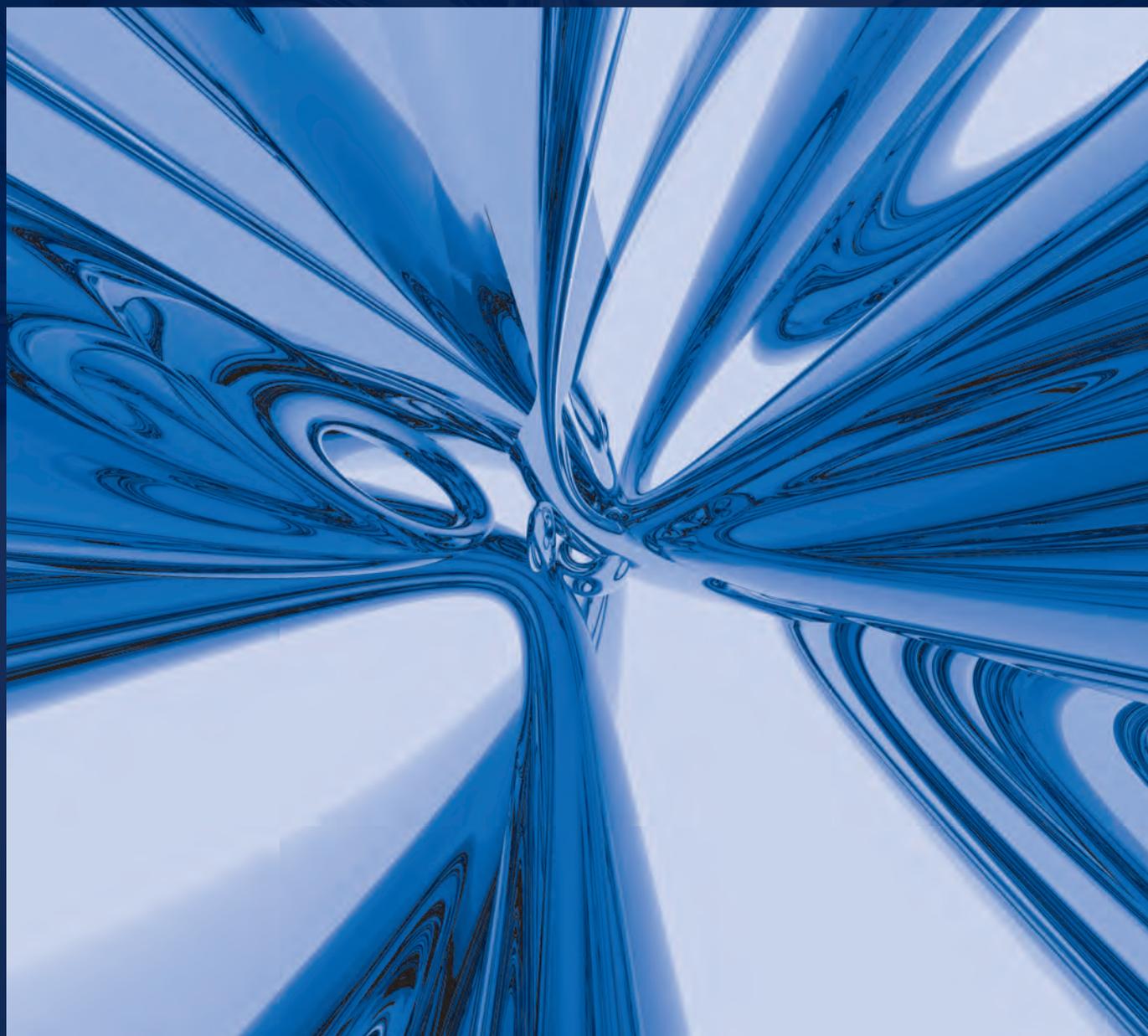




**NHS Innovations South East**

*... the innovations management service*

**2010 - 2011**



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# Foreword



Over the past six years, NHS Innovations South East (NISE) has worked hard to promote and support innovation arising from and for the benefit of the NHS in the south east.

During that time, we have helped our main stakeholders - the region's NHS Trusts and their staff - to translate a host of innovative ideas and projects into an impressive range of commercially successful healthcare products and services. In doing so, we have helped deliver better patient care, improved outcomes and a more efficient and cost-effective NHS. NISE has also had important benefits for the broader regional economy. We have helped to forge strong, mutually-beneficial relationships between the local NHS and the south-east's thriving commercial healthcare sector. Thanks to us, health and technology companies throughout the region are now involved in profitable partnerships with NHS Trusts to deliver a wide range of healthcare innovations that were conceived inside the NHS and which, in most cases, would not have progressed beyond the drawing board without NISE's involvement.

Last year, a cost-benefit analysis undertaken by the independent York Health Economics Consortium (YHEC) studied just one of the innovations which NISE has supported and concluded that, even assuming just 20% adoption across the NHS and 50% effectiveness, the innovation would deliver a significant reduction in critical illness - with many lives being saved - and savings to the NHS of £26.9m per annum.

That innovation is just one of many vitally-important healthcare products and services conceived within the NHS and realised with the assistance of NISE. A number of others are featured in the pages of this report. They all started-out as the 'bright ideas' of NHS staff. None would have reached the market - or even interested a commercial partner - without support from NISE. It is difficult to say how much these innovations are already saving the British taxpayer but there is no doubt whatsoever that the financial benefit to 'UK Ltd' hugely exceeds their development costs and will continue to grow. Last year, NISE cost the taxpayer around £1.1m in direct support and grants.

However, in spite of our proven track record and demonstrable value for money, our public funding has now been withdrawn and NISE is being encouraged to move to a "fully commercial" model. Fortunately, we have been steadily working towards greater financial and commercial independence for some time and, though the loss of public investment is a major blow to our plans for the future, we are confident in our ability to survive and prosper in the new commercial environment.

At the same time, we believe there is a strong economic argument for continued public investment in a scientifically-robust, professional innovations management service for NHS inventors. The danger is that withdrawing that investment now will result in financially hard pressed Trusts having to support innovation management on their own, even though the NHS as a whole benefits from the results of this work. This puts at risk much current healthcare innovation which results from a direct awareness of the needs of NHS patients. This in turn reduces the opportunities to reduce costs and improve standards of care within the NHS whilst impeding the pace of future recovery and leaving the UK less well-equipped to compete when world markets improve. NISE will therefore continue to press for public investment in healthcare innovation.

In the mean-time, our team of innovations experts, led by Chief Executive Dr. John Stedman, will continue to provide a first class innovations-management service. Never has their task been more important.

Oliver Wells

# Introduction



As our Chairman has indicated, 2010-11 was a challenging year for NISE. Like all businesses, we have been affected by the extraordinarily difficult economic and political climate. But we had also to contend with the loss of most of our public funding and with the uncertainty created by the latest round of changes taking place within the NHS.

In spite of that unpromising background, NISE's team of innovations experts have been hard at work all year, promoting the cause of innovation, assessing new innovations and progressing existing projects. We currently have around 100 new healthcare products and services in development, every one of which has the potential to increase the welfare of NHS patients, the efficiency and cost-effectiveness of the NHS, deliver savings for the UK taxpayer and generate profits for British healthcare companies. First, though, they have to complete the innovation journey. Taking an idea, assessing it, protecting it, refining it and bringing it to market with the right commercial partner is highly-skilled work. It takes time. And the right conditions 'on the ground'.

Conditions over the past twelve months have been far from ideal but I am proud to say that we still had our most successful year to date, managing to exceed all the targets set for us by our funders as well as our own Board of Directors. We have also begun to change our operational model to help us survive the transition period, cope better with the significant changes taking place within the NHS and adapt to the increased operational and financial pressures affecting NHS delivery organisations. Quite simply, we have to change because we no longer receive core funding to support our core activity of stimulating and supporting innovation within the NHS. But whilst we are confident of our ability to survive and prosper in the new world of UK healthcare, we nonetheless have serious misgivings about the wisdom of the decision to withdraw public support from healthcare innovation.

**NISE is a cost effective service provider.** The innovations we have helped develop over the past six years have delivered significant benefits right across the healthcare economy. As a hitherto confidential external review of NISE<sup>1</sup> observed last year, we *"generate value in many ways; for patients, NHS organisations, SHAs and the Department of Health, healthcare businesses and their employees and the taxpayer."* The report lists some of the main benefits that NISE has delivered: cost savings, better patient care, more productive workplaces and staff, royalty income and the protection of NHS intellectual property (IP) and regional business benefits (sales and employment). Its authors concluded that, even using highly cautious assumptions about adoption, effectiveness and 'additionality', our figures to date still predict *"an annual future value of cost savings attributable to NISE of £3.3m, which is more than three times the annual running costs."*

Our public sector support has allowed NISE to establish contact with NHS staff across the south-east, and to embed a culture of innovativeness and empowerment in people who have ideas on how to improve the way the NHS can help its service users. We have worked with Trusts to hold Innovation competitions; we have provided Web-based Intellectual Property (IP) awareness training for all NHS staff; we have worked with inventors to develop their concepts, supported proof of concept projects and capture and protect their IP. As projects reach a successful conclusion, we have driven the licensing process; and once the licensing is completed, we continue to manage the deal. Our grants have allowed us to provide these services to NHS Trusts initially free of charge, and over the last two years at less than 30% of cost, and certainly at a very much lower price than they would be able to get similar service from elsewhere.

The big question remains "for how much longer will public support be required before the business is self supporting?" NISE is a company limited by guarantee: all its surplus is reinvested in the development of our services for the benefit of our members and stakeholders: the NHS and its patients and staff. We have a growing stream of licence fee income, but this will not be sufficient to make the company self supporting and fulfil its mission. Income from our Trust members is less than the cost of providing services to them: why can't we raise the price of our services?

While Trusts (as owners of the resulting IP) are themselves beneficiaries of our services, the vast majority of the benefits of the inventions arise to the NHS as a whole, and not to the originating Trust. The diagram below illustrates where the benefits are realised. In a time of harsh cost constraint and risk aversion, there is an increasing unwillingness to undertake investments which do not give short-term payback. This puts our income from Trust members at risk, even at rates which reflect the benefits arising to the whole NHS.

## What benefits



## Who benefits

NHS Innovations South East	Licensor (owner of the IP trusts /inventor)	Service / technology supplier	Healthcare delivery (NHS Trusts)	Patients / UK taxpayer



**ALERT** a one day multi professions course which allows early detection and treatment of acutely ill patients, gives a **£329k** turnover to the originating Trust, and predicted savings of **£26.9m<sup>7</sup>** for the NHS and UK taxpayer.

In these circumstances, NISE is putting in place the necessary plans to maintain the capability of the organisation in supporting healthcare innovation. We will be extending our range of services to do more to complete the development of the innovations in our pipeline; and to assist our NHS Trust members in their search for innovations whose adoption can help them deliver the services required of them better and more efficiently.

Meanwhile, we will continue to make the case for public funding to ensure the continuation of innovation support services to the NHS. The arguments in favour of public investment in healthcare innovation are so strong that they must eventually prevail. This is not just our view. In discussions with many senior people with an interest in innovation, we have received comments recognising that the Innovation Hubs are a 'strategic medium to long term investment'; and that 'If the Department of Health allows you to disappear, it will have to re-invent you - at great expense - in 3 to 5 years time. The requirement [for your services] simply will not go away.'

It is our purpose to ensure that they will not need to reinvent us!

Dr. John Stedman

The NHS faces a challenging future with increasing financial pressures and continually increasing demand for improved quality of services. It is clear that the NHS must raise its game to develop more high-quality and cost-effective interventions if it is to keep improving.<sup>9</sup>

**Innovation will support the UK economy.<sup>9</sup>**

Innovation is recognised as essential to the future of the NHS.<sup>9</sup>

The NHS remains a major investor and wealth creator in the UK, and in science and engineering in particular.<sup>10</sup>

GP consortia must engage in QIPP – the application of quality, innovation, productivity and prevention, through which the NHS hopes to generate billions of pounds in annual savings – while simultaneously adapting to major reorganisational changes.<sup>8</sup>

**“ Delivering more than monetary worth ”**

Innovation is not just about the future of the NHS and health and social care, it is about the future of our country's economy too.<sup>11</sup>

Innovation connects and drives quality and productivity in the NHS.<sup>12</sup>

Innovation improves and extends lives. Innovation in the NHS is about making a real and tangible difference to the lives of millions. Across the NHS, countless patients bear witness to the power of great ideas.<sup>13</sup>

# Ideas to Reality

The diagram to the right illustrates the innovation journey and the role that NISE plays in supporting ideas becoming reality.

NISE provides innovation services to NHS innovators, raising awareness of innovation and its benefits to patients, the NHS and ultimately the UK taxpayer. These benefits are only realised after the innovation has been commercialised; made available to the healthcare system; and usually spread across the healthcare system, in different organisations at different times. Ultimately patients benefit from what we do, which is why NISE was originally set up in 2004.

Our services include assessment, project management, IP protection and commercialisation of NHS ideas. These involve specialist skills and expertise such as market research, due diligence, financial analysis, project management, facilitation and commercial negotiation skills, internal legal support, intellectual property identification and protection, and writing business plans. These are skills and expertise that NISE has developed to support NHS innovators, and its unique access to the NHS has also been made available to companies to support their innovation and product development (Business Innovation Services).

During the last year, NISE has begun to extend and develop its range of services beyond post deal management into adoption and diffusion. NISE services to NHS Trusts and other organisations now includes:

- Horizon scanning: identifying innovations that have the potential to save money and improve quality in particular care pathways;
- Business case support: qualifying suppliers and their innovations, and acting as an honest broker by assisting with NHS business cases and financial return on investment analysis for technological innovation adoption.
- NISE can also act as a third party between the supplier and the Trust, validating the suppliers performance data, facilitating clear articulation of an innovations benefit in NHS terminology, working across boundaries (public / private sector) with a deep appreciation of NHS priorities and culture.

This way, the specialist healthcare innovation skills and expertise that NISE has developed over the last six years are being deployed more widely to support adoption and diffusion of good innovations to the benefit of patients and the NHS.



# 2010-2011 Operations and Achievements

In spite of the extremely difficult economic and political climate, NISE had its most successful year to date in 2010-11, meeting (and in most cases exceeding) the challenging targets set by our funders, our customers and ourselves.

Much of our work was again supported by the Public Sector Research Exploitation (PSRE) fund. The PSRE fund was introduced in 2001, in response to the Baker Report<sup>2</sup> on knowledge transfer, which was published by the Treasury in August 1999. Its main aim was to enable public sector research establishments to exploit their science and technology potential by providing seed funding to support their early stage business formation. The first round of awards, worth £10m, was announced in October 2001, with three further rounds following in January 2004 (£15m), January 2006 (£25m) and June 2008 (£30m). NISE is proud to have been awarded funding from every round since we were established in 2004.

Our targets and achievements for this 2010-11 included

Registration of new projects



Progression of new project



Completion of new commercial deals



Registration of new Intellectual Property Filings



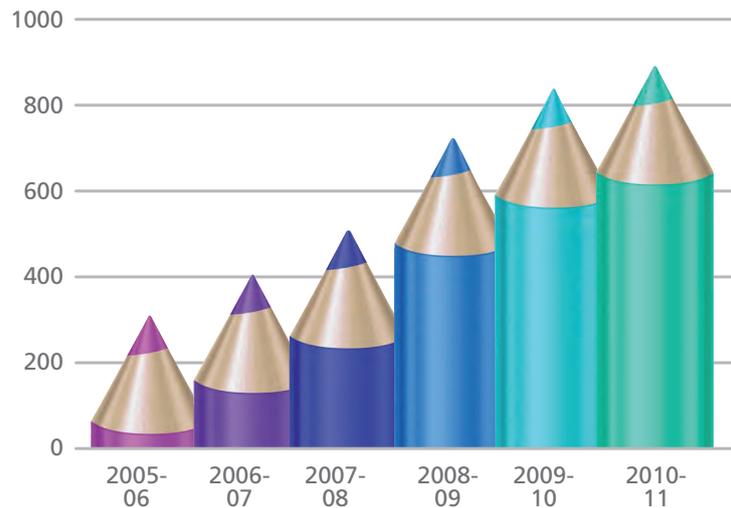
Cumulative innovators NISE has worked with



Cumulative projects registered with NISE



## Cumulative Disclosures 2005 - 11



The registration of projects over NISE's six-year history.

This year's completed commercial deals covered an extremely wide range of products, including the following:

**The trans-lacrymal cannula** - This new medical device, designed for use in ophthalmology surgery, and originating in Royal Berkshire NHS Foundation Trust allows surgeons to provide drainage into the nasal cavity. This makes the procedure quicker (typically by 50%) and safer and less traumatic for patients, who can be treated under local anaesthetic freeing up an overnight bed for the NHS. Patients experience less pain, swelling and fistula-formation; and shorter post-operative recovery times. The benefits for the NHS include improved productivity, a freeing-up of surgical staff and facilities, and reduced operating costs.

**The smoking calculator** - Everyone knows that smoking is a major health risk; a leading cause of preventable morbidity and premature mortality. For clinicians, however, it is rarely enough to know whether a patient is a smoker or a non-smoker. They need to be able to calculate a patient's total 'cigarette load', in order to predict either the probable progress of an existing disease or the likelihood of developing a disease in the future. Making that calculation has, up to now, been a highly complicated task, as people who smoke tend to vary their smoking habits over time. Cue the smoking calculator. Jointly developed by a GP and Practice Nurse Specialist with special interests in respiratory diseases, the calculator (essentially an algorithm) produces a numerical value for a patient's lifetime tobacco exposure, measured in 'pack years'.

The calculator does not just simplify an important task; it also offers more accurate calculations (and predictions) and provides a new, universal standard for smoking load/pack year recording across all healthcare settings. It therefore has the potential to significantly improve the diagnosis and treatment of smoking-related disease, to motivate patients to modify their behaviour, and thereby saving lives and reducing NHS expenditure on the treatment of smoking-related diseases.

**Tracheostomy collar** - A dislodged tracheotomy tube can be fatal but whilst older children and adults can easily replace a dislodged tube, younger children and babies clearly cannot. This comfortable and secure device fits around a child's neck and keeps a neonatal or paediatric tracheotomy tube in place.

Existing collar designs tend to be uncomfortable and often cause chafing of the skin which is not only uncomfortable for patients but also increases the likelihood of infection. As a result, it is common practice in paediatric hospitals for staff to make their own 'bespoke' collars. However, this is time consuming and expensive.



It is estimated that the new collar will provide the NHS with around £150,000pa in efficiency savings (due to the staff-time freed-up) plus an average of c£5,000 per case of prevented infection.<sup>3</sup> There are wider benefits too; the Tracheostomy Collar has now been licensed to a British company selling healthcare products into 38 countries. As a result, the Trust where the collar was first developed Brighton and Sussex University Hospital NHS Trust is set to receive royalties, whilst a British healthcare company has a new product, to sell here and overseas.

**Cannula Fixing** - This is a dressing with a new and improved design that delivers a stronger, more flexible fixing and so reduces the likelihood of 'pull', movement or detachment of a cannula. The major breakthrough here is in the design, which enables the same materials to be used as in other 'conventional' dressings, so there are no significant cost implications for users in switching from conventional dressings to the new design. (The only alternative solution currently available uses different materials and is almost 10 times more expensive than conventional dressings.)

By reducing the risk of the cannula becoming detached and /or patients picking-up infections arising from poor adhesion or movement, the new cannula-fixing offers better outcomes for patients and huge financial benefits to the NHS and the wider healthcare economy. More than 12 million patients are admitted to NHS Hospitals each year (based on actual 2008 figures) and most are fitted with an IV cannula at some point. One well-known study<sup>4</sup> puts infection rates at 5%. Assuming just 1% serious infections, at a cost of £5K per infection, use of the new cannula-fixing could save the NHS up to £50 million per year. This is another example of a NISE-assisted innovation being licensed to a British company with established overseas markets. Again, the originating Trust, East Kent Hospitals University NHS Foundation Trust, will receive a steady stream of royalties whilst the British healthcare company has a new product to sell both here and overseas.



**Tucks** - is the name of an environmentally-friendly disposable bag for fruit, chocolate and other items that might otherwise be left exposed to airborne infections (e.g. MRSA, C. difficile) on a bedside locker. The bag has a re-sealable flap and can carry printed advertising.

MRSA can be transmitted by nasal particles (from sneezing) and C. diff by airborne spores. Both can contaminate items of fruit and other foods which are often left on a patient's bedside locker. Elimination of this source of infection would be an enormous boost to infection control in any hospital. And given that average cost of dealing with a single infection-episode is estimated at £5,000, the financial benefits are obvious.

**The Cannulation Device:** This device makes catheter insertion and retention easier during chemotherapy and other intravenous therapies. Use of the device helps make chemotherapy sessions less stressful and less painful for patients. It also reduces the amount of time that nurses need to spend with each individual patient and so offers increased throughput, improved productivity and a reduction in unit-costs.

There are an estimated 5,600 chemotherapy stations in England and it is calculated that the use of the glove would allow them to provide more than 2 million extra chemo sessions per annum from existing resources. The glove also has significant overseas sales potential.

**Colonoscopy garment** - this range of disposable underwear has been specially-designed for patients undergoing colonoscopy or sigmoidoscopy. The garments provide greater dignity for patients as well as improved hygiene and efficiency.

**Free Flaps database** - Developed at the Queen Victoria Hospital in East Grinstead, Sussex, the Free Flaps database allows retrospective and prospective entry of data about 'free flap patients' (those undergoing groin or breast reconstruction using free flap procedures) and uses that data to generate reports of outcomes and of the correlation between outcomes and co-morbidities, demographics, outcomes, time to referral etc. As well as providing an extremely detailed, accurate and interrogable record of free flap procedures, the database can be used to generate detailed operation notes - with pre-set post-operative instructions - on the directions of the plastic surgeon.

The benefits of the database include improved patient care and outcomes; both now and in the future since, over time, the database will contribute to our knowledge of emerging best practice. The database will also improve efficiency and cost-



effectiveness by enabling the 45 NHS specialist centres to maintain an accurate record of all free flap reconstruction outcomes and complications. It may also reduce costs more directly, by providing accurate and reliable information on outcomes and techniques for use in medico-legal disputes.

**Ladders & Bladders** - The NHS Institute for Innovation and Improvement recently highlighted Ladders & Bladders in their latest High Impact Actions programme. There is more information on it on page 16.

**Resource Services Organiser** - The Resource Services Organiser (RSO) is a bespoke software solution for Health Promotion Services. Key features of the highly configurable software package include real time library and client database display, an always accessible on line catalogue and ordering system and sophisticated stock control systems including management of overdue stocks. Highly configurable, the RSO can be used to generate a wide range of statistical and management reports and is also the only solution of its type to offer full on-screen preview of every type of resource available, including video clips, leaflets, posters, photographs and equipment.

At its most effective in multi-site settings, the RSO has already demonstrated its worth at the Berkshire East NHS PCT, where it was originally developed, with output more than doubled despite a 48% reduction in staffing and a standstill budget. In addition it has enabled a more equitable use of public health education resources (lent and consumables) across six PCTs, and widened its user base to non-NHS staff.

**Primary Emotional First Aid** - The term Emotional First Aid (EFA) refers to the initial response given to a young person experiencing emotional distress before specific professional help is obtained. It is also the name of a highly successful training and awareness-raising programme. Primary EFA is a new version of the tool, focusing on the needs of primary-age children and those with learning difficulties and / or special needs. The main beneficiaries of the programme are, of course, emotionally distressed children and young people. But we should not overlook the economic benefits of a programme that helps prevent the early onset of mental health problems and relieves the pressure on hard-pressed CAMHS services. Rolled-out across the NHS, it is estimated that EFA could save the NHS (and the UK taxpayer) around £40m per year.



Our PSRE funding agreement also required us to assess the economic impact of two NISE innovations – VitalPAC and EFA.

As we noted earlier, it is almost impossible to assess precisely the full economic value of the **Emotional First Aid (EFA)** programme to the NHS and the UK taxpayer. The right kind of early intervention can help to prevent the onset of serious mental health problems that might otherwise necessitate psychiatric, social and welfare support into, and in some cases throughout, adult life, at huge cost to the taxpayer. We can certainly be confident that EFA is helping to reduce NHS expenditure, as the areas in which it has been trialled have seen a welcome reduction in referrals to their Child and Adolescent Mental Health Services (CAMHS).

**VitalPAC** is a real-time, mobile, 'Track and Trigger' information system that monitors patient condition and quickly identifies signs of patient deterioration. By enabling healthcare professionals to capture vital signs electronically at the bedside – and analysing those signs alongside other clinical data - the system generates assessments and risk scores that help to ensure optimal and timely treatment.

VitalPAC is delivered in a range of clinical modules, one of which is designed for Infection Prevention & Control (IPC) managers. Within nine weeks of the IPC Module going live in Portsmouth Hospitals NHS Trust in June 2010, the hospital's Infection Control team conducted 220 more patient case reviews (which equates to a 53% rise in productivity compared with the same period in the previous year). More recent data showed that this increased level of output was maintained throughout the rest of the year, even though infection control staffing-levels were reduced by more than a third (from 14.7 WTE to 9.7 WTE), delivering a net saving, in just one hospital, of £138,000 per annum (cash released).

Data supplied by the hospital's Senior Infection Prevention Nurse has also been used, in conjunction with official information on incidence costs, to determine the overall reduction in costs achieved by VitalPAC across the Portsmouth Hospitals for MRSA, CDiff and Norovirus (diarrhoea and/or vomiting).

- The incidence of MRSA cases was reduced from 501 to 388 in the year that IPC manager was implemented at PHT. MRSA incident costs per patient are approximately £5,430 so the 23% reduction in the number of MRSA cases not only represents a significant benefit for patients but also equates to a £613,590 'saving' (i.e. cost avoided) for the Trust.
- The number of CDAD (C. Diff associated disease) fell from 111 to 88 in the same year. CDAD incident costs per patient are approximately £4,900 so a reduction of 23 MRSA cases equates to savings of £112,700 (costs avoided).
- Norovirus affects both patients and staff. In 2009/10, 54 staff were affected with Norovirus. Following the implementation of the IPC Manager module, this fell to 1. Infected staff must be clear of any diarrhoea and / or vomiting symptoms for 48 hours before they can return to work, which means that the reduction in staff sickness generated a minimum cost saving of £10,100, though this is an extremely conservative estimate that assumes nobody was absent for more than two days. It also makes no allowance for associated agency costs for backfill of staff.

The aggregate net cost savings described above amount to £875,000pa across the Portsmouth Hospitals NHS Trust.

## Summary

Over the past six years, NISE has worked on more than 800 healthcare innovation projects. Last year alone, we registered 149 new innovations, many of which have the potential to deliver improved patient care and / or better patient outcomes, along with significant savings for the NHS. Most also have real commercial potential, both at home and overseas and they therefore offer a wealth of opportunities for the private healthcare sector.



*"In the NHS, innovation occurs in the delivery of patient care, in the education and training of employees and in R & D programmes. Innovation occurs naturally in the normal course of employment. The innovation may be a novel treatment, a device, a new drug, data, software, training material or a new management system. Most innovations are best implemented by making them freely available through normal knowledge management processes when they have demonstrated a quantifiable health gain. However, some innovations are inventions which can be realised only through commercial development, and for these the professional management of associated intellectual property (IP) is crucial. There must be wider recognition across the NHS that protection of IP facilitates, rather than impedes, uptake of inventions.<sup>14</sup>*



# Understanding Innovation

We are often asked what it takes to translate one person's good idea into a new healthcare product or service. NISE has been supporting NHS innovators throughout the South East for six years now and in that time we have learned a lot about what we call the 'innovation journey'. Successful innovation begins, of course, with a good idea – but translating that into a successful product involves a lot of painstaking work. Along the way, an innovator's bright idea needs to be

- Assessed... to establish whether it is genuinely new and original;
- Tested... to make sure that it works;
- Protected... any new intellectual property created has to be protected;
- Market-tested... to assess the potential market for the 'end product';
- Planned... a properly-prepared business-plan will help take the project forward;
- Funded... it may be necessary to raise funds for further development work (e.g. in the case of a new medical device, to build a prototype)
- Partnered... at this point we may negotiate a deal with a commercial partner.

To these ends, NISE's team of innovation experts offers a varied range of technical, scientific, legal and commercial support services, all designed to give the bright ideas of NHS innovators the best possible chance of success. But though we are proud of our achievements, it is impossible to guarantee the success of a project, no matter how brilliant the idea behind it. The conditions also have to be right. The purpose of this section of the report is to answer some of the questions we are asked most frequently and to highlight the lessons we have learned about the conditions for successful healthcare innovation.

## At what point should innovators share their ideas?

Ideas need to be professionally assessed and any new intellectual property (IP) protected – and the sooner the better. Why? Because there is a risk that someone else has had, and laid claim to, the same idea as you. In that case, inventors can work for years on projects that they may not be able to exploit. And remember, if two or more people try to patent the same idea, the patent is likely to be awarded to whoever applied for it first. They may not have had the idea first; perhaps they were simply quicker to recognise its potential or just better organised. Anyway, if you have a bright idea, talk to us about it and let us advise you on how best to protect it!



## What do you mean by Intellectual Property (IP) *management*?

Most people appreciate the importance of protecting their initial intellectual property. But the job doesn't end there. The innovation journey can be a long one, with ideas being refined and adapted along the way. What began as one person's project can become a broader collaboration. The twin processes of refining and sharing ideas are often essential to successful innovation but they require very careful IP management. Take the case of the Emergency Capacity Management System (ECMS), a web-based patient referral solution originally developed in Surrey and now deployed by a consortium of ambulance services. In its original form, the ECMS provided a real time admissions database showing pressure between acute hospitals. Later, however, the consortium sought to improve the system by incorporating additional features. To help them, they engaged someone to re-write the software program under-pinning the system. However, their 'helper' then asserted ownership of the software, creating a major obstacle to the wider 'roll-out' of the service to other ambulance services.

Fortunately, NISE was able to resolve the problem, brokering an Intellectual Property Rights ownership agreement that secured an outright assignment of all IPR to the consortium, thereby freeing it to extend the system to other services. However, the experience illustrated perfectly the importance of managing and updating your IP rights.

### Why is innovation so technical?

It doesn't have to be. We are proud to say that many of the innovations we have helped bring to the market have exploited the latest scientific knowledge linked to cutting-edge technology. But it doesn't have to be that way. They do say that the best ideas are often the simplest. Take Ladders and Bladders for example. A simple board game? Well, yes – but also a highly effective means of tackling healthcare associated infection (HCAI), one of the biggest challenges facing NHS hospitals.

Based on Snakes & Ladders, the board game of Ladders & Bladders is used to demonstrate and teach best practice in catheter management. The game comes in two versions - a large floor mat, with the actual players acting as the counters, or a tabletop version.

Ladders and Bladders is the brainchild of Paula Tucker, a Hospital Matron with the Brighton and Sussex University Hospitals NHS Trust. Paula is the first to admit that a board game based on Snakes and Ladders is not exactly 'high-tech' innovation but then, as she points out, good catheter management is hardly the most glamorous subject. However it is extremely an important one; a crucial element in effective infection control. Unfortunately, most current teaching methods involve staff attending formal courses or seminars, usually offsite. Such training is relatively expensive and often viewed by participants as something of a chore. By contrast, Ladders & Bladders is inexpensive, flexible and, above all, fun which makes for faster learning, easy reinforcement and longer retention of the message. Better still, the game can be used outside normal training hours as a quick "game" to assess and update staff knowledge. And it can be used with patient groups too!

The appeal of Ladders and Bladders is not confined to the NHS. It has aroused a lot of interest within the private sector particularly in care homes, where the cost of delivering compulsory training is a major factor. And although Ladders and Bladders is currently designed for use in urology, it could easily be adapted to other clinical areas. Potentially, there is a significant market for this kind of innovation it is worth remembering that, in addition to the obvious patient care benefits and efficiency-savings, preventing just one HCAI episode saves the NHS an estimated £5,000. Small wonder that Ladders and Bladders now has a commercial partner who is planning to market the game nationwide.

### Do things ever go wrong?

Yes, a lot *can* go wrong. Establishing IP ownership can be problematic. Finding finance is often difficult. Finding the right commercial partner – on the right terms – is never easy. Fortunately, NISE has experience of helping innovators solve these and most of the other problems that tend to arise.

However, support from the originating Trust is important too, as this example shows. COUNT<sup>®</sup> is another of those apparently simple ideas that has enormous potential; one that costs very little to implement but could improve patient care, reduce admissions to hospital and save the NHS a lot of money. A sure-fire winner, you might think? So far, unfortunately, this highly promising innovation has come to nothing.



Conceived by the pharmacy team at Guildford and Waverley PCT in Surrey, COUNT<sup>®</sup> was designed for patients in the community who were at risk of hospital admission, as they may not be benefiting fully from their prescriptions. The five most common reasons gave rise to the name of the new service...

<b>Confusion</b>	Patients are unsure how much medicine to take or when to take it.
<b>Over-ordering</b>	Patients over-order, resulting in stockpiling, sharing or overuse.
<b>Unable to open</b>	Patients are unable to unscrew lids on bottles or open foil packs.
<b>Not taking medicines</b>	Patients are either forgetting or choosing not to take their medicine.
<b>Too many journeys</b>	Patients have difficulty collecting all the medicines they need.

Under the COUNT<sup>®</sup> programme, the intermediate carers making home visits to patients could if necessary, refer them to the pharmacy team. A pharmacist would then visit, conduct a full medication review and discuss the medications – and any problems - with the patient and their family / carers. This was intended to

- help the patients get the best out of their medicines;
- reduce unnecessary prescribing (the team estimated that, in their PCT area alone, prescribed medicines worth between £1.5m and £2m were going to waste each year).
- reduce the number of admissions to hospital.

Trials showed that COUNT<sup>®</sup> was more effective than other 'medicine management' schemes in reducing hospital admissions and cutting down levels of 'wasted' prescriptions its success probably due in part to the pro-active way in which COUNT<sup>®</sup> engaged with GPs who generally gave it their full support. The service was also extremely well-received by patients, intermediate care services and other healthcare professionals and took first place in no fewer than three regional and national innovation competitions. An evaluation of one pilot scheme, working with just 158 patients, calculated the probable net cost savings of the scheme at £235,000, mainly complex elderly patient admissions.

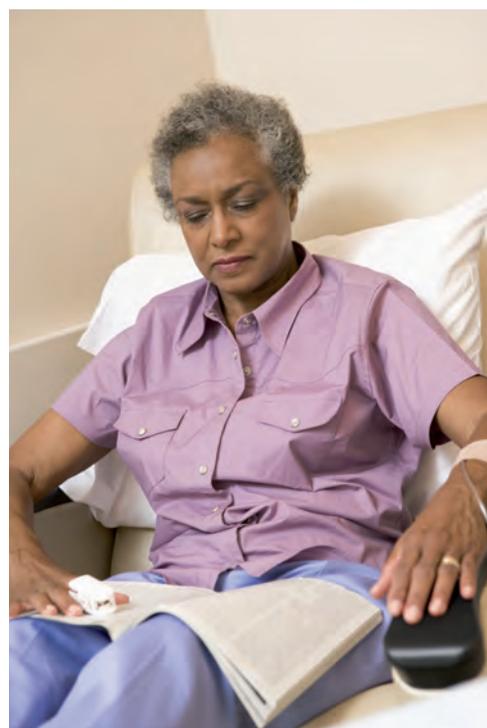
NISE worked with the pharmacy team to develop the COUNT<sup>®</sup> service further; our joint aims being to adapt it to the needs of a broader range of patients and to market the service throughout the NHS. However, healthcare in Surrey was about to undergo a major re-organisation with all the Primary Care Trusts being merged to form one 'super PCT', which meant that all the pharmacists had to re-apply for their jobs. Half the eight-strong pharmacy team at Guildford & Waverley PCT left as a result of this process and though NISE tried to persuade the management team at the new 'super PCT' to adopt and support the project, they declined to do so – even though a number of other PCTs and one SHA had expressed interest in licensing it.

So far, then, COUNT<sup>®</sup>'s enormous potential is unrealised. However, it is not necessarily a failed innovation; its 'prime mover' now occupies a senior position in another PCT (outside the South East region) and is interested in developing a similar programme there. The potential benefits - for patients and the NHS – are so great that we can only hope the next COUNT<sup>®</sup> experiment takes place in a more stable and supportive environment.

### Which comes first – patients or profits?

In our experience, an innovation that is good for patients is likely to be profitable too. (Conversely, a healthcare product with no obvious patient benefits would be certain to fail commercially.)

When it comes to working with the private sector, NISE has an extremely strong track record. We want as many patients as possible to benefit from the products and services we help bring to the market – and we want the hard work, creativity and commitment of 'our' NHS innovators and Trusts to be rewarded. The best way to make that happen is, almost invariably, to create a partnership between the people behind an innovation and one of the specialist healthcare and / or technology companies who make such an important contribution to the regional and national economy. NISE has been responsible for a lot of highly successful commercial partnerships between the NHS and the private sector. Our partners range from small 'start-ups' and 'spin-offs' working in highly specialised niche markets to some of the biggest multi-national concerns.



Every so often, however, somebody presents us with an innovation which is hugely important but which offers little profit; an innovation which no healthcare company is likely to find commercially attractive – or even viable. Take, for example, the Oxford Child Sexual Abuse Examination Skills Trainer, also known as OXCAT. The brainchild of Dr Sue King, an associate specialist in community paediatrics at the Oxford Children’s Hospital, OXCAT consists of a highly sophisticated and technically advanced anatomical model, plus supporting DVD, which can be used to train paediatricians and other authorised specialists when using specialist equipment (a colposcope) to investigate suspected cases of pre-pubertal Child Sexual Abuse (CSA).



Individual medical practitioners may take some time to acquire the experience and confidence they ideally need when called upon to make an assessment of pre-pubertal CSA. Assessment is difficult and the stakes are obviously extremely high for everyone concerned. Because the stakes are so high and practical case-experience limited, realistic and effective training is of critical importance. However, much current training still relies on photographic and other illustrations and / or on the use of toys, such as dolls and even teddy bears. Dr King’s idea was to develop instead a highly-realistic anatomical model, suitable for use with a colposcope. The result, OXCAT, was launched a year ago to considerable acclaim from all the agencies involved in the important job of child protection; from paediatricians to police officers, solicitors to social workers. But whilst NISE was able to help Dr King find a company willing to manufacture the OXCAT ‘manikins’ (Pharmabotics Ltd), we were never able to interest a commercial partner in the project at an earlier stage. Even now, in fact, there is no prospect of a long-term deal because

- OXCAT manikins cost a lot to produce;
- initial demand will be limited (in most cases, one manikin per training centre will suffice);
- there is little prospect of significant repeat business or greatly-increased future demand.

Why, then, should any private sector company have invested a lot of time, money and expertise in developing OXCAT and bringing it to the market? Quite simply, they shouldn’t – and didn’t. However, NISE did. Thanks to our (part) public funding, we were able to support the development of OXCAT from first principles through to production, secure in the knowledge that whilst it may not make a profit, it offers huge benefits for all those involved in the diagnosis, treatment and prosecution of child sexual abuse – and in particular, provision of earlier and better support for the young victims themselves. And there are economic benefits too; OXCAT is expected to deliver significant cost-savings to the UK taxpayer, by generating savings in the NHS, in children’s services and in the criminal justice system.

Roughly how long does it take to turn an idea into a new product or service?

There is another reason why we at NISE feel strongly about the need for public investment in healthcare innovation. Without it, everyone – not least the private sector - loses out. Since we were established we have helped bring around fifty new healthcare products and services to the market-place – almost all of them benefitting from the involvement of a private sector partner. But none of those innovations would have found a commercial partner but for the prior, publicly funded, involvement of NISE. To assume that the private sector will fill any gap created by the withdrawal of public funding is to misunderstand how business operates. Take the case of mIPS.



The brainchild of Dr Fares Mayia, a Consultant Clinical Scientist working in the Medical Physics Department of the Oxford Radcliffe Hospitals NHS Trust, mIPS (mini Isolated Power Supply) is a device that helps delivers a guaranteed, fail-safe power supply in conjunction with a UPS system to operating theatres, treatment rooms and other medical settings – including emergency facilities such as field-hospitals.

It is obviously essential that modern operating theatres have a fail-safe electrical supply and the latest electrical safety standards (MEIGaN, IEC60364-7-710 and HTM 06-01 16.27-16.48) are specifically designed to provide a safe, isolated electrical environment. However, these ‘new’ safety standards initially placed a considerable financial and logistical burden on the NHS.

The cost to the average NHS Hospital Trust of upgrading ten 'interventional rooms' using conventional technology was estimated at £100,000 and, to make matters worse, the upgrading exercise frequently involved a lengthy 'down-time' and the permanent loss of valuable space. (The newly-installed equipment was bulky.) Thankfully, along came mIPS.

mIPS is a compact unit that simply plugs-in over an existing socket, converting it into a twin isolated outlet. mIPS is fully compliant with the new electrical safety standards and is quickly and easily-installed, reducing 'down time' to around a day and upgrade-costs by 75%. Better still, mIPS requires no operator training, takes-up little space and delivers even greater safety for patients and staff than IPS or UPS technology - because it permits any 13 Amp wall sockets to have an isolated supply, thereby offering maximum isolated-supply capacity in any given medical location. And mIPS is so easy to deploy that it can even be used on mobile units such as transfer trolleys.

But, for the purposes of this report, the really remarkable thing about mIPS is that the inventor and NISE worked together for four years – protecting, refining, developing and 'future-proofing' Dr Mayia's idea – before they had a sufficiently-strong commercial proposition to attract a commercial partner. Innovation Manager Dr Arshad Mairaj explains: "Dr Mayia very sensibly approached us early; he foresaw the problems that the new regulations could bring and had an idea about how best to tackle them – but those ideas were still somewhat speculative. We were able to help him obtain an expert second opinion; then to 'firm-up', test and protect his ideas and assess their future commercial potential. Only then were we able to put together a strong-enough business-case to make a successful application for 'proof of concept' funding, which, with additional investment from the Trust, would enable us to build the first commercial prototype. And it was at that point that we were able to secure the right kind of partnership deal with the right commercial partner; mIPS is now in production with Starkstrom, one of the world's leading manufacturers and suppliers of technical equipment for hospitals."



Dr Mairaj continues "For many innovations, a four-year timetable is about right. A lot depends on the nature of the innovation and the extent to which clinical and other trials are necessary; software applications are typically quicker to bring to market than service developments, with new medical devices taking even longer. These things cannot be rushed; nor should we look to engage the private sector before we have built and tested a business case. Many an innovation has been lost because it has looked to find a commercial partner too early and been rejected. Worse still, some very promising ideas have been 'sold-on' too early, only to be shelved when the partner decided that the direct financial return was insufficient and / or would take too long to realise. The problem here lies not with the private sector but with those politicians and others in the public sector who fail to appreciate its proper role and so look to engage too early."

## Summary and Conclusions

Over the past six years, NISE has built a track record of success in championing innovation throughout the NHS in the south-east. This was built initially on services that, like the NHS itself, were free at the point of delivery. This allowed us to unlock and mobilise the innate creativity of the NHS workforce. We have worked with almost 600 inventors and innovators on more than 800 projects.

Innovations arise from NHS staff at all levels and in a wide range of settings, typically driven by interaction with service users at the "coalface". Before NISE existed to help turn these into reality, many never progressed beyond being good ideas. Since its establishment, NISE has been able to work with hospital consultants like Dr Mayia to realise a number of successful launches: COUNT<sup>®</sup> was developed by a PCT pharmacy team and 'Ladders and Bladders' by a Hospital Matron. We have examples of successful innovations developed by GPs, nurses, paramedics, health-promotion staff, tutors, researchers, managers and administrators. Service users can also make vital contributions as with The Emotional First Aid<sup>™</sup> training course<sup>5</sup>, with estimated annual cost-savings of around £40 million to the NHS in England<sup>6</sup>.



Good ideas are continuing to emerge – innovation becomes a habit when people can see their ideas turned into reality. However, the loss of our public funding support means that there will be less resource in future to be able to assist projects like these. Without our help, such innovations are less likely to see the light of day. So, while NISE focuses on the innovations that offer an immediate return, other projects that offer far bigger returns to the NHS as a whole in terms of improved patient-care, reductions in NHS expenditure and savings for the UK taxpayer are at risk of simply withering on the vine.

## References

- <sup>1</sup> Frontline, 2010, 'Review of NHS Innovations South-East; a report for NHS South Central and NHS South East Coast'
- <sup>2</sup> HM Treasury, Aug 1999, 'Creating Knowledge, Creating Wealth; realizing the economic potential of public sector research'
- <sup>3</sup> Plowman R, Craves N, Griffin M, Roberts J, Swan A, Cookson B, Taylor L (2000). 'The socio economic burden of hospital acquired infection. London: Public Health Laboratory Service.' Puts cost of infection at an absolute increase of £3154 per case over and above "normal" treatment costs.  
In Jan 2000 The Public Health Laboratory Service (PHLS) and the London School of Hygiene and Tropical Medicine (LSHTM) analyzed the social and economic burden of hospital-acquired infections (HAIs).The research shows that on average a patient with a HAI:
  - Spends 2.5 times longer in hospital than if they had not contracted an HAI
  - Costs almost £3,000 more to treat
  - Can often require additional treatment for their infection after they have left hospital
  - Suffers additional distress and illness, which is shared by their family and those who have to care for them once they have left hospital
- <sup>4</sup> E Creamer, G McCarthy, I Tighe and E Smyth, 'A survey of 554 peripheral intravenous catheters: infection, duration of cannulation and documentation issues', Journal of Infection Prevention August 2003 vol. 4 no. 4 21-25
- <sup>5</sup> 'Me & U – a real insight into the emotional experience of a young person today'
- <sup>6</sup> If Emotional First Aid™ were rolled-out across England, and effected a 10% reduction in referrals to CAMHS.
- <sup>7</sup> Paul Trueman et al, April 2009, 'NHS Innovation Hubs - Development of Metrics for the NHS Innovation Hubs, York Health Economics, Consortium', (Full report available from NHS Innovations South East)  
*Extract:* It is now widely recognised that some in-hospital cardiac arrests, intensive care unit admissions and even deaths are avoidable. Regrettably, patients can show signs of clinical deterioration for many hours, without these necessarily being detected or adequately treated by ward staff. That failure to get the basics right – ensuring that the patient's airway is not restricted, that their breathing and circulation are not impaired, that their oxygen therapy and fluid balance are right – can seriously undermine acute care. ALERT™ is a one-day focussed training course intended to help healthcare professionals, particularly junior medical staff and nursing staff, recognise and respond better to impending clinical deterioration.  
Due to the high costs associated with critical care and intensive care admissions, even a small reduction in admissions can generate significant savings. If we assume that 50% of eligible staff attend and implement the ALERT programme in their trust and that upto 20% of admissions to intensive care are avoidable, then the potential savings are in excess of £26M per year. Key outcomes (assuming 10% impact on ICU/CCU admissions): Potential life-threatening events avoided: 351; Potential ICU/CCU admissions avoided: 1,634; Potential savings to the NHS: £26.9M.  
Over 160,000 UK healthcare staff have received training, and it has been franchised overseas: Ireland, Sweden, Denmark, Norway, Australia, New Zealand, Italy.
- <sup>8</sup> Sir David Nicholson Speaking at the House of Commons health and social care bill committee on 8 February. Guardian Professional, Wednesday 9 February 2011
- <sup>9</sup> Department of Health web site Innovation - NHS innovation – Call for Evidence.
- <sup>10</sup> East Midlands Innovations Survey for Ideas to Increase the Spread of Innovation 5/8/2011.
- <sup>11</sup> [www.improvement.nhs.uk/qipp/Home/Innovation/tabid/181/Default.aspx](http://www.improvement.nhs.uk/qipp/Home/Innovation/tabid/181/Default.aspx)
- <sup>12</sup> Design Centre article Quality, Innovation, Productivity and Prevention.
- <sup>13</sup> NHS Improvement website – Innovation eQIPP. [www.improvement.nhs.uk/innovationqipp](http://www.improvement.nhs.uk/innovationqipp)
- <sup>14</sup> Department of Health, September 2002, Gateway: 29030. The NHS as an Innovative Organization: A Framework and Guidance on the Management of Intellectual Property in the NHS.

# Financial Information

## NHS Innovation South East income and expenditure summary

	2009-2010	2010-2011
<b>Income</b>		
Membership fees	186,575	186,550
Government grants	991,622	350,000
Other operating income	16,644	30,539
Bank & other interest received	5,661	4,807
Reserves carried forward from previous years	-	347,778
<b>Total</b>	<b>1,200,502</b>	<b>919,674</b>
<b>Expenditure</b>		
Pay & pensions	851,464	732,329
Recruitment, etc.	29,126	10,035
Travel & associated costs	46,093	34,311
Rent, rates, utilities, telephone	58,382	35,355
Marketing & exhibitions	102,871	18,632
Post, stationery & office expenses	23,847	28,575
Computer costs	25,699	19,120
Legal & professional fees	9,336	23,611
Accountancy & auditors	13,460	17,095
Bank charges & interest	584	611
<b>Total</b>	<b>1,160,862</b>	<b>919,674</b>
Surplus before depreciation, disposals, bad debts and tax	39,640	-

NHS Innovations South East detailed and audited accounts are available on request

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Eastern and Coastal Kent PCT

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Maidstone and Tunbridge Wells NHS Trust

Medway NHS Foundation Trust

NHS Hampshire

NHS Oxfordshire

Nuffield Orthopaedic Centre NHS Trust

The Oxford Radcliffe Hospitals NHS Trust

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Royal Berkshire NHS Foundation Trust

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Southampton City PCT

The Ridgeway Partnership

University Hospital Southampton NHS Foundation Trust

Western Sussex Hospitals NHS Trust

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## **NHS Innovations South East**

*... the innovations management service*

**NHS Innovations South East identifies and manages intellectual property in the South East on behalf of the NHS**

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