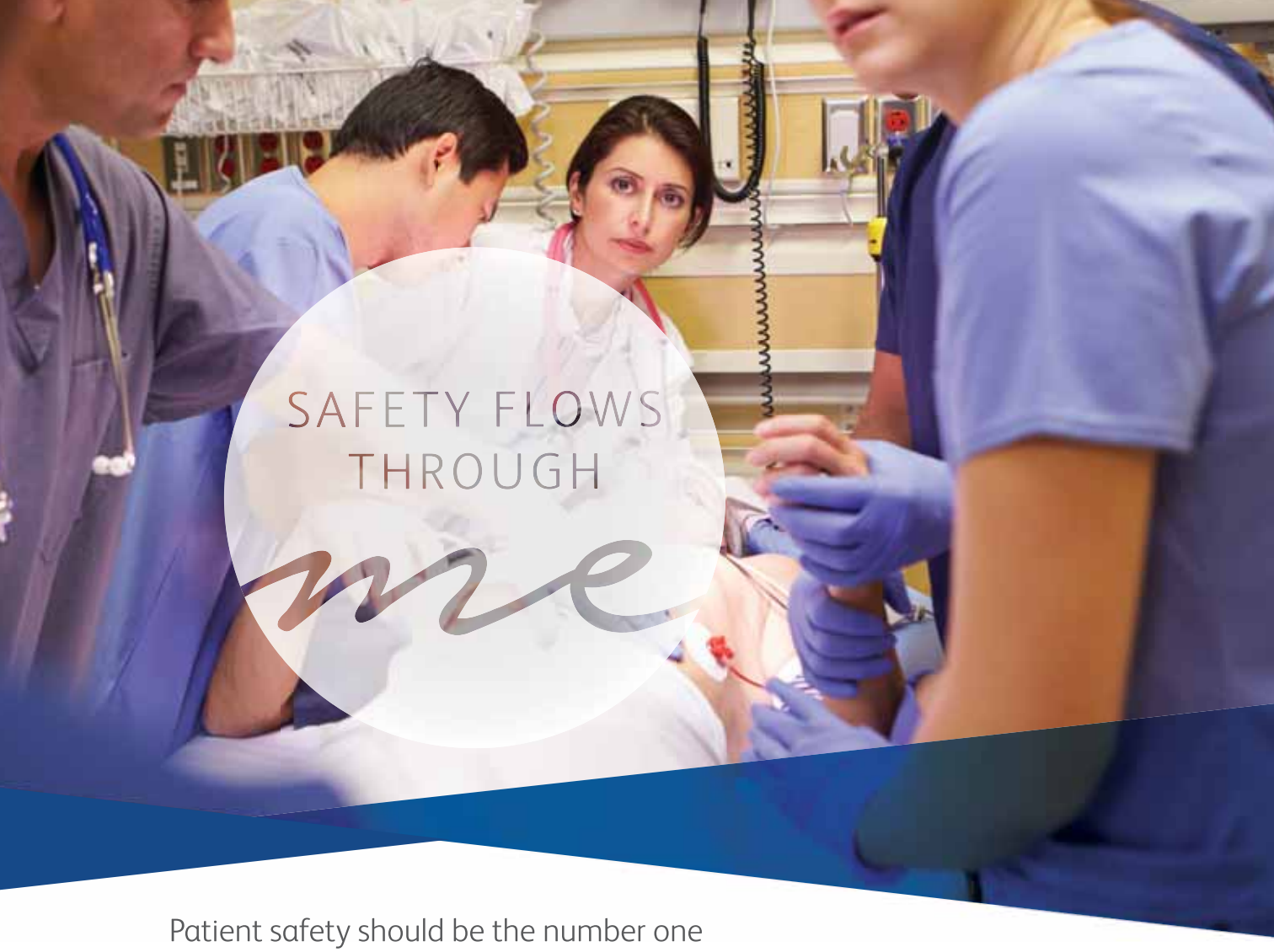
Deltex exemplifies the innovation versus adoption challenge. Deltex has pioneered Oesophageal Doppler Monitoring (ODM), a haemodynamic monitoring technology which enables anaesthetists to ensure that surgical patients benefit from accurate, real-time management of parameters that directly influence the outcome of the procedure. ODM reduces length of stay by halving post-operative complications which are expensive to treat and knock years off patients' remaining lifespans. ODM saves money, it frees beds, and it improves the patient experience. It's the definition of win-win and the independent evidence agrees.

The possibilities of widescale implementation of ODM were recognised early with a specific NICE approval (MTG3), selection as one of six "high-impact innovations" to be adopted by the NHS and even a report on BBC News. However, neither ODM nor haemodynamic monitoring in general are yet practiced as "standard of care".

Multiple factors act as drags on uptake. For example, inadequate data and metrics on current practice make it very difficult to clearly define a benefit of any innovative technology. Add to this a lack of clearly defined adoption pathways, unfocused clinical leadership, silo budgeting, misaligned commissioning and general financial constraint.

Deltex is responding with further innovation. Its new "TrueVue" system means its ODM monitor can now be used on all patients, not just those in surgery or intensive care. This opens the door to broader adoption and early stage triage monitoring, with therapeutic intervention focused on those that will really benefit from it. Even low-risk patients can rapidly and covertly become high-risk, with significant adverse consequences, making early detection the safest option.

So what can the government do to ensure the NHS enjoys the benefits of SMEs' contributions? AHSNs are now responsible for fast-track innovation adoption, but most would agree this process remains disjointed, with varying levels of success and limited national impact. The challenges remain to define implementation pathways clearly at the clinical level, provide adequate investment in resources, and reward success.



Patient safety should be the number one priority at all stages of the patient journey – a culture of safety must flow through all healthcare organisations.

BD – helping to protect patients and reduce harm

BD – your partner in making this happen

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