



Innovation Impact Stories

Clinical academic collaborations improving the lives of our patients



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innovation



Introduction

At King's Health Partners, our primary purpose is innovation. Innovation to translate cutting-edge research into patient care as quickly as possible; to deliver improved outcomes for our patients and service users; to make sure our workforce have the skills they need to deliver the best possible care; to connect mental and physical health; and to improve the health and wellbeing of our local population.

Our innovation takes many different forms. Much of it is delivered through our Clinical Academic Groups, which bring together clinical, research and education experts from across our four partner organisations (Guy's and St Thomas', King's College Hospital and South London and Maudsley NHS Foundation Trusts and King's College London). This book provides an example from each of our Clinical Academic Groups of how they have worked collaboratively to deliver an innovative approach to providing better patient care. The breadth of innovations on show here is testament to our partnership's commitment to using our collective expertise to improve the lives of the people we serve.

Our Clinical Academic Groups are supported by a number of innovative cross-partner programmes. Mind and Body is focused on integrating mental and physical health, Value Based Healthcare seeks to identify the best interventions to improve patient outcomes and optimise value, and our Informatics programme is concentrated on finding digital solutions to some of the collective challenges we face.

While innovation does not need to be expensive, it does not always come for free either, and we are very grateful to our many partners who make our work possible, particularly Guy's and St Thomas' Charity, King's College Hospital Charity and Maudsley Charity who between them have helped fund many of the examples in this book. We also work very closely with the Health Innovation Network (our Academic Health Science Network partner) to spread our innovations throughout South London.

I hope you enjoy reading about the many different ways in which our Academic Health Sciences Centre is using innovation to continually drive improvements with a real and lasting impact.

**// Professor Sir Robert Lechler,
Executive Director, King's Health Partners**

innovation

Foreword from our Biomedical Research Centres

It's been ten years since the National Institute for Health Research (NIHR) first established the Biomedical Research Centres (BRCs), a national network of clinical academic partnerships which turn scientific discoveries into medical advances for clinical practice.

We have the privilege of heading up two of the UK's NIHR BRCs at Guy's and St Thomas' and South London and Maudsley NHS Foundation Trusts which, with our academic partner King's College London, both form part of King's Health Partners Academic Health Sciences Centre.

It has been a great honour to have played a leading role in advances made in the last decade, seeing real examples of research moving out of laboratories and into the clinic.

At Guy's and St Thomas' BRC, our expertise in developing advanced therapeutics and experimental medicines has enabled us to develop a wide portfolio of clinical trials investigating conditions such as diabetes, head and neck cancers, liver and renal disease, and developing therapies that can prevent organ rejection following transplantation. The LEAP study of peanut allergy in children has led to a change in the official national feeding guidelines.

At the Maudsley BRC, we have pioneered new treatments for mental disorders and dementia – such as the surprising development of a new drug derived from one of the components of cannabis which shows great promise as a treatment for psychosis, and which is now being tested in large clinical trials. We've pioneered the use of informatics and artificial intelligence in health research, and we've developed a world-leading programme of research led by service users.

As part of King's Health Partners, we are fortunate to be able to exploit the connections and resources that being part of a wider research partnership offers to us, as well as the inspiring colleagues and shared research facilities offered by our individual NHS and academic organisations.

Moreover, the close relationship between our BRCs means that we are able to focus on some exciting new research priorities, in addition to continuing and expanding on what we've achieved in the last decade.

For both of our BRCs, it's become clear that understanding the interface between mental and physical health is a fundamental priority in improving our patients' health and wellbeing. We are uniquely placed to address this challenge together, and the funding we've received for the next five years will allow us to make a concerted effort to break new ground in this field.

At the Maudsley BRC, we'll be exploring how new technologies such as mobile devices and artificial intelligence can be used to improve people's mental and physical health, and how genomics can provide new insights into mental disorders. At the Guy's and St Thomas' BRC we will continue to conduct pioneering world-first clinical trials across all of our research areas, while also developing our state-of-the-art research infrastructure to better support our dedicated researchers to discover new disease biomarkers and develop innovative treatments for our patients.

Innovation is the lifeblood of our partnership. We must ensure that we continually seek to push the boundaries of science and work collaboratively to find new ways to improve the care and outcomes we provide to our patients.

**// Professor Matthew Hotopf and Professor Graham Lord,
Directors, NIHR Biomedical Research Centres**

innovation

Acute Mental Health

Improving mental health care for homeless people



01 In England over 1.2 million bed days were lost in 2013/14 across all physical and mental health hospitals due to people being unable to leave hospital for a range of reasons. This costs the NHS over £300 million per year. Individuals who are admitted to inpatient mental health wards who are homeless or have housing issues often have delayed discharges, resulting in 'bed blocking'. The annual cost of unscheduled care for someone who is homeless is eight times that of a housed person, which suggests a significant cost specifically associated with this client group.

The King's Health Partners Pathway Homeless Team was created after a Needs Assessment in 2012. Initially a pilot service run by Lambeth and Southwark Clinical Commissioning Groups (CCGs) in Guy's and St Thomas' and King's College Hospital it was expanded in 2015 to include South London and Maudsley. The team improve discharge planning for individuals with barriers around housing. The service aims to shorten inpatient hospital stays, provide longer-term support based around recovery and

independent living, and is cost effective to the trusts it operates in.

Since 2015 the service has seen patients with a variety of issues such as homelessness, hostel dwelling, temporary accommodation, squatting, sofa surfing, those at risk of eviction, missing people, and European Economic Area (EEA) and foreign nationals regardless of public funds entitlement. The team have accepted 201 referrals through to February 2017 with 136 patients having improved housing status upon discharge from the service. Of these, 50 patients were giving housing options, 50 were referred to supported accommodation and the rest were reconnected or repatriated to their local area.



Addictions

Diagnosing lung disease in drug and alcohol treatment services

02 Although smoking-related respiratory disease contributes to the excess mortality for people with drug and alcohol addiction, screening for lung disease is not routinely offered in community drug and alcohol treatment services. To address this unmet need, we established a pilot weekly drop-in Lung Health Clinic, a collaboration between Addictions and Respiratory Medicine at King's College Hospital.

The project aimed to improve the lung health of people who use drug and alcohol services in Lambeth by increasing recognition and documentation of signs and symptoms of respiratory problems, and by raising awareness of chronic pulmonary disease (COPD) and its connection with smoking among both service users and key workers.

As part of our service key workers have been trained to assess the lung health of service users and make appropriate referrals in light of screening results. A 'COPD checklist' was also created which assesses service users' lung health and asks about cough, smoking status (of

tobacco, heroin, crack or cannabis) and previous attempts to quit. Key workers are then prompted to refer service users for smoking cessation support and/or specialist assessment.

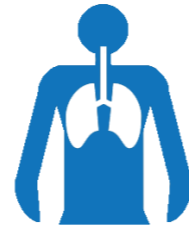
Between February 2015 and October 2016, 160 service users had lung health checks as part of the service. In the first year of the clinic 112 service users were seen. 81% currently smoked cigarettes and 11% were former cigarette smokers. 41% had previously attempted to stop smoking, 51% had not (8% had never smoked). Of the total, 20% had clinically significant breathlessness and 62% had a chronic cough. Only 5% had previously been given a COPD diagnosis. 36% had COPD - a diagnosis made following assessment in the clinic.

The project was named 'Most innovative collaboration' at the CLAHRC (Collaboration for Leadership in Applied Health Research and Care) South London' 2016 awards ceremony.

i n n o v a t i o n

Allergy, Respiratory, Critical Care, Anaesthetics and Pain

Improved clinical practice for severe COPD treatment



03

A recently completed clinical trial will lead to changes in clinical practice to improve the lives of patients after life threatening increases in the severity of chronic obstructive pulmonary disease (COPD) conditions.

COPD is the name for a group of long-term lung conditions that cause breathing difficulties. Globally COPD is responsible for an increasing proportion of deaths, and patients with the condition can experience potentially serious but unpredictable disease exacerbations. People with very severe COPD have a burden of disabling physical symptoms (especially breathlessness), compounded by comorbidity and psychological distress.

The team from our Lane Fox Clinical Respiratory Physiology Research Centre completed the trial that will lead to the changes in practice. The trial showed that the addition of home non-invasive ventilation to home oxygen therapy in severe COPD patients improves 12-month admission free survival, reduces 28-day readmission, improves gas exchange, reduces exacerbation frequency and enhances quality of life.

The data from the study is now part of a clinical pathway in the Lane Fox Respiratory Service. Patients with COPD, following a crisis admission, will now be followed up early in their treatment in a specialist 'HOT-HMV' (home oxygen therapy - home non-invasive/mechanical ventilation) clinic where patients will be assessed to determine if they would benefit from home non-invasive ventilation and home oxygen therapy.

The concept for the trial came from the Respiratory Global Medical Excellence Cluster meeting hosted at King's College London. Patients were recruited for the trial from 13 sites, including St Thomas' Hospital and King's College Hospital.



Behavioural and Developmental Psychiatry

Developing an adult autism spectrum disorder pathway

04

Autism Spectrum Disorder (ASD) costs the UK £32 billion annually, more than heart disease, cancer and stroke combined. The majority of this cost is attributable to adults who commonly have complex co-occurring mental health difficulties. In 2009 the UK government introduced the Autism Act to specifically ensure that adults with ASD get the help they need.

To address this, we have developed a unique pathway for adults with complex ASD. We start with the provision of gold standard diagnostic assessments and innovative adapted psychological treatments in the community. Our attention to the needs of our clients was recognised in 2017 when we received a National Autistic Society Autism Professional Award.

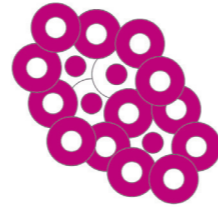
Our person centred approach extends to our specialist inpatient National Autism Service. Here we improve coping skills and daily living abilities of people with ASD and challenging comorbidities, according to individual need. We closely involve families and local teams to best support patients in their local

communities. The service was rated 'outstanding' by the Care Quality Commission (CQC) and has recently received accreditation from the National Autistic Society.

Our clinical work is informed and guided by evidence based research. Integrated within our service we host groundbreaking research into treatments for neurodevelopmental disorders by leading EU-AIMS (European Autism Interventions). This Europe-wide collaboration between clinicians, researchers and drug companies is the first to work closely with the European Medicines Agency to define outcome measures for clinical trials. This environment also provides an unmatched opportunity for medical students, MSc and PhD students to work alongside our clinicians and scientists to receive truly comprehensive exposure to translational medicine as part of a full and varied teaching programme.

i n n o v a t i o n

Cancer



Developing the new Cancer Centre

05

The development of the new Cancer Centre at Guy's, which opened in September 2016, is a perfect illustration of our partnership's innovative approach to achieving excellence.

To ensure that we were able to deliver the highest quality clinical care, research and education, we undertook a major programme of work to redesign care pathways for the different tumour groups around the needs of our patients. We also focused on providing an excellent environment in which to receive care, and set about consolidating as much holistic care as possible under one roof, alongside a research infrastructure to allow patients to easily participate in research with our scientists.

Guided by our patients, we became the first place in Europe to provide radiotherapy above ground level so that our patients have a light and bright environment where they receive treatment. We also provide psychological and holistic care through Dimbleby Cancer Care and our Gordon Survivorship Centre, ensuring a focus on mind, as well as body. The new Cancer Centre now

sits at the heart of a regional network providing care across South East London and beyond.

As both a Cancer Research UK Centre and a European Comprehensive Cancer Centre, the co-location of clinicians and scientists is absolutely integral to the new Cancer Centre. The ninth floor of the building is dedicated to an innovation hub focused on developing novel therapeutics and immunotherapies. By having clinical trials for cancer all concentrated in one building we now have patients, their bio-samples, clinicians, a trials unit, scientists and an engine room of research all coming together in one environment to feed the pipeline from the lab to the clinic and back to the lab again – one continuous and seamless pathway of research and clinical improvement.

Drawing on the collective strength of our four partners, not only are we improving cancer care now, we are also training the next generation of multi-professional cancer specialists and scientists.

i n n o v



Cardiovascular

Integrated heart failure care for our communities

06

In 2016 we launched a two-year project to develop an integrated heart failure service and test a new model of community working. The new service aims to improve quality of life for people living with heart failure through:

- Early and accurate diagnosis: less than 3,000 heart failure patients are known to services but estimated prevalence is 9,000 in Southwark and Lambeth
- Equitable access: evidence shows access to specialist care and evidence based treatment can halve mortality rates
- Good long-term condition management and patient centred holistic care: approximately 70% of local heart failure patients have three other comorbidities and about 30% of patients have depression or anxiety
- Unnecessary hospital admissions avoidance: admissions for heart failure are not only costly (making up about 2% of the NHS budget) but also have a detrimental impact on patients' quality of life.

In 2016 the project focused on joining up processes across our existing specialist

teams at Guy's and St Thomas' and King's College Hospital and linking with our academics to foster cross-site research and innovation. In January 2017 the Integrated Heart Failure service was officially launched with the introduction of five dedicated multidisciplinary teams for each of the Local Care Networks in Southwark and Lambeth. These local teams provide specialist support to primary care clinicians and other services.

The team have developed clear, easy to use pathway aids for the diagnosis and management of heart failure, simple medication prescribing algorithms (which have been adopted across South London), and a comprehensive education and training pack for generalists as well as patients.

The service addresses the physical, psychological and social needs of people living with heart failure and other conditions, from diagnosis to end of life. Recently the service has begun working with colleagues from South London and Maudsley to ensure unmet mental health needs are addressed for all patients, and are initiating work to provide integrated pathways for breathless patients.

a t i o n

Child and Adolescent Mental Health



Using web-based and wearable technology to improve care

The Centre for Interventional Paediatric Psychopharmacology and Rare Diseases at the Maudsley Hospital is a national specialist psychopharmacology unit which offers a visionary approach to helping children and young people with complex neurodevelopmental, genetic and neurodegenerative disorders. The Centre focuses on providing whole-person medicine and integrated mental and physical healthcare, using clinically cost-effective and innovative interventions alongside patient involvement.

We identified that many of our complex and treatment-resistant patients have emotional, behavioural and autonomic dysregulation (EBAD), especially those with rare diseases such as Rett Syndrome. To help address this, we have harnessed the potential of e-Health solutions. Web-based patient monitoring via the HealthTracker™ platform monitors specific symptoms related to the patient's medical and psychiatric conditions, psychotropic-induced side-effects, quality of life and patient experience. Biometric physiological data, captured using wearable sensor technology, provides real-time information on heart rate, skin conductance, blood volume pressure, perspiration and temperature.

The monitoring of real-time biometric physiological and web-based data and how they relate to medication use as well as external factors assists both personalised care and shared treatment decision-making. Our expertise and approach has allowed us to become the first UK centre to participate in a randomised clinical trial of a novel therapeutic agent in Rett Syndrome.

In people with intellectual disability, poor communication, and EBAD, capturing physiological responses using wearable technology allows for a biometric proxy measure that assists monitoring and improves treatment decision-making. Once the physiological dysregulation has been identified, our clinician teaches parents and carers how to use wearable technology to track changes that require intervention. They also learn to understand what activities produce physiological stress and what interventions help to normalise the physiological state. This allows for the development of 'biometric guided therapy', personalised stress management toolkits and targeted pharmacotherapy. The effectiveness of these innovations has been demonstrated through research studies published by the Centre.



Child Health

Unrivalled images of the fetal heart through 3D reconstructions

New MRI techniques to image the fetal heart are currently being developed at Evelina London Children's Hospital, in collaboration with King's College London and the iFind project. These techniques, unique to King's Health Partners, correct fetal motion to allow for detailed 3D reconstructions of the fetal heart whilst still in the womb, even when just a few centimetres in size.

These reconstructions have provided unrivalled images of the fetal heart and its vessels to plan care after birth. By combining these images with other advanced ultrasound and MRI methods to measure blood flow through the heart and lungs, the developing brain, and the placenta, a uniquely detailed anatomical and physiological profile of fetal cardiovascular systems can be generated for each patient. In addition, ethical approval is now in place to couple these methods with other novel non-invasive diagnostic tests and potential therapeutic approaches, such as maternal hyper-oxygenation.

These new techniques have an immediate clinical impact for conditions which have

traditionally been difficult to diagnose before birth, such as coarctation of the aorta, right aortic arch, and some forms of hypoplastic left heart syndrome, and are already helping to better inform pre- and postnatal management in some cases. To date the service has received nearly 100 referrals from within Guy's and St Thomas' and from other centres around the UK.

Our aim is to use these new methods not only to aid the antenatal diagnosis of severe congenital heart disease, but also, through close collaboration with both our fetal medicine colleagues and researchers at the Centre for the Developing Brain, to better understand how fetal and placental circulation can affect other aspects of long-term health, such as brain growth, neurodevelopment and long-term cardiovascular health.

i n n o v a t i o n

Clinical Neurosciences



Improving neurorehabilitation in South East London

09

Neurorehabilitation services play a vital role in supporting recovery from severe neurological illness or injury, including improving patients' ability to talk, walk and do everyday activities. During the last year we have been successful in enhancing both the clinical and academic components of this service.

During 2016 all three trusts in King's Health Partners developed a single overarching bid to the six Clinical Commissioning Groups (CCGs) in South East London for the increased provision of neurorehabilitation services. The bid was in response to a recognised unmet need and was based on each organisation's respective skills, capabilities and assets, to meet the requirements of commissioners and patients.

Our expanded service comprises of inpatient rehabilitation based at two sites (one at the Pulross Centre in Brixton and the other at Orpington Hospital) and a neuronavigation service for the six CCGs, with an underpinning integrated clinical pathway across mental and physical health, meeting British Society of Rehabilitation Medicine standards.

Neuronavigators support the patient journey from acute and level 1/2a services, through to community neurorehabilitation or community services in each of the six CCG areas. The neuronavigators work collaboratively so that all patients receive the same level of case management and signposting regardless of acute site or destination.

We have a strong focus on outcomes, so as well as collecting the UK National Dataset for Specialist Rehabilitation Services, we plan to collect outcome data which is meaningful to our patients, enabling an overarching evaluation of their rehabilitation journey from inpatient care to improved independence and participation in community.

Alongside this we are establishing a Brain Injury Neuropsychology Chair. This post will enhance the delivery of brain injury rehabilitation across South East London.



Dental

Device to detect untreated bacteria during root canal treatment

10

A new method of detecting bacteria during root canal treatments could eradicate the need for follow up appointments and prevent treatments from failing.

The SafeRoot device, created by a team of researchers at our Dental Institute, enables rapid bacterial detection inside the root canal, ensuring the procedure has been successful and thus reducing the need for tooth extraction or surgical intervention.

Root canal treatments remove bacterial infections from the root canal space, while retaining as much of the natural tooth as possible. Around a quarter fail over time due to secondary infections, and most procedures require one or two visits to the dentist.

During treatment, dentists remove infected material in the tooth and administer an antibacterial treatment. They then visually assess the canal to check if the infection has been removed, but cannot guarantee that treatment has been successful.

The SafeRoot device was created to detect any existing bacteria once the root canal

treatment has been completed, with the aim of eliminating persistent or secondary infections and reducing the need for further treatments. Through florescent dyes and fluorescence microscopy/spectroscopy, SafeRoot can optically detect minute amounts of residual live bacteria in the root canal space. During trials the team were able to successfully detect bacterial cells after just three minutes of testing.

SafeRoot is a collaboration between the Biophotonics Research group in the Dental Institute and clinical specialist endodontists in Guy's and St Thomas'.

i n n o v a t i o n

Diabetes, Endocrinology, Nutrition, Obesity, Vision and Related Surgeries

Using wearable technology to halt diabetes



King's Health Partners and Buddi Ltd., a high growth British technology company, were awarded a grant from Innovate UK, part of the Department for Business, Innovation and Skills, to collaborate in the development of nujjer, a digital diabetes prevention programme spanning mind and body care.

The programme combines a highly sensitive wristband, which enables tailored motivational feedback on individuals' unique data, a series of educational modules available within an app and personalised motivational messages. It aims to assess whether progression to diabetes can be halted and then sustained through the use of wearable technology and person-centred apps and messaging.

The programme began in September 2016 and is the first example of a commercial technology company working with the NHS to test prevention of type 2 diabetes using wearable technology in this way.

We are aiming to demonstrate that a wearable technological intervention coupled with personalised motivational information can reduce weight and increase physical

activity; the two important risk factors for type 2 diabetes.

The project is developed and grounded in a theoretical psychological framework and will include an element of Motivational Interviewing, a collaborative, goal-oriented method of communication which pays special attention to the language of change. It is designed to strengthen an individual's motivation toward a specific goal, such as reducing weight or increasing physical activity, by eliciting and exploring the person's own arguments for change.

In March 2017 nujjer was long-listed by Public Health England and NHS England for their evaluation of digital behaviour change interventions for those at high risk of type 2 diabetes.



Genetics, Rheumatology, Infection, Immunology and Dermatology

Working at the interface of immunology, genetics and cancer

Our Clinical Academic Group has responsibility for connecting clinical genetics with clinical research across our partnership. We play a central role in the South London NHS Genomic Medicine Centre, part of the 100,000 Genome Project. We are using DNA sequencing to identify genetic variants associated with rare diseases and cancers, providing new insights into disease causation, diagnosis, and management and have developed an innovative Genomic Medicine MSc, delivered with colleagues at St George's, University of London.

We have also worked with the Cancer Clinical Academic Group to establish a new Centre for Inflammation Biology and Cancer Immunology (CIBCI), focusing our research and clinical care at the interface of immunology, genetics and cancer.

Many cancers (estimated at 20%) have an inflammatory cause. Hepatitis is a common prequel to hepatocellular carcinoma, while inflammatory bowel disease (IBD) substantially increases disposition to colorectal carcinoma. While we have a range of clinical and research programmes devoted to understanding inflammatory diseases, they have not

previously extended into cancer. At the same time, there has been a significant increase in cancer research focused on immunology, with T lymphocyte-based immunotherapy achieving remarkable durable cure rates in advanced melanoma and lung cancer patients that had previously been resistant to treatments. Advances in immunotherapy have however come at a cost. Because the brakes have been taken off the immune system, many patients are developing severe inflammatory diseases.

This combination of momentum and challenge obliges our immunologists and oncologists to work together to achieve even greater advances. We are superbly equipped with research programmes in immunology, infectious disease and genetics that can define pathways by which the immune system might be better equipped to recognise and control cancer and attend to any adverse effects.

The Centre has no obvious equivalent in the UK, and we have already received backing from Cancer Research UK and Arthritis Research UK. Our hope is that the Centre emerges as a national model of integrated interdisciplinary research, education and clinical care.

12

i n n o v a t i o n

Imaging and Biomedical Engineering

Transforming Outcomes and Health Economics through Imaging



13 Transforming Outcomes and Health Economics through Imaging (TOHETI) is a four year programme for Lambeth and Southwark to develop a vision for the future of imaging with patient experience and outcomes at its core. By integrating academic research with service improvement, TOHETI aims to show how imaging can be used more proactively and effectively as a diagnostic and therapeutic tool and contribute to cost-effectiveness.

Working with teams in Guy's and St Thomas' and King's College Hospital, five research studies are underway focusing on changing the way we use imaging in the diagnosis and treatment of scaphoid fracture, chronic headache, colorectal cancer, acute chest pain and lung cancer. In addition, we are exploring opportunities to work with colleagues in South London and Maudsley to build on our lung cancer work exploring heightened risk associated with long-term drug abuse.

TOHETI has facilitated service improvement work in areas including breast cancer, prostate cancer, uterine

fibroids, treatment of metastatic bone disease, small renal tumours, oesophageal stents and streamlining patient preparation for CT colonography.

TOHETI won the Patient Safety Champion Award at the 2016 South London Innovation and Diffusion Awards for work in listening to, and empowering women who have uterine fibroids. Patients stressed the need for more and better information, resulting in the development of a film and new patient resources.

The installation of two CT scanners and a 3T MRI scanner coupled with the new technologies of PET-MR and MR-guided High Intensity Focused Ultrasound has increased imaging capacity across the partnership, engaged and motivated staff, and enabled TOHETI research.



Liver, Renal, Urology, Transplant, Gastro/Gastro Intestinal Surgery

First robotic kidney surgeries in the UK

14 Our Clinical Academic Group carried out the first robotic kidney transplants in the UK. This has allowed kidney transplant operations to be performed in a minimally invasive fashion for the first time and the team have been impressed by the speed of recovery and quick discharge of patients after surgery.

The team were supported by Professor Pranjali Modi, Institute of Kidney Diseases and Research Centre, Ahmedabad, India, who has carried out more than 250 laparoscopic robot-assisted kidney transplants.

The successful introduction of this programme is likely to have a significant impact on transplant surgery in the UK by improving recovery times with consequent benefits to patients.

Guy's Hospital was the only hospital in the UK to be involved in a Worldwide Robotic Surgery 24 Hour Event in November 2016, which saw 14 of the world's leading global robotic centres broadcast pioneering operations to around 27,000 health professionals

watching online. The featured operation was the first live robotic partial nephrectomy in the UK.

Guy's and St Thomas' carries out the most robotic operations in the UK, with around 450 cases a year. Robotic surgery is commonly used for prostate, bladder and kidney removal, requiring collaboration between staff from multiple specialties across the Clinical Academic Group.

We are investigating new developments in advanced robotic tools for minimally invasive surgery through our involvement with STIFF-FLOP (stiffness controllable flexible and learnable manipulator for surgical operations), an £8 million multidisciplinary, cross-site, EU funded project. We also continue to develop our education provision, training specialist trainees and Fellows from the UK and across the world.

i n n o v a t i o n

Medicine



Improving the safety of catheter care

15

Urinary catheterisation leads to risk of catheter-associated urinary-tract infections (CAUTI), one of the most common hospital acquired infections. It can also lead to complications such as haemorrhage, blockage, trauma and, particularly for older people, delirium, falls and sepsis. This can result in reduced independence and emergency admission to hospital, as well as prolonged hospitalisation and sometimes death.

We developed a catheter safety programme, "No Catheter, No CAUTI", and worked as a collaborative using the 'breakthrough' method with the Health Innovation Network (the HIN - our Academic Health Science Network partner) to spread this to our partners in South London. We provided a safety bundle to reduce unnecessary use of catheters and improve discharge of patients with catheters using a catheter passport.

My Catheter Passport is a patient document full of useful information and key contact details for people with catheters to support them to live as independently as possible with their catheters, and know

what services can support them, including out of hours. It also allows the sharing of catheter care plans between health and social care professionals in hospital and the community, ensuring there is an up-to-date record that is easily accessible. The Passport was developed by staff at King's College Hospital, Guy's and St Thomas', primary care colleagues, and was co-produced with patients supported by AgeUK.

The Passport is just one of a number of interventions that we are working with the HIN to spread across South London as part of our catheter campaign. Our collaborative approach means that we are able to reach not just hospitals and GP practices, but care homes and community settings as well.

Since our work to improve catheter care started, data monitoring using the NHS Safety Thermometer has shown a 30% reduction in CAUTIs in our hospitals. We hope that our work will continue to support the safe and appropriate use of catheters, not just across South London, but nationally.



Mental Health of Older Adults and Dementia

Improving the quality of our dementia care

16

We are committed to developing innovations to continually improve the quality of dementia care we provide.

We have commenced the development of an informatics platform for use in dementia diagnosis services to streamline information gathering through a tablet-based records interface. We will build on this through the wider development of the HealthLocker personal health record portal at South London and Maudsley.

We are also utilising our partnership's Centre for Translational Informatics framework, through which we have overseen the development of MedCheck, an app which allows medications to be entered and automatically rated on their anticholinergic properties. This is an important consideration when the medications are being taken by people with newly-diagnosed dementia.

The development of our staff is a vital part of ensuring high quality dementia care. We mapped existing training on dementia provided to staff against the competencies for effective dementia care listed in the Health Education England

(HEE) Dementia Skills Framework. It is now clear for each member of staff how to access training to meet each of the HEE competencies and our training sessions have been adapted to address the new HEE framework.

Prototype versions of the information gathering platform and Medcheck app are now complete and ready for incorporation and pilot application in routine care. The Medcheck app has substantial potential for expansion (such as to other medication properties, and potentially to other age-associated disorder groups) and for commercialisation which is being explored. Informal feedback from a recent Care Quality Commission (CQC) visit on the level of acute inpatient staff skill and knowledge of dementia was very positive, and the CQC noted a marked improvement since a previous visit 18 months earlier.

i n n o v a t i o n

Orthopaedics, Trauma and Plastics



Redesigning fracture pathways to improve outcomes



Patients with hip fractures represent a high-risk group. The average patient is an 84-year-old with complex physiological and social care needs. The patients' fragility often amplifies their acute vulnerability and they are recognised as having the second highest 30-day mortality rates following emergency admissions. The UK annual incidence of patients with hip fractures is projected to rise to approximately 90,000, which will be matched with an increasing annual expenditure of £2.2 billion by 2020.

Recognising the high mortality rates and associated costs of care, we redesigned the Fractured Neck of Femur (NOF) Pathway in line with value based healthcare methodology. Value is defined as outcomes achieved relative to the costs it takes to deliver them. The outcomes measured are those that matter to the patient over the whole pathway and are standardised to meet national measures.

Understanding the patients on this pathway presented an opportunity to re-orientate the delivery of care from fragmented, inconsistent pathways to

focusing on the specific needs of the patient group. An Integrated Practice Unit was developed which managed patients on a condition basis. Specialist care provided by a multidisciplinary team of orthogeriatric physicians, surgeons, clinical nurse specialists, physiotherapists and others wrapped the patients in care that was most suited to meeting their needs. NOF patients are now managed along consistent, best practice pathways.

Following the implementation all key performance indicators, including time to surgery and length of stay improved. Mortality rates fell from over 10% to under 5%, which pushed one of our hospitals from being an outlier to joining leading peers at the top of national rankings for this service. It is estimated that cost savings from providing care in the new format could generate up to £1.5 million each year. This value driven approach demonstrates how re-orientating the service towards the needs of the patients can drastically improve outcomes, while also being cost effective.



Palliative Care

Measuring what matters most to patients

In palliative care, standard clinical measures such as mortality, health status or test results, are often not relevant. Measures of more intangible aspects such as quality of life, outcomes and quality of care are needed. Our Cicely Saunders Institute is leading the advancement and implementation of valid and reliable patient-centred outcome measures (PCOMs) for palliative care, to capture what matters most to patients and their families, and to aid clinical screening, assessment and monitoring. This is being achieved via an innovative programme of research and education developed and delivered across our partnership.

PCOMs are important as they help to:

- inform clinical practice and improve individual patient care
- enable quality improvement
- enhance planning, commissioning and service delivery.

Our Palliative care Outcome Scale (POS) family of measures are freely available online and we have now validated the shorter Integrated-POS (IPOS), which

measures physical and psychosocial problems and concerns.

In 2016, we completed a major three-year project, the Outcome Assessment and Complexity Collaborative (OACC). This not only saw the adoption of routine outcome measurement in nine hospital and community palliative care services across South London, but also strongly influenced national change. Our OACC outcome measures have been recommended by Public Health England and NHS England, and have been widely adopted by palliative care providers in the UK.

Integral to our success were clinical academic partnerships to develop and deliver comprehensive OACC resource packs disseminated to 220 services nationally, and an OACC training package. We also support the implementation of IPOS internationally, with 16 new translations and cultural adaptations underway. In 2016, IPOS was adopted across the New York State healthcare delivery system and was recommended in the Australian Government's national 'Advance Project' for palliative care.



innovation

Pharmaceutical Sciences

Partnership working for drug innovations



Our four pharmacy teams work in unison to deliver joined up teaching and research, collaborating with clinical academic teams across our partnership to provide improved care for our patients and service users.

Working with the Addictions Clinical Academic Group, we have developed and patented a buccal formulation of the opiate antagonist naloxone. The formulation is intended to be used as a fast-acting rescue medication for people experiencing opiate overdose and it is hoped it will replace the current somewhat unreliable nasal spray and the cumbersome injectable form. Human volunteer trials are about to start on this project.

With researchers from our Psychological Medicine and Integrated Care Clinical Academic Group and Imperial College London, we have formulated and trialled psilocybin (the active ingredient in Magic Mushrooms) in refractory depression where it has shown unparalleled acute and chronic activity. We have also begun formulating s-ketamine as a nasal spray for the treatment of refractory depression.

We work closely with our Psychosis Clinical Academic Group, developing formulations of cannabidiol (a constituent of cannabis) for investigational use in the treatment of psychosis. Cannabidiol has antipsychotic properties whereas THC (tetrahydrocannabinol, another constituent of cannabis) causes psychosis. With the Psychosis Clinical Academic Group we are currently analysing seized samples of cannabis to determine the concentrations of THC and cannabidiol. Our aim is to link the rising incidence of cannabis-induced psychosis to the increasing predominance of THC in illegally grown cannabis.

These collaborations illustrate the potential for further cross-partner working which fully utilises the varied expertise available within King's Health Partners.



Psychological Medicine and Integrated Care

Integrating mental and physical healthcare for outpatients

IMPARTS (Integrating Mental and Physical health: Research Training and Services) is a flagship King's Health Partners project hosted in the Psychological Medicine and Integrated Care Clinical Academic Group. IMPARTS provides a platform to allow outpatient services provide better integrated mental and physical healthcare.

It explicitly addresses the tripartite mission of King's Health Partners, and leverages our strengths in informatics. IMPARTS is now active in more than 40 services across our partner trusts, and more than 15,000 individuals have taken part.

The IMPARTS platform consists of five components:

1. Informatics: patients attending clinics use an electronic tablet device to enter data about their clinical state, which is uploaded in real-time to their electronic health record and made available to their clinician. Information on physical conditions is combined with measures of depression, anxiety and smoking
2. Pathways: we work with the service to

define care pathways, making best use of what is already there and helping improve provision of mental health where needed

3. Training: we work with clinical teams to provide a bespoke training package delivered by a clinical psychologist over several sessions. We also provide a five-day MSc level training course in mental health skills for all clinical staff
4. Self-help materials: we work with services and patients to co-design self-help materials for common problems experienced by individuals with a chronic condition, several of which have been adopted by national charities
5. Research: our data forms a research database and we routinely gain patient consent for participation in future research projects.

The IMPARTS programme has been recognised in several national competitions, receiving a BMJ award for best dermatology service through our use of IMPARTS, being highly commended in the Positive Practice in Mental Health awards and shortlisted in the HSJ awards.

innovation

Psychosis

Improving patient mortality rates through smoking cessation



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Although the prevalence of cigarette smoking has been progressively declining in the general population, it is unusually high among patients with psychosis: 60% are regular smokers. Life expectancy of our patients is 15-20 years shorter than the general population. Cigarette smoking is the single largest contributing factor and is also the factor most amenable to change.

In collaboration with the Addictions Clinical Academic Group, we have pioneered the assessment and treatment of physical health problems in psychosis, with a particular focus on cigarette smoking. Tobacco use is carefully assessed in every new patient. Patients who smoke are provided with a programme of information and advice, with referral to smoking cessation services. All wards and community facilities in South London and Maudsley, where our group is based, have been smoke-free since 2014.

Smoking cessation interventions that are effective in the general population may be less effective in patients with

psychosis. Psychosis involves changes to the chemistry of the brain which may make it harder for patients to quit. Psychosis is also associated with a loss of motivation, normally a key determinant of success in smoking cessation.

We therefore sought to employ innovative approaches to reducing tobacco use. We have recently completed a clinical trial of electronic cigarettes where we assessed the effects of providing patients who were regular smokers with free electronic cigarettes for six weeks. Over this period, there was a significant reduction in both the number of cigarettes smoked and in the levels of expired carbon monoxide.

This innovative harm-reduction approach may provide a way of reducing cigarette use in patients with psychosis, and thereby improve their long-term physical health.



Women's Health

Helping surgeons perform safer caesarean sections

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Delivering a baby by caesarean can be more difficult if done in the late first or second stages of labour. The difficulty arises because the baby's head is positioned much lower down, making it harder to get to. This is made even trickier because the contraction of the womb creates a partial vacuum between the mother and the baby's head. The contractions act like a suction cup removing air, meaning the baby's head can get stuck and to deliver the baby, the surgeon must release this vacuum.

This complication affects up to 50,000 women every year and makes it much harder for the surgeon to safely remove the baby. We have developed a novel method to release the baby's head and assist delivery. The device, the Tydeman Tube, is inserted vaginally and allows the passage of air around the baby's head, alleviating the partial vacuum. This method also ensures elevation of the head without the need for vaginal examination, and pressure is spread over a larger surface area.

Development of the Tydeman Tube was supported by intellectual property and commercial research teams. Industry links were formed with Silicone Altimex who produced a prototype, and after minor modification, manufactured the initial Tydeman Tube. Academic, statistical support and advice was provided by our Division of Women's Health at King's College London. Medical physics approved the use of the device in trust controlled circumstances and provided evidence of efficacy and enabled initial assessment and attainment of pilot data for future academic collaborations.

Results of the initial experiences have been published, funding opportunities for a definitive trial are currently being sought and commercialisation of the Tydeman Tube is in progress.

i n n o v a t i o n

King's Health Partners

We bring together:

- three of the UK's leading NHS Foundation Trusts
- a world-leading university for health research and education
- 4.2 million patient contacts each year
- more than 36,000 staff
- more than 25,000 students
- a combined annual turnover of £3.1 billion
- services provided across central and South London and beyond, including nine mental health and physical healthcare hospitals and many community sites
- a comprehensive portfolio of high quality clinical services with international recognition in cancer, diabetes, mental health, regenerative medicine, transplantation, cardiac and clinical neurosciences
- a major trauma centre and two hyper-acute stroke units.

About us

King's Health Partners Academic Health Sciences Centre brings together one of the world's top research-led universities, King's College London, and three of London's most prestigious and highly regarded NHS Foundation Trusts – Guy's and St Thomas', King's College Hospital and South London and Maudsley.

Our partnership provides a powerful combination of complex clinical specialties that cover a wide range of physical and mental health conditions and a breadth of research expertise that spans disciplines from medicine and biomedical sciences to the social sciences and humanities.

There are three parts to our mission: excellence in research, education and clinical care.

To support our mission, we are delivering programmes of work to:

- join up mental and physical healthcare so that we treat the whole person, mind and body
- increase the value of the care we provide and the outcomes we achieve for our patients and service users
- integrate care across local primary, secondary and social care services to make it easier for people to get the care and support they need
- improve the public health of our local community by tackling inequalities and supporting people to live healthy lives
- bring together our collective strength and expertise in a range of specialist areas to deliver world-leading care, research and education.

We are uniquely structured to deliver our mission for excellence. Our Clinical Academic Groups (CAGs) bring together all the clinical services and staff from the three trusts with the relevant academic departments of King's College London.

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For more information:

King's Health Partners
Ground Floor, Counting House
Guy's Hospital
London SE1 9RT

Phone: 0207 188 2892

Email: kingshealthpartners@kcl.ac.uk

kingshealthpartners.org
[@kingshealth](https://twitter.com/kingshealth)