International Innovation speaks to the heads of each of the NIHR’s eight Healthcare Technology Co-operatives (HTCs) – centres of expertise in the development of new medical devices, healthcare technologies and technology-dependent interventions that improve treatment and quality of life for patients.
BRAIN INJURY HTC

Clinical Director: John Pickard

The NIHR Brain Injury HTC is dedicated to identifying areas of unmet need amongst patients of all ages with brain injury. The HTC works with patients, carers, the NHS, charities, academia, inventors and SME’s to develop new medical devices, healthcare technologies and technology-dependent interventions with high potential for improving quality of life and the effectiveness of healthcare services. The HTC provides a ‘go-to’ centre of expertise for understanding of the care pathways, including market size based on unique registries, clinical research networks, innovation pathways, funding landscapes, roadmapping, regulatory frameworks, public and patient engagement, patient-centred design, early phase evaluation and rapid response consultants.

An Innovate UK-funded collaborative research project between the Brain Injury HTC, a consortium of seven organisations and DAMSEL (Detection and Assessment of Malignancy by Symptom Evaluation) will seek to establish a high-resolution neuro-oncology dataset from initial referral onwards, with a view to improve service delivery, care quality monitoring and drive further research into early diagnosis.

www.brainhtc.org

CARDIOVASCULAR HTC

Clinical Director: Reza Razavi

The NIHR Cardiovascular HTC was established to identify, encourage and facilitate the development of new medical devices and technology-driven solutions to improve the diagnosis, treatment and wellbeing of patients with heart disease. We bring together clinicians, researchers and companies with patient input to focus on improving healthcare for sufferers of heart disease. The HTC covers all aspects of heart disease with four focus areas:

- Atherosclerosis – narrowing of the arteries due to fatty deposits
- Cardiac arrhythmia – heart beats too fast, slow or irregularly
- Heart failure – heart pumping inefficiently
- Structural heart disease – abnormality/defect in the heart

We have taken a research idea for treating arrhythmias, combined state-of-the-art medical technology with newly developed instrumentation and software, and progressed this idea to a treatment now reaching first-in-man trials. This is all in partnership with two companies – one of which is a start-up.

www.guysandstthomasbrc.nihr.ac.uk/Professionals/NIHRHTC/TheNIHRHealthcareTechnologyCooperative.aspx
**ENTERIC HTC**

Clinical Director: Charles Knowles

The NIHR Enteric HTC opened in 2007 and develops technology to improve the quality of life of patients with chronic bowel disorders. We develop innovative solutions and trial them within our well-developed research network. We currently have over 20 active projects, 100 industrial partnerships and countrywide clinical collaborators, and have leveraged £5 million in grant income since our inception.

This Co-operative focuses on unmet clinical needs such as bowel incontinence, severe constipation and problems arising from fistulas and stomas. The Enteric HTC continually 'horizon scans' for new technologies in this clinical sector, carrying out clinical trials via our academic and clinical network, and seeking industrial partners. Our well-developed Patient and Public Involvement project is crucial to the decision making and execution of this strategy. Stoma construction is a routine surgical procedure (100,000 patients in the UK) and herniation around the stoma is not only extremely common but may cause significant morbidity. 'SMART' is designed to prevent the complication by reinforcing where the bowel exits through the abdominal wall. The technique uses a special stapling gun and is the subject of a multicentre (n=12) randomised controlled trial to establish whether the pilot data is reproducible on an international scale.

www.bowelfunctionhtc.org.uk

**MINDTECH HTC**

Clinical Director: Chris Hollis

The NIHR MindTech HTC, hosted by Nottinghamshire Healthcare NHS Foundation Trust, aims to develop technology for mental health, neurodevelopmental disorders and dementia. MindTech comprises a range of clinicians, academics and technology experts as well as an active patient reference group. The Co-operative works closely with NHS organisations and service users to identify and understand unmet needs. We also work with industry to develop, test and implement technologies that aim to address these needs. The most promising technologies are showcased at our annual national symposium (this year’s event takes place on 3 December 2015).

Examples of current industry projects include: an evaluation of an objective test of activity and attention for diagnosis of attention deficit/hyperactivity disorder (with QbTech); the development of a new avatar-based psychological therapy for children and young people (with ProReal); and the development of a digital platform to support treatment for Tourette syndrome (uMotif).

www.mindtech.org.uk

**COLORECTAL THERAPIES HTC**

Clinical Director: David Jayne

The NIHR Colorectal Therapies HTC is a national network bringing together academics, clinicians, commercial partners, and patient and public representatives to develop novel solutions to unmet needs in colorectal disease and to facilitate pull-through into clinical practice. Colorectal disease represents a significant healthcare burden to the NHS, encompassing many common infective, inflammatory and malignant conditions. The HTC’s scientific interests in engineering, nanotechnology and biosensing are disciplines that can bring innovation to change the way that colorectal disease is treated.

Through a series of roadshows and interactive events, the HTC has developed a network of ‘hubs’ across the NHS that brings interested parties together to exchange ideas and stimulate collaborative research, primed by small proof of concept funding. An exemplar project is the collaboration with E&B Devices to develop a novel chemiluminescent test for bowel cancer that circumvents many of the patient compliance problems with current faecal occult blood test sampling.

www.colorectal.htc.nihr.ac.uk

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**HTC objectives**

The eight NIHR HTCs:

- Help the NHS to ‘pull through’ the development of new medical devices and technologies into clinical practice
- Focus on clinical areas and/or themes of high morbidity
- Work collaboratively with industry, charities and patients
TRAUMA MANAGEMENT HTC

Clinical Director: Thomas Clutton-Brock

The NIHR Trauma Management HTC is hosted by the University Hospitals Birmingham NHS Foundation Trust and is led by Dr Tom Clutton-Brock. The aims of this HTC are to reduce the mortality, pain and suffering, loss of dignity, length of hospital stay and long term disability and dependency associated with all forms of trauma. Four research themes identify the unmet need in trauma along the patient journey: immediate care, secondary care, regeneration and rehabilitation. Trauma Management brings together clinicians, academics, patient groups, charities and industry to develop new medical devices and technology-dependent interventions; supports grant applications; and provides intellectual property protection, prototype development, advice regulations and device usability studies.

Working with ViVO Smart Medical Devices Ltd, the NIHR Trauma Management HTC is developing the translation pathway from proof-of-concept to CE marked device for the Pupiloscope® device. The device is a handheld, affordable pupil reaction monitor that will enable medics to detect the onset of traumatic brain injury.

www.trauma.htc.nihr.ac.uk

DEVICES FOR DIGNITY HTC

Clinical Director: Wendy Tindale

Devices for Dignity (D4D) is a national initiative funded by NIHR that drives innovative new products, processes and services to help people living with long-term conditions preserve their dignity and independence. Working with inventors, clinical and healthcare staff, industry, academics, charities, the public and patients, D4D brings real solutions to areas of unmet clinical and patient need. Our work focuses on four key areas: renal technologies, assistive and rehabilitative technologies, urinary continence management, and paediatric technologies. D4D supports the adoption of new technologies and treatments into practice more quickly, improving healthcare quality and wellbeing for patients.

The current portfolio comprises more than 30 research and innovation projects, including the development of an innovative neck collar for patients with neck muscle weakness, the re-purposing of an inexpensive hand-held point of care blood analyser for measurement of potassium and the development of soft robot technologies needed to delivering wearable intelligent assistive clothing to enable people with mobility impairments and other disabilities to move unaided more easily.

www.devicesfordignity.org.uk

WOUNDTEC HTC

Clinical Director: Peter Vowden

The management of wounds is a major economic burden on healthcare providers as well as having a significant impact on the quality of life of patients and carers. One of the aims of the NIHR WoundTec Healthcare Technology Co-operative is to act as a platform for innovation, identifying and supporting the development of promising concepts for medical devices that have potential to fulfil unmet needs, thereby improving the lives of patients and carers and reducing the financial cost of delivering wound care.

To carry out these aims, NIHR WoundTec HTC is working through a formal collaboration between strategic partners and a network of key stakeholders (patients, patient groups, charities, academics and industry). WoundTec HTC commissioned a health economic study of 2,000 patients (data obtained from the THIN database) examining the resource use and financial burden of wounds on the NHS. The study will provide a much needed insight into how wounds are currently being managed in the NHS. The study is in the process of publication in a peer reviewed journal.

www.woundtec.htc.nihr.ac.uk