

Better with age

Is the ageing population improving the NHS?

Personal account

The pioneering treatment that could save my child

The experts talk

Why it's possible to save lives whilst saving money

INNOVATIONS IN HEALTHCARE

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TIPS FOR

THE FUTURE OF MEDICINE

Racing forward: The latest technological advancements helping to improve treatment and patient care

Curbing infection
How the NHS are trying to eradicate disease



Stem Cells
Prof Anthony Hollander on regenerative medicine



PHOTOS: ISTOCKPHOTO



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CHALLENGES

The NHS, like so many other public services today, faces severe challenges which could seal its future. Will it be glass half-empty or glass half-full asks Lynne Maher, head of the Innovation Practice Team at the NHS Institute for Innovation and Improvement

Crisis or opportunity for action - a defining moment for the NHS

Recent announcements about the need to cut costs and increase quality in the NHS have created a climate of uncertainty. It is now time for decisive and intelligent action, which will demand a radical rethink about how we provide healthcare services.

The NHS has to make some critical choices about the way it approaches its future. The sense that everything is about to change has not been helped by recommendations to axe jobs in order to achieve financial savings. The ambition of the NHS is to provide high-quality care for everyone: this will be much harder to achieve if we focus on cutting people and services. This 'slash and burn' approach may be traditional but it rarely achieves longstanding improvements in quality.

Moving forward

1 There are many examples worldwide where lack of resources have resulted in a new resourcefulness, determination and innovation from the workforce. The last

60 years are a testimony to British healthcare innovation - consider the first hospice, the portable defibrillator, x-ray scanners and penicillin. New technologies, combined with new workforce practice, have revolutionised surgical care with particularly groundbreaking work in stem-cell research, cardiology and orthopaedics.

Cutting costs

2 There is a massive opportunity for the NHS to achieve high-quality care at reduced cost through practical innovation. There is a need to think radically. We must work more closely with patients, healthcare teams and other industries to learn about new methods of delivering high-quality personal services at a sensibly reduced cost.

Is this an impossible dream? No, it's already happening. The enthusiasm of frontline staff who are already thinking differently about the way they provide healthcare is palpable and has already achieved transformation, resulting in more personalised, safe and convenient servic-



Lynne Maher
NHS Institute: Innovation and Improvement

MY BEST TIPS

Cultivate your staff

1 Leaders to support their staff and keep a mindset of opportunity rather than crisis. Use innovation for improvement rather than 'slash and burn' approaches. Cherish and support NHS staff as our most important asset.

Be brave

2 Think the unthinkable. Create meaningful relationships with service users and really understand their experience of care. Seek out ideas from others including industries outside of health. Innovate now to secure future sustainability.

es with cost savings found through waste reduction and more streamlined processes.

The NHS Institute's Productive Ward programme is an excellent example of how methodologies learned from manufacturing organisations can be translated for use in ward situations, resulting in many improvements and saving thousands of pounds. Combining the expertise of external companies with internal initiatives has allowed the full reach and innovative power of commercial healthcare technology to be implemented within the NHS, with many pioneering solutions introduced from other sectors as well as those developed for healthcare.

If we are to achieve the long-term sustainability of our health service we need to focus on innovative practice in the here and now - but also for the future. This means that we need to take action on the real and increasing challenges that we will continue to face in the future, such as the rise in obesity and the needs of our aging population.



WE RECOMMEND



Martin Rothman
The cardiac interventionist talks innovation, teamwork and self-belief

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"We are all motivated to care for the patient better."

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1. The NHS' plan to improve healthcare whilst lowering expenses.

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MEDIA PLANET

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INNOVATIONS IN HEALTHCARE,
2ND EDITION, SEPTEMBER 2009

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Distributed with: The Sunday

Telegraph, September 2009

Print: Telegraph Media Group

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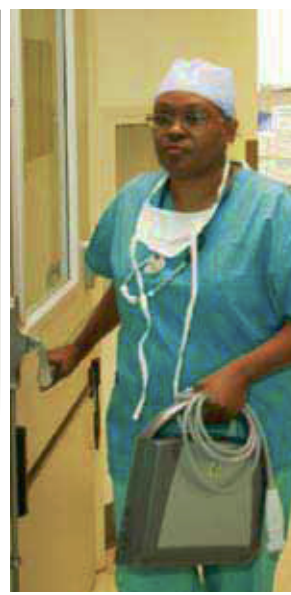
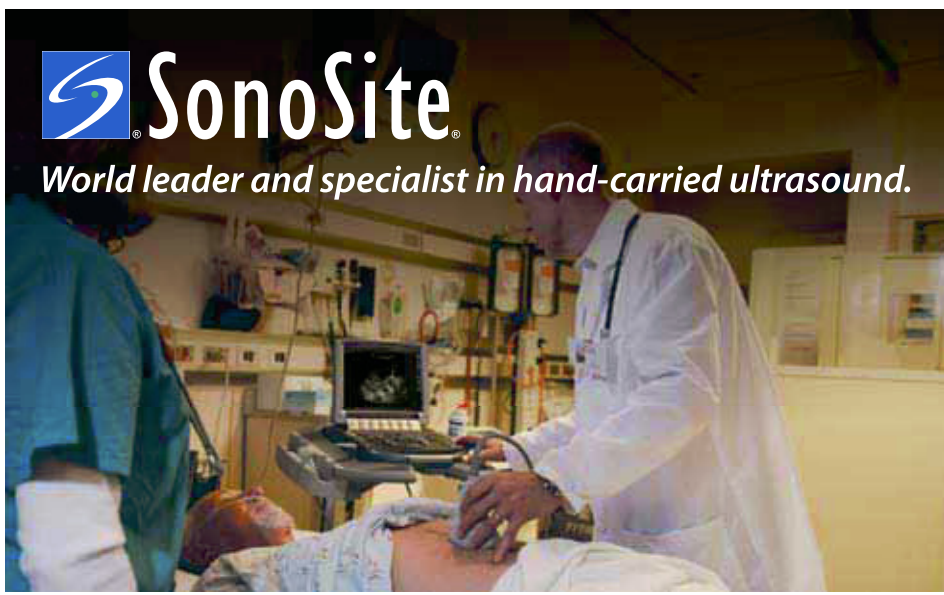


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The changing face of ultrasound and its growing role in patient care

Think of ultrasound and an image of a pregnant woman having her unborn baby scanned would pop into most people's minds. However, innovations in technology are turning this traditional view of ultrasound on its head. Now, small, laptop-sized, hand-carried ultrasound systems from SonoSite, the recognised market leader, are now well-established as everyday tools in outpatient clinics, operating theatres, emergency departments, intensive care units, and even in some GP surgeries.

SonoSite created and developed the original hand-held ultrasound system (first sold in the UK over 10 years ago), and is the world leader and specialist point-of-care ultrasound manufacturing company. The systems provide clinicians with the critical information they need literally at the point-of-patient care, and as SonoSite ultrasound systems were originally designed for use by clinicians on the battlefield, the SonoSite family of products are extremely durable and robust and backed by the ultrasound industry's only standard five-year warranty.

Point-of-care ultrasound fits in well with the medical and surgical management of individual patients, offers a cost-effective service to NHS trusts and provides quicker and safer results. It plays a very important role in reducing patient transfers around the hospital, cutting the risks associated with moving very ill patients as well as helping in the fight to minimise the spread of infection. At the same time, this has freed up space, time and staff in radiology departments, cutting waiting times and allowing sonographers to concentrate on specialist applications requiring their expertise.

Taking centre stage in theatres

In surgery, the expanded role of ultrasound has been driven by NICE (National Institute for Clinical Excellence) guidelines recommending that ultrasound be used to guide the insertion of central venous catheters. Numerous clinical studies have shown that ultrasound guidance increases the accuracy of interventional procedures and reduces associated complications. Since establishment of the NICE guidelines, use of ultrasound has spread rapidly through many medical specialities such as the anaesthesia community, where it offers easier,

quicker and safer positioning of intravenous lines and nerve blocks. Ultrasound guidance of nerve blocks allows anaesthetists to administer local anaesthetic with such accuracy that more and more surgical procedures can be carried out as day cases – far better and safer for the patient, and considerably reducing costs for the hospital. Patients having a local anaesthetic nerve block, for example for hand surgery, suffer none of the risks or side-effects associated with a general anaesthetic, can go home the same day and often report fewer problems with post-surgical pain control. No wonder then that ultrasound is now the guidance method of choice for many anaesthetists, a change no doubt aided by the robustness and ease-of-use of instruments like SonoSite's **M-Turbo**[®], **S-Nerve**[™] and, more recently, the **NanoMaxx**[™] ultrasound system.



Built to withstand Accident and Emergency

Robustness and simplicity are also major considerations in the Accident and Emergency setting where portable ultrasound has found roles in needle guidance and assisting detection of fluid collections in the abdomen of blunt trauma injured victims. Rapid bedside ultrasound is able to provide clinical information not available by physical examination

alone, offering better insight into the condition of trauma patients, and allowing immediate and potentially life-saving action to be taken without delay. Although many hand-carried ultrasound instruments are suitable for use in emergency medicine, focused systems – such as SonoSite's **S-FAST**[™] tool – provide specially tailored features designed for just a single discipline. By removing unnecessary or unwanted features, these systems put the required functions at the user's fingertips with the press of just two buttons.

Patient care is the primary concern

With simple, robust and cost-effective equipment like this available, it's no surprise that point-of-care ultrasound is now being considered as an option in all manner of disciplines throughout hospitals, outpatient clinics and even further afield. Some GPs already have their own systems for use in limited applications, and this year sees the introduction of a national screening programme to identify abdominal aortic aneurysms (AAAs), where point-of-care ultrasound offers an excellent first line investigation. The service will be offered initially by approximately 300 centres across the country, and will be performed using point-of-care systems.

Point-of-care ultrasound is now a powerful front-line medical tool, routinely used in disciplines including critical care, cardiology, rheumatology, palliative care and orthopaedics, and is likely to become even more so in the future. Ultimately, point-of-care ultrasound offers healthcare professionals greater insight into a patient's condition when and where it is most effective, allowing them to provide faster, better care, more efficiently than ever before.

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INSPIRATION

Question: How can we improve healthcare while keeping expenses down?

Answer: By investing in people and striving for good ideas we can improve health services without spending a fortune

How to save lives and cut costs

CHANGE

Keith Chantler's entire career is built on the genius and inspiration of innovation. Originally trained as a mechanical engineer, after 15 years with the NHS Mr Chantler is now executive director of TrusTech, the NHS Innovations hub in the NorthWest which pursues research and development to help the NHS maximise clinical efficiency and quality in patient care.

"It's about both the production and the translation of ideas," says Mr Chantler. When the government realised the need to step up the fight against healthcare-associated infections (HCAIs) such as MRSA and C. difficile in the NHS, it approached TrusTech. The result was Smart Solutions, an NHS programme run by TrusTech on behalf of the NHS Purchasing and Supply Agency and supported by the NHS National Innovation Centre, dedicated to quickly and effectively find new ways to battle HCAIs.

Be pro-active

"We engaged with 500 different companies, some from beyond the healthcare field from sectors such as the food or the building industries," says Mr Chantler. The result was nine products new to the NHS and now currently in clinical evaluation throughout UK hospitals with the hope of combating HCAIs. "If the results of the evaluation are positive as we expect, this will make a step-change in how we share and process innovation," says Mr Chantler.

Crucial to Smart Solutions and to the future of how innovation is utilised by the NHS was the recognition that some solutions already in existence might not have been originally designed for the healthcare industry but could be modified for its use - an economic solution that also enables direct implementation. For instance, an anti-graffiti paint coating developed by a building company appeared equally as resistant to germs when applied to bedside lockers.

It's vital to encourage a culture of inno-



"It's about the production and the translation of ideas"

Keith Chantler
Executive Director of
TrusTech

vation within the NHS from both the top down and the bottom up, according to Mr Chantler. "Every NHS employee with an idea, from doctors and scientists to dieticians and mortuary assistants should be able to come forward and have the idea explored", he says. "We want a system in place to receive ideas from anywhere and anyone, to provide support and to best harness the staff's expertise and the technology available so that we can take it forward," he says. It's not enough to simply have an idea.

"By properly managing our intellectual assets we can get a share in the profits of innovation which of course represents an appropriate investment for the taxpayer. It's not a new idea for the NHS to look to the workforce for innovation but it's a good and reliable one - they are on the front line and so often know what is best for them.

Be prudent

As Mr Chantler notes, innovation is inherently a risky venture and healthcare

must involve as little risk as possible - so it's an interesting combination and we have to manage the risk to make the most of it. The NHS needs permission to innovate, is how he puts it. Every strategic health authority in the NHS has been given the brief to encourage innovation and it's actually a legal duty to promote innovation, Mr Chantler points out. With this in mind TrusTech runs an annual competition internally to promote ideas, with 150 new projects this year. Last year's winners included a web-based interactive 3-D obstetric education programme, a one-stop transplant and dermatology clinic and a portable wheelchair.

"We're proud of what we've achieved through Smart Solutions, at relatively short notice and at some speed - it's a great example of the possibilities of innovation", says Mr Chantler. "Of course, the patient is the net beneficiary both as the end-user of the service and as the taxpayer," he says. "It's saving costs - and it's saving lives".

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TIP
1
 INVEST IN PEOPLE



FACTS

How the NHS are trying to curb infection



The Smart Solutions programme to prevent hospital infections exemplifies how lateral thinking has made the most of innovation for the NHS. Here are some of the ideas chosen to be tested in NHS hospitals:

- The NHS's IT arm is piloting 20,000 fully enclosed easy-to-clean keyboards and mice for clinical staff across the NHS that even bleep when cleaning is required.
- V-Link is the first antimicrobial needle-free IV connector in the UK, which has been shown to kill at least 99.99 per cent of the six most common pathogens known to cause catheter-related bloodstream infections including MRS.
- MedMat is a unique two-layer mat system that provides a barrier to infection by separating the clean from the dirty elements of a clinical procedure.
- The AD (air disinfection unit) emits hydroxyl radicals which destroy pathogens, replicating the way in which the natural environment disinfects the air in open spaces.
- Recombinase polymerase amplification (RPA) tests will allow medical staff to screen patients on admission to hospital, and detect those carrying infections within just 15 minutes.

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INSPIRATION



ON THE MEND
Dr Rothman's medical innovations have helped hundreds of patients
PHOTO: ISTOCKPHOTO

The secret to mending broken hearts

Question: What role has research played in pioneering cardiologist Professor Martin Rothman's work?

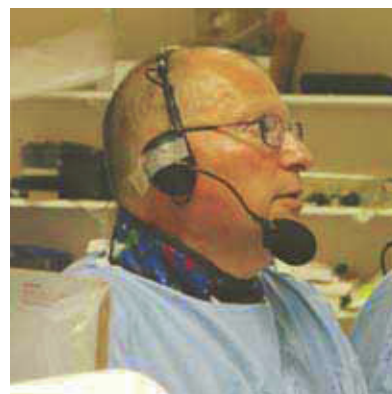
Answer: Through new technology and technique, quality of life for the very sick has dramatically improved

HOW I MADE IT

The roots of my success as a cardiologist and cardiac interventionist have long laid in innovation. Early on I recognised the need to kiss a lot of frogs to find the princes of ideas, which has pushed me further and kept me at the leading edge of research.

Cardiology is so dynamic: it's an area in which research and development of new ideas can have an impressive effect very quickly. For instance, in 2002 the first minimally invasive (percutaneous) human aortic valve implant took place; by next year at least 10,000 to 20,000 will have taken place. Innovation changes the lives of very sick people very fast.

The key is to be an entrepreneur in every sense. In 1980 my colleagues thought me cavalier for implementing an angioplasty programme; the same opinion was held of the coronary stent, first implemented in 1987 in the UK. Both seemed novel and dangerous - yet both are now main-



"The key is to be an entrepreneur in every sense"

Martin Rothman
Cardiac Interventionist

stream procedures.

Innovation in cardiology has dramatic effect. Both the health costs to the patient and the economic cost to the NHS of many cardiac procedures is considerable - there are the risks of surgery, infection, the need for intensive care and additional procedures such as renal dialysis. All these factors must be evaluated because the cost of a device can go up as the health costs it will place on the NHS go down.

He is the Honorary Professor of Interventional Cardiology, Queen Mary, University of London. His achievements include:

- Inventor on 25 patent families.
- Generated £4million in research income since 2002.

Innovation might be expensive but presents a relative saving which is a great driver: we are all motivated to care for the patient better, to achieve a reduction in morbidity and

INNOVATIONS FROM PROFESSOR ROTHMAN

- Created VAD, a ventricular assist device, a fully implantable mechanical solution that reduces the need for heart transplant.
- Created a Chronic Total Occlusion (CTO) crossing device, a blood vessel blockage penetrator.
- Established PerQTech, an interventional cardiology products company with its lead project being the Ascending Thoracic Aortic Graft (ATAG) system.

to shorten hospital stay.

Every year 250,000 people are diagnosed with end-stage heart failure, in which their condition seriously affects their life. It's highly unpleasant for them, a huge cost to the NHS and the only treatment is a heart transplant while medication is simply palliative. With energy engineers from Queen Mary, University of London, we are developing a fully implantable mechanical solution that if successful will alleviate these symptoms.

Another development is an ascending thoracic aortic graft, or ATAG - a prosthetic blood vessel using a catheter to re-establish blood flow around a diseased or damaged vessel section. ATAG will replace the current high-cost, high-risk procedure - for the patient it means far less intervention and a more minimal anaesthetic. ATAG addresses a significant market, could save thousands of lives each year and will generate valuable income for the Trust. Both of these innovations are being developed with the support from NHS Innovations London.

I'm building a research inheritance and a succession by training my juniors to continue.

EMILY DAVIES

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QUESTION & ANSWER



Mary-Ellen Westwood, 60

The company director from London had an implantable loop recorder (ILR) and a biventricular pacemaker implanted earlier this year

Why did you have to have the procedure?

! About five years ago I started to fall over without reason. I thought I was just clumsy and joked it was my high heels. During meetings the room would disappear in front of my eyes and I would feel faint.

I had private health insurance and over five years I saw 17 doctors. They suspected MS, Parkinson's Disease or a brain tumour but were unable to find a cause despite many tests. After collapsing while wheeling my bike across a busy road my husband took me to his GP who immediately suspected syncope and referred me to the cardiology team at Queen Mary's, Roehampton. I was instantly sent to St Mary's, Paddington for a "tilt test" in which I was strapped to a raised table in an upright position to see if it induced a faint. I duly fainted and was diagnosed with syncope.

What did the procedure entail?

! I had an ILR fitted last March: it took 30 minutes and I was awake. I recovered quickly and there is only a small scar. From then on whenever I felt faint I would use a handheld data reader that linked to the ILR and I'd make a note of how I felt. The ILR data showed that my heart had paused a few times but that there was no correlation with my notes. Last May it was advised I have a biventricular pacemaker fitted, for which I was also awake and which took about 90 minutes.

What was life like before the procedure?

! I've always been very fit: swimming and running marathons. Fainting had a significant impact - when you fall over all the time you are unemployable. I was even accused of having an alcohol problem after falling over at work at 9am.

What is life like now?

! I haven't fainted since I received the pacemaker and I am ready to return to work. I feel fit, healthy and confident. In fact my husband and I recently cycled from Putney to Windsor and back, a 105km round-trip. I look better too: so much so that friends and colleagues ask if I have been on holiday or had a facelift!

Dynamic volume CT scans a heart in 1 beat and could save millions

Toshiba's new Aquilion ONE CT scanner represents an innovative leap in CT technology. It is the world's first dynamic volume CT scanner, which can scan a heart in a single heartbeat while administering just a fifth of the radiation dose of conventional scanners. A new health economics study has shown

*a fifth of the
radiation dose*

that introducing the system into the pathway for managing patients presenting with acute chest pain can considerably reduce costs.

Since the first CT scanner was developed by the British scientist, Godfrey

Hounsfield*, computed tomography (CT) has undergone continuous development in terms of both scanning speed and imaging quality. The first CT scanner was originally intended for examinations of the head, with scans taking hours. Currently, the most significant applications for CT are in the diagnosis of cardiological, neurological and oncological disorders.

The new scanner opens up a completely new dimension in the use of

*a matter
of minutes*

computed tomography, as the new system is predicted to revolutionise

patient care, helping to reduce diagnosis time for life-threatening conditions such as stroke and heart disease from days and hours to mere minutes, reducing the costs of care considerably.

Until now, patients exhibiting symptoms of heart attack or stroke have normally had to submit to a variety of examinations, preparatory to a precise diagnosis, all of which takes

up a considerable amount of time. This can now be cut to a matter of minutes and one single examination. For patients with acute stroke symptoms, just one examination taking no more than sixty seconds can provide critical information on blood flow through the brain including vascular analysis measurements. This information could be key to improving the rapid

assessment and treatment of acute stroke.

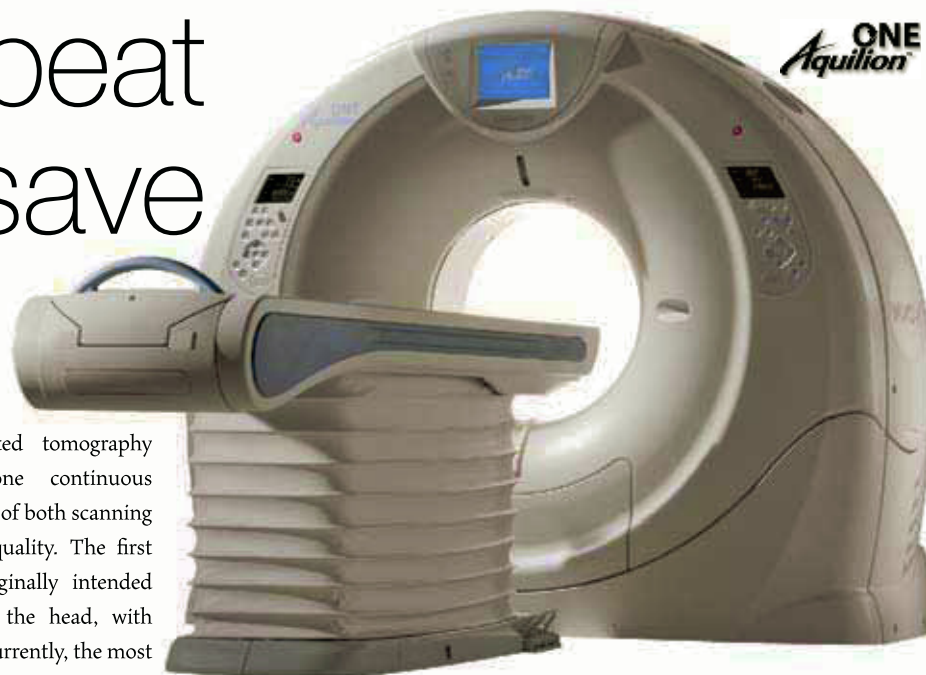
With the potential to open new pathways in patient care, Toshiba's new system is predicted to deliver major benefits to healthcare services. Indeed, a recent Health Economics Study, conducted by

*save as much
as £1.6m*

Toshiba Medical Systems, with the assistance of Simon Kucher, a leader in healthcare analytics, demonstrates that using the Aquilion ONE early in the treatment pathway for acute chest pain in a hospital can considerably reduce the costs of care and release capacity for other uses. The system could save as much as £1.6m for a typical sized NHS Acute Trust seeing 4,000 patients with acute chest pain per annum.

For further information on this new technology call Toshiba Medical Systems on 01293 653 700 or visit <http://www.toshiba-medical.co.uk>.

**Sir Godfrey Hounsfield received a Nobel Prize for his work in 1979, after patenting his first CT system.*



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SIEMENS

NEWS

DISCOVERING BRILLIANT NEW WAYS TO BEAT DISEASE

■ **Question:** Why have stem cells been hailed as the solution for a huge range of conditions and diseases?

■ **Answer:** Regenerative medicine, based primarily on stem cells, is one of the fastest growing areas of modern medicine

The successful trachea transplant last November in the 30-year-old Colombian mother Claudia Castillo using an organ partly grown from her own stem cells saved her life - and marked a new era in medicine.

Castillo's own windpipe had been irreparably damaged by tuberculosis and without treatment death was certain - today, she is in perfect health. The transplant used a donated organ from a deceased donor that was stripped of its own stem cells and used as a "scaffold" for her own cells; because Castillo's body recognises her own cells there is no need to take immune-suppressing drugs. Its success, the result of a collaborative project by doctors in Spain, Italy and the UK, has transformed the future of transplant surgery. What was previously the stuff of sci-fi - laboratory-grown organs and the regenera-

tion of brain tissue - are now a possibility.

Professor Anthony Hollander, a key member of the Castillo trachea-transplant team and the Arthritis Research Campaign Professor of Rheumatology and Tissue Engineering at University of Bristol has developed a stem cell 'bandage' to prevent people developing osteoarthritis, whether prematurely as a result of traumatic injury to the meniscus - the knee cartilage - or through age.

Prof Hollander's stem cell 'plaster', works by first harvesting stem cells from the patient's bone marrow and then attaching these cells to a membrane (the "bandage"). This is implanted into the knee where the stem cells grow and heals any tears in the cartilage, thus avoiding the need for surgery. Prof Hollander hopes the procedure will be widely available by 2016.



Anthony Hollander
Professor and researcher pioneered the first successful trachea transplant.

Surgeons at Spire Hospital in Southampton have already successfully used stem cells to repair bones in five patients instead of giving them hip replacements, and Prof Richard Oreffo of Southampton University has said he hopes to improve the treatment further by replacing the donated bone with a synthetic material to help stem cells grow.

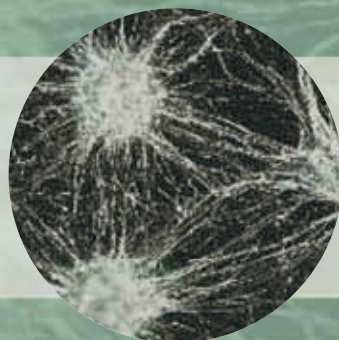
Other developments in stem-cell research include the possibility of "smart stitches" embedded with patients' own cells (taken from their bone marrow) to dramatically speed up surgery: initial tests at the John Hopkins University in Baltimore suggest that the cells grow into replacement tissue and accelerate healing through the release of proteins. It is hoped that experimental and regenerative medicine could also be used to extend the quality of life for patients with neurodegenerative disease such as motor neuron disease (MND) - at the Euan MacDonald Centre for MND Research in Edinburgh scientists are already generating patient-specific motor neurons from a simple skin biopsy.

EMILY DAVIES

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ReNeuron
pioneering stem cell therapeutics



ReNeuron is a UK-based leader in the development of stem cell therapies targeting areas of significant unmet or poorly-met medical need. We have received regulatory and conditional ethical approvals to commence clinical trials in the UK with our lead ReN001 stem cell therapy for disabled stroke patients. This is the first such therapy of its kind to be approved by a leading regulatory authority for clinical use in a major neurological condition. We are also developing stem cell therapies for a number of other conditions including peripheral arterial disease and diseases of the retina.

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MOVING FORWARD
A researcher does her part for stem cell development and innovation
PHOTO: ELENA KORENBAUM

Give your kids the best chance of good health

NEWS

Cord-blood banking offers the possibility of curing the disorder or disease that a newly born child may suffer in the future, through the simple extraction of blood from the umbilical cord after birth.

Anbreen Agnihotri, a 38-year-old physiotherapist from Brighton, had never heard of cord bloodbanking until, pregnant with her daughter Amara earlier this year, she was leafing through some pregnancy magazines at her brother's home in the United States. "They were full of information about cord bloodbanking and its benefits," she says. "Yet nothing I read here mentioned it".

There are no diseases or conditions in Anbreen's family that make her especially keen to boost the chance of recovery for her children in the event that something does strike. But, she says, reassurance is invaluable and as progress evolves forward, the possibilities will only increase.

"I have complete peace of mind that if something does happen to my children, there's a chance of a cure," Anbreen says. Anbreen's experience of brain-damaged patients in her work meant that she was aware of both the extent of damage wrought by accidents as well as disease and of the vast progress being made in neurological injury research in relation

to bloodbanking.

"The procedure was so simple," says Anbreen. As there was nobody within the hospital chosen by the Agnihotris for the birth with the necessary training to extract the blood, her cord bloodbank arranged a phlebotomist, who waited at Royal Sussex County Hospital while Amara was born. After the placenta delivery the blood was extracted and whisked by FedEx to the States into storage. There's a high probability that Amara's umbilical cord blood will also be compatible with her two-year-old son Zain, in addition to which the pulp of Zain's milk teeth can be used similarly once they have fallen out.

"I wish I had known about it before - I even had to explain it to my midwife!", says Anbreen. "It makes sense to have every insurance policy for your children that you can".



QUESTION & ANSWER

Anthony Hollander, the Arthritis Research Campaign Professor of Rheumatology and Tissue Engineering at the University of Bristol is an expert in stem-cell research

■ What can be done with stem cells?

! Stem-cell research is pushing forward every area of medicine. Our trachea transplant was a landmark example of how stem-cell treatment can actually cure, by removing disease from someone's life rather than simply treating it.

■ Why is stem-cell research so important?

! Pharmaceutical therapies have been around for the best part of a century - they treat symptoms and improve life but on the whole they don't cure. What about embryonic cells?

■ Why is stem-cell research so important?

! Pharmaceutical therapies have been around for the best part of a century - they treat symptoms and improve life but on the whole they don't cure. What about embryonic cells?

■ And the future?

! We are just beginning to understand how to use tissue engineering to cure diseases. As well as the trachea and the stem-cell alternative to joint replacement, a recent study shows potential for replacing damaged cells after a stroke. The more we explore these possibilities the more likely it is that we will develop successful therapies.

Cord blood is one of the richest sources of stem cells

EVERY BABY IS PRECIOUS

Umbilical cord blood is now widely recognised as an alternative to bone marrow and peripheral blood as a source of stem cells. Well over 6,000 successful transplants using cord blood stem cells have been performed worldwide to treat a range of chronic and acute blood-related illnesses.

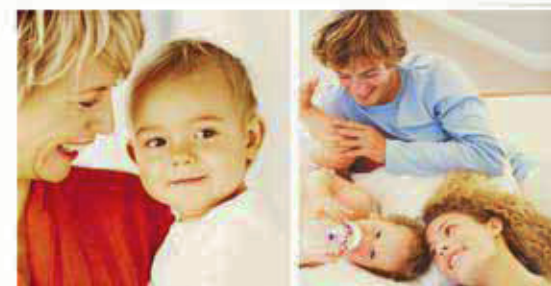
EXTRAORDINARY EXPERIENCE

Established by one of the world's leading cryogenic centres, UK Cord Blood Bank is the most experienced private cord blood bank in the UK, offering expectant parents over twenty five years of dedicated service in the preservation and long-term storage of human tissue.

TO REQUEST AN INFORMATION PACK:

visit www.cordbloodbank.co.uk

call 020 7291 4569 to speak to a cord blood expert



NEWS

Here lies the truth for better bones



■ **Question:** How significant is technological development in orthopaedics?

■ **Answer:** Innovative devices are improving operations cutting recovery time and pain for patients and optimising surgical expertise

From traumatic injury suffered by athletes to chronic conditions that accrue with age, there is greater demand for orthopaedic surgery than ever. Fortunately technology and science are ever-ready to support this, with a continuous stream of innovation that promises to revolutionise technique and delivery in orthopaedics for the healthcare industry.

Bone fractures of any kind can result in enduring pain, with particularly serious ramifications with the onset of age. The older we get, the greater our risk of breaking a bone. Not only does the likelihood of a fracture increase with age but so do the physical consequences, with a break due to osteoporosis more likely to require in-patient treatment, and surgery such as joint replacement, both of which have their own associated risks. As the National Osteoporosis Society points out, fragility fractures and other breaks as a result of osteoporosis can have a major impact on subsequent quality of life.



LOOKING FOR ANSWERS Healthcare professionals are pioneering new orthopaedic technology to improve patient care
PHOTO: ISTOCKPHOTO

Acrobot, the brainchild of orthopaedic surgeons Professors Justin Cobb and Brian Davies at Imperial College London, began in 1991 and took eight years to become a final product, backed by Imperial College's innovations wing Imperial In-

novations, London Technology Fund and PUK Ventures. It now employs 26 staff with the Acrobot used by orthopaedic surgeons throughout the country. Acrobot perfects surgical accuracy which improves the entire experience for the patient, consider-

ably minimising the very serious risk that is inherent in any surgery to repair bones even when the initial fracture is a simple one.

Another vital development in the field was last year's winner in the orthopaedic category of Medical Futures, the leading medical innovation awards: the injectable bone solution from Professor Kevin Shakesheff of the University of Nottingham and Regentec, he regenerative medicine specialists. It's a polymer technology that makes a liquid bone for use as a bone graft during surgery, filling the "gaps". When injected into the body it hardens within 15 minutes, stays at body temperature and has similar characteristics to normal bone.

As its inventors note, approximately 1.5 million bone graft procedures are performed annually worldwide, many of which require bone to be taken from other parts of the body or from other donors. The new 'injectable bone' offers a much simpler procedure than synthetic products have previously permitted and the material is biodegradable, allowing new bone to replace it gradually. The team are seeking funding to carry out clinical trials.

EMILY DAVIES

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FACTS

- **58,952 primary hip replacements** were carried out in England and Wales in 2006-7 according to the Arthritis Research Campaign: 94 per cent were due to osteoarthritis.
- **62,150 primary knee replacements** were carried out in England and Wales in 2006-7: 97 per cent of these were due

to osteoarthritis.

- **The average cost of a hip replacement** is £7,350.
- **One in two women in the UK and one in five men over the age of 50** will break a bone mainly because of poor bone health. (National Osteoporosis Society)



QUESTION & ANSWER



Professor Justin Cobb
A practising surgeon and chair of orthopaedics at Imperial College NHS Trust London and co-developer of Acrobot

■ What exactly is Acrobot?

! Acrobot is a robot that works in joint replacement surgery, using computer-assisted 3D planning, surgical navigation and surgeon-controlled robotic surgery. It interprets CT scans to reproduce the patient's anatomy and all its individual idiosyncrasies in 3D on a pre-operative plan so that the surgeon can plan the surgery to maximum precision. The plan is then input into the robot and combined with a mechanical tracking system to monitor in real time the patient and the operation.

■ What are the benefits?

! It maximises the accuracy and efficiency of surgeons to the point of perfection. For the patient it minimises discomfort, complications and operation and recovery time.

■ And where to next?

! Acrobot gives us a platform technology that will allow us to design a new world of even smarter devices. We're now developing the next generation of devices for orthopaedic surgery that we hope will become standard tools for surgeons—the future is exciting.

MEDACTA® INTERNATIONAL CELEBRATES THE 5TH ANNIVERSARY OF THE AMIS® SURGICAL TECHNIQUE



The AMIS® surgical technique represents a major advance in the orthopaedic world. It presents social and economical advantages because it reduces hospital stay and rehabilitation, giving the patient a faster return to daily activities.

Zurich, Switzerland, 10th September 2009 – Medacta® International (www.medacta.com), a Swiss company specialized in the development, manufacture and distribution of implant systems for hip and knee, as well as computer-assisted surgery technologies, celebrated the fifth anniversary of AMIS® – Anterior Minimally Invasive Surgery.

Hundreds of thousands of patients all over the world suffer from hip joint pain due to arthritis.

Unlike traditional hip replacement surgical techniques, where the surgeon cuts the muscles in order to replace the patient's hip joint, AMIS® is a minimally invasive total hip replacement surgical procedure where **no muscles are cut**. Speaking during the press conference in Zurich, Dr. Frédéric Laude from the Centre Médico Chirurgical, Paris V, said: "The AMIS® surgical technique is the only technique which follows the principles of MIS (minimally invasive surgery), characterized by a reduced skin incision and the preservation of muscles and tendons." Also, Dr.

Claudio Dora from Uniklinik Balgrist in Zurich, co-president of the conference, said: "AMIS® is "the only soft way" to implant an artificial hip joint which reduces hospital stay and rehabilitation which in turn gives the patient a faster return to daily activities and can offer a cost reduction to the hospital"

In order to facilitate orthopaedic surgeons' adaptation to the AMIS® surgical procedure, Medacta® International has created the AMIS® Education Program, in the shape of the M.O.R.E. Institute (Medacta Orthopaedic Research and Education). In several countries, surgeons are able to visit a Reference Centre

hospital, to assist in AMIS® surgery and to attend a Learning Centre with an anatomical workshop. They also have the opportunity to improve their technique with the assistance of teaching surgeons, to attend live surgeries, to analyse difficult cases, to go thoroughly into indications and contraindications. The assistance of a "Reference Surgeon" is also provided for the first surgeries.

Through minimally invasive muscle-sparing innovations, Medacta® International's primary objective is to aid patients in regaining healthy and active lifestyles with shorter hospital stay and faster rehabilitation.

NEWS

Keyhole surgery offers new lease of life for osteoporosis sufferers

Question: What treatment is available for people with the most severe spinal problems?

Answer: A new innovative approach to spinal surgery has allowed surgeons to tackle this medical issue in a new way

A new keyhole operation for spinal fractures is beginning to offer hope for people living with osteoporosis and spinal cancer.

One of the major complications of osteoporosis is that the vertebrae lose their strength and fracture with minimal force. The results can be varied. Whilst some patients' bodies will be able to heal naturally within a few weeks, with the aid of painkillers, many will be in more severe pain and possibly immobile.

For these patients a new technique, called balloon kyphoplasty, is beginning to be offered and Sean Molloy, Consultant Spinal Surgeon at the Royal National Orthopaedic Hos-

pital in Stanmore, North London believes the operation should become increasingly available as doctors learn more about it and patients start to enquire after it.

"I'm not afraid to refer to it as revolutionary," he says. "I learned about it when I did a fellowship at the Johns Hopkins University in America and I'm now teaching the technique, so hopefully it will become increasingly available across the country."

Balloon kyphoplasty is offered to patients if a selective MRI scan reveals there is a fracture which doctors believe will not mend on its own and will continue to cause severe pain and immobility. This pain is caused by the fracture causing bone to rub on bone. Fortunately, the good news for patients is that the technique takes a maximum of thirty minutes and there is not normally a need to stay in hospital. "It's keyhole surgery so we make the tiniest of incisions," Molloy explains.



"We then push a small tube in to the vertebrae and inflate a small balloon. This pushes the soft bone in the middle of the vertebrae to the outside edge so it can form an outer layer. This outer layer acts as a barrier to prevent any leakage of the bone cement we then put in to the gap to support the bone. This cement takes about ten minutes or so to set and then the operation is complete."

The whole procedure need not last more than thirty minutes and although it can be offered with just a local anaesthetic, Molloy prefers to carry it out under a general anaesthetic because it keeps the patient perfectly still.

He believes the operation is vital in helping people living with osteoporosis back on their feet again and remaining mobile.

"The real tragedy can come when people are not offered effective treatment because some doctors may not be aware it exists," he says.

"People can then end up being sent home in pain with some painkillers and they lose their mobility. If they can't get up and about they tend to sit in a chair and their lungs begin to lose some function and their health can really suffer. It's imperative we don't let people deteriorate, we need to keep them on their feet and mobile."

Aside from helping people with osteoporosis get back on their feet without pain, balloon kyphoplasty is also holding out hope for people with spinal cancer. This is often caused by a form of blood cancer in the spine itself or through the blood spreading another form of cancer from elsewhere in the body, particularly breast and kidney cancer.

"The technique can also help the spine remain strong in people living with cancer and so prevent patients suffering the extra indignity of becoming progressively paralysed," explains Molloy.

Signature

Custom made instruments for your personalised knee replacement.

Patient's shapes differ on the inside as much as they do on the outside. That's why Biomet now offers Signature Personalised Patient Care, which utilises MRI (magnetic resonance imaging) technology to create personalised positioning guides for total knee replacement.

Before Surgery

An MRI is used to create a three-dimensional joint reconstruction, which enables the surgeon to preoperatively plan your knee replacement. In the past, surgeon planning has typically been based off of two-dimensional X-rays. The innovative Signature system utilises custom femoral and tibial positioning guides developed from your MRI scan.

During the knee replacement procedure an assortment of instruments are used to verify component sizing and establish proper positioning and alignment. However with the Signature personalised positioning guides, surgeons now have access to a greater level of detail and precision for implant position and alignment before the procedure. This allows for personalised implant positioning and may help enhance surgical efficiency.

When used in conjunction with the Signature system, the Vanguard Complete Knee System from Biomet allows orthopaedic surgeons to provide more of a custom fit specifically for you, regardless of age, race, size, or gender. The Vanguard knee offers a range of femoral size options with 90 different size combinations being available.

During Surgery

The surgical procedure using the Signature personalised positioning guides is similar to traditional total knee replacement with a few exceptions. During traditional total knee surgery, multiple instruments are used to position the guides for removing damaged bone and cartilage. Traditional total knee replacement sometimes uses instruments placed inside the femur (thigh bone) and/or tibia (shin bone) to assist with implant alignment and positioning. Signature personalised positioning guides are placed directly onto your femur and tibia, and therefore do not require instrumentation of the bone canal, allowing for a potentially less invasive procedure. The Signature personalised positioning guides enable the surgeon to position a knee implant accurately according to the preoperative plan, whilst using fewer invasive instruments.



If you have questions regarding Signature Personalised Patient Care, please speak with an orthopaedic surgeon.



TIP
4
LOOK AFTER THOSE IN NEED

FEELING THE BENEFITS
Older patients can now hope to be treated with the latest medical innovations.
PHOTOS: ISTOCK PHOTO

How the ageing population is driving healthcare innovations forward

Question: What kind of effect is the ageing population having on the British healthcare system?
Answer: As the number of elderly patients increases, healthcare professionals are placing a greater emphasis on improving both technology and patient care.

As life expectancy in the UK pushes ever upwards it brings with it new challenges and demands from medicine: with an increasing emphasis on at-home care, new solutions provide better recovery, greater comfort and improved quality of life for many.

According to the Office of National Statistics, women born in 2006 are expected to live to the age of 91 and men to 88-years-old in the UK. This changing demographic is the key driver for a change in the healthcare industry. With an ageing population come a range of healthcare challenges, seen most prominently in orthopaedics and chronic conditions. Figures have shown that alongside the fields of diagnostics and cardiovascular care, orthopaedic interventions on hip and knee replacements make the largest contribution to the global medical technology industry. The orthopaedic product sector is divided into a variety of segments: reconstructive devices and joint replacements, spinal implants and in-



strumentation, fracture repair and orthobiologics. In 2005 the orthopaedic market was £26 billion worldwide and is estimated to grow even further as populations around the world begin to live longer and longer.

This also means that Britain's ageing population will add to the 17.5

FACTS

- The UK medical technology sector is made up of over 2,000 companies - more than 80 per cent of which are small and medium sized enterprises (SMEs).
- The sector is trade positive exporting around £4 billion worth of technology annually
- Medical device manufacturers employ nearly 50,000 people in manufacturing,

million people already living with a chronic condition. The Department of Health has said that it is likely that over three-quarters of those over 75 are living with a chronic condition such as osteoarthritis. People suffering from chronic conditions are now demanding healthcare solutions

management and research and development.

- The UK market sales of medical devices are around £6 billion annually.
- Overall, UK expenditure on medical technologies is just 4.5 per cent of the healthcare budget, compared with a European average of 6.3 per cent.

that allow them to remain at home with relatives and to live their lives as close to their normal life as possible. There is currently huge growth in new products which enable people to spend less time in healthcare settings and more time at home, especially in and around areas such as telemedicine and telecare. The real challenge for healthcare providers is adapting existing treatments in order that they can be administered in the home and don't require the patient to make frequent trips to hospitals or GP surgeries.

Future NHS budget constraints will mean that manufacturers must offer increasingly innovative solutions. It is vital that industry demonstrates the long-term benefits of their devices and proves to healthcare suppliers, home and abroad, that investing in the most innovative technologies can have a considerable reduction on the patient pathway costs and release money back into the healthcare system. ABHI continues to work with the Department of Health and associated bodies to demonstrate the value of providing patients with the most innovative treatments and to highlight the dangers of cutting back on treatments to cut costs - a practice which is both detrimental to patients and more expensive in the long-term.



NEWS



Strengthening infection control in the NHS

Beating MRSA and hospital-acquired infections remains a key issue for patients. According to the National Audit Office nine per cent of all patients will acquire an infection during their stay in hospital, costing the NHS around £1 billion each year. More widespread use of appropriate medical technology, such as infection resistant and control products, could make a real impact into the Healthcare Acquired Infections (HCAI) rate.

For example, urinary tract infections are at 40 per cent the most common of all documented healthcare-acquired infections and in about 80 per cent of cases are associated with use of a catheter. Evidence has shown that patients who receive a silver alloy catheter are less likely to acquire an infection than those who receive a standard catheter.

As NHS budgets get more and more stretched the pressures on the Department of Health to find new ways to spend more efficiently will become ever more pressing: it is crucial that medical technology companies are able to demonstrate to healthcare providers the benefits of their technologies.

The Department of Health has already demonstrated their commitment to bringing through new technologies by hosting the HCAI Technology Innovation Summit and Awards earlier this year. Their devices and proves to healthcare suppliers, home and abroad, that investing in the most innovative technologies can have a considerable reduction on the patient pathway costs and release money back into the healthcare system.

Currently, the Association of British Healthcare Industries is working with the Department of Health and associated bodies to demonstrate the value of providing patients with the most innovative treatments and to highlight the dangers of cutting back on treatments to cut costs - a practice which is both detrimental to patients and more expensive in the long-term.

NEWS

Bionic limbs fitted in pioneering prosthetic break-through

Question: What developments have been made in the field of prosthetics?

Answer: Scientists have developed artificial limbs that not only respond to conscious thought but allow users to feel

Bionic arms that can sense pressure, temperature and pain and move when the brain commands are under development with development teams from the UK in the vanguard.

The world of advanced prosthetics has been making progress at a breathtakingly fast pace in the last year.

Both the man and woman can sense pressure and pain as if their missing upper limbs were still present because surgeons were able to move nerves left behind from their arms to the skin close to their breast-bones.



GIVE ME FIVE: the bionic limbs that respond to thought, move naturally and feel sensation.

Claudia Mitchell 28 is a former US Marine and she lost her arm in a motorcycle accident. She was recently fitted with the world's most ad-

vanced artificial arm at the Rehabilitation Institute of Chicago.

Here she is performing a high five handshake with Jesse Sullivan, a 61

year old, who lost his arms in an electrical burn in 2001.

A pressure pad close to the relocated nerves transmits electrical signals to the brain so both can feel sensations just as though they had come from their phantom limbs.

The goal is to make artificial limbs that can accurately reproduce feeling.

This is only possible because even years after amputees lose their limbs the peripheral nerves in their arms are often still capable of receiving electrical control signals from the brain, signals that originally would have told the muscles in the hand how to contract and move. By placing electrodes near these nerves it is possible to decipher the brain's intentions and apply them to motors in a prosthetic limb.

To generate sensations the reverse is applied to nerves in the forearm

that were originally used to relay sensation signals from the hand to the brain.

Sensors could be placed in a prosthetic hand to measure contact forces and temperatures while a microprocessor turns the data into a stream of electrical impulses that the brain decodes as the feelings the skin of the lost limb would have felt.

This year the world's first bionic hand won Britain's top technology prize.

The i-LIMB is a prosthetic device with five individually powered digits. It won this year's Mac Robert award from The Royal Academy of Engineering.

Using advanced electronic and mechanical techniques and manufactured with high-strength plastics, the lightweight hand is the first of a new generation of prosthetics.

The Silver Solution to Fighting Catheter Infections

A fact often overlooked is that many patients when admitted to the hospital require a urinary catheter (a small tube inserted into the urethra which drains urine from the bladder). Many of these may be indwelling and remain in-situ for a period of time. A recent survey conducted in selected hospitals found that 31.6%¹ of patients had an indwelling urinary catheter - so it is therefore not surprising that Urinary Tract Infections (UTIs), account for 20%² of all healthcare acquired infections and that over half² of this 20% are associated with the use of indwelling catheters. This is because such catheters provide an easy route for micro-organisms to gain entry into the body and in extreme cases, the blood stream. Urinary catheters are also often required by patients at home when bladder muscles can no longer contract, or for long term and ongoing medical conditions.

With the era of antibiotic resistance and superbugs upon us, it has never been more important to use innovative technology combined with medical equipment such as the BARDEX® I.C. anti-infective Foley catheter, which is coated with a combination of BACTI-GUARD®** silver alloy and BARD® hydrogel, ensuring the catheter is easy to insert and remove.

Silver has long been used in medicine for its known germicidal effects and the technology behind the BARDEX® I.C. Foley catheter harnesses the natural anti-microbial properties of silver.

The silver alloy coating can decrease microbial bonding with the catheter surface and in a hospital study in 2000 was shown to reduce the risk of infection by almost a third in one hospital³.

Based on the compelling evidence and its infection control properties, a number of Trusts in England have not hesitated to convert to using the BARDEX® I.C. Foley catheter with BACTI-GUARD®** silver alloy and BARD® hydrogel⁴. In the background, government initiatives such as the 'Showcase Hospital Project' have encouraged the implementation of new technologies, such as this Infection Control catheter, across the National Health Service.

The BARDEX® I.C. Foley catheter is available in selected Trusts in England and on prescription for patients requiring on-going urinary catheter use at home.

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For further information on BARDEX® I.C. Foley Catheters please call: +44 (0) 1293 529 555



PROFESSIONAL INSIGHT

Andy Taylor, director of healthcare policy at the ABHI, explains the thinking behind a new initiative for the NHS that combines commercial concern with patient needs.

A masterplan for healthcare

Necessity not Nicety is the new commercial strategy from the Department of Health and the NHS in England. Details of how it will operate are eagerly awaited, although it is understood that developments are now well underway between the procurement and commercial part of the health department directorate and the NHS.

What was the problem?

As the Office for Government Commerce in its review of Department of Health procurement capability outlined last year; "There are many different organisations undertaking procurement activities across the system, including those with devolved governance, which means that strong central 'control' is virtually impossible and probably undesirable. But even allowing for this, there is confusion, duplication and some dysfunctional behaviour caused by the lack of an understood and agreed strategy and operating model for commercial activities across the system."

Two consequences of this situation are that the NHS is generally slow on the uptake with regard to innovative technologies and techniques and that the supplier's 'cost to serve' and the NHS's 'cost to buy' are both higher than they need to be because of the

complexity of the systems involved.

How was it addressed?

The Healthcare Industries Taskforce (HITF) recommended in 2004 that modern approaches to procurement are embedded in the NHS to deliver better value for patients through:

- nationally-agreed/accepted best practice models, including early communication with industry on workplans (eg, the Supply Chain Excellence Programme (SCEP)) to provide clarity on levels of market access and to ensure capture of innovative solutions
- a focus for regional procurement with significant clinician involvement to provide the platform for an informed approach to procurement decision-making
- ensuring that the role of procurement in supporting the timely uptake of new technologies identified as providing benefit to patients is embraced.

At present, the landscape remains difficult to navigate: it seems likely that cost to serve for suppliers and cost to acquire for the NHS could both be reduced.

Implications for the future

David Nicholson, chief executive of the NHS, recently highlighted five things the NHS should not do during the financial crisis. One of these

INVESTMENT

"If we invest now, a decrease in costs will come later."



Andy Taylor
Director of healthcare policy at the ABHI

was not to cut investments in technology: "If we invest now, a decrease in costs will come later," he said. Mr Nicholson also wrote to stakeholders in the medical technology sector to highlight the challenge of managing through a period of significant financial pressure. He said that this challenge "cannot be addressed through a national programme of set of top-down initiatives. It needs input from right across the healthcare system and its partners".

The plans being set in place under the government's 'Life Sciences Blueprint' are intended to involve industry and work is beginning on this.

The inter-dependence between the medical technology industry and the NHS could hardly be more significant. Yet it is a relationship which is sometimes not harnessed to deliver better treatments to the extent that it might be.

The NHS will need to play its part in getting the best from every pound it spends, including the money it invests in medical technology. This will mean the NHS and its suppliers working together in ways that are very different from those operating today: the language needs to be that of partnership to ensure best value for suppliers and patients. This means some big changes and the time for these changes is now: necessity, not a nicety, indeed.

LONDON

The future of British medicine

How the ABHI is driving medical technology forward with partnership and dialogue

Inventing the therapy is just the first step of the journey and innovation can be wasted if new therapies are not adopted quickly and efficiently, which is crucial in making sure that patients are able to benefit from advances in medical technology.

Companies need to work in partnership with all stakeholders in the health economy: clinicians, NHS management, the Department of Health, regulatory bodies and of course patients themselves, to ensure that advances reach those who will most benefit.

It is through partnerships with health professionals that we can drive the development of innovative technologies for the benefit of patients. Innovation often begins with clinicians: many of the therapies and advances developed by Medtronic have come from working with professionals who use medical technology to treat patients on a daily basis.

When a clinician or surgeon has an idea or a novel way of improving on existing technology to treat patients, working with a company such as Medtronic will help to develop a concept and bring it to patients safely and effectively.

Single Use Nail Nippers

An Innovation By Bailey Instruments Ltd

Bailey Instruments Ltd has launched a revolutionary, sterile, single use nail nipper. This innovative product with its shock absorbing, streamlined handles and precision honed blades has been designed to combat RSI (Repetitive Strain Injury) a condition caused by excessive strain on the hand and wrist which threatens the working capacity of podiatrists.

Most podiatry clinics treat 18 patients per day equating to 2,700 separate cutting actions per week. Over time, poor quality nail cutters can cause injury to the hand and wrist. Bailey Instruments has worked alongside clinicians to develop an exciting new range of disposable podiatry instrument packs. In the NHS Primary Care Trust where the instruments were trialled, 7 podiatrists out of a staff of 20 were diagnosed with having RSI in the wrist or upper limb. Within three weeks of starting to use this patented nail nipper all staff were able to return to full workloads.

The health benefits for clinicians in using this unique product is self evident as well as the financial benefits to both the public and private health care sectors who will see a cut in the amount of clinical days lost due to Repetitive Strain Injury.

In addition, these nail nippers come sterile saving health authorities money on reprocessing costs and offering vulnerable patients surety against cross infection.



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